



Proposal

Hampton Roads Sanitation District

High Priority Inflow and Infiltration Reduction Program

CIP No. GN020300

May 2024



HRSD

Katrina Davis, *Engineering Department Contract Specialist*
1434 Air Rail Avenue
Virginia Beach, Virginia 23455
Email: kndavis@hrsd.com

May 17, 2024

Re: High Priority Inflow and Infiltration Reduction Program

Dear Ms. Davis and the HRSD Selection Committee:

Arcadis is pleased to present our proposal to deliver on your High Priority Inflow and Infiltration (I&I) Reduction Program. Thank you for considering us for this important collaborative delivery project!

The keys to delivering success for this Program include:

- A clear understanding of objectives and the critical success factors needed to achieve the Consent Order goals.
- An experienced team that are both thought leaders in the I&I industry and are hands-on field/construction practitioners, led by nationally recognized experts who work alongside the team in the office AND in the field.
- Proven practices and methodologies customized for this specific assignment that will be further adapted as necessary to maximize effectiveness and minimize cost based on the results of completed Program work.
- Communicating with stakeholders to gain insight to maximize the effectiveness of the investment while avoiding inconveniences and negative impact on the public.
- Leveraging our extensive collaborative delivery experience on I&I removal projects to bring best practices and lessons learned for HRSD's benefit.

Our proposal is offered as requested by HRSD. In Part 1, Arcadis demonstrates our unmatched experience on programs and projects just like this one, delivered by the team that we offer to HRSD for this Program. Our expertise was built on I&I projects delivered through traditional, design-bid-build implementation but we moved to collaborative delivery for this type of work 12 years ago, and have enjoyed our greatest I&I successes using collaborative design-build. Arcadis highlights five such projects that are very similar in scope to your program and were delivered using engineer-led, collaborative delivery where Arcadis was the general contractor and sole source of responsibility. We offer the same to HRSD for this Program.

1. Sand River Basin Sewer Rehabilitation Program – EPCM, City of Aiken, Aiken, SC.
2. River Valley Highlands Sewer Rehabilitation – Design-Build, City of Lancaster, Lancaster, OH.
3. Sullivan's Island Sewer Rehabilitation Program – CMAR, Town of Sullivan's Island, Sullivan's Island, SC.
4. Virginia Beach Basin 340 Sewer Rehabilitation – Design-Build, HRSD, Virginia Beach, VA.
5. Baxter Healthcare – North Cove Sewer Rehabilitation Program – EPCM, Baxter Healthcare, Marion, SC.

We hope you concur that our collaborative delivery experience is a true differentiator from our competition.

Part 2. offers our thoughtfully prepared team and organization structure. They have worked as a team for more than 20 years for many different clients, on exactly this type of Program. Everyone knows and likes their role on the team and HRSD will know clearly who does what. Our subconsultant partners are primarily included as value added resources that HRSD knows and trusts and results in a "deep bench" of I&I professionals to deliver quality, on time, outmatching the aggressive schedule under Arcadis' direction.

Another Arcadis differentiator from our competition is that our team includes "road warriors" that travel to these projects with our team leaders. Our proposed Project Manager will be your single point of contact and Arcadis will be the single responsible and accountable party to HRSD.

Part 3. describes our four-pronged approach to delivering this Program. The four-prongs include:



1. An aggressive, early program element aimed at locating and removing primary sources of inflow from manholes and cleanouts in the 19 identified, High Priority Project (HPP) catchments.



2. A Fast Track program element to begin removing I&I from the “low hanging fruit” HPP catchments within six months using Arcadis’ Expedited Holistic Rehabilitation approach for comprehensive rehabilitation of public-side mains, taps, and risers.



3. Detailed existing data review followed by effective Sanitary Sewer Evaluation Studies (SSES) fieldwork in the areas with substantial private systems to discern between public and private wet weather contributions and then systematically remove these expected significant contributors of excess flow.



4. Recalibrating sewer system modeling in concert with HRSD, supporting this recalibration with flow metering and rain gauge data, completing RDII evaluations, and then potentially adding missed HPP areas outside of the 19 HPP areas.

The four-pronged approach is an Arcadis differentiator, offering a comprehensive strategy that establishes a current baseline condition through model calibration with current data, addresses the typical “bad actors” including private systems, cleanouts, risers, and manhole chimneys, tackles the HPPs in a logical fashion, and considers the addition of other HPP areas to deliver the I&I removal percentages. To meet the target removals on schedule, the four prongs will be delivered simultaneously.

Part 4. is our attestation that we have not, and will not, organize or create exclusive relationships with specialty sewer rehabilitation service providers and subcontractors for this Program. Part 5. is our acceptance of the proposed contract terms and conditions with some narrative to consider additions or edits that may benefit the Program. Part 6. is the Appendix and includes resumes for our proposed team members and an initial schedule.

In closing, we trust that our proposal demonstrates that Arcadis will deliver:

- The best team for the Program, led by a hands-on, nationally recognized Program Leader, that has worked together for over a decade and recognizes that it takes methodical field work to deliver success.
- The only team that has a substantial, proven track record of delivering I&I Removal Programs using engineer-led collaborative delivery. Our clients enthusiastically and openly speak about our excellence in delivering success including our proven cost estimating and cost delivery track record.
- An approach that is comprehensive, timely, and cost sensitive, matching the commitment of HRSD’s financial resources with the rehabilitation areas and types that will deliver the reductions most cost effectively and ahead of schedule.
- A track record of success backed by an unmatched number of published case study proofs demonstrating significant wet weather flow reductions using the full suite of rehabilitation technologies across a broad range of rainfall induced infiltration and inflow types/sources.
- A Program that attracts out-of-area specialty contractors necessary to get this specialized work constructed in less than four years and needed to ensure longevity and effectiveness.
- A long-standing leadership team that has delivered this type of work many times before with innovation to meet project specific engineering and construction needs.
- An established Road Warrior team augmented by local staffing that accounts for the huge amount of field work needed, and the multiple simultaneous parallel paths needed to deliver this Program.

We’re excited about doing this Program and look forward to meeting with you to further demonstrate why Arcadis is the right choice for HRSD.

Very truly yours,

Arcadis U.S., Inc.

James Shelton, PE
Vice President Buried Infrastructure & Program Project Manager
✉ james.shelton@arcadis.com | ☎ 302.723.1450

Travis R. Davis
Program Executive and Locality Liaison
✉ travis.davis@arcadis.com | ☎ 757.652.5026



Table of Contents

PART 1. Experience of Private Entity

PART 2. Proposed Organization and Experience of Private Entity and Subconsultants for this Program

PART 3. Program Understanding and Technical Approach

PART 4. Commitment by the Private Entity Not to Create Exclusive Relationships with Subcontractors or Specialty Firms, or Refusal to Make Such Commitment.

PART 5. Acceptance of HRSD's Proposed Terms and Conditions

PART 6. Appendices

Acronyms and Abbreviations

ACOIT: Arcadis cleanout inspection tool

AMHIT: Arcadis Manhole Inspection Tool

BINGO: buried infrastructure guaranteed outcome

BOR: basis of rehabilitation

CIPLL: cured in place lateral lining

CIPPR: cured in place point repair

EHSR: expedited holistic sewer rehabilitation

I&I: infiltration and inflow

IDR: inspectors daily reports

LACO: lateral accessed via cleanout

LEET: low end element technique

LFC: lid:frame:chimney

LFD: longitudinal fracture defect

LHM: local hydraulic model

LTC: lateral tap connection

MLJ: main line joint

PIPPT: pay item progress payment tracker

RDII: rainfall induced infiltration and inflow

RII: rainfall induced infiltration

SPT: soft packer technique

SRP: source reduction program

SSO: sanitary overflow

SSES: sanitary sewer evaluation surveys

RHM: regional hydraulic model

This proposal and its contents shall not be duplicated, used or disclosed in whole or in part for any purpose other than to evaluate the proposal. This proposal is not intended to be binding or form the terms of a contract. The scope and price of this proposal will be superseded by the contract. If this proposal is accepted and a contract is awarded to Arcadis as a result of or in connection with the submission of this proposal, Arcadis and/or the client shall have the right to make appropriate revisions of its terms, including scope and price, for purposes of the contract. Further, client shall have the right to duplicate, use or disclose the data contained in this proposal only to the extent provided in the resulting contract.



Part 1.

Experience of Private Entity



Part 1. Experience of Private Entity

Part 1.A. Demonstrated experience on similar, completed projects.

Below is demonstrated experience of our team's similar, completed RDII reduction projects not delivered as collaborative delivery.

Requested Information

Owner Reference: Robert Roff, Operations Manager, T. 302.395.5868, E. RRoff@nccde.org

Key Personnel - Role on Project

- Jim Shelton – Program Manager, Basis of Rehabilitation selection
- Todd Williams – Physical Condition Assessment Manager
- Paul Batman – Design Engineer, SSES
- Jason Marrella – Design Engineer
- Dan Cooper – Design Engineer
- Tony Dill – Private-side Pilot Program Manager
- JP Travis – Flow and I&I Analysis

Project Drivers: RDII and SSO reduction, extended service life

Leakage Reduction: RDII leakage reduction: **72% RDII volume.**

Start - Completion Dates: 2013

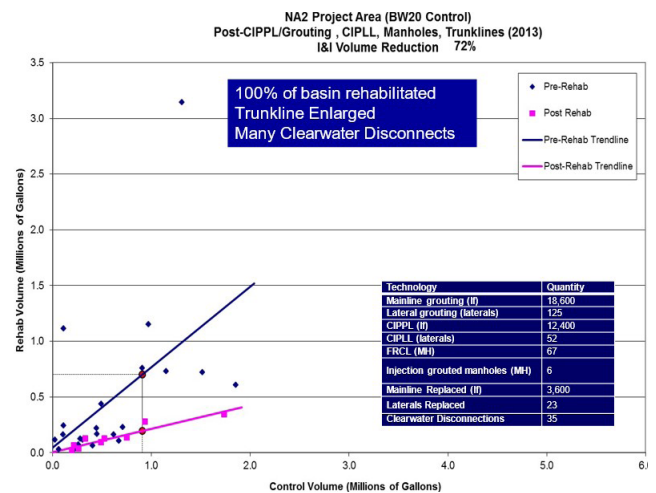
Total Program Budget (Total Construction Costs): \$4.3 million

Fee for Engineering Services: \$0.8 million

1. NA2 Sewer Rehabilitation

New Castle County, DE

Sized similarly to several of the HPPs, the 8 mile NA2 basin was identified by flow metering and SSES work (night time weiring, smoke testing, basement inspection) to be significantly impacted by rainfall induced infiltration and inflow (RDII), inflow and clearwater connections. Approximately 60 years old and constructed primarily of VCP mains and laterals, the project goal was to reduce RDII volume by at least 60% by holistically rehabilitating every sewer in this basin. As part of a pilot clearwater program developed and implemented by Arcadis, 35 sump pumps and punctured floor drains (~ 1/4 were clearwater connections) were disconnected. Arcadis also designed the rehabilitation of 3.5 miles of sewer by lining, 2.5 miles of sewers by grouting, 101 laterals via grouting, 52 laterals via liners, and 74 manhole via grouting and lining. Additionally, the ¾ mile trunk line serving this area and running along the stream was upsized and all its manhole covers sealed.



Arcadis oversaw all construction work. Completed in 2012, with interim control basin data collected to show the impact of various techniques, the overall reduction exceeded goals by 12%.

Requested Information

Owner Reference: Hap Ryan, Project Manager, T. 302.395.5700, E. HJRyan@nccde.org

Key Personnel - Role on Project

- Jim Shelton – Program Manager, Basis of Rehabilitation selection
- Tony Dill – Deputy Program Manager, Private side Pilot Program Manager
- Todd Williams – Physical Condition Assessment Manager
- Dan Cooper – Design Engineer
- Jason Marrella – Design Engineer, SSES
- Emily Sadowsky – Construction Engineer
- JP Travis – Flow and I&I Analysis

Project Drivers: RDII and SSO reduction, extended service life

Leakage Reduction: RDII leakage reduction: **49% RDII volume.**

Start - Completion Dates: 2014

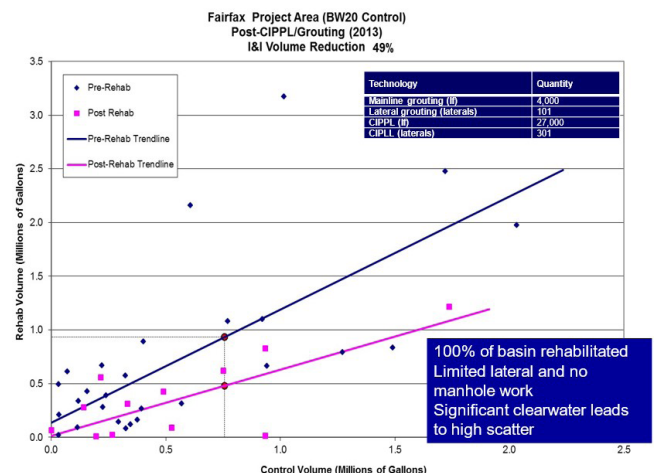
Total Program Budget (Total Construction Costs): \$3.7 million

Fee for Engineering Services: \$0.5 million

2. Fairfax Sewer Rehabilitation

New Castle County, DE

The 6.5 mile Fairfax basin was identified by flow metering and SSES work (night time weiring, smoke testing, basement inspection, storm sewer dye testing) to be significantly impacted by rainfall induced infiltration and inflow (RDII), inflow, and clearwater connections. Approximately 65 years old and constructed primarily of VCP mains and laterals, the project goal was to reduce RDII volume by at least 50%. To accomplish this, 15 of the illegal sump pumps and foundation drains (~8% of the total found) were disconnected as part of a pilot clearwater program developed and implemented by Arcadis. Arcadis also designed the rehabilitation of 5.5 miles of sewer by lining, 1 mile of sewers by grouting, 101 laterals via grouting, 301 laterals via liners. *Lateral lining and manhole lining were curtailed when program goals were realized early.* Arcadis oversaw all construction work.





Requested Information

Owner Reference: Dave Hofer, County Engineer (Retired), T. 302.731.9718, E. HOFJL@aol.com

Key Personnel - Role on Project

- Jim Shelton - Program Manager, Basis of Rehabilitation selection
- Todd Williams – Physical Condition Assessment Manager
- Paul Batman – Design Engineer, SSES
- Dan Cooper – Construction Engineer
- JP Travis – Flow and I&I Analysis

Project Drivers: RDII and SSO reduction, extended service life

Leakage Reduction: RDII leakage reduction: **77% RDII volume.**

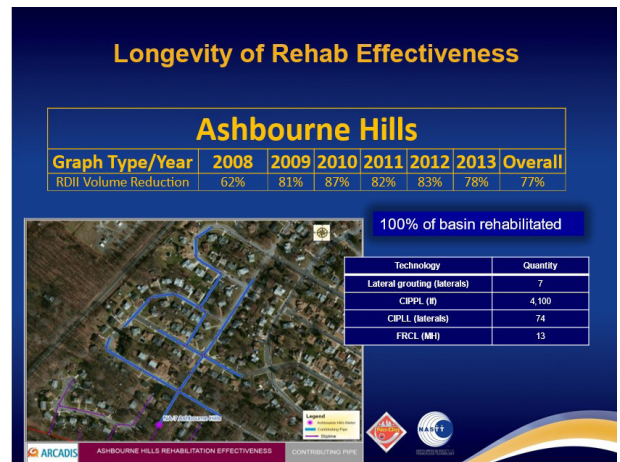
Start - Completion Dates: 2008

Total Program Budget (Total Construction Costs): \$2.5 million

Fee for Engineering Services: \$0.3 million

3. Ashbourne Hills Sewer Rehabilitation
New Castle County, DE

Ashbourne Hill was identified by flow metering and SSES work (primarily night time weiring) to be significantly impacted by rainfall derived infiltration and inflow (RDII). Approximately 45 years old and constructed of 8-inch VCP mains and laterals, the project goal was to reduce RDII volume by at least 50%. To accomplish this, Arcadis designed the rehabilitation of 1.5 miles of 8-inch sewer, 122 laterals, and 40 manholes using cured-in-place main and lateral liners, lateral grouting, and manhole lining. Arcadis oversaw all construction work. The project was monitored for an additional five years and showed no loss of reduction.



Requested Information

Owner Reference: Robert Roff, Operations Manager, T. 302.395.5868, E. RRoff@nccde.org

Key Personnel - Role on Project

- Jim Shelton – Program Manager
- Paul Batman – Task Manager – Rehab Effectiveness
- JP Travis – Flow Monitoring and Data Analysis

Project Drivers: RDII and SSO reduction, Consent Decree compliance

Leakage Reduction: **86% reduction in overflow volume, 50% reduction in overflow sites**

Start - Completion Dates: 2002-2019

Total Program Budget (Total Construction Costs): \$210 million

Fee for Engineering Services: \$35 million

4. Brandywine Hundred Sewer Rehabilitation – SSO Reduction Proof
New Castle County, DE

Arcadis had developed and implemented a planned \$405 million, 16-year sewer rehabilitation program to eliminate stream discharges, basement backups, and manhole overflows during rain events from an aging suburban sanitary sewer system. Program goals were to seal overflow structures entirely and reduce SSO volumes for a 6-year return frequency. The resulting work included more than 135 miles of mainline rehabilitation and replacement, repair of 4800 manholes and 9400 laterals, installation of 3800 cleanouts on private property, and identifications and disconnection of hundreds of private property clearwater connections (sumps, floor drains, and roof drains), all with less than a 1% change order value.

To validate program success, Arcadis conducted flow monitoring and hydraulic modeling to evaluate RDII and SSO reduction. This was done throughout the course of

the program using control basin rehab effectiveness monitoring of many of the projects within the program. See results in Table 1-1. Work order calls for blockages and basement backups also dropped significantly, even when particularly wet years like 2018-2019 occurred, so the benefits of the work were revealing themselves clearly (see Figure 1).

The control basin technique is only useful locally (10-mile basins or smaller), it doesn't track peak inflow reduction well, and it doesn't quantitatively show downstream impact on SSOs in

Study Area	Status of Rehab	Reductions
SP-27	T&S, CIPPL, CIPLL	69%
SP-23 3401	T&S, CIPPL, CIPLL	49%
Presidential Towers	T&S, CIPPL, CIPLL	63%
SP-24 Surrey Park	T&S, CIPPL, CIPLL, Manholes, Trunkline	49%
SP-24 Sorrel	T&S, CIPPL, CIPLL, Manholes	70%
NA-2	T&S, CIPPL, CIPLL, Manholes, Trunkline	72%
BW09 - Cedar Tree	T&S, CIPPL, CIPLL	65%
Ashbourne Hills	T&S, CIPPL, CIPLL, Manholes	77%
NA-5 NCA	T&S, CIPPL, CIPLL, Manholes	45%
Murphy	T&S, CIPPL, Partial CIPPL	32%
Fairfax	T&S, CIPPL, Partial CIPPL	49%
TalleyBrook	T&S, Manholes	97%



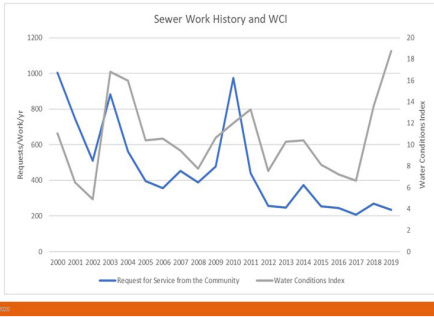


Figure 1 Sewer Work Order History

interceptors and upstream of regional pump stations. To demonstrate the broader impacts of the RDII reduction efforts, Arcadis reinstated meters at the original metering locations and recalibrated the system-wide model to

assess progress on the system-wide goals. Model results (see Figure 2) showed far better than anticipated performance, leading the state (DNREC) to close out the Secretary’s Order and allow New Castle County to proceed with remaining source reduction work at a slower schedule based on system wide asset management performance goals.

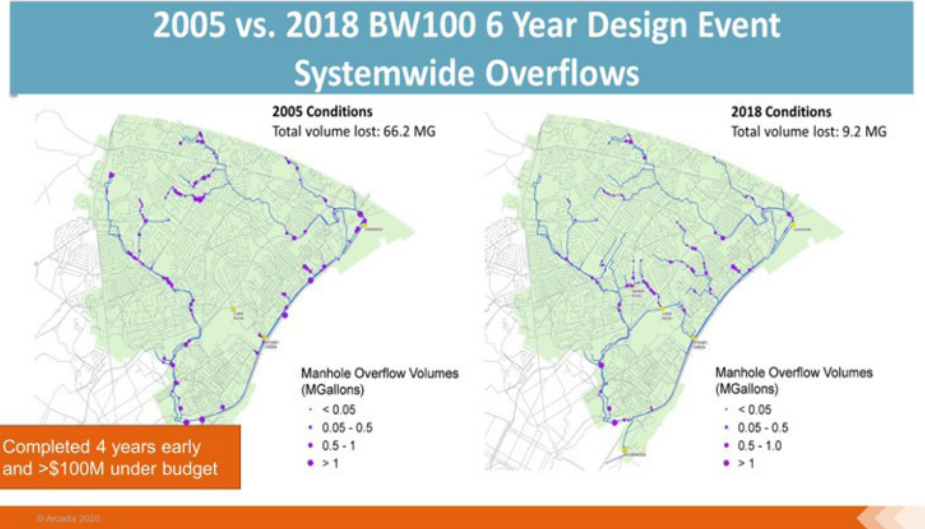


Figure 2. Model Results

Requested Information

Owner Reference: Quentin Nelson, Engineering Program Supervisor, T. 501.688.1436, E. Quentin.Nelson@lrwra.com

Key Personnel - Role on Project

- Jim Shelton – Program Developer
- Paul Batman – Program Manager
- Emily Sadowsky – SSES Manager, Construction Manager
- Tony Dill – Design
- Jason Marrella – SSES, Design, Basis of Rehabilitation selection
- Dan Cooper – Design, Basis of Rehabilitation selection
- Trey Waagen – Construction Engineer, SSES
- Michael Bell – Construction Engineer, SSES
- Nolan Schendel – SSES
- JP Travis – Flow and I&I Analysis

Project Drivers: RDII reduction

Leakage Reduction: 38% RDII volume

Start - Completion Dates: 2019-2024

Total Program Budget (Total Construction Costs): \$35 million

Fee for Engineering Services: \$10.9 million, including all SSES and inspections

5. Little Rock Small Diameter Inflow and Infiltration Reduction Program



Little Rock Water Reclamation Authority (LRWRA), Little Rock, AR

Like HRSD, the LRWRA program’s goal was to avoid construction of major infrastructure and equalization basin construction through cost effective RDII reductions of 35% via sewer rehabilitation. This project highlights **Arcadis’ ability to quickly mobilize a large team**, leverage our **Road Warrior program**, work with local engineers, and **rapidly expand our local team to deliver expedited SSES** and rehabilitation work. The results of this program demonstrate our ability to **successfully close-out a Consent Decree on time and on budget** while delivering the total program for \$552,000 per rehabilitation mile. Work included: over 250 miles SSES (smoke testing, nighttime weiring); 6,000 manhole inspections; nearly 100 miles of CCTV inspection; 61 miles of pipe rehabilitation (grouting, lining, pipebursting); 2,100 manholes rehabilitated.



“The Arcadis team has been crucial to the successful reduction of I&I across the Rose Creek, Rebsamen, Rock Creek, Grassy Flat sewersheds. They applied their experiences with other I&I reduction projects to develop a systematic, expedited approach to SSES, inspection and trenchless sewer rehabilitation. The team helped us successfully close our Consent Administrative Order with the State of Arkansas.”

*Quentin Nelson
Little Rock Water Reclamation Authority*

Part 1.B. Demonstrated experience of collaborative delivery projects.

Below is demonstrated experience of our team's RDII reduction projects delivered via collaborative delivery.

Requested Information

Owner Reference: John Poole, PE,
City Engineer, T. 803.260.0433,
E. johnapoole@outlook.com;
PooleJA@dhec.sc.gov

George Grinton, PE, Director of
Engineering and Utilities, T. 803.221.8532,
E. GGrinton@cityofAikensc.gov

Key Personnel - Role on Project

- Jim Shelton – Program/Construction Manager
- Emily Sadowsky – SSES
- Dan Cooper – Construction Engineer
- Mike Bell – Construction Engineer
- Trey Waagen – Construction Engineer
- Nolan Schendel – Construction Engineer
- JP Travis – Flow meter install/evaluation

Project Drivers: Pipe life stabilization,
baseline infiltration reduction

Leakage Reduction: 25-30% infiltration
leakage reduction (inflow as not targeted)

Start - Completion Dates: 2018 - 2021

Total Program Budget (Total Construction Costs): GMP budget: \$11,940,650
Scope completed: \$10,500,000
Extended scope completed: \$11,592,984

Primary Contractors: GCU LLC; Bionomic Services; Videopipe Services; Standard Pipe Services; Culy Construction; Dukes Root Control; Babcock Construction; B&D Enterprises

1. Sand River Basin Sewer Rehabilitation Program – Design-Build Guaranteed Maximum Price Scope

City of Aiken, Aiken, SC



The City of Aiken's (City) Sand River Basin sewers were largely constructed a century ago and saw little maintenance. Many sewers operated in near overflow conditions daily due to root and debris obstructions. The City sought to structurally stabilize the oldest third of the system while removing blockages, reducing I&I, and correcting their GIS mapping.

Arcadis performed as integrated engineer/contractor under BINGO/collaborative progressive design-build. Arcadis worked with City engineering to define problems, quantify realistic objectives given system condition and City financial resources, and evaluate approaches. The contract was for 44 miles of RCP, terracotta, vitrified clay, HDPE, PVC, and ductile iron pipes varying in diameter from 6-inches to 36-inches. Mainline lining, capital grouting, manhole lining, chemical root control, manhole framed cover replacement, pipe bursting, and open cut replacement were used. Arcadis completed this work for well under the contract amount, and the City elected to extend the work. In the end, **Arcadis conducted work on 54 miles of sewers in just over three years.** This project is one of the few turnkey engineering and construction programs implemented for sewers systems with guaranteed maximum price and achieving both flow reductions and increased life expectancy.

This project **underscores the importance of being able to entice contractors from outside the geography.** It also highlights the **need to be innovative when faced with new challenges** such as when a significant portion of the sewers are found to have fracturing at their joints and miles of 6-inch sewers with badly offset joints drive Arcadis' development of low end element technique (LEET) and 6-inch SPT grouting techniques and packers to avoid extensive, expensive lining and open cut replacement.

The average cost was \$215,000 per mile. Average improvement to pipe years remaining service life across the entire program (not including pipes that were determined to be NFA) was 34 years.



The City of Aiken contracted with Arcadis U.S., Inc. to complete an \$11.5M sanitary sewer grouting project. The scope of work included grouting and condition assessment of 54 miles of high-risk mainline sewer pipes along with associated manholes and service connections. These pipes are mostly in the downtown and oldest portion of our sewer system and careful coordination of the work to insure safety, quality of the work and minimize the impact on our Citizens was a big concern. Grouting is a process where the performance of the contractor determines the quality of the results, so this made it essential that experienced oversight of the contracting crews was on the job at all times. Arcadis was selected to be the contract manager at risk for the City of Aiken. Jim Shelton oversaw the project and insured that trained Arcadis employees were on site inspecting and assuring the quality of work of the contractors at all times. Arcadis managed all aspects of the project including deciding on the proper rehabilitation work if grouting was not the right thing to do in segments of sewer line, and coordinating with the City Utility Department for any unforeseen issues that arose. While our GIS mapping of our sewer utility lines is extensive, it was not always 100% accurate. This required detective work with Arcadis personnel in coordination with our utility crews who were able to resolve all issues that were presented. Regular status meetings held by Arcadis with the contractors and with the City utility personnel were very productive and key to keeping the project on track. At the end of the project, we have an updated GIS map of our system, rehabilitation of the most critical failed sewer segments that were discovered as the work progressed, and a capital management plan for the foreseeable future to maintain our sewer lines in good condition.

Jim Shelton was a key reason for the success of the project for the City of Aiken. His knowledge of the technology of sewer line maintenance and repair, grouting as a cost effective means to rehabilitate the sewer utility, his ability to effectively communicate, and his attention to detail made the project a success. Personnel and contractors that he brought to the project were all knowledgeable, highly capable and great to work with. The project budget was met and additional work of 10 miles of sewer lines was performed within the budget, bringing the total accomplished to 54 miles. During the project Arcadis developed a new grouting technique for longitudinal fractures which saved the City \$2.5 M in rehabilitation costs.

I would use Arcadis again on any future City project and recommend them without hesitation.

George Grinton
City of Aiken | Director of Engineering & Utilities

Requested Information

Owner Reference: Mike Nixon
Superintendent, T. 740.687.6664,
E. mnixon@ci.lancaster.oh.us

Key Personnel - Role on Project

- Jim Shelton – Construction Manager
- Emily Sadowsky – Construction Superintendent

Project Drivers: SSO elimination,
basement backup elimination

Leakage Reduction: 61% RDII volume
reduction; Complete elimination of
SSOs and basement backups

Start - Completion Dates: 2018

**Total Program Budget (Total Construction
Costs):** GMP budget: \$1,838,000; Scope
completed: \$1,614,000

Primary Contractors: Michels;
Lake County; Equix

2. River Valley Highlands Sewer Rehabilitation**City of Lancaster, Lancaster, OH**

River Valley Highlands is a 12-mile sewer system dedicated to City of Lancaster (the City), Ohio 10 years prior to the project. Heavy rains caused unexplained basement backups one to three times per year. The City retained Arcadis to conduct a pilot project to prove an approach, narrow the remediation area, then sole sourced the implementation of design, procurement, construction, and construction management.

Arcadis performed as integrated engineer/contractor under BINGO. Investigations showed significantly increased flows during rain, with peaks >10x normal flows for any significant rainfall. Inflow sources were identified and corrected and approximately four miles of pipe were rehabilitated by joint and tap connection grouting.

One of the wettest periods in more than a decade followed project completion. **No SSOs or basement backups occurred.** Post-rehabilitation flow monitoring compared against pre-rehabilitation data using a control basin methodology showed 45% to 76% reduction in I&I volume across various mini basins.

This project **highlights work completed under expedited schedule** using multiple contractors simultaneously performing the same type of work. **The average cost was \$400,000 per mile.** The project was completed for 88% of the budget and 25% faster than planned.



Good morning. I am not sure if Jim/Arcadis shared the attachment with you. This is a very good description of a recent project. We feel Jim and his team are very knowledgeable in sewer rehabilitation. We are thrilled with the results of this project and consult with Jim on a variety of sewer rehabilitation issues. Our relationship with Malcolm Pirnie/Arcadis dates back to 1992 doing projects ranging from master plans, rate studies, pump station design/rehabilitation, wastewater treatment plant improvements/expansions, new MBR/VLR treatment plant, sewer collection system modeling, construction management, resident inspections. Arcadis is a firm that involved the owners staff and wants to build long term relationships. Obviously we are thrilled with Arcadis and their associates as we have trusted them with approximately \$100,000,000.00 in CIP's and studies over 29 years.

Michael B. Nixon
Superintendent
City of Lancaster
Water Pollution Control
800 Lawrence Street
Lancaster, Ohio 43130-9401
Voice: 740.687.6664
E-Mail: mnixon@ci.lancaster.oh.us



Requested Information

Owner Reference: Greg Gress, Water and Sewer Manager, T. 843.883.5748, E. GGress@sullivanisland-sc.com

Key Personnel - Role on Project

- Jim Shelton – Construction Manager
- Emily Sadowsky – Construction Engineer

Project Drivers: RDII reduction

Leakage Reduction: 49% RDII volume reduction

Start - Completion Dates: 2014-2015, 2018-2019

Total Program Budget (Total Construction Costs): GMP budget: \$7,820,000
Scope completed: \$5,639,000

Primary Contractors:

Bionomic Services; TriState Grouting; Videopipe Services; National Water Main; Am-Liner East; Layne In-Liner; Robinson Pipeline; Chandler Construction; Equix

3. Sullivan’s Island Sewer Rehabilitation Program

Town of Sullivan’s Island, Sullivan’s Island, SC

The Town of Sullivan’s Island, SC (TOSI) a 17-mile sewer shed on a barrier island, had 68% average daily gpd flow attributable to I&I. Wet weather flows commonly exceed three times the average flow for a week following rain events, with I&I flow contributions increasing with each passing year. TOSI spent considerable time researching methods to control leakage, and repeatedly were recommended to engage the expertise of Arcadis.

Arcadis performed the work in two phases as integrated engineer/contractor under BINGO/collaborative CMAR. **Arcadis collaborated with TOSI to develop a tailored approach to their I&I reduction program.** A suite of trenchless rehabilitation technologies featuring chemical grouting to seal the leaking sewers, laterals, and manholes, cured-in-place lining to fix badly broken structural conditions, and manhole lining to repair leaking and damaged manholes was used.

As the Engineer-Construction Manager, Arcadis developed requirements for the all sewer rehabilitation technologies. **Arcadis also implemented unique management practices to shift the rehab subcontractors from typical low bid mentality of “complete the work as cheaply as possible” to “how do we deliver the best possible product for the Owner while making solid profit”.** This was achieved through progressive design and pricing negotiation with subcontracts.

This project **emphasizes how local and outside the geography contractors, properly motivated and trained by expert construction engineers, can achieve a 49% reduction in RDII, even in salt-water influence shoreline areas, for only \$332,000 per mile. It also highlights how a motivated utility owner coupled with a risk-tolerant engineer can develop innovative tools and processes to meet new challenges,** such as Arcadis’ development of LFD Packer grouting for fractured pipes and LACO Packer grouting to address lateral joints between the tap and the clean out. **The average cost was \$332,000 per mile.**



“This project has been a success in large measure to the high degree of collaboration between the Town, the Engineer-Construction Manager (Arcadis), and the subcontractors during both the final design phase and as field changes have dictated needed changes. The free exchange of ideas, and our ability as the utility to be involved in these problem solving situations, has provided us with a level of confidence not typically provided by normal design-bid-build projects.”

*Greg Gress
Manager of Water and Sewer
Sullivan’s Island, SC*

Requested Information

Owner Reference: John (Jay) Dano, HRSD Chief of Planning and Analysis, T. 757.353.0380, E. JDano@hrsd.com

Key Personnel - Role on Project

- Jim Shelton – Construction Manager
- Emily Sadowsky – Construction Superintendent
- Todd Williams – Design Engineer and Contracts Manager

Project Drivers: RDII reduction

Leakage Reduction: 36% RDII volume reduction; 12% peak 1-hour 10-year design storm reduction

Start - Completion Dates: 2015-2016

Total Program Budget (Total Construction Costs): GMP budget: \$1,150,000; Scope completed: \$847,000

Primary Contractors: Bionomic Services; Videopipe Services

4. Virginia Beach Basin 340 Design-Build Sewer Rehabilitation

HRSD, Virginia Beach, VA



HRSD piloted a design-build approach for their regional sewer rehabilitation program using Basin VB340 in the City of Virginia Beach's collection system. HRSD set a goal of reducing the peak one-hour flow during a 10-year design storm by 20%. Arcadis was selected because our turnkey approach addressed all of the pipes (rather than the Find and Fix fraction proposed by the other teams) and because our price was significantly lower than the others.

Arcadis performed as integrated engineer/contractor under BINGO/collaborative progressive design-build. Pipes were found to be without structural defects but air testing found a high rate of leaking main joints, lateral joints and tap connections. These were successfully grouted to seal out infiltration at a fraction of the cost of lining. Almost all the cleanouts were found to be below grade and leaking, and all the manhole covers/inflow dishes were found to leak badly.

RDII volume was reduced by 36% and peak one-hour flows during the 10 year storm were reduced by 12%. The work was only allowed



to address public-side leakage. Half of the 5-mile system was private and exhibited very similar sewer issues and overwhelmingly obvious inflow problems (roof drains to open cleanouts, 12 hole covers 1-inch below grade, open cleanouts clipped below grade) that would have been easy, cheap, and highly effective, leaving some easy fixes unaddressed.

This project **demonstrates Arcadis' transparent collaboration style**. The project **highlights the importance of clearly understanding the accuracy and reliability of the measuring metrics (models and flow data)**. It also shows the **limitation of sewer main rehabilitation, which addresses rainfall induced infiltration, on the peak inflow sources that cause SSOs**. It also **stresses the impracticality of achieving RDII reduction goals if significant portions of the system (namely private-side inflow sources) are not addressed**.

The average cost was \$367,000 per mile. All work was completed for 84% of the allotted cost.



HRSD would like to acknowledge the efforts of Arcadis in delivering our Locality Rehabilitation Design Build Pilot Project. The project involved evaluating and implementing the most cost effective solution for reducing inflow and infiltration into a gravity sanitary sewer collection system. The Arcadis project manager, Jim Shelton, was knowledgeable, responsive, and a great communicator. The level of collaboration between HRSD, the City of Virginia Beach, and Arcadis was outstanding. The project was delivered within the guaranteed maximum price and on time, due in large part to the efforts of the Arcadis project team. I look forward to the opportunity to work with Jim and the Arcadis team in the future.

John J. Dano

John J. Dano, P.E., PMP, ENV SP
Chief of Planning & Analysis



Requested Information

Owner Reference: Lee Moore, Utilities Engineer, T. 828.803.9752, E. stephen_moore@baxter.com

Key Personnel - Role on Project

- Jim Shelton – Project and Construction Manager
- Emily Sadowsky – Construction Engineer
- Mike Bell – Construction Engineer
- Trey Waagen – Construction Engineer
- Nolan Schendel – Construction Engineer

Project Drivers: Asset longevity; emergency response; turnkey delivery

Leakage Reduction: N/A

Start - Completion Dates: 2020 - 2024

Total Program Budget (Total Construction Costs): GMP budget: \$2,600,000

Primary Contractors: Bionomic Services, Sunbelt, Vortex, CBET, MTC, GEM, Jeff Banks & Son

5. Baxter Healthcare – North Cove Sewer Rehabilitation Program – Design-Build

Baxter Healthcare, Marion, SC

Shortly after Arcadis conducted a site-wide assessment and prioritized rehabilitation of the process sewers at this 3,600-person factory, its 10-inch ductile iron force main ruptured at the end of its river crossing, shutting down the entire facility. Working through the Thanksgiving holiday, Arcadis worked with Baxter to first develop a temporary bypass over the river, then completed the design for rehabilitation of both the ruptured force main and the gravity sewers with failed inverts, completing both gravity and force main rehabilitations simultaneously as the designer and the general contractor, returning the factory to full production within four weeks.

During two subsequent non-emergency factory shutdown periods, Arcadis bypass pumped the entire facility, rehabilitated 100% of the 2,700-foot exterior sewer mains via either capital grouted or lining with vinyl ester high temperature tolerant cured-in-place liners, 18 manholes were lined with epoxy or epoxy cement liners, and the pump station wet well was completely rehabilitated with a new novalac epoxy lining system. This work involved eight different types of sewer rehabilitation technologies and seven different contractors. It significantly reduced risk to operations.

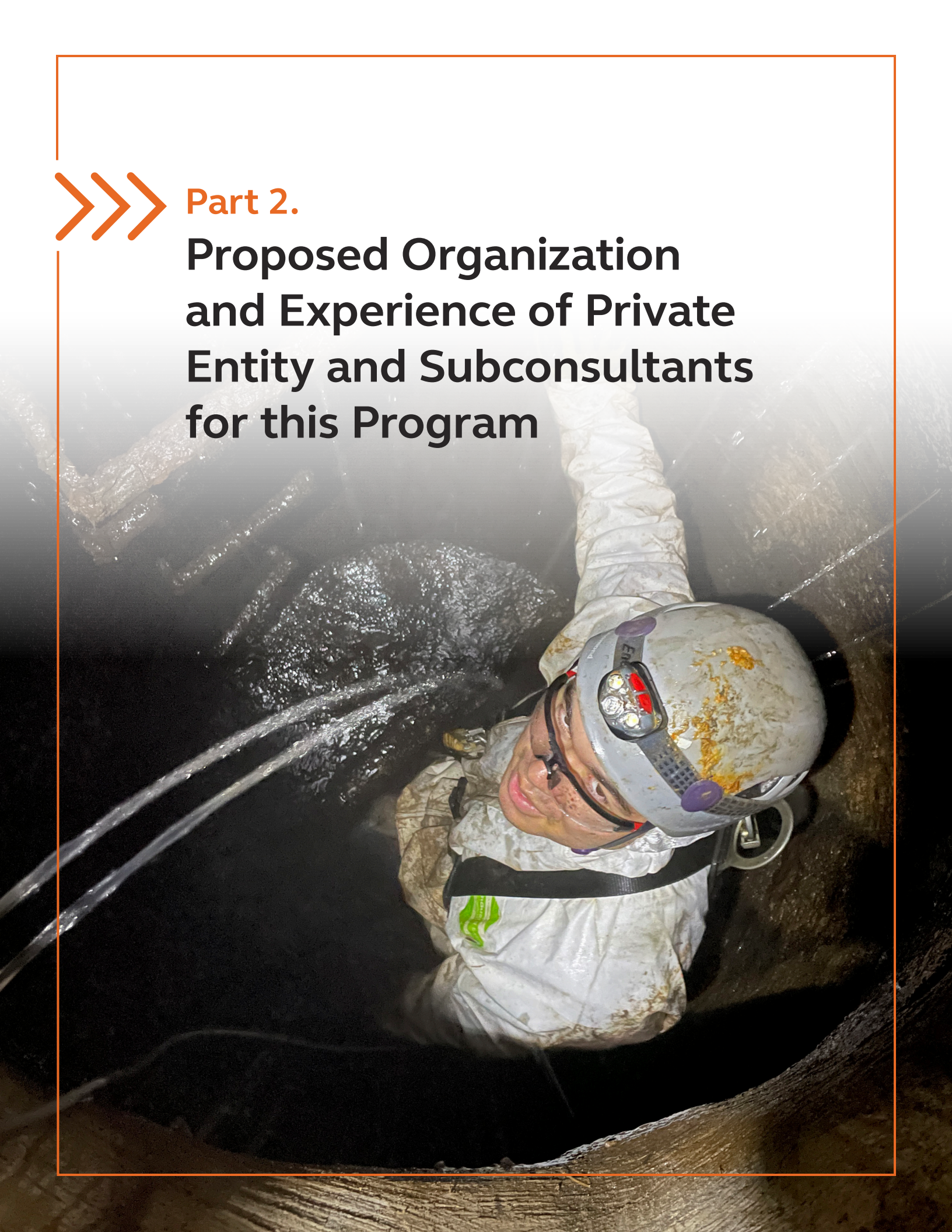
This project demonstrates Arcadis’ nimbleness, speed of execution, and ability to find multiple contractors to deliver the best performance when needed. All work was completed ahead of schedule and under budget.





Part 2.

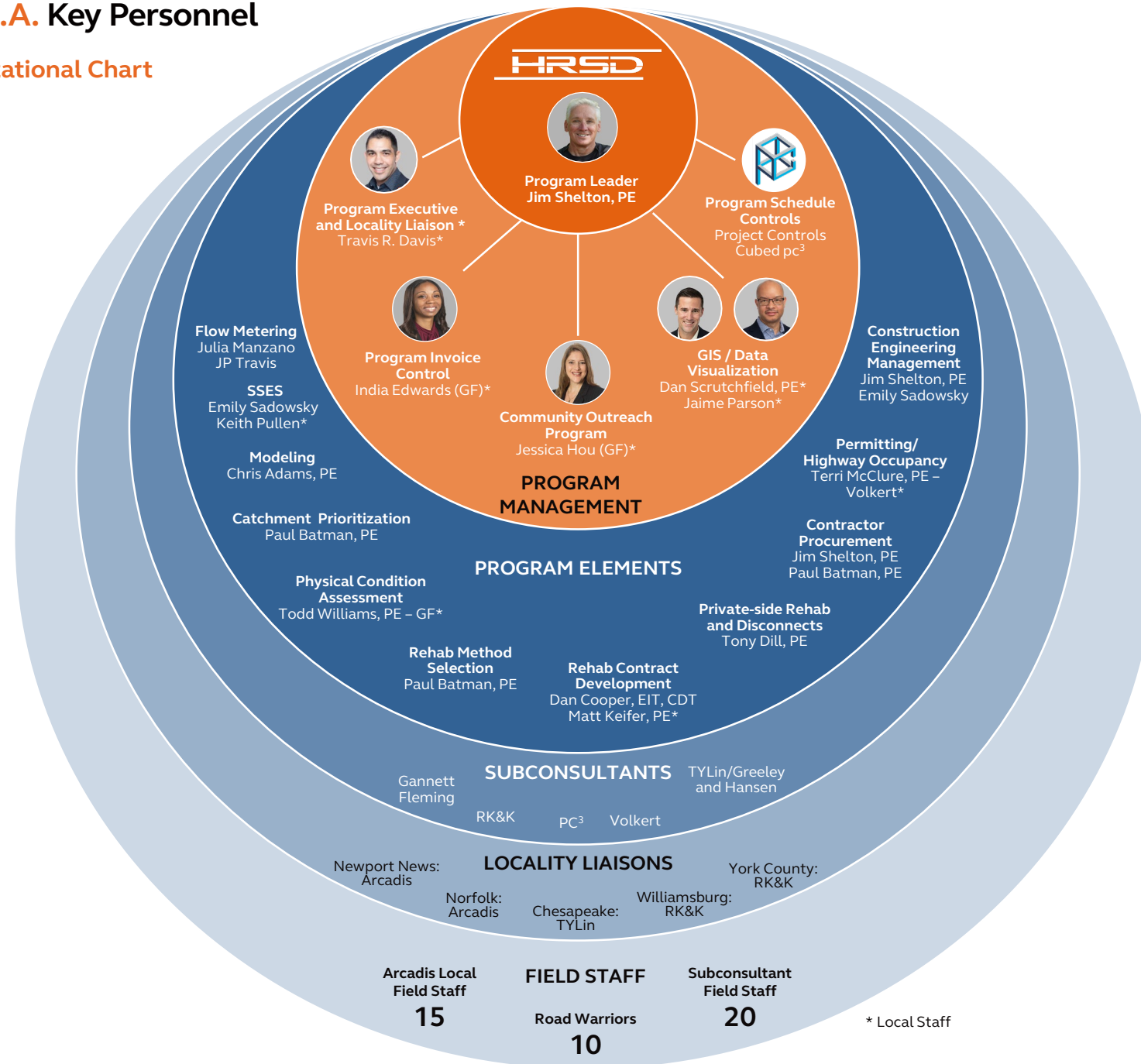
Proposed Organization and Experience of Private Entity and Subconsultants for this Program



Part 2. Organization and Experience

Part 2.A. Key Personnel

Organizational Chart



Our team will function as an integrated engineer/construction manager under the direction of Jim Shelton. All of the program element managers have worked extensively together, with the average time together being 17 years and **the median time together being 20 years**. Only Matt Kiefer and Chris Adams have fewer than 15 years with the team, and both of them have worked significantly with Jim since joining Arcadis.

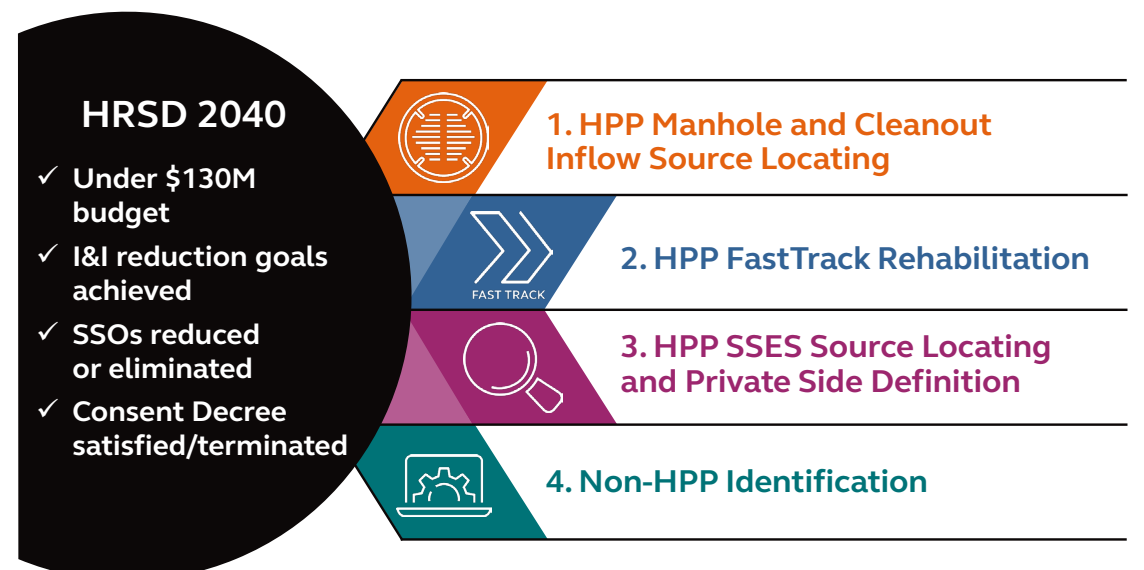
HRSD benefits from these long associations because this team **knows what to expect from each other** after many, many projects together. While highly collaborative, **the chain of command and the spans of authority are well defined and practiced**. HRSD also benefits from Jim’s unusual combination of experience as both a licensed PE and a licensed Water and Sewer contractor, which is a critical differentiator when implementing (rather

than just specifying and inspecting) buried infrastructure works, especially trenchless rehabilitation within our **BINGO CMAR/ PDB** projects for clients like City of Aiken, Sullivan’s Island, HRSD, Lancaster OH, Springfield MO, Ford, Baxter Healthcare, and Bristol-Myers Squibb and our **IDIQ-program implementor** roles for Fairfax MSMD and LRWRA.

I&I Reduction Road Warriors



Focused, Fast and Effective Four-Prong Mission to Success



Jim’s expertise as a design and construction national subject matter expert — specific to cured-in-place lining, capital grouting, manhole rehabilitation, lateral rehabilitation, and inflow elimination — coupled with the program development and implementation experiences/successes for many large, multi-year I&I reduction programs (New Castle County, Lehigh County Authority, Emerald Coast Utilities Authority, WSSC, Aiken, Sullivan’s Island, LRWRA, and City of Princeton) gives HRSD a powerful advocate and partner in this PPEA endeavor.

Jim hired, trained, and developed the leaders on this team over the past 24 years. All of this team’s leaders and key field staff are specialists in buried infrastructure, with particular emphasis on SSES condition assessments and trenchless construction, as well as buried infrastructure design and management.

Arcadis’ attitude that **“If you can’t actually build it yourself, then you can’t design or manage it properly”** holds sway, with many, especially Jim, Paul, JP, Emily, Jason, and Dan, continuing to perform field roles regularly, well into the design and management phases of their careers.

This team will be led almost exclusively by Arcadis’ Buried Infrastructure engineers. We elect to do it this way because

our team has worked together on many successful I&I reduction programs over the last 24 years, so everyone on the team knows their roles and responsibilities very well. The only program elements leader outside Arcadis is Todd Williams from Gannett Fleming, and he served in this role while he was employed at Arcadis.

The staffing requirements of this program demand primarily **boots-on-the-ground engineers** and specialists, most particularly for the SSES aspects at the front third of the program and the construction engineering aspects of the back 75% of the program. Because buried infrastructure programs span the entire U.S., Arcadis has a **Road Warriors** program for engineers that “go where they are needed”. As a result of this, all field activities, including SSES condition assessment and rehabilitation construction engineering will be led by Arcadis. In addition to Arcadis’ local staff, our team will include **RK&K, Gannett Fleming, and TYLin/Greeley and Hansen** as staff augmentation for SSES and construction-oriented field activities. Gannett Fleming and TYLin/Greeley and Hansen have field staff suited to SSES work, and RK&K has more than a dozen construction inspection staff that Arcadis will cross-train as rehabilitation technology construction inspectors or construction engineers. Realistically, this team provides 20 field staff available at the start of this program; this number will grow as dictated by the outcome of the Program Definition stage (Interim Agreement).

Experience Working Together on Similar Projects

Our team leaders have worked together on the following buried infrastructure I&I programs/projects:

Client	Dates	Team Leaders
New Castle	2002-2018	Jim Shelton, Tony Dill, Paul Batman, Emily Sadowsky, Dan Cooper, Todd Williams, JP Travis, Jason Marrella
Fairfax County MSMD	2005-2008	Jim Shelton, Tony Dill, Paul Batman, Emily Sadowsky, Todd Williams, JP Travis, Jason Marrella
Emerald Coast Utility Authority	2006-2012	Jim Shelton, Emily Sadowsky, Dan Cooper, JP Travis
Lehigh County Authority	2008-present	Jim Shelton, Tony Dill, Emily Sadowsky, Dan Cooper, Chris Adams, Julie Manzano, JP Travis
DC Water	2010-present	Jim Shelton, Tony Dill, Todd Williams, Paul Batman
WSSC	2012-present	Jim Shelton, Paul Batman, Emily Sadowsky, Jason Marrella, Dan Cooper
Sullivans Island	2014-2019	Jim Shelton, Emily Sadowsky, Dan Cooper
City of Aiken	2018-2022	Jim Shelton, Emily Sadowsky, Dan Cooper, Travis Davis
HRSD VB340	2015-2016	Jim Shelton, Emily Sadowsky, Todd Williams
JEA	2016-2018	Jim Shelton, Paul Batman
LRWRA	2018-present	Jim Shelton, Tony Dill, Paul Batman, Emily Sadowsky, Dan Cooper, JP Travis, Jason Marrella
Ford	2015-present	Jim Shelton, Emily Sadowsky, Dan Cooper, Jason Marrella
Princeton	2022-present	Jim Shelton, Emily Sadowsky

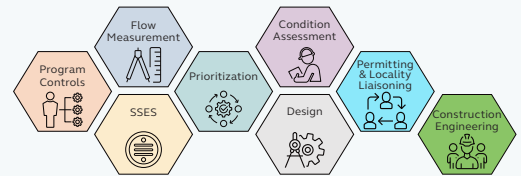
Within our subconsultants, Todd Williams from Gannett Fleming has worked on four large programs with our team. (Todd worked under Jim Shelton for nearly 15 years while employed with Arcadis and was supervisor for Paul Batman, Dan Cooper, Jason Marrella, and Emily Sadowsky at various points in their careers). Arcadis (Travis Davis) and RK&K staff have worked together on various consent order programs throughout Hampton Roads.

Arcadis (Travis Davis) and Volkert are currently working together as engineer and permitting lead respectively for Norfolk’s Coastal Storm Risk Management program and the City of Virginia Beach’s \$350M progressive design-build project.

Arcadis and PC3 have worked together on projects nationwide. Arcadis (Travis Davis) and TYLyn/Greeley and Hansen worked together on SSES programs for both Chesapeake and Norfolk.

Program Element Responsibilities

To provide multiple perspectives and spread the workload across the team leadership, program element responsibilities have been delineated as shown below.



39
Years

Jim Shelton, PE | Program Leader

Mr. Shelton will take responsible charge of all technical aspects of the planning, design, conditions assessments, field work, construction engineering, and rehabilitation. He will oversee day-to-day management of the program. He will be responsible for recruiting and training subcontractors to perform rehabilitation work. He will also hold day-to-day responsibilities for construction, construction engineering, and construction management. He will be the primary point of contact with the HRSD project managers for this work.

Location: Wilmington, DE; will spend 40% of time in Tidewater

Qualifications: BSE Chemical Engineering, University of Pennsylvania 1984

Relevant Team Experience: Aiken, Lancaster, Sullivan's Island, HRSD, LRWRA, Baxter Healthcare, New Castle County, Fairfax County, Emerald Coast Utility Authority, Lehigh County Authority, DC Water, WSSC, JEA, Princeton, Bristol Myers Squibb



19
Years

Travis Davis | Program Executive, Locality Liaison

Mr. Davis will serve as the program executive responsible for project resourcing, and monitoring HRSD feedback regarding team performance. He will take responsible charge of all program communications aspects of the program. He will be responsible for management of subconsultants, resource planning, and invoice generation. He will serve as HRSD's advocate within the program team. He will act as program conduit for liaison work with the four localities. He will be the secondary point of contact with the HRSD project managers for this work. His experience includes years of SSES efforts with Chesapeake, Hampton, Norfolk, Newport News, York County, Virginia Beach, and Williamsburg.

Location: Virginia Beach, VA

Qualifications: BS Civil Engineering Technology, Old Dominion University 2006

Relevant Team Experience: Aiken, HRSD



17
Years

Emily Sadowsky | SSES, Construction Engineering Management

Mrs. Sadowsky will direct all SSES activities, including manhole inspections, I-tracker, night-time weiring, smoke testing, basement inspections, and cleanout assessments. In this role, she will both direct and train the field teams as well as be responsible for the expert interpretation of findings relative to leakage source locating. She will also act as program construction superintendent; all construction engineering staff will report through her, and construction data metrics tracking will be her responsibility.

Location: Wilmington, DE, but will spend 25% of her time in Tidewater

Qualifications: BS Environmental Protection, West Virginia University 2006

Relevant Team Experience: New Castle County, Fairfax County, Emerald Coast Utility Authority, Lehigh County Authority, WSSC, Sullivans Island, Aiken, HRSD, LRWRA, Lancaster, Baxer Healthcare, Princeton, Sullivan's Island



35
Years

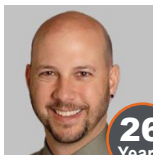
Todd Williams, PE, ENV SP (GF*) | Physical Condition Assessment

Mr. Williams will manage all CCTV inspection, PACP databases, and GIS presentation of finding for rehabilitation prioritization and basis of rehabilitation method selections.

Location: Newport News, VA

Qualifications: BS, Biology, Muhlenberg College, 1985; MS, Water Resources and Environmental Engineering, Villanova University, 1989

Relevant Team Experience: New Castle County, Fairfax County, DC Water, HRSD



26
Years

Paul Batman, PE | Catchment Prioritization, Rehabilitation Method Selection, Contractor Procurement

Mr. Batman will be responsible for assessing physical condition assessment findings, prioritizing work for construction based on SSES and CCTV findings, rendering basis of rehabilitation decision for mains, taps, risers, laterals, and manholes, and building task order assignments to construction subcontractors. He will also assist in the negotiation of subcontractor unit prices, assessment of value vs. cost evaluations across subcontractors within a specific specialty, and development and maintenance of program life cycle/capital cost rehabilitation methods decision tools.

Location: Wilmington, DE, but will spend 20% of his time in Tidewater

Qualifications: MS Environmental Engineering Drexel University 1999; BS Environmental Health Sciences West Chester University 1996

Relevant Team Experience: New Castle County, Fairfax County, DC Water, WSSC, LRWRA, JEA

17
Years

Dan Cooper, EIT, CDT | Rehabilitation Design/Contract Development

Mr. Cooper will be responsible for the preparation of design specification, drawings, pre-rehabilitation asset inventory trackers, and pre-negotiation cost estimates. He will also be responsible for subcontract agreements, resolution of pre-construction RFIs, and review of all pre-construction subcontractor submittal reviews.

Location: Philadelphia, PA

Qualifications: BS Environmental Systems Engineering The Pennsylvania State University 2007

Relevant Team Experience: New Castle County, LRWRA, Lehigh County Authority, WSSC, Aiken, Fairfax County

19
Years

Matt Kiefer, PE | Rehabilitation Contract Development

Mr. Kiefer will be responsible for the preparation of design specification, drawings, pre-rehabilitation asset inventory trackers, and pre-negotiation cost estimates. He will also be responsible for subcontract agreements, resolution of pre-construction RFIs, and review of all pre-construction subcontractor submittal reviews.

Location: Raleigh, NC

Qualifications: BS Civil Engineering University of Dayton 2005

Relevant Team Experience: Wilmington, DE; Greensboro, NC; Columbus, OH

12
Years

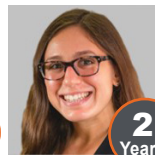
Terri McClure, RWP-GN (Volkert*) | Permitting/Highway Occupancy

Ms. McClure will be responsible for all construction permit applications, especially highway occupancy permits. This responsibility includes defining traffic control requirements for each rehabilitation site.

Location: Springfield, VA

Qualifications: HS Advanced Diploma, 1990

Relevant Team Experience: Norfolk, Prince William County DOT

21
Years2
Years

JP Travis and Julia Manzano | Flow Metering

Mr. Travis and Ms. Manzano will be responsible for siting meters and rain gauges, meter data validation and acceptance, RDII analyses/hydrograph expert interpretation, rehabilitation effectiveness evaluations, and data preparation for model calibrations.

Location: Wilmington, DE

Qualifications: HS Glasgow High School 1994

Relevant Team Experience: LRWRA, WSSC, New Castle County, Fairfax County, Emerald Coast Utility Authority, Lehigh County Authority, Aiken, Wilmington, Buffalo

Location: Cincinnati, OH

Qualifications: MS Civil Engineering Michigan Technological University 2021; Graduate Certificate Resilient Water Infrastructure Michigan Technological University 2021; BS Environmental Engineering Michigan Technological University 2020

Relevant Team Experience: Lehigh County Authority, Princeton, Buffalo

28
Years

Jessica Hou (GF*) | Community Outreach Program

Ms. Hou will leverage experience serving the Hampton Roads community managing multi-phase and concurrent collaborative delivery projects to provide meaningful community outreach.

Location: Newport News, VA

Qualifications: MS, Environmental Engineering, Old Dominion University, 2004; BS, Civil Engineering, Old Dominion University, 1998

Relevant Team Experience: Virginia Beach, VA; Norfolk, VA; Chesapeake, VA

17
Years

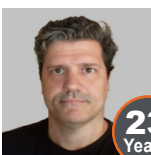
India Edwards (GF*) | Program Invoice Control

India will apply lessons learned from her contract administrative support for various HRSD projects. She will monitor project progress for compliance with contractual obligations and maintains document control procedures.

Location: Newport News, VA

Qualifications: BS, Accounting, Hampton University, 2003

Relevant Team Experience: Virginia Beach, VA; Norfolk, VA; Chesapeake, VA

23
Years

Chris Adams, PE | Modeling

Mr. Adams will be responsible for all model calibration and model use limitations specific to its ability to accurately measure SSO conditions and predict peak flow reductions from source reduction actions. This responsibility includes advising of software selection.

Location: Athens/Atlanta, GA

Qualifications: BS Civil Engineering Georgia Institute of Technology 2000

Relevant Team Experience: Lehigh County Authority



Tony Dill, PE | Private-Side Rehabilitation and Disconnects

Mr. Dill will manage work (other than laterals) outside of the public right-of-way; specifically, sump pump disconnects, foundation drain solutions, puncture floor drain corrections, and roof downcomer disconnects, including negotiation of access and correction with homeowners.

Location: Philadelphia, PA

Qualifications: MS Environmental Engineer University of Illinois at Urbana-Champaign 1994; BS Civil Engineering University of Notre Dame 1992

Relevant Team Experience: LRWRA, New Castle County, Fairfax County, Lehigh County Authority, DC Water



Dan Scrutchfield, PE and Jaime Parson | GIS and Data Visualization

Mr. Scrutchfield and Mr. Parson will develop GIS based tools and all data visualizations for the program, including GIS-based Power BI dashboards for assessment, modeling, and construction-oriented work processes.

Location: Virginia Beach, VA

Qualifications: BS Civil Engineering University of Delaware 2013

Relevant Team Experience: HRSD, City of Virginia Beach, City of Richmond, VA

Location: Virginia Beach, VA

Qualifications: Microsoft Certified Data Analyst

Relevant Team Experience: HRSD, City of Newport News, VA, City of Virginia Beach, VA

Part 2.B. Collaborative Delivery Projects - Subconsultants

Below is demonstrated experience of our team’s collaborative delivery projects.

Much of the proposed Arcadis leadership team was hired by or supervised by Todd Williams currently of Gannett Fleming and previously of Arcadis. Todd was assistant program manager under Jim Shelton for the Fairfax County MSMD Storm Sewer Program and DC Water Sewer Program Management Program. Demonstrated experience of our team working together is highlighted in the graphic to the right.

Project Name	Consultant Team
Fairfax Co - MSMD Storm Sewer Program	ARCADIS GANNETT FLEMING
DC Water - Sewer Management Program	ARCADIS GANNETT FLEMING
Chesapeake Consent Order	ARCADIS TYLin Greeley and Hansen Water Solutions
Norfolk Consent Order	ARCADIS TYLin Greeley and Hansen Water Solutions
Newport News Consent Order	ARCADIS RK&K
Williamsburg Consent Order	ARCADIS RK&K
York County Consent Order	ARCADIS RK&K
Virginia Beach DPW PDB	ARCADIS VOLKERT
Norfolk CSRM	ARCADIS VOLKERT
Portland, Bull Run Treatment Program Mgmt	ARCADIS [Logo]

Part 2.C. Anticipated Contractual Relationship - covered by the Interim Agreement



Contractual Relationship

Arcadis and the above listed subconsultants will use a standard MSA contract for our engineering/analysis work.

Part 2.D. Anticipated Contractual Relationship - covered by the Comprehensive Agreement



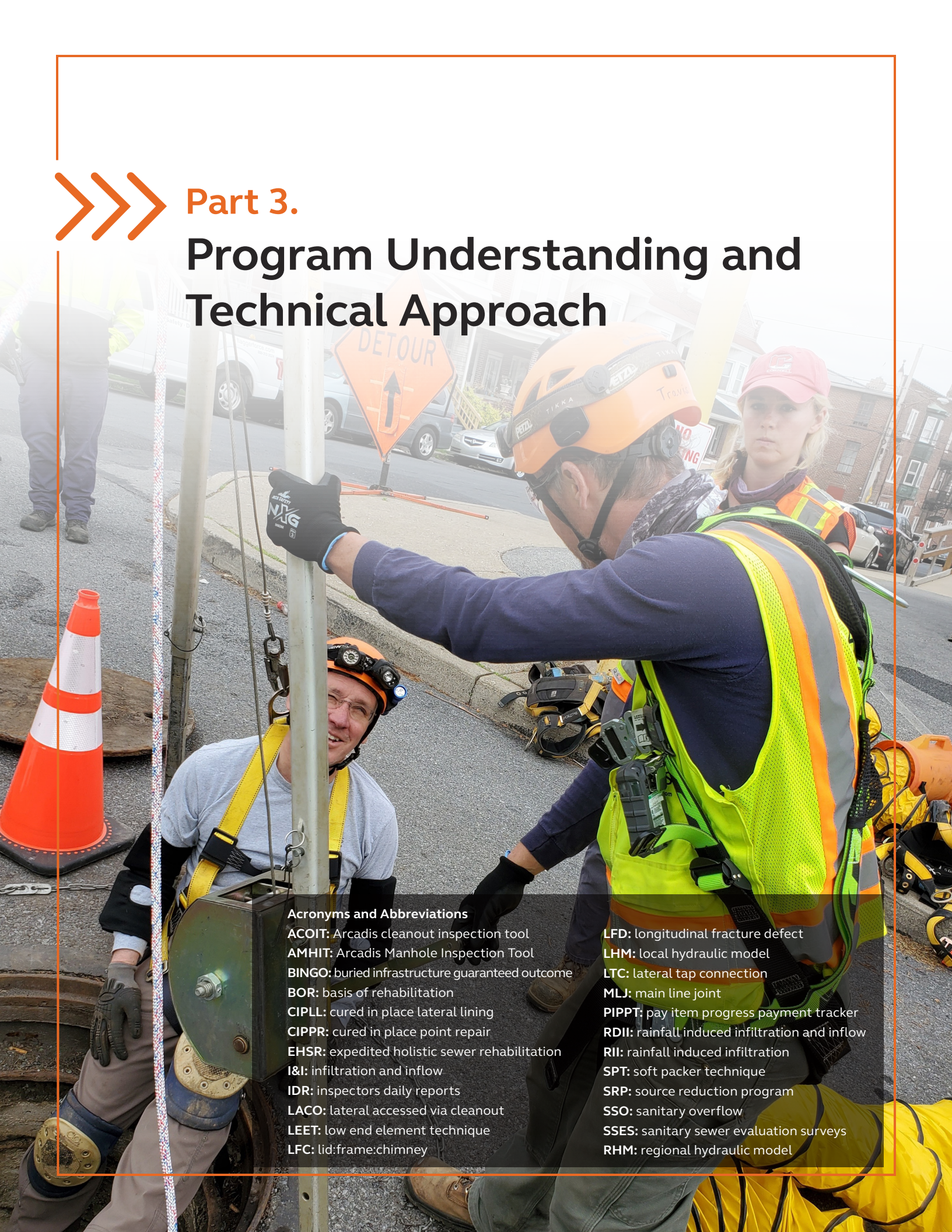
Contractual Relationship

For construction contractors used on this program, Arcadis will rely on our proven Construction Subcontract Agreement, which we have successfully implemented for this type of work dozens of times.



Part 3.

Program Understanding and Technical Approach



Acronyms and Abbreviations

ACOIT: Arcadis cleanout inspection tool

AMHIT: Arcadis Manhole Inspection Tool

BINGO: buried infrastructure guaranteed outcome

BOR: basis of rehabilitation

CIPLL: cured in place lateral lining

CIPPR: cured in place point repair

EHSR: expedited holistic sewer rehabilitation

I&I: infiltration and inflow

IDR: inspectors daily reports

LACO: lateral accessed via cleanout

LEET: low end element technique

LFC: lid:frame:chimney

LFD: longitudinal fracture defect

LHM: local hydraulic model

LTC: lateral tap connection

MLJ: main line joint

PIPPT: pay item progress payment tracker

RDII: rainfall induced infiltration and inflow

RII: rainfall induced infiltration

SPT: soft packer technique

SRP: source reduction program

SSO: sanitary overflow

SSES: sanitary sewer evaluation surveys

RHM: regional hydraulic model

Part 3. Program Understanding/Technical Approach

Part 3.A. Program Understanding and Process/Approach

Under a regulatory action that goes back two decades, HRSD and its member Localities must reduce sanitary sewer overflow (SSO) volumes during a modeled five-year event by 69% by 2040. The benchmark for this reduction is the 2008 regional hydraulic model (RHM). HRSD desires to achieve a 49% reduction in SSO volume via infiltration and inflow (I&I) source reduction efforts (rather than grey infrastructure expansions) before the 2030 adaptive management program evaluation with the USEPA. The remainder of the SSO volume reduction between 2030 and 2040 will be accomplished via a combination of additional source reduction work and conveyance expansion. The original 2014 Alternatives Analysis Report work identified 287 areas out of approximately 500 catchments where source reduction work would be cost-effective. Combined with capacity expansions, these works were modeled to remove nearly 125 mgd of flow from the peak 10-year recurrence event. The 2018 Regional Wet Weather Management Plan (RWWMP) further optimized these into 191 areas.

The 2018 RWWMP culled these down based on input from Localities, and a group of High Priority Project catchments where the greatest good from source reduction was thought to exist were defined. Some of these HPPs were assigned to assess-design-bid-build project teams for Portsmouth and Boat Harbor.

At this point, the prioritized source reduction work in the RWWMP is based on 19 HPP catchments in the cities of Chesapeake, Newport News, Norfolk, and York County totaling 89.6 miles of sewer mains, nearly 25% of which are privately owned sewers.

After starting this process using traditional multi-consultant project area awards, HRSD realized the pace of work was too slow and the unstructured demand for engineering and construction resources between multiple projects would obstruct the program's 2030 deadline and budget goals. Using the PPEA, HRSD desires to consolidate the source reduction work into a single large plan-engineer-procure-construct-confirm contract headed by an engineer (rather than the traditional contractor lead) that **HRSD trusts** who has:



1. **Substantiated experience delivering multiple sewer rehabilitation D-B/CMAR/EPCM projects**
2. Reputation for **sustaining collaborative relationships** with clients and contractors for multi-year programs to solve difficult I&I problems
3. **Clear leadership** model with defined roles and responsibilities
4. **Published proofs of significant RDII reductions** using the full suite of rehabilitation technologies across a broad range of rainfall induced infiltration and inflow types/sources
5. **Demonstrated ability to attract out-of-area contractors** necessary to get this specialized work constructed in less than four years **while teaching them the construction practices needed to ensure longevity and effectiveness**
6. **Long-standing leadership team** that has **delivered this type of work many times** before while **innovating to meet engineering and construction needs**
7. **Staffing plan** that accounts **for the huge amount of field work needed** and the **multiple simultaneous parallel paths** needed to deliver this program
8. **Proven cost estimating and cost delivery** track record

The Arcadis team checks all these requirements.

Both HRSD and Arcadis recognize that while these 19 HPP catchments are obvious contributors to the SSO problem, the 2014/2018 conclusions were based on high-level asset management rubric of cost effectiveness, which is not very location-specific and using the original underlying 2008 flow meter data, which is unlikely to be reflective of current conditions. There may be other sewer catchments that return greater peak flow reduction or flow reduction at a lower price per peak flow gallon removed than these 19 HPP catchments.

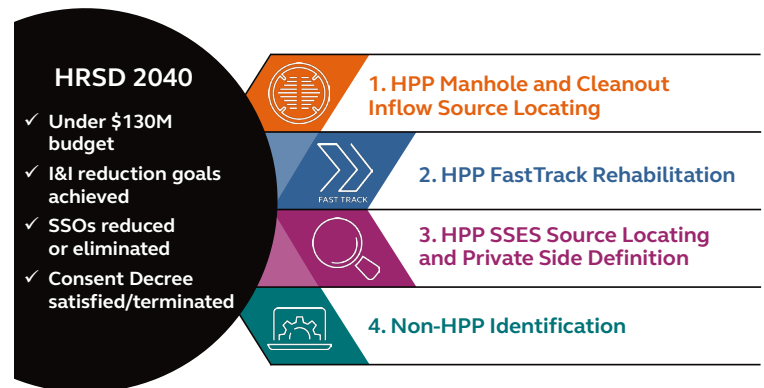
Therefore, the *19 HPPs are simply the starting point for this program*. The driving factor throughout the development and implementation of this program needs to be the elimination of SSO volumes, which compels parallel attacks that address the 19 HPPs while simultaneously evaluating whether other sewer systems upstream of the modeled SSOs need/should be addressed. Of secondary, yet still extremely important, priority is the selection of I&I reduction techniques that achieve and sustain over several decades peak flow reductions in the most cost-effective and timely manner practical.

There are a few key realities of source reduction work overlooked by most SSO elimination programs.

- ▶ SSOs, especially those driven by big rain like 5-year and 10-year recurrence events, are primarily **inflow** driven. Therefore, *the bulk of RDII reduction should come from inflow sources*. Sewer rehabilitation addresses primarily rainfall induced infiltration issues, which are often meaningful with regard to total RDII volume but less impactful and much more expensive to reduce than inflow sources. Our proposed approach recognizes this reality by focusing on inflow source locating and correction as the first and primary means of SSO reduction.
- ▶ Only a small percentage of the sewer mains and laterals that leak during/following rain events have PACP structural defects. Instead, most of the leakage is coming through visually sound joints that leak. CCTV and visual Find and Fix approaches do not find the sewers that leak (unless they happen to be televising during a rain storm, which is rare). *The focus needs to be on leaky pipes, not ugly pipes.*
- ▶ Sewer sealing must be done holistically to get meaningful results. Simply sealing mains only pushes the leakage to the taps, risers, and laterals. To achieve meaningful reductions, all sewer components in a leaking segment need to be made watertight, and segment rehabilitation needs to be done on the neighborhood basis to prevent the trenchwater from simply migrating to the next group of leaking joints.

There is a tightly limited timeframe to meet SSO reduction goals, so *source reduction work must begin as soon as possible*. Effectiveness and efficiency is of the essence, so an *evaluation of other potential HPPs upstream of the SSOs must begin as soon as possible*. And since the cost of the overall program is significant, those *assets that contribute significantly to the peak flow during storm events need to be identified as soon as possible*.

Therefore, Arcadis proposes a four-prong initial attack:



1. In all HPPs, immediately begin manhole and cleanout field investigations to **identify inflow** and tenaciously pursue making these watertight.
2. In HPPs that are easy to access and clearly likely high sources of I&I areas, immediately begin holistic rehabilitation of sewer mains, taps, and risers.
3. In HPPs with significant private sewers and/or known pipe defects and/or uncertain I&I characteristics, conduct focused SSES field investigations and negotiate access rights with private sewer owners for both investigations and rehabilitations.
4. For the rest of the non-HPP sewers upstream of defined SSOs, reassess 2008 model results and underlying data to discover additional HPPs that deliver cost-effective benefit.

Our Communications Plan will meet the needs of HRSD, the Localities, and the residents impacted. Leveraging Gannett Fleming's successes on HRSD & Norfolk project's, we will partner with HRSD's communications group to deliver needed messaging and notices following clear standards and expectations regarding:

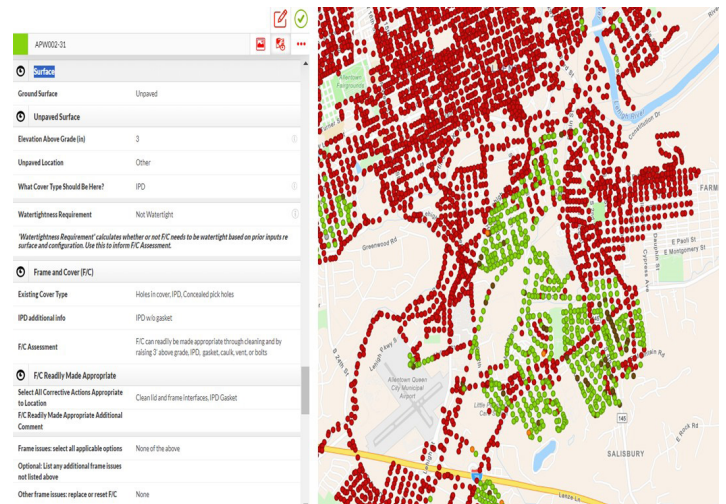
- Program mission statement, objective, and communications goals
- Stakeholder and public outreach schedule (inclusive of internal meetings, project milestones, and outreach activities organized by milestones)
- Co-branding logos and standards
- Audience/stakeholder identification and contact information
- Stakeholder feedback mechanisms
- Communications channels
- Communications standards for both HRSD and the Locality



1. HPP Manhole and Cleanout Inflow Source Locating:

All 2,105 HPP manholes will be inspected using Arcadis’ AMHIT manhole inspection protocol/data collection system, which is software developed in 2023 by Arcadis to focus on the lid-frame-chimney inflow potential of manholes to get at very cost-effective inflow reductions.

All ~10,000 HPP cleanouts will be inspected using Arcadis’ ACOIT (Arcadis Cleanout Inspection Tool) cleanout inspection protocol/data collection system, which is new software developed in 2024 by Arcadis to focus on inflow into clipped cleanouts and the potential for using Arcadis’ innovative LACO (lateral accessed via cleanout) grouting tools and processes to get at very cost-effective inflow and RDII reductions.



AMHIT (Arcadis Manhole Inspection Tool) Screenshot

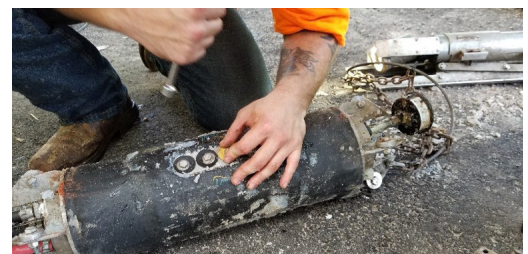
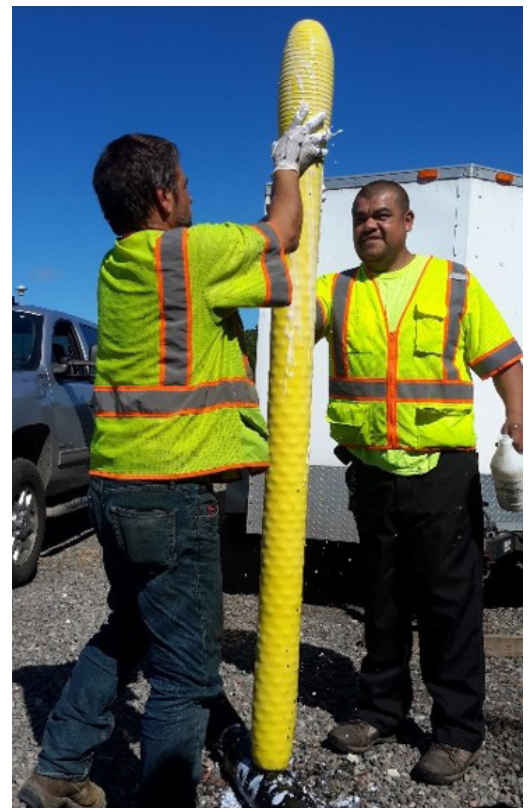


2. HPP Fast Track Rehabilitation:

Of the 19 HPPs, there are several that contain large swaths of public sewers near water bodies. Most of these have been CCTV’d and are reported to have few structural defects. These specific HPPs likely have outsized rainfall induced infiltration (RII) impacts. These specific HPP areas total 31 miles of publicly owned sewers as shown in Table 3-1. While RII is a secondary driver to peak flow (which is generally inflow predominated), it is reasonable to assume that there will be significant benefit from sealing these mainlines, taps, risers, and potentially laterals. We propose to use a combination of capital grouting techniques and cured-in-place lining techniques. Capital grouting techniques, which are highly I&I effective and are typically more cost-effective than other rehabilitation techniques, are slow moving, so starting on them early gains the program time and allows these cost-effective techniques the greatest opportunity to reduce program costs. Any sewer or lateral found to require lining, bursting, or open cut replacement will be bundled for rehabilitation later in the program. Any sewers with significant root intrusion will be chemically de-rooted by Duke’s Root Control prior to rehabilitation.



Arcadis conducted grouting work at Sullivan’s Island, Aiken and HRSD VB340.



HPP Catchment	Description	Prong 2 - FastTrack Sequence	Total Miles	Public Miles	Private Miles	FastTrack - Public (miles)
YORK-001	Back yards, commercial, lots of defects		3.5	2.2	1.3	N
YORK-003	Single family, no defects	1	7.1	6.0	1.2	6.0
YORK-006	Single family homes, no private systems, Good starter for SSES		7.3	7.3	0.0	N
YORK-229-2	Mostly private, stream trunkline	9	5.5	3.2	2.3	3.2
NORF-H-106-G002	OFF ROAD		1.3	0.9	0.4	N
NORF-H-106-G001	Easy Road, Next to Water, Great Grout First	2	2.4	2.2	0.3	2.2
NORF-H-113-G001	Lots of CIPP Mains, Next to Water, Roads and back yard, Great Grout First	4	3.6	3.3	0.3	3.3
NORF-H-113-G1	Inactive mains, next to water, good small area to start with	5	1.2	1.1	0.1	1.1
NORF-H-113-G2	CIPPL mains, next to water, good Grout First candidate	6	0.9	0.9	0.0	0.9
NEWP-WCPSA001575	CCTV results with noted defects, lots of private sewers		6.7	5.4	1.3	N
NEWP-WCPSA001600	Lots of townhouses, lots of private		5.7	3.4	2.3	N
CHES-016	Townhouses, shopping centers, lots of private sewer		9.5	5.7	3.8	N
CHES-018	Mix of public and private, defects from CCTV		11.4	7.7	3.6	N
CHES-026	1/2 private, townhouses		2.4	1.4	0.9	N
CHES-032	Easy roads, not many defects	3	4.3	4.0	0.3	4.0
CHES-047	Lots of Defects		2.5	2.0	0.5	N
CHES-067	Single Family, Roads, few defects, good Grout First candidate	7	6.7	5.8	0.9	5.8
CHES-111	Fields and roads, single family homes	8	4.4	4.4	0.1	4.4
CHES-227	Mix		3.2	2.6	0.6	N
			89.6	69.6	20.0	30.9

Table 3-1. HPP Fast Track and SSES Sequence of Work



3. HPP SSES Source Locating and Private Side Definition:

These Fast Track HPPs will include areas without significant private sewers. Those HPPs with significant private systems will undergo Sanitary Sewer Evaluation Survey (SSES) evaluations because, in our experience, privately owned sewers tend to leak far more than public systems, and we want to discern if leakage in these HPPs originates primarily from privately owned sewers. So HPPs with significant amounts of privately owned sewers will be SSES evaluated before proceeding to rehabilitation.

Each of the ~150 private sewer properties will require a right-of-entry agreement for both SSES investigations and for any subsequent rehabilitation. Work will start with coordinating property owner outreach, notifications, and Locality outreach with HRSD’s communications team. We anticipate conducting night time weiring, flow depth sensor tracking, manhole inspections, roof drain assessments, and clean out inspections for every private property, with the potential for smoke testing as well.

Where not prioritized for Fast Track rehabilitation, publicly owned sewers will be evaluated using SSES investigations

potentially including flow depth sensor tracking, night time salinity testing, and/or night time weiring to confirm its contribution to leakage.



4. Non-HPP Identification:

Working with Steven Poe, Arcadis will evaluate if recalibrating portions of the RHM and LHM models provides a better basis for SSO locating/sizing, program level of service evaluations, and identify additional HPP catchments that benefit from the program.

Arcadis will install flow meters and rain gauges as appropriate to support this work, then work with HRSD to recalibrate the model as needed. Arcadis will also complete RDII analyses of the metered catchments to discern the nature and extent of leakage, assess reprioritization of the 19 HPPs, and assess the potential need for adding additional HPPs.

If additional HPPs are added to the program, they will be prioritized for rehabilitation and SSES work as described in prongs 1-3 above.

Part 3.B. Study, Design, and Construction Approach for this Program

Study Approach

Arcadis will use a combination of historical flow and rainfall data analyses, new flow data and rainfall monitoring, and additional SSES source locating techniques. These works will be completed nearly simultaneously.

All work will start with a deep dive into the historical data. For this, Arcadis will need to collaborate deeply with HRSD staff, Locality staff, and previous program consultants. This collaboration will unite program leadership staff at HRSD and Arcadis with a common understanding of idiosyncratic basin problem definitions and objectives by jointly

synthesizing past and newer data sources. Arcadis will primarily use previously collected flow data, CCTV reports, and SSES reports. We anticipate that this will include all catchments upstream of any 2008 modeled SSO to make certain that we are attacking the most influential problem areas. Because this is an SSO problem, the focus will be on inflow. Because inflow is generally laborious to find but inexpensive to remove, Arcadis is likely to recommend field assessments outside the HPPs, especially for manhole lid-frame-chimney and clipped cleanout (sheered off by lawnmowers) inspections for inflow sources.

Arcadis will gather the flow data from all sources available. We will conduct a rigorous and technically skeptical evaluation of the flow data to assess reliability, then discern the nature and extent of I&I in each metershed numerically and qualitatively via hydrograph interpretation, especially to assess outsized impacts of RII and inflow. ***This flow evaluation was integral to our success at reducing I&I and SSOs to satisfy consent orders in New Castle County, DE and Little Rock, AR, and entirely redefined the source reduction program into an inflow reduction program for the 985-mile Lehigh County, PA sewer rehabilitation program.***

Additionally, Arcadis will review all available CCTV data, primarily to identify pipe material, diameter, joint spacing, and tap configuration while also considering the type of structural defects and root intrusion evident to help shape the prioritization of areas and the selection of the most cost-effective rehabilitation techniques. Arcadis will also review the workplans and results summaries from all previous SSES investigations. From these historic record reviews, Arcadis will build GIS and table summaries of each catchment/subcatchment.

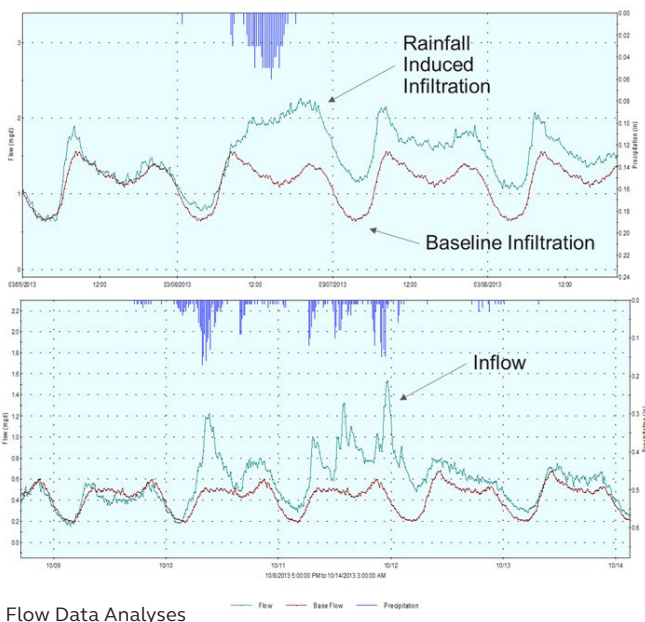
Areas requiring model recalibration will be identified in the first three months of the program and meters and rain gauges installed as soon as possible. Arcadis has no expectation for the number of meters required for this program, but our team recently completed a highly rigorous 120 meter Flow Characterization Study for Lehigh County Authority where **this data was used for triple duty: model calibration; I&I analysis and extent evaluation; and identification and prioritization of SSES techniques.** We anticipate meters will be installed in basins sized to optimize the data reliability/cost/ actionability triangulation.

Arcadis will also **immediately install rehabilitation effectiveness pre-rehabilitation meters in HPPs** sufficiently large (typically >4 miles of sewer main) to reliably collect accurate flow data, which is about half the HPP catchments. These meters will serve triple duty as well. For the balance of the HPPs, we will install Flow Depth Sensors to collect similar though less quantitatively accurate rehabilitation performance data. Field-verifications of monitor installment and data accuracy will be conducted by Arcadis staff. This is beneficial for collecting quality data to be used for subsequent analyses and model recalibration and allows Arcadis staff to develop comprehensive knowledge of the system to carry over to the subsequent analyses and model recalibration to make these as robust as possible. While meter studies are often measured in weeks, our experience indicates six to 10 months of flow assessment is necessary to ensure various types of storms and antecedent conditions are captured so that we have a complete understanding of the wet weather stress reactions in the systems and make certain that we identify the most effective solutions to reduce overflows. We recognize that this creates schedule difficulties, so this work will be prioritized at the start of the program. Arcadis will then recalibrate the required sections of the model. Where desired, we will also assist in the evaluation and selection of a new modeling platform as well as converting existing model platform over to the new model platform and appending LHM models to the RHM, as needed/desired by HRSD.

Meter Name	Manhole ID	Signatory	Net LF of Pipe	Net Parcel Count	Gross Parcel Count
SUMNER 1	12_14A	City	124,566	3,154	4,179

	SUMNER 1	SUMNER 1_Net
RDII Statistics Summary		
Dry Weather GPD/EDU	195	205
Average Dry Weather Flow, DWF (MGD)	0.817	0.647
Baseline Infiltration %	38%	40%
Average Peaking Factor- Average Daily DWF	3.6	4.1
Average Peaking Factor- Actual Time of Day	3.0	3.5
Max Peaking Factor- Average Daily Flow	6.6	6.4
Max Peaking Factor- Actual Time of Day	5.4	5.1
Average RDII Flow Rate (MGD)	0.331	0.329
Length Normalized RDII Flow Rate (GPD/LF)	1.7	2.6

Hydrograph Conclusions:
• Very minor RII
• Manholes F&C leakage from sheet flow
• Storm inlet or roof drains
• Stream flooding of MH F&C
Statistics Conclusions:
• Average GPD/EDU
• Very High Baseline Infiltration
• Moderate Peaking Factor (Peaking factor is suppressed because of high BI)
• Moderate RDII/LF
SSES Recommendations:
• Nighttime weiring – Priority 1 (Low RDII/LF but high BI)
• Smoke testing – Priority 1
• Manhole frame and cover and clipped CO inspection/pudding investigation- Priority 2



HPPs not being Fast Tracked will undergo SSES evaluations for RII and inflow using flow depth sensor tracking, night time salinity testing, and/or night time weiring. **All manholes and all cleanouts** in prioritized areas **will be inspected** to determine their contribution to inflow. We anticipate these field efforts to be conducted through 2024 and 2025 as weather permits.

Because SSES work is often limited by lack of rain conditions and may not be completed in one season/cycle, we **anticipate a second round of SSES work** for existing HPPs and a first round for newly identified HPPs in 2026 to complete the required source locating work ahead of rehabilitation prioritization and construction.

Design Approach

Rehabilitation work under this contract will primarily include all aspects of capital grouting, cured-in-place mainline lining, potentially lateral lining, manhole lining, manhole grouting, inflow dish insertion, manhole lid-frame-chimney sealing/resetting/replacement, cleanout cover repair/capping, excavated point repairs, and chemical root treatment. It may also include pipe bursting and open cut same trench replacement, though we anticipate these will be minimally applied.

Following our typical BINGO design-build approach, Arcadis will prepare technical specifications for these primary technologies at the start of the program. This will include reconciliation of the various design standards quoted in the RFP's Supplementary Conditions with Arcadis' preferred requirements. Deviations from existing Locality standards and specifications will be negotiated with each Locality. *Measurement and payment descriptions will include different cost structures for on-road, off-road, and significant traffic control work basis to minimize contractor refusals to work.*

We plan on several rounds of design/construction. As shown in our program schedule and described in our Program Understanding, **we will Fast Track sewer main, tap, riser, and lateral rehabilitation in several HPPs starting with a Grout First approach** in portions or all of nine HPPs. We will use HPP York-003, NORF-H-106-G001, and Ches-032, which total 12.1 miles of public sewer, as the cost basis for this first design/procure/construction round. This Fast Track round will give us a chance to learn the construction and permitting requirements/realities of three of the Localities. We anticipate this design and construction effort to be included in the first of several GMP agreements. Contract documents for capital grouting, manhole rehabilitation, chemical root treatment and mainline lining will be prepared shortly after program start. **We anticipate start of construction in 1Q25 with multiple construction crews.**

In December of 2025, based on lessons learned during the first group of Fast Track projects, we will modify the construction documents, get new pricing, and **release a 2nd group of Fast Track HPP packages** for the remainder of the Fast Track HPPs, totaling another 18.7 miles of public mains, with construction work on this group of projects **starting 1Q26**. We anticipate this design and construction effort to be included in the first Addendum to the GMP Agreement.

While these Fast Track rehabilitation works are underway, the additional HPP identification, the source location work in the remaining public and all privately owned sewer systems, and *negotiations with private sewer owners will be conducted*, resulting in a prioritized list of remaining work. From this list of work and the lessons learned during the two Fast Track rounds, a revised set of design specifications and drawings will be prepared. Pricing will then be acquired for the third GMP round of pricing (Comprehensive Agreement). Once the Comprehensive Agreement is completed, which we anticipate will be the end of 2026, *Arcadis will issue construction assignments in rolling tranches every six months* to ensure work goes to contractors with capacity and whose performance has met quality expectations.

Throughout this program, any work requiring either pipe bursting or same trench open cut replacement will be treated as a standalone design. We will design and procure these works as defined scope of work construction packages to account for the idiosyncratic site conditions that drive costs on these types of work.

Construction Approach

MANHOLE REHABILITATION

Arcadis will begin manhole rehabilitation in 1Q25. While all components of the manhole will be inspected, our attention will be primarily focused on the inflow aspects of the manhole. Based on the AMHIT inspections described above (*our Road Warrior team has inspected >7,000 manholes over the last three years*), Arcadis will ruthlessly pursue elimination of inflow leakage through the lid:frame:chimney (LFC) components of the manhole.



Performance required of an LFC in the crown of a road is different from those in the gutter or next to a swale, so we will make location-specific decisions about the LFC driven by the logic programmed into the AMHIT software. We will clean lid:frame interfaces to make them seal better; replace, raise, or reset frames and lids to make them watertight; and/or install finned gasketed inflow prevention dishes. Where resetting or replacement is not desirable due to paving conditions, we will use a very short list of proven effective chimney seal products to achieve chimney watertightness. Where brick and block manhole bodies leak, we will use fiberglass reinforced cement liners or, where needed for sulfide protection, calcium aluminate, epoxy, or polyurethane liners, depending on the hydrogen sulfide corrosion duty. Precast manholes that leak will be grouted to watertightness with hydrophobic polyurethane expansion grouts, as will all leaking pipe penetrations, including those that were previously cured-in-place mainlined without adequately performing liner:host pipe end seals.

Manhole rehabilitation will follow shortly behind manhole inspections, typically in groups of 150 manholes per assignment. Based on experience in other systems, as much as 80% of the manhole LFC's could require work while only 5% of manhole bodies will likely require rehabilitation. Like grouting and cured-in-place lining, Arcadis will use multiple contractors for this work and take advantage of specific pricing differences to provide the most cost-effective construction.

CLEANOUT REHABILITATION

Simultaneous to the manhole rehabilitation, Arcadis will begin conducting cleanout rehabilitation. The focus of cleanout inspections is primarily on the inflow aspects of the cleanout, but inspections will also document cleanout plumbing to determine its compatibility with lateral grouting techniques or cured-in-place lateral lining (CIPLL). Based on the ACOIT inspections described above, **Arcadis will ruthlessly pursue elimination of inflow leakage** through cleanout opening and the top 18 inches of the cleanout body. We will make location-specific decisions (performance requirements of a cleanout in a low lying portion of a driveway are different from those mounted near the top of a grade) driven by the logic programmed in the ACOIT software. We will install new cleanout covers or compression caps, rebuild the top 18-inches with cast iron (especially where lawn mowers have clipped the PVC stickups off below grade), and/or regrade around the cleanout to make them watertight and/or render them less susceptible to acting as areas drains. Any deviations from existing design standards or technical specifications will be negotiated with the owner of the asset. Where resetting or replacement is not desirable

due to paving conditions, we will use compression caps to achieve long-lasting cleanout watertightness.

Cleanout rehabilitation will follow shortly behind cleanout inspections, typically in groups of 500 cleanouts per assignment. Based on experience in other systems, we anticipate ~20% of the cleanouts will require work. **Arcadis will self-perform the cap and cover replacement work** and will use contractors for any work that requires minor excavation.

SEWER REHABILITATION

Simultaneous to the manhole and cleanout rehabilitation work, Arcadis will use **Expedited Holistic Sewer Rehabilitation (EHSR)** for most of the sewer pipe rehabilitation work. Work will be assigned to CCTV inspection crews on a sub-catchment basis, typically in two to four miles of sewer main per assignment. Ideally, these CCTV inspection crews are also capital grouting contractors as in our experience 79% (Aiken) to 98% (Sullivan's Island) to 100% (HRSD VB340, WSSC Piscataway, Lancaster RVH) of mains and 80% of lateral taps/risers are readily groutable and require no other rehabilitation techniques to make the mains, taps, and risers watertight and structurally sound for decades. However, we recognize that there are no grouting contractors presently based in the Tidewater area, so the only grouting firms initially starting work will be those Arcadis brings with it (i.e., Mobile Dredge Video Pipe, Standard Pipe Services-Aegion, Bio-nomic Services, Equix, GCU LLC, which may limit how much grouting we can actually accomplish versus the amount of pipe conducive to grouting. For that reason, we will likely also augment our start of construction with a dedicated CCTV subcontractor (likely TriState Utilities). The CCTV dedicated crew will be used in areas constructed of pipes of 3-foot joint spacing, which are typically cheaper to rehabilitate using CIPP than main line grout. This will allow for the CCTV/grout contractors to focus on areas more conducive to less expensive grouting.

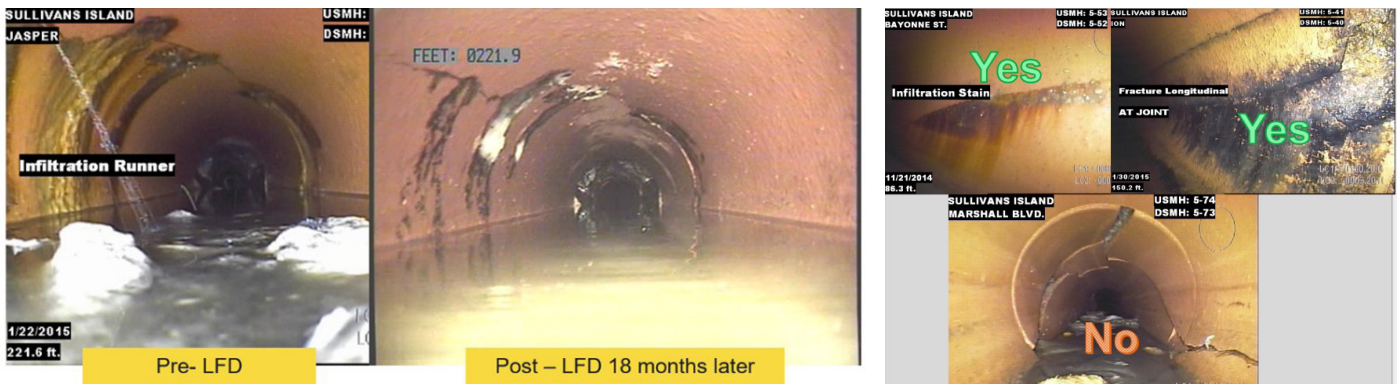
Capital Grouting is distinctly different from traditional pipeline grouting. It uses a stronger, more resilient grout recipe, applies four to 10 times as much grout, and provides a watertight and structural rehabilitation of sewers with a proven longevity of at least 25 years. Unlike CIPP which requires complete pipe replacement at the end of its life, a second round of grouting at a fraction of the cost of the first round is easily decades from now, if necessary. Capital grouting techniques are also great companions to mainline lining as a much less expensive replacement for lateral lining techniques. Capital grouting has been repeatedly shown in control basin proofs to provide the same effectiveness as mainline and lateral lining.

In EHSR, contractors start work by light cleaning and CCTV inspection. PACP reports and videos are uploaded to our SharePoint site at the end of each day. Twice weekly, Arcadis engineers (typically Jim or Paul) review each inspection and make a Basis of Rehabilitation (BOR) decision. Typically, fewer than 10% of the pipes require anything other than capital grouting to make them structurally stable and watertight for at least 25 years. Arcadis will use our **BORApp** to quickly confirm the most cost-effective combination of technologies to apply based on current available contractor pricing. We also consider both initial capital and life-cycle costs when selecting technologies to reflect different life expectancies between grouting, lining, bursting, or replacement. At this point, we also decide whether to grout or line the lateral via lateral tap connection (LTC), ultra long LTC (12 to 24-foot lateral grouting from main), LACO (Lateral Accessed via Cleanout for grouting laterals from cleanout to main), or CIPLL techniques, depending on the results of the CCTV and the presence of acceptable cleanout configurations and the location. We also consider when it is beneficial to have Contractor A perform one aspect of the rehabilitation while using Contractor B for another aspect; *it is very common for us to split out specific specialties based on specific unit pricing as well as track record of crews conducting these types of work*, especially for the more recently developed grouting innovations, tools, and processes (e.g., longitudinal

fracture defect (LFD) grouting for fractures and cracks, Low End Element Technique (LEET) for pipe with joint defects, and Soft Packer Technique (SPT) for 6-inch pipe) as well as decide whether to use water vs. steam vs. UV cured lining based on pipe defects and ground conditions. Where appropriate, *we will teach subcontractor teams these Arcadis innovations to expand the program team resources.*

Laterals whose leakage is cost effective to remove will be LACO grouted where cleanouts conducive to LACO tools are available. In areas where sewers are clearly underwater much of the time (e.g., next to water bodies) but where usable cleanouts are not present, Arcadis may sonde the lateral or enter the homes to locate where the lateral leaves the building, locate ideal places for cleanout installation, and install new sweep or double sweep cleanouts to facilitate lateral rehabilitation. To the extent practical, LACO grouting will address 4-inch-by-6-inch transitions in the laterals, if present. To the extent practical and agreeable to property owners, we will place new cleanouts as close to the transition to cast iron soil pipe to maximize I&I removal benefits.

Segments that have significant roots will be chemically treated with diquat dibromide by Dukes Root Control. While the root kill is nearly instantaneous, we will typically delay rehabilitation for four to six months to allow the roots to decay to the point where they can be removed with jetting rather than root cutters.



Longitudinal Fracture Defect Grouting

While Arcadis’ innovative capital grouting techniques and tools allow us to provide long-term seals and structural repairs for short cracks and fractures, it cannot repair breaks or holes or cracks/fracture that span through multiple joints. Segments that have a single break/hole are typically repaired with a cured-in-place point repair (CIPPR) and grouted, while segments with two or more breaks/holes are cured-in-place pipe lined (CIPLL). Depending on the pricing of available contractors, mainlines with short joint spacing (typically 3-feet or less) are also typically cheaper to CIPLL than to capital grout. Arcadis’ CIPLL specifications will allow steam, water, and UV cured lining systems. To minimize pinholes and prevent pipe collapse, we primarily use water cure CIPLL, but will use UV and steam curing as an alternate *in places where pipe bedding is stable.*

The same grouting limitations for mains apply to laterals. Laterals whose leakage is cost effective to remove but cannot be grouted may be CIPLL. For this work, Arcadis will use only LMK products as our experience with other lateral lining products have found them to have significantly higher rates of post-installation defects, failures and infiltration leakage. Having said this, we expect CIPLL work will be minimal as we have found less than 1% of laterals contain breaks or holes. To the extent practical, CIPLL will encompass 4-inch-by-6-inch transitions if present.

Part 3.C. Inflow Reduction and Cost-Effectiveness Analysis

Arcadis proposes to use two rehabilitation effectiveness monitoring practices. Both are quantitative assessments of flow change. They compare pre-rehabilitation flows with post-rehabilitation flows using area-velocity flowmeters installed at the catchment level downstream of an SRP work area.

The first practice is the control basin methodology, which, unlike simple end-of-system single meter monitoring accounts for antecedent rainfall, ground, and vegetation conditions. Using the pre-rehab and post-rehab flow data, Arcadis will perform an RDII volume rehabilitation effectiveness analysis of the rehabilitated HPP and compare this against a neighboring catchment that remains unrehabilitated. Pre-rehabilitation flow data will be either the 2008 flow data (if determined reliable and still relevant) or flow data collected at the start of this program. Arcadis anticipates all the Fast Track project areas will be monitored via control basin methods. The results of the inflow reduction and cost-effective analysis will become a major factor in guiding the potential necessity and location of additional sewer main and lateral rehabilitation work.

While the control basin method very reliably measures I&I volume removed, it poorly reflects reductions in peak flow rate during a rain event due to variability in rainfall intensities, timing of inflow surges, and hydraulic time of concentration issues between the two catchments. Model recalibration is the best technique to measure peak flow reduction. Arcadis will recalibrate and validate the model using the post-rehabilitation flow monitoring and rain gauge data. Once the model is recalibrated, Arcadis will compare against the 2008 model results to assess if source reduction work reduced the peak flows leading to SSOs and recommend additional rehabilitation locations and types of work, if needed and appropriate.

Part 3.D. Innovative Approaches to the Program

The team leaders for this proposal are published sewer rehabilitation industry thought and innovation leaders, who have worked together as a collaborative team for nearly 25 years.

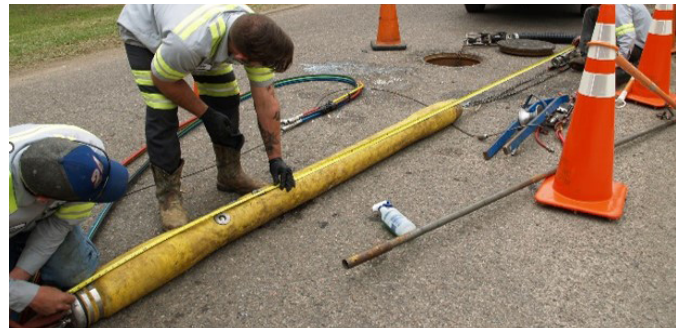
Ideas and Concepts

This team was the first in the industry to recognize and begin publishing the need for and the I&I reduction benefits of **holistic comprehensive rehabilitation** (vs. the still often prevalent yet failed find and fix approaches) in 2003.

This especially revealed the need to seal lateral taps and risers to achieve significant reductions in rainfall induced infiltration (2004 - Jim). Jim, Paul, and John Paul began publishing Arcadis' control basin rehabilitation effectiveness findings nearly a decade before others began. It is the many, many case proofs of I&I removal performance and I&I reduction longevity of different types of technologies and combination of technologies that gave Arcadis the confidence to begin offering guaranteed I&I reductions via our turnkey design-build BINGO offering more than a decade ago (2013 - Jim). We were among the first to recognize the impact of significant private-side clearwater elimination (2007 - Jim and Tony) and full-length lateral rehabilitation (2005 - Jim).

Technologies

This team was the first to recognize the process changes needed in test and seal (grouting) protocols that resulted in the development (2008 - Jim) and longevity effectiveness proofs (2012 - Jim and Emily) of capital grouting, which in turn led to NASSCO requesting Arcadis to write first the 2012 NASSCO Guidance Specification for Grouting (Jim) and then lead the 2022 wholesale revision to the NASSCO capital grouting specification (Jim and Emily).



Arcadis conducted grouting work at Sullivan's Island, Aiken and HRSD VB340.

This team also developed and tested the grouting innovations of fracture defect grouting and the development of the Fleetwood packer (2014 - Jim and Emily), LACO lateral grouting through cleanout

technique and packer design (2015 – Jim and Emily), low end element (LEET) technique for grouting fractured joints (2018 - Jim), and soft packer technique and tool design for 6-inch sewers (2019 - Jim), all developed under the freedom and deep collaboration afforded by Engineer-led design-build projects. So when we say Arcadis is **sewer rehab innovative**, in this context, we actually mean the leadership team we propose for this program.

Design and Construction

Perhaps most significantly, our team recognized sewer rehabilitation could largely **skip the design step and developed our Expedited Sewer Rehabilitation process, cutting project start to finish time and program cost significantly**. Coupled with the techniques in the previous paragraph, these innovations have been successfully applied across six large programs to date and to great effect; the 135 miles of rehabilitation for New Castle County took 13 years to complete while the 54 miles of rehabilitation in Aiken took less than three years and the 61 miles of rehabilitation in Little Rock took four years while **reducing program per mile cost by 50% to 75%**.

Arcadis was also the only engineering firm to offer guaranteed outcome sewer rehabilitation turnkey design-construction projects with the engineering team being both the designer and the general contractor, flipping the role of contractor to subcontractor and opening a new level of performance capabilities for utilities regarding I&I reduction, expedited rehabilitation, and influence over construction work.

Field Inspection Tools

As discussed above, Arcadis has developed and field perfected Fulcrum-based phone apps for manhole and for cleanout inspections. AMHIT and ACOIT have captured the complicated logic related to the thousands of permutations of site conditions and construction features to allow trained inspectors to look for, photodocument, and measure specific actionable items to consistently deliver the necessary Basis of Rehabilitation decisions for these critical inflow sources, *including all the field measurements required to go directly to construction*. Results are data rich without gathering or documenting information unnecessary to the rehabilitation process. All results are digital, so are readily loaded into GIS, CMMS, or data visualization tools as well as readily queryable within the tools or using Excel downloads.

Construction Control and Reporting Tools

For Arcadis, the challenges to construction controls for sewer rehabilitation design-build projects have been largely worked out via our innovative and tested suite of Tracker Tools. We use a data-centric method of project control employing multiple cross-referenced tools to track progress, assess production rates, predict work completion, evaluate costs, and influence installation quality.

Like most construction projects, productivity determines schedule, so schedule controls begin with documenting daily performance. To document field production, Arcadis uses computerized Inspectors Daily Reports (IDR). An IDR is generated each day for each contractor by the Arcadis construction engineers to document productivity, equipment and manpower uptime, traffic controls, confined space entry permit logs, safety issues, homeowner interactions, and QA/QC tests while influencing quality and production. Arcadis IDRs are cloud-based tools that largely automate pay basis.

Data from the IDRs are fed into a tracking tool called Pay Item Progress Payment Tracker (PIPT). The PIPT tracks daily, weekly, and monthly progress for each individual bid item for each individual contractor, identifies daily, weekly, and monthly production rates, and serves as a point of comparison against the production rates used to estimate our at-bid schedule. The PIPT serves as the basis for all unit price invoicing, both from our subs to Arcadis and from Arcadis to HRSD.

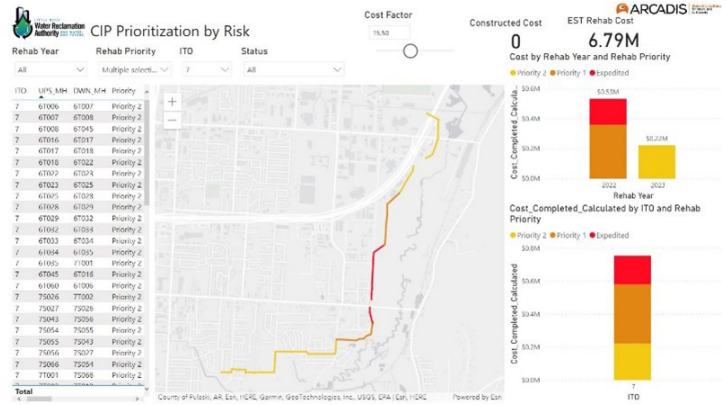
From a pipe standpoint, data from each segment is entered into our Sequence Tracker to track the dates of work, specific quantities, materials and methods applied to each pipe, and receipt and acceptability of PACP inspections and performance test results. The Sequence Tracker currently contains 143 different fields per main, including all fields specific to technology performance. We have a companion Lateral Tracker (113 fields) that similarly tracks lateral inspection and rehabilitation. Similar tracking is used for manhole rehabilitation and cleanout rehabilitation. (In locations with basements, we have similar tracker for basement inspections and corrective actions). Arcadis also relies heavily on our Issues Tracker. This tracker is linked to the other trackers and identifies and traces any issues preventing work, including access, specialized cleaning, chemical root control, cured-in-place point repairs, manholes unable to locate/open/access, special permitting, special traffic controls, special access requirements, segments and lateral that are determined to be poor grouting candidates but good candidates for CIPPL, replacement, etc.

Dashboard Development and Data Analytics

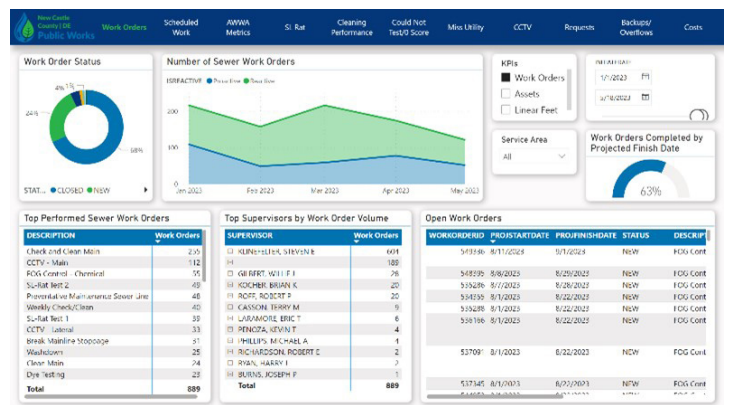
Dan Scrutchfield and Jaime Parson specialize in data analytics and innovative dashboards for our clients, including HRSD. They build dashboards and tools supporting a range of project and program needs. These tools are incredibly adaptable and powerful, combining data from disparate sources such as GIS, NOAA, USGS, CityWorks, NASSCO databases, and more.

All field data and construction performance data will be digital, including the use of cloud databases and geo-tagging. Our dashboards compile data from these and other sources to provide visual and dashboard interfaces for viewing all data on the program. **This makes our team efficient and our data management and storage more robust, and lets HRSD and Localities monitor performance via in near real-time throughout the project and use summary dashboards and key performance metrics for reporting and communication with their respective leadership and stakeholders.**

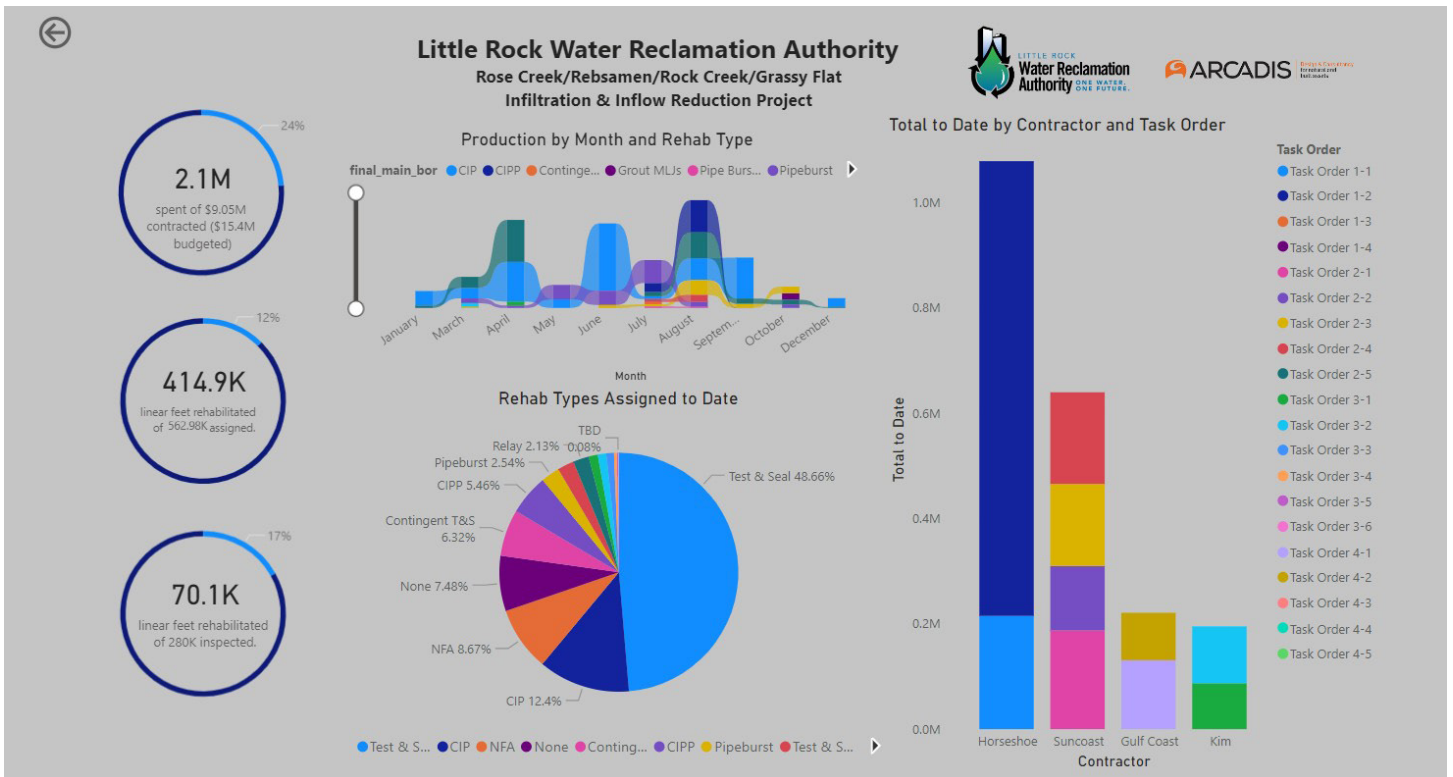
More advanced tools can also be incorporated into the data analytics, taking advantage of the continual developments with machine learning algorithms and “artificial intelligence”. Our team is pilot testing a similar sewer tool (operations-based) for New Castle County, DE to help prioritize, schedule, and manage preventive cleaning program at the asset level leveraging analysis of historical and geographical data for some 50,000 assets.



Large Diameter Sewer Rehabilitation Cost and Prioritization - Little Rock



Sewer Work Order Status and Cost Tracking - New Castle County

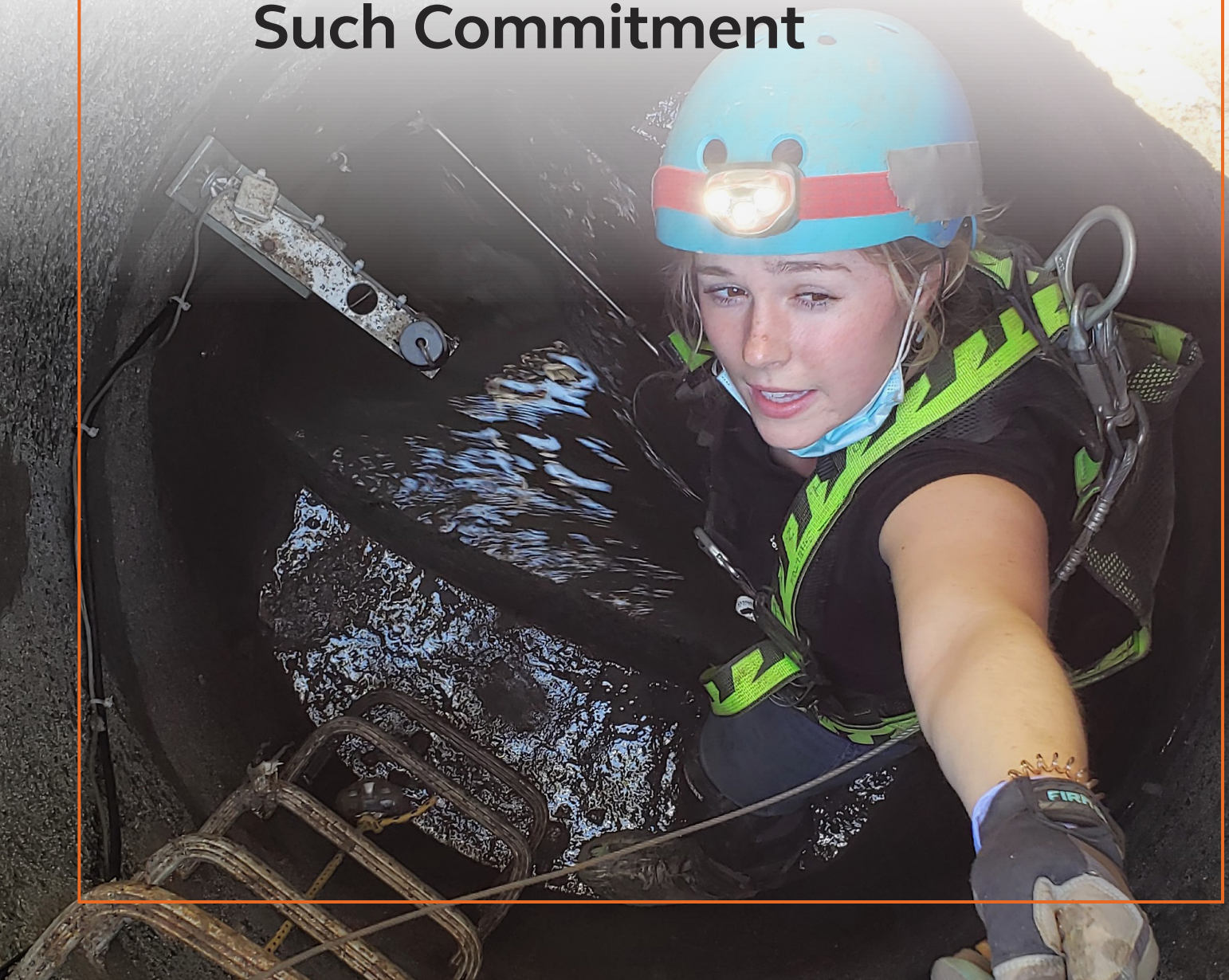


Small Diameter Task Order Tracker - Little Rock



Part 4.

Commitment by the Private Entity Not to Create Exclusive Relationships with Subcontractors or Specialty Firms, or Refusal to Make Such Commitment



Part 4. Commitment Not to Create Exclusive Relationships with Subcontractors or Specialty Firms

Arcadis will deliver this Program as HRSD's prime contract holder, using our unique and highly successful engineer-led process. Our process includes the development of work packages/ construction contracts, based on SSES and data driven evaluations, that we then compete amongst contractors and suppliers to result in quality at competitive prices.

We have not formed teams with contractors and suppliers in advance but rather allow the market to dictate our subcontracts with qualified and responsive service providers. We then leverage these economies to offer Guaranteed Maximum Price (GMP) assurance to our clients.

1

Our award winning, I&I rehabilitation, collaborative delivery process attracts contractors who like to work with Arcadis and who bring cost competitiveness to our programs. Arcadis has contacted these contractors; seven of these companies have indicated their intent to set up operations in Hampton Roads if Arcadis is selected. However, Arcadis has not entered into any exclusivity agreements or arrangements with these companies.

2

We reinforce to HRSD that we commit to not creating exclusive relationships with subcontractors or specialty firms and suppliers.

3



Arcadis' DBIA 2015 Award of Honor - Sullivan's Island Turnkey Sewer Rehab Construction Program



Harold Kosova Lifetime Achievement Award 2024 NASSCO-ICGC



Part 5.

Acceptance of HRSD's Proposed Terms and Conditions



Part 5. Acceptance of HRSD's Proposed Terms and Conditions

Arcadis **explicitly acknowledges acceptance** of the General Conditions, Supplementary Conditions, and Interim Agreement. Having said that, we offer the following observations.

1. Unlike the DBIA template documents, these contract documents do not offer the Owner an off-ramp at the GMP stage of the contract, which might be in HRSD's interest to have.
2. The Agreement contains for both liquidated and consequential damages. There is typically one or the other of these in a contract document.
3. The Agreement mentions penalties and fines that HRSD might be subject to the Entity would be responsible for under liquidated and consequential damages, but the basis of these are undefined in the RFP documents.
4. The documents cite a 5% retainage. Does HRSD intent to retain this amount for the entire 4 year contract period? Can this be broken into contract groupings?
5. Article 6 of the GC/SC requires \$74M in Builder's Risk insurance. Builder's risk is not typically needed for sewer rehabilitation work and Owners typically do not want to pay for unnecessary insurance. Why is it needed for this contract, and why is \$74M needed?
6. SC-7.19 does not limit liability to a defined and insurable amount.



Part 6. Appendices





Part 6. Appendices
Resumes - Arcadis



Jim Shelton, PE

Program Manager

Mr. Shelton is the National Technical Director for Buried Infrastructure, specializing in condition assessment and rehabilitation using trenchless technologies. He is/has been Program Manager for several large multi-year programs encompassing investigation, regulatory negotiation, condition assessment, engineering and capital planning, design, inspection, and construction for capacity assurance and/or rehabilitation of water and sanitary, combined, and storm sewer infrastructure in urban, suburban, and industrial systems. He leads teams of engineers and technicians that develop and implement inspection, leak detection, assessment, planning, modeling, permitting, design, construction management, and O&M consulting for public water utilities. Mr. Shelton is a licensed water and sewer contractor and leads ARCADIS's Pipeline Construction and Rehabilitation Practice. Leveraging decades of experience working closely with utilities to conceive, develop, and implement rehabilitation solutions that provide measurable capacity assurance, asset management, and long lasting effectiveness benefits, he specializes in the delivery of guaranteed outcome turnkey pipeline rehabilitation projects focused on leakage reduction (water and sewer) using Program Manager at Risk and Collaborative Design-Build.

Education/Qualifications

- BSE Chemical Engineering
University of Pennsylvania 1984

Years of Experience

Total – 39
With Arcadis – 27

Professional Registration/ Certifications

- Professional Engineer – VA PE
License # 0402041811, OH, NJ,
PA, DE, DC, NC, SC, MD, AR,
MI, NY, MO, IL
- Licensed Water and Sewer
Contractor – SC, NC
- NASSCO Pipeline Assessment
and Certification Program
- Project Management Certificate

Professional Associations

Chesapeake Water Environment
Association
Pennsylvania Water Environment
Association
National Association of Sewer
Service Companies
North American Society for
Trenchless Technology
Water Environment Federation

Office Location

Wilmington, DE

Relevant Experience

Klines Island Sewer System Sewer Capacity Assurance and Rehabilitation Program

Lehigh County Authority, Lehigh County, PA

As program manager, in response to PADEP and USEPA regulatory orders regarding SSOs and future capacity, developed a partnership between 14 different communities and municipal utility authorities to evaluate current and future flow conditions, assess I&I impact on the 985 miles of pipe within the various systems, determined a collaborative corrective action plan, and is currently implementing that plan. Work was begun by repairing broken relationships, establishing trust, and negotiating an MOU between the partners to conduct the assessment phase of the work. Acting a program consultant and trusted advisor, worked with the individual community staffs and their engineering firms to implement a consistent SSES, project future development impacts, and prioritize and track sewer rehabilitation and capital improvements over more than a decade. Developed an InfoWorks model to support multiple level of protection evaluation and alternatives analysis. Developed 20 alternative scenarios and worked with municipal leadership to select the best approach: a \$90M Source Reduction Program coupled with \$159M in conveyance upgrades and a \$119M

wet weather treatment upgrade to the WWTP. Orchestrated the implementation of consistent rehabilitation works between 9 different engineering firms engaged directly by Signatories to deliver consistent, highly effective, long lasting I&I removal projects over a 15-year period. Negotiated a 4-year extension to the original 5 year USEPA Administrative Order, then negotiated two separated consent orders with both PADEP and USEPA Region 3 governing the 25-year compliance schedule to achieve the required 5-year overflow frequency.

Sewer Rehabilitation Program

Emerald Coast Utilities Authority, Pensacola FL

Served as program developer for ECUA's ongoing sewer rehabilitation program for their 856 mile, 347 pump station sanitary sewer system. Managed engineering services for multiple projects to identify, prioritize, design, construct, and implement cost-effective solutions during the first 5 years of the program, then acted as program consultant afterward. This comprehensive program involved hydraulic and physical condition assessment, including flow monitoring, inspections, cleaning, internal testing, and engineering evaluations to identify and prioritize areas for rehabilitation and provide a benchmark for determining the effectiveness of implemented solutions. Activities included a complete evaluation of the existing systems and data, then development of monitoring programs intended to identify the nature, extent, and sources of I/I, cross connections, and structural failures. Based on these hydraulic integrity condition assessments, the rehabilitation was prioritized based on contribution of I/I, anticipated failure period, and other criteria. This prioritization identified projects requiring R&R, which in turn were prioritized, then scoped, budgeted, designed, and constructed. Program development included the development and maintenance of a master program schedule, capital improvement plan and budget, public involvement plan, ongoing community relations and public meetings, and program management.

Princeton: MiniSystems 35/36 Sewer Rehabilitation

Municipality of Princeton, NJ

Project manager, engineering design lead, and construction manager for a collection sewer rehab project to stabilize, repair, and reduce I&I from 15 miles of 40-60 year old 8-inch - 12-inch VCP and ACP sanitary sewers featuring Arcadis' Expedited Rehabilitation Approach. Arcadis developed construction package, assisting in contractor selection, and inspected all aspects of the inspection and cleaning, pipeline packer injection grouting, cured in place point repairs, excavated point repairs, chemical root treatment, and manhole grouting and lining work. Grouting techniques include MLJ, LEET, LFD, LTC, and LACO.

Interceptor Sewer Rehabilitation Progressive Design-Build Project

City of Springfield, MO

Program developer, engineering design lead, and construction manager for a progressive design-build project to stabilize, repair, and reduce I&I from 5 miles of 30-inch – 54-inch RCP sanitary sewers featuring Arcadis' Expedited Rehabilitation Approach. Arcadis engaged three trenchless subcontractors, providing significant overlap of

capabilities to minimize performance risks and to complete the project quickly and cost effectively. Arcadis conducted training for each contractor in the specialized techniques necessary then organized and directed the daily field activities. This turnkey work featured the capital grouting techniques that addressed the specialized needs of large diameter sewers impacted by weak backfill, leaking joints, and internal pipe corrosion issues.

Private Sewer Clearwater Source Removal Program Pilot

Washington Suburban Sanitation Commission, MD

Program developer for a pilot program to first evaluate the sources of and impact of private property clearwater connection (sump pumps, punctured floor drains, foundation drains, roof drains) and private-side lateral defects on I&I flows and then develop and implement approaches to eliminate these sources. Rehabilitation solutions included disconnections, basement modifications, lateral grouting, and lateral rehabilitation.

Piscataway EHR Sewer Program Pilot

Washington Suburban Sanitation Commission, MD

Program developer and construction manager for a pilot program to develop and implement sewer rehabilitation in a 15 mile basin of the Piscataway sewershed using Arcadis' Expedited Rehabilitation Approach. Arcadis worked with WSSC to develop a multi-awarded IDIQ construction package, assisting in contractor selection, and then provided full construction management, engineering, and inspection control for all aspects of the inspection and cleaning, lateral sounding and inspection, establishment of what rehabilitation techniques to apply to each pipe, chemical root treatment, pipeline packer injection grouting, cured in place point repairs, excavated point repairs, cleanout installation, manhole grouting and lining work, cured in place mainline and lateral lining, and pipe bursting. Grouting techniques include MLJ, LEET, LFD, LTC, SPT, and LACO.

Brandywine Hundred Sewer Rehabilitation and Capacity Assurance Program

New Castle County, New Castle DE

Program manager for the development and implementation of a \$300 million, 18 year sewer rehabilitation to eliminate stream discharges, basement backups, and manhole overflows during rain events from an aging suburban sanitary sewer system. I&I program reduction goals were achieved 5 years early and \$150M under budget. Managed engineering services for nearly 200 separate projects to identify, prioritize, design, construct, and implement cost-effective solutions to the leaking sewer problems in the 420-mile Brandywine Hundred Sewer System. This comprehensive program involved investigation, regulatory negotiation, condition assessment, engineering and capital planning, design, and

construction oversight. Work included manhole, pipe, and lateral inspection and assessment, I&I data interpretation, pipeline inspection and SSES, infrastructure rehabilitation prioritization, hydraulic modeling (XP-SWMM and InfoWorks), and regulatory negotiation and planning prior to design and construction of more than 135 miles of mainline rehabilitation and replacement, 4800 manhole repairs, 9400 laterals rehabilitated, 3800 cleanouts installed on private property, and hundreds of private property clearwater connections (sumps, floor drains, and roof drains) identified and disconnected, all with less than a 1% change order value. Rehabilitation methods designed and/or constructed under these programs/projects include chemical grouting, spray-on coatings, cured in place lining, lateral lining, slip lining, pipe bursting, open cut sewer replacement, jack and bore, microtunneling, tunneling, horizontal directional drilling, force main piping and replacement, and manhole grouting, lining, and chimney coating. Implementation of this program entailed more than 100 public presentations and the successful negotiation of more than 3000 easements and temporary access agreements for private property work.



Travis Davis

Program Executive, Locality Liaison Coordinator

Mr. Davis will serve as the program executive responsible for project resourcing, and monitoring HRSD feedback regarding team performance. He will take responsible charge of all program communications aspects of the program. He will be responsible for management of subconsultants, resource planning, and invoice generation. He will serve as HRSD's advocate within the program team. He will act as program conduit for liaison work with the five localities. He will be the secondary point of contact with the HRSD project managers for this work.

Travis has supported Special Order By Consent (SOBC) work in Hampton, Newport News, James City County, Gloucester County, City of Williamsburg, and York County, Norfolk, Virginia Beach, and Chesapeake. Mr. Davis has managed and performed condition assessment of both sanitary sewer and storm water infrastructure. From these condition assessments he helped identify priority project areas and take them from concept to construction.

Education/Qualifications

- BS Civil Engineering Technology
Old Dominion University 2006

Years of Experience

Total – 19
With Arcadis – 6

Professional Registration/ Certifications

- Certified Nutrient Management
Planner-VA

Office Location

Virginia Beach, VA

Relevant Experience

SSES Program

Hampton, VA

Part of the SSES program management team for the City of Hampton, VA. The team managed and performed all aspects of the city's SSES program including condition assessment, flow monitoring, rehabilitation planning and design. The team's approach to system rehabilitation was adopted by the city and was the basis for their standard approach to system prioritization and rehabilitation to reduce I&I.

Sanitary Forcemain Prioritization Study

Virginia Beach, VA. (068002)

The City of Virginia Beach has a collection of sanitary sewer force mains that convey wastewater from the pump stations are comprised of approximately 1,061,773 LF of pipe. Many of these force mains have experienced failures in the past or are rapidly approaching the end of their effective useful life. The City had previously developed an Integrated Planning Model (Excel based) which calculates Probability of Failure (PoF) and Consequence of Failure (CoF) for every force main. This model was given to Arcadis for analyzing the existing force mains for this study. Travis managed the team as they use the City's existing model and GIS to create and prioritize projects for replacement via Horizontal Directional Drilling technology (HDD). Also, as part of the project the Arcadis team assisted the City with the development of a CIP based around these proposed HDD projects.

Special Order by Consent (SOBC) Services

Hampton Roads Sanitation District, Hampton, Virginia.

Project Engineer for the support of various locality programs throughout Hampton Roads. The localities were brought under SOBC by DEQ and EPA Region III in 2007 to eliminate sanitary sewer overflows. Assisted in numerous tasks

including flow monitoring, SSES studies, data processing, condition assessment, criticality assessment and rehabilitation plans. Travis assisted the localities (listed below) in the standardization of condition assessments around the National Association of Sewer Service Companies Pipeline Assessment and Certification Program / Manhole Assessment Certification Program methodology.

- City of Newport News — Program management firm, managed field operations for condition assessment, processed and analyzed data and developed reports.
- York County — Planned and managed condition assessment field work, analyzed data and developed report. Used data collected to develop detailed Rehabilitation Plans for identified SSES basins.
- Gloucester County — Developed CMOM plan and SSES plan including sanitary sewer scoring/ranking criteria to meet consent order requirements. Planned and managed condition assessment field work analyzed data and developed report for 25 basins ranking them in order of criticality. Used data collected to develop detailed Rehabilitation Plans for identified SSES basins.
- James City Service Authority — Developed a sanitary sewer scoring / ranking criteria for James City County's Consent Order requirements. He compiled and compared the data for approximately 100 basins and then ranked them in order of criticality.
- City of Williamsburg — Developed SSES plan and Flow Evaluation Report. Managed field operations processed and analyzed condition assessment work and developed reports.
- City of Chesapeake — As a sub-consultant to the lead program management firm, developed a smoke testing program, implemented field work, processed data, and analyzed the results to provide recommendations regarding sanitary sewer rehabilitation and further investigations.

Park Hydro Sewer Rehabilitation

City of Richmond, VA

Mr. Davis was the design engineer for this project. He worked closely with Jim Shelton, Paul Batman and Mike Mull on the condition assessment and rehabilitation of approximately 400 LF of sanitary sewer infrastructure ranging in size and shape from 36-inch RCP, 81-inch stone arch and 84-inch RCP box. Aside from the challenge in working with the irregularities of 82" stone arch pipe, the alignment was located under a CSX railway. Visual inspection of the alignment was performed, and rehabilitation recommendations were developed. A combination of grouting and either shotcrete or centrifugally-cast concrete pipe lining (CCCPL) were proposed.

Daniels Run Rehabilitation

Work Package, Fairfax, VA

Project engineer responsible for the development of a prioritized work package under an annual services contract with the City of Fairfax to identify problematic sanitary sewer pipes within the city. Upon review of condition assessment data, a project area was selected. This work package proposed the rehabilitation of approximately 2310 LF of 18-inch gravity sanitary trunk main found to have numerous PACP structural and maintenance related defects as of January 2011. The project area was located centrally in the City of Fairfax running parallel to Old Lee Highway on the south side (Planimetric Page 57-2). The western portion of the project area was directly adjacent to Old Lee Highway and crosses Farrcroft Drive. The eastern portion follows the Daniels Run Walking Trail. The trail runs along Daniels Run Creek with multiple bridge crossings throughout, however none of the pipes proposed for rehabilitation are in the vicinity of these crossings.

Andrews AFB I&I Study (East)

In close proximity to Washington D.C., Joint Base Andrews (formerly Andrews Air Force Base and Naval Air Facility Washington) plays a critical role in ensuring the nation's security. Since early 2006, Terrapin Utility Services, Inc. (TUS) has been operating and maintaining its water and wastewater systems. TUS is responsible for operating, maintaining, assessing, and upgrading the water and wastewater systems across the 7,000-acre base. Its duties include managing 300,000 LF of water distribution pipe, 300,000 LF of wastewater collection pipe, and 60 lift stations. Mr. Davis managed the project which provided TUS an Inflow and Infiltration (I&I) Study for the East side of Joint Base Andrews. Services provided included data management, field inspections and data analysis, and a final report of the findings and recommendations of the study. The purpose of the study was to identify critical areas of inflow and infiltration to assist TUS in locating and prioritizing future rehabilitation or replacement work and reduce overflows in the Eastern sanitary sewer system. The field aspect included 38,221 LF of smoke testing via 23 setups within the Eastern portion of Joint Base Andrews in March 2016. The next phase of field inspections was performed by a sub-contractor, on behalf of the prime consultant, and consisted of closed-circuit television (CCTV) investigations of the sanitary and storm sewer systems. The purpose of the CCTV investigations was to provide more detail of areas of concern indicated by the smoke testing performed. The final phase of the project consisted of prioritizing defects and making recommendations for system improvement. The project came in approximately \$14,000 under budget.



Emily Sadowsky

SSES, Construction Engineering

Mrs. Sadowsky will direct all SSES activities, including manhole inspections, night-time weiring, smoke testing, basement inspections, and cleanout assessments. In this role, she will both direct and train the field teams as well as be responsible for the expert interpretation of findings relative to leakage source locating. She will also act as program construction superintendent; all construction engineering staff will report through her, and construction data metrics tracking will be her responsibility.

Mrs. Sadowsky specializes in conditional assessment and construction activities related to buried infrastructure work for municipal and industrial clients. Mrs. Sadowsky has provided management, engineering and field support for projects involving municipal wastewater collection systems evaluations, design, and construction and storm water rehabilitation and design.

She has managed, led and performed numerous inflow/infiltration studies and infrastructure evaluations and provided construction oversight. This work includes basin prioritization, flow analysis, smoke-testing, flow metering, above grade storm observations, nighttime infiltration evaluations, basement inspections, manhole/catch basin inspections, dye-testing, reviewing, and coding CCTV inspection videos, photographs, and inspection reports using PACP, LACP, and MACP defect coding, and developing rehabilitation recommendations. Her experience with rehabilitation methods includes cured in place pipe/lateral lining; mainline and lateral test and seal; open-cut sewer replacement; manhole grouting, lining, and chimney replacement. Mrs. Sadowsky is proficient in the use of GIS.

Relevant Experience

Storm Water Rehab Project

Ford Motor Company, Livonia, MI

Served as the technical expert for a storm water rehab project to eliminate groundwater leakage and structurally secure various sizes and materials of leaking storm sewers on an industrial facility. Oversaw open cut and trenchless subcontractors. Provided oversight of the following trenchless technologies, Test and Seal, CIPPL, man entry injection grouting and manhole lining. Open cut work included manhole and lamphole installations, chimney resets and pipe replacement. Responsibilities included submittal review, daily interaction with contractors and client, daily planning, coordination and execution of work, H&S, coordination with the plant to maintain normal plant operations, making sure the specifications were met and the work was completed to standard, completing daily inspection reports including logs and pay reports, tracking work completed and issuing payment for work completed and processing pay applications.

Sewer Rehabilitation Project

HRSD, Virginia Beach, VA

Served as construction supervisor for a construction management at risk project featuring Arcadis' SAPR (Stabilize-Assess-Prioritize-Rehab) approach to

Education/Qualifications

- BS Environmental Protection
West Virginia University 2006

Years of Experience

Total – 17

With Arcadis – 17

Professional Registration/ Certifications

- NASSCO Pipeline Lateral, & Manhole Assessment and Certification Program
- NASSCO Inspector Training & Certification Program for CIPPL
- Avanti Municipal Grout Operator Trained
- PADI Certified Open Water Diver

Office Location

Wilmington, DE

reduce leakage and structurally secure sanitary sewers. Oversaw two trenchless subcontractors. During the oversight, testing of mainline joints and laterals took place. Laterals connected to manholes were also tested and grouted. Cured in place point repairs and manhole grouting were used sparingly as the grouting work proved to be overwhelmingly successful. Responsibilities included submittal review, daily interaction with contractors, client and customers, daily planning, coordination and execution of work, H&S, making sure the specifications were met and the work was completed to standard, completing daily inspection reports including logs and pay reports, tracking work completed and issuing payment for work completed and processing pay applications. Rainfall derived inflow and infiltration volume was reduced by 36%.

Phase One Sewer Rehabilitation CMAR Project

Town of Sullivan's Island, SC

Served as construction supervisor for a construction management at risk project featuring Arcadis' SAPR approach to reduce leakage and structurally secure 7.5 miles of badly leaking sanitary sewers on a sandy barrier island. Oversaw one open cut and six trenchless subcontractors. During the oversight, testing of 6616 mainline joints and 383 laterals took place. 38% of the pipe joints and 87% of the laterals failed the air test and were successfully grouted. Additionally, approximately 400 pipe fractures and cracks were successfully sealed, some using a new technology developed by Arcadis specifically to seal previously ungroutable longitudinal fractures, called Long Sock Fracture Grouting. 91 laterals connected to manholes were also tested and grouted. 454 laterals were sonde and televise inspected from the main to the house (average length 55-feet). Cured in place point repairs, mainline lining, manhole lining, and excavated point repairs were used sparingly as the grouting work proved to be overwhelmingly successful.

SSES Emergency Efforts

City of Atlanta, Atlanta GA

Lead and directed ten field inspection crews dispatched to verify if manhole and pipe rehabilitation was performed. Responsibilities included coordinating assets on priority list with the client, handing out field assignments to the crews making sure they had corresponding maps and proper equipment, fielding phone calls and questions from the field teams and offering support, organizing, analyzing and verifying field data. Coordinating with the client on GIS field maps and updating the client daily on our daily progress and results. If rehab work was not completed, assisted in coordinating a subcontractor to do the rehab work and provided construction oversight while overseeing and supporting other construction inspectors.

River Valley Highlands Sewer Rehabilitation

City of Lancaster, OH

Served as the construction superintendent for the project which included approximately four miles of the City's sewer system. The goal of this project was to lower leakage from these sewers and to stabilize the structural condition of the pipes for the next 30 years using a design-build approach. Work included the development of specifications; cleaning and assessing the condition of sewers and rehabilitating the sewers and manholes primarily using grout sealing technologies augmented by minor mainline lining and excavated point repairs. Pipeline packer injection grouting was used to achieve a complete elimination of all overflows with a nearly 70% reduction in RDII. Warranty inspection 2 years after completion of work showed a nearly 100% of the sealed defects remained airtight.

Little Rock Small Diameter I&I Reduction Program

Little Rock Water Reclamation Authority, AR

Task manager for SSES and inspection activities including night-time weiring, smoke testing, wet weather observations, and manhole inspections. Provided final rehab recommendations for manholes. Provided technical support and guidance to construction inspectors particularly regarding grouting and performed routine QAQC on inspector daily reports and contractor submittals.

Piscataway EHR Sewer Program Pilot

Washington Suburban Sanitation Commission, MD

Lead construction inspector and construction administrator for a pilot program to develop and implement sewer rehabilitation in a 15 mile basin of the Piscataway sewershed using Arcadis' Expedited Rehabilitation Approach. Arcadis worked with WSSC to develop a multi-awarded IDIQ construction package, assisting in contractor selection, and then provided full construction management, engineering, and inspection control.



Paul Batman, PE

Rehabilitation Prioritization, Rehabilitation Method Selection, Contractor Procurement

Mr. Batman will be responsible for assessing physical condition assessment findings, prioritizing work for construction based on SSES and CCTV findings, rendering basis of rehabilitation decision for mains, taps, risers, laterals, and manholes, and building task order assignments to construction subcontractors. He will also assist in the negotiation of subcontractor unit prices, assessment of value vs. cost evaluations across subcontractors within a specific specialty, and development and maintenance of program life cycle/capital cost rehab methods decision tools.

Mr. Batman has been involved as program manager, project manager, or senior engineer in sewer infrastructure investigation and rehabilitation efforts for projects and programs nationwide. His experience includes inflow & infiltration (I&I) studies, infrastructure evaluations, physical condition assessments, gravity sewer design, gravity sewer operations and maintenance planning and implementation, water distribution design, sanitary sewer rehabilitation, storm system rehabilitation, preparation of construction/bid documents, construction administration services, design support during construction, community relations, and flow data analysis for evaluating effectiveness of I&I reduction efforts. Mr. Batman is currently Arcadis's national practice coordinator for buried infrastructure assessment, design and rehabilitation and is responsible for identifying and sharing our best talent, tools and practices with project teams and clients nationwide.

Education/Qualifications

- MS Environmental Engineering
Drexel University 1999
- BS Environmental Health
Sciences West Chester
University 1996

Years of Experience

Total – 26

With Arcadis – 24

Professional Registration/ Certifications

- Professional Engineer – VA PE
License # 0402057503, DE, MA,
MD, NY, PA
- NASSCO Pipeline, Lateral and
Manhole Assessment and
Certification Programs (PACP,
LACP and MACP) License # U-
1102-426 (8/10/2026 exp)

Professional Associations

Water Environment Federation
Chesapeake Water Environment
Association

Office Location

Wilmington, DE

Relevant Experience

Little Rock Small Diameter Inflow and Infiltration Reduction Program

Little Rock Water Reclamation Authority, AR

Program manager directing this effort using Arcadis' "Expedited Holistic Rehabilitation" approach across a 375-mile portion of the system. The goal is to reduce overflows in less than 5 years by identifying I&I sources in mains, manholes and laterals by SSES and inspection, then quickly moving assets into rehabilitation using Indefinite Deliverable-Indefinite Quantity (IDIQ) contracts. Work includes flow data analysis for 40 flow meter subbasins, night-time weiring, smoke/dye testing, inspection, rehabilitation selection, construction management, and analysis of post-rehabilitation flow reduction. Rehabilitation technologies include CIP lining, pipe bursting, open cut replacement and joint, tap and defect grouting.

Brandywine Hundred - Infiltration and Inflow Evaluations

New Castle County, DE

Project manager and project engineer for I&I evaluations for an area spanning 4 sewersheds and containing over 420 miles of sewer and over 20,000 residences and businesses. Smoke testing was conducted to identify inflow sources. Night-

time flow isolation weiring to identify pipes with high baseline infiltration and greatest potential for rainfall-derived infiltration. Results were used to prioritize the system for inspection, assessment and ultimately rehabilitation.

Storm System Inspection and Rehab Program

Fairfax County, VA

Assistant program manager and project engineer for multi-year inspection, condition assessment and rehabilitation. The program involved 41 individual projects among eight project managers and project teams spanning five offices. Program-specific policies, processes, tools, and job-specific training were developed which provided consistent work and deliverables across project teams. Inspections covered 80 miles of storm conveyance pipes ranging 12-inch to 66-inch diameter round, up to 66-inch-by-40-inch arched and up to 72-inch-by-96-inch box. Rehabilitation technologies included cured-in-place pipe liners and point repairs, pressure testing and chemical sealing of pipe joints, excavated point repairs, masonry repairs and fiberglass reinforced cementitious liners (for manholes and catch basins), pipe excavation and repair/replacement, and stabilization and concrete repair of storm water channels.

I&I Reduction Effectiveness

Emerald Coast Utilities Authority, Pensacola, FL

Senior project engineer providing QAQC of infiltration/inflow (I&I) analysis as well as technical guidance for the implementation and analysis of flow monitoring for assessments to determine the effectiveness of rehabilitation efforts at reducing I&I, using a control basin analysis method.

Consent Decree Sewer Rehabilitation Program - Design BOA

Washington Suburban Sanitary Commission, Laurel, MD

Program manager and engineer of record for the rehabilitation design for more than twenty Indefinite Deliverable-Indefinite Quantity (IDIQ) Contract task order packages totaling over \$60M in construction cost for sewers ranging from 8-inch - 48-inch diameter with many sites located in and requiring access roads through environmentally, historically, and/or culturally sensitive areas requiring additional site investigation and permitting efforts.

Wastewater Engineering BOA (Pipe Assessment)

Washington Suburban Sanitary Commission, Laurel, MD

Project manager for BOA contract for Water/Wastewater Systems Assessment Division aimed at supporting sewer assessment and investigation, including collection sewers, large diameter trunk/interceptor sewers, and force mains. Fifteen task orders totaling approximately \$4M issued, including assessment of approximately 12,000 LF of the 36-inch and 42-inch PCCP Broad Creek Force Main

Trunk Sewer Inspection Services (Rounds 3 and 4)

Washington Suburban Sanitary Commission, Laurel, MD

Project manager for over 5,000 trunk sewer manhole inspections by Arcadis crews and subcontractors in the Piscataway and Seneca sewersheds for the Round 3 5-year contract (awarded 2016) as well as overseeing more than 10,000 collection system manhole inspections in the Piscataway Sewersheds by more than 15 crews from multiple Trunk Sewer consultants and their subcontractors. Currently overseeing trunk sewer manhole inspections in Rock Creek sewershed for the Round 4 contract (Awarded 2022).

New Castle County

Wilmington, DE

Project manager and senior engineer for the development a new approach to O&M for the 2,000-mile collection system aimed at reducing overflows and blockages while managing increasing costs by optimizing the frequency of cleaning and inspection activities. This included program elements addressing issues such as (FOG), mainline blockages and overflows, roots, trunklines, interceptors, and preventive maintenance of collection sewers. The development work was followed by implementation of several program elements as well as pilot testing of acoustic pipe testing as an assessment step to target cleaning on those pipes needing it most. Currently developing dashboard tools for operational support.

JEA Large Diameter Evaluation and Replacement Program

JEA, Jacksonville, FL

Served as technical advisor and support engineer during condition assessment of more than 900 miles of large diameter water, gravity, and force main pipelines for risk assessment, capital program development, conceptual design, and the I&I analysis and SSES of an 80-mile sewershed.



Daniel Cooper, EIT, CDT

Rehabilitation Design/Contract Development

Mr. Cooper will be responsible for the preparation of design specification, drawings, pre-rehab asset inventory trackers, and pre-negotiation cost estimates. He will also be responsible for subcontract agreements, resolution of pre-construction RFIs, and review of all pre-construction subcontractor submittal reviews.

Mr. Cooper is an experienced buried infrastructure engineer who leads design and construction engineering for water, storm, combined, and sanitary sewer pipelines nationwide. He regularly performs water and wastewater inspections of plants and pump stations to identify maintenance needs and capital improvements. He is proficient with design phase services, including utility coordination, permitting, geotechnical investigations and reporting, contract drawing development utilizing AutoCAD, AutoCAD Civil 3D and GIS, contract specification development. He is also proficient in project management and cost estimation, construction engineering, and contract management. Construction rehabilitation methods designed and/or constructed under these projects include chemical grouting, spray-on coatings, cured-in-place lining, lateral lining, open-cut sewer replacement, jack and bore, and manhole grouting, lining, and chimney coating.

Relevant Experience

New Castle County, Brandywine Hundred SSES, I&I and Sewer Rehabilitation and Capacity Assurance Program New Castle County, DE

Project engineer for sewer rehabilitation projects for 730,000 LF of sewer in eight sewer basins within New Castle County. Rehabilitation methods designed and/or constructed under these projects include chemical grouting, cured-in-place lining, lateral lining, open-cut sewer replacement, jack and bore, and manhole grouting, lining, and chimney coating. The projects included approximately 77 miles of cured-in-place pipe lining (CIPPL), 62 miles of test and seal, five miles of open cut collection, trunkline, and interceptors, nearly 10,000 cured-in-place lateral liners, and rehabilitation of more than 2,000 manholes.

Small Diameter Sewer Assessment and Rehabilitation Program Little Rock Water Reclamation Authority, Little Rock, AR

Project engineer for inspection and rehabilitation of small diameter (6 to 15-inch) sanitary sewer inventory. Work included evaluation of CCTV to determine rehabilitation technologies for more than 75,000 LF of inventory across eight basins and develop construction rehabilitation task orders for contractors. Assisted with the development of four construction contract specification

Education/Qualifications

- BS Environmental Systems Engineering The Pennsylvania State University 2007

Years of Experience

Total – 17

With Arcadis – 17

Professional Registration/ Certifications

- Construction Document Technologist
- Pipeline Assessment and Condition Assessment (PACP)
- Fundamentals of Engineering – PA

Office Location

Philadelphia, PA

packages, utilizing the client's standard documents and modifying them based on Arcadis' proven rehabilitation specifications.

**Allentown Water System Master Plan:
5-Year Update**

Lehigh County Authority, Allentown, PA

Project engineer responsible for the preparation of a revised long-term master plan for the Allentown drinking water system, including condition assessment of existing assets, review of work completed during the first five years, optimization of treatment processes, and a revised 50-year capital improvement plan.

**Consent Decree Sewer Rehabilitation
Program BOA**

WSSC Water, Laurel, MD

Assistant project manager for the development of sewer system rehabilitation and replacement plans and designs for two major sewer basins: Northeast Branch (42 sq. mi; 298 miles of sewer) and Parkway (14 sq mi; 140 miles). The sewer system rehabilitation & replacement work has been organized into two sets of construction bid packages for each basin: work within the road system and work within Environmentally Sensitive Areas (ESAs).

**Lehigh County Authority, Sewer Rehabilitation and
Program Management**

Lehigh County Authority, Allentown, PA

As project engineer, performed the physical condition assessment for more than 25,000 LF of the interceptor, including reviewing CCTV inspections, determining rehabilitation and access requirements to each segment, and developing GIS-based maps.

**Western Lehigh Sewerage Partnership (WLSP)
Sewer Capacity Assurance and Rehabilitation
Program (SCARP) Program Management 2015**

Lehigh County Authority, Allentown, PA

Performed the physical condition assessment for more than 25,000 LF of the interceptor, including reviewing closed-circuit television inspections, determining rehabilitation and access requirements for each segment, and developing GIS-based maps. Program management services included semi-annual reports of activities to the United States Environmental Protection Agency and annual reports to the PA Department of Environmental Protection, as required by an EPA Administrative Order, that reviews activities under the Western Lehigh Sewerage Partnership for their Sewer Capacity Assurance and Rehabilitation Program to reduce I&I into the sewer system and reduce peak flows to the Kline's Island Wastewater Treatment Plant in Allentown.



Matthew Kiefer, PE

Rehabilitation Design/Contract Development

Mr. Kiefer will be responsible for the preparation of design specification, drawings, pre-rehab asset inventory trackers, and pre-negotiation cost estimates. He will also be responsible for subcontract agreements, resolution of pre-construction RFIs, and review of all pre-construction subcontractor submittal reviews.

Specializing in condition assessments and design, Matt is a National Technical Manager for sewer condition assessment and rehabilitation design. He has extensive hands-on experience performing condition assessments and overseeing the sewer inspection process and field work. Matt has managed several recent Condition Assessment projects with over 900,000 linear feet of sewer inspected which included closed-circuit television (CCTV), sonar, laser, H2S measurements, personnel-entry, manhole inspections, and ultimately rehabilitation recommendations, detailed design, and construction oversight.

Education/Qualifications

- BS Civil Engineering University of Dayton 2005

Years of Experience

Total – 19
With Arcadis – 2

Professional Registration/ Certifications

- Professional Engineer – NC, OH
- 2022 NASSCO Pipeline Assessment Certification Program (PACP)
- Project Management Certificate
- OSHA Confined Space Entry

Professional Associations

Water Environment Federation
NC One Water Collections &
Distribution Committee
SCAWWA/WEASC

Office Location

Raleigh, NC

Relevant Experience

Price's Run Combined Sewer Rehabilitation

City of Wilmington, DE

Technical manager, responsible for sewer rehabilitation of 7,000-feet of 66-inch to 111-inch reinforced concrete pipe which is around 120 years old. This historical pipe had significant invert and wall damage due to erosion and overall concrete decay. Personnel entry into the sewer allowed inspectors to perform concrete testing including sounding, pH measurement, and concrete core sampling which included compression testing and petrographic analysis. Mr. Kiefer designed the invert repairs and cementitious lining system which consisted of 1.5-inch to 2.5-inch geopolymer lining. In addition, Mr. Kiefer led the design of the plan and profile drawings, bypass pumping plans, specifications, and provided construction services.

Brush Creek Sewer Replacement and Pipe Bursting

City of Greensboro, NC

Project manager and technical lead for replace of 9,000 LF of existing 15-inch gravity sewer by pipe bursting with a new 20-inch HDPE-DIPS pipe. The City of Greensboro is experiencing growth and increased sewer flows in the northwest part of the City near PTI Airport. Future planning year flows have been modeled and the capacity of the existing outfall sewer leading to the Cardinal Sewer Lift

Station will be exceeded soon. The limits of the project are from the Cardinal Sewer Lift Station upstream to Muirfield Drive, traversing The Cardinal Country Club Golf Course property.

North Buffalo Outfall Sewer Phase 2

City of Greensboro, NC

Project manager, responsible for the final design of 1,700-feet of 48-inch to 54-inch ductile iron sanitary replacement sewer 20-feet deep located along a congested corridor which passes under several streets including Battleground Avenue. This project addresses capacity limitations brought on by future Mitchell WTP waste discharge combined with wet weather flows in the outfall. In addition, operational limitations such as inadequate slope, reverse-grade slopes, undersized pipe, and inverted siphons will be eliminated with the new sewer. Approximately 250-feet of sewer will be installed using Jack and Bore trenchless installation under Battleground Avenue and W. Smith Street.

Blueprint Columbus – Kent/Fairwood Area Project

City of Columbus, OH

Project manager responsible for overseeing work on this critical project for the City of Columbus Blueprint program. The project tasks included inflow & infiltration (I&I) reduction, stormwater quantity control, and treatment of stormwater with Green Infrastructure. Mr. Kiefer guided the team during field investigations, hydraulic and hydrologic analyses, evaluation of alignment alternatives, green infrastructure improvements, and detailed design of the selected alternative.

Blueprint Columbus – Artane/Parkwood Area Project

City of Columbus, OH

Project manager overseeing detailed field investigations as well as the detailed design of green infrastructure and stormwater infrastructure improvements. The Linden project area has a total of 7 sanitary sewer overflows (SSOs) that discharge near vulnerable population within 500 feet of a school. There were also over 350 WIBs between January 1, 2010 and July 31, 2013. These critical SSOs and WIBs will be mitigated by reducing inflow and infiltration using lateral sewer lining, roof drain redirection, sump pumps, and green infrastructure. Mr. Kiefer led the team in completing the detailed design drawings and contract documents for bid.

Residential Sewer Lining,

Department of Utilities, Clark County, OH

Project engineer, responsible for sewer assessment and pipe liner design to reduce I&I in the collection system. Project tasks included the development of a prioritized list of sewer segments for rehabilitation, review of CCTV data, service history, record drawings, and previous studies to identify and scale the likelihood for impact by excessive I&I and the consequence of failure for each segment. Detailed design drawings and specifications were developed for bid.

Barthman/Parsons Inflow and Infiltration Project

City of Columbus, OH

Project manager and point-of-contact between the prime engineering firm and the sewer inspection contractors. Mr. Kiefer was responsible for monitoring the sewer system condition assessment using sewer cleaning and televising techniques for this Inflow and Infiltration (I&I) remediation project. The project covered approximately 2,000 acres and over 400,000 feet of sewer lines.

Plum Ridge Sewer System I&I Project

City of Columbus, OH

Project manager, as a subconsultant, responsible for coordinating his team's work on the Plum Ridge Private and Public Source I&I project. Mr. Kiefer developed the procedures manual that contained comprehensive details and step-by-step instructions needed to perform all field work. He supervised the Private and Public Source I&I testing that included CCTV inspection, dye testing of downspouts, yard drains, driveway drains, and sanitary laterals. His team summarized all findings in a final report that contained a summary of the field investigations and recommended methods to disconnect or rehabilitate sewer system defects that were a source of I&I. In addition, his team performed detailed calculations showing the expected reduction in I&I along with a cost/benefit analysis to assess the feasibility of implementing the improvements.



John Paul Travis

Flow Metering

Mr. Travis will be responsible for siting meters and rain, meter data validation and acceptance, RDII analyses/hydrograph expert interpretation, rehab effectiveness evaluations, and data preparation for model calibrations.

Mr. Travis provides technical services for projects involving water supply, wastewater treatment, stormwater collection systems, environmental remediation, and utility construction. His experience includes field services, small and large-diameter pipe condition assessment, design, O&M planning, and I&I studies. Mr. Travis is Arcadis' subject matter expert in open channel flow metering.

Education/Qualifications

- HS Glasgow High School 1994

Years of Experience

Total – 21

With Arcadis – 21

Professional Registration/ Certifications

- OSHA Occupational Safety and Health Training
- NASSCO Pipeline, Lateral, & Manhole Assessment and Certification Program

Office Location

Wilmington, DE

Relevant Experience

Little Rock Small Diameter Inflow and Infiltration Reduction Program

Little Rock Water Reclamation Authority, AR

Project engineer for this I&I reduction project which follows an “Expedited Holistic Rehabilitation” approach aimed at identifying I&I sources in mains, manholes and laterals then moving them quickly to repair/rehabilitation under task orders using four annual contracts. Work to date includes flow data analysis for 65 flow meter sub-basins, night-time weiring, smoke testing, CCTV inspection, rehabilitation selection, contract procurement, bidding assistance, and preparation for construction implementation.

Flow Monitoring – District No. 2 I/I Quantification Report

Erie County Department of Environmental Protection (ECPDEP), Buffalo, NY

Data analyst currently overseeing the initial data analysis. Project includes the placement and installation of 23 flow meters, 3 rain gauges and 2 groundwater monitoring wells. Provided technical oversight for the I/I analysis, using the Arcadis developed Time Series Analyzer (TSA) software to support the Final Engineering Report.

County Wide Flow Metering/ Rehabilitation Effectiveness

New Castle County, DE

Task manager implemented several long-term flow monitoring projects. Team installed, maintained, and reviewed data from 55 meters and seven rain gauges to support a rehabilitation effectiveness study and the recalibration of the County's model used to determine compliance with a consent decree. Led a rehabilitation effectiveness analysis to measure the benefits of various construction technologies and their effect on sanitary flow during rain events. Studied over 20 rehabilitation projects and presented results, methods, and findings at 11 national and local conferences and recently presented as part of a large professional engineer continuing education series.

Private-side I&I Reduction Pilot Support

WSSC Water, MD

Oversaw the analysis of flow data with the purpose of selecting areas with high rainfall-derived I&I and recommending target areas for pilot rehabilitation efforts for the Development Services Group. The project areas are intended to test various private side rehabilitation and I&I reduction techniques that developers could use to offset new flows introduced under their proposals.

Sewer Rehabilitation Program – Flow Analysis

Emerald Coast Utilities Authority, Pensacola, Florida

Managed inter-office QA/QC of data provided by the subcontractor. Developed procedures for handling subcontracted work involving flow monitoring for I&I study and dynamic hydraulic model. Advised and supported product delivery and data assessment.

Flow Metering

DC Water, DC

Project manager directed the installation, collection, and maintenance of 40 flow meters installed within the DC system. Provided analysis and recommendations to client and worked with clients' needs to finalize various short-term metering projects. Led team building a large, year-long metering study to provide support for a system wide model and I/I analysis involving 161 meters for a year-long study.



Julia Manzano, EIT

Flow Metering

Ms. Manzano will be responsible for siting meters and rain, meter data validation and acceptance, RDII analyses/hydrograph expert interpretation, rehab effectiveness evaluations, and data preparation for model calibrations.

Ms. Manzano has supported multiple project teams in a variety of capacities with a focus in I/I analysis and quantification, data evaluations, and hydraulic/hydrologic modeling using InfoWorks ICM and PCSWMM. She has been providing modeling support for MSDGC through calibrations and quarterly model vaulting activities, as well as her continued modeling effort for Lehigh County Authority's alternative analysis.

Education/Qualifications

- MS Civil Engineering Michigan Technological University 2021
- Graduate Certificate Resilient Water Infrastructure Michigan Technological University 2021
- BS Environmental Engineering Michigan Technological University 2020

Years of Experience

Total – 2
With Arcadis – 2

Professional Registration/ Certifications

- Engineer in Training
- Confined Space Entry Certification
- CPR/AED Certification

Professional Associations

American Water Works Association
Ohio Water Environment Association
SW Ohio Water Environment Association – YP Co-Chair
New York Water Environment Association

Office Location

Cincinnati, OH

Relevant Experience

ECDEP Sewer District No. 1 and 4 Flow Monitoring – I/I Quantification Report Erie County Department of Environmental Planning, Buffalo, NY

Reviewed existing reports, data, and projects to identify potential areas of concern. Performed site visits to ensure accuracy of flow meters. Analyzed raw flow rate and rain gauge data. Characterized storm events and identified the four largest events. Prepared Final Engineering Reports summarizing all data, information, evaluations, findings, and recommendations.

LCA Flow Data QA/QC

Lehigh County Authority, Allentown, PA

Performed multiple rounds of thorough flow, velocity, level, and rainfall data validation of 100+ flow meters and 10+ rain gauges. Data is reviewed to ensure data are valid, true, and suitable for RDII analysis, model calibration and verification, and catchment-wide rehabilitation effectiveness evaluations.

Tonawanda Island Infrastructure Analysis

City of North Tonawanda, North Tonawanda, NY

Developed material to be presented at the kick-off workshop. Reviewed existing data to plan and prepare for field investigations. Field activities to be completed for this project includes smoke testing, CCTV inspection, manhole inspections, broadband electromagnetic inspection, and flow monitoring. All data collected were analyzed to provide a comprehensive conditions assessment and capacity analysis of the city owned infrastructure on Tonawanda Island.

MSDGC Model Support

Metropolitan Sewer District of Greater Cincinnati, Cincinnati, OH

Provided modeling support on multiple tasks under the MSDGC multi-year contract, including model calibration and quarterly model vaulting activities.

KISS Preliminary Screening of Alternatives

Lehigh County Authority, Allentown, PA

Modeled several alternatives to evaluate the impact of major corrective measures and assess their costs. Determined the size, extent, and cost of infrastructure improvements needed to eliminate all overflows and achieve the site specific hydraulic grade line level of service that protects homes near the interceptors for basement backups when presented by the occurrence of rainfall from Hurricane Ida under 2050 wastewater usage demands.

Western Lehigh Sewer Partners / City of Allentown 2022 Nighttime Weiring

Lehigh County Authority, Allentown, PA

Participated in five weeks of nighttime weiring to measure groundwater infiltration at an average resolution of less than a half-mile of sewer main. Performed confined space entry into 70+ weir locations.

KISS Model Expansion & Calibration

Lehigh County Authority, Allentown, PA

Performed multiple rounds of flow, velocity, level, and rainfall data validation. Calibrated predicted model flows to match that of the observed data for dry and wet weather. Model being created expands and recalibrates the previous model for the project area to evaluate the competing effects of growth and of rehabilitation work realized since the original model was first built and calibrated using data from 2009. The recalibrated model is intended to provide a more accurate reflection of the current system's response to rainfall events.



Chris Adams, PE

Modeling

Mr. Adams will be responsible for all model calibration and model use constraints specific to its ability to accurately measure SSO conditions and predict peak flow reductions from source reduction actions.

Mr. Adams specializes in hydraulic analysis via modeling. He is part of Arcadis' national teams for both water and wastewater modeling. His experience includes the development and calibration of hydraulic models, facility design of pump stations, transient analysis, developing and evaluating flow monitoring programs, sewer evaluation studies involving RDII analysis, and alternatives analyses using hydraulic modeling.

Education/Qualifications

- BS Civil Engineering Georgia Institute of Technology 2000

Years of Experience

Total – 23
With Arcadis – 2

Professional Registration/ Certifications

- Professional Engineer – GA

Office Location

Athens/Atlanta, GA

Relevant Experience

Santa Monica Sewer System Master Plan

Santa Monica, CA

Technical lead for updating and recalibrating the City's sewer system model and evaluating existing and future flows to develop a 20-year capital improvement plan. Responsibilities also included managing subcontractors for flow metering and CCTV work, developing a flow metering plan, and reviewing flow meter data for model development. Lead customized training for City staff related to hydraulic modeling and using their model for further analysis.

Takoma Park Basement Backup Investigation

Takoma Park, MD

Technical advisor for updating and recalibrating the Takoma Park basin hydraulic model to identify rehabilitation/replacement projects for eliminating basement backups. The model recalibration was performed using the "Model at Source" approach to identify rainfall-dependent inflow and infiltration sources entering the sewer. Alternatives for increasing the hydraulic capacity through the rehabilitation of each RDII source and through capital projects were developed.

Harford County Sewer Modeling

Harford County, MD

Technical lead for updating and recalibrating the Harford County sewer model. The model recalibration is supplemented with 30 temporary flow monitors, 12 pump station flow meters, and three WWTP flow meters. Responsibilities included identifying flow monitor locations, QA/QC of flow data analysis, and identifying flow components of sanitary flow, including DWF, Base infiltration, and RDII. The project is ongoing and will proceed with model recalibration upon completion of the flow data collection period.

Lehigh County Authority

Allentown, PA

Technical advisor and QAQC lead for hydraulic modeling of preliminary and final alternatives analysis. Responsibilities included optimizing the model development of alternatives, developing priority source reduction plans based on model calibration, and reviewing the modeling input and output. Several custom SQL queries were developed to optimize QAQC, allowing the project to increase efficiency.

Wet Weather Management Program

City of Chattanooga, TN

Technical lead for the development and calibration of the initial hydraulic model of the combined and sanitary sewer system. From 2010 to 2022, responsibilities have included QAQC, pre and post-modeling calibrations, SSO reduction plans, continued hydrologic and hydraulic modeling for finalizing production of model updates, training mid-level and entry-level staff on the use of the model, updating complex real-time controls, and supporting facility design for CSO operations. Developed and performed flow data analysis for over 120 flow monitors used for calibration.

Sanitary Sewer Overflow Reduction Program

City of Bellevue, WA

Modeling and hydraulics technical leader responsible for reviewing sanitary flow data and developing calibrated models and recommendations for eliminating SSOs for the City's wet weather design events up to 100-yr events. These projects included developing and analyzing temporary flow monitoring programs for model calibration, updating hydraulic models to reflect current conditions, and providing alternatives for eliminating SSOs within the system. To date, Newport, Fairweather, Somerset, and Medina Basins have been completed. The Newport basin model was used to design a wet weather pumping station used to divert flows to areas of the system with available capacity.

North Mercer Island Interceptor & Enatai Interceptor Upgrade

King County, WA

Hydraulics team and model lead are responsible for modeling and hydraulic analysis of gravity and inverted siphon elements. Tasks included developing preliminary pipeline alternatives, including alignments and construction techniques for additional capacity along the interceptor using fully developed conditions.

Calibration of Plant 1/Plant 2 InfoWorks Hydraulic Model

Orange County Sanitation District, CA

Modeling and technical lead responsible for updating the calibration of the existing OCSD wastewater treatment plant models to simulate peak flow periods for both Plants 1 and 2 with a peak flow event measured on January 22, 2017. The peak measured flow for this event was 565 mgd of combined inflow to both plants. The model was set to include the combined capacity of the plant to include the Interplant diversion line and complex logical statements to allow for calibration.

Additional responsibilities for OCSD included developing and evaluating alternatives for the replacement of aging existing conveyance infrastructure from headworks to primary clarifiers and from primary clarifiers to secondary treatment. The analysis included peak and average day flows to ensure minimal settling along the conveyance routes. Included in the development of the alternatives included training OCSD staff on the model for future analysis.

Modeling team member responsible for evaluating dry weather and wet weather inflows under existing and future flow conditions. The analysis included the development of a localized flow monitoring program and capacity analysis for the Browning Sub-Trunk and Knott Interceptor/Miller Holder Sub-Trunk Sewer Relief pipelines. Recommendations for increasing sewer capacity within these areas, as well as evaluation of the tractive forces associated with existing and future systems.



Anthony Dill, PE, BCEE, CDT

Private-side Rehabilitation and Disconnects

Mr. Dill will be responsible for work (other than laterals) outside of the public right-of-way; specifically, sump pump disconnects, foundation drain solutions, puncture floor drain corrections, and roof downcomer disconnects, including negotiation of access and correction with homeowners.

Mr. Dill leads planning, studies, inspections, assessments, design, procurement and construction administration for improvements to municipal buried infrastructure systems. Mr. Dill's experience is focused on the use of trenchless technologies for rehabilitation of municipal storm water and wastewater sewer systems, including cured-in-place pipe lining, testing and sealing pipe joints and laterals, and a variety of manhole rehabilitation technologies. Mr. Dill served as the Program Manager for the assessment and rehabilitation of a municipal sewer system that contains more than 400 miles of pipes and 6,000 manholes and is the lead design engineer for all trenchless rehabilitation projects.

Education/Qualifications

- MS Environmental Engineer
University of Illinois at Urbana-Champaign 1994
- BS Civil Engineering University of Notre Dame 1992

Years of Experience

Total – 30

With Arcadis – 29

Professional Registration/ Certifications

- Professional Engineer – DE, MD, PA, NY, NJ, DC
- Board Certified Env Engineer
- Construction Documents Technologist
- NASSCO PACP, MACP, LACP
- Confined Space Entry Training

Professional Associations

American Academy for
Environmental Engineering
Pennsylvania Water Environment
Association
Water Environment Federation
2014 Golden Manhole Society
Award recipient
2020 Golden Rain Drop Society
Award recipient
Water Design-Build Council Trained
Instructor

Office Location

Philadelphia, PA

Relevant Experience

Clearwater Elimination Pilot Program and Program Development New Castle County, New Castle DE

Project manager for the pilot program to eliminate of illegal clearwater connections in several neighborhoods of North Brandywine. These neighborhoods include more than 600 residences. Eliminating illegal sump pump and punctured basement floor drain connection to the sanitary sewer will reduce the total flow in the system, especially during rain events. The Pilot Program involved basement inspections of approximately 500 homes to identify clearwater connections; storm water analyses to assess relative impact of new sump pump discharges on the overall storm water flows in the various neighborhoods; presentation of the Pilot Program to the neighborhood Civic Associations; follow-up inspections of homes with clearwater connections and preparation of an Agreement between NCC and individual property owners to provide the property owner's consent to the clearwater disconnection work; subcontracting the clearwater connections to local contractors and overseeing the disconnection work; receiving follow-up calls from residents to identify and resolve any issues with the disconnection work; and assessing the effectiveness of the Pilot Program and identify issues that must be addressed to implement future NCC policies and programs regarding clearwater disconnections. Lessons learned during this Pilot Program were used to plan a system-wide program to eliminate illegal clearwater connections by identifying and addressing financial, legal, technical, property owner, stormwater, and political issues that would impact the success of a larger program.

Sewer Rehabilitation Projects

New Castle County, New Castle DE

Assistant program manager for sewer rehabilitation projects for 730,000 LF of sewer in eight sewer basins within New Castle County. Rehabilitation methods designed and/or constructed under these programs/projects include chemical

grouting, spray-on coatings, cured in place lining, lateral lining, slip lining, pipe bursting, open cut sewer replacement, jack and bore, microtunneling, tunneling, horizontal directional drilling, force main piping and replacement, and manhole grouting, lining, and chimney coating. The projects included approximately 77 miles of cured-in-place pipe lining (CIPPL), 62 miles of test and seal, 5 miles of open cut collection, trunkline, and interceptors, nearly 10,000 cured in place lateral liners, and rehabilitation of more than 2000 manholes.

89-1 Stormwater Rehabilitation Design

Fairfax County MSM Division, Fairfax, VA

Project manager for the physical condition assessment (PCA) and rehabilitation design of over 30,000 LF of stormwater conveyance pipes, channels, and related structures. Assessment phase involved field inspection of all structures and channels, review of closed-circuit television of all pipes, assigning PCA ratings based on the condition of the assets, determining the basis of rehabilitation, and development of GIS-based maps of findings. Design phase included design of cured-in-place pipe liners, packer injection grouting, masonry rehabilitation of structures and channels, and open-cut excavation and replacement of structures and pipes. Developed four separate sets of construction documents as the work will be constructed under different contracts according to the type of work. Developed construction cost estimates for basis of negotiations with on-call contractors.

Large Diameter Condition Assessment Program

DC Water, Washington, DC.

Project manager for inspection and condition assessment of approximately 58 miles of large diameter sewers, force mains, siphons and manholes. The inspection program is being completed with a team of subcontractors and includes reinforced concrete, unreinforced concrete, brick, cast iron, and vitrified clay pipes ranging up to 164-inches in diameter. Inspection technologies include CCTV, sonar, laser profiling, person-entry pipe inspection and testing, and various manhole inspection technologies.

Claymont Sewer Rehabilitation

New Castle County, New Castle County, Delaware

Project manager and technical lead for the condition assessment and rehabilitation design for the 44,000 LF Claymont sanitary sewer system. The project included the identification of active vs inactive laterals, determination of the most appropriate method to rehabilitate the sewers, laterals and manholes, preparation of six rehabilitation contracts, negotiation of access agreements, and providing bidding and construction services. The project included the rehabilitation sewer mains and laterals using cured-in-place pipe lining and test and seal grouting technologies. The project also included a manhole lining technology demonstration project, repairs to manhole chimneys, frames and covers, and manhole injection grouting.

Sewer System Facilities Plan

DC Water, Washington, DC

Project manager for the preparation of the sewer system facilities plan (SSFP) for DC Water's more than 1,800 miles of combined and separate sewer. The SSFP includes condition and risk assessment for the sewers, pump stations and other ancillary facilities, recommendations for future capital improvements over a 20-year planning horizon, and recommendations for implementing or improving numerous program initiatives.

Large Diameter Sewer Main Condition Assessment

Little Rock Water Reclamation Authority, Little Rock, AR

Lead engineer for the inspection and condition assessment of 16 miles of interceptor sewers up to 54-inches in diameter for the Little Rock Water Reclamation Authority. Pipe materials included reinforced concrete, vitrified clay, PVC, ductile iron and coated corrugated metal pipe. Project included field reconnaissance to determine accessibility and manhole conditions, as well as preliminary assessment of pipe condition via confined space entries to support selection of the most appropriate inspection methodology to be utilized. CCTV inspections were reviewed, and man-entry inspections performed in order to determine recommended repairs and estimated years of remaining service life and schedule for future inspections.



Dan Scrutchfield, PE

GIS and Data Visualization

Mr. Scrutchfield will be responsible for GIS based tools and all data visualizations for the program, including GIS-based Power BI dashboards for assessment, modeling, and construction-oriented work processes.

Mr. Scrutchfield specializes in developing and supporting enterprise project management, data management and business intelligence (BI) solutions using commercially available products. His expertise includes the implementation of management tools, development of visualizations, organization, and execution of training programs, and supporting the operation of enterprise programs.

Education/Qualifications

- BS Civil Engineering University of Delaware 2013

Years of Experience

Total – 10
With Arcadis – 4

Professional Registration/ Certifications

- Professional Engineer – VA PE License # 0402061249
- AWWA Utility Risk and Resilience Certificate

Office Location

Virginia Beach, VA

Relevant Experience

America's Water Infrastructure Act (AWIA) Program

City of Virginia Beach, VA

Management consultant facilitated the national effort across multiple clients to reach compliance with the AWIA of 2018. Developed a standard Template for managing data associated with J100 Risk and Resilience Assessment Methodology and integrated the template with PowerBI for visualizing the data. Using the tools developed, facilitated workshops to collect data and reach consensus on risk tolerance for critical assets. Also, facilitated Cyber Security Assessments using standard American Water Works Association (AWWA) tools.

RVAH2O Business Intelligence System Implementation

City of Richmond Department of Public Utilities, Richmond, VA

Systems analyst. Designed and implemented SharePoint and PowerBI environments for tracking data related to the City of Richmond Clean Water Program, also known as RVA H2O. Responsible for coordinating with multiple stakeholders and developing the SharePoint environment to serve as the data management portal related to the Program. Also responsible for implementing the PowerBI environment, which consolidated data from the SharePoint environment, their Cityworks CMMS, and an off-site LIMS system.

Program Management System Implementation

Alexandria Renew Enterprises, Alexandria, VA

SharePoint administrator and project engineer working on an accelerated schedule, responsible for designing and deploying a cloud-based program management system to manage documents and schedules for AlexRenew's \$120M wet-weather program. The system is designed to allow multiple organizations to access information using their own accounts and allows users to edit and manage documents in a collaborative environment. As administrator, responsible for managing access to the site, training end users, improving processes through automation, and providing guidance for best document control processes.

Business Intelligence System Implementation

City of Newport News Public Works, VA

Project engineer and systems analyst assisted in the implementation of a BI system to analyze the data in the city's computerized maintenance management system (CMMS) system. The team connected to live data in both the CMMS and Geographic information system systems and produced BI dashboards from the results. Directly responsible for analyzing the initial data provided, constructing a data model from the data, and authoring the final reports delivered to the client.

Business Intelligence System Implementation

Hampton Roads Sanitation District, VA

Project engineer assisted in the development and implementation of Microsoft SharePoint enterprise BI solutions intended to present the performance of metrics that help measure progress toward compliance as part of consent decree response efforts. The system currently using monthly user input into the BI site. Assisted with end-user support for data management as well as developing and leading training programs for new users.

Program/Construction Management and Business Intelligence System Implementation

Honolulu Board of Water Supply, Honolulu, HI

Responsible for the upgrade and migration of the existing MANAO Project and Construction Management system used by Board of Water Supply staff as well as outside consultants and contractors. Converted the existing form-based project tasks into Microsoft Project schedules in Microsoft Project Online, then developed SharePoint site templates to manage submittals, RFIs, change orders, inspection forms, photographs, and other construction documents. The site templates also included custom-developed workflows to manage each of the document types, and a security model to control access. PowerBI dashboards were also developed to report on the data in the project schedule and associated with documents on the site. The dashboards also connected to their billing system to provide a holistic view of their capital program.

Project Management and Business Intelligence System Implementation

Gwinnett County Department of Water Resources (DWR), Lawrenceville, GA

Project engineer and systems analyst responsible for implementing a comprehensive project management information system to manage the DWR's \$250M annual capital improvement program. The system is now DWR's primary method for tracking and managing all DWR projects; more than 50 project managers work in the system daily. Responsible for configuring the system, developing business intelligence dashboards, training end users, and providing support to all users of the system.



Years of Experience

Total – 19
With Arcadis – 4

Professional Registration/ Certifications

- Microsoft Certified Data Analyst

Office Location

Virginia Beach, VA

Jaime Parson

GIS and Data Visualization

Mr. Parson will be responsible for GIS based tools and all data visualizations for the program, including GIS-based Power BI dashboards for assessment, modeling, and construction-oriented work processes.

Mr. Parson implements information technology (IT) projects for program information management systems (PIMS), document management systems, Microsoft/Azure tenant administration, business intelligence solutions, and program integrations with cross references to geographic information systems (GIS) including enterprise server administration and ArcGIS Online administration. He has worked with enterprise databases and various asset management tools such as the Innovyze suite and has served as a technical lead for mobile platform implementations.

Relevant Experience

Business Intelligence System Implementation

Hampton Roads Sanitation District (HRSD), Hampton, VA

Senior IT consultant assisted a team with deployment of a web-based dashboard for the presentation of performance measures. These measures are a part of consent decree response efforts and help HRSD to measure progress toward compliance. Microsoft's SharePoint Enterprise BI solution is being used along with SQL and Analysis Server to deliver an enterprise solution. The system will provide mechanisms for pulling data from multiple data sources, including HRSD's computerized maintenance management system. The intent of the project is to provide HRSD leadership with summary performance information that is clear, accurate and easily communicated to a variety of stakeholders.

Business Intelligence for Management, Operations and Maintenance (MOM) Program Management

City of Newport News, Newport News, VA

Senior IT consultant deployed a series of dashboards that help the City of Newport News to track its MOM program. The system pulls data from several city systems and presents the data using Microsoft's visualization environment. More than 30 dashboards were deployed, tracking maintenance and operational data across the entire scope of the city's wastewater infrastructure. Planners and managers now can interact with maintenance and asset data dynamically, without extensive training in the underlying systems. These tools can help the city make better, more informed asset maintenance decisions.

Sewer System Evaluation Survey

City of Virginia Beach, Virginia Beach, VA

Senior IT consultant analyzed the city's data to determine Sewer System Evaluation Survey basins. Helped develop a force main criticality model and work orders for a prompt repair program. Created mapping for 181 sanitary sewer basins (259 service areas) to show all completed fieldwork and related sanitary sewer defects. Compiled data into GIS for a comprehensive condition assessment report to satisfy the city's consent order-driven requirements.

Find and Fix Implementation

City of Virginia Beach, Virginia Beach, VA

Senior IT consultant developed tracking tools to assist in the prioritization of assets needing immediate rehabilitation. Asset prioritization was performed using Innovyze InfoMaster and the project/document tracking tool was built using SharePoint.

Wastewater Collection System Projects

Hampton Roads Sanitation District, Virginia Beach, VA

- Senior IT consultant for several projects Private Inflow/Infiltration (I/I) Abatement Program. Provided support for a multi-year program involving 13 localities. The role required enterprise GIS data administration and mobile field data collection using tablets to analyze areas in need of rehabilitation, then estimating the amount of potential I/I reduction from private vs. public sanitary sewer based on the relative proportion of infrastructure within each sanitary basin.
- Condition Assessment Program (CAP). Provided support for a multi-year study of HRSD's wastewater collection system. The project included inspection, evaluation and data management of gravity and pressure systems using Pipeline Assessment Certification Program, Manhole Assessment Certification Program, and various other force main inspection technologies. Asset condition and rehabilitation recommendations were designed to create asset-level work orders on the HRSD CMMS. Data managed using Innovyze asset management and GIS tools.
- Master Meter and Rain Gauge Mapping. Developed locations and mapping for master meter and rain gauge locations. Provided GIS support for pressure reducing station and Hampton studies. Developed mapping for work orders and data management for fieldwork activities related to the CAP.

Wet-Weather Program Management Support

Hampton Roads Sanitation District, Hampton Roads, VA

Senior IT and GIS consultant developed the GIS framework for the regional GIS dataset used for asset management and modelling. Analyzed the Regional Wet-Weather Management Plan to prioritize projects and developed reporting tools.

RiverRenew Program Owner Advisor

AlexRenew, Alexandria, VA

Senior IT consultant served as owner advisor for a program to capture and treat the majority of combined sewer overflow (CSO) discharge by the legislative deadline of July 1, 2025, to reduce bacteria, trash and other pollutants impacting the Potomac River, Hooffs Run and Hunting Creek. Work involved siting facilities, advancing hydraulic design, defining land and easement acquisition requirements, developing procurement, and contracting strategy, managing risks, coordinating regulatory approval, and developing the 20 percent design. The IT team fast-tracked the design and deployment of an online collaboration portal for AlexRenew's three-year CSO design-build program. This effort, valued at \$120M, engages a broad array of stakeholders in a complex urban environment. The site, using the SharePoint Online as its foundation, provides team members with the latest in collaborative tools. All program documents are managed by the system, which also incorporates workflow automation to improve program efficiencies.

System Implementation

Gwinnett County Department of Water Resources (DWR), Atlanta, GA

Senior IT analyst for the deployment of a comprehensive program management information system (PMIS) for DWR. DWR is responsible for managing a capital improvement plan comprising over 500 projects with a total annual spending level of approximately \$250M. The system was configured to support a variety of project types, including design-bid-build and on-demand services contracts. The implementation involved providing training and support to more than 60 project managers within DWR. Based on Microsoft's PMIS and BI solution sets, this system also involves more than 30 dashboards used by key project staff, project managers and senior program managers.



Michael Bell, EIT

Road Warrior

Mr. Bell a buried infrastructure engineer specializing in construction engineering, especially for lining and capital grouting, and in conditions assessments, especially SSES work for municipal and industrial sewer and water systems.

Relevant Experience

Education/Qualifications

- MS Civil Engineering Virginia Tech 2022

Years of Experience

Total – 2
With Arcadis – 2

Professional Registration/ Certifications

- Engineer-in-Training
- 30 Hour Construction - OSHA
- Confined Space Entry - OSHA

Office Location

Hanover, MD

Little Rock Small Diameter Inflow and Infiltration Reduction Program – Nighttime Weiring

Little Rock Water Reclamation Authority, Little Rock, AR

Field engineer for small diameter pipe nighttime weiring operation. The role consists of weiring several pipes in a given night, coordinating confined space entry permits, and scouting locations prior to entry. Michael performed this work in a team setting and rotated between the role of the entrant and the attendant for each confined space entry. Additionally, Michael created the permits for his group and assisted with the location scouting before the project got underway. He also facilitated repairs to the equipment to ensure that each team had enough function weirs to report accurate data back to the project manager.

Large Diameter Rehabilitation – Construction Management

Little Rock Water Reclamation Authority, Little Rock, AR

Construction inspector for large diameter pipe operations. The role consists of checking subcontractors work for punch list items, inspecting large diameter manholes for proper lids, and compiling data from previous manhole inspection projects to create a priority list for rehabilitation. Michael was on site to supervise subcontractors completing the punch list for the Boyle park 30-inch overflow connection. This required visual inspections of the all the manholes slated for final repairs and brief reports back to the project manager detailing the work completed for the day, issues encountered, and an updated timeline for the completion of work. Additionally, Michael has visited several large diameter manholes to visually inspect for evidence of SSO events and to determine if the lids were properly secured. The data compilation involves ranking the large diameter manholes needing rehabilitation from low to high.

Little Rock Small Diameter Inflow and Infiltration Reduction Program – Grouting & Manhole Inspections

Little Rock Water Reclamation Authority, Little Rock, AR

Construction inspector (Green role) and Field Engineer for small diameter pipe test and seal operation. The role consists of managing the lateral and main line packer injection operations, inspecting manholes for LCM connections, and coordinating with the contractor to resolve issues with manholes, all while ensuring that the specification is being followed and client goals are being met. Additionally, Michael

has been working with the project manager of the subcontractor to compile all the existing task orders, track which work has been completed, documenting which work cannot be complete due to reasons beyond the contractor's control, and communicating all this information to engineer of record for the project. Michael has also been submitting the inspector daily report which details all work completed and any issues that arise while completing the pipe rehabilitation. For the manhole inspections, the role consists of locating manholes, collecting measurements and photographs of the manholes, and escalating any major defects to the project manager.

Aiken Sewer Rehabilitation CMAR – Site and Project Management

City of Aiken, SC

Construction inspector/administrator/superintendent (Green role) for CMAR project featuring Arcadis's Expedited Holistic Rehabilitation approach to reduce infiltration/inflow and structurally stabilize old, often collapsing VCP and RCP sewers. Construction oversight of mainly trenchless pipe rehabilitation methods. The role involved managing multiple trenchless pipe rehabilitation subcontractors within areas such as packer injection grouting, lateral grouting, and pre CCTV inspections while ensuring safety protocols were followed, proper grouting techniques were implemented, and project administration tasks such as completing inspector daily reports, sending dispatch emails, and coordinating with the City of Aiken to resolve any issues experienced by or brought forth from the grouting operations. In addition, Michael verified that all information on deliverables such as pre inspection videos and grouting reports contained all the necessary and accurate information.

Piscataway Grout Pilot Program – Inspector

Washington Suburban Sanitary Commission (WSSC), Prince Georges County, MD

Construction inspector for small diameter grouting pilot program for WSSC. The role primarily involved ensuring that grouting operation was executed using the techniques outlined in the specifications, ensuring that all safety protocols were followed, and assisting WSSC Inspectors in understanding the techniques and best practices behind packer injection grouting. Additionally, Michael conducted manhole inspections to assess the condition of the manhole and propose recommendation for rehabilitation.

Baxter NC Exterior Sewer and Lift Station Wet Well Rehab – Manhole and Pipeline Inspections

Marion, NC – Baxter International

Construction inspector for the lining of pipe and wet well rehabilitation for the Baxter International manufacturing facility. The role consists of oversight for all contractor's work, providing pump watch for bypass operation, and inspecting the work for quality. Michael also oversaw the health and safety requirements of the Arcadis staff by completing the CSE forms for each entry, creating a HASP for the project, and ensuring that the contractor was operating in a safe manner while performing the work. Additionally, Michael assisted with the after-action report and debriefed staff on health and safety issues that contractor incurred during the work.

Mini System #35 Sewer Rehabilitation – Grouting and Manhole Inspections

Princeton, NJ – City of Princeton

Construction engineer (Green role) for small diameter pipe test and seal operation. The role consists of managing the lateral and main line packer injection operations, inspecting the manholes in the project area for various defects and signs of I&I, and performing basement inspections to search for illegal connections, all while ensuring that the specification is being followed and client goals are being met. Additionally, Michael has taken on the responsibility of reviewing all the submittals, pay applications, and the certified payroll submissions from the contractor as well as ensuring that all the daily submittals are accurate and correct. Michael has also been submitting the inspector daily report which details all work completed and any issues that arise while completing the pipe rehabilitation. For the manhole inspections, the role consists of completing a full visual inspection of each manhole, documenting the defects with said manhole, and taking any measurements necessary for the eventual rehabilitation of defects.

2023 WLSP Grouting Care – Grouting and Manhole Inspections

Lehigh County Authority, Lehigh County, PA

Construction engineer (Green role) for small diameter pipe test and seal operation. The role consists of managing the lateral and main line packer injection operations, inspecting manholes for LCM connections, and inspecting the manholes in the project area for various defects and signs of I&I, all while ensuring that the specification is being followed and client goals are being met.



Jason Marrella

Road Warrior

Mr. Marrella is a buried infrastructure engineer specializing including condition assessment and design engineering. His experience includes inflow/infiltration studies and infrastructure evaluations, and conceptual through detailed construction design of gravity sewers and force mains. This includes manhole, pipe, and lateral inspection; smoke testing, dye testing, and sump pump investigations; stormwater structures and channels inspections, outfall pipe mapping, outfall pipe inspections, and illicit connection testing. It has also included rehabilitation such as testing and sealing (chemical joint grouting), cured-in-place lining, slip-lining, pipe bursting, tunnelling, open cut sewer replacement, force main piping and installation, and manhole grouting and lining.

Education/Qualifications

- BS, Civil Engineering, Lehigh University, 2003

Years of Experience

Total – 20

With Arcadis – 20

Professional Registration/ Certifications

- Fundamentals of Engineering (PA, Civil)

Training/Certifications

Confined Space Entry 29
CFR 1910.146(g) OSHA
CPR and First Aid Trained
Certified Construction Document Technologist (CDT), CSI
NASSCO Pipeline, Lateral, and Manhole Assessment and Certification Programs (PACP, LACP, and MACP)
Maryland Erosion and Sediment Control Certification (Green and Yellow Card)
Delaware Sediment and Stormwater Management Certification (Blue Card)

Office Location

Wilmington, DE

Relevant Experience

LRWRA Small Diameter Program

Little Rock Water Reclamation Authority, Little Rock, AR

Field team leader for 39 basins, 2,372 smoke test emissions, and 252 miles of pipe that was smoke tested.

Monroe Smoke Testing

City of Monroe, LA

Field team leader for the smoke testing of 46 miles of gravity mains across three basins.

Brandywine Hundred Construction

New Castle County, New Castle, DE

Project manager (and/or task manager), construction manager, and field inspector for 10 projects using trenchless rehabilitation methods including cured-in-place pipe lining, cured-in-place lateral lining, cured-in-place point repairs, test and seal (joint grouting), and manhole lining. Projects total 10,000 LF of cured-in-place pipe lining; 25 cured-in-place pipe repairs; 1,181 cured-in-place lateral liners; 34,631 linear feet for test and seal (grouting); test and seal of 283 laterals connected to sewer mains; and test and seal of 68 laterals connected to manholes.

Clearwater Pilot Program

New Castle County, Wilmington, DE

Project engineer conducting 500 basement inspections to identify clearwater connections and construction oversight of construction work to disconnect clearwater connections to the sanitary sewer system with typical types of work including adjustments to floor drains, french drains and sump pumps; follow-up inspections of homes with clearwater connections and preparation of an Agreement to provide the property owner's consent to the clearwater disconnection work; subcontracting the disconnection of more than 40 clearwater connections

to local contractors and overseeing the disconnection work; and assessing the effectiveness of the Pilot Program.

I/I and Sewer Rehabilitation Program

Town of Wallkill, NY

Served as primary field lead and project engineer for the Phase II Infiltration and Inflow (I/I) study for 5 priority mini-areas. Data was collected and analysed for 20 weiring locations. 515 manholes were inspected with estimated contributing I/I rates. 58,000 LF of sanitary sewer were CCTV inspected, reviewed and PACP coded for defects and leakage. 4 of the 5 mini-areas were smoke tested.

Brandywine Hundred 2009 Test and Seal Construction

New Castle County, New Castle, DE

Provided construction oversight for trenchless rehabilitation project using test and seal technologies. Project included rehab of 40,000 LF of 8-inch to 12-inch diameter sanitary sewer mains, 750 laterals, and 10 manholes. 38 spot repairs were performed using Cured-in-Place methods.

NA2 and Ashbourne Hills Manhole Rehabilitation Design

New Castle County, New Castle, DE

Performed physical condition assessment of 221 manholes located in the NA2 and Ashbourne Hills project areas. Assisted in making recommendation for rehabilitation utilizing technologies including manhole lining, chimney seal, injection grouting and rebuild and replace.



Nolan C. Schendel

Road Warrior

Mr. Schendel is a buried infrastructure engineer specializing in construction engineering, especially for lining and capital grouting, and in conditions assessments, especially SSES work. He has experience working with pipe inspection and rehabilitation, stormwater, wastewater, and contractor oversight on various municipal and industrial projects.

Education/Qualifications

- BS Chemical Engineering - Environmental Science Concentration Michigan State University East Lansing, 2022

Years of Experience

Total – 2
With Arcadis – 2

Professional Registration/Certifications

- Avanti “Fundamentals of Municipal Grouting” Certified
- OSHA 30 hr. Construction Safety & Health
- OSHA 40 hr HAZWOPER
- Red Cross CPR, First Aid, and AED Certified
- 8-Hour OSHA Confined Space Certified

Office Location

Novi/Detroit, MI

Relevant Experience

Aiken Construction Management at Risk (CMAR) Service for Sand River Basin Rehabilitation

Aiken, SC

Construction field inspector/administrator providing oversight for MLJ and LTC packer injection grouting and other trenchless pipe rehabilitation methods. Became familiar with NASSCO standards and client-specific concerns.

Little Rock Water Reclamation Authority

Little Rock, AR

Served as field engineer for small diameter pipe nighttime weiring operation as a part of a larger I&I study. The role consists of weiring several pipes each night, coordinating confined space entry permits, and scouting locations prior to entry. Nolan also performed this work in a team setting and rotated between the role of the entrant and the attendant for each confined space entry.

Sewer Rehabilitation

Ford Motor Company - Livonia Transmission, Livonia, MI

As a field engineer, led in the oversight and fieldwork at various points of the rehabilitation process including CIPP lining, manhole installation, sewer locating, cleaning, and pipe inspections. Oversaw the daily execution of work while communicating specifications and logistics between the client and contractors.

Environmental Engineering and Consent Decree

Ford Motor Company - Livonia Transmission, Livonia, MI

As an engineer, task manager, and field support, in a variety of tasks related ongoing remediation efforts of VOCs. Assisted in the design and operation of two groundwater treatment systems treating 50+ gpm, and two vapor mitigation systems. Assisted in sampling events including groundwater, sewer, subslab vapor, and treatment system sampling. Became familiar with sampling techniques and equipment such as low flow Perri pump, Suma canisters, sorbent tubes, and auto samplers. Oversaw underground ZVI injections to encourage the breakdown of chlorinated compounds.

Storm Water Management

Ford Motor Company - Chicago Stamping, Chicago Heights, IL

Assisted in overseeing the cleaning and inspection of storm sewers for the purpose of flood prevention. Acted as the field engineer by documenting and mapping the existing storm water system for later modeling and rerouting.

Storm Water Reroute

Ford Motor Company – Ohio Assembly Plant, Avon, OH

Operated as field engineer coordinating and overseeing a variety of events relating to the upsizing the current storm system to handle additional flow from a plant expansion. This includes open trench pipe and manhole installations of 300 ft of pipe, survey work, pipe inspections, and a connectivity study.

Connectivity Study

Ford Motor Company – Sterling Axle Plant, Sterling Heights, MI

Operated as a field engineer leading a connectivity study of the plant's process, storm, and sanitary sewers. Pipe inspections, dye testing, and cleaning were performed in the field then the updates were drawn in CAD.

Tunnel and Pipeline Inspection

Red Mountain Tunnel Inspection, Birmingham, AL

Served as field engineer for tunnel and pipeline inspection of 2200' of tunnel containing water main pipe. Utilized visual inspections and broadband electromagnetic (BEM) scanning to conduct a condition assessment of the pipes and surrounding tunnel.

Outfall 003 Industrial Storm Sewer Evaluation

BASF – North Works, Wyandotte, MI

Assisted in the investigation and condition assessment of 70 storm water and non-contact cooling water segments with the associated pipes and manholes. The investigation included visual condition inspections, dye testing, and low flow sampling methods.

Corrosion Control Study

Great Lakes Water Authority (GLWA), Detroit, MI

Participated in the field sampling for the Arcadis GLWA corrosion control study; the largest study conducted of this kind. Assisted with the detection and monitoring of simulated drinking water for contaminants and additives.

Sub slab Depressurization System Pilot Study

Ford Motor Company – Ford Ypsilanti, Ypsilanti, MI

Served as field support for a SSDS install to mitigate vapor intrusion. The scope included drilling 3 suction pits, 5 SSMPs, and 60 temporary sampling points.

Floor Drain Condition Assessment and Wet Well Rehabilitation

Baxter Health, Marion, NC

Served as field engineer in a condition assessment of 500+ ft floor drain systems running throughout a section of a plant. Utilized a push camera to conduct the condition assessment according to NASSCO PACP standards. Oversaw steam cured CIPP lining of one pipe segment and the epoxy lining of a wet well.

Storm Sewer Lining Construction Support

General Motors, Bay City, MI

Served as field engineer in the lining of 300ft of storm water pipe and epoxy lining of two manholes. The scope of work included coordination with subcontractors throughout the bidding process, construction oversight, and post-lining inspection.



Eric Soll

Road Warrior

Mr. Soll is a buried infrastructure specialist with technical focus on construction oversight for mainline and lateral pipeline packer injection grouting and SSES field implementation.

Relevant Experience

Education/Qualifications

- BS Mathematics Cabrini University 2020

Years of Experience

Total – 1
With Arcadis – 1

Professional Registration/ Certifications

- Engineer-in-Training
- 30 Hour Construction - OSHA

Office Location

Yardley, PA

2023 WLSP Grouting Care – Grouting and Manhole Inspections

Lehigh County Authority, Lehigh County, PA

Construction engineer (Green role) for small diameter pipe test and seal operation. The role consists of managing the lateral and main line packer injection operations, inspecting manholes for LCM connections, and inspecting the manholes in the project area for various defects and signs of I&I, all while ensuring that the specification is being followed and client goals are being met. Eric has also been submitting the inspector daily report which details all work completed and any issues that arise while completing the pipe rehabilitation. For the manhole inspections, the role consists of completing a full visual inspection of each manhole, documenting the defects with said manhole, and taking any measurements necessary for the eventual rehabilitation of defects.

City Manhole Inspections 2023 – Manhole Inspections

Lehigh County Authority, Allentown, PA and Lehigh County, PA

Construction inspector for manholes in the City of Allentown and Lehigh County. The role consists of locating and inspecting manholes in the project area using Arcadis Manhole Inspection Tool as the data collection tool. The inspections include detailing all defects with the manhole, detailing as surface level inflow issues, taking of 360-degree photos, and collecting the necessary measurements for any corrective actions the manholes may need.

Mini System #35 Sewer Rehabilitation– Grouting and Manhole Inspections

City of Princeton, Princeton, NJ

Construction engineer (Green role) for small diameter pipe test and seal operation. The role consists of managing the lateral and main line packer injection operations, inspecting the manholes in the project area for various defects and signs of I&I, and performing basement inspections to search for illegal connections, all while ensuring that the specification is being followed and client goals are being met.



Rachel Tellish, PE

Road Warrior

Mrs. Tellish is a buried infrastructure engineer specializing in pipeline conditional assessment and rehabilitation activities using trenchless technologies. She is a skilled construction engineer for cured in place pipe/lateral lining; mainline and lateral test and seal; open-cut sewer replacement; manhole chemical grouting, lining, and chimney replacement. She leads field team during industrial site investigations related to industrial storm and process sewers, including mapping, catch basin and manhole inspections, dye-testing, directing, and reviewing CCTV inspection videos, photographs, and inspection reports using PACP, LACP, and MACP defect coding, and developing initial rehabilitation recommendations.

Education/Qualifications

- BS Civil Engineering Trine University 2013

Years of Experience

Total – 10
With Arcadis – 10

Professional Registration/ Certifications

- Professional Engineer – MI

Professional Associations

40 Hour Hazardous Waste Operations and Emergency Response, HAZWOPER certified (initial)
30 Hour OSHA Construction Confined Space Trained
MI DEQ Construction Stormwater Inspector, Expires 2025

Office Location

Novi, MI

Relevant Experience

Sanitary and Storm Sewer Investigation

Active Manufacturing Plant, MI

Served as the field team lead investigator at an industrial facility mapping, assessing and investigating the condition of the storm and sanitary sewer networks. Responsibilities included manhole inspections, oversight of the CCTV subcontractor, daily planning, coordinating the work with the client, the plant and the subcontractor, assuring quality of the work, that the work completed conformed to specification, completing daily inspection reports with nightly updates to team members, while implementing health & safety standards.

Storm Sewer Investigation

Active Manufacturing Plant, IL

Served as the field team lead investigator at an industrial facility mapping, assessing, and investigating the condition of the storm sewer networks, determining methods for cleaning, dewatering, and disposing of a variety of hazardous and non-hazardous wastes from the heavily clogged sewers, CCTV internal visual inspections of below-grade pipes and photographic external visual inspections of above-grade pipes, determining hydraulic conveyance capacity requirements/limitations/needed improvements, creating and using a condition grading system, and determining appropriate rehabilitation method for defective assets. Design services included review of CCTV inspections, preparation of PACP-based physical condition assessment, preparation of cost estimates of various rehabilitation methods, initial determination of method of rehabilitation.



Trey Waagen, EIT

Road Warrior

Mr. Waagen is a project/field engineer within the Arcadis Buried Infrastructure Resource Team. He specializes in construction engineering, especially for capital grouting, and in conditions assessments and SSES work. He has worked on water, wastewater, stormwater planning and design projects for municipal and industrial system. He regularly leads and assists with field investigations during planning, design and construction and providing construction administration services. Mr. Waagen has completed various trainings that credit him with being able to identify and focus on rehabilitation efforts for Buried Infrastructure systems, including but not limited to water distribution systems, sewer systems, combined sewer systems, and storm sewer systems.

Education/Qualifications

- BS Civil Engineering Trine University 2019
- M.Env.Sc University of Oklahoma 2021

Years of Experience

Total – 5
With Arcadis – 5

Professional Registration/ Certifications

- EIT
- Confined Space Certified
- OSHA 30 Hour Training
- Avanti Grouting Inspection Certified
- NASSCO PACP/LACP/MACP Certified
- Broadband ElectroMagnetic Pipe Scanning Certified
- NPDES MS4 Inspector

Office Location

Fort Wayne, IN

Relevant Experience

Construction Manager at Risk (CMAR) Packer Grouting of Sanitary Sewers Aiken, SC

Functioned as a construction engineer directing the repair and rehabilitation to reduce I&I from 49 miles of 100 year old 6-inch -24-inch clay and concrete sanitary sewers featuring ARCADIS's Expedited Rehabilitation Approach. The work featured the capital grouting techniques that addressed all aspects of the mains, tap, laterals, and manholes, cured in place pipe lining, chemical root control, pipe bursting, open cut replacement, and manhole frame and cover replacement.

Little Rock Small Diameter Inflow and Infiltration Reduction Program – Night-time Weiring & Manhole Inspections

Little Rock Water Reclamation Authority, Little Rock, AR

Completed analysis of flow rates through multi-diameter sanitary sewers using weirs and confined space entry into the sanitary network. Additionally, a large-scale number of manhole inspections to determine the best basis of rehabilitation needed for each manhole was conducted.

Little Rock Small Diameter Inflow and Infiltration Reduction Program – Smoke Testing

Little Rock Water Reclamation Authority, Little Rock, AR

Lead a team of engineers to complete smoke testing procedures to look for infiltration and inflow points using GIS and boots on ground to record the emissions. Additionally, collaborated with local authorities and homeowners to ensure public awareness of the testing was complete.

Lehigh County Authority Test and Seal Construction Cost Geographic Information System (GIS) Mapping

Lehigh County Authority, Lehigh County, PA

Used ArcPro to generate GIS based maps to help facilitate the estimation of cost and planning for construction for a Test and Seal pilot project that looks to change large

diameter gravity sanitary sewer into low-pressure sanitary sewer system. The goal is to aid the hydraulic load for the authority in its efforts to keep their system working efficiently without occurring large costs.

Franklin St Sewer & Manhole Open Cut Replacement

Evansville, IN

Construction engineer onsite throughout the entirety of the replacement of 72-inch RCP sewer to 72-inch FRP Sewer, and the replacement of two manhole structures. Completed field testing, field measurements, and oversight to ensure construction practices were to specifications and quality controls were met. Assisted in facilitating progress meetings, coordination with Owner, and submittal reviews.

WLSP – Grouting and Manhole Inspections

Lehigh County Authority, Allentown, PA

Construction engineer for small diameter pipe test and seal operation. The role consists of managing the lateral and main line packer injection operations, inspecting manholes of LCM connections, and coordinating with the contractor to resolve issues with manholes, all while ensuring that the specification is being followed and client goals are being met. For the manhole inspections; the role consists of locating manholes, collecting measurements and photographs of the manholes, and escalating any major defects to the project manager.

Red Mountain Tunnel Inspection and Broadband Electromagnetic Scanning

Birmingham Water Works Board (BWVB), Birmingham, AL

Inspected an 1880's blast and dig rock tunnel which hosts two 1889 Pit Cast Iron potable forcemains (42-inch and 30-inch) that spans over 2000ft. This included the inspection of rock tunnel, arch brick tunnel, tunnel liner plate, exterior Cast Iron and Broadband Electromagnetic (BEM) scanning. The inspection results will be used to help BWVB to generate risk analysis and an approach to rehabilitation.

Evansville Sewer Rehabilitation Phase II – Injection Grouting

Evansville, IN

As a field engineer, collaborated with a subcontractor to rehabilitation 892 LF of 72-inch sanitary sewer through the use of injection grouting. Operating as the field engineer and making engineering decisions to facilitate proper rehabilitation efforts. On the construction administration side, organized and reviewed the contractor's payment applications and submittals using E-Builder.

Lehigh County Water Authority – Night-time Weiring

Lehigh County, PA

Completed analysis of inactive flow rates through multi-diameter sanitary sewers using weirs and confined space entry into the sanitary network.

Storm Sewer Rehabilitation Phase I & II – Packer Grouting

Bristol Myers Squibb, Devens, MA

Operated as a field engineer to inspect and coordinated decisions with the contractor for the rehabilitation of multiple diameter storm sewers through the use of packer grouting. Techniques from the capital grouting techniques that addressed all aspects of the mains, tap, laterals, and manholes.

Little Rock Small Diameter Inflow and Infiltration Reduction Program - Grouting Oversight

Little Rock, AR

Operated as a field engineer to inspect and make decisions on the continuous operations of the multiple diameter sewer packer grouting rehabilitation program that is occurring in the city of Little Rock.

Fort Wayne Open Cut Rehabilitation Package

City of Fort Wayne, IN

Lead the design engineering of an open cut package that focused on rehabilitating twelve separate locations of varying length of combined sewer and sanitary sewer systems. Worked with City Utilities to gain easement rights and explored unique design considerations.



Part 6. Appendices

Resumes - Gannett Fleming



TODD WILLIAMS, PE, ENV SP

Sewer Rehabilitation Condition Assessment

Years of Experience:

35

Education:

BS, Biology,
Muhlenberg College,
1985

MS, Water Resources
and Environmental
Engineering, Villanova
University, 1989

Registrations:

Professional Engineer
in Virginia - No.
0402052758 (+PA)

Envision Sustainability
Professional (ENV
SP): Institute
for Sustainable
Infrastructure (ISI) -
No. 8719

NASSCO Pipeline
Assessment &
Certification Program
(PACP, MACP, LACP) -
No. P0045813-01202

Location:

Newport News, VA

Using his experience and understanding of collaborative delivery projects, HRSD Design and Construction Standards and technical experience from 170+ sanitary sewer rehabilitation and replacement projects, Todd will serve as task leader for all physical condition assessments on this program. Specializing in physical condition assessment, rehabilitation, and replacement using trenchless technologies, including chemical grouting, cured- in-place pipe (CIPP) lining, , Todd has assessed, replaced, or rehabilitated thousands of miles of pipelines, up to as large as 84-inches-in-diameter.

Relevant Projects

VB 340 I/I Removal Project, Virginia Beach, VA, HRSD. While at Arcadis, task leader for the physical condition assessment, design document preparation, permitting and construction administration for HRSD's first collaborative delivery project for reduction of I/I in sewer basin 340.

Sewer Program Management, Washington, DC, District of Columbia Water and Sewer Authority. While at Arcadis, lead engineer for inspection and assessment of the entire storm, combined sewer, and sanitary sewer system. Specific responsibilities included quality assurance/quality control reviews for condition assessments and designs for rehabilitation of the critical interceptors throughout the DC Water system. Also managed six-multi-million dollar contracts for inspection of the entire 1,800-mile DC Water system using closed-circuit television, sonar, and laser-profiling technologies.

Northcrest – Afton Sewer Rehabilitation, Wilmington, DE, New Castle County. While at Arcadis, Project Manager for the rehabilitation of the Northcrest - Afton sewer system, which involved the construction of 3,840 LF of CIPP lining, CIP lateral lining, 30 manhole rehabilitations, and a pressure-testing and chemical- sealing program for 3,760 LF of main lines and 53 lateral taps. The scope of work included pre-design activities, identification of property issues, and closed-circuit television inspections; physical condition assessment based on the pipeline assessment and certification program; determination of the basis of rehabilitation; design of rehabilitation and preparation of plan and profile drawings, technical specifications, and contract documents.

Larchmont Area Sanitary Sewer Improvements, Norfolk, VA, HRSD. Pipeline Design Leader for the replacement of eight pump stations with five new pump stations and associated gravity sanitary sewer and force mains. This program is jointly managed by HRSD and the city of Norfolk using the CMAR collaborative delivery approach. Responsible for development of the preliminary engineering report and preliminary design and alignment of approximately 10,000 LF of gravity pipelines ranging in size between 8- and 12-inches and approximately 500 LF of force main ranging in size between 6- and 12-inches.

South Shore Gravity Sewer Improvements – General Engineering Services, Virginia Beach, Portsmouth, and Norfolk, VA, HRSD. Project Manager for the evaluation of alternatives, preliminary engineering report (PER) preparation, and design review for the rehabilitation/replacement of influent gravity sanitary sewer pipeline segments at three pump stations and within one neighborhood within the South Shore.

Infiltration and Inflow (I/I) Study, Petersburg, VA, Dinwiddie County Water Authority. While at Arcadis, Project Manager and Field Team Leader for easement walk and inspection of approximately 125 manholes on the interceptors. These inspections were used to not only collect structural information, but to also assess the hydraulic condition of each manhole. The anticipated elevated groundwater conditions revealed any of the inspected manholes subject to infiltration. Each manhole was inspected, and information was stored in an electronic data collection format. Also served as Design Quality Leader for the review of closed-circuit television inspection information, which provided the data required to determine the type of rehabilitation best suited to address structural issues and reduce I/I in a given pipe segment (e.g., excavation and replacement, cured-in-place liners, joint sealing, manhole lining, manhole grouting). Using the collected condition assessment information, the team determined appropriate rehabilitation methods for each segment of pipe and manhole.

Sanitary Sewer Rehabilitation Design, Roanoke, VA, Western Virginia Water Authority. Project Manager and Engineer of Record for the Crystal Spring Avenue and Westside Boulevard Interceptors. Responsibilities included reviewing closed-circuit television (CCTV), performing a physical condition assessment, developing a basis of rehabilitation, and designing necessary improvements for rehabilitation of all mainlines, manholes, and service laterals. Rehabilitation technologies include CIPP lining of mainlines and laterals, and full lateral replacement and manhole rehabilitation using fiber reinforced cementitious liners.

Delaire Interceptor Rehabilitation, New Castle County, DE, New Castle County. While at Arcadis, Project Manager for rehabilitation of approximately 4,000 feet of 8-, 12-, and 15-inch interceptor sewer. The Delaire Interceptor was identified through flow monitoring as a major contributor to I/I problems in the sewershed. Project components included development of technical specifications and bidding documents for cleaning, televising, joint testing, and grouting. Other services included bid assistance and construction administration.

Sanitary Sewer Evaluation Studies, Isle of Wight, VA, Isle of Wight County. While at Arcadis, Project Manager for sewer system evaluation survey studies for the Gatling Point and Carrollton Forest sewer basins. These studies were conducted as part of the requirements of the regional order by consent and the county's management, operations and maintenance plan. This project included performing smoke testing to identify buried defects in the sewer system piping and laterals and completing manhole assessment and certification program compliant inspection of manholes. Following analysis of the smoke testing report, closed-circuit television inspection of the pipelines and laterals was performed. In accordance with the consent order, a condition assessment and rehabilitation plan were developed for the Gatling Point sewer basin and submitted to Virginia Department of Environmental Quality for review and approval.

Sanitary Sewer 1950 Replacement, Ferebee Avenue Pump Station Replacement, and Park Avenue Pump Station Replacement, Chesapeake, VA, HRSD. Pipeline Task Manager for the preliminary engineering and Design Leader for the rehabilitation and replacement of a 12-inch force main (2,600 LF), and 30-inch gravity interceptor (6,500 LF). Conducted detailed alternatives evaluation, used weighted decision criteria software, and provided stakeholder management and design. Current tasks include preconstruction, contract administration, field engineering, and inspection. Design responsibilities include plan and profile alignments of the new force main and gravity pipeline to balance triple bottom line criteria, including utility conflicts, impacts to the public, and cost. Also responsible for coordinating future improvements to the neighborhood, such as the Southgate Plaza Bridge replacement, into the current design.

Sanitary Sewer Rehabilitation, Jacksonville, NC, City of Jacksonville. While at Arcadis, Project Manager and Design Engineer for on-site inspections of manholes and reviewed closed-circuit television information to develop an action plan for the reduction of infiltration and inflow into the sanitary sewer system. Provided condition assessment and design services for the rehabilitation of three sewer basins within the city's wastewater collection system. Upon completion of the action plan, provided design services including preparation of bidding documents for the rehabilitation of approximately 35,000 linear feet of sanitary sewer ranging in size from 8-to-24 inches.



JESSICA HOU

Community Outreach

Years of Experience:

28

Education:

MS, Environmental Engineering, Old Dominion University, 2004

BS, Civil Engineering, Old Dominion University, 1998

Registrations:

Professional Engineer in Virginia - No. 402038762

Project Management Professional, Project Management Institute (PMI-PMP) - No. 57938

Board Certified Environmental Engineer (BCEE), American Academy of Environmental Engineers and Scientists

Envision Sustainability Professional (ENV SP): Institute for Sustainable Infrastructure (ISI) - No. 7548

Location:

Newport News, VA

Jessica will leverage her 20+ years of experience serving the Hampton Roads community and demonstrated history of successfully managing multi-phase and concurrent collaborative delivery projects to provide effective, comprehensive, and meaningful community outreach that successfully meets HRSD's expectations and keeps the community informed. Familiar with local issues and community concerns, Jessica has presented on stakeholder impacts on her HRSD projects at multiple regional and national conferences and will continue her proven focus and dedication to delivering HRSD's satisfaction for this contract, applying her familiarity and lessons learned to deliver successful project outcomes.

Relevant Projects

Larchmont Area Sanitary Sewer Improvements, Virginia Beach, VA, HRSD.

Program Manager for the replacement of eight pump stations with five new pump stations and associated linear assets, jointly managed by the district and Norfolk Utilities. Led the pump station design team, pipeline design team, communications team, and construction management team for a successful multi-phased long-term replacement program delivered by the CMAR collaborative delivery method.

South Shore Gravity Sewer Improvements, Virginia Beach, VA, HRSD.

Project Principal for oversight of professional engineering services for the evaluation of alternatives, preliminary engineering report preparation, and design review for the rehabilitation/replacement of influent gravity sanitary sewer pipeline segments at three pump stations and within one neighborhood within the South Shore system. Major challenges include coordination with multiple localities, including Virginia Beach, Portsmouth, and Norfolk for site plan review, traffic controls, and maintenance of flow.

On-Call Engineering Services, Virginia Beach, VA, HRSD.

Project Manager for technical analysis, design services, construction administration services, inspection services, and specialty studies for HRSD's treatment plants, pump stations, and administrative and maintenance facilities. Current tasks include staff augmentation services for the management of six projects associated with the Middlesex County Interceptor System Program, the Colley Avenue Pump Station Pump replacement, biogas feasibility studies, South Shore gravity sewer improvements, Dozier's Corner Pump Station replacement, small communities pump station standards development, and King William Main Pump Station rehabilitation.

Ferebee and Park Avenue Pump Stations Replacement and Rehabilitation, Virginia Beach, VA, HRSD.

Project Manager for replacement of two pump stations, a 12-inch force main, and 24- and 18-inch gravity main replacement. Preliminary engineering services include detailed alternatives evaluation, use of weighted decision criteria software, stakeholder management, and preliminary design.



TIFFANY HARRISON, ENV SP

Physical Condition Assessment

Years of Experience:

16

Education:

BS, Civil Engineering,
Morgan State
University, 2008

Registrations:

NASSCO Pipeline
Assessment &
Certification Program
(PACP) - No. U-808-
7262

NASSCO Manhole
Assessment
Certification Program
(MACP) - No. U-808-
7262

NASSCO Inspection
Training Certification
Program (ITCP) Cured
in Place Pipe (CIPP)
- No. CIPP-916-
0201878

Envision Sustainability
Professional (ENV
SP): Institute
for Sustainable
Infrastructure (ISI)

Location:

Newport News, VA

Tiffany will apply her design and engineering knowledge from dozens of sanitary sewer, urban utility, and pipeline projects to perform thorough condition assessments and develop efficient design solutions based on pipe and field conditions, as needed. Tiffany is NASSCO certified in PACP, MACP, and LACP and CIPP and regularly performs technical and design review of sanitary sewer systems and pipelines, including performing CCTV and quality control reviews and developing recommendations for rehabilitation design.

Relevant Projects

South Shore Gravity Sewer Improvements – GES, Virginia Beach, Chesapeake, and Norfolk, VA, HRSD. QA/QC for gravity sewer improvements which included design review for the rehabilitation/replacement of influent gravity sanitary sewer pipeline segments within the South Shore system. Major challenges include coordination with multiple localities, including Virginia Beach, Portsmouth and Norfolk for site plan review, traffic controls and maintenance of flow.

Larchmont Area SS Improvements, Norfolk, VA, HRSD. QA/QC for the Larchmont improvements using the CMAR collaborative design approach. Project included development of the PER and preliminary design and alignment of approximately 10,000 LF of gravity pipelines ranging in size between 8- and 12-inches and approximately 4,000 LF of force main ranging in size between 6- and 12-inches.

Sanitary Sewer 1950 (SS 1950) Replacement and Ferebee Avenue and Park Avenue PS Replacements, Chesapeake, VA, HRSD. QA/QC for replacement of a 12-inch force main, and 24- and 18-inch gravity main replacement.

Outfall Sewershed Improvements – SC 919 Rehabilitation Design Services, Baltimore, MD, City of Baltimore DPW, Bureau of Water and Wastewater. Project Designer in charge of the technical and video review and design drawing preparation for the sanitary sewer collection system improvements as part of the Consent Decree Program. Design and construction-phase services involved approximately 100,000 feet of CIPP lining; 78 point repairs; rehabilitating 300 manholes and replacing 19 manholes; CIPP lining of 870 sanitary house connections (laterals), replacing 10,000 feet of 8- to 24-inch sewer; locating, excavating, opening, and inspecting 150 manholes; heavy cleaning and inspection of 7,000 feet of sewers; and re-inspection of 92,000 feet of sewers and 1,000 manholes.

2022 Small Diameter Sewer Rehabilitation, Pittsburgh, PA, Pittsburgh Water and Sewer Authority. Project Designer for the rehabilitation of approximately 4.7 miles of sewers ranging in size from 8- inches to 30-inches. Project responsibilities include oversight of CCTV and evaluation of sewers for potential lining, identification and documentation of locations of necessary point repairs, coordination of project team schedule and assignments, and preparation of cost estimates and bidding documents.



TEDDY THURSTON

Construction Engineering

Years of Experience:

20

Education:

HS Diploma,
Monticello High
School, 1999

Registrations:

AWWA DIP
Certification

Pipeline Condition
Assessment
Techniques
Certification

ProCore Construction
Management
Certification

ArcGIS 10 Migration
Training Certification

Confined Space and
Trench Safety Training

SAP Project
Coordinator Training

"Miss Utility" Locator
Training

OSHA 30-Hour Safety

Location:

Newport News, VA

A proven Project/Construction Manager, Teddy brings extensive construction management/inspection (CM/I) experience, including multiple HRSD projects involving pipelines, pump stations, and treatment facilities. Teddy's areas of specialization include large-diameter pipelines, complex bypass systems, and emergency response projects. He has directed multiple multi-million-dollar projects involving work adjacent to rural and heavy traffic and has served in management roles on multiple HRSD, VDOT, Federal, and local municipal projects, including coordinating with multiple project stakeholders, localities, utilities, and contractors. Teddy is also proficient in design review, specification coordination, scope and fee development, schedule management, field logistics, document preparation, site management, project closeout, and start-up activities. Intimately familiar with HRSD's Design and Construction Standards,

Relevant Projects

Sanitary Sewer 1950 (SS1950) Replacement and Ferebee Avenue and Park Avenue PS Replacements, Chesapeake, VA, HRSD. Construction Manager providing CM/I services for this \$16M project that includes the replacement of a 8.5 mgd PS and installation of approximately 270 LF of 8-inch PVC pipe, 1,975 LF of 12-inch HDPE pipe, 1,750 LF of 18-inch PVC and CIPP Lining, and 5,300 LF of 30-inch PVC. Responsibilities include attending and presenting at public meetings; conducting monthly progress meetings; guiding submittals through the workflow approval process in Unifier; coordinating RFI responses; and reviewing change order requests. Also prepare associated work change directives and change orders; verifies compliance with the VCWRLF requirements; reviewing monthly pay applications; and verifying the project is constructed in accordance with the contract documents and HRSD's Construction Standards.

HRSD Condition Assessment Program, Chesapeake, VA, HRSD. Construction Manager and Emergency Responder as part of this program covering inspection of gravity sewer and force mains as part of a Regional Consent Decree. Program included CCTV inspection of gravity mains and man-holes and siphon chambers. Rehabilitation of gravity sewer mains consisted of CIPP lining, point repairs, and installation of new mains and manholes. Provided emergency response project management and inspection for pipeline failures. These failures included the use of linestop installation and complex bypass pumping systems using HDPE and implemented pump and haul trucks. Provided construction management and daily inspections. Job responsibilities included change order review and negotiating, quality control reviews, and schedule reviews.

Larchmont Area SS Improvements, Norfolk, VA, HRSD. Construction Manager assisting with constructability reviews for the construction of 3 pump station replacements, 3 pump station rehabilitations, more than 10,000 LF of associated 6- to 18-inch gravity sewer lines, and approximately 4,000 LF of 6- to 12-inch force main in the historic community of Larchmont.



SUTHERLYN BRINN, ENV SP

Sanitary Sewer Evaluation Studies

Years of Experience: 4

Education:

BS, Civil Eng., Old Dominion University, 2022; BS, Environ. Science, George Mason University, 2018

Registrations:

ENV SP: ISI - No. 50234; SSCO Pipeline Assessment & Certification Program (PACP, MACP, LACP) - No. P0046197-022024

Location:

Newport News, VA

An Associate Designer at Gannett Fleming, Sutherlyn provides design assistance for a wide variety of projects, including water and sewer pipelines. She regularly performs data collection and documentation; prepares plan details and outlines, technical specifications, and reports; and also performs process and hydraulic calculations in support of broader engineering activities involving the design of equipment, components, structures, or systems.

- **South Shore Gravity Sewer Improvements – GES, Virginia Beach, Chesapeake, and Norfolk, VA, HRSD.** Associate Designer assisting with the PER, site visits with HRSD, and capturing/documenting images of each site. Conducted historical research for each site and gathered survey data. Captured site images, analyzed CCTV clips of sewer mains, and compiled GIS images of pump station locations.
- **SS 1950, Chesapeake, VA, HRSD.** Associate Water Designer creating conformed documents for the 12-inch force main between the Ferebee Avenue and Park Avenue pump stations. Delivered construction notices; visited site to determine locations of cleanouts, analyzed site plans, completed hydraulic calculations, and created a map of proposed cleanouts and pipeline.
- **Larchmont Area Sanitary Sewer Improvements, Norfolk, VA, HRSD.** Associate Designer organizing development of the PER addendum. Assisted with writing report's of pipeline sections. Conducted a study on backyard sewers. Assisted with survey notifications. Summarized issues along final properties and alignments in ERIS report. Completed manhole calculations; compiled list of homes with backyard sewers to determine if CCTV was needed.



INDIA EDWARDS

Contract Administration/Permitting

Years of Experience: 17

Education:

BS, Accounting,
Hampton University,
2003

Location:

Newport News, VA

Having been extensively working on HRSD projects, India can apply lessons learned from her contract administrative support for various HRSD projects. She monitors project progress for compliance with contractual obligations for small projects as well as large projects with high risk and complexity. India also develops and maintains project schedules, while maintaining document control procedures. She actively assists in project budgeting, quality, and risk management controls, and is involved in outreach activities with community service programs.

- **Professional GES, Virginia Beach, VA, HRSD.** Contract Administrator maintaining project controls for task orders related to technical analysis, design services, construction administration services, inspection services, and specialty studies.
- **Larchmont Area SS Improvements, Norfolk, VA, HRSD.** Contract Administrator for permitting efforts and contract administration services for the design and construction of S3 PS replacements, 3 PS rehabilitations, and 3 service area improvement projects in the historic community of Larchmont.
- **SS1950 Replacement and Ferebee Avenue and Park Avenue PS Replacements, Chesapeake, VA, HRSD.** Contract Administrator for permitting efforts and contract administration services for the design of replacements of two PSs, a 12-inch FM, and a 30-inch gravity main. Permitting efforts include site plan, re-subdivision, and conditional use permits.



JOVANTE LILLARD

Sanitary Sewer Evaluation Studies

Years of Experience: 2

Education:

BS, Civil Engineering Technology, Old Dominion University, 2021

Registration: NASSCO Pipeline Assessment & Certification Program (PACP, MACP, LACP) - No. P0046522-022024

Location:

Newport News, VA

Jovante is well-versed in planning and execution of civil construction projects, including multiple sewer projects for HRSD. He is skilled in hydraulic design, concept studies, erosion and sedimentation control, AutoCAD, operational analysis, soil composition analysis, technical review, project support, stress analysis, quantity surveys, and construction surveying. Jovante's experience also includes creating PADMPs for and assisting with locating utilities for backyard sewers.

- **South Shore Gravity Sewer Improvements – GES, Virginia Beach, Chesapeake, and Norfolk, VA, HRSD.** Technician responsible for edits to the drawings in AutoCAD based on markups provided for Seay Avenue Pump Station and Arctic Avenue Pump Station.
- **Larchmont Area SS Improvements, Norfolk, VA, HRSD.** Technician responsible for creating the PADMP, assisting with backyard sewers, making edits to drawings on AutoCAD, and assisting with compiling meeting summaries for project meetings. Future responsibilities include construction inspection.
- **SS1950 Replacement and Ferebee Avenue and Park Avenue PS Replacements, Chesapeake, VA, HRSD.** Technician responsible for managing shop drawings between the contractor and the engineer, and assisting in construction inspection when needed.

TRESON SCALF

Sanitary Sewer Evaluation Studies

Years of Experience: 1

Education:

BS, Environmental Engineering, University of Florida, 2023

Location:

Newport News, VA

Treson's experience includes writing reports, reviewing shop drawing submittals, making calculations, recording field observations, reading blueprints, and permitting assistance. She regularly provides project support, technical review, and preparation of technical documents, and has PADMP experience with stage 1 and 2.

- **South Shore Gravity Sewer Improvements – GES, Virginia Beach, Chesapeake, and Norfolk, VA, HRSD.** Designer responsible for writing, editing, and finalizing PADMP stages 1 and 2, including the noise and vibration analysis. Also assisted with progress reports and permitting.
- **Larchmont Area SS Improvements, Norfolk, VA, HRSD.** Designer for PS 165 curb and gutter analysis and site assessment. Provided notice distribution as part of the project's communications plan and GIS support. Prepared deliverables for 90% design. Reviewing plats for site plan permitting. Progress Reports. Drafted the Geotechnical Design Scope for PS 165. Drafted Work Orders and Work Order Amendments. Assisted in drawdown testing at PS 124.
- **SS1950 Replacement and Ferebee Avenue and Park Avenue PS Replacements, Chesapeake, VA, HRSD.** Designer responsible for keeping track of DBA Compliance and AIS Compliance, as well as assisting with permitting and reviewing Park shop drawing submittals. Provided on-site data collection and notice distribution as part of the project's communications plan. Assisted with progress reports, drafting change order 4 recommendation letter, and reviewing change order requests.

JAMANTE WILSON

Construction Engineering

Years of Experience: 1

Training:

Competent Person for Fall Protection Training, National Environmental Trainers

Personal Protective Equipment Training, National Environmental Trainers

Location:

Newport News, VA

Jamante is a Construction Inspector with recent and ongoing HRSD inspection experience. Local and HRSD-experienced, Jamante regularly verifies work is in accordance with contract drawings and client specifications. His experience also includes daily communication and coordination for various aspects of these projects.

- **Larchmont Area Sanitary Sewer Improvements, Norfolk, VA, HRSD.** Inspector verifying if work is in accordance with contract drawings and client specifications. Other responsibilities include daily reports, contractor material take offs, progress meetings/precon meetings, pay app review, daily coordination with contractor, residents, and community, conflict resolution, overseeing required testing, submittal reviews/coordination, and coordination with subconsultants for geotechnical and specialized concrete testing.
- **Sanitary Sewer 1950 Replacement, Ferebee Avenue Pump Station Replacement, and Park Avenue Pump Station Replacement, Chesapeake, VA, HRSD.** Inspector verifying if work is in accordance with contract drawings and client specifications. Other responsibilities include daily reports, contractor material take offs, progress meetings/precon meetings, pay app review, daily coordination with contractor, residents, and community, conflict resolution, overseeing required testing, submittal reviews/coordination, and coordination with subconsultants for geotechnical and specialized concrete testing.

THOMAS TRACY

Construction Engineering

Years of Experience: 8

Education:

Currently attending Columbia Southern University for BS

Location:

Newport News, VA

Thomas is construction professional with more than 8 years of experience in the construction field, with a focus on water/wastewater utilities, treatment plants, and roadway construction. He brings knowledge of OSHA and VDOT standards as well as site inspection experience.

- **Larchmont Area Sanitary Sewer Improvements, Norfolk, VA, HRSD.** Recently hired to provide construction management services for the replacement of eight pump stations with five new pump stations and associated gravity sanitary sewer and force mains. This program is jointly managed by HRSD and the city of Norfolk and includes the transfer of existing assets between owners.
- **Garney Construction, Virginia Beach, VA.** Project Engineer responsible for assisting with the estimating process, keeping job documentation organized, site visits, permitting/surveying needs, execution of drone surveying on pipeline and plant projects, coordinate community outreach events as required by contracts with HRSD, maintaining project schedules in Primavera P6, reviewing monthly pay applications, ordering materials for job sites/coordinating pick-up and delivery, and issuing purchasing orders.



BRYAN KELLEY, PMP

GIS

Years of Experience: 23

Education:

MS, Geography, Ohio University, 1999

BS, Cartography, Ohio University, 1997

Registrations:

PMI-PMP - No. 2555982

Location:

Newport News, VA

A Vice President of Gannett Fleming's GeoDecisions and previous employee of VDOT, Bryan's experience involves implementing and managing linear referencing systems (LRS) and GIS with associated technology solutions, along with integrating supporting business applications and databases. He Supports business processes that build and maintain enterprise decision-making abilities for various agencies and companies.

- **Geographic Information System Migration Services, Richmond, VA, VDOT - Central Office.** Project Manager working directly with VDOT Information Technology Division's technical staff and subject matter experts and providing oversight and guidance to a team of technical architects, data and business analysts, and a scrum master.
- **Mapping Application Reintegration System Geospatial Migration Services, Richmond, VA, VDOT - Central Office.** Project Manager for the planning, coordination, and execution of an agile-based application development effort.
- **Geospatial System Migration (GEMINI) Planning for the Cloud, Richmond, VA, VDOT - Central Office.** Project Manager coordinating and planning the migration of VDOT's system portfolio to the cloud in response to an Executive Order from the Governor.



Part 6. Appendices
Resumes - RK&K

Brad Alger

Project Engineer II

Assigned Office: Newport News

Years of Total Experience: 21

Education:

BS/Civil Engineering Technology

Overview:

Brad's experience includes site, transportation, stormwater and wastewater engineering projects to a variety of clients throughout Hampton Roads, VA and North Carolina. He has experience in on-site inspection/construction administration, has prepared construction plans and specifications and has assisted in the design of sanitary sewer, sanitary rehabilitation, and stormwater systems. Brad has also assisted in roadway designs and site plan development.

Project Experience:

- **City of Newport News, VA | Warwick Blvd - Main Street Drainage, Newport News, VA:** As project engineer, Brad assisted with providing CA/CI services and shop drawing review for the installation of helical piles, a drainage conveyance system, beach nourishment, and site improvement and restoration.
- **City of Virginia Beach, VA | Annual Services Contract for Various Public Utilities Projects Contract #30, Task: Baylake Pines Pump Station 304 and Force Main Replacement, Virginia Beach, VA:** As project engineer, Brad assisted with the development of construction plans and documents for the design of 2,000 LF of sewer force main replacement from PS 304 to an existing gravity manhole at the intersection of Indian Hill Road and Ben Gunn Road.
- **HRSD | Interceptor System Projects Annual Contract, Task: Morrison Pump Station Discharge Force Main Replacement & Capacity Enhancements, Newport News, VA:** As the project engineer, Brad is currently providing design engineering services for replacement of a 12-inch sanitary sewer force main which includes a jack and bore operation under CSX railroad tracks, horizontal directional drilling and direct bury. Responsibilities include the processing of a Valuation Map Reproduction Request Form for right-of-way entry and facilitation of an encroachment agreement for HRSD for the new force main pipe and casing pipe to be installed under CSX railroad tracks.
- **HRSD | Interceptor System Projects Annual Contract, Task: Morrison Pump Station Discharge Force Main Replacement & Capacity Enhancements, Newport News, VA:** As the project engineer, Brad is currently providing design engineering services for replacement of a 12-inch sanitary sewer force main which includes a jack and bore operation under CSX railroad tracks, horizontal directional drilling and direct bury. Responsibilities include the processing of a Valuation Map Reproduction Request Form for right-of-way entry and facilitation of an encroachment agreement for HRSD for the new force main pipe and casing pipe to be installed under CSX railroad tracks.
- **James City Service Authority | Engineering Services for College Creek Water Main Crossing (HDD), James City County, VA, VA:** As the project engineer, Brad assisted in the development of construction plans and documents for a new 14" HDPE water main under College Creek south of the east bound lanes. He performed a horizontal directional drill (HDD) which will provide the service authority with a level of redundancy allowing them to rehabilitate the existing 16" main and have system redundancy.

Marina Doyle, PE

Project Engineer I

Assigned Office: Newport News

Years of Total Experience: 10

Education:
BS/Civil Engineering

Overview:

Marina has experience providing utility and stormwater engineering services to clients throughout the Hampton Roads area including the Cities of Virginia Beach and Newport News, the Town of Poquoson, Isle of Wight, York County, James City County, VA and the HRSD (HRSD). Prior to joining RK&K, Marina completed a two-year planning/analysis internship with HRSD.

Project Experience:

- **City of Newport News, VA | General Architectural and Engineering Services Annual Contract- Rexford Drive Sanitary Force Main Replacement, Newport News, VA:** Marina served as engineer responsible for Horizontal Directional Drill (HDD) design, pipe line design, and cost estimation. The scope of work included relocation of an 8-inch cast iron force main. RK&K designed and prepared construction drawings and technical specifications for construction of up to 3,100 LF of sewer force main realignment generally aligned along Rexford Drive from Rexford Drive West to the newly constructed HRSD force main tie-in.
- **City of Newport News, VA | General Architectural and Engineering Services Annual Contract- Huxley Place Sanitary Sewer Rehabilitation and Replacement, Newport News, VA:** Marina served as engineer responsible for compiling, analyzing and creating maps using GIS data. She served as project engineer for the replacement/rehabilitation of approximately 1,500 LF of 10-inch sanitary sewer main, eight manholes and associated laterals. This work is being performed in conjunction with the replacement and extension of a 36-inch HRSD Interceptor Force Main diversion to eliminate unvented high points and allow for the abandonment of approximately 5,000 LF of aged infrastructure.
- **City of Newport News, VA | General Architectural and Engineering Services Annual Contract, Task 10: Hilton Beach Shoreline Restoration/Expansion, Newport News, VA:** Engineer responsible for assessment and design of replacement alignment to abandon an in-line pressurized IFM vault, replace aged IFM, facilitate condition assessment of IFM in heavily traveled urban roadway, and design maintenance of service flow diversion through a temporary HDPE force main aligned along a former CSX right-of-way. Project features phased construction with Phase 1 isolation, force main replacements and condition assessment and Phase 2 force main rehabilitation.
- **HRSD | Jefferson Avenue Interceptor Force Main Replacement Phase III (JR011730), Newport News, VA:** Marina served as engineer for the replacement of approximately 9,400 LF of 12 to 24-inch pipeline with a new 30-inch using conventional trench construction and tunneling methods along Jefferson Avenue. Specific responsibilities included analyzing hydraulic model results, GIS mapping, assisting with records research and coordination with utilities, cost opinions, feasibility and comparative analysis for alignments, determination of easement acquisition for the alignments.
- **HRSD | Patrick Henry Pump Station Interconnection Force Main, Newport News, VA:** Marina served as engineer for the replacement of approximately 9,400 LF of 12 to 24-inch pipeline with a new 30-inch using conventional trench construction and tunneling methods along Jefferson Avenue. The Patrick Henry Pump Station Interconnection Force Main consists of approximately 2,000 LF of 18-inch, 24-inch, and 30-inch DI force main and 1,600 LF of pipe abandonment. Specific responsibilities included analyzing hydraulic model results, GIS mapping, assisting with records research and coordination with utilities, cost opinions, feasibility and comparative analysis for alignments, determination of easement acquisition for the alignments.

Frank Gundrum, CCM

Construction Manager

Assigned Office: Virginia Beach

Years of Total Experience: 21

Years of RK&K Experience: 1

Education:

High School Graduate

Professional Registration:

Certified Construction Manager

Overview:

Frank possesses an extensive background in construction management, project management, construction administration, and maintenance and construction services. He has served as a Construction Manager with an engineering consultant firm for structures, water, wastewater, and stormwater facilities. As a Navy veteran, Frank is familiar with local government contracts and procurements as well.

Project Experience:

HRSD | James River Treatment Facility, Newport News, VA: Construction Manager for this project valued at \$650M, for Design-Build of a new Sustainable Water Initiative for Tomorrow (SWIFT) facility. Project includes two process buildings, EQ tanks, multiple recharge wells, main electrical building, and new administration building. Frank was responsible for RFI, submittal processing, daily reports, construction process update meetings, special inspections, pay app review and contractor construction schedule updates. Applications used: Procore, ProjectWise, Bluebeam, REDit, and BIM360.

HRSD | Nanesmond WRF Screen Replacement, Suffolk, VA: Senior Field Coordinator for this project valued at \$800,000 for replacement of three Duperon multi-rake traveling bar screens. Project included extensive instrumentation and controls (I&C) inspection, minor structural work for reinforcing pads, and some valve replacements on upstream piping. Owner furnished equipment for installation by general contractor (GC). Responsible for associated special inspections for minor structural work for reinforcing pads since new screens were smaller. Responsibilities also included onsite inspection of GC work, review and approval of pay applications, and coordinating review of shop drawings and RFIs.

HRSD | SWIFT Recharge Well Installation, Suffolk, VA: Senior Field Coordinator for this project which included extensive mechanical and pipe work, electrical (MCC) and I&C work for pump controls and actuated valves. Responsibilities included RFI and shop drawing coordination, pay application review, and some special inspections. Project valued at \$1.2M.

HRSD | Grease Handling Facility – Nansemond WRF, Suffolk, VA: Senior Field Coordinator. Frank was responsible for all special inspections of structural steel and concrete as well as all mechanical inspections. Responsibilities also included RFI and shop drawing coordination and reviewing pay applications. Project valued at \$10.8M.

HRSD | Pump Station PS-191, Norfolk, VA: Frank was a senior field coordinator for this project valued at \$1.5M – 9-month duration. Responsible for structural and mechanical inspections including special inspections and masonry.

HRSD | Condition Assessment Program, Virginia Beach, VA: Frank served as senior field coordinator providing field inspections as needed to support program. Responsibilities included inspecting UST pipe and valves, inspecting ARVs, and overseeing ground penetrating radar (GPR) work.

Harry Hardy

Senior Inspector

Assigned Office: Virginia Beach

Years of Total Experience: 38

Years of RK&K Experience: 1

Education:

AAS/Civil Engineering Technology

Employment History:

HRSD | Virginia Beach, VA: Harry served as interceptor inspector. He improved quality assurance procedures to minimize errors and increase the effectiveness of inspections. Harry upheld codes and regulations governing materials, processes, and procedures. He provided CIP projects' design review and construction coordination with D&C Division. Harry was responsible for in-house project management for South Shore Interceptors and the development of future CIP projects. He inspected and maintained HRSD pumping stations and was responsible for flow and CCTV monitoring, and pressure, corrosion, and data analysis.

Leanne Kay, EIT

Project Manager

Assigned Office: Virginia Beach

Years of Total Experience: 17

Education:
BS/Civil Engineering

Overview:

Leanne is an engineer providing support for public works and public utilities projects for various municipalities in the Hampton Roads area. She has experience with civil and environmental engineering, including rehabilitation of water and wastewater conveyance systems, pump stations, stormwater conveyance systems, watershed management, and wastewater treatment.

Project Experience:

- **City of Suffolk, VA | Crittenden/Eclipse Water and Sanitary Sewer Extension, Suffolk, VA:** Leanne was the engineer responsible for developing a cost estimation and specifications for extension of water and sanitary sewer facilities. The project area was served by six privately owned well systems for water and individual septic systems for sanitary sewer. The well systems were replaced with a City owned and maintained water distribution system. The water distribution system included replacement of multiple private well systems with 21,000 LF of 6 to 12-inch water main. The sewer collection system features two lift stations, one pump station, 18,000 feet of gravity sewer, and 4,000 feet of force main.
- **City of Norfolk, VA | Colonial Place Sanitary Sewer and Water System Rehabilitation & Replacement, Norfolk, VA:** Leanne was the project engineer responsible for engineering evaluation of pavement surveys for project that included evaluation and design of sewer and water system rehabilitation and replacements involving 18,000 LF of gravity sewer and water main in this historic waterfront community on the Lafayette River.
- **York County, VA | YKCOVA York Point Water & Sanitary Sewer Study & Design, York County, VA:** Leanne was the project engineer responsible for the analysis of utility conflicts of vacuum sewer alignment services, design of vacuum sewer connections including vacuum pit type/depth selections for this vacuum sewer system extension project serving 250 residential properties in York County. The project included topographic survey, geotechnical investigations, design of 35,000 LF of vacuum, a vacuum pump station, upgrades to two vacuum pump stations and a remote gravity sewer system and lift station.
- **HRSD | Interceptor System Improvements Part 4 - North Trunk Sewer Sections D, W and R, Norfolk, VA:** Leanne was the engineer responsible for the engineering evaluation for pipeline design including pavement surveys involving the replacement of three aging North Trunk Sewer Interceptor Force Main Sections located in the City of Norfolk. The project included replacement of Sections D, W and R of the North Trunk Sewer (7,500 LF of 24-inch RCP, 6,000 LF of 6 – 12-inch cast iron, and 2,300 LF of vitrified clay) with DI force main and gravity sewer. Engineering services included feasibility analyses, stakeholder coordination, multiple jack and bore crossings, hydraulic modeling, pump station analyses and box-culvert support system investigation using GPR.
- **City of Norfolk, VA | Neighborhood Water and Sewer Rehabilitation/Replacement for PS #81 and PS #23, Norfolk, VA:** Leanne was the project engineer responsible for odor control sampling for the pump station and outlying manholes. Project included the evaluation of sewer and water infrastructure in this 317 acre predominately residential service area featuring over 40,000 LF of water main, 47,000 LF of sewer main, 4,000 LF of sewer force main and one sewage pump station.

Tony McCall, PMP, CCM

Senior Inspector

Assigned Office: Virginia Beach

Years of Total Experience: 21

Years of RK&K Experience: 1

Education:

AA/Liberal Arts

Professional Registration:

Certified Construction Manager

Certified Project Management Professional

Overview:

Tony has extensive experience in construction management, project planning, and facilities management. He is a retired US Navy Veteran with a history of success in planning, resourcing, and executing projects across the United States and globally. Tony has documentation and project controls experience, including constructability review, cost estimating, CPM schedule review, quality assurance plan development, and overseeing project record keeping systems. He currently serves as a senior project inspector and some of his duties include, contractor coordination, project specifications management, project record keeping, and working as the liaison between the project team and the contractor in the field.

Project Experience:

- **HRSD | Interceptor System Projects Annual Contract, Task: Effingham Interceptor Force Main Vault Abandonment, Portsmouth, VA:** Inspector for the rehabilitation and replacement of 36-inch force main, flow diversions through a temporary HDPE force main aligned along a former CSX right-of-way and phased construction featuring Phase 1 isolation, force main replacements and condition assessment and Phase 2 force main rehabilitation. RK&K developed a maintenance of service plan that facilitates isolation, cleaning and inspection, and rehabilitation of 1,500 LF of 36-inch force main aligned along the heavily traveled Effingham Street corridor in Portsmouth. The temporary bypass will be aligned along the former CSX railroad to an IFM in Elm Avenue. Rehabilitating the IFM reduces the duration of construction and impacts to the traveling public.
- **HRSD | Willard Avenue Pump Station Replacement (BH013020) Task, Hampton, VA:** Construction inspector for this pump station replacement project. Upgrades included a new pump station, controls, pipe, valves and fittings, gravity influent sewer, force main, wet well, odor control and electrical and control systems. The required wet weather station capacity is 11 MGD achieved by installing two dry weather and three wet weather pumps.

Mojgan Mohammadi

Field Engineer II

Assigned Office: Newport News

Years of Total Experience: 5

Years of RK&K Experience: 3

Education:

BS/Civil Engineering

AS/Engineering

Overview:

Mojgan is an environmental engineer in RK&K's Newport News, Virginia office. She previously worked for the HRSD as an Asset Management Intern for while finishing her bachelor's degree. Ms. Mohammadi's duties at RK&K include providing full-time construction monitoring, inspection and administration of water/wastewater infrastructure construction projects; communicating effectively and collaboratively coordinate with clients, contractors, sub-contractors, and project teams including other disciplines, such as cost estimators, designers, and other engineers; and quality control review and analysis of contract documents.

Project Experience:

- **HRSD | Patrick Henry Pump Station Interconnection Force Main, Newport News, VA:** Engineer for the replacement of approximately 9,400 LF of 12 to 24-inch pipeline with a new 30-inch using conventional trench construction and tunneling methods along Jefferson Avenue.
- **HRSD | Interceptor System Projects Annual Contract, Task: Morrison Pump Station Discharge Force Main Replacement & Capacity Enhancements, Newport News, VA:** Construction inspector for the replacement and rerouting of approximately 850 LF of 12-inch AC pipe with 16-inch HDPE pipe from Morrison Pump Station to the IFM connection across the CSX railroad. Debris buildup in the existing 12-inch AC force main completely blocks flow through the pipe. The project included a horizontal directional drill beneath a stream crossing and a micro-tunnel under the CSX right-of-way.
- **HRSD | Interceptor System Projects Annual Contract, Task: Bethel-Poquoson Force Main Replacement Phase II, Poquoson, VA:** Construction inspector for the replacement of 3,700 LF of 20-inch reinforced concrete force main based on available topographic mapping and improvement plans provided by VDOT in the Wythe Creek Road right-of-way.
- **HRSD | Boat Harbor Treatment Plant Pump Station Conversion, Newport News, VA:** Engineer for the preliminary engineering, design and construction phase services for a new pumping facility with diurnal and wet weather equalization within the vicinity of the BHTP. RK&K incorporated multiple substantial completion objectives accommodating schedule concerns of contracting community, providing layout space for critical path pump station construction, and allowing delayed delivery of the wet weather storage tank

Dani Sciulli

Engineer I

Assigned Office: Virginia Beach

Years of Total Experience: 3

Years of RK&K Experience: 1

Education:

BS/Environmental Engineering

Overview:

Dani specializes in water/wastewater and has experience with Fairfax County, Loudoun County, Spotsylvania County, and Prince William County. While at RK&K, she has used ArcGIS and Arcade code to provide graphics for a stormwater management project for the City of Virginia Beach. Dani also has experience generating preliminary cost estimates and design work for an interceptor replacement project for the City of Chesapeake that involved horizontal direction drilling (HDD). She wrote a technical memorandum for a water meter replacement project for two towns on the Eastern Shore.

Project Experience:

- **HRSD | Interceptor System Projects Annual Contract, Task: Small Communities Rehabilitation Phase IV, Urbanna and West Point, VA:** This project consists of the installation of a new, large wet well, influent saddle manhole and rehabilitation of the pump station to include new pumps, controls and metering as well as site beautification. This project will allow for the installation of an influent side manhole to be installed on HRSD property. On this project, Dani worked on a work change directive (construction administration work).
- **HRSD | Interceptor System Projects Annual Contract, Task: West Point PS # 4 Rehabilitation, West Point, VA:** This project consists of the installation of a new, large wet well, influent saddle manhole and rehabilitation of the pump station to include new pumps, controls and metering as well as site beautification. This project will allow for the installation of an influent side manhole to be installed on HRSD property. While on this contract, Dani created a shop drawing submittal log (construction administration) and created an engineer's cost estimate for the project.
- **HRSD | Great Bridge Interceptor Force Main Emergency Repair, VA Beach, VA:** A portion of the Great Bridge Interceptor Force Main located within the Albemarle Chesapeake Canal portion of cast iron force main was damaged and is no longer operational. The force main is to be replaced and relocated. On this project, Dani established a cost estimate review, prepared meeting minutes/records, generated graphics and AutoCAD drawings, video review, established list of parcels, proposed test hole and soil boring locations, and construction administration.
- **HRSD | Interceptor System Projects Annual Contract, Task: Ingleside Road Pump Station Replacement, Norfolk, VA:** For this contract, Dani ensured the submittal met the requirements for the City of Virginia Beach site plan submittals. She also filled out the form for the site plan submittal, determined the submittal fee, and obtained addresses and property information for the public notices for the project.
- **HRSD | Interceptor System Projects Annual Contract, Task: Washington District Pump Station Replacement, Chesapeake, VA:** On this contract, Dani established a value engineering list to cut down on project costs and prepared 90% design specifications. Performed hydraulic calculations for pump and wet well design.
- **HRSD | Interceptor System Projects Annual Contract, Task: Birchwood Trunk 24-inch and 30-inch Force Main at Independence Boulevard Replacement Phase II, Virginia Beach, VA:** Dani ensured the submittal met the requirements for the City of Virginia Beach site plan submittals and filled out the form for the sit plan submittal. Determined the submittal fee.

Larry Sumpter, RCI, CMIT

Senior Inspector

Assigned Office: Newport News

Years of Total Experience: 39

Years of RK&K Experience: 16

Education:

High School Graduate

Professional Registration:

Certified Construction Manager-in-Training

Certified Cathodic Protection Technician

Registered Construction Inspector

Overview:

Larry has experience in construction and engineering methods. During his career he has managed and provided construction quality control inspections for commercial, industrial and public agency facilities. His experience includes installation and start-up of HVAC systems, electrical systems, pumping stations, sewer systems, and welding and fitting of various pipe and structural steel. His responsibilities have included preparing cost estimates for change orders; organization and review of project submittals, specifications and drawings; assurance of job site safety; supervision of subcontractors and suppliers; scheduling; quality control testing and inspections; drafting and material take-offs; and inventory control management and purchasing.

CONSTRUCTION: CONSTRUCTION INSPECTION

Larry has experience in construction and engineering methods. During his career he has managed and provided construction quality control inspections for commercial, industrial and public agency facilities. His experience includes installation and start-up of HVAC systems, electrical systems, pumping stations, sewer systems, and welding and fitting of various pipe and structural steel. His responsibilities have included preparing cost estimate for change orders; organization and review of project submittals, specifications and drawings; assurance of job site safety; supervision of subcontractors and suppliers; scheduling; quality control testing and inspections; drafting and material take-offs; inventory control management and purchasing.

Josh Williams

Engineer II

Assigned Office: Virginia Beach

Years of Total Experience: 6

Education:

BS/Civil Engineering

Overview:

Josh is an environmental engineer in RK&K's Virginia Beach, Virginia office. Recently graduated from Old Dominion University, Josh brings internship experience assisting HRSD Interceptor Engineers with project studies, evaluations and designs, supporting stormwater and wastewater management projects in multiple municipalities. His duties at RK&K include design and monitoring construction of water/wastewater facilities.

Project Experience:

- **City of Virginia Beach, VA | Annual Services Contract for Various Public Utilities Projects Contract #30, Virginia Beach, VA:** Engineer for on-call contract to provide preliminary engineering, design, and construction phase services for sanitary sewer collection systems, pump stations, force mains, and water distribution. Josh has provided engineering assistance on several tasks under this contract, including Pembroke Meadows Water Distribution System Replacement and Sanitary Sewer Replacement/Rehabilitation, Regency Drive Sewer Replacement, and Cardinal Estates Pump Station 550 Replacement.
- **HRSD | Interceptor System Projects Annual Contract, Hampton Roads, VA:** Engineer for this annual contract providing engineering services for various interceptor sewer system improvements for the HRSD. To date, Josh has provided engineering services for over 25 tasks. These tasks have included valve replacements, force main replacement and relocation; vault abandonment; pump station rehabilitation and replacements; and emergency piping repairs.
- **HRSD | Interceptor System Projects Annual Contract, Task: Poplar Hall Davis Corner Trunk 24-Inch Gravity Sewer Improvements (CE011600), Virginia Beach & Norfolk, VA:** Engineer assisting with design of the rehabilitation or replacement of approximately 1,600 LF of 24-inch diameter gravity pipeline and associated manholes due to risk of failure. The project includes evaluation to consider whether the gravity main is a candidate for rehabilitation and/or replacement, including CCTV inspection, confirmation of accuracy of defect and lateral locations, and summary condition assessments. RK&K will prepare a technical memorandum including an executive summary that documents the CCTV inspection summary, manhole inspection summary, and includes an AACE Class 4 construction cost estimate.
- **City of Suffolk, VA | Kings Landing Water Replacement Services, Suffolk, VA:** Engineer responsible for assisting with preparing construction documents to complete water services line replacements for the Kings Landing Neighborhood. The replacements will include a new connection to the PVC water main, a new Type K copper service line from the connection to the meter, abandonment of the existing main and required surface restoration.

Ken Wims

Construction Manager

Assigned Office: Virginia Beach

Years of Total Experience: 19

Education:

AAS/Mechanical Drafting and Design

Overview:

Ken specializes in construction inspection and design of sanitary and storm sewer systems, water distribution systems, pumping stations and wastewater treatment facilities. He is experienced at maintaining on-site copies of contract documents and approved shop drawings, filing daily reports of all construction progress, maintaining a digital photo history of construction activities, and inspecting materials as they are installed. Mr. Wims also offers experience in inspection of traffic control, proper erosion control devices, material installation, backfill requirements and compaction testing, monitoring and recording pipe pressure testing, coordinating with the Owner/Contractor for all field condition revisions, and collecting and logging material delivery tickets as required.

Ricky Zakrysek

Field Engineer II

Assigned Office: Newport News

Years of Total Experience: 21

Education:

BS/Civil Engineering Technology

AAS/Civil Engineering Technology

Military Service/OPERATIONS SPECIALIST, E5 - Honorable Discharge/United States Coast Guard

Overview:

Ricky is a Field Engineer I performing construction inspection services for RK&K's Virginia Beach and Newport News offices. He is a recent graduate of Old Dominion University and proudly served in the US Coast Guard as an Operations Specialist for 12 years. He has internship experience performing construction inspection, managing heavy machinery such as dump trucks and concrete trucks. He has helped with surveying, project scheduling and assisting subcontractors. He also has experience maintaining bid calendars, vendor lists, and daily work reports.

Project Experience:

- **City of Virginia Beach, VA | Annual Services Contract for Various Public Utilities Projects Contract #30, Task: Black Creek/Blackwater Water Main Repainting - Construction Services, Virginia Beach, VA:** Field Engineer I for the construction of the coating system replacement for the for the black creek crossing of the Lake Gaston pipeline. This project consists of a 60-inch diameter aerial steel river crossing constructed in 1995. RK&K provided design, bid and construction phase services for the coating system.
- **HRSD | Interceptor System Projects Annual Contract, Task: Effingham Interceptor Force Main Vault Abandonment, Portsmouth, VA:** Construction inspector overseeing rehabilitation and replacement of 36-inch force main, flow diversions through a temporary HDPE force main aligned along a former CSX right-of-way and phased construction featuring Phase 1 isolation, force main replacements and condition assessment and Phase 2 force main rehabilitation. RK&K developed a maintenance of service plan that facilitates isolation, cleaning and inspection, and rehabilitation of 1,500 LF of 36-inch force main aligned along the heavily traveled Effingham Street corridor in Portsmouth. The temporary bypass will be aligned along the former CSX railroad to an IFM in Elm Avenue. Rehabilitating the IFM reduces the duration of construction and impacts to the traveling public.
- **HRSD | Interceptor System Projects Annual Contract, Task: Bethel-Poquoson Force Main Replacement Phase II, Poquoson, VA:** Construction inspector for the replacement of 3,700 LF of 20-inch reinforced concrete force main based on available topographic mapping and improvement plans provided by VDOT in the Wythe Creek Road right-of-way.
- **HRSD | Surry Hydraulic Improvements & Interceptor Force Main Design-Build, Task: Field Engineering & Inspection Services, Surry County to James City Co, VA:** Field Engineer I for the design and construction of three new pump stations, capacity and storage upgrades at a fourth pump station and twenty miles of force main required to close the Town of Surry WWTP prior to a regulatory deadline. Flows from the Town of Surry will be permanently diverted to the Smithfield Interceptor Force Main. Services include design of multiple horizontal directional drills, environmental permitting and construction administration and inspection.



Part 6. Appendices

Resumes - Volkert



Years of Experience

Firm: 2 | Total: 12

Education

HS Advanced Diploma | 1990

Licenses & Certifications

Right of Way Professional –
Generalist (RWP-GN) | #44783 |
Expiration Date: (08/27)

Right of Way Agent (RWA)

Notary Public, Commonwealth of
Virginia

Terri McClure, RWP-GN ROW Services Lead

Ms. McClure is a property, easement, relocation, and ROW Acquisition Specialist responsible for negotiations with property owners. She has experience acquiring ROW and easements and providing relocation advisory services for municipal transportation infrastructure and utilities projects. She has in-depth knowledge of State Codes as well as State departments of transportation such as VDOT.

Norfolk CRSM

Norfolk, VA | City of Norfolk

ROW Project Manager. This \$2.6B project aims to mitigate coastal flooding and storm damage by building eight miles of floodwalls, 11 tide gates, and 10 pump stations. It will also include nature-based features along with property-specific floodproofing measures. **Responsibilities:** Managing property acquisitions, utility relocations, site assessments, ALTA title searches, title insurance, land surveys, deeds, clearing utilities, certifications, appraisals, negotiations, and relocations, both temporary and permanent.

Balls Ford Interchange Project

Prince William County, VA | Prince William County DOT

ROW Acquisition & Relocation Advisory Services. This \$145M project provides a new grade-separated interchange at Route 234 (Prince William Parkway) and relocated Route 621 (Balls Ford Road), and a bridge crossing the existing Norfolk Southern Railroad. In addition, the project constructs a relocated Balls Ford Road as a new four-

lane facility with a raised median between Delvin Road and Doane Drive. **Responsibilities:** Successfully completed the acquisition of two parcels of land critical to the construction of this project funded with I-66 Outside the Beltway Concessionaire Funds. Provided Relocation Advisory Services in compliance with all Federal and State regulations to facilitate two complex non-residential relocations and personal property moves.

I-66 Outside the Beltway Expansion Project P3

Prince William, Fairfax, & Arlington Counties, VA | Express Mobility Partners, Concessionaire/VDOT

Project Manager, ROW & Relocation Advisory Services. This \$2.3B P3 project is delivering transportation improvements on the I-66 corridor and impacting more than 300 parcels. **Responsibilities:** Successfully completed nine complex residential relocations during a challenging real estate market. All necessary property rights were acquired at 25% under budget and all delivery milestones were exceeded.

Berea Church Road Improvements Project

Stafford County, VA | County of Stafford

ROW Project Manager. This roadway improvement project featured horizontal and vertical realignment, lane and shoulder width increases, and sight distance improvements. **Responsibilities:** Managed acquisition of necessary property rights from 27 residential and commercial property owners with no condemnations.

Sudley Road Third Lane

Manassas, VA | City of Manassas

ROW Project Manager. This project eases traffic congestion and enhances pedestrian safety by widening and repurposing a right turn lane into a third through lane on northbound Sudley Road between Grant Avenue and Godwin Drive in Manassas, connecting it to a third lane north of Godwin Drive in Prince William County. **Responsibilities:** Acquired the necessary property and property rights needed to construct the project. The property rights were in the City of Manassas and Prince William County



Years of Experience

Firm: 15 | Total: 33

Education

BS | 1990 | Civil Engineering

Licenses & Certifications

PE | VA #04020322576 | 1998

Ben Lineberry, PE Land Use Permits Coordination

Mr. Lineberry is a construction engineer with experience in the design and construction of transportation infrastructure for VDOT, including managing the department's Northern Virginia Permits & Street Acceptance Services contract for fifteen years. He works collaboratively with designers and contractors to resolve construction issues and meets with public agencies, public officials, and citizen groups to address concerns.

Northern Virginia Permits and Street Acceptance Services

NOVA District | VDOT

Construction Inspection Coordinator (CIC) / Chief Construction Engineer. Volkert is providing staff augmentation to support permitting inspection operations in the Northern Virginia District's permit offices in Arlington, Fairfax, Loudoun, and Prince William counties through this contract. Volkert provides full-time and part-time permit inspectors and administrative assistants who conduct permit application reviews, field inspections, and coordination for projects within VDOT right-of-way as

an extension of VDOT staff. **Responsibilities:** Managed and now provides oversight for this contract. As the CIC, assigned personnel, developed and tracked task orders, provided guidance regarding resolution of issues, evaluated staff performance, monitored and tracked costs, and submitted invoices. Coordinated monthly with the Land Use Permits Office to determine future needs and plan staffing requirements. Provides full-time staff to manage all aspects of the permit process for Locally Administered Projects and to aid with acceptance of secondary roads reviews and approvals.

I-64 Southside Widening & High-Rise Bridge, Phase I, Design-Build

Chesapeake, VA | VDOT

Quality Assurance Manager. Volkert is providing Quality Assurance Management for this design-build project that is widening eight miles of I-64 from four to six lanes and providing the addition of a managed lane in each direction with ITS tolling. It also includes a new High Rise Bridge (HRB) over the Elizabeth River; replacement and realignment of the Great Bridge Boulevard Bridge; widening of six bridges; and additional improvements to I-64. Construction activities have included the installation of 120 66-inch hollow cylindrical piles to support fifteen HRB piers in the river. The remaining 21 piers and abutments on the HRB are supported by 36-inch, 24-inch, and 18-inch solid, square piles. Hollow 14-inch steel pipe piles driven into the ground support the six small bridge widenings. 80,000 LF of soundwall along the eight miles of roadway improvements include some that are transparent on the HRB. Additional improvements consist of 39 overhead sign structures (OHSS) with DMS, signage, integration of new toll facilities and OHSS with Operations Center, and 40,000 LF of storm drainage and 39 BMP facilities. **Responsibilities:** Developed and is implementing the project's Quality Management Plan (QMP), working with the Design Build Project Manager and the Quality Control Manager to develop the project's inspection and testing plans for each approved construction phase. Provides daily on-site oversight of the construction quality program with a team of 12 inspectors verifying quality workmanship, adherence to the frequency of material testing requirements, and the contract, specifications, and special provisions. Works closely with the Field Engineers and Lead Construction Managers to develop and review work plans for specific construction tasks and confirms the quality component is incorporated into every plan. Verifies all project documentation is completed correctly and on-time; monitors compliance with the QMP's provisions for tracking and correcting non-conforming work; verifies identification of noncompliance issues and monitoring of corrective actions; and addresses all aspects of QA inspection/materials testing. Maintains the materials notebook detailing all materials used are approved and acceptable.

Environmental compliance is a notable challenge given the construction over the Elizabeth River and through adjacent salt marshes and wetlands with highly erodible sandy soil. With 86,000 vehicles per day, maintenance of traffic (MOT) is a high priority with close oversight and proper planning to assure the work is performed safely for the traveling public and the contractors.



Part 6. Appendices

Resumes - PC3

Serelle Corn, AIA, LEED AP BD+C



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• www.projectcontrolscubed.com

PROJECT CONTROLS, PLANNING & SCHEDULING

19 years of construction experience in managing design, planning, scheduling, cost control and VDC for all phases of major construction and infrastructure programs. Experienced in all types of delivery methods including design-bid-build, design-build, progressive design build, and Integrated Project Delivery, including LEAN construction methods. Created contract specifications for construction schedules, payment, cost controls and 4D/5D digital twins. Proven history of on-time, and under-budget project completions.

Lead planner, scheduler and VDC 4D/5D manager on multi-billion dollar water and wastewater programs. Responsibilities include: Developing and managing the master schedule; technical and constructability analysis of Design Consultant and Contractor construction schedules, and integration into the program master schedule; and cost analysis for all phases of the program including compliance with multiple funding sources. Skilled in integrating Primavera schedules with a BIM model in Synchro to create a live program master 4D/5D construction schedule.

Key Skills

- | | | |
|------------------------------------|---|--|
| — Primavera 6.0, all versions | — Bentley Digital Construction Platform | — Acumen Fuse + Risk |
| — Cost & Resource Loaded Schedules | — Synchro(4D/5D Scheduling) | — Schedule & Risk Analysis |
| — Managing Program Level Schedules | — Budgeting & Cost Controls | — CPM and LEAN Scheduling |
| — Baseline & Recovery Schedules | — Forecasts | — Power BI |
| | — Time Impact Analyses | — Funding Requirements (SRF, WIFIA, WSIP, Prop1) |

Professional Experience

PROJECT CONTROLS CUBED LLC (MWBE/WOSB) (Laguna Beach, CA) —

PRESIDENT/MANAGER OF SCHEDULING AND VIRTUAL PLANNING, 2010 to Present

Manage planning and scheduling on a variety of large construction projects including water, wastewater treatment facilities, pipelines, infrastructure, airports and theme parks. Works closely with owners, designers, construction managers, consultants, and contractors. Develop on-time and on-budget schedules with the integration of 4D/5D Synchro modeling. Created many successful recovery schedules and time impact analysis (TIA's) resulting in approved concurrent and compensable delays. Analyze and review schedules with high accuracy and integrity using the latest suite of scheduling tools integrated on the cloud for real time collaboration with stakeholders. Results have shown a significant reduction in risk, a large increase in project knowledge for all stakeholders throughout all phases of a project/program and a higher percentage of projects finishing on time and on budget with fewer change orders.

PIERCE GOODWIN ALEXANDER LINVILLE (PGAL) (Los Angeles, CA) — ASSOCIATE ARCHITECT/PROJECT MANAGER, 2006 to 2010

Co-Managed and Developed a variety of construction and renovation projects such as airports, medical facilities and federal projects. Experienced with Design/Bid/Build, Design/Build and Fast Track project deliveries.

Awards/Publications

- Winner – Bentley's Year in Infrastructure Going Digital Awards 2023 – Water/Wastewater
- B1M – "The \$1BN Megaproject to Save California"
- Informed Infrastructure – "Waste Water Not an Option - 5D Technology Helps EchoWater Project Save \$400 Million (and a Lot of Water)"
- Smart Water Magazine - "The EchoWater Project truly is the legacy project for the modern day iTwin"

Project Highlights

Sacramento Area Sewer District – EchoWater Advanced Wastewater Treatment Project (2012 to 2023) ● Budget: \$1.7 Billion

Lead Scheduler responsible for the schedule development and implementation of a major wastewater expansion program consisting of 22 projects ranging from \$23 million to \$454 million. Completed on time and \$400 Million under budget. Worked closely with the Owner, Program Managers, Designers, Construction Managers and Contractors. Developed the detailed program work plan with resource, cost loaded schedules. Prepared monthly progress status and financial reports. Created and updated monthly program cash flow projections and resource histograms, which were vital in obtaining \$1.5 billion in State Revolving Fund (SRF). Analyze, review and approve Designers, Consultants and Contractors baseline and monthly progress schedules and payment applications. Created a program level 5D model utilized in all project phases and was a useful tool in constructability reviews, baseline schedule reviews, and to track development and construction progress. Created master commissioning and operational blackout schedules which assisted operations support and maintained integration with existing processes. Performed Time Impact Analyses.

City of San Diego - Pure Water Program (2018-Present) ● Budget: \$1 Billion+

Pure Water will clean recycled water to produce 30 million gallons per day of high-quality purified water. As part of the construction management team, the Project Scheduler responsible for managing the seven major water infrastructure construction projects (including pipelines, pump stations and treatment facilities) cost and schedule. Analyze, review and approve Contractor baseline schedules and monthly progress update schedules. Manage and create performance and cost reporting for two funding sources State Revolving Fund (SRF) and Water Infrastructure Finance and Innovation Act (WIFIA). Review Contractor payment applications and compliance with the funding requirements for reimbursement. Develop construction scheduling specifications. Analyze project impacts and inter-project relationships and coordination. Create and maintain the 5D construction digital twin which is an effective tool for constructability reviews and visualizing the shut down and cutover sequences during activation. Perform Time Impact Analyses and alternate scenario/recovery studies.

Portland Water Bureau - Bull Run Treatment (2018-Present) ● Budget: \$2.1 Billion

Program Lead for VDC, planning, scheduling, and cost control. Develop scheduling guidelines and specifications for design and construction. Analyze, review, and approve designers, consultants and CM/GC's baseline and monthly progress schedules and payment applications. Customize monthly key performance indicator (KPI) reports for Portland Water Bureau. Collaborated to create Power Bi dashboards showing real time KPIs. Manage program costs and create program budget estimate forecasts, cash flow projections and resource histograms. Generate Water Infrastructure Finance and Innovation Act (WIFIA) Funding project status and program forecast reports. Collaborate with the Designers and CM/GCs to create a federated 5D digital twin using Bentley's digital construction solution. Maintain the 5D construction digital twin thru the life cycle of the program. Integrate the risk register into the program schedule to create risk adjusted schedules. Create and analyze different "what-if" program planning scenarios.

Sacramento Area Sewer District – Harvest Water Program (2022 to Present) ● Budget: \$600 Million

Harvest Water, California's largest agricultural water recycling project, will supply 16 billion gallons of drought resistant recycled water to agricultural lands and existing habitats. Program Lead Scheduler responsible for developing and maintaining the program schedule and costs. Analyze project impacts and inter-project relationships and coordination. Analyze, review and approve Contractor baseline schedules and monthly progress update schedules. Manage and create performance and cost reporting for funding sources Prop 1 and Water Storage Investment Program (WSIP). Review Contractor payment applications and compliance with the funding requirements for reimbursement. Develop construction scheduling specifications. Analyze project impacts and inter-project relationships and coordination.

Education & Certifications

UNIVERSITY OF SOUTHERN CALIFORNIA (Los Angeles, CA) — Bachelors in Architecture, 2006

Leadership in Energy and Environmental Design – Building Design + Construction Certified (LEED BD+C)

Registered Architect

Jeffrey A. Campbell, PSP



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PROJECT CONTROLS, PLANNING & SCHEDULING

24 years of experience in managing planning, scheduling, cost control and VDC for all phases of major construction and infrastructure programs. Experienced in all types of delivery methods including design-bid-build, design-build, progressive design build, and Integrated Project Delivery, including LEAN construction methods. Created contract specifications for construction schedules, payment, cost controls and 4D/5D digital twins. Proven history of on-time, and under-budget project completions.

Lead planner, scheduler and VDC 4D/5D manager on multi-billion dollar water and wastewater programs. Responsibilities include: Developing and managing the master schedule; technical and constructability analysis of Design Consultant and Contractor construction schedules, and integration into the program master schedule; and cost analysis for all phases of the program including compliance with multiple funding sources. Skilled in integrating Primavera schedules with a BIM model in Synchro to create a live program master 4D/5D construction schedule.

Key Skills

- Primavera 6.0, all versions
- Cost & Resource Loaded Schedules
- Managing Program Level Schedules
- Baseline & Recovery Schedules
- Time Impact Analysis
- Bentley Digital Construction Platform
- Synchro (4D/5D Scheduling)
- Budgeting & Cost Controls
- Forecasts
- CPM and LEAN Scheduling
- Acumen Fuse + Risk
- Schedule & Risk Analysis
- Power BI
- Funding Requirements (SRF, WIFIA, WSIP, Prop1)

Professional Experience

Project Controls Cubed LLC (Laguna, CA) Owner & Director of Scheduling and Virtual Planning 2010 - Present

Director of Scheduling and Virtual Planning – Manage planning and scheduling on a variety of large construction projects including water, wastewater treatment facilities, pipelines, infrastructure, airports and theme parks. Works closely with owners, designers, construction managers, consultants, and contractors. Develop on-time and on-budget schedules with the integration of 4D/5D Synchro modeling. Created many successful recovery schedules and time impact analysis (TIA's) resulting in approved concurrent and compensable delays. Analyze and review schedules with high accuracy and integrity using the latest suite of scheduling tools integrated on the cloud for real time collaboration with stakeholders. Results have shown a significant reduction in risk, a large increase in project knowledge for all stake holders throughout all phases of a project/program and a higher percentage of projects finishing on time and on budget with fewer change orders.

CLARK CONSTRUCTION (Costa Mesa, CA) - SCHEDULING MANAGER, 2008-2010

Acting western division scheduling manager on multiple projects.

JGM INC. (Los Angeles, CA) – SENIOR SCHEDULER, 2006-2008

Senior scheduler on LAX North and South Terminals Security System Capital Improvement Programs.

US ARMY CORPS OF ENGINEERS (Los Angeles, CA) – SENIOR SCHEDULER, 2005-2006

Senior Scheduler managing cost and schedule for the \$2Billion Santa Ana River Flood Control Project.

PARSONS/CH2MHILL (Pasadena, CA) – INTERN, JUNIOR SCHEDULER 2002 - 2005

Internship with Parsons for project controls. Also worked for Gibbs, Giden, Locher, & Turner Law Firm for 6 months to develop construction law knowledge.

Awards/Publications

- Winner – Bentley's Year in Infrastructure Going Digital Awards 2023 – Water/Wastewater
- BIM – "The \$1BN Megaproject to Save California"
- Informed Infrastructure – "Waste Water Not an Option - 5D Technology Helps EchoWater Project Save \$400 Million (and a Lot of Water)"
- Smart Water Magazine - "The EchoWater Project truly is the legacy project for the modern day iTwin"

Project Highlights

Sacramento Area Sewer District – EchoWater Advanced Wastewater Treatment Project (2012 to 2023) ● Budget: \$1.7 Billion

Lead Scheduler responsible for the schedule development and implementation of a major wastewater expansion program consisting of 22 projects ranging from \$23 million to \$454 million. Completed on time and \$400 Million under budget. Worked closely with the Owner, Program Managers, Designers, Construction Managers and Contractors. Developed the detailed program work plan with resource, cost loaded schedules. Prepared monthly progress status and financial reports. Created and updated monthly program cash flow projections and resource histograms, which were vital in obtaining \$1.5 billion in State Revolving Fund (SRF). Analyze, review and approve Designers, Consultants and Contractors baseline and monthly progress schedules and payment applications. Created a program level 5D model utilized in all project phases and was a useful tool in constructability reviews, baseline schedule reviews, and to track development and construction progress. Created master commissioning and operational blackout schedules which assisted operations support and maintained integration with existing processes. Performed Time Impact Analyses.

City of San Diego - Pure Water Program (2018-Present) ● Budget: \$1 Billion+

Pure Water will clean recycled water to produce 30 million gallons per day of high-quality purified water. As part of the construction management team, the Project Scheduler responsible for managing the seven major water infrastructure construction projects (including pipelines, pump stations and treatment facilities) cost and schedule. Analyze, review and approve Contractor baseline schedules and monthly progress update schedules. Manage and create performance and cost reporting for two funding sources State Revolving Fund (SRF) and Water Infrastructure Finance and Innovation Act (WIFIA). Review Contractor payment applications and compliance with the funding requirements for reimbursement. Develop construction scheduling specifications. Analyze project impacts and inter-project relationships and coordination. Create and maintain the 5D construction digital twin which is an effective tool for constructability reviews and visualizing the shut down and cutover sequences during activation. Perform Time Impact Analyses and alternate scenario/recovery studies.

Portland Water Bureau - Bull Run Treatment (2018-Present) ● Budget: \$2.1 Billion

Program Lead for VDC, planning, scheduling, and cost control. Develop scheduling guidelines and specifications for design and construction. Analyze, review, and approve designers, consultants and CM/GC's baseline and monthly progress schedules and payment applications. Customize monthly key performance indicator (KPI) reports for Portland Water Bureau. Collaborated to create Power Bi dashboards showing real time KPIs. Manage program costs and create program budget estimate forecasts, cash flow projections and resource histograms. Generate Water Infrastructure Finance and Innovation Act (WIFIA) Funding project status and program forecast reports. Collaborate with the Designers and CM/GCs to create a federated 5D digital twin using Bentley's digital construction solution. Maintain the 5D construction digital twin thru the life cycle of the program. Integrate the risk register into the program schedule to create risk adjusted schedules. Create and analyze different "what-if" program planning scenarios.

Sacramento Area Sewer District – Harvest Water Program (2022 to Present) ● Budget: \$600 Million

Harvest Water, California's largest agricultural water recycling project, will supply 16 billion gallons of drought resistant recycled water to agricultural lands and existing habitats. Program Lead Scheduler responsible for developing and maintaining the program schedule and costs. Analyze project impacts and inter-project relationships and coordination. Analyze, review and approve Contractor baseline schedules and monthly progress update schedules. Manage and create performance and cost reporting for funding sources Prop 1 and Water Storage Investment Program (WSIP). Review Contractor payment applications and compliance with the funding requirements for reimbursement. Develop construction scheduling specifications. Analyze project impacts and inter-project relationships and coordination.

Education & Certifications

American Association of Cost Engineers Member (AACE) - Certified Planning & Scheduling Professional

AACE Board of Education Member

Parsons Scheduling & Project Controls School - Certified Scheduler and Project Controls Specialist

Helistream, Newport Beach, CA – Commercial/Instrument Rated Helicopter Pilot



Part 6. Appendices

Resumes -

TYLin/Greeley and Hansen

Jennifer I. Arias, PACP, MACP, LACP

Civil/Sanitary Engineer

YEARS OF EXPERIENCE

7

EDUCATION

B.S. Civil, Environmental, and Infrastructure Engineering, George Mason University, 2017

PROFESSIONAL REGISTRATIONS

- Pipeline Assessment and Certification Program (PACP), NASSCO
- Manhole Assessment and Certification Program (MACP), NASSCO
- Lateral Assessment and Certification Program (LACP), NASSCO
- OSHA 10-hr Training
- Ductile Iron Pipe Research Association (DIPRA) Certification

PROFESSIONAL SOCIETIES

- Virginia Water Environment Association (VWEA)

PROFESSIONAL EXPERIENCE

Mrs. Jennifer Arias has seven years of experience in the fields of water and wastewater engineering. Her experience includes the design of wastewater and water conveyance systems, feasibility studies, evaluation of existing facilities, condition assessment, and project management. She has experience managing multi-firm teams and has proven success in establishing and utilizing highly effective project communication procedures to optimize adherence to project goals, budgets, and schedules.

RELEVANT PROJECT EXPERIENCE

Wastewater

Project Engineer for the Old Town Condition Assessment – Sewers and Structures for City of Alexandria, VA.

The Old Town area consists of both sanitary sewers and combined sanitary sewer areas. The Condition Assessment project performed an analysis on previous CCTV inspections of all sewer assets within Old Town. The analysis provided rehabilitation recommendations for mainlines, laterals, catch basins, manholes, and inlets. As a Project Engineer, Mrs. Project tasks included providing rehabilitation methods for large diameter mainlines as well as creating a decision matrix for when assets require rehabilitation. A total of three reports were prepared that contained a summary of asset results, their recommendation, and cost for rehabilitation.

Project Engineer for the Little Hunting Creek Sanitary Sewer Replacement for Fairfax County, VA.

Project tasks include condition assessment, hydraulic analysis, conceptual alignment designs, basis of design report, and initial environmental permitting review for the 12-inch gravity sanitary sewer. Designed new parallel 12-inch gravity sewer across tidally influenced Little Hunting Creek and new 8, 21, and 24-inch gravity sanitary sewer along Stockton Parkway. Assisted in coordination of Nation-Wide Permit and Joint Permit Application. *

Project Engineer for the Flatlick Phase I&II Sewer Rehabilitation for Fairfax County, VA.

Assisted in developing rehabilitation design of approximately 5,000 LF of 15-inch to 24-inch asbestos concrete and reinforced concrete pipe trunk sewer using cured-in-place lining of the pipes plus cementitious and epoxy lining of the manholes.*

* Indicates experience with previous firm

Brandon E. Cooper, PE, PACP, MACP, & LACP

Civil/Sanitary Engineer

YEARS OF EXPERIENCE

10

EDUCATION

M.S. Civil Engineering (Thesis),
Virginia Tech, 2016

B.S. Civil Engineering, Virginia
Tech, 2014

PROFESSIONAL REGISTRATIONS

Professional Engineer: Virginia

Pipeline Assessment and
Certification Program (PACP),
NAASCO

Manhole Assessment and
Certification Program (MACP),
NAASCO

Lateral Assessment and
Certification Program (LACP),
NAASCO

VA DEQ ESC & SWM Plan
Reviewer Certified, 2018

PROFESSIONAL SOCIETIES

- Virginia Water and Environment Association (VWEA)
 - Chair of Membership Comm.
 - Collection System Committee
 - YP Committee
- Virginia Tech Environmental & Water Resources Institute / Coasts, Oceans, Ports, & Rivers Institute *
- Virginia Tech American Society of Civil Engineers *
- Virginia Tech Sustainable Land Development Club *
- Virginia Tech Chi Epsilon National Civil Engineering Honor Society *

PROFESSIONAL EXPERIENCE

Mr. Brandon Cooper is an Associate Civil Engineer for TYLin | Greeley and Hansen Water Solutions who graduated from Virginia Tech with a Master's Degree in Civil Engineering. His specialization is in urban hydrology and stormwater management/planning. Since joining the team, Mr. Cooper has worked as a project manager and project/design engineer on stormwater, collection system, and wastewater projects for major urban cities in the Commonwealth of Virginia. He has proven success in managing the project tasks that he has been assigned and producing high quality work. He communicates his workload very well and finds solutions to meet deadlines for multiple projects.

RELEVANT PROJECT EXPERIENCE

Project Manager/Engineer for Sanitary Sewer Evaluation Studies for Sewersheds SH-10, SJ-01, SH-12, SJ-11, & SH-08 and Trunk Sewer Condition Assessment Preliminary Engineering Report (PER) for BQ-B09, BQ T01-T08, GC T3, T4, & C1 for the City of Richmond, VA.

Responsibilities include coordination of CCTV and manhole inspection, review of field investigation and condition assessment data, assessment of risk, and development and prioritization of rehabilitation recommendations with associated cost estimates.

Project Engineer for CSO 14 33 & 34 Preliminary Engineering Report for the City of Lynchburg, VA.

Evaluated and documented recommendations regarding controls for the CSO 14, 33, and 34 regulators (Priority Project No. 8 in the CSO Long Term Control Plan (LTCP)). The project evaluated and provided recommendations regarding complete separation of drainage areas, combined sewer overflow point elimination, sewer and storm cross connection elimination, sanitary sewer capacity issues, and regulator modifications.

Project Engineer for CSO 56 Basis of Design Report for the City of Lynchburg, VA.

Evaluated, selected, and documented improvements options and the basis of design for the new CSO 56 regulator (Priority Project No. 1 in the CSO LTCP). The project evaluated the existing regulator and combined sewer system using hydrologic and hydraulic (H&H) modeling, developed and evaluated improvement alternatives using hydraulic design concepts and a physical model, and provided a basis of design recommendation.

Project Manager/Engineer for the Crescent Street Sanitary Sewer Improvements for Virginia American Water, Prince William County, VA.

Design, Bid, and Construction Phase Services for a relief pumping station and force main to relieve surcharging, overflow, and flooding in residential homes. The design will capture the sewer overflows, bypass the existing

Brandon E. Cooper, PE, PACP, MACP, & LACP

Civil/Sanitary Engineer

gravity sewer, and discharge the sewage downstream where there is additional capacity in the sewer system to convey the flows. This project includes the design of a diversion structure, pumping station, 4,300 LF of force main, and a transition manhole. Responsibilities include hydraulic analysis, coordination of topographic survey, wetland delineation and confirmation, subsurface investigation, permit coordination with USACE, DEQ, VDOT, and local government, and preparation of biddable plans and specifications.

Project Manager/Engineer for Sewer Creek Crossing Improvements for the City of Richmond, VA.

As part of the collection system master plan, Greeley and Hansen performed a system wide desktop analysis of the wastewater collection system near or crossing creeks and other waterways, conducted field investigations to further refine inspection prioritization, and developed a list of sewers to be further inspected (including CCTV). Four sewer crossings were identified as urgent, high priority candidates requiring rehabilitation due to the sewer being exposed to the stream flow and severe bank erosion. Primary duties include coordination of CCTV and manhole inspection, condition assessment review, easement procurement and site survey, wetland delineation and confirmation, permit coordination with USACE and VMRC, permit coordination with VDOT and local government, review of field investigations, access road coordination, development of rehabilitation recommendations and cost estimates, and preparation of biddable plans and specifications for creek stabilization, asset armoring, and sewer creek crossing protection.

Project Manager/Engineer for Sewer Design Improvements for the Shockoe Box, Arch, West, and Northeast Interceptors for the City of Richmond, VA.

Responsibilities include preparing biddable plans and specifications for recommended rehabilitation of four large interceptor sewers in the Shockoe Valley Sewershed based on the results of a condition assessment review of CCTV and sonar videos. Other tasks included easement procurement and coordination with multiple stakeholders for access and right-of entry, including: VDOT, CSX, Norfolk Southern, and other local stakeholders.

Project Engineer Intern for the Sanitary Sewer Evaluation Study for the City of Lynchburg, VA.

Project included compiling and analyzing manhole check and inspection data from the Burton Creek Field Investigation.

Project Manager/Engineer for Chimborazo Interceptor Sewer Improvements (Phases 1-3) and CSO No. 004 Regulator Relocation Design for the City of Richmond, VA.

Coordinated with multiple stakeholders to design a multi-phase combined sewer interceptor improvement project on historical Chimborazo Hillside, which has experienced slope failures several times throughout the past century. Phase 1 replaces an existing aged and failing brick step sewer with 60-inch open cut and micro-tunneled pipe, an inlet chamber, and a 100-foot vertical drop shaft with siphon spillway brake drop units. Phase 2 replaces and realigns the deteriorating downstream sewer from underneath an abandoned warehouse to within City owned right-of-way. Phase 3 will be the final phase of the permanent solution to improve the interceptor sewer downstream of Phase 1 and 2 work and improve and relocate the CSO No. 004 regulator and outfall. Responsibilities include project management, GIS work, hydraulic calculations, CADD work, presentation materials and exhibits, cultural resource assessment, environmental sampling, geotechnical borings, specification development, and permit writing.

Joshua J. Crossen, PE

Civil/Sanitary Associate

YEARS OF EXPERIENCE

17

EDUCATION

Master of Engineering Management, Old Dominion University, 2010

B.S., Civil Engineering, Old Dominion University, 2007

PROFESSIONAL REGISTRATIONS

Professional Engineer: Virginia

OSHA Permit-Required Confined Spaces (29 CFR 1910.146)

PROFESSIONAL SOCIETIES

- Water Environment Federation (WEF)
- Virginia Water Environment Association (VWEA)

PROFESSIONAL EXPERIENCE

Mr. Joshua Crossen is an Associate with 17 years of experience in the fields of water and wastewater engineering. His experience includes design, and evaluation of existing facilities, and onsite inspection of various types of projects in the water and wastewater industries. His responsibilities have involved the management of diverse project teams, quality control of contractor deliverables, and design of rehabilitation plans. Mr. Crossen has served as a project manager on numerous projects, including new water main installation, Sanitary Sewer Evaluation Studies and facility design, and pumping stations and force mains. He has proven successes in coordinating with regulating agencies and obtaining project permits from National Park Service (NPS), US Army Corp of Engineers (USACE), DC, VA and MD departments of transportation (DDOT, VDOT, MD SHA), etc.

RELEVANT PROJECT EXPERIENCE

Wastewater

Project Engineer Sanitary Sewer Evaluation Study (SSES) for City of Portsmouth, VA.

Mr. Crossen installed and maintained and collected and analyzed data from runtime, pressure, and rainfall data loggers throughout the city. The SSES was conducted to meet the requirements of the Virginia Department of Environmental Quality special consent order. The majority of the City's system was monitored for the duration of the study period to assess inflows and discharges.

Project Engineer for Sanitary Sewer Evaluation Survey (SSES) Flow and Rainfall Data Analysis for the City of Chesapeake, VA.

Tasks included conduction manhole inspections, compiling data and entering into GIS, data quality assurance, determining possible areas of repair, rehabilitation and replacement and reviewing CCTV. (Pro serv 2012)

Project Engineer for Sanitary Sewer Evaluation Studies for Sewersheds SJ-01, SH-12, & SJ-11 for the City of Richmond, VA.

Responsibilities include identification of study areas based on prior work order and pipe characteristic information, coordination of CCTV and manhole inspections with inspection contractor, review of field investigation and condition assessment data, assessment of risk, and development and prioritization of rehabilitation recommendations with associated cost estimates.

Stephen T. Crowe, PE, PACP, MACP, LACP

Civil Engineer/Senior Project Manager

YEARS OF EXPERIENCE

24

EDUCATION

M.S. Civil & Environmental Engineering, University of Maryland, 1999

B.S. Biology, University of Maryland, 1995

PROFESSIONAL REGISTRATIONS

Professional Engineer: Virginia and Maryland

Pipeline Assessment and Certification Program (PACP), NASSCO

Manhole Assessment and Certification Program (MACP), NASSCO

Lateral Assessment and Certification Program (LACP), NASSCO

CSI, Construction Document Technologist

PROFESSIONAL EXPERIENCE

Mr. Stephen Crowe has 24 years of experience managing projects throughout Virginia and the Mid-Atlantic for various water and wastewater planning, design, and construction projects, operating as project manager, technical designer, or quality control for projects such as buried infrastructure, utility rehabilitation, water and wastewater treatment, pump stations, reuse evaluation and planning, and infrastructure modeling.

RELEVANT PROJECT EXPERIENCE

Wastewater

Project Manager/Quality Control for Gillies Creek (GC-08) Sewer and Water Rehabilitation for Henrico, VA.

Design of approximately 35,000 LF of gravity sanitary sewer rehabilitation and 22,000 LF of waterline relocation and replacement. The project involved work in dense residential areas, traffic control and impacts, Wetlands/WOUSA, and required USACE permitting. *

Quality Control and Technical Advisor for Strawberry Hill Subbasin SH-02C Sewer Rehabilitation for Henrico County, VA.

The project includes the design and construction administration for the rehabilitation of approximately 15,000 LF of 8-inch gravity sanitary sewers throughout a residential community. *

Quality Control for Strawberry Hill SH-48 SSES for Henrico County, VA.

Responsible for performing a Detailed Check and Quality Review of the project. The project consists of the evaluation and condition assessment of approximately 30,000 LF of 8- to 24-inch gravity sanitary sewer and approximately 130 manholes.*

Lead Designer for Strawberry Hill Subbasin SH-02B Sewer Rehabilitation for Henrico County, VA.

Design and construction administration for the replacement of approximately 10,000 LF of 8- to 15-inch gravity sewer, the rehabilitation of approximately 25,000 LF of 8- to 21-inch gravity sewer, and 180 manholes. *

Project Manager for Pennrose Sewer Rehabilitation for New Castle County, DE.

Sewer rehabilitation in a section of New Castle County's rehabilitation program. Prepared detailed construction documents for approximately 10,000 LF of rehabilitated sewer and 45 manholes. *

Stephen T. Crowe, PE, PACP, MACP, LACP

Civil Engineer/Senior Project Manager

Lead Designer for Lick Run Interceptor Rehabilitation for Western Virginia Water Authority, VA.

Design and construction administration of approximately 8,500 LF of 24-inch sewer rehabilitation and the rehabilitation of approximately 35 manholes. The project is located within the environmentally sensitive and public areas in Roanoke Greenway and public park areas. *

Project Manager and Lead Designer for Springfield Road Storm Sewer Rehabilitation for Henrico County, VA.

Evaluation, design, and construction administration for the rehabilitation of approximately 180 feet of 30" RCP, 385 feet of 48" RCP, 67 feet of 38"x60" elliptical RCP, and 67 feet of 43"x68" elliptical RCP. The project resulting in CIPP and Injection Grouting, with no excavation or pavement restoration. *

Project Manager and Lead Designer for Powder Mill Sewer Rehabilitation (Task R) for Baltimore County, MD.

Design and construction administration for the rehabilitation of approximately 5,500 feet of 27 – to 36-inch circular and non-circular (horseshoe-shaped) interceptor, and related 21 manholes. The project is under EPA Consent Decree, is located within environmentally sensitive park areas, and requires numerous permits and regulatory coordination. *

Lead Designer for Ashton Creek Interceptor Rehabilitation for Chesterfield County, VA.

design and construction administration for the rehabilitation of approximately 1,150 LF of 42-inch, 1,750 LF of 36-inch, and 375 LF of 18-inch trunk sewer. *

Project Manager for Sewer Rehabilitation - Sanitary Sewer Rehabilitation Program Assistance for Washington Suburban Sanitary Commission, MD.

Managed the evaluation, design, and permitting for three Environmentally Sensitive Area basins (approximately 75 sq. miles), as part of the WSSC Consent Order Program. Prepared detailed construction documents for the rehabilitation of approximately 25,000 LF of gravity sewer, the replacement of 10,000 LF of gravity sewer, and 220 manholes. *

** Indicates experience with previous firm*

Paul Essigman, EIT, PACP, MACP, LACP

Project Engineer

YEARS OF EXPERIENCE

6

EDUCATION

B.S. Civil and Environmental Engineering, Virginia Military Institute, 2018

PROFESSIONAL REGISTRATIONS

- Engineer-in-Training
- Pipeline Assessment and Certification Program (PACP), NASSCO
- Manhole Assessment and Certification Program (MACP), NASSCO
- Lateral Assessment and Certification Program (LACP), NASSCO
- OSHA 10-Hr Training for the Construction Industry
- OSHA Confined Space Entry for General Industry Course
- DOT HAZMAT Awareness, Security, and Function Specific (49 CFR 172.704)

PROFESSIONAL SOCIETIES

- None

PROFESSIONAL EXPERIENCE

Mr. Paul Essigman has six years of experience in field inspection, project management, and condition assessment. He has experience in GIS and pipeline and manhole installation and inspection. His current focus is on condition assessment and rehabilitation of sewer and storm water systems.

RELEVANT PROJECT EXPERIENCE

Water, Wastewater

Project Engineer and Field Inspector, Combined Sewer System (CSS) Condition Assessment for the City of Alexandria, VA.

Mr. Essigman assisted the Project as it performed inspections of the City's combined wastewater collection system to identify the structural and O&M defects and evaluate asset rehabilitation. As a Project Engineer and Field Inspector, Mr. Essigman's responsibilities included site visits to ensure the Contractor was performing inspections efficiently and effectively, preparing GIS maps and 2-week look ahead, reviewing the CCTV images, condition assessment reports, and databases, updating the City's GIS database with corrected data, and creating a new lateral shapefile for the City's GIS. (Date: March 2020-August 2021)

Field Inspector, Sewer Manhole Insert Investigation for the City of Alexandria, VA.

This project aimed to assess the condition of approximately 1,200 manhole inserts and develop a plan for replacement of damaged inserts to prevent future infiltration of surface water into the sewer system. Mr. Essigman performed data collection of the presence, dimensions, material, and condition of manhole inserts throughout the city. Other responsibilities include developing a MOT plan, creating inspection schedules, holding progress meetings with the City, and interpretation and communication of the data to the City via a report. (Date: March 2020-March 2021)

Project Engineer and Field Inspector for the Del Ray East Condition Assessment for the City of Alexandria, VA.

Mr. Essigman oversaw the Project as it performed inspections of the City's wastewater collection system to identify the structural and O&M defects in sewers, manholes, and laterals. As a Project Engineer and Field Inspector, Mr. Essigman's responsibilities included site visits to ensure the Contractor was performing inspections efficiently and effectively, preparation of GIS and 2-week look ahead maps, reviewing the CCTV images, condition assessment reports, and databases, updating the City's GIS database with corrected data, and creating a new lateral shapefile for the City's GIS. (Date: January 2021-August 2021)

Paul Essigman, EIT, PACP, MACP, LACP

Project Engineer

Field Inspector for the N. Columbus St. Drainage Survey for the City of Alexandria, VA.

In preparation for an upcoming sewer separation project, the City needed private stormwater connections of approximately 70 properties potentially connected to the sewer system to be identified. Mr. Essigman conducted dye testing of private storm water systems to identify these connections and mapped out the connections for use in future separations. Other responsibilities included public outreach to gain access to private property needed for the testing. (June 2021-August 2021)

Project Engineer for the Del Ray West Condition Assessment for the City of Alexandria, VA.

The project consists of reviewing the City of Alexandria's sanitary sewer infrastructure using CCTV and providing rehabilitation recommendations. Mr. Essigman assists in reviewing deliverables and providing information about the system that is clearly and concisely summarized in quarterly rehabilitation recommendation reports provided to the City. Mr. Essigman's other responsibilities include communication with the City and contractor to resolve issues and ensure inspections occur in a timely manner. (Date: March 2023 -Present)

** Indicates experience with previous firm*

Rodger E. Insignares, EI, PACP, MACP, LACP

Civil Engineer

YEARS OF EXPERIENCE

6

EDUCATION

B.S. Environmental Engineering,
Florida International University,
2018

PROFESSIONAL REGISTRATIONS

- Engineer Intern / EIT
- OSHA 10-Hr Training for the Construction Industry
- OSHA Confined Space Entry for General Industry Course
- Pipeline Assessment and Certification Program (PACP), NASSCO
- Manhole Assessment and Certification Program (MACP), NASSCO
- Lateral Assessment and Certification Program (LACP), NASSCO

PROFESSIONAL EXPERIENCE

Mr. Rodger Insignares is an environmental engineer with TYLin | Greeley and Hansen Water Solutions. He is experienced in pipeline condition assessment, utility design, and water, stormwater, and wastewater utility construction.

RELEVANT PROJECT EXPERIENCE

Civil Engineer on the Del Ray Basement Backups Desktop Analysis for the City of Alexandria, VA.

Conducted hydraulic modeling of the Commonwealth Interceptor under four major rain events, using XPSWMM and InfoSWMM. Mr. Insignares assessed surcharging under existing and future infrastructure conditions. Developed a Zone of Influence for the Commonwealth Interceptor and sanitary collector system and evaluated impacts on basement backups by comparing the influence of illicit connections and their contribution to the overall sanitary system.

Civil Engineer on the Sanitary Sewer Inspections at Stream Crossings for the City of Alexandria, VA.

This study aimed to aid the City in taking proactive measures to evaluate the conditions of its 160 sanitary sewers and associated structures in stream areas prone to stream erosion. The study will prioritize sewer pipeline rehabilitation projects for cost-effective risk management in environmentally sensitive regions. As a Project Engineer, Mr. Insignares was responsible for the condition assessment of these sewers. This involved QAQC of the most recent CCTV inspection data, creating a Likelihood of Failure (LoF) and Consequence of Failure (CoF) for critical sewer assets, and preparing permits within CSX right of way to support field inspections.

Civil Engineer on Four Mile Run Relief Sewer Investigation for the City of Alexandria, VA.

Oversaw the review process from the contractor submittals and provided the rehabilitation recommendations based on the NASSCO condition assessment of the large diameter sewers that discharge into the Four Mile Run pumping station. Mr. Insignares was in charge of deliverables for the client and updating existing GIS Data to represent the actual conditions found during inspections.

Civil Engineer on Old Town South Condition Assessment Project of the Sewer System for the City of Alexandria, VA.

The project consisted of the Inspection of 182,385 LF of sewer pipe ranging from 8 to 60 inches in diameter and 2,610 sewer laterals within 18 months using NASSCO coding and rating standards to evaluate the structural and maintenance conditions of sewer pipes. Mr. Insignares worked in the review process of contractor submittals, monthly schedules, and submittals to the city and reviewed contractor invoices. He updated existing GIS Data to represent the actual conditions found during inspections and created biweekly schedules and progress maps using GIS.

Emily Kyewski, PE

Civil Engineer

YEARS OF EXPERIENCE

15

EDUCATION

B.S. Civil Engineering, University of Delaware, 2009

PROFESSIONAL REGISTRATIONS

Professional Engineer: Virginia

PROFESSIONAL SOCIETIES

- Engineers Without Borders
- Virginia Water Environment Association (VWEA)

PROFESSIONAL EXPERIENCE

Mrs. Emily Kyewski is an Associate Civil Engineer and Project Manager at TYLin | Greeley and Hansen Water Solutions with 15 years of experience in design-build construction management of heavy civil infrastructure as a contractor and bid-build construction management of water/wastewater infrastructure as the designer. Mrs. Kyewski's experience includes an immersed tube tunnel, cable-stay bridge, submarine wharf, water/wastewater mains, and combined sewer overflow structures. Mrs. Kyewski has led or contributed to services for means and methods planning, scheduling, quality control, cost management, contract terms negotiations, and submittal, RFI, and change order reviews. She brings experience working with clients to develop design alternatives to reduce costs and shorten construction durations in order to optimize client resources and objectives. Clients served range from municipalities and federal agencies to large, private sector and P3 entities.

RELEVANT PROJECT EXPERIENCE

Wastewater

Project Manager for Centerville Turnpike Water Main for City of Chesapeake, VA.

Construction management includes reviewing submittals, answering RFI's, reviewing change orders and pay applications, facilitating design alternative brainstorming, and holding progress meetings on behalf of the owner.

Project Manager for Dominion Blvd Force Main Replacement for City of Chesapeake, VA.

Construction management includes reviewing submittals, answering RFI's, reviewing change orders and pay applications, and holding progress meetings on behalf of the owner.

Project Manager for Shockoe Diversion Structure Improvements for City of Richmond, VA.

Construction management includes completing permit applications, drafting grant funding reports, issuing conformed documents, submittal reviews and RFI responses during construction on behalf of the owner.

Erin Milligan, EIT

Civil Engineer

YEARS OF EXPERIENCE

5

EDUCATION

M.S. Civil Engineering, Virginia Polytechnic Institute and State University, 2022

B.S. Civil Engineering, Ohio University, 2019

PROFESSIONAL REGISTRATIONS

Engineer-in-Training

PROFESSIONAL SOCIETIES

- Virginia Water Environment Association (VWEA)

PROFESSIONAL EXPERIENCE

Ms. Erin Milligan is a Civil Engineer who graduated from Virginia Tech with a Master's in Civil Engineering in 2022. Since joining TYLin | Greeley and Hansen Water Solutions, she has worked as a Program and Operations Manager for Water Resources permitting and compliance for the City of Richmond, VA.

RELEVANT PROJECT EXPERIENCE

Stormwater

Program and Operations Manager for the City of Richmond, VA.

Administer City of Richmond Stormwater Management Program.

Responsibilities include preparation of Chesapeake Bay Act Program annual compliance report, preparation of annual recertification package for FEMA Community Rating System, coordination with Plan Review Team to review all erosion and sediment control, stormwater management, Chesapeake Bay, and floodplain permits, and communication with permit applicants to ensure efficient and effective review process.

Wastewater

Project Engineer for Wastewater Treatment Plant Master Plan for the City of Richmond, VA.

Preparation of masterplan for City of Richmond Wastewater Treatment Plant. Assist with writing of report and analysis of plant effluent data for last 10 years.

Juliann Pham, PACP, MACP, LACP

Civil Engineer

YEARS OF EXPERIENCE

3

EDUCATION

B.S. Environmental Engineering,
Georgia Institute of Technology,
2021

PROFESSIONAL REGISTRATIONS

Pipeline Assessment and
Certification Program (PACP),
Manhole Assessment and
Certification Program (MACP),
Lateral Assessment and
Certification Program (LACP);
NASSCO

Certified Stormwater
Management Inspector (SWM),
Virginia Dept. of Environmental
Quality

Certified for Erosion and
Sediment and Stormwater
Inspector (CPESC), Virginia
Dept. of Environmental Quality

PROFESSIONAL SOCIETIES

None

PROFESSIONAL EXPERIENCE

Ms. Juliann Pham is Civil/Sanitary Engineer-in-Training with three years of experience in the field of wastewater engineering. Her experience includes onsite inspection of wastewater projects. Her responsibilities involved quality control of contractor deliverables. Ms. Pham has proven success serving as an inspector for condition assessment.

RELEVANT PROJECT EXPERIENCE

Wastewater

Assistant Engineer for City of Chesapeake Dominion Boulevard and I-64 Sewer Force Main Replacement, VA.

Served as engineer's representative on site for installation of 7000 feet of HDPE force main. HDPE fusion and open-trench installation inspection, managed and reviewed shop drawings, coordinated with contractor on day-to-day operations, construction document management.

Assistant Engineer for Northern Virginia Stormwater Infrastructure Condition Assessment, VA.

Reviewed existing data and CCTV footage, provided recommended rehab for each pipe segment.

Brandon Rigby, EIT

Sanitary Engineer

YEARS OF EXPERIENCE

1

EDUCATION

B.S. Civil Engineering, Embry-Riddle Aeronautical University, 2023

PROFESSIONAL REGISTRATIONS

Engineer-in-Training

PROFESSIONAL SOCIETIES

- American Society of Civil Engineers (ASCE)

PROFESSIONAL EXPERIENCE

Mr. Brandon Rigby is a civil engineer who graduated from Embry Riddle Aeronautical University with a bachelor's degree in civil engineering. Since joining the team, Mr. Rigby has worked as a sanitary engineer on stormwater and water utilities related projects. He has provided senior engineers with high quality analysis, saving them valuable time and developing his professional experience. Communication of workload, engineering concerns, and request for assistance or clarifications has been efficient and clear.

RELEVANT PROJECT EXPERIENCE

Wastewater Collection System & Treatment

Sanitary Engineer for the Design of Oakwood Cemetery for the City of Richmond, VA.

This included the analysis and revision of design drawings, as well as a hydrologic rational method capacity analysis using GIS data and design drawing information. Ensured that a Dominion power line was being constructed without disturbing the Gilles Creek Trail. This was done by cross-checking drawings and determining distances from relevant reference points to ensure there was no interference. *

Sanitary Engineer for the Chimborazo 3 and CSO 4 Project for the City of Richmond, VA.

Assisted senior engineers with the review of submittals for Chimborazo 3 CSO 4 for the city of Richmond, VA. This included reviewing several mixing pump submittals, the FRP jacking pipe Submittal, and the Screw and Belt conveyors Submittal by comparing them against their respective technical specifications. I also ensured that a Dominion power line was being constructed without disturbing the Gilles Creek Trail. This was done by cross-checking drawings and determining distances from relevant reference points to ensure there was no interference. *

Sanitary Engineer for Almond Creek Interceptor Creek Crossing Replacement & Creek Stabilization for the City of Richmond, VA.

Assisted with the CTC application and specification check listing for the almond creek interceptor crossing project. *

* Indicates experience with previous firm

Grisha Santuryan, EIT, PACP

Civil Engineer

YEARS OF EXPERIENCE

7

EDUCATION

B.S. Civil and Environmental Engineering, Virginia Tech, 2017

PROFESSIONAL REGISTRATIONS

Engineer-in-Training

Pipeline Assessment and Certification Program (PACP), NASSCO

PROFESSIONAL SOCIETIES

- Chi Epsilon Civil Engineering Honor Society

PROFESSIONAL EXPERIENCE

Mr. Grisha Santuryan is a Project Engineer with seven years of experience in the fields of asset management and wastewater engineering. His experience includes evaluations of existing facilities, program management, and onsite inspection of various types of projects in the stormwater, water, and wastewater industries. His responsibilities involved the coordination of diverse project teams, quality control of contractor deliverables, and management of rehabilitation projects. Mr. Santuryan has proven success serving as a project engineer on numerous projects, including asset evaluations, condition assessment, and construction management of wastewater and water facilities.

RELEVANT PROJECT EXPERIENCE

Wastewater

Assistant Engineer for Hampton Roads Sanitation District Providence Road Offline Storage Facility and Providence Park Improvements, VA.

Served as engineer's representative on site for design-build project for the construction of 5.2 MG offline storage tank. Rebar and concrete inspection, managed and reviewed shop drawings, coordinated with contractor on day-to-day operations, construction document management. *

Assistant Engineer for the Hampton Roads Sanitation District Condition Assessment Program, VA.

Generated work orders for sewer interceptor prompt repairs, including GIS mapping and cost estimates. Managed subconsultant performing cathodic protection test station evaluations on sewer interceptor. Developed risk framework for sewer system valves to identify most critical valves in the system. *

Stormwater

Assistant Engineer for Virginia Beach Stormwater Infrastructure Condition Assessment, VA.

Reviewed existing data and CCTV footage, provided recommended rehab for each pipe segment, led field work crew to investigate above ground conditions and perform desktop analysis to provide prioritized rehabilitation based on condition assessment ratings with cost estimates. Developed project schedule and met with client regularly to provide status updates. *

* Indicates experience with previous firm



Part 6. Appendices Schedule

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