INFLOW & INFILTRATION PROGRAM MANAGEMENT

ANNUAL REPORT FY 2023-2024

June 2024 | WE #OC23-II

wallis engineering

Acknowledgements

The FY 23-24 Annual Report is the product of collaboration of numerous people across several disciplines, as summarized on the Organizational Chart. But there are many others outside of the I&I Reduction Program that support this Program that we would like to acknowledge here. Without their support, the I&I Reduction Program would not have been able to be as successful as it has been.

A sincere thank you to:

Mayor Denyse McGriff

The Oregon City Commissioners

Oregon City Public Works Department

Clackamas Water Environmental Services

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EXECUTIVE SUMMARY

In its second full year, the Oregon City I&I Rehabilitation Program collaboration between Wallis Engineering and Oregon City Public Works Department is continuing its program to investigate, design, and construct projects that will reduce Inflow and Infiltration (I & I) into the Oregon City sewer system and into the Water Environmental Services (WES) Tri-City Wastewater Treatment Plant. This program focuses on six sewer basins determined to have the most I&I issues.

The engineering design for several basin rehabilitation projects are nearing completion. Construction is completed on one basin package and the manhole sealing program. Two more basin rehabilitation packages will start construction after July 1, 2024. At the end of the 2024 calendar year, 4.7 miles of sewer mainline and 4.4 miles of private laterals will be rehabilitated.

I&I Rehabilitation Program effectiveness is measured by flow monitoring the amount of water in the sewer system. A low I&I system should have the roughly the same amount of water flowing in the mainline pipes regardless of rainfall amounts in the area. A yearly flow monitoring and analysis in the target basins will determine program effectiveness. This year's monitoring showed reductions in flow with only partial basin rehabilitation and manhole sealing completed.

The program's ability to advance to the construction phase is due to work of four engineering firms, 12 specialty consulting firms, and the cooperation of different departments within Public Works. The FY 23-24 budget of $2.9 MM will be slightly under budget for program tasks of project administration, program management, flow monitoring, and basin package design for construction.

Looking ahead to FY 24-25, the design of three new area packages and the construction of four packages are planned.

This report contains the following information:

Section 1 summarizes the purpose and background of the I&I Rehabilitation Program.

Section 2 describes the Wallis Engineering efforts for the administration and management work for Fiscal Year 2023-2024 (FY 23-24).

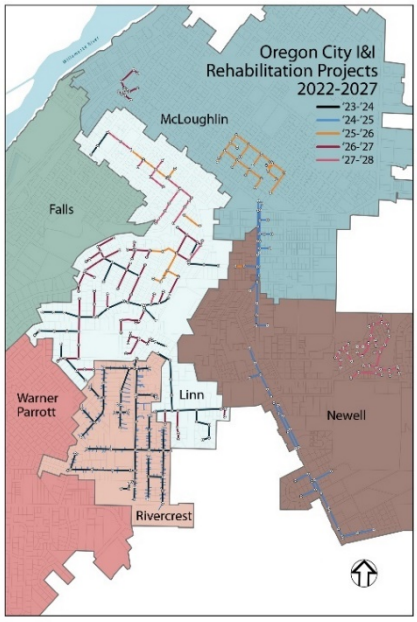
Section 3 provides an overview of the Program Management tasks for the I&I Reduction Program.

Section 4 describes the I&I Reduction Program's flow monitoring efforts and the results.

Section 5 summarizes the financial and budgeting aspects of the I&I Reduction Program for FY 23-24.

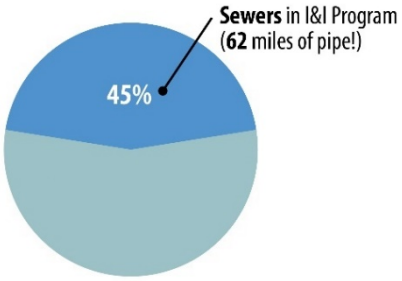
Section 6 looks ahead to Fiscal Year 2024-2025 and the Five Year Plan developed for the I&I Reduction Program.

I&I Rehabilitation Program Status



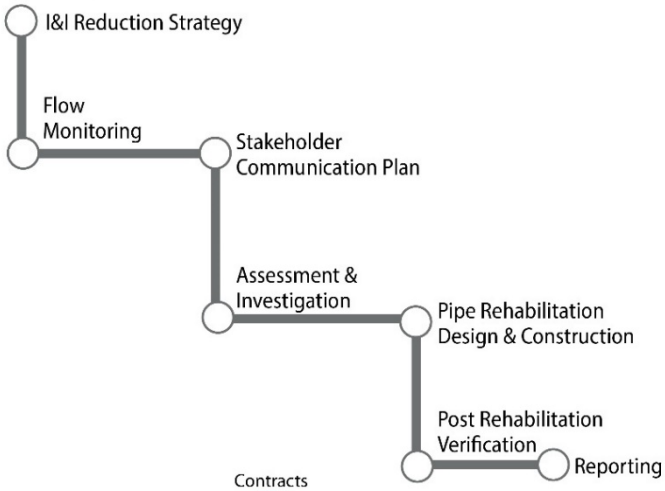
Sewer Basins in I&I Program

Second year of a 5-year program to reduce inflow and infiltration into Oregon City's sanitary sewer system, and the portion owned and operated by WES (Clackamas Water Environmental Services).



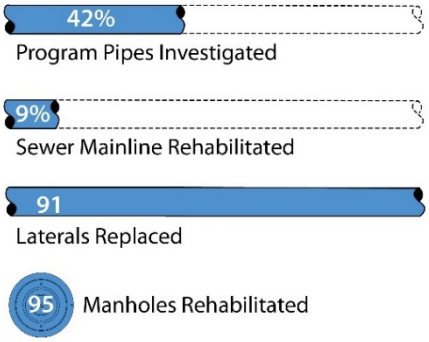
Oregon City Sanitary Sewer System

I&I Program Steps



Rehabilitation Highlights

(through June 2024)



Types of Pipe Rehabilitation Used

- Open Trench Construction
- Pipe Bursting
- CIPP (Cured-in-Place-Pipe Lining)
- HDD (Horizontal Directional Drilling)

Public Outreach

- 5 City Commission Meetings
- 14 website updates
- 865 Right-of-Entry Forms Approved
- 590 hits—project landing page
- 434 hits—lateral program page

SECTION 1: INTRODUCTION

Purpose and Background

The City of Oregon City provides sewer collection service to more than 37,000 people over an area that covers almost 9.3 square miles. Some city sewer collection areas, called basins, experience high infiltration and inflow (I&I). Infiltration means groundwater enters the sewer system through cracks and joints; inflow means water from stormwater and private drainage systems enter the sewer system through a direct connection. This I&I adds extra water to the sanitary sewer system, ultimately increasing the overall cost of providing sewer service to customers.

A 2014 Oregon City Wastewater Master Plan (WWMP) recommended the City initiate an I&I reduction plan to lengthen the life of its sewer system. In 2019, the Clackamas County Water Environmental Services (WES) Sanitary Sewer Master Plan (SSMP) recommended a 65% reduction in rainfall-derived inflow and infiltration (RDII) from its member cities' sewer basins by 2040. This would be the most cost-effective way to avoid potentially expensive capacity increases to WES sewer infrastructure, such as the Tri-City Wastewater Treatment Plant. The WES SSMP analysis validated that four Oregon City basins had significant I&I and included these basins in their 65% I&I reduction target calculation.

The Oregon City's I&I Reduction Program was created with a goal to reduce infiltration and inflow into the City's sanitary sewer system and meet the 65% WES I&I reduction target. To aid the reduction efforts, WES is contributing to the I&I Reduction Program funding by reimbursing 33% of the costs. This program will help reduce future Oregon City sewer costs. The work of the I&I Reduction Program includes system investigation and evaluation, design of improvements, and construction of projects that will reduce infiltration and inflow.

The I&I Reduction Program started with investigations of the city's sewer basins, finding six basins with high I&I. Private lateral and sewer mainline rehabilitation packages were developed for areas in these basins.

FY 2023-2024 represents the second full year of the City's Public Works Department and Wallis Engineering's collaboration. The investigation work continues. There are several project packages in the engineering design phase. By the end of this fiscal year, construction will be complete in one package in the Linn Basin and the manhole project and two packages will be out to bid for construction

Roles and Responsibilities

This I&I Reduction Program includes the effort of multiple organizations and individuals, as well as the Wallis Engineering consulting team. This organization chart summarizes the roles and responsibilities for those involved with the I&I Reduction Program in FY 23-24. *Table 1: Roles and Responsibilities* on page 9 summarizes the current I&I Reduction Program team members, their tasks, and program wide responsibilities. A contact list for the key personnel is included in ***Appendix A***.

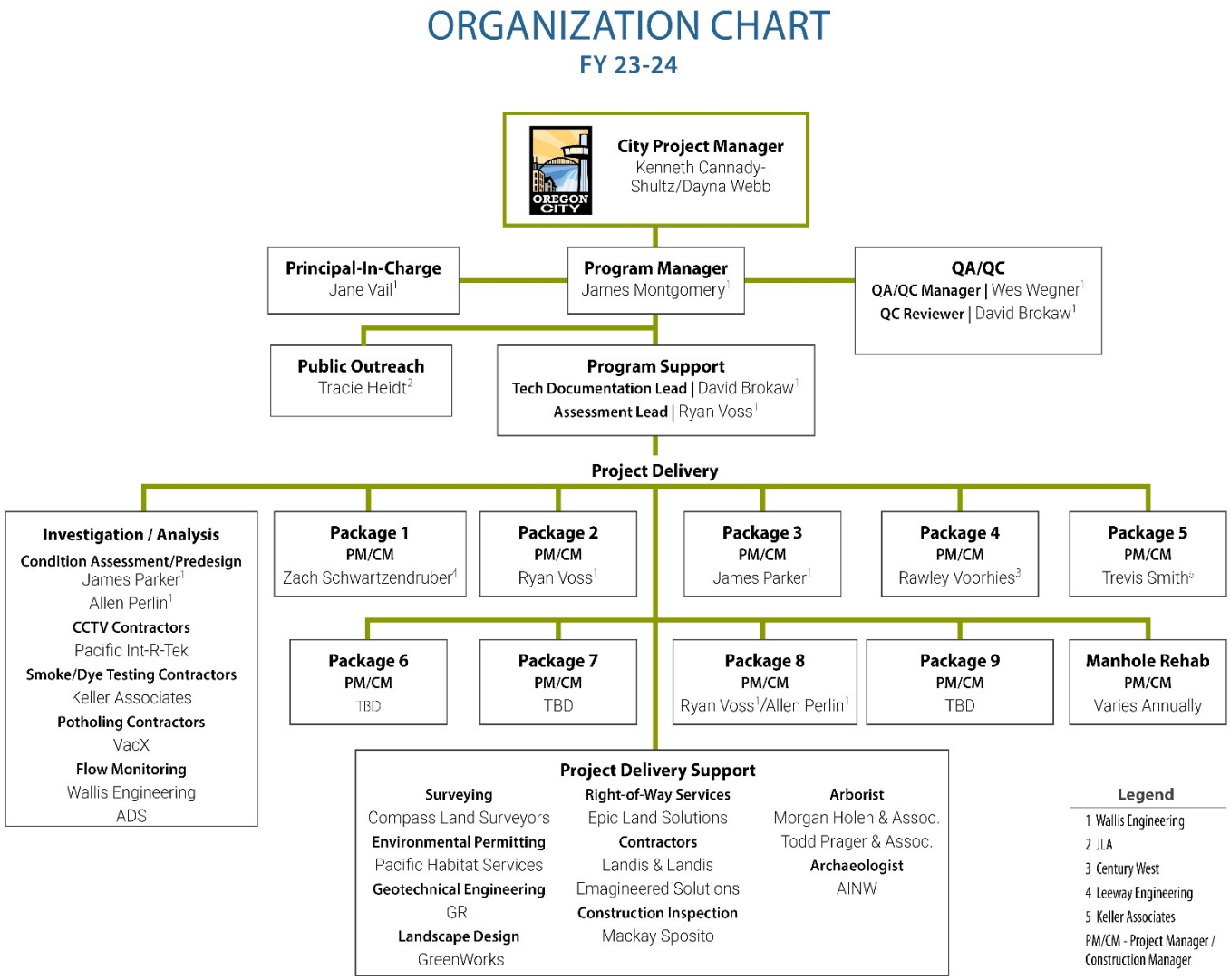


Figure 1.1: Organization Chart

Table 1: Roles and Responsibilities

Firm	Task	I&I Reduction Program Effort
Wallis Engineering, PLLC	Program Management Package Design Construction Management	Program wide Linn Basin 2, Molalla, Manhole Rehabilitation
Leeway Engineering Solutions	Package Design Construction Management Flow Monitoring	Linn Basin 1 Flow Monitoring McLoughlin 1
Keller Associates	Package Design Smoke Testing	Newell Basin 1 Smoke Testing
Century West	Package Design	Rivercrest 4
Mackay Sposito	Inspection	Program wide
Compass	Surveying, monumentation	Program wide
GRI	Geotechnical engineering	Program wide
Morgen Holen & Assoc	Arborist	Program wide
Todd Prager & Assoc	Arborist	Program wide
VacX	Potholing	Program wide
Pacific In Tek	CCTV	Program wide
Pacific Habitat Services	Environmental Permitting	Program wide
Greenworks	Landscape Restoration	Program wide
EPIC Land Solutions	Right of Way	Program wide
ADS	Flow Monitoring	Flow Monitoring and Modeling
AINW	Archaeological Services	Program wide
Landis & Landis	Contractor	Linn Basin 1
Emagineered Solutions	Contractor	Manhole Rehabilitation

List of Commonly Used Terms

The Annual Report will use many of the following terms defined here.

Basin: a collection of homes, laterals, and mainlines into a sewer system whose sewage all flows into a single location.

Burst: a mechanical repair method of inserting new plastic pipeline within an older pipeline that requires repair. The old pipeline is broken as the new pipeline is fed through on a line. Requires more groundwork than CIPP, but less than full trenching pipeline repairs.

CCTV: A type of camera system that travels through a pipeline filming the pipe conditions.

CIPP: Cured In Place Pipe lining. A flexible liner that can be inserted into pipelines and cured with various forms of heat including UV lights to repair a leaking pipe. The ability to utilize manhole or cleanout access limits ground work to areas where a cleanout needs to be installed..

Cleanout: a cap and pipe that allows access to the lateral or mainline sewer.

Dry Weather Flow (DWF): a measurement of sewer flows in pipes during dry weather. There are two types of DWF, wet season DWF captures the non-storm ground water infiltration and base flow. The other is dry season DWF which captures base flow only that establishes a baseline flow without any groundwater infiltration.

Dye Testing: a method where UV or colored dye is added to a water source to trace flows through pipelines.

FY: fiscal year; in Oregon City the fiscal year is from July 1 through June 30.

HDD: Horizontal Directional Drilling. This method allows for the installation of pipe underground without disturbing the surface ground at sending and receiving pits.

I&I: abbreviation for Inflow and Infiltration, which are two ways that water other than wastewater enters sewer pipelines. Inflow is water from non-sewage sources such as stormwater that enters the sewer system through roof drains or storm basin cross connections. Infiltration is groundwater that enters pipelines through cracks, breaks, or disconnected pipelines. Pipes, pumps, and the wastewater treatment plant for the sewer are sized based on predicted sewer flows, not for this extra water entering the pipes.

LF: abbreviation for linear feet, used to quantify investigation and rehabilitation quantities when talking about sewer pipelines.

Lateral: the connecting pipeline or pipelines from a building or residence that flows to the mainline sewer. A group of pipelines are referred to as a Private Sewer System. These are generally on private property.

Main: or mainline; the publicly owned sewer line that collects flow from private laterals and drains into the
Tri-City Wastewater Treatment Plant.

NROD: Natural Resource Overlay District. An Oregon City designated area that protects environmental assets within the City. This designation impacts design and construction in the overlay.

Package: an area to be assessed and evaluated as a probable priority contributor to inflow and infiltration in Oregon City. After assessment and evaluation, package refers to that area where construction will take place to rehabilitate/reconstruct laterals and/or sewer mains.

RDII: Rain Derived Inflow and Infiltration. This is the extra flow added from an increase in ground water that causes an immediate inflow peak and short term infiltration increase to a sewer system during a rain event.

Right of Entry: a document that gives the City, engineers, and contractors the permission to investigate and potentially repair infrastructure on private property.

Right of Way: In this document, Right of Way refers to two different areas: 1) the area of the street managed by the municipality, and 2) the land that has been subject to an easement agreement that allows for passage of people, utilities, or infrastructure from one property to another.

Smoke Testing: a method of locating openings in the sewer system that allow inflow. Air combined with non-toxic smoke is forced into the sewer lines, causing smoke to come out of the gutters or catch basins where there are cross connections or where there are defects in the lines.

SSMP (Sanitary System Master Plan): a document that provides an evaluation of the City's existing sewer collection system and recommends improvements. It measures conditions of area pipes' capacity, modeling of DWF and WWF for the area, pipe conditions, and suggests best growth practices.

Task: another way of identifying an I&I design area in Wallis budgets.

WES: Water Environmental Services is the Clackamas County group that operates the Tri-City Wastewater Treatment Plant and some trunk lines in Oregon City.

Wet Weather Flow (WWF): a measurement of sewer flows in pipes during rainy periods that determines peak flows in the pipes.

SECTION 2: I&I REDUCTION PROGRAM ADMINISTRATION AND MANAGEMENT – FY 23-24

Program Administration

Wallis Engineering continues to manage the Oregon City I&I Reduction Program. During Fiscal Year 2023-2024 (FY23-24), the I&I Reduction Program continued investigation work, design, and construction of project packages. Administration work focused on budget management, I&I Reduction Program standards, organization operations, and contract administration. Specifically:

- Forecasting, tracking, and invoicing the financial aspects of the I&I Reduction Program to deliver on I&I Reduction Program commitments as efficiently as possible
- Managing organizational operations, which included maintaining records, holding update meetings with the City public works staff, construction meetings, and attending public meetings
- Applying I&I Reduction Program standards to right of entry documentation, construction bid and payment request documents, organizational systems, and package plan sets
- Providing contracting support in coordination with budgeting in order to facilitate timely scoped work needs
- Reporting and communicating I&I Reduction Program progress, including preparation of annual reports summarizing the annual accounting and progress of the I&I Reduction Program and presentation of updates to city officials

The growth in the overall I&I Reduction Program scope from investigation to design and construction increased administrative efforts.

This work is expected to continue at a similar level of effort in FY 24-25.

Program Management

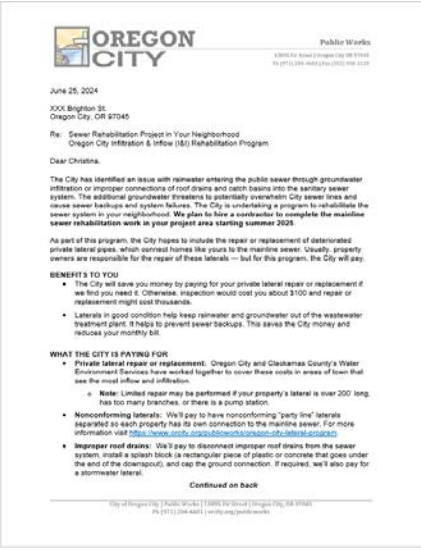
The Program Manager provided comprehensive administration of the I&I Reduction Program, managing the work teams formed for each I&I Reduction Program task. As the City's liaison, the Program Manager assisted communication between work teams and City leadership. I&I Reduction Program management work in FY 23-24 included:

- Public outreach – participated in community outreach and supporting the implementation of private and commercial I&I reduction projects
- CCTV program management – critical for investigating, documenting and assessing the condition of 43,000 LF of CCTV mainline in the Falls, McLoughlin, and Linn sewer basins

- Condition assessment of 18,000 LF of pipe within the Falls, McLoughlin, and Linn sewer basins. This helps prioritize pipe segments for rehabilitation
- Catch Basin Disconnect program – this helps identify potential cross-contamination sources
- Smoke Testing program – this helps identify priority projects to address inflow from cross connections
- Manhole Sealing program – creation of a project for design and construction
- Development of project design criteria – critical component of prioritized design and construction packages

Wallis Engineering continued efforts developed as part of the FY 22-23 I&I Reduction Program management plan. This resulted in the first lateral construction project, Linn Basin San Sewer I&I Rehab Project 1 (Linn 1), which started construction in December 2023 and finished in June 2024. The construction of Linn 1 provided a chance to refine the I&I Reduction Program specifications and communication protocols. The Program Manager worked with the City, the Contractor, and public works staff to find solutions to issues noted during bidding and construction in a Lessons Learned meeting. As a result, the Oregon City boilerplate specifications and guidelines were updated. Lessons Learned sessions will be utilized after each package construction to optimize program results.

The Program Manager is responsible for ensuring the success of the I&I Reduction Program. Though the primary objective is to reduce infiltration and inflow, it is also critical that the program is supported by the community that it serves. It is the opinion of this report that the two objectives – I&I reduction and community support – have been achieved for FY 23-24. The reduction of I&I is measured by pre- and post-construction flow monitoring. Results are described in the Flow Monitoring section of this report, beginning on page 30. Public support of this project has been measurable in the form of support and interest in the Private Lateral Policy, program website traffic, and relatively few complaints during construction of the I&I Reduction Program's packages.



OREGON CITY

Public Works

June 25, 2024

XXX Brighton St.
Oregon City, OR 97045

Re: Sewer Rehabilitation Project in Your Neighborhood
Oregon City Infiltration & Inflow (I&I) Rehabilitation Program

Dear Christina,

The City has identified an issue with rainwater entering the public sewer through groundwater infiltration or improper connections of roof drains and catch basins into the sanitary sewer system. The additional groundwater threatens to potentially overwhelm City sewer lines and cause sewer backups and system failures. The City is undertaking a program to rehabilitate the sewer system in your neighborhood. **We plan to hire a contractor to complete the mainline sewer rehabilitation work in your project area starting summer 2025.**

As part of this program, the City hopes to include the repair or replacement of deteriorated private lateral pipes, which connect homes like yours to the mainline sewer. Usually, property owners are responsible for the repair of these laterals — but for this program, the City will pay.

BENEFITS TO YOU

- The City will save you money by paying for your private lateral repair or replacement if we find you need it. Otherwise, inspection would cost you about $100 and repair or replacement might cost thousands.
- Laterals in good condition help keep rainwater and groundwater out of the wastewater treatment plant. It helps to prevent sewer backups. This saves the City money and reduces your monthly bill.

WHAT THE CITY IS PAYING FOR

- **Private lateral repair or replacement:** Oregon City and Clackamas County's Water Environment Services have worked together to cover these costs in areas of town that see the most inflow and infiltration.
  - **Note:** Limited repair may be performed if your property's lateral is over 200' long, has too many branches, or there is a pump station.
- **Nonconforming laterals:** We'll pay to have nonconforming "party line" laterals separated so each property has its own connection to the mainline sewer. For more information visit https://www.orcity.org/publicworks/oregon-city-lateral-program
- **Improper roof drains:** We'll pay to disconnect improper roof drains from the sewer system, install a splash block (a rectangular piece of plastic or concrete that goes under the end of the downspout), and cap the ground connection. If required, we'll also pay for a stormwater lateral.

Continued on back

City of Oregon City | Public Works | 13895 Ft Street | Oregon City, OR 97045
Ph (971) 204-4401 | orcity.org/publicworks

Right of Entry Form

2.1.1 Public Outreach and Right of Entry

The I&I Reduction Program includes a robust public outreach element. JLA facilitated the community communication that supports City and Wallis Engineering efforts. Now in their second year, there is a plan for public communication used to direct and support public outreach efforts. There is also a plan for public notifications associated with I&I Reduction Program efforts including CCTV inspection, smoke testing, dye testing, and construction of project packages. Flow charts illustrating public communication plan and outreach efforts are included in ***Appendix B***.

Improving private side sewer laterals is critical to effective I&I reductions. As such, the I&I Reduction Program includes a strong effort to obtain Rights of Entry (ROEs) from private property owners to facilitate the investigation, design, and construction of private side lateral improvements. Because ROEs are necessary for any property whose lateral might need repair, obtaining positive ROE responses are crucial to maximizing the number of residents who will allow work on their property for lateral replacement. The coordination efforts for this are summarized in a flow chart included in ***Appendix B***.

Future public outreach efforts will evolve based on the results of these initial efforts. For example, the 80% positive ROE responses allowing investigation and construction work for the Linn 1 packages was raised to 95% by later work by the Contractor during construction. As a result of this response improvement, the I&I Reduction Program's boilerplate specifications now include contractor ROE program outreach as part of the construction package.

The results of project package-specific ROE results are included in the package summaries in Section 3.

2.1.2 Condition Assessment and Design Criteria

The pipe and manhole conditions are a critical factor in determining which areas of the sewer system to prioritize for maximizing I&I reduction. Areas with apparent pipe defects or faulty connections are generally prioritized highest. Condition assessment for the City's I&I Reduction Program starts with CCTV pipeline inspection, supplemented by smoke testing and/or dye testing of questionable connections.

Tree root intrusion in pipe

CCTV plays a significant role in identifying areas of concern. The age of Oregon City's pipelines spans over a century of service. FY 23-24 condition assessments were focused on targeted areas that support package design efforts. There were two packages of CCTV that totaled 100,000 feet of mainline sewer. The CCTV footage is reviewed by engineers to assess pipe conditions. To date, Wallis Engineering has reviewed almost 18,000 feet of mainline sewer within the City. Future pipe condition assessment, in the areas captured in the 2023 CCTV program, will continue to represent an important component of project scoping and design. This assessment will be leveraged into a forward-thinking, project-focused approach, described in the five-year plan in Section 6 and included in ***Appendix I***.

The map in *Figure 2.1: CCTV Winter 2023* illustrates the pipes where CCTV has been completed, the pipes that were assessed by engineers for package design, and pipes that will be the focus of upcoming CCTV work.

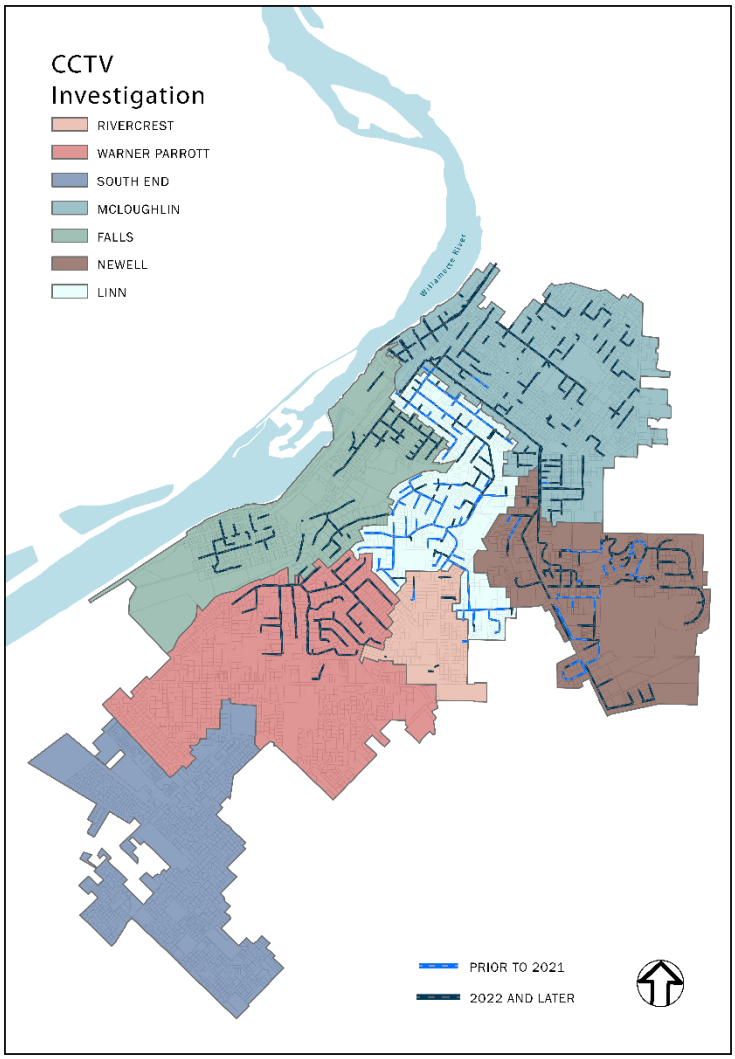
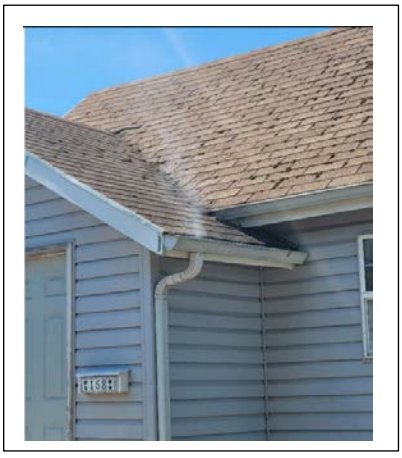


Figure 2.1: CCTV Winter 2023

Sometimes, smoke testing and dye testing are used to inform package design. Either test can help find sources of inflow into the sewer system from stormwater and private drainage systems. Oregon City transitioned from a combined storm and sewer system to separate systems beginning in the 1970s but some connections still exist between the sources of stormwater and the sewer system. One City lateral rehabilitation program goal is to remove private downspout connections to the sewer system.



Smoke testing visible from drainpipe

Smoke testing can help identify difficult to locate connections between storm and sewer systems that CCTV or visual inspection can't find.

In the summer of 2023, smoke testing of 135,000 LF of mainlines with 206 manholes in the Newell, McLoughlin, Warner Parrot, Falls, Linn and Rivercrest sewer basins was completed. A majority of the issues were found in the McLoughlin Basin.

Smoke testing found 159 potential sources of I&I:

- 27 Cleanouts
- 26 Ground Leaks
- 24 Storm Catch Basins
- 44 Illicit Connections
- 5 Stand pipes
- 33 Miscellaneous defects

Figure 2.2 below illustrates 2023 smoke testing "hits" of areas with cross connections found during smoke testing.

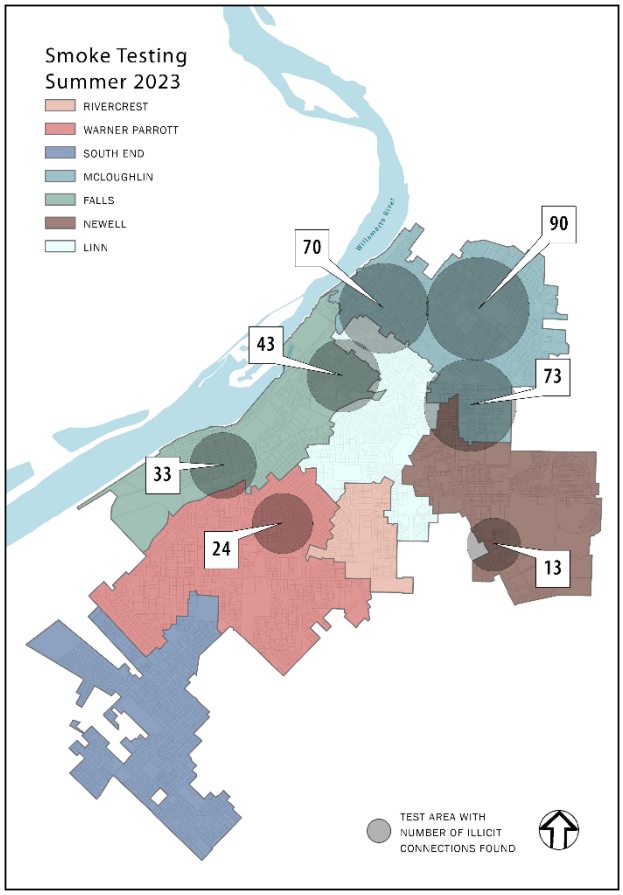


Figure 2.2: Smoke Testing Summer 2023

Smoke testing can also provide insight into the condition of laterals. Issues like structural deficiencies may cause smoke to migrate through soils or surrounding utility structures.

The I&I Reduction Program is intended to use the assessment information to form holistic packages; priority areas would be completely rehabilitated prior to moving to the next design area. The Rivercrest package is an example of this. This basin will be completely rehabilitated after the 2024 summer lateral rehabilitation construction. But, there is also a need to coordinate

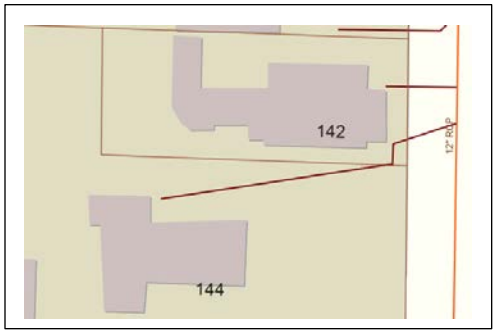
closely with other City programs such as PMUF and WIFIA to avoid unnecessary rework. The Molalla package, in construction during the summer of 2024, is an example of construction coordination. And, there are small area packages that focus on addressing specific community problem areas that are included in an upcoming package because the issues need to be addressed prior to their area's rehabilitation package. A flowchart describing the process by which condition assessment and investigation efforts result in a project package is included in ***Appendix C***.

2.1.3 Project Package Delivery

After an area of priority pipes and manholes are identified, I&I Reduction Program efforts focus on designing the project package. This starts with identifying what efforts will be needed to design and construct improvements. Oregon City is a geologically interesting and historically important area. This adds complexity to project delivery, with additional efforts necessary such as geohazard planning, cultural resources investigation, construction monitoring, and easement/ROW procurement.

Projects within mapped geologic hazards overlay zone require extensive background research, and generally require a Type II planning permit to proceed. Several packages in design and others planned for design in FY 24-25 and beyond will require a Type II permit. A flowchart describing this process is included in ***Appendix D***.

Oregon City was founded in 1829, making it one of Oregon's oldest cities. With many historic buildings and properties, cultural resources investigation and construction monitoring are elements of the City's I&I Reduction Program. For example, the Rose Farm property received new laterals in the Linn 1 Basin package, requiring an archaeologist to be monitor construction work. Other properties will require historic reviews. Package design and timelines will include the necessary steps to ensure this heritage is preserved.



Parcels with cross easement

Another implication of historic areas is that the underground infrastructure does not always keep pace with the buildings and streets above it. Multiple areas of the City have issues with cross easements – sewer laterals located in multiple private properties which lack an easement allowing them to be located in that property. In the case of cross easements, the I&I Reduction Program can either realign each property's sewer lateral so it lies fully within the property, or facilitate easement negotiations between property owners.

In some cases, the City must add infrastructure within private property. In this case, Right of Way (ROW) needs to be secured through the purchase and registration of an easement. This process can be complicated and must be factored into timelines. One package has completed such a purchase (Linn Basin 2), and others may be identified in future packages. A flow chart describing the process of obtaining easements and ROW is included in ***Appendix E.***

Once the project package is scoped, the project can be designed and constructed. The process of project delivery is summarized in a flow chart included in ***Appendix F***.

2.1.4 Lateral Policy and Boilerplate Specifications

I&I Reduction Program management efforts this year included revisions to the Private Lateral Policy, and boilerplate specifications that guide the design and construction of the project packages. These documents reflect the lessons learned from the Rivercrest projects and Linn 1 package construction this year. It is expected that each package construction will provide an opportunity to upgrade both documents, allowing for better results on future project packages.

2.1.5 Cross-Connection Identification

The intent of the I&I Reduction Program is to reduce the inflow of stormwater into the sewer system. One way this is accomplished is by eliminating cross connections between stormwater and sewer systems, as identified through smoke testing (discussed on page 12). Cross connection fixes are incorporated into package designs, and corrected during construction. The I&I Reduction program will continue to identify cross connections and design improvements that address them.

2.1.6 Additional Work

I&I Reduction Program management also included additional work not scoped with other tasks.

Public works standards and private building code requirements are both necessary for this I&I Reduction Program and can be a source of disagreement. Project construction in FY 23-24 highlighted the need for coordination between public works and the building division on lateral rehabilitation and replacement on private property. A coordination workshop was held to ensure understanding between building department requirements and rehabilitation standards. The team incorporated the workshop consensus into the I&I Reduction Program's boilerplate specifications, which will be incorporated into future packages.

The Linn 2 package, not constructed in this fiscal year, found several challenges during the design phase that necessitated additional I&I Reduction Program management efforts. These challenges are highlighted in the each of the package narratives included in Section 3. One example, the addition of a sewer line and manhole on private property between Terrace Avenue and East Street required acquiring an easement with EPIC Land Services. There were challenges in timing, compensation, and recording this easement acquisition.

SECTION 3: PACKAGE INFORMATION

Several project packages have been part of the I&I Reduction Program this fiscal year. The following pages describe the FY 23-24 package in design and construction. There are 10 packages in progress, including:

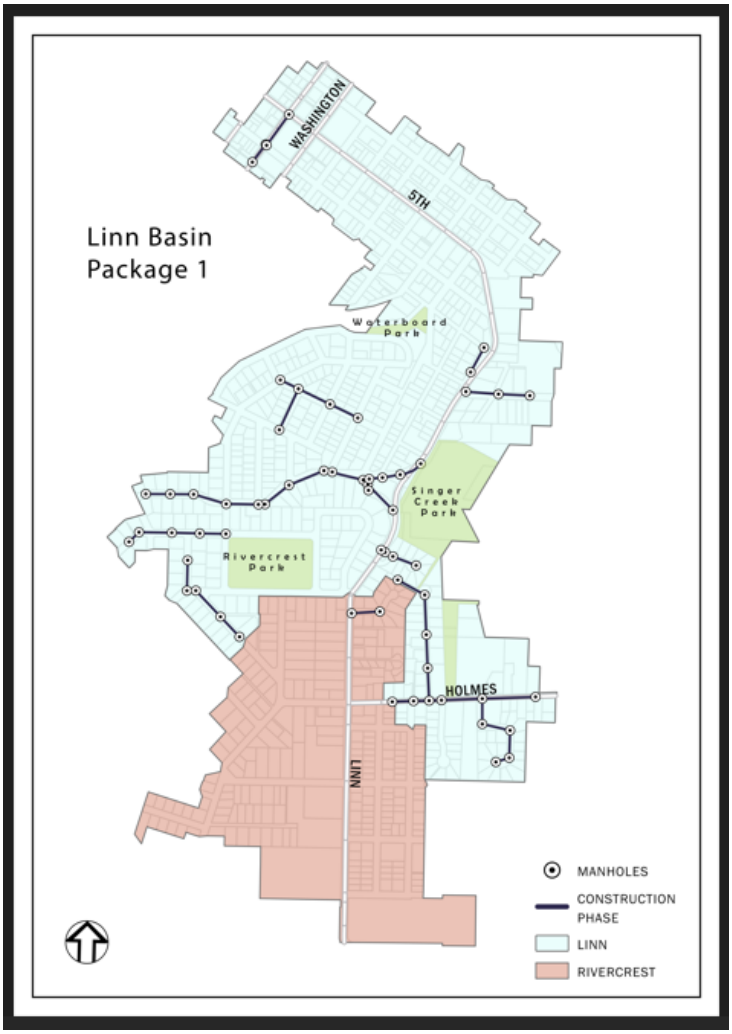
1.	Linn Basin SS I&I Rehabilitation 1	CI 23-001 –Construction complete
2.	Linn Basin SS I&I Rehabilitation 2	CI 23-002 – At 90% Design
3.	Molalla Ave. SS I&I Rehabilitation	CI 23-013 - Bidding
4.	Rivercrest SS I&I Rehabilitation 4	CI 23-009 – Final Review
5.	Newell Basin SS I&I Rehabilitation 1	CI 23-012 – In Scoping
6.	Linn Basin SS I&I Rehabilitation 3	CI 23-003 – In Scoping
7.	McLoughlin SS I&I Rehabilitation 2	No CI Number - Investigation
8.	Center St/Catch Basin Disconnect	CI 23-005 – At 30% Design
9.	McLoughlin SS I&I Rehabilitation 1	CI 24-005 - Investigation
10.	Manhole Rehabilitation	CI 23-011 – Construction complete

Linn Basin 1 – CI 23-001

Design and Construction Management: Leeway Engineering Solutions

This area is located in the City's north central section. The sewer system is 30 to 120 years old.

Package Details			
Construction Dates	February – May 2024	**Status**	Construction complete
Number of Laterals	172	**Feet of Laterals**	8,500
Feet of Sewer Main	9,700	**Number of Manholes**	2
Right of Entry Returned (%)	207 of 217 = 95%		



This package is in an area of high I&I. It is a residential area that also contains apartment complexes and business plazas.

Homes: 170

Apartment Complexes: 3

Business Plazas: 3

The challenges to this package design are geologic hazard areas, historic properties, NROD, large trees, traffic patterns, and City infrastructure construction. These challenges necessitate the use of CIPP pipe rehabilitation in specific areas.

Contractors and Subcontractors

Landis & Landis – Contractor

Mackay Sposito – Inspection

Subcontractors: Oxbow Construction, Linescape, Local Plumbing, Bulls Eye Boring, River City Environmental, ATS Electrical, McCoy Electrical, S2 Contractor, RLC Contractor

Project status: Complete by June 30, 2024. Repair of 9,700 ft of mainline sewer using open cut, CIPP lining, and pipe bursting. Lateral repair of 8,500 feet using 1,250 lf of CIPP, 7,200 lf of burst or open cut, and one lateral using HDD. Ten laterals were found to be in good condition but cleanout or cap was installed.

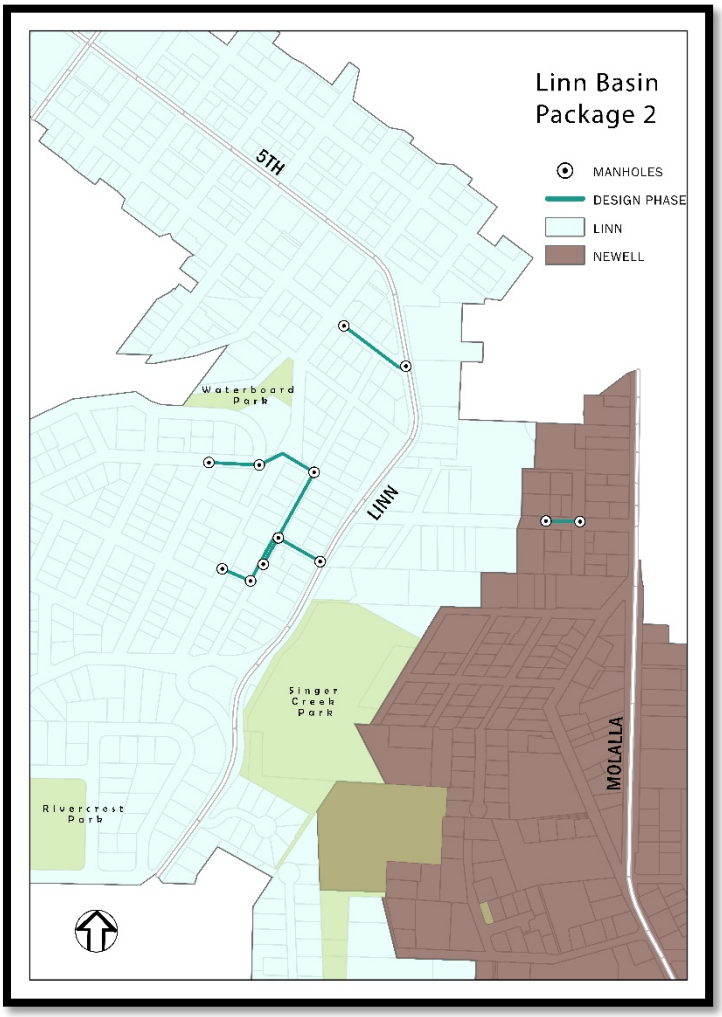
Change orders: utility relocations, emergency pipe repair, private pump station pumping, lifting of manhole

Linn Basin 2 – CI 23-002

Design and Construction Management: Wallis Engineering

There are six areas in the Singer Creek neighborhood. The sewer system is 30 to 120 years old.

Package Details			
Construction Dates	Summer 2025	**Status**	90% Design Phase
Number of Laterals	46	**Feet of Laterals**	1,923
Feet of Sewer Main	2,397	**Number of Manholes**	15 new, 5 rehabilitated
Right of Entry Returned (%)	36 of 52 = 69% (Note: 12 addresses are recent additions to ROE count)		



Basin Flows indicate high stormwater infiltration in this area. Major structural issues, pipe separation, and collapsed sewer mains were identified within this package.

Homes: 40

Apartment Complexes: 6

Business Plazas: 0

Challenges to this area are: Geologic hazards on most of the project area, historic properties, and NROD impacts. In addition, the area is heavily forested and includes a high-density tree canopy. There are sewer main alignments without easements on private property and City property.

Landslide prone areas will require HDD.

Package construction will require Type II planning to proceed.

Contractors and Subcontractors

To Be Determined – bidding likely in February 2025.

Project status: At 90% Design. Recent addition of Pearl and Myrtle Streets to project. There will be five types of repairs utilized: a) burst – 830 LF of mainline sewer, b) open trench – 1150 LF of mainline sewer, c) HDD – two runs, d) CIPP, and e) no repair if lateral is in good shape.

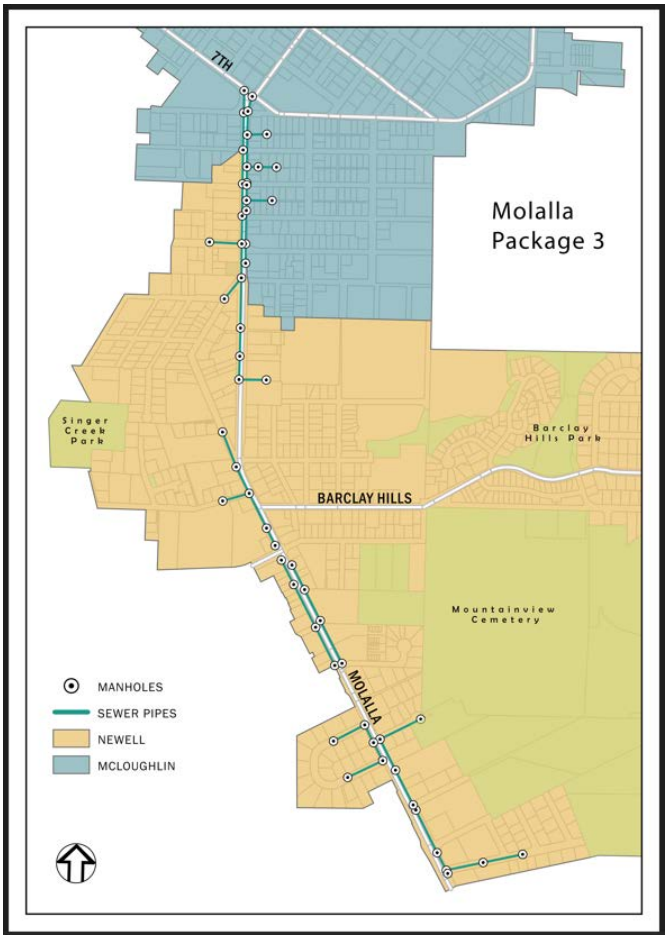
Project will need to install laterals in new alignments in multiple cases. Tree impacts, geological impacts, and historic designations are challenges to the design, permitting , and construction.

Molalla – CI 23-013

Design and Construction Management: Wallis Engineering

Located on the east central side of Oregon City. Most work is within 500 feet of Molalla Avenue. The sewer system is 60 to 120 years old.

Package Details			
Construction Dates	Summer 2024	**Status**	Bidding
Number of Laterals	83	**Feet of Laterals**	3,580
Feet of Sewer Main	9,880	**Number of Manholes**	7 new, 56 rehabilitated
Right of Entry Returned (%)	Business/apartments: mailed 9 of 52 = 17% Homes/vacant lots: 33 of 63 = 52%		



Basin Flows indicate high stormwater infiltration in this area. Major waterline repair scheduled summer of 2024 is being coordinated with construction activities. Night work could take place due to daytime traffic volumes. Numerous redundant or inactive laterals could be contributing to infiltration flows as they age.

Homes: 36

Apartment Complexes: 11

Business/Business Plazas: 43

Mixed Use: 2

Challenges to this area are: The primary challenge of the Molalla Ave package is managing the flow of traffic, as much of the construction work takes place within one of the City's busiest arterial roadways.

Project schedule was accelerated due to schedule of waterline repairs.

Contractors and Subcontractors

To Be Determined – bidding in June 2024

Project status: At Bidding. There will be four types of repairs utilized: a) burst, b) open trench, c) CIPP, and d) no repair if lateral is in good shape.

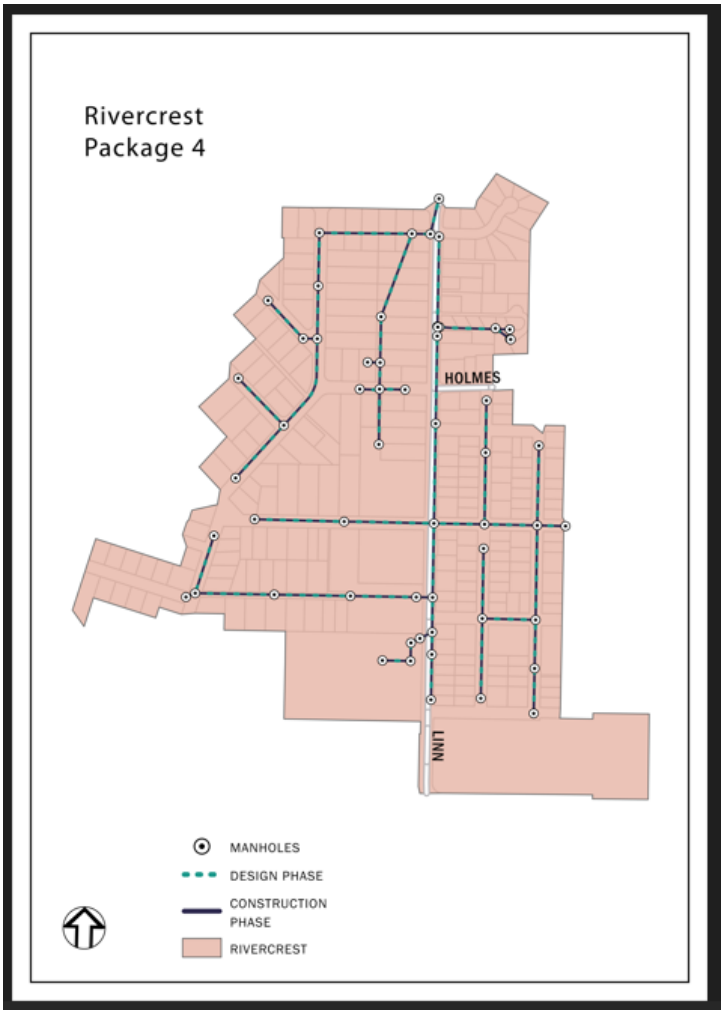
Project will need to install laterals in new alignments in multiple cases. Tree impacts and historic designations are challenges to the design, permitting , and construction.

Rivercrest 4 – CI 23-009

Design and Construction Management: Century West Engineering

Located in the south central portion of Oregon City. Most sewer mainline work completed previously in 2022-2023. The sewer system is 40 to 120 years old.

Package Details			
Construction Dates	Summer 2024	**Status**	Final Review
Number of Laterals	236	**Feet of Laterals**	10,900
Feet of Sewer Main	620	**Number of Manholes**	3 new
Right of Entry Returned (%)	155 of 220 = 70%		



Investigation found lateral defects such as breaks, cracks, fractures, root intrusion, pipe separation and water infiltration throughout the system. While the mainline system found to be free of stormwater cross connections, there is a high probability that numerous homes have roof drains that tie into sanitary laterals. This to be confirmed at construction.

Homes: 219

Apartment Complexes: 5

Business/Business Plazas: 3

Mixed Use: 2 churches, 1 school, 1 government building

Challenges to this area are: Geohazard, historic, NROD, Tree size, traffic flow, scheduling (City water or pavement plans)

Contractors and Subcontractors

To Be Determined – bidding in July 2024

Project status: At 100% Design. There will be four types of repairs utilized: a) burst, b) open trench, c) CIPP, and d) no repair if lateral is in good shape.

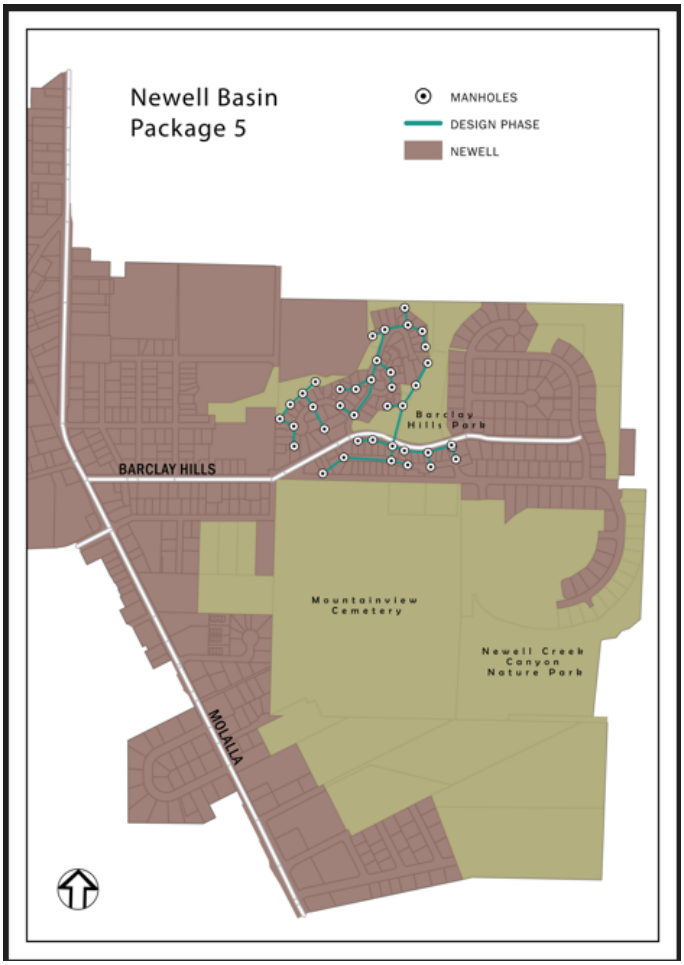
New lateral alignments will necessitate working around existing buildings, fences, walls, trees and other obstructions. Lateral connections to deep mainlines, and performing traffic control on Linn Ave and Holmes Ln will be complicated. Construction to coordinate with City paving project on Randall St.

Newell Basin 1 – CI 23-012

Design and Construction Management: Keller Associates

Located on the east side of Oregon City. Most sewer lines are from 1972 to 1980.

Package Details			
Construction Dates	Summer 2025	**Status**	Preliminary Design
Number of Laterals	86	**Feet of Laterals**	TBD
Feet of Sewer Main	4,784	**Number of Manholes**	42
Right of Entry Returned (%)	Not issued		



Area identified as a high contributor during the flow monitoring investigations by WES. A failed storm outfall has deeply incised a channel at its outfall location, compromising the integrity of the sewer system in this area. A high priority repair due to potential failure.

Homes: 86

Apartment Complexes: 0

Business/Business Plazas: 0

Mixed Use: 0

Challenges to this area are: significant challenges associated with geologic hazard and NROD impacts along Barclay Hills Park. The area is heavily forested and includes a high density tree canopy. Several sewer main alignments are located within easements on private property. Charter park limitations will impact repair methodologies.

Contractors and Subcontractors

To Be Determined – bidding likely in Spring 2026

Project status: Preliminary Design. There will be four types of repairs utilized: a) burst, b) open trench, c) CIPP, and d) no repair if lateral is in good shape.

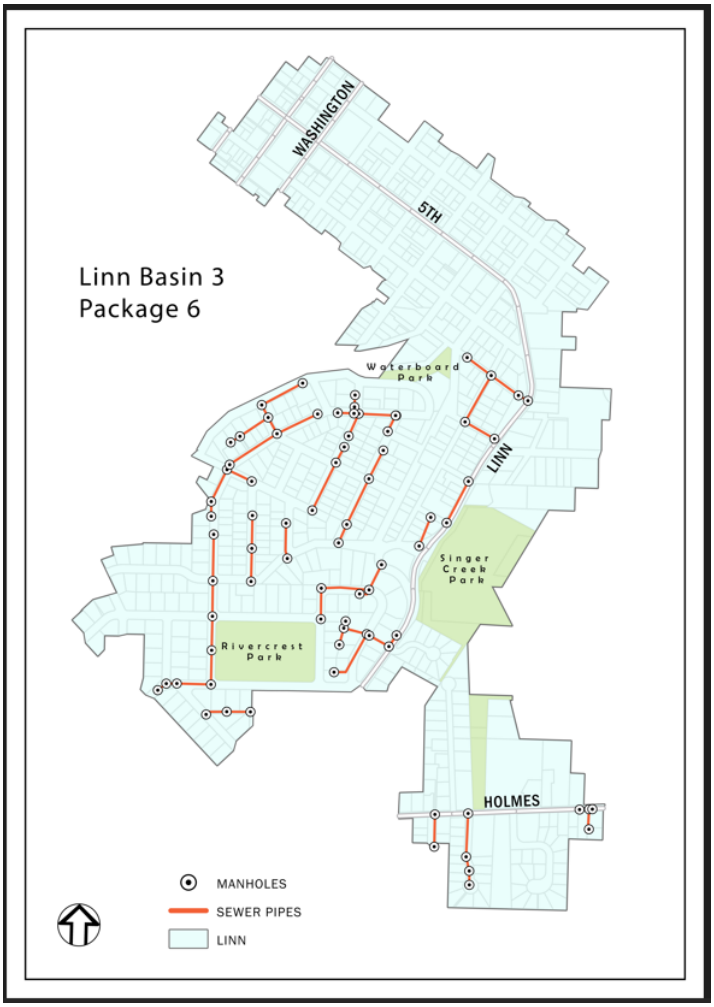
Large areas of work in geohazard and /or NROD will require Type II permits.

Linn Basin 3 – CI 23-003

Design and Construction Management: TBD

This area is located in the City's north central section. The sewer system is 30 to 120 years old.

Package Details			
Construction Dates	**TBD**	**Status**	**Scoping**
Number of Laterals	**TBD**	**Feet of Laterals**	**TBD**
Feet of Sewer Main	**TBD**	**Number of Manholes**	**TBD**
Right of Entry Returned (%)	Not issued		



This package will potentially be part of the FY 24-25 construction and will help complete the upper portion of the Linn Basin. As with Linn 2, basin flows indicate high stormwater infiltration in this area. Major structural issues, pipe separation, and collapsed sewer mains are possible within this package.

Homes: TBD

Apartment Complexes: TBD

Business/Business Plazas: TBD

Mixed Use: TBD

Challenges to this area are: Geologic hazard, historic, NROD, Tree size, traffic flow, scheduling (City water or pavement plans)

Contractors and Subcontractors

To Be Determined – bidding likely in June 2025

Project status: In scoping. There could be five types of repairs utilized: a) burst, b) open trench, c) HDD, d) CIPP, and e) no repair if lateral is in good shape.

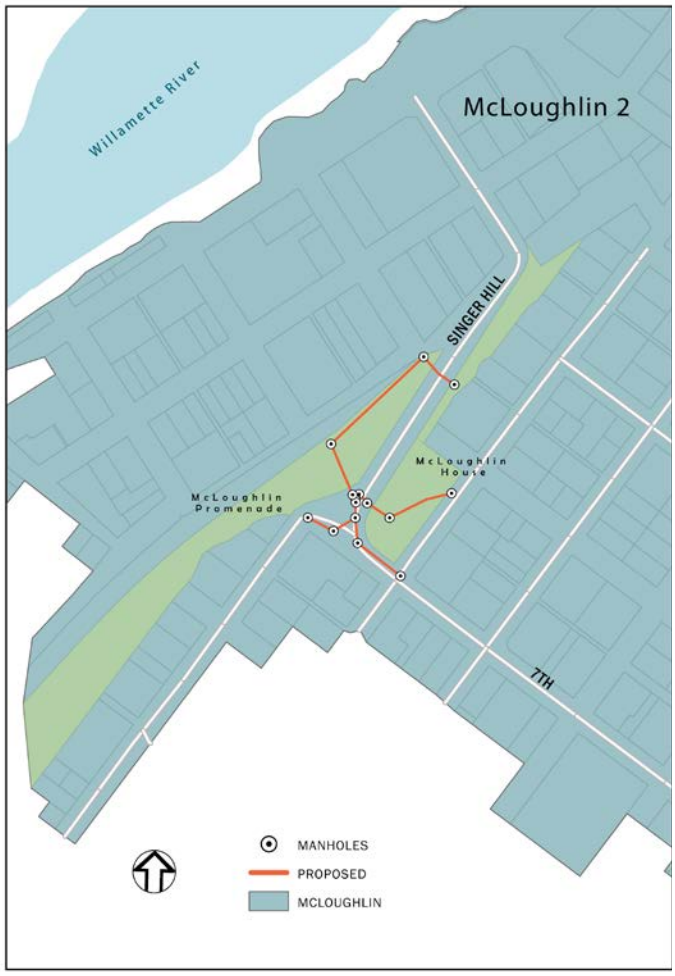
Project will need to install laterals in new alignments in multiple cases. Tree impacts, geological impacts, and historic designations are challenges to the design, permitting , and construction.

McLoughlin 2 – No CI Number

Design and Construction Management: TBD

This area is located in the north section of the City. The sewer system is approximately 30 to 120 years old.

Package Details			
Construction Dates	**TBD**	**Status**	Scoping
Number of Laterals	**TBD**	**Feet of Laterals**	**TBD**
Feet of Sewer Main	**TBD**	**Number of Manholes**	**TBD**
Right of Entry Returned (%)	Not issued		



This package will be potentially part of the FY 24-25 design and FY 25-26 construction. Basin flows indicate high stormwater infiltration in this area. Major structural issues, geologic hazards, NROD, historic designation, traffic flow, railroad considerations could possible within this package.

Homes: TBD

Apartment Complexes: TBD

Business/Business Plazas: TBD

Mixed Use: TBD

Challenges to this area are: Geologic hazards, historic, NROD, Tree size, traffic flow, scheduling (City water or pavement plans) Charter park rules will impact type of repair methodologies utilized.

Contractors and Subcontractors

To Be Determined – bidding likely in June 2026

Project status: Scoping. There could be five types of repairs utilized: a) burst, b) open trench, c) HDD, d) CIPP, and e) no repair if lateral is in good shape.

Project will need to install laterals in new alignments in multiple cases. Tree impacts, geological impacts, and historic designations are challenges to the design, permitting , and construction.

Center Street/Catch Basin Disconnect – CI 23-005

Design and Construction Management: Wallis Engineering

This area is located mainly in the north section of the City.

Package Details			
Construction Dates	**TBD**	**Status**	**Reassigned**
Number of Laterals	**TBD**	**Feet of Laterals**	**TBD**
Feet of Sewer Main	**TBD**	**Number of Manholes**	**TBD**
Right of Entry Returned (%)	Not issued		

NO MAP

This package was initially designed to address some specific needs in FY 22-23. As time progressed, portions of this project have been migrated to other packages. The remaining areas are difficult to bring together into a cohesive package.

At this time, it is expected that the remaining areas will be added to future packages.

There are some specific areas that will need extra work due to geologic hazards, traffic flow, easement concerns, and others.

Homes: TBD

Apartment Complexes: TBD

Business/Business Plazas: TBD

Mixed Use: TBD

Challenges to this area are: Geologic hazards, historic, NROD, Tree size, traffic flow, scheduling (City water or pavement plans)

Contractors and Subcontractors

NA

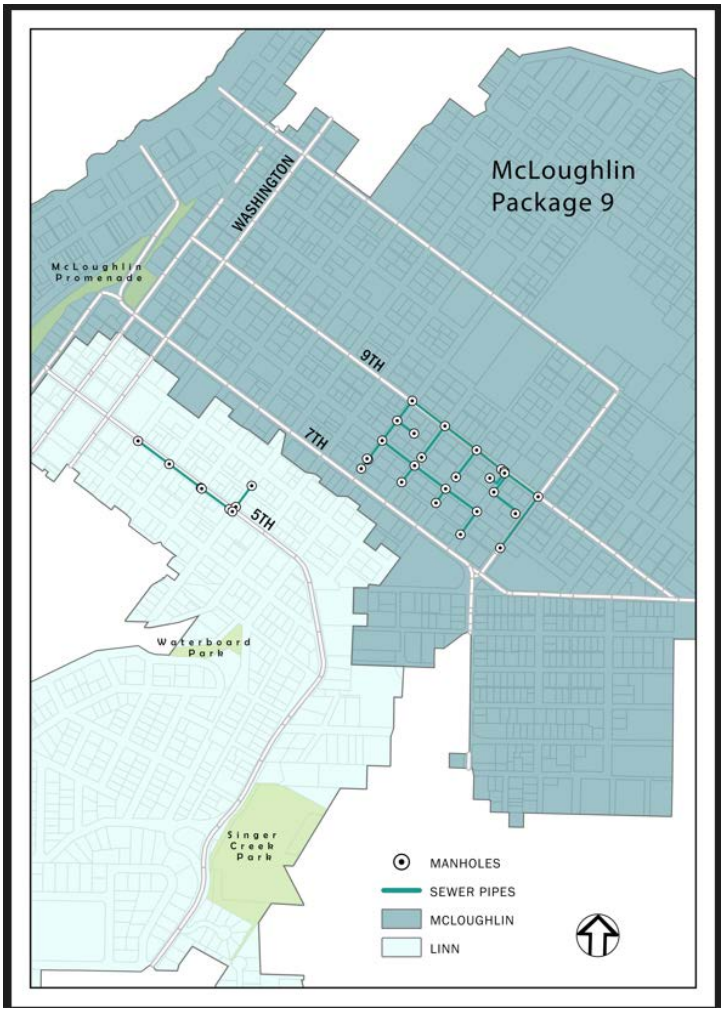
Project status: Reassigned. To be migrated into other package designs.

McLoughlin Basin 1 – CI 24-005

Design and Construction Management: TBD

This area is located in the north, central section of the City. The sewer system is approximately 20 to 120 years old.

Package Details			
Construction Dates	**TBD**	**Status**	**Condition Assessment**
Number of Laterals	**TBD**	**Feet of Laterals**	**TBD**
Feet of Sewer Main	**TBD**	**Number of Manholes**	**TBD**
Right of Entry Returned (%)	**29 of 61 = 48%**		



This package was prioritized due to identified high I&I within the McLoughlin Basin. Construction to be completed on Harrison Street ahead of an overlapping 2025 pavement improvements program.

This area includes several undersized mainline pipe segments including long lateral lines indicative of older lateral pipe segments converted to mainlines. A high number of smoke testing hits were identified in McLoughlin Basin in the 2022 smoke testing report.

Homes: approx. 58

Apartment Complexes: 4

Business/Business Plazas: 1

Mixed Use: 2 churches

Challenges to this area are: 15 historic properties, traffic flow, scheduling (City pavement plans), cross easements

Contractors and Subcontractors

To Be Determined – bidding likely in Winter 2025

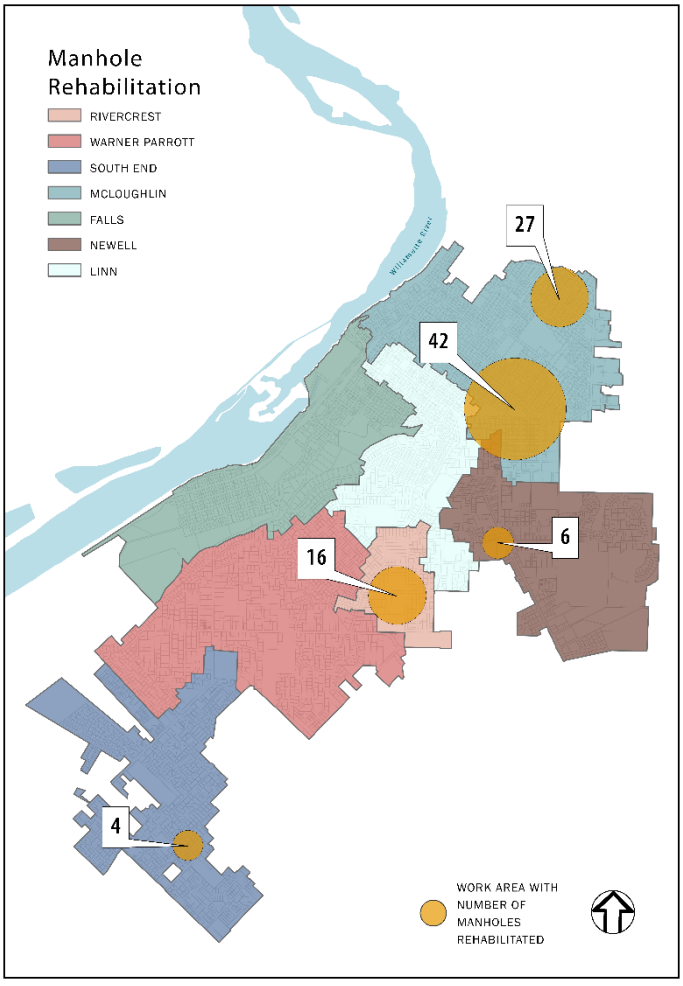
Project status: Condition Assessment. Design work will likely commence in July 2024.

Manhole Rehabilitation – CI 23-011

Design and Construction Management: Wallis Engineering

Construction is mostly located in the north, central section of the City. The manholes are approximately 20 to 60 years old.

Package Details			
Construction Dates	March – July 2024	**Status**	Construction complete
Number of Laterals	NA	**Feet of Laterals**	NA
Feet of Sewer Main	NA	**Number of Manholes**	90
Right of Entry Returned (%)	NA		



The 2024 Manhole Rehabilitation package includes 90 manholes located primarily in the McLoughlin and Rivercrest neighborhoods. Included in the package, City operations staff identified 23 "high-priority" manholes with known deficiencies.

The City seeks to utilize a manhole grout sealing contract to extend the life of existing manholes, especially those in areas of mainline rehabilitation in the past 20 years. An I&I Reduction Program in FY 23-24. Future manhole rehabilitation packages will follow mainline rehabilitation packages. A 2025 Manhole Rehabilitation program is planned for the upcoming year.

Homes: 0

Apartment Complexes: 0

Business/Business Plazas: 1

Mixed Use: 0

Challenges to this area are: traffic flow

Contractors and Subcontractors

Emagineered Solutions, Inc.

Project status: Construction. Manhole rehabilitation using injection grout and cementitious spot repair for precast manhole structures. Additional work may include curtain grouting, additional structural repair, and grout fill and abandonment of overflow connections to City storm structures.

SECTION 4: FLOW MONITORING RESULTS

The goal of the City's I&I Reduction Program is to reduce infiltration and inflow within the sanitary sewer system, and measuring the progress of this goal is a key component of the I&I Reduction Program.

Infiltration and inflow are linked to precipitation volumes and elevated winter water tables. Stresses to the Oregon City sewer system, the WES trunklines, and the WES Tri-City Water Reclamation Facility are driven by peak flows during the winter season.

Flow monitoring is the mechanism by which the I&I Reduction Program will determine if I&I has been reduced by the program's construction projects, and by how much. Generally speaking, the program monitors wet weather flow (WWF) in the sanitary sewer system before and after I&I Reduction projects, and additionally performs targeted annual monitoring to track overall progress towards the programs ultimate goal of 65% reduction of I&I peak flows within the program area.

Flow monitoring efforts for FY 23-24 were focused on gathering pre-construction flow data to set a baseline for measurement of post-construction flow data and determination of I&I reduction. The I&I Reduction Program is intended to prioritize areas with the highest I&I, so the four basins selected for flow monitoring are located in high I&I areas – the Newell, Linn, Rivercrest, and Warner Parrott Basins.

In FY 22-23, Leeway Engineering Solutions was hired to perform flow monitoring and to create a revised flow model for Oregon City. Due to the timing of flow measurement and data analysis, their report was not completed prior to last year's Annual Report. Going forward, the program will provide basic summary information of flow monitoring in the same year it is completed, and detailed analyses of the observed flows the year after. System Model updates will be performed every 2-4 years, as deemed appropriate by the I&I ReductionProgram. The 2023 Flow Monitoring report is attached as ***Appendix G***.

This year, flow monitoring is complete for the winter season. The period included a peak storm that had a similar 24-hour rainfall depth to the 2023 peak storm, and flow monitoring results were somewhat similar.

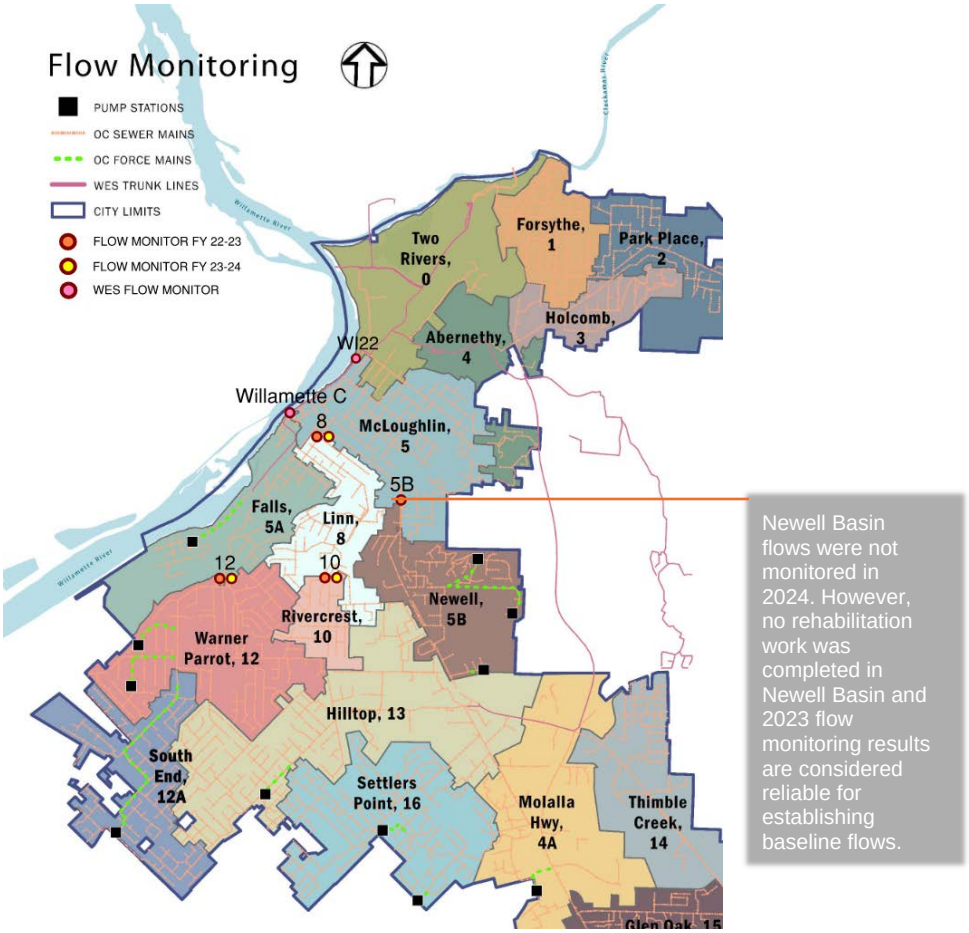


Figure 4.1: Flow Monitoring Map

Table 2: Flow Monitoring Summary

	2023	2024
Peak Event Date	4/10/2023	2/29/2024
Peak 24 hr Total Rainfall (inch)	1.16	1.51
Total Storm Duration[a] (hr)	91	204
Newell (5B) Basin Flow (mgd)	1.23	Not monitored
Linn (8) Basin Flow (mgd)	3.00	3.00
Rivercrest (10) Basin Flow (mgd)	0.60	0.68
Warner Parrot (12) Basin Flow (mgd)	4.58[b]	2.56

1. Note: the unit mgd is million gallons per day
2. [a]Storm duration measured from the first rain after 24 hr dry period to last rain before 24 hr dry period
3. [b]The accuracy of the 2023 Basin 12 flow is being analyzed

A brief overview of the 2024 findings are:

- **Newell Basin** information from 2023 is good quality and will be used as the baseline for pre-I&I Reduction Program flows.
- **Linn Basin** peak flows did not change between the 2023 and 2024 peak storm events, and were relatively similar overall for both monitoring periods, despite the higher intensity of the 2024 storm event. Linn Basin 2024 peak sewer flows indicate the I&I repairs completed as part of the Linn Basin I&I Rehab Project 1 successfully removed some amount of I&I from the system.
- **Rivercrest Basin** peak flows from the 2023 peak storm even were slightly higher than those from the 2024 peak storm event. As no work was completed in the Rivercrest Basin between 2023 and 2024, these flow monitoring results provide a baseline expectation for 2023 and 2024 peak storm event flows relative to each other.
- **Warner Parrot Basin** peak flows were lower in 2024 than the 2023 peak flows, despite the lack of I&I rehabilitation work in the basin. The 2023 and 2024 measurements from this monitor are being analyzed for accuracy, but preliminary review of the data indicates that the 2024 monitoring results better match 2024 downstream WES monitoring data than the 2023 monitoring results. The baseline flow from this area will be determined after this analysis using the flow results found to be most reliable.

The Linn Basin is the first basin that was monitored before and after rehabilitation work – winter 2024 monitoring took place after completion of approximately 50% of Linn I&I Rehab Project 1. Work in the Linn Basin included mainline sewer rehabilitation and lateral rehabilitation covering approximately ¼ of the basin. Flow monitoring results in the basin are shown in Figures 4.3 through 4., along with monitoring results from the Rivercrest Basin from the same period to show a baseline basin flow response (note that the Linn Basin flows include flow from Rivercrest Basin, which is upstream of the Linn Basin flow meter). The peak Linn Basin flow rate observed in 2024 was nearly identical to the 2023 flow rate, while the Rivercrest Basin flow rate increased slightly from 2023 to 2024.

The slight increase in Rivercrest Basin flows between the two years can be explained by certain differences in the otherwise similar 2023 and 2024 storms. While both storms had similar total rainfall depths, the 2024 storm's rainfall intensity was greater, meaning more rainfall fell over a shorter period of time (*see Figure 4.2: Cumulative Rainfall, 2023 and 2024 Peak Rain Events)*. Typically, I&I increases with greater rainfall intensity, matching what was observed in the Rivercrest Basin. Since the Linn Basin peak flow rate did not increase from 2023 to 2024, this indicates that the rehabilitation work reduced I&I in the basin.

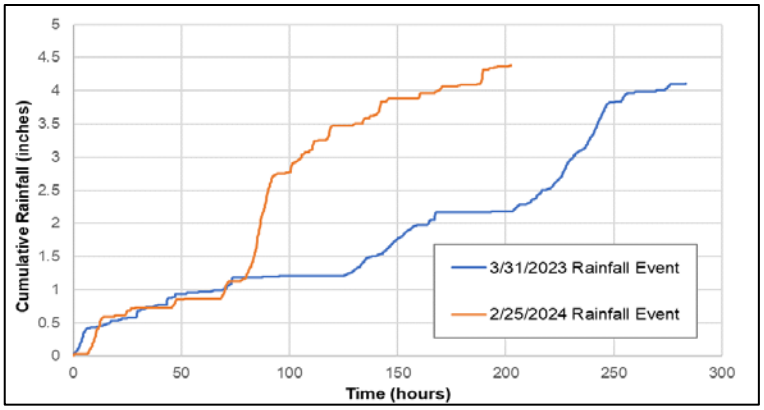


**Figure 4.2: Cumulative Rainfall,
2023 and 2024 Peak Rain Events**

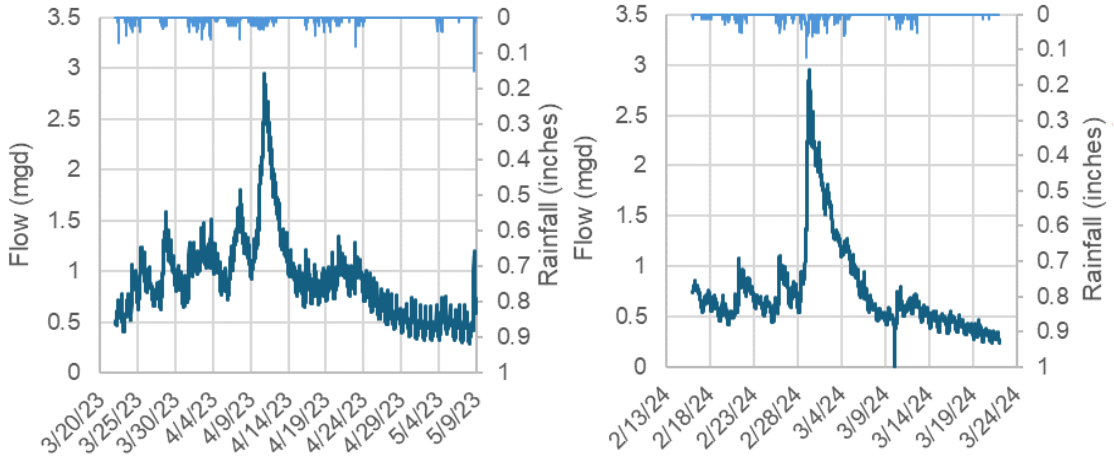


Figure 4.3: Rivercrest/Linn Basin 2023 to 2024 Comparison

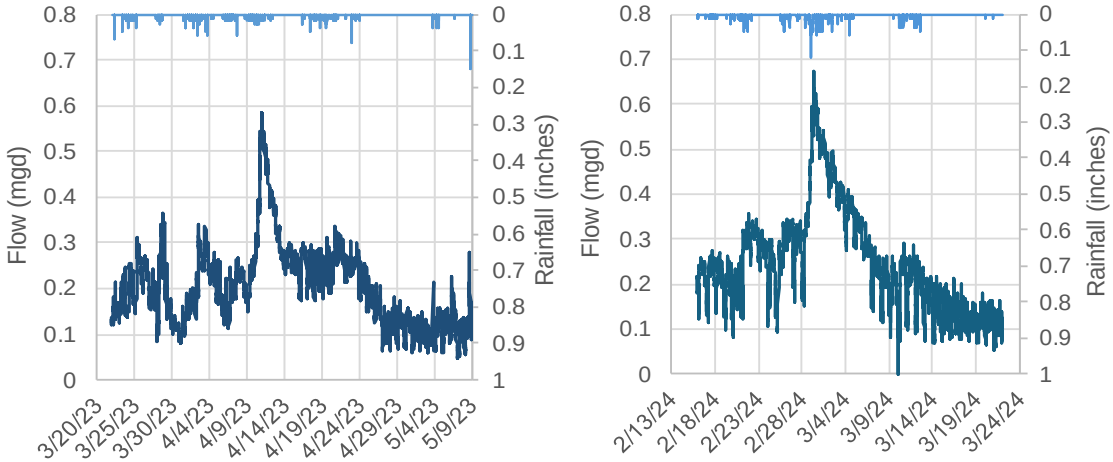


Figure 4.4: Rivercrest Basin 2023 to 2024 Comparison

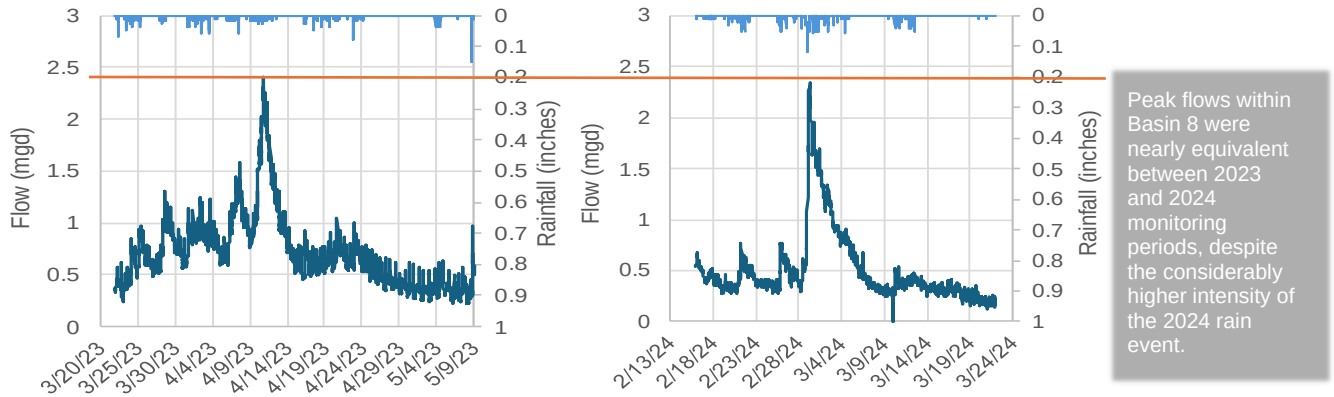


Figure 4.5: Isolated Linn Basin Flow 2023 to 2024 Comparison

Over the next few months, additional analysis of the flow monitoring results will be completed to help guide ongoing flow monitoring and hydraulic modeling work. Work will continue on the hydraulic model, which will project peak flows in each basin during 5-year and 10-year storm events once fully updated. This information will be critical to determine progress towards the I&I reduction goals.

Work is currently ongoing to quantify the I&I reduction as it relates to the overall I&I Reduction Program goals. However, the qualitative results from the Linn Basin repairs completed this year are encouraging and indicate the program's wholistic rehabilitation approach is effective at reducing I&I. Metrics for comparing flow data between years are currently being developed, and a more comprehensive analysis of the 2023 and 2024 flow monitoring data is ongoing. A more detailed report summarizing the 2023 and 2024 flow monitoring data and quantifying the I&I reduction will be submitted to Oregon City by the next annual report.

SECTION 5: BUDGET

Wallis oversaw a budget of over $2,977,231.08 in FY 23-24. This budget covers Wallis Engineering and the work of several other firms hired to support the Oregon City I&I Reduction Program efforts. The Annual Report is issued prior to the close of the fiscal year, which runs from July 1st through June 30th, in Oregon City. The budget numbers in this document reflect accounting numbers through May 2024.

The Wallis Engineering billed portion of the budget is shown below. This is the program cost for Wallis Engineering to perform investigation, design, construction, administration, and public outreach portions of the I&I Reduction Program. The Wallis Engineering budget breakdown by task item is shown below in *Figure 5.1 Wallis Engineering Program Billed Expenses* .

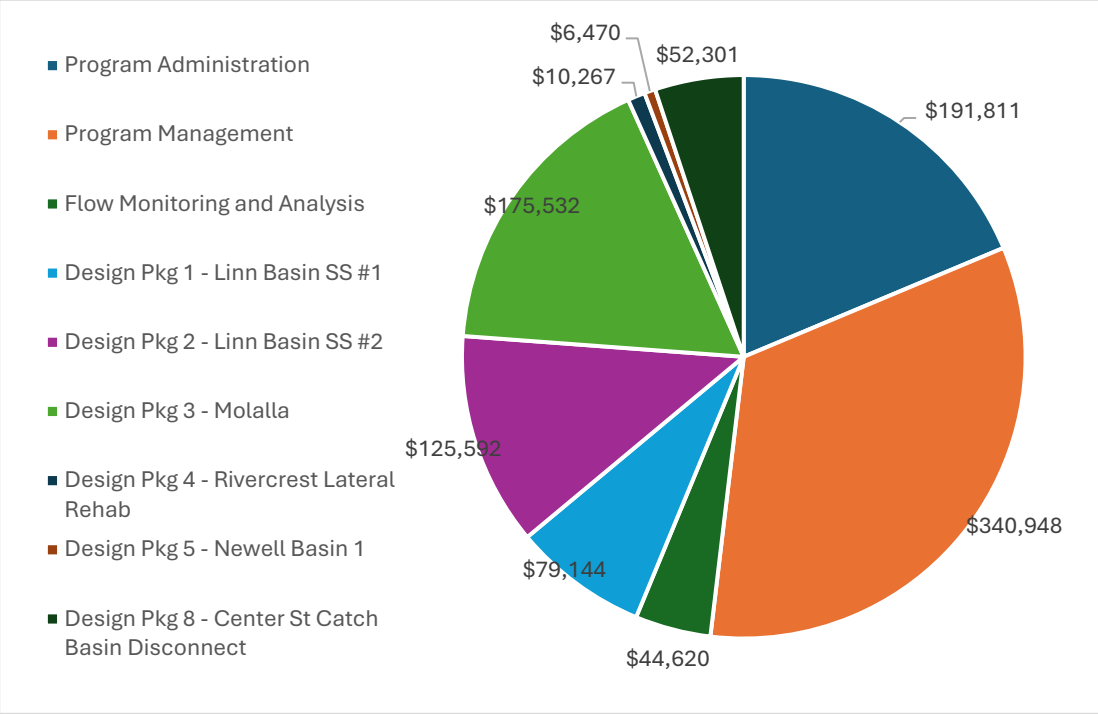


Figure 5.1: Wallis Engineering Program Billed Expenses

These are the Wallis Engineering budget expenses to date:

Table 3: I&I Reduction Program Budget Costs

	FY 23-24 (contracted)	FY 23-24 (billed)
Program Administration	**$210,751**	**$ 191,810**
Program Management	**$612,672**	**$340,948**
Flow Monitoring	**$21,430**	**$44,620**
Linn Basin 1 – CI 23-001	**$5,925**	**$79,144**
Linn Basin 2 – CI 23-002	**$156,067**	**$125,592**
Molalla – CI 23-0013	**$362,490**	**$175,532**
Rivercrest 4 – CI 23-009	**$36,787**	**$10,267**
Newell Basin 1 – CI 23-012	**$250,098**	**$6,470**
Linn Basin 3 - CI 23-003	**$285,100**	**$0**
Singer Hill/McLoughlin 2 – No Number	**$0**	**$0**
Center St/CB Disconnect - CI 23-005	**$114,090**	**$52,301**
Total (through May 2024)	**$2,055,309**	**$1,026,686**

Though Wallis Engineering holds the prime contract for I&I Reduction Program management work with the City, the work of several engineering subcontractors support program efforts. In addition, several specialty subconsultants are necessary to package design efforts. There are also expenses such as mileage, materials, or permits.

The subcontractor and expense billed portion of the budget is shown below:

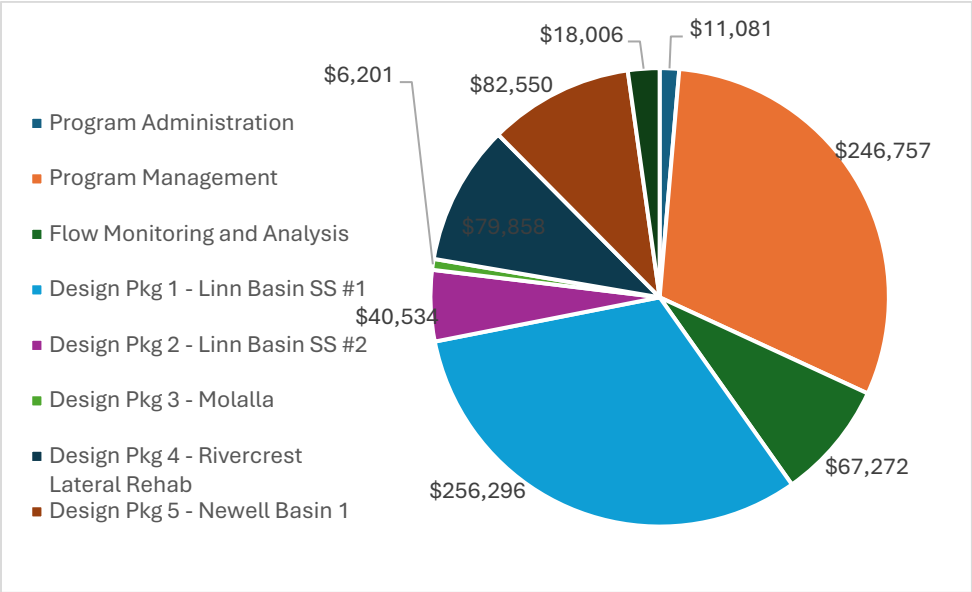


Figure 5.2: Program Subcontractor and Expense Billed Expenses

Table 4: Subcontractor Budget and Billed Expenses

	FY 23-24 (contracted)	FY 23-24 (billed)
Program Administration	$33,851	$11,081
Program Management	$466,441	$246,757
Flow Monitoring	$115,500	$67,272
Linn Basin 1 – CI 23-001	$288,921	$256,296
Linn Basin 2 – CI 23-002	$99,891	$40,534
Molalla – CI 23-0013	$120,115	$6,201
Rivercrest 4 – CI 23-009	$ 161,791	$79,858
Newell Basin 1 – CI 23-012	$394,791	$82,550
Linn Basin 3 - CI 23-003	$0	$0
Singer Hill/McLoughlin 2 No Number	$0	$0
Center St/CB Disconnect - CI 23-005	$67,010	$18,006
Total (through May 2024)	$1,748,412	$941,561

Overall, I&I Reduction Program expenses are expected to come in under budget at the end of the FY 2023-2024.

A full accounting of the I&I Reduction Program's expenditures is included in ***Appendix H***.

SECTION 6: FIVE YEAR PLAN

The Oregon City I&I Reduction Program is developed so that packages are designed ahead of construction (for construction within the summer months). Because the FY divides the construction season, packages are often designed in one FY and built the next FY. Several tasks, such as condition assessment activities such as CCTV and smoke testing will be a yearly effort. Flow monitoring will also be done yearly to assess program results.

A five year plan was developed; with a high level budget and schedule. This plan is summarized below, and included in ***Appendix I***. Manhole Rehabilitation will be an annual task. The plan presented is a continuation of the five year plan started in FY 22-23, and includes tentative budgets and proposed project packages for the next three years.

FY 24-25 - tentative budget of $15M for design and construction will be focused on:

- Linn Basin 2
- Newell Basin 1 - design only
- McLoughlin 1
- Linn Basin 3 – design
- Manhole Rehabilitation
- McLoughlin 2- design

FY 25-26 – tentative budget of $6M for design and construction will be focused on:

- Linn Basin 3 - construction
- McLoughlin 2 – design
- Manhole Rehabilitation

FY 26-27- tentative budget of $4M for construction will be focused on:

- Newell Basin 1 - construction
- McLoughlin 2 - construction
- Manhole Rehabilitation

FY 26-27 and beyond will be determined in the next year, as information is analyzed from flow monitoring and assessment program.

Five-Year Plan Schedule

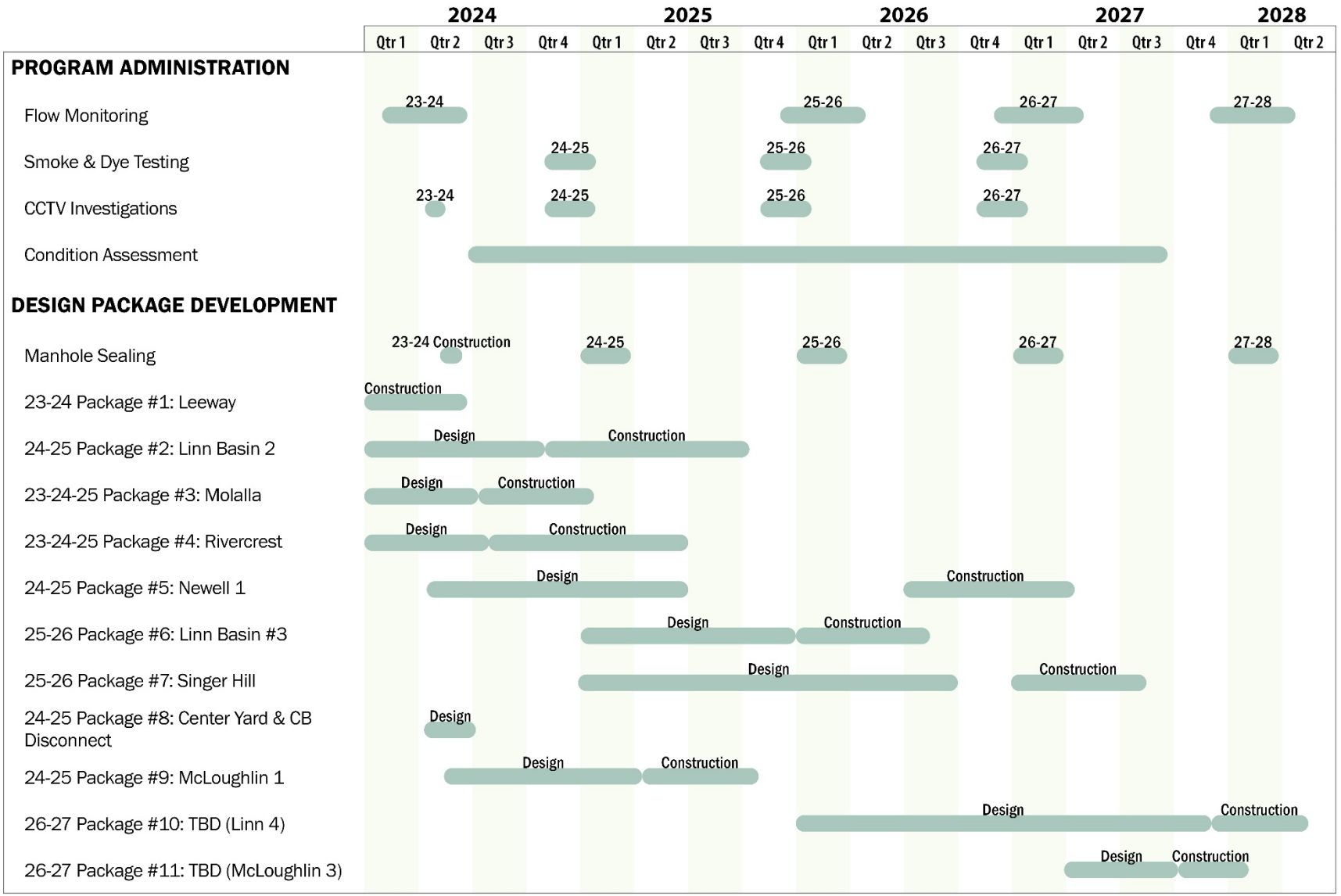


Figure 6.1: Five Year Plan Schedule

Appendices

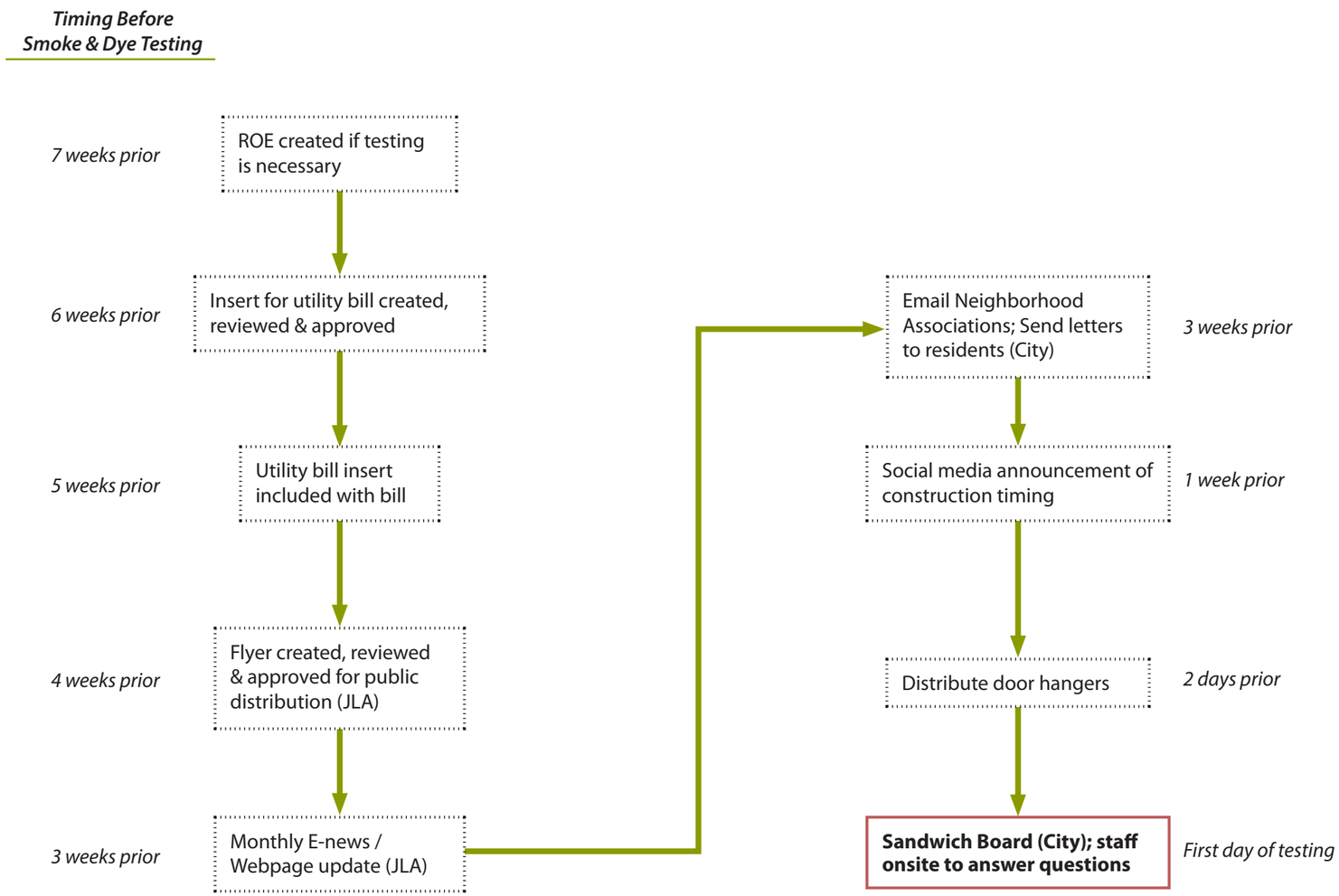
APPENDIX A: Contact List

	Task	Program Effort
Wallis Engineering, PLLC	**Program Management:** Jim Montgomery **Program Support:** Dave Brokaw	Phone: 360-852-9178 Email: jim.montgomery@Walliseng.net Phone: 360-852-9153 Email: dave.brokaw@Walliseng.net
Leeway Engineering Solutions	Rob Lee Zach Swartzendruber	rob.lee@leewayengineeringsolutions.com zach.swartzendruber@leewayengineeringsolutions.com
Keller Associates	Trevis Smith	tsmith@kellerassociates.com
Century West	Rawley Voorhies	rvoorhies@centurywest.com
Mackay Sposito	Mike Bayautet	mbayautet@mackaysposito.com
Compass	Don Devlaeminck	dond@compass-landsurveyors.com
GRI	Per Onsager	POnsager@gri.com
Morgen Holen & Assoc	Morgan Holen	morgan@mholen.com
Todd Prager & Assoc	Todd Prager	todd@toddprager.com
VacX	Jason Jones	jj@vacx.com
Pacific Int-r-Tek	Adam Scott	adam@tvmypipe.com
Pacific Habitat Services	John van Staveren	jvs@pacifichabitat.com
Greenworks	Mike Faha	mikef@greenworkspc.com
EPIC Land Solutions	Dave Nickerson	dnickerson@epicland.com
ADS	Brian Sheehy	bsheehy@idexcorp.com
AINW	Teresa Trost	teresa@ainw.com
Landis & Landis	Myke Landis	mlandis@llconstruction.com
Emagineered Solutions	Grant Waring	grant.w@emagineered.com

APPENDIX B: Public Outreach

Oregon City Inflow / Infiltration Program

Public Outreach — Smoke and Dye Testing Flow Chart



Oregon City Inflow / Infiltration Program

Public Outreach — CCTV Flow Chart

Timing Before Construction

Program Fact Sheet & ROE have been created

4 weeks prior — ROE sent (City)

Flyer Mailer created (JLA)

25th of month prior to start date — Monthly E-news / Webpage update (JLA)

3 weeks prior — Email drafted w/ or w/o Traffic Plan (JLA)

2 weeks prior — Email Neighborhood Associations; Send letters to residents (City)

1 week prior — Distribute door hangers

1 day prior — Social media announcement of construction timing

First day of construction — **Sandwich Board (City); staff onsite to answer questions**

Oregon City Inflow / Infiltration Program

Right of Entry (ROE) Process Flow Chart

Define Area ~6 months prior to bidding

Get addresses from OC GIS

Organize address list into 3 categories: Business, Apartment, Private Residence

Business

Prepare and send **ROE Docs—Business** to business owner

Is signed ROE received back?

YES → Add to **Signed ROE List**

NO → Is the person who received the letter the responsible party (check OC utilities)?

NO → Resend cover letter & docs to correct responsible party

YES → At ~4 months to bidding send 2nd cover letter & ROE

Is signed ROE returned within 3 weeks?

YES → Add to **Signed ROE List**

NO → Send via certified mail; is signed ROE received back?

YES → Add to **Signed ROE List**

NO → **Property laterals are not investigated or rehab'd**

Apartment

Prepare and send **ROE Docs—Apt** to apartment owner

Is signed ROE received back?

YES → Add to **Signed ROE List**

NO → At ~4 months to bidding send 2nd cover letter & ROE.

Is signed ROE returned within 3 weeks?

YES → Add to **Signed ROE List**

NO → Send via certified mail; is signed ROE received back?

YES → Add to **Signed ROE List**

NO → **Property laterals are not investigated or rehab'd**

Residence

Prepare and send **ROE Docs—Residence** to property owner

Is signed ROE received back?

YES → Add to **Signed ROE List**

NO → At ~4 months to bidding send 2nd cover letter & ROE.

Is signed ROE returned within 3 weeks?

YES → Add to **Signed ROE List**

NO → Add to list for door knocking; visit home with ROE Docs & ask owner to sign; did owner sign?

YES → Add to **Signed ROE List**

NO → Send via certified mail; is signed ROE received back?

YES → Add to **Signed ROE List**

NO → Add to **Contractor List**; did owner sign?

YES → Add to **Signed ROE List**

NO → **Property laterals are not investigated or rehab'd**

LEGEND

ROE Docs—Business. *Letter & ROE to be signed, including name & dates of project.*

ROE Docs—Apt. *Letter & ROE to apt owner — noting only an accessible main lateral (no branch lines) will be rehab'd. If not accessible, main lateral will be rehab'd to public ROW.*

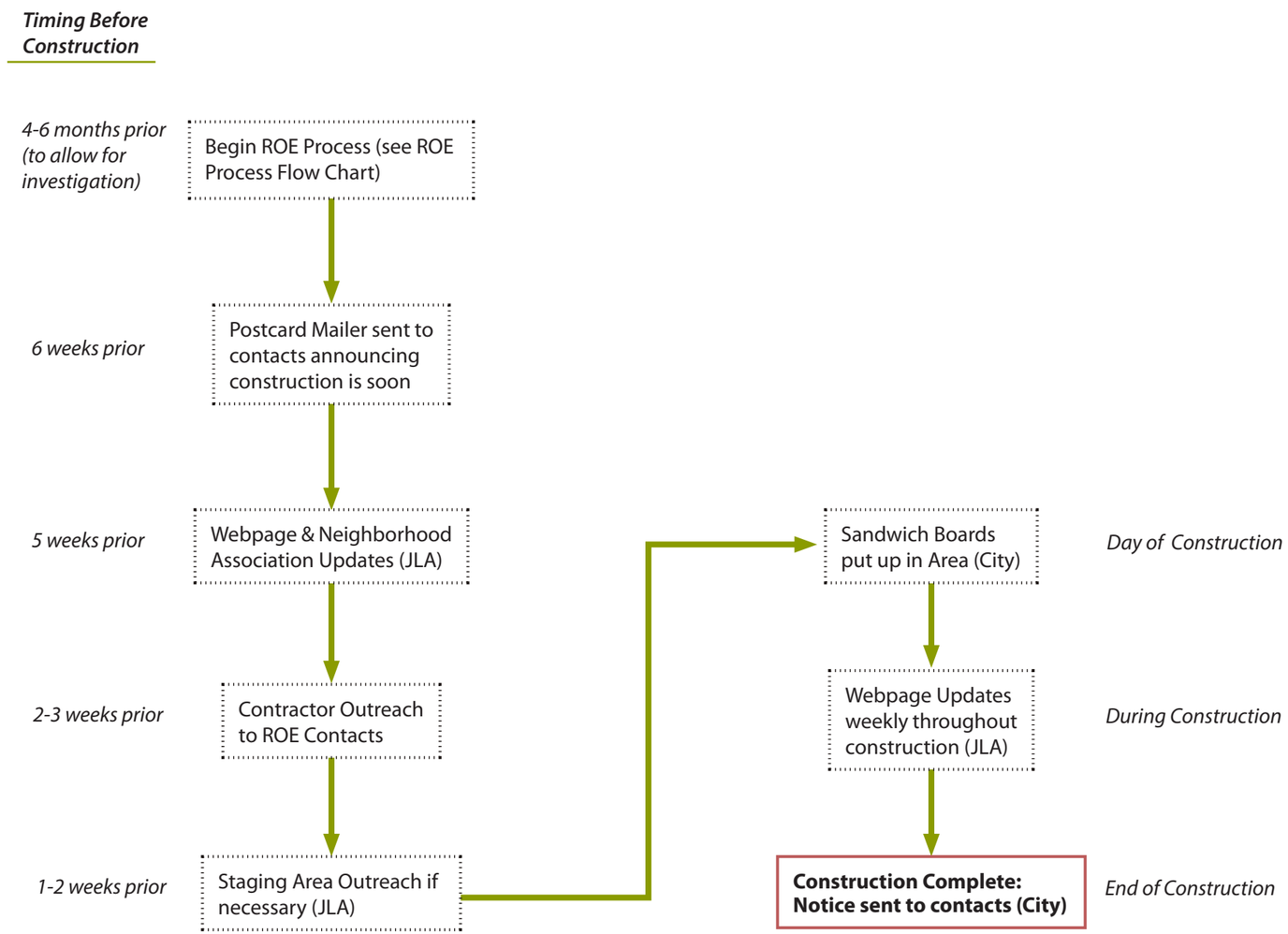
ROE Docs—Residence. *Letter & ROE to be signed, including name & dates of project.*

Signed ROE List. *Enter info into master spreadsheet, put ROE scan into Sharepoint ROE folder, & folder in Project ROE folder.*

Contractor List. *List of owners without a signed ROE.*

Oregon City Inflow / Infiltration Program

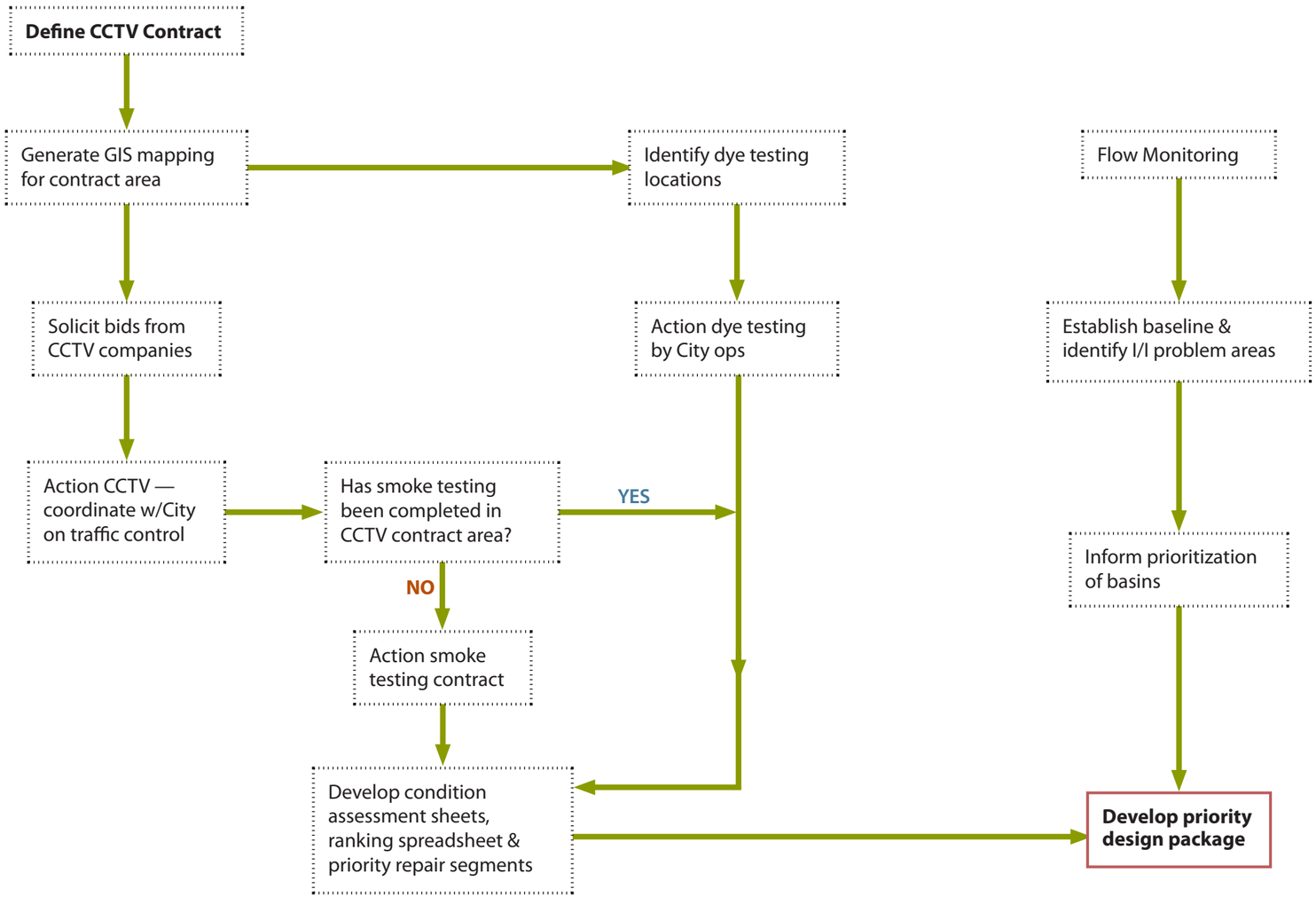
Public Outreach — Construction Flow Chart



APPENDIX C: CCTV Decision Flow Chart

Oregon City Inflow / Infiltration Program

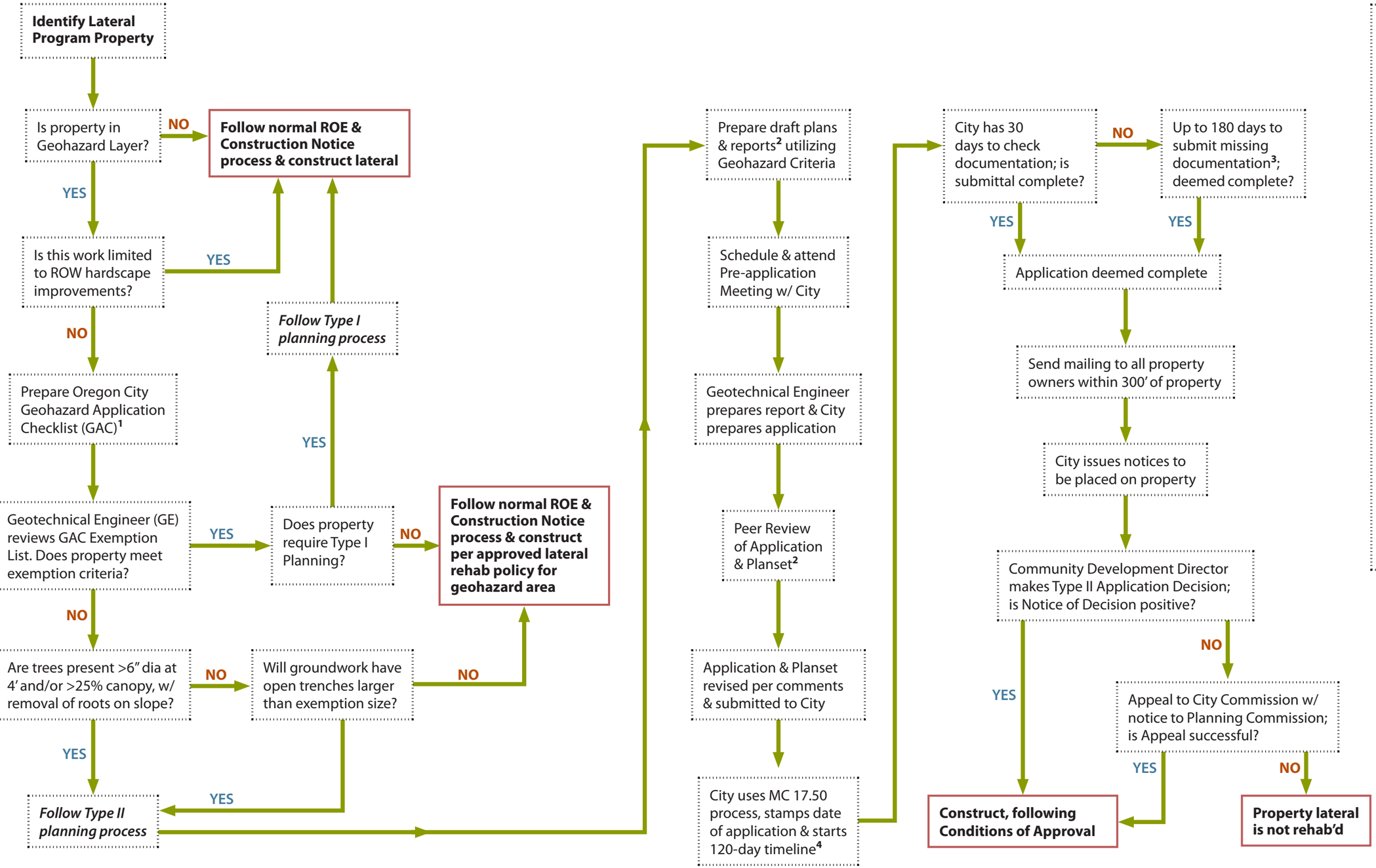
Condition Assessment Investigation and Package Development Process Flow Chart



APPENDIX D: Condition Assessment Investigation

Oregon City Inflow / Infiltration Program

Type II Application for Geologic Hazard Flow Chart



LEGEND

Assumptions

- Arborist has been hired & has identified affected trees
- Geotechnical Engineer (GE)has been hired & is on-call

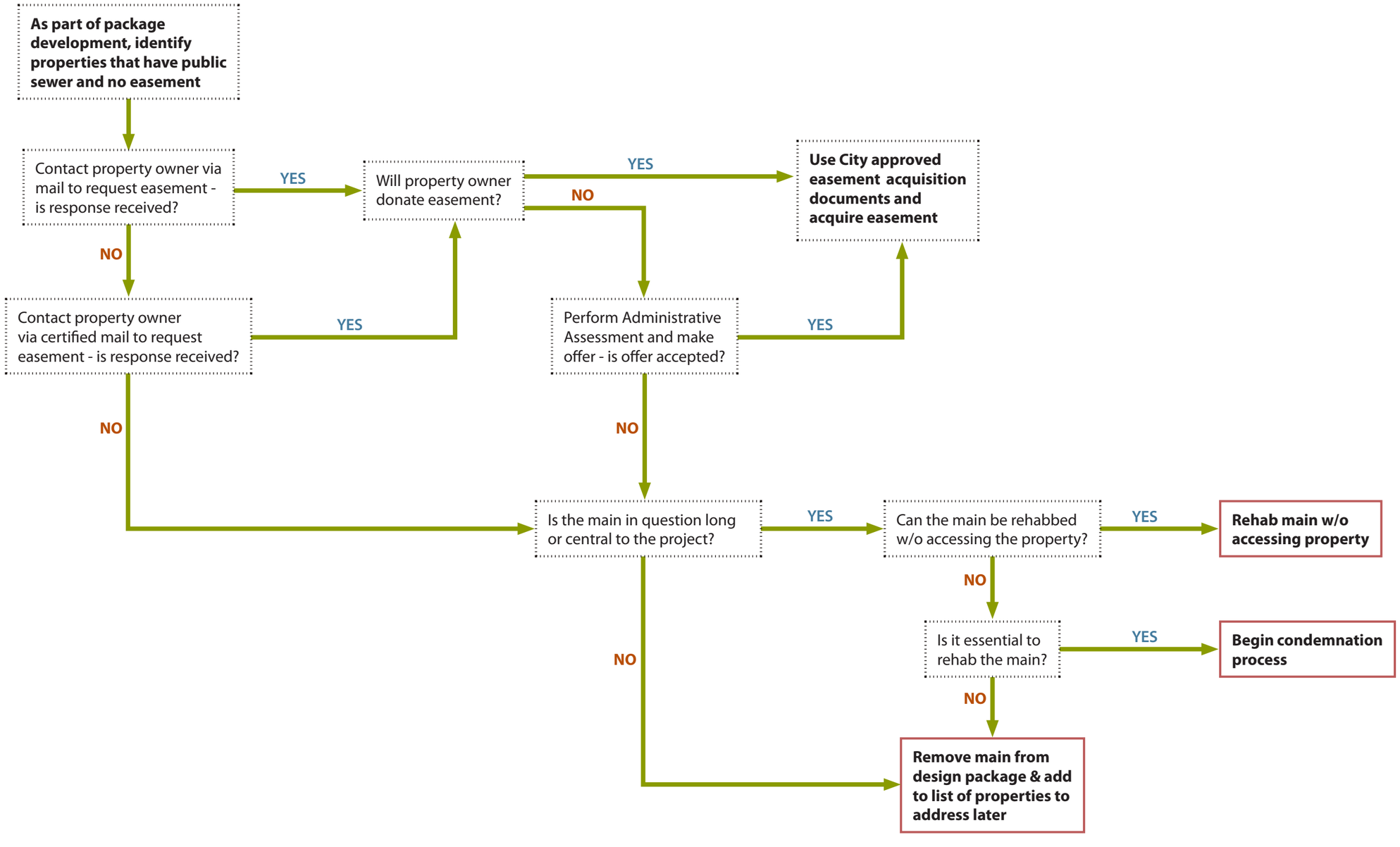
Notes

1. Geohazard Application Checklist (GAC) Exemption List:
   - Excavation is <2' or <25 yd^3
   - Fill is <2' depth or <25 yd^3
   - Utility Lines
   - Emergency actions
2. Planset & Reports Geohazard Criteria
   - See MC 17.44
3. Options to submit missing information:
   - Submit info
   - Submit some info & written notice of no more info to be submitted
   - Written notice that no more info will be submitted
4. Potential Delays to timeline:
   - Court actions
   - Inaccurate mailing labels for notice
   - Parts of permit outside City control
   - Other land use or comprehensive plan approvals needed for permit

APPENDIX E: Type II Application

Oregon City Inflow / Infiltration Program

Right-of-Way (ROW) Easement Acquisitions Flow Chart

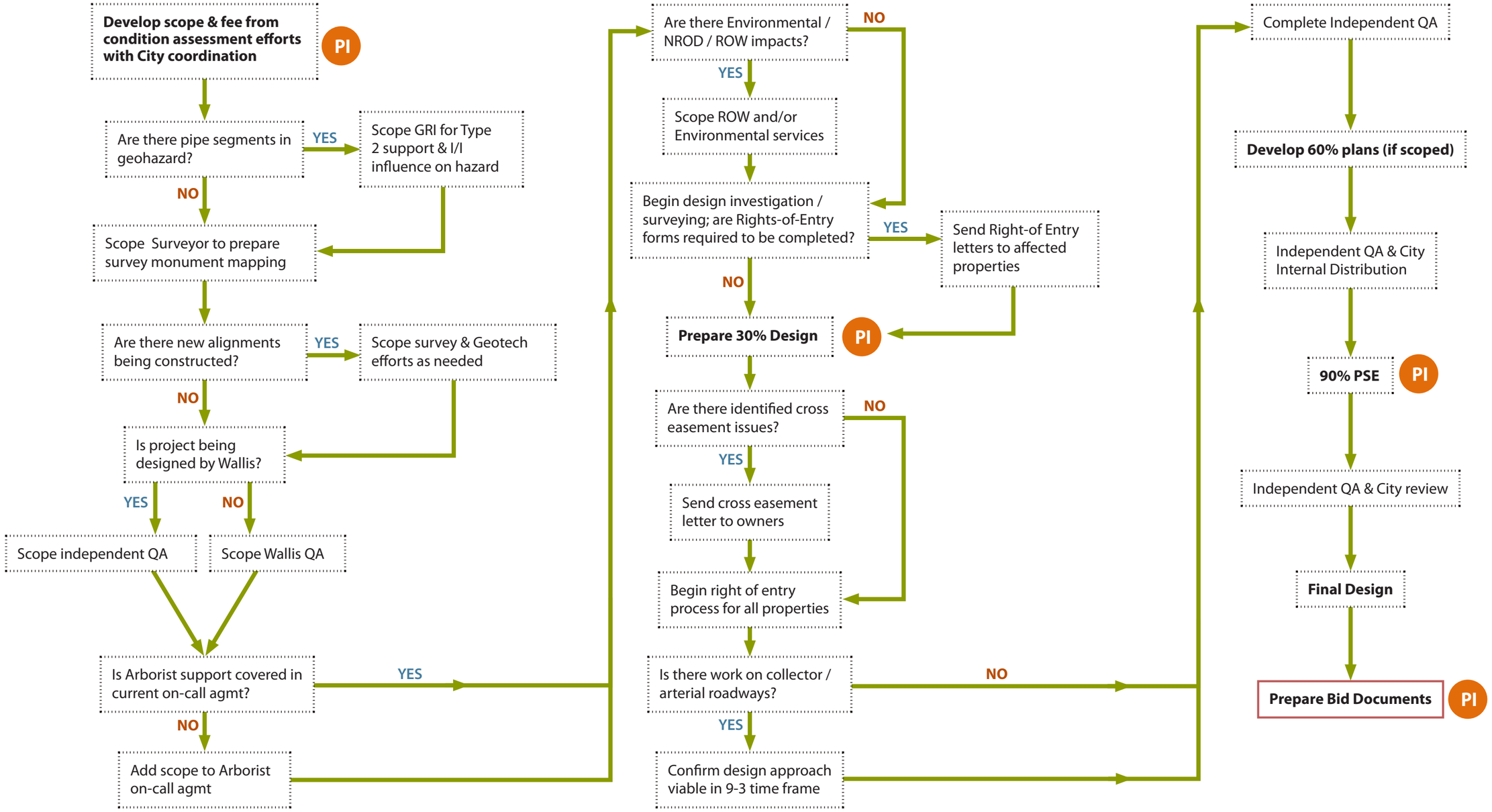


APPENDIX F: Project Delivery

Oregon City Inflow / Infiltration Program

Project Delivery Process Flow Chart

PI *Public involvement coordination / outreach points*



APPENDIX G: Flow Monitoring Report FY 22-23

Oregon City Flow and Rain Monitoring Report

Final Report Submitted to **Leeway Engineering Solutions, LLC**
May 30, 2023

ADS ENVIRONMENTAL SERVICES

340 The Bridge Street, Suite 204
Huntsville, AL 35806

800-633-7246
www.adsenv.com

Oregon City Flow and Rain Monitoring Report

Prepared For:

Yarrow Murphy, PE
Leeway Engineering Solutions, LLC
12597 NW Majestic Sequoia Way
Portland, Oregon 97229

Prepared By:

ADS, LLC
846 Industry Dr.
Tukwila, WA 98188

May 30, 2023

Yarrow Murphy, PE
Leeway Engineering Solutions, LLC
12597 NW Majestic Sequoia Way
Portland, Oregon 97229

SUBJECT: Oregon City Flow and Rain Monitoring Report

Dear Yarrow Murphy,

ADS is pleased to submit the report for the **Oregon City Flow and Rain Monitoring Report** completed on behalf of Leeway Engineering Solutions, LLC. The metering was conducted at four (4) locations. The study was conducted during the period of Wednesday, 22 March 2023 to Monday, 08 May 2023.

The report contains depth, velocity, and quantity hydrographs as well as daily long tables for the metering period. An Excel file containing depth, quantity, and velocity entities for the monitoring location in 5-minute format was provided previously.

In addition, we would be happy to further explain any details about the report that may seem unclear. Should you have any questions or comments, you may contact the Project Manager, Sean Winder at 206.423.3453.

It has been our pleasure to be of service to you in the performance of this project. Thank you for choosing ADS products and services to meet your flow monitoring needs.

Sincerely,
ADS ENVIRONMENTAL SERVICES

Tyler Bui
Hydraulic Data Analyst

Scope and Methodology

Introduction

Leeway Engineering Solutions, LLC entered into an agreement with ADS Environmental Services to conduct flow monitoring at (4) four locations in the Oregon City, OR Sanitary Collection System. The study was scheduled for a period of (6) six weeks. Once in place, the flow monitoring equipment was to be used to measure depth, velocity, and to quantify flows. The objective of this study was to assist Oregon City in monitoring flows in its wastewater system as part of the city's effort to reduce infiltration and inflow in its collection system. This data will be used to calibrate the existing hydrologic and hydraulic model to reassess I/I rates following rehabilitation construction projects.

Project Scope

The scope of this study involved using a flow monitor to quantify wastewater flow at the designated locations for the study period. Specifically, the study included the following key components.

- Investigate the proposed flow-monitoring site for adequate hydraulic conditions
- Flow monitor installation
- Flow monitor confirmations and data collections
- Flow data analysis

Equipment installation was completed on March 21, 2023. The monitoring period began on March 22, 2023, and was completed on May 08, 2023. Upon completion of the study, equipment was removed from the system.

Flow Monitoring Equipment

The ***ADS FlowShark Triton*** monitor was selected for this project. This flow monitor is an area velocity flow monitor that uses both the Continuity and Manning's equations to measure flow.

The ADS FlowShark Triton monitor consists of data acquisition sensors and a battery-powered microcomputer. The microcomputer includes a processor unit, data storage, and an on-board clock to control and synchronize the sensor recordings. The monitor was programmed to acquire and store depth of flow and velocity readings at 5-minute intervals.

The FS Triton monitor features cross-checking using multiple technologies in each sensor for continuous running of comparisons and tolerances. The FS Triton monitor can support two (2) sets of sensors. The sensor option used for this project was:

The Peak Combo Sensor installed at the bottom of the pipe includes three types of data acquisition technologies.

The ***up looking ultrasonic depth*** uses sound waves from two independent transceivers to measure the distance from the sensor upward toward the flow surface; applying the speed of sound in the water and the temperature measured by sensor to calculate depth.

The ***pressure depth*** is calculated by using a piezo-resistive crystal to determine the difference between hydrostatic and atmospheric pressure. The pressure sensor is temperature compensated and vented to the atmosphere through a desiccant filled breather tube.

To obtain ***peak velocity*****,** the sensor sends an ultrasonic signal at an angle upward through the widest cross-section of the oncoming flow. The signal is reflected by suspended particles, air bubbles, or organic matter with a frequency shift proportional to the velocity of the reflecting objects. The reflected signal is received by the sensor and processed using digital spectrum analysis to determine the peak flow velocity.

Installation

Installation of flow monitoring equipment typically proceeds in four steps. First, the site is investigated for safety and to determine physical and hydraulic suitability for the flow monitoring equipment. Second, the equipment is physically installed at the selected location. Third, the monitor is tested to assure proper operation of the velocity and depth of flow sensors and verify that the monitor clock is operational and synchronized to the master computer clock. Fourth, the depth and velocity sensors are confirmed and line confirmations are performed.

In pipes up to 42 inches in diameter, the sensors were mounted on expandable stainless-steel rings, inserted at least a foot upstream into influent pipes and tightened against the inside walls of the pipes. Influent pipe installations reduce the influences of turbulence and backwater often caused by changes in channel geometry in manholes.

Data Collection, Confirmation, and Quality Assurance

Data collects were done remotely via wireless connect on a weekly basis. As needed, during the monitoring period, field crews visit each monitoring location to verify proper monitor operation and document field conditions. The following quality assurance steps are taken to assure the integrity of the collected data:

Measure power supplies: monitors were powered by dry cell battery packs. Voltages were recorded and battery packs replaced, as necessary. Separate batteries provided back-up power to memory allowing primary batteries to be replaced without loss of data.

Clock synchronization: Field crews synchronized monitor clocks to master clocks.

Confirm depth and velocity readings: Field crews descended into meter manholes to manually measure depths and velocities and compare the meter readings to confirm that they agreed. The site met the criteria for confirmation for depth and velocity unless noted otherwise in the site commentary section. They also measured silt levels, if any, in the inverts of the pipes. Silt areas were subtracted from flow areas to compute true areas of flow.

Confirm average velocities through cross-sectional velocity profiles: Since ADS velocity sensors measure peak velocity, field crews collected cross-sectional velocity profiles in order to develop a relationship between peak and average velocity in lines that meet the hydraulic criteria.

Upload and Review Data: Data collected from the monitors were uploaded and reviewed by a Data Analyst for completeness, outliers and deviations in the flow patterns, which indicate system anomalies or equipment failure.

Flow Quantification Methods

There are two main equations used to measure open channel flow: the ***Continuity Equation*** and the ***Manning Equation.*** The Continuity Equation, which is considered the most accurate, can be used if both depth of flow and velocity are available. In cases where velocity measurements are not available or not practical to obtain, the Manning Equation can be used to estimate velocity from the depth data based on certain physical characteristics of the pipe (i.e. the slope and roughness of the pipe being measured). However, the Manning equation assumes uniform, steady flow hydraulic conditions with non-varying roughness, which are typically invalid assumptions in most sanitary sewers. The Continuity Equation was used exclusively for this study.

Continuity Equation

The Continuity Equation states that the flow quantity (Q) is equal to the wetted area (A) multiplied by the average velocity (V) of the flow.

ORC_S10

Site Commentary

SITE INFORMATION

Pipe	Elliptical (9.75 in H x 9.5 in W)
Silt	0.00 (in)

OBSERVATIONS

This site functioned under normal conditions during the study period. No surcharge conditions were experienced at this location.

This site is located upstream of site ORC_S5B. A normal net flow was recorded between the sites.

5-min flow depth, velocity, and quantity data observed during **Wednesday, 22 March 2023 to Monday, 08 May 2023**, along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	**DFINAL (in)**	**VFINAL (ft/s)**	**QFINAL (MGD - Total MG)**
Average	2.19	3.55	0.200
Minimum	1.33	1.00	0.044
Maximum	3.54	6.31	0.604
Min Time	03/30/2023 21:45:00	05/06/2023 22:40:00	05/07/2023 06:50:00
Max Time	03/23/2023 19:35:00	04/10/2023 20:35:00	04/10/2023 23:25:00

Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Values in the Observed Flow Conditions and data on the graphical reports are based on the 5-min average.

DATA UPTIME

Data uptime observed during **Wednesday, 22 March 2023 to Monday, 08 May 2023** is provided in the following table:

Percent Uptime	
DFINAL (in)	100
VFINAL (ft/s)	100
QFINAL (MGD - Total MG)	100

OregonCity.LES.TFM.OR23		Site Name
Flow Monitoring Site Report	ADS ENVIRONMENTAL SERVICES	ORC_S10

Site Address /Location:	Park Dr and Linn Ave			Monitor Series	Location Type
				TRITON+	Temporary
Site Access Details:	Off road cone around	Latitude:	45.3445061	Pipe Size (H x W)	Pipe Shape
		Longitude:	-122.6050458	9.75 X 9.50	Elliptical

Manhole #	System Characteristics
#10896	Commercial
Access	Traffic
Drive	Light

ADS Project Name:	OregonCity.LES.TFM.OR23
ADS Project Number:	22910.11.325

Installation Information

Installation Date:	Installation Type:
3.20.23	Doppler Standard Ring and Crank
Monitoring Location (Sensors):	Monitor Location:
Upstream 0-5 FT	Manhole
Sensors / Devices:	Pressure Sensor Range (psi)
Peak Combo (CS4), Smart Depth (CS5)	0 - 5 psi

Installation Confirmation:

Time	
12:29:00 PM	
Depth of Flow (Wet DOF) (in)	
2.13	
CS5 Physical Offset (in)	Measurement Confidence (in)
1.38	0.25"
Peak Velocity (fps)	Velocity Sensor Offset (in)
4.05	N/A
Silt (in)	Silt Type
0	

Manhole / Pipe Information:

Manhole Depth (Approx. FT):	Manhole Configuration
8"	Single
Manhole Material:	Manhole Condition:
Concrete	Good
Manhole Opening Diameter (in)	Manhole Diameter (Approx.):
24	26
Manhole Cover	Manhole Frame
Steel	Normal
Active Connections	Air Quality:
Yes, Inside	Normal
Pipe Material	Pipe Condition:
Concrete	Good

Communication Information:

Communication Type	Antenna Location
Wireless	Manhole Pick / Vent Hole

Additional Site Info. / Comments:

Additional Photos

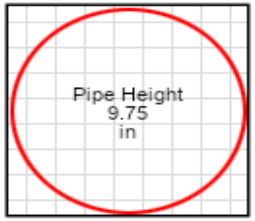
Monitoring Point	Outlet	South Line (Side Line)
		
Top Down	**Location**	**other line**
		
other line	**KEY**	**Sewer map**
	Flow Direction Monitoring Point	

Hydrograph Report

ORC_S10

Flow Monitor

ORC_S10



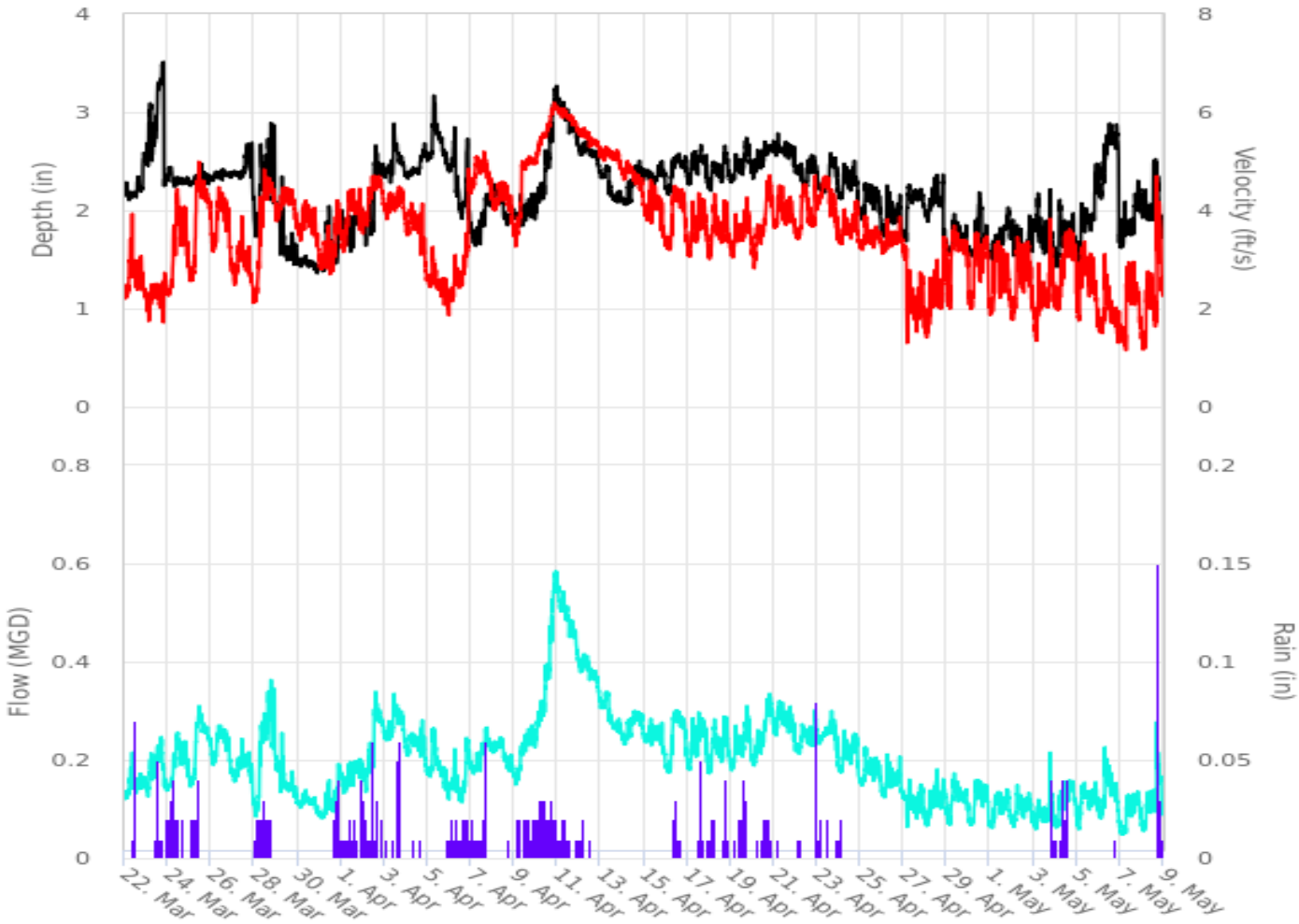
Report Period

03/22/2023
To
05/08/2023

Legend

DFINAL
VFINAL
QFINAL
RAIN FINAL

ADS ENVIRONMENTAL SERVICES



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Huntsville, AL 35806

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Scattergraph Report

ORC_S10

Flow Monitor

ORC_S10

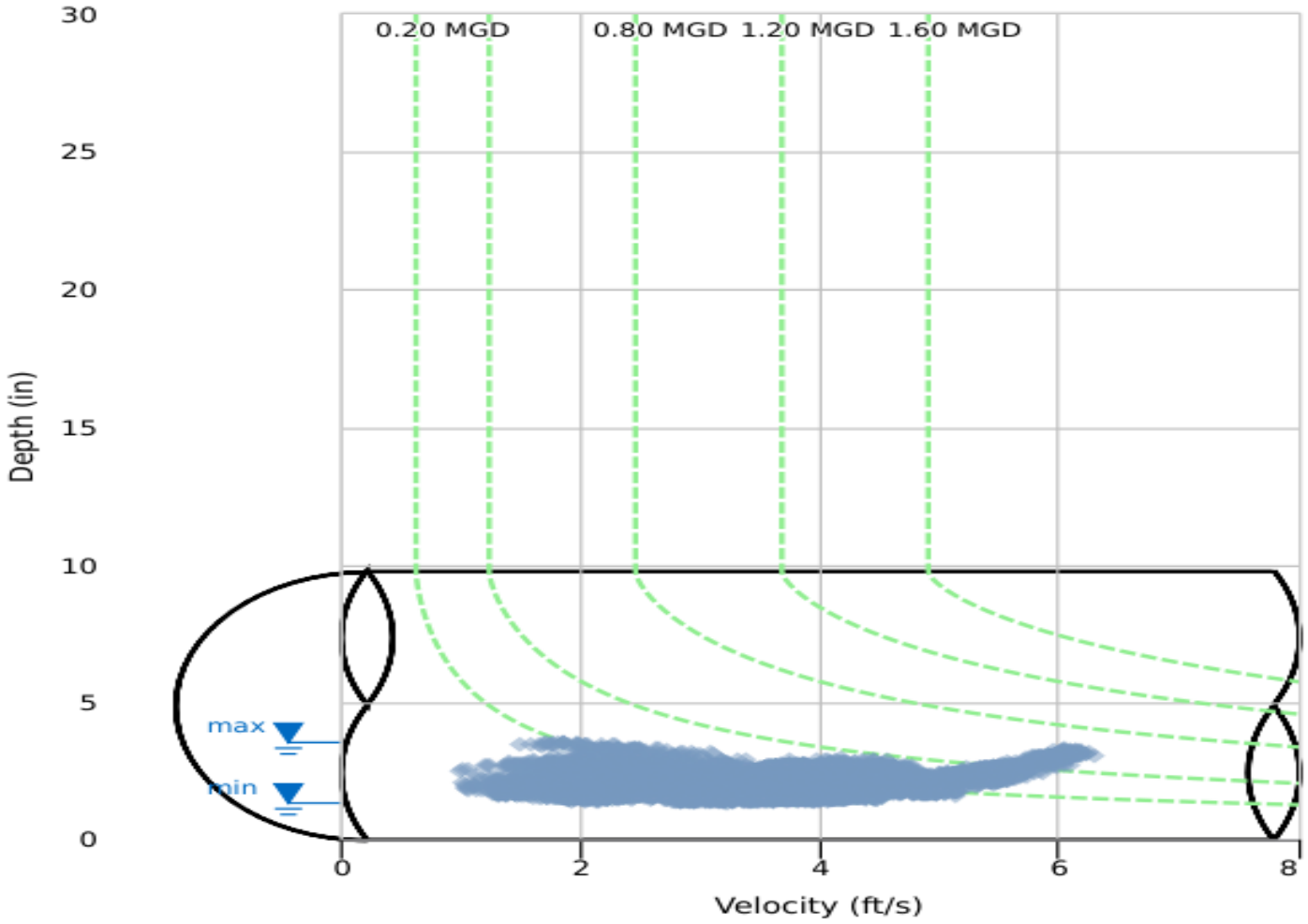
Pipe Height
9.75
in

Report Period

03/22/2023
To
05/08/2023

Legend

- DFINAL - VFINAL
- Iso-Q™
- Min-Max Depth



340 The Bridge Street, Suite 204
Huntsville, AL 35806

800-633-7246
www.adsenv.com

Daily Tabular Report

03/22/2023 00:00 - 05/08/2023 23:59
ORC_S10Pipe: Elliptical (9.75 in H x 9.5 in W), Silt0.00 in

	DFINAL (in)					VFINAL (ft/s)					QFINAL (MGD - Total MG)						RAIN FINAL (in)
Date	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
03/22/2023	05:05	2.09	21:15	2.61	2.25	02:55	2.05	08:35	4.22	2.62	02:25	0.112	08:35	0.233	0.149	0.149	0.16
03/23/2023	19:45	2.20	19:35	3.54	2.85	19:10	1.48	19:40	3.09	2.27	02:00	0.114	17:15	0.263	0.179	0.179	0.24
03/24/2023	07:30	2.22	03:15	2.45	2.31	01:00	2.10	10:30	4.58	3.35	02:05	0.133	11:20	0.264	0.198	0.198	0.34
03/25/2023	01:05	2.24	13:10	2.50	2.33	03:40	2.49	10:25	5.09	3.92	02:55	0.143	10:55	0.335	0.236	0.236	0.34
03/26/2023	02:25	2.27	13:35	2.43	2.36	22:45	2.63	08:30	4.59	3.73	22:40	0.164	08:30	0.275	0.228	0.228	-
03/27/2023	23:55	1.93	16:25	2.83	2.41	22:50	2.04	10:05	4.13	2.89	23:55	0.106	10:05	0.258	0.182	0.182	0.01
03/28/2023	01:55	1.72	22:10	2.96	2.25	01:50	2.01	10:50	5.88	3.87	01:50	0.079	18:15	0.372	0.228	0.228	0.63
03/29/2023	19:55	1.42	06:40	2.60	1.69	23:45	3.54	08:05	4.60	4.13	23:25	0.109	06:40	0.290	0.156	0.156	-
03/30/2023	21:45	1.33	09:05	1.55	1.45	23:50	2.95	08:55	4.47	3.71	21:45	0.086	09:00	0.142	0.113	0.113	-
03/31/2023	04:25	1.36	10:55	2.17	1.63	11:35	2.49	20:15	4.30	3.27	02:55	0.080	21:25	0.198	0.119	0.119	0.43
04/01/2023	10:55	1.55	22:30	2.04	1.85	01:40	3.09	20:55	4.54	3.89	04:55	0.126	22:30	0.215	0.168	0.168	0.28
04/02/2023	03:35	1.62	15:40	2.71	2.15	00:30	3.33	13:05	4.87	4.27	03:35	0.129	14:40	0.346	0.231	0.231	0.25
04/03/2023	07:00	2.27	10:45	2.89	2.49	06:00	3.08	16:40	4.60	4.15	06:00	0.189	11:10	0.337	0.272	0.272	0.23
04/04/2023	02:30	2.32	20:55	2.70	2.45	23:35	2.42	18:15	4.27	3.59	23:35	0.160	18:15	0.290	0.230	0.230	0.02
04/05/2023	23:00	2.38	06:50	3.19	2.68	23:45	1.74	06:00	3.39	2.51	23:45	0.112	06:50	0.286	0.184	0.184	0.05
04/06/2023	21:25	1.68	06:05	2.86	2.26	03:20	2.01	21:25	4.88	2.86	14:15	0.103	19:15	0.270	0.163	0.163	0.58
04/07/2023	05:45	1.62	18:10	2.18	1.90	23:40	4.15	14:45	5.29	4.76	03:25	0.168	16:20	0.272	0.213	0.213	0.33
04/08/2023	16:55	1.84	08:55	2.30	2.05	23:10	3.48	10:40	4.77	4.20	23:10	0.164	10:40	0.252	0.211	0.211	0.01
04/09/2023	09:20	1.83	20:05	2.21	1.99	01:50	3.10	16:25	5.18	4.52	01:50	0.142	19:45	0.283	0.218	0.218	0.49
04/10/2023	00:15	1.93	23:25	3.36	2.53	00:15	4.87	20:35	6.31	5.65	00:15	0.223	23:25	0.604	0.387	0.387	1.16
04/11/2023	13:25	2.62	01:15	3.23	2.92	23:50	5.51	00:00	6.18	5.89	23:55	0.395	00:00	0.576	0.485	0.485	0.18
04/12/2023	23:55	2.35	09:15	2.72	2.58	22:45	5.03	06:00	5.76	5.46	23:55	0.313	05:45	0.421	0.378	0.378	0.10
04/13/2023	09:20	2.04	08:10	2.49	2.24	23:15	4.74	05:20	5.35	5.10	22:20	0.247	08:10	0.352	0.289	0.289	-
04/14/2023	03:25	2.04	19:05	2.53	2.27	23:50	4.02	05:35	5.04	4.67	03:50	0.230	13:30	0.310	0.269	0.269	-
04/15/2023	23:55	2.23	19:15	2.56	2.37	23:45	3.26	12:20	4.71	4.08	23:45	0.187	07:45	0.290	0.250	0.250	-
04/16/2023	02:15	2.13	14:55	2.60	2.41	05:15	3.09	10:55	4.67	3.91	05:15	0.166	12:10	0.312	0.248	0.248	0.26
04/17/2023	23:30	2.22	15:15	2.78	2.46	02:00	2.95	12:50	4.41	3.65	23:20	0.169	12:45	0.303	0.237	0.237	0.17
04/18/2023	02:05	2.15	18:05	2.68	2.41	00:50	2.89	17:05	4.59	3.58	01:00	0.165	17:05	0.325	0.226	0.226	0.24
04/19/2023	01:35	2.27	17:45	2.80	2.47	01:40	2.92	16:15	4.42	3.54	01:40	0.170	18:20	0.318	0.231	0.231	0.21
04/20/2023	01:10	2.31	23:35	2.73	2.54	02:30	2.65	20:15	4.77	3.77	02:30	0.177	20:15	0.345	0.256	0.256	0.36
04/21/2023	22:05	2.43	04:40	2.91	2.61	23:55	3.42	09:30	4.62	3.97	23:55	0.218	06:20	0.332	0.278	0.278	0.01
04/22/2023	10:00	2.19	20:50	2.68	2.39	04:15	3.33	22:15	4.77	3.94	04:30	0.203	21:50	0.312	0.245	0.245	0.25
04/23/2023	23:50	2.15	15:25	2.67	2.32	23:20	3.33	09:50	4.76	4.22	23:25	0.179	16:10	0.309	0.251	0.251	0.11
04/24/2023	23:50	1.92	17:40	2.53	2.26	23:55	3.23	20:15	4.27	3.64	23:50	0.152	06:35	0.269	0.210	0.210	0.03
04/25/2023	23:40	1.77	11:45	2.31	2.08	00:20	3.07	07:05	4.12	3.43	23:35	0.132	17:25	0.235	0.176	0.176	-
04/26/2023	03:00	1.64	05:40	2.32	1.94	00:15	2.93	06:25	4.21	3.41	23:35	0.117	06:25	0.236	0.158	0.158	-
04/27/2023	03:20	1.67	06:40	2.31	2.08	04:10	1.24	00:00	3.39	2.25	03:55	0.062	06:40	0.183	0.113	0.113	-
04/28/2023	23:55	1.58	20:05	2.53	2.04	01:50	1.35	20:30	3.59	2.36	01:50	0.061	13:20	0.201	0.116	0.116	-
04/29/2023	02:50	1.53	13:40	2.03	1.70	02:15	1.84	08:15	3.75	3.11	02:15	0.062	08:15	0.177	0.120	0.120	-
04/30/2023	23:45	1.51	12:05	2.19	1.73	23:25	1.79	09:30	3.82	2.86	23:25	0.059	09:30	0.175	0.113	0.113	-
05/01/2023	02:50	1.49	20:10	2.10	1.71	00:20	1.60	08:40	3.48	2.65	00:20	0.054	19:55	0.152	0.103	0.103	-
05/02/2023	02:25	1.53	10:30	2.14	1.69	01:30	1.68	06:15	3.56	2.72	02:20	0.062	06:15	0.162	0.102	0.102	-
05/03/2023	23:25	1.49	18:50	2.37	1.77	03:25	1.04	18:45	4.00	2.27	03:25	0.046	18:50	0.241	0.091	0.091	0.10
05/04/2023	02:20	1.41	05:20	2.14	1.74	02:50	1.72	15:10	3.79	2.92	02:50	0.058	15:10	0.185	0.117	0.117	0.30
05/05/2023	03:20	1.43	23:00	2.63	1.91	23:00	1.56	09:10	3.45	2.60	02:25	0.055	21:00	0.165	0.117	0.117	-
05/06/2023	23:20	1.58	20:20	2.92	2.53	22:40	1.00	07:30	3.18	1.88	23:35	0.059	07:35	0.233	0.129	0.129	0.01
05/07/2023	01:40	1.61	20:15	2.39	1.88	04:15	1.07	15:25	3.69	2.07	06:50	0.044	15:25	0.174	0.093	0.093	-
05/08/2023	16:10	1.42	15:40	2.63	2.04	04:40	1.01	17:10	5.04	2.32	03:05	0.048	17:10	0.313	0.115	0.115	0.43

03/22/2023 00:00 - 05/08/2023 23:59

	DFINAL (in)	VFINAL (ft/s)	QFINAL (MGD - Total MG)	RAIN FINAL (in)
Total			9.583	8.31
Average	2.19	3.55	0.200	

ORC_S12

Site Commentary

SITE INFORMATION

Pipe	Elliptical (24 in H x 24.5 in W)
Silt	0.00 (in)

OBSERVATIONS

This site functioned under normal conditions during the study period. No surcharge conditions were experienced at this location.

5-min flow depth, velocity, and quantity data observed during **Wednesday, 22 March 2023 to Monday, 08 May 2023**, along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	**DFINAL (in)**	**VFINAL (ft/s)**	**QFINAL (MGD - Total MG)**
Average	5.09	5.33	1.765
Minimum	2.64	4.21	0.522
Maximum	8.56	7.06	4.580
Min Time	05/08/2023 02:55:00	05/08/2023 02:55:00	05/08/2023 02:55:00
Max Time	04/11/2023 00:30:00	04/11/2023 02:50:00	04/11/2023 00:30:00

Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Values in the Observed Flow Conditions and data on the graphical reports are based on the 5-min average.

DATA UPTIME

Data uptime observed during **Wednesday, 22 March 2023 to Monday, 08 May 2023** is provided in the following table:

Percent Uptime	
DFINAL (in)	100
VFINAL (ft/s)	100
QFINAL (MGD - Total MG)	100

OregonCity.LES.TFM.OR23

Flow Monitoring Site Report

ADS ENVIRONMENTAL SERVICES®

Site Name

ORC_S12

Site Address /Location:	409 Barker Ave			Monitor Series	Location Type
				TRITON+	Temporary
Site Access Details:	located behind gate on side of 409	Latitude:	45.3436399	Pipe Size (H x W)	Pipe Shape
		Longitude:	-122.6172411	24.00 X 24.50	Elliptical

Manhole #	System Characteristics
11243	Residential
Access	Traffic
Drive	None

ADS Project Name:	OregonCity.LES.TFM.OR23
ADS Project Number:	22910.11.325

Installation Information

Installation Date:	Installation Type:
3.20.23	Doppler Standard Ring and Crank
Monitoring Location (Sensors):	Monitor Location:
Upstream 0-5 FT	Manhole
Sensors / Devices:	Pressure Sensor Range (psi)
Peak Combo (CS4), Smart Depth (CS5)	0 - 5 psi

Installation Confirmation:

Confirmation Time:	Pipe Size (HxW)
2:03:00 PM	24.00 X 24.50
Depth of Flow (Wet DOF) (in)	Range (Air DOF) (in)
4.25	
CS5 Physical Offset (in)	Measurement Confidence (in)
1.38	0.25"
Peak Velocity (fps)	Velocity Sensor Offset (in)
6.04	
Silt (in)	Silt Type
0	

Hydraulic Comments:

Manhole / Pipe Information:

Manhole Depth (Approx. FT):	Manhole Configuration
12"	Single
Manhole Material:	Manhole Condition:
Concrete	Good
Manhole Opening Diameter (in)	Manhole Diameter (Approx.):
24	26
Manhole Cover	Manhole Frame
Vented	Normal
Active Drop Connections	Air Quality:
No	
Pipe Material	Pipe Condition:
Concrete	Good

Communication Information:

Communication Type	Antenna Location
Wireless	Drilled Pavement / Concrete

Additional Site Info. / Comments:

Additional Photos

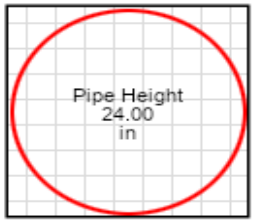
Monitoring Point	Outlet	Side line
		
Top Down	Location	Sewer Map
		
	Flow Direction Monitoring Point	

Hydrograph Report

ORC_S12

Flow Monitor

ORC_S12

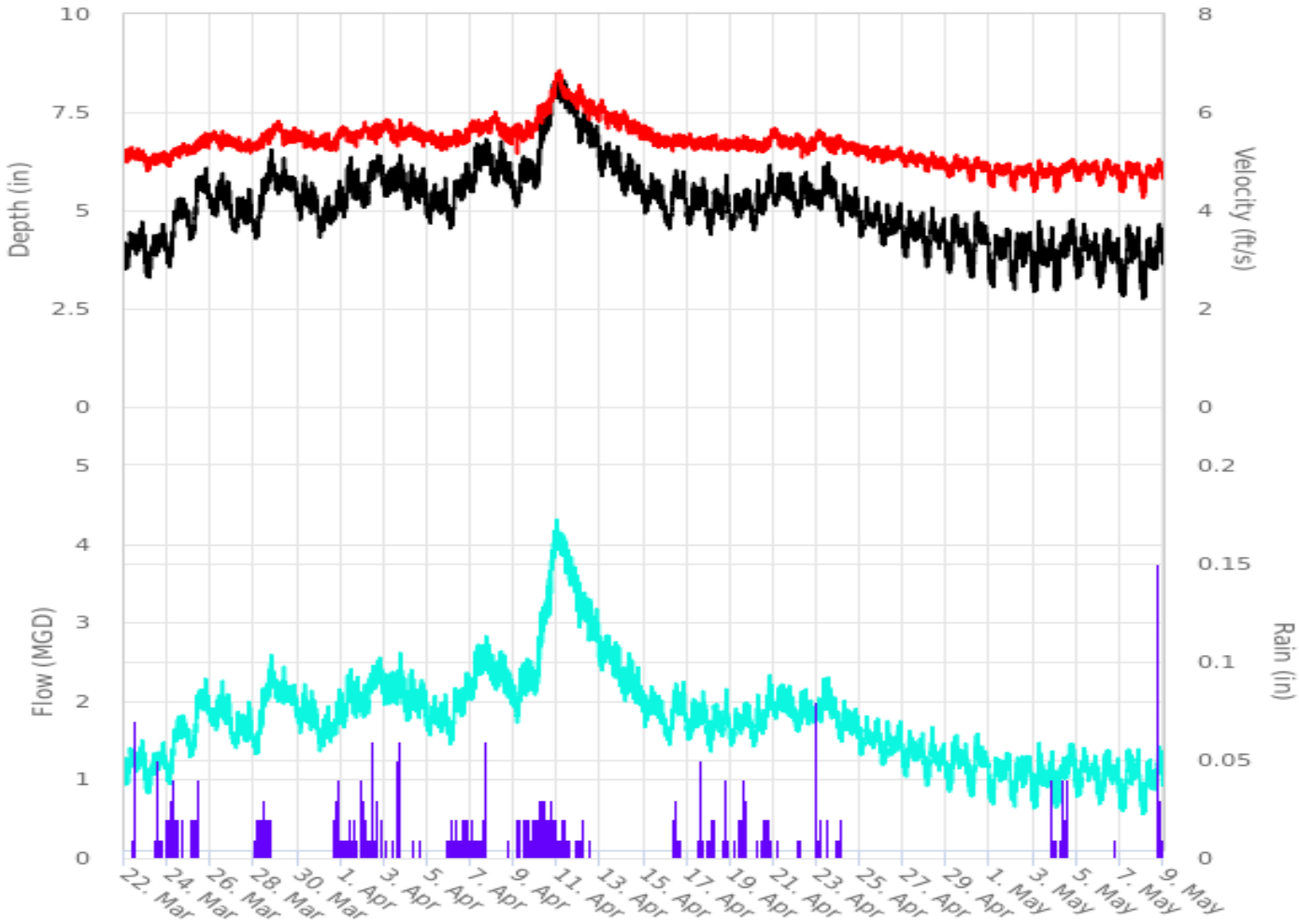


Report Period

03/22/2023
To
05/08/2023

Legend

DFINAL
VFINAL
QFINAL
RAIN FINAL



340 The Bridge Street, Suite 204
Huntsville, AL 35806

800-633-7246
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Scattergraph Report

ORC_S12

Flow Monitor

ORC_S12

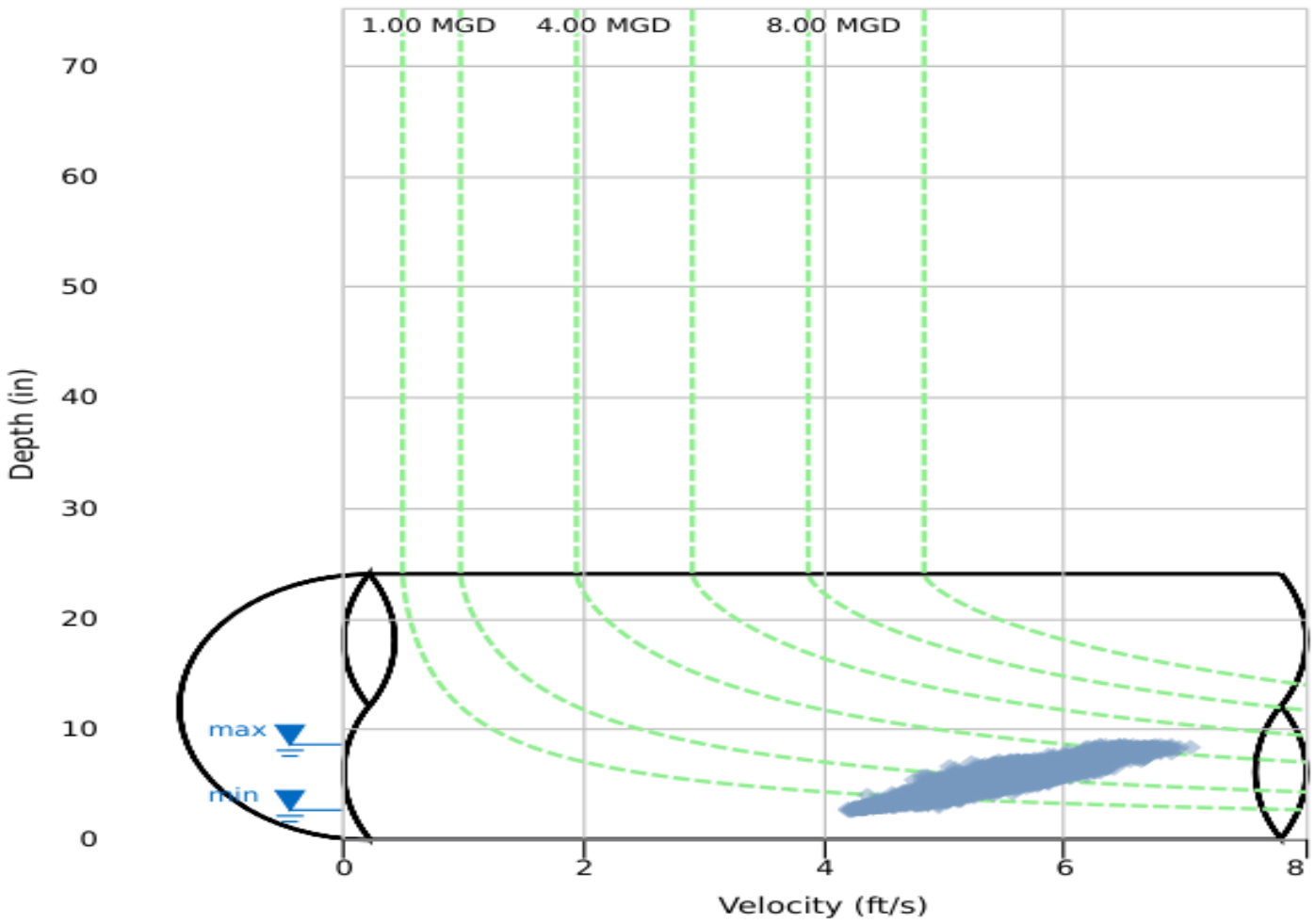
Pipe Height
24.00
in

Report Period

03/22/2023
To
05/08/2023

Legend

DFINAL - VFINAL
Iso-Q™
Min-Max Depth



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Huntsville, AL 35806

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Daily Tabular Report

03/22/2023 00:00 - 05/08/2023 23:59
ORC_S12Pipe: Elliptical (24 in H x 24.5 in W), Silt0.00 in

	DFINAL (in)					VFINAL (ft/s)					QFINAL (MGD - Total MG)						RAIN FINAL (in)
Date	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
03/22/2023	23:55	3.25	19:25	5.42	4.08	23:25	4.75	01:05	5.59	5.11	23:30	0.806	19:25	1.818	1.203	1.203	0.16
03/23/2023	01:30	3.14	19:00	5.40	4.03	09:25	4.73	19:40	5.43	5.04	03:00	0.760	19:40	1.804	1.164	1.164	0.24
03/24/2023	01:00	3.40	12:50	6.04	4.69	01:00	4.78	23:55	5.65	5.18	01:00	0.859	12:50	2.243	1.489	1.489	0.34
03/25/2023	03:10	3.96	18:55	6.87	5.26	11:25	4.97	13:40	5.80	5.35	03:10	1.130	18:55	2.661	1.813	1.813	0.34
03/26/2023	23:15	4.41	10:45	6.67	5.25	09:05	5.01	03:15	5.97	5.44	23:00	1.377	17:50	2.634	1.829	1.829	-
03/27/2023	23:55	4.11	08:15	6.40	4.88	08:35	5.02	03:00	5.80	5.32	23:55	1.199	17:40	2.459	1.612	1.612	0.01
03/28/2023	01:00	4.03	17:30	7.15	5.44	02:45	5.04	17:20	5.98	5.47	01:05	1.164	17:30	2.902	1.945	1.945	0.63
03/29/2023	23:35	4.64	08:20	6.84	5.67	15:35	5.06	01:10	6.12	5.55	23:35	1.517	08:20	2.749	2.084	2.084	-
03/30/2023	23:15	4.31	06:30	6.66	5.22	21:00	4.95	08:10	5.82	5.42	23:45	1.294	06:30	2.696	1.810	1.810	-
03/31/2023	02:20	4.15	21:45	6.69	4.95	14:45	5.00	10:10	5.87	5.40	02:20	1.234	21:45	2.674	1.676	1.676	0.43
04/01/2023	03:50	4.53	18:20	7.08	5.48	17:05	5.12	02:20	5.96	5.55	03:15	1.461	18:20	2.900	1.986	1.986	0.28
04/02/2023	01:25	4.78	21:35	7.24	5.80	10:25	5.11	23:30	6.08	5.61	01:25	1.579	21:35	3.052	2.177	2.177	0.25
04/03/2023	01:55	4.90	09:15	7.15	5.75	14:50	5.15	03:10	6.18	5.62	23:40	1.626	09:15	2.993	2.153	2.153	0.23
04/04/2023	23:00	4.57	19:30	7.07	5.48	19:37	5.12	09:25	5.94	5.54	22:45	1.438	19:30	2.787	1.983	1.983	0.02
04/05/2023	23:30	4.36	08:50	6.37	5.16	10:40	4.91	04:00	5.99	5.42	22:40	1.315	08:50	2.479	1.780	1.780	0.05
04/06/2023	01:45	4.30	19:05	6.96	5.44	05:10	5.06	23:55	5.90	5.47	01:40	1.317	19:05	2.821	1.939	1.939	0.58
04/07/2023	00:45	5.21	09:40	7.18	6.21	17:20	5.19	22:10	6.12	5.69	00:45	1.838	09:40	3.032	2.427	2.427	0.33
04/08/2023	23:05	5.07	08:45	7.11	5.98	21:00	5.21	03:00	6.25	5.65	23:05	1.677	09:10	2.955	2.282	2.282	0.01
04/09/2023	03:00	4.78	10:55	6.87	5.78	03:40	4.97	01:25	6.06	5.61	03:30	1.524	10:55	2.782	2.162	2.162	0.49
04/10/2023	00:20	5.30	20:25	8.51	7.19	00:20	5.28	23:30	6.88	6.15	00:20	1.796	23:30	4.421	3.232	3.232	1.16
04/11/2023	23:10	6.63	00:30	8.56	7.81	22:15	5.82	02:50	7.06	6.42	23:10	2.828	00:30	4.580	3.760	3.760	0.18
04/12/2023	23:45	5.73	09:35	7.69	6.94	22:10	5.61	01:00	6.66	6.12	23:45	2.231	00:25	3.777	3.045	3.045	0.10
04/13/2023	23:50	5.18	07:15	7.27	6.25	17:15	5.35	02:55	6.38	5.90	23:50	1.819	04:30	3.203	2.541	2.541	-
04/14/2023	23:30	4.86	07:25	7.00	5.74	19:05	5.22	00:35	6.35	5.72	23:30	1.629	00:20	3.046	2.185	2.185	-
04/15/2023	23:00	4.53	16:05	6.50	5.35	23:15	4.99	04:25	5.90	5.48	23:00	1.406	09:35	2.536	1.895	1.895	-
04/16/2023	03:15	4.29	17:45	6.59	5.29	11:15	4.98	02:25	5.81	5.41	04:25	1.304	10:30	2.642	1.840	1.840	0.26
04/17/2023	23:45	4.34	07:25	6.55	5.14	07:30	4.93	03:15	5.87	5.37	23:55	1.319	06:00	2.493	1.756	1.756	0.17
04/18/2023	01:25	4.20	19:25	6.44	5.06	20:35	4.99	05:35	5.73	5.34	01:25	1.242	19:25	2.442	1.705	1.705	0.24
04/19/2023	02:55	4.25	08:30	6.36	5.08	05:05	5.04	22:55	5.68	5.34	02:55	1.273	08:30	2.319	1.715	1.715	0.21
04/20/2023	01:25	4.26	20:05	6.91	5.26	08:50	4.97	22:25	5.89	5.36	01:25	1.266	20:05	2.785	1.809	1.809	0.36
04/21/2023	23:40	4.62	11:45	6.72	5.48	10:15	5.05	03:10	5.87	5.43	23:40	1.440	14:40	2.590	1.940	1.940	0.01
04/22/2023	04:30	4.55	12:10	6.59	5.32	13:30	4.76	02:05	5.91	5.34	04:30	1.419	17:30	2.483	1.831	1.831	0.25
04/23/2023	04:25	4.71	11:20	6.88	5.49	14:30	4.85	03:10	5.93	5.42	21:50	1.480	15:15	2.760	1.940	1.940	0.11
04/24/2023	23:25	4.34	11:05	6.15	5.07	21:15	4.89	00:05	5.76	5.30	23:25	1.302	11:05	2.291	1.698	1.698	0.03
04/25/2023	23:55	3.94	08:10	6.06	4.77	14:30	4.68	02:55	5.60	5.20	23:55	1.088	17:40	2.134	1.527	1.527	-
04/26/2023	23:40	3.83	06:30	6.20	4.62	23:05	4.79	00:15	5.52	5.14	23:40	1.030	06:30	2.339	1.444	1.444	-
04/27/2023	23:35	3.59	19:45	5.76	4.42	15:10	4.56	03:30	5.39	5.04	23:55	0.908	21:10	2.002	1.332	1.332	-
04/28/2023	01:50	3.46	07:55	5.76	4.29	11:25	4.63	07:55	5.38	4.97	01:50	0.873	07:55	2.056	1.258	1.258	-
04/29/2023	02:40	3.32	09:20	5.95	4.19	03:10	4.57	10:30	5.35	4.90	03:10	0.803	09:20	2.078	1.202	1.202	-
04/30/2023	03:05	3.17	08:55	5.89	4.11	03:05	4.49	09:50	5.27	4.85	03:05	0.728	08:55	2.002	1.159	1.159	-
05/01/2023	03:40	3.01	19:35	5.35	3.95	01:00	4.38	14:35	5.30	4.79	03:40	0.662	19:35	1.719	1.081	1.081	-
05/02/2023	03:40	2.90	16:45	5.46	3.86	03:25	4.35	13:05	5.33	4.76	03:40	0.623	16:45	1.836	1.040	1.040	-
05/03/2023	02:05	2.74	21:20	5.69	3.80	03:45	4.28	14:05	5.17	4.74	02:05	0.563	21:20	1.918	1.014	1.014	0.10
05/04/2023	01:45	2.78	19:25	5.36	3.98	01:45	4.27	18:45	5.26	4.81	01:45	0.569	16:15	1.764	1.100	1.100	0.30
05/05/2023	02:05	3.11	08:25	5.71	3.95	07:05	4.36	19:50	5.28	4.83	03:25	0.709	08:25	1.882	1.087	1.087	-
05/06/2023	03:05	2.85	09:30	5.54	3.82	04:05	4.32	22:05	5.31	4.79	04:05	0.606	12:45	1.914	1.031	1.031	0.01
05/07/2023	03:40	2.68	10:50	5.72	3.80	03:40	4.25	12:00	5.28	4.76	03:40	0.539	10:50	1.932	1.019	1.019	-
05/08/2023	02:55	2.64	09:50	5.33	3.80	01:35	4.21	21:00	5.25	4.75	02:55	0.522	09:50	1.772	1.020	1.019	0.43

03/22/2023 00:00 - 05/08/2023 23:59

	DFINAL (in)	VFINAL (ft/s)	QFINAL (MGD - Total MG)	RAIN FINAL (in)
Total			84.718	8.31
Average	5.09	5.33	1.765	

Note: data associated with 5B is actually flow from basin historically called 8. We will be referring to the basin as 8 in our model and documentation.

ORC_S5B

Corrected: Site 8

Site Commentary

SITE INFORMATION

Pipe	Circular (18 in H x 18 in W)
Silt	0.00 (in)

OBSERVATIONS

This site functioned under normal conditions during the study period. No surcharge conditions were experienced at this location.

This site is located downstream of site ORC_S10. A normal net flow was recorded between the sites.

5-min flow depth, velocity, and quantity data observed during **Wednesday, 22 March 2023 to Monday, 08 May 2023**, along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	**DFINAL (in)**	**VFINAL (ft/s)**	**QFINAL (MGD - Total MG)**
Average	4.18	4.19	0.886
Minimum	2.44	2.96	0.279
Maximum	8.06	6.05	2.999
Min Time	05/07/2023 03:20:00	05/08/2023 03:00:00	05/08/2023 03:00:00
Max Time	04/10/2023 21:05:00	04/10/2023 21:05:00	04/10/2023 21:05:00

Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Values in the Observed Flow Conditions and data on the graphical reports are based on the 5-min average.

DATA UPTIME

Data uptime observed during **Wednesday, 22 March 2023 to Monday, 08 May 2023** is provided in the following table:

Percent Uptime	
DFINAL (in)	100
VFINAL (ft/s)	100
QFINAL (MGD - Total MG)	100

Note: data associated with 5B is actually flow from basin historically called 8. We will be referring to the basin as 8 in our model and documentation.

OregonCity.LES.TFM.OR23

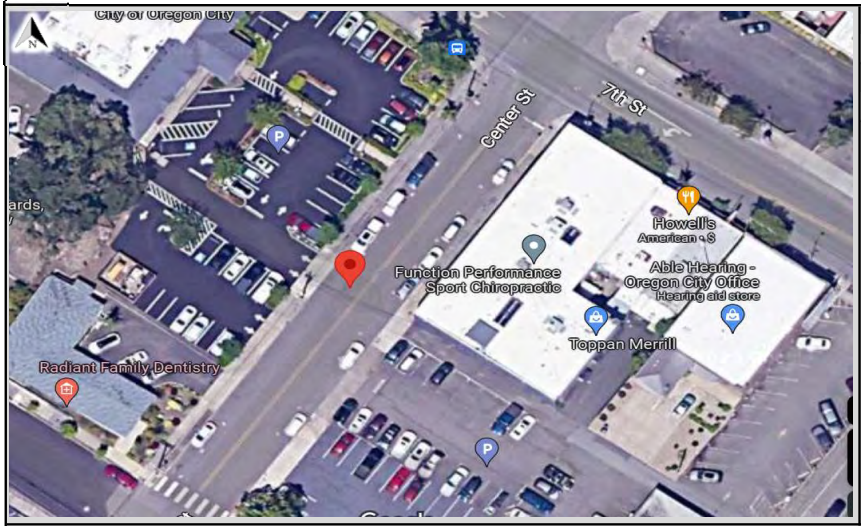
Flow Monitoring Site Report

Corrected: Site 8

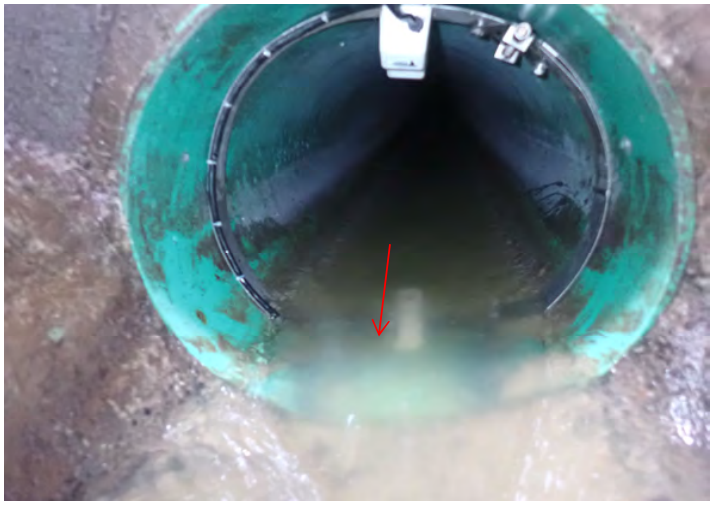
Site Name

ORC_~~S5B~~

Site Address /Location:	502 7th St			Monitor Series	Location Type
				TRITON+	Temporary
Site Access Details:	middle of road barricade around	Latitude:	45.356434	Pipe Size (H x W)	Pipe Shape
		Longitude:	-122.6063265	18 X 18	Circular



Manhole #	System Characteristics
10206	Residential
Access	Traffic
Drive	Medium



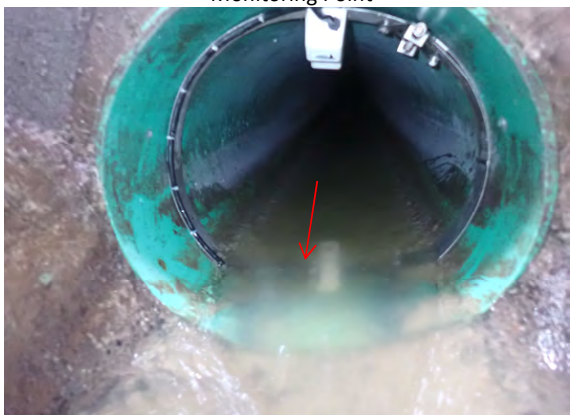
ADS Project Name:	OregonCity.LES.TFM.OR23
ADS Project Number:	22910.11.325

Installation Information	
Installation Date:	Installation Type:
3.20.23	Doppler Standard Ring and Crank
Monitoring Location (Sensors):	Monitor Location:
Upstream 0-5 FT	Manhole
Sensors / Devices:	Pressure Sensor Range (psi)
Peak Combo (CS4), Smart Depth (CS5)	0 - 5 psi
Installation Confirmation:	
Confirmation Time:	Pipe Size (HxW)
10:51:00 AM	18 X 18
Depth of Flow (Wet DOF) (in)	Range (Air DOF) (in)
3.50	
CS5 Physical Offset (in)	Measurement Confidence (in)
1.38	0.25"
Peak Velocity (fps)	Velocity Sensor Offset (in)
4.67	
Silt (in)	Silt Type
0	
Hydraulic Comments:	
Manhole / Pipe Information:	
Manhole Depth (Approx. FT):	Manhole Configuration
12"	Single
Manhole Material:	Manhole Condition:
Concrete	Good
Manhole Opening Diameter (in)	Manhole Diameter (Approx.):
24	26
Manhole Cover	Manhole Frame
Vented	Normal
Active Drop Connections	Air Quality:
No	
Pipe Material	Pipe Condition:
PVC	Good
Communication Information:	
Communication Type	Antenna Location
Wireless	Manhole Pick / Vent Hole
Additional Site Info. / Comments:	

Site 8

Additional Photos

Monitoring Point



Outlet

Side line

Top Down

Location

Sewer Map

Flow Direction

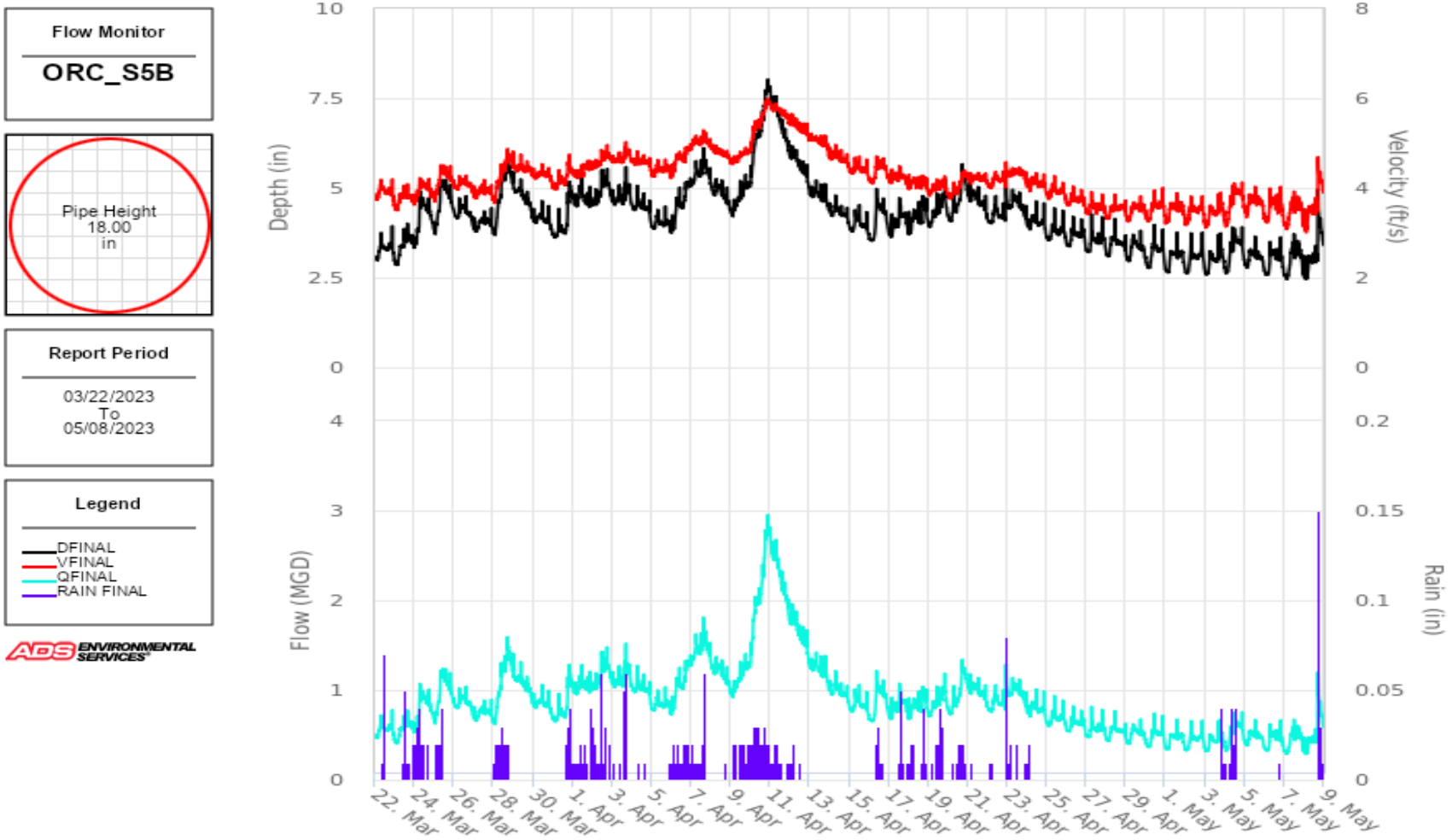
Monitoring Point

Note: data associated with 5B is actually flow from basin historically called 8. We will be referring to the basin as 8 in our model and documentation.

Hydrograph Report

ORC_~~S5B~~

Corrected: Site 8



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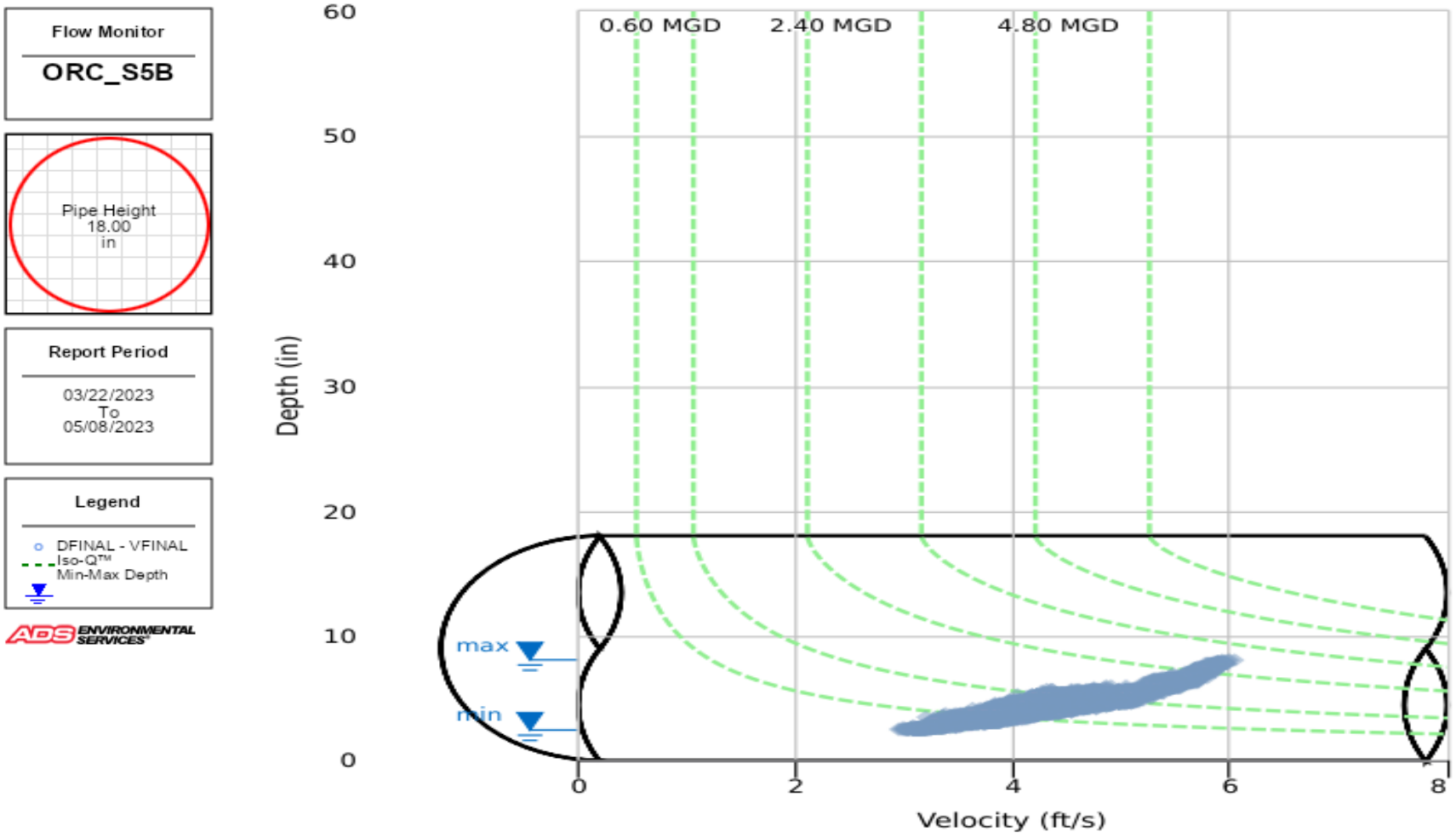
Note: data associated with 5B is actually flow from basin historically called 8. We will be referring to the basin as 8 in our model and documentation.

Scattergraph Report

ORC_~~S5B~~

Corrected: Site 8



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Note: data associated with 5B is actually flow from basin historically called 8. We will be referring to the basin as 8 in our model and documentation.

Daily Tabular Report

Corrected: Site 8

03/22/2023 00:00 - 05/08/2023 23:59
ORC_S5BPipe: Elliptical (18 in H x 18 in W), Silt0.00 in

	DFINAL (in)					VFINAL (ft/s)					QFINAL (MGD - Total MG)						RAIN FINAL (in)
Date	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
03/22/2023	03:10	2.96	07:30	4.00	3.27	23:30	3.56	07:25	4.32	3.90	23:30	0.441	07:30	0.813	0.555	0.555	0.16
03/23/2023	02:40	2.84	15:25	4.15	3.37	03:00	3.45	11:20	4.17	3.75	03:00	0.402	15:25	0.811	0.559	0.559	0.24
03/24/2023	02:25	3.42	06:30	5.01	4.20	20:00	3.63	06:30	4.31	3.96	02:45	0.552	06:30	1.118	0.807	0.807	0.34
03/25/2023	01:15	3.70	14:25	5.33	4.64	01:15	3.65	07:30	4.57	4.20	01:15	0.618	14:25	1.290	0.988	0.988	0.34
03/26/2023	23:55	3.85	14:45	4.85	4.29	23:55	3.78	14:40	4.43	4.07	23:55	0.678	14:40	1.086	0.851	0.851	-
03/27/2023	23:50	3.72	12:45	4.63	4.01	22:25	3.68	12:40	4.32	3.91	23:30	0.630	12:45	0.994	0.742	0.742	0.01
03/28/2023	02:05	3.66	17:00	6.02	4.95	01:30	3.59	16:55	5.04	4.34	01:30	0.609	17:00	1.648	1.126	1.126	0.63
03/29/2023	23:55	4.12	09:10	5.33	4.74	23:50	4.22	09:05	4.82	4.43	23:50	0.837	09:10	1.360	1.065	1.065	-
03/30/2023	23:50	3.70	10:50	4.75	4.10	23:55	3.99	10:45	4.68	4.29	23:55	0.677	10:45	1.112	0.841	0.841	-
03/31/2023	03:05	3.60	20:15	5.19	4.07	03:10	3.89	20:10	4.85	4.21	03:10	0.640	20:10	1.317	0.825	0.825	0.43
04/01/2023	20:35	4.44	11:20	5.47	4.69	07:50	4.14	18:40	4.72	4.39	04:55	0.937	11:20	1.354	1.041	1.041	0.28
04/02/2023	00:40	4.50	11:45	5.67	4.90	00:55	4.38	18:00	5.02	4.63	00:25	0.982	18:05	1.524	1.169	1.169	0.25
04/03/2023	23:55	4.51	16:45	5.66	4.76	02:50	4.50	16:40	5.11	4.68	02:50	1.012	16:40	1.557	1.134	1.134	0.23
04/04/2023	23:55	3.95	06:35	5.20	4.45	23:05	4.32	06:35	4.96	4.58	23:55	0.804	06:35	1.357	1.007	1.007	0.02
04/05/2023	23:55	3.73	07:30	4.64	4.01	23:45	4.18	16:35	4.75	4.40	23:50	0.715	07:30	1.082	0.835	0.835	0.05
04/06/2023	00:00	3.73	23:00	5.49	4.59	00:15	4.20	22:55	5.11	4.67	00:15	0.720	23:00	1.496	1.079	1.079	0.58
04/07/2023	01:10	5.07	14:45	6.18	5.42	23:55	4.80	14:35	5.43	5.03	01:05	1.278	14:35	1.862	1.460	1.460	0.33
04/08/2023	23:55	4.37	06:40	5.44	4.83	23:00	4.54	03:00	5.01	4.79	23:45	0.978	06:40	1.458	1.181	1.181	0.01
04/09/2023	02:50	4.19	18:15	5.55	4.76	08:40	4.30	18:15	4.97	4.72	02:55	0.914	18:15	1.489	1.142	1.142	0.49
04/10/2023	00:30	5.12	21:05	8.06	6.73	01:05	4.79	21:05	6.05	5.52	00:00	1.297	21:05	2.999	2.173	2.173	1.16
04/11/2023	23:55	5.89	00:00	7.90	6.84	23:05	5.30	07:00	5.95	5.70	23:55	1.738	00:00	2.853	2.276	2.276	0.18
04/12/2023	23:55	4.88	02:25	6.29	5.60	22:55	4.98	02:25	5.71	5.33	23:55	1.261	02:25	2.031	1.620	1.620	0.10
04/13/2023	23:15	4.36	08:00	5.41	4.75	22:50	4.57	02:10	5.29	5.02	22:50	0.983	08:00	1.516	1.212	1.212	-
04/14/2023	23:55	3.95	07:20	4.86	4.31	23:55	4.42	00:10	5.11	4.68	23:55	0.822	07:20	1.239	0.983	0.983	-
04/15/2023	23:55	3.64	12:25	4.60	3.98	23:50	4.17	07:15	4.75	4.42	23:55	0.694	12:20	1.079	0.829	0.829	-
04/16/2023	03:45	3.52	09:05	5.09	4.10	04:20	4.05	09:05	4.82	4.37	04:20	0.643	09:05	1.277	0.863	0.863	0.26
04/17/2023	03:25	3.63	12:45	4.75	4.03	22:00	3.96	03:55	4.50	4.21	03:25	0.670	12:45	1.084	0.805	0.805	0.17
04/18/2023	00:20	3.69	21:40	4.93	4.17	09:25	3.82	17:05	4.38	4.10	01:10	0.665	17:05	1.100	0.825	0.825	0.24
04/19/2023	02:00	3.89	19:50	5.38	4.37	01:40	3.65	19:50	4.34	4.00	01:40	0.675	19:50	1.245	0.859	0.859	0.21
04/20/2023	02:40	4.06	17:20	5.70	4.67	02:55	3.70	20:15	4.47	4.05	02:30	0.717	17:20	1.355	0.961	0.961	0.36
04/21/2023	23:25	4.15	02:55	5.30	4.65	04:00	3.98	12:30	4.42	4.21	23:25	0.812	02:50	1.221	0.984	0.984	0.01
04/22/2023	04:55	4.00	22:35	5.36	4.28	21:25	3.90	22:20	4.63	4.18	04:50	0.753	22:35	1.308	0.873	0.873	0.25
04/23/2023	23:55	3.95	06:20	5.09	4.51	23:30	3.99	14:30	4.57	4.31	23:55	0.745	14:30	1.213	0.967	0.967	0.11
04/24/2023	23:55	3.62	11:05	4.75	4.02	18:05	3.77	20:10	4.45	4.08	23:30	0.635	11:05	1.052	0.778	0.778	0.03
04/25/2023	23:55	3.42	19:15	4.59	3.76	23:25	3.60	09:05	4.30	3.90	23:55	0.550	19:15	0.974	0.675	0.675	-
04/26/2023	23:55	3.25	07:55	4.43	3.65	23:35	3.36	17:40	4.16	3.72	23:55	0.482	07:55	0.903	0.619	0.619	-
04/27/2023	03:15	3.20	06:05	4.41	3.51	12:25	3.20	06:00	4.02	3.56	23:40	0.460	06:05	0.869	0.559	0.559	-
04/28/2023	02:30	3.08	10:35	4.31	3.42	02:10	3.25	10:35	3.96	3.52	02:10	0.425	10:35	0.833	0.534	0.534	-
04/29/2023	04:05	2.95	17:55	3.97	3.30	03:00	3.21	17:50	3.93	3.50	03:00	0.394	17:50	0.721	0.505	0.505	-
04/30/2023	23:55	2.72	10:35	4.11	3.16	23:55	3.20	10:30	4.05	3.53	23:55	0.347	10:35	0.790	0.481	0.481	-
05/01/2023	03:20	2.63	14:05	3.88	3.04	00:05	3.15	14:05	3.93	3.51	03:25	0.334	14:05	0.712	0.451	0.451	-
05/02/2023	02:05	2.60	07:00	3.87	3.02	00:25	3.01	06:55	3.94	3.47	00:25	0.314	07:00	0.708	0.441	0.441	-
05/03/2023	01:10	2.57	19:00	3.82	2.99	00:55	3.07	19:05	3.97	3.45	00:55	0.311	19:00	0.699	0.433	0.433	0.10
05/04/2023	02:35	2.61	09:10	4.04	3.26	00:50	3.07	11:25	4.20	3.69	02:30	0.320	21:05	0.791	0.529	0.529	0.30
05/05/2023	23:55	2.73	12:50	3.74	3.05	02:25	3.19	12:45	4.23	3.66	23:55	0.356	12:45	0.724	0.470	0.470	-
05/06/2023	02:20	2.57	07:00	3.81	2.98	23:45	3.17	07:00	4.18	3.55	03:25	0.321	07:00	0.737	0.443	0.443	0.01
05/07/2023	03:20	2.44	12:10	3.96	2.99	02:45	3.03	12:05	4.10	3.47	03:20	0.287	12:10	0.751	0.439	0.439	-
05/08/2023	01:45	2.46	17:25	5.18	3.20	03:00	2.96	17:25	4.83	3.65	03:00	0.279	17:25	1.314	0.521	0.521	0.43

03/22/2023 00:00 - 05/08/2023 23:59

	DFINAL (in)	VFINAL (ft/s)	QFINAL (MGD - Total MG)	RAIN FINAL (in)
Total			42.512	8.31
Average	4.18	4.19	0.886	

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Note: data associated with 8 is actually flow from basin historically called 5B. We will be referring to the basin as 5B in our model and documentation.

Corrected: Site 5B

ORC ~~S8~~

Site Commentary

SITE INFORMATION

Pipe	Circular (12 in H x 12 in W)
Silt	0.00 (in)

OBSERVATIONS

This site functioned under normal conditions during the study period. No surcharge conditions were experienced at this location.

5-min flow depth, velocity, and quantity data observed during **Wednesday, 22 March 2023 to Monday, 08 May 2023**, along with observed minimum and maximum data, are provided in the following table.

Observed Flow Conditions			
Item	**DFINAL (in)**	**VFINAL (ft/s)**	**QFINAL (MGD - Total MG)**
Average	2.09	7.14	0.448
Minimum	0.78	2.93	0.044
Maximum	3.25	11.15	1.228
Min Time	05/06/2023 02:35:00	05/08/2023 03:05:00	05/06/2023 02:35:00
Max Time	04/10/2023 20:05:00	04/10/2023 19:50:00	04/10/2023 19:50:00

Based upon the quality and consistency of the observed flow depth and velocity data, the Continuity equation was used to calculate flow rate and quantities during the monitoring period.

Values in the Observed Flow Conditions and data on the graphical reports are based on the 5-min average.

DATA UPTIME

Data uptime observed during **Wednesday, 22 March 2023 to Monday, 08 May 2023** is provided in the following table:

Percent Uptime	
DFINAL (in)	100
VFINAL (ft/s)	100
QFINAL (MGD - Total MG)	100

Note: data associated with 8 is actually flow from basin historically called 5B. We will be referring to the basin as 5B in our model and documentation.

OregonCity.LES.TFM.OR23

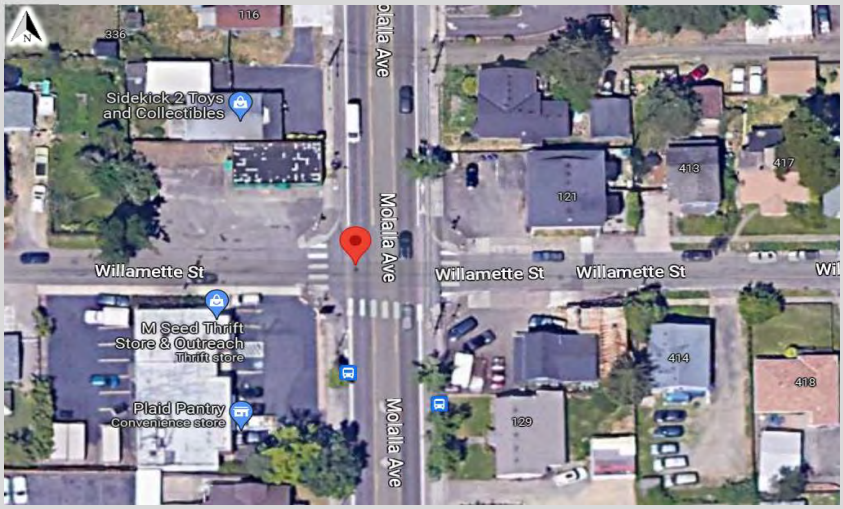
Flow Monitoring Site Report

Site Name

ORC_S8

Corrected: Site 5B

Site Address /Location:	122 Molalla Ave			Monitor Series	Location Type
				TRITON+	Temporary
Site Access Details:	Traffic control needed	Latitude:	45.3509535	Pipe Size (H x W)	Pipe Shape
		Longitude:	-122.5967668	12 X 12	Circular



Manhole #	System Characteristics
	Residential
Access	Traffic
Drive	Medium

ADS Project Name:	OregonCity.LES.TFM.OR23
ADS Project Number:	22910.11.325

Installation Information

Installation Date:	Installation Type:
3.21.23	Doppler Standard Ring and Crank
Monitoring Location (Sensors):	Monitor Location:
Upstream 0-5 FT	Manhole
Sensors / Devices:	Pressure Sensor Range (psi)
Peak Combo (CS4), Smart Depth (CS5)	0 - 5 psi

Installation Confirmation:

Confirmation Time:	Pipe Size (HxW)
9:46:00 AM	12 X 12
Depth of Flow (Wet DOF) (in)	Range (Air DOF) (in)
1.63	
Downlooker Physical Offset (in)	Measurement Confidence (in)
	0.25"
Peak Velocity (fps)	Velocity Sensor Offset (in)
8.75	
Silt (in)	Silt Type
0	

Hydraulic Comments:

Manhole / Pipe Information:

Manhole Depth (Approx. FT):	Manhole Configuration
10"	Single
Manhole Material:	Manhole Condition:
Concrete	Good
Manhole Opening Diameter (in)	Manhole Diameter (Approx.):
24	26
Manhole Cover	Manhole Frame
Vented	Normal
Active Drop Connections	Air Quality:
No	
Pipe Material	Pipe Condition:
Concrete	Good

Communication Information:

Communication Type	Antenna Location
Wireless	Drilled Pavement / Concrete

Additional Site Info. / Comments:

Note: data associated with 8 is actually flow from basin historically called 5B. We will be referring to the basin as 5B in our model and documentation.

Additional Photos

Corrected: Site 5B

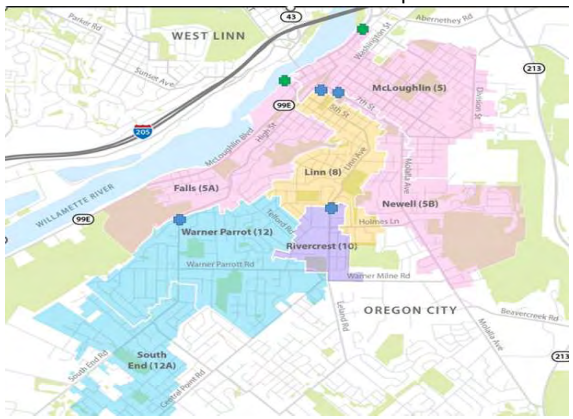
Monitoring Point

Outlet

Top Down

Location

Flow meter locations map



Flow Direction

Monitoring Point

Note: data associated with 8 is actually flow from basin historically called 5B. We will be referring to the basin as 5B in our model and documentation.

Hydrograph Report
ORC_S8

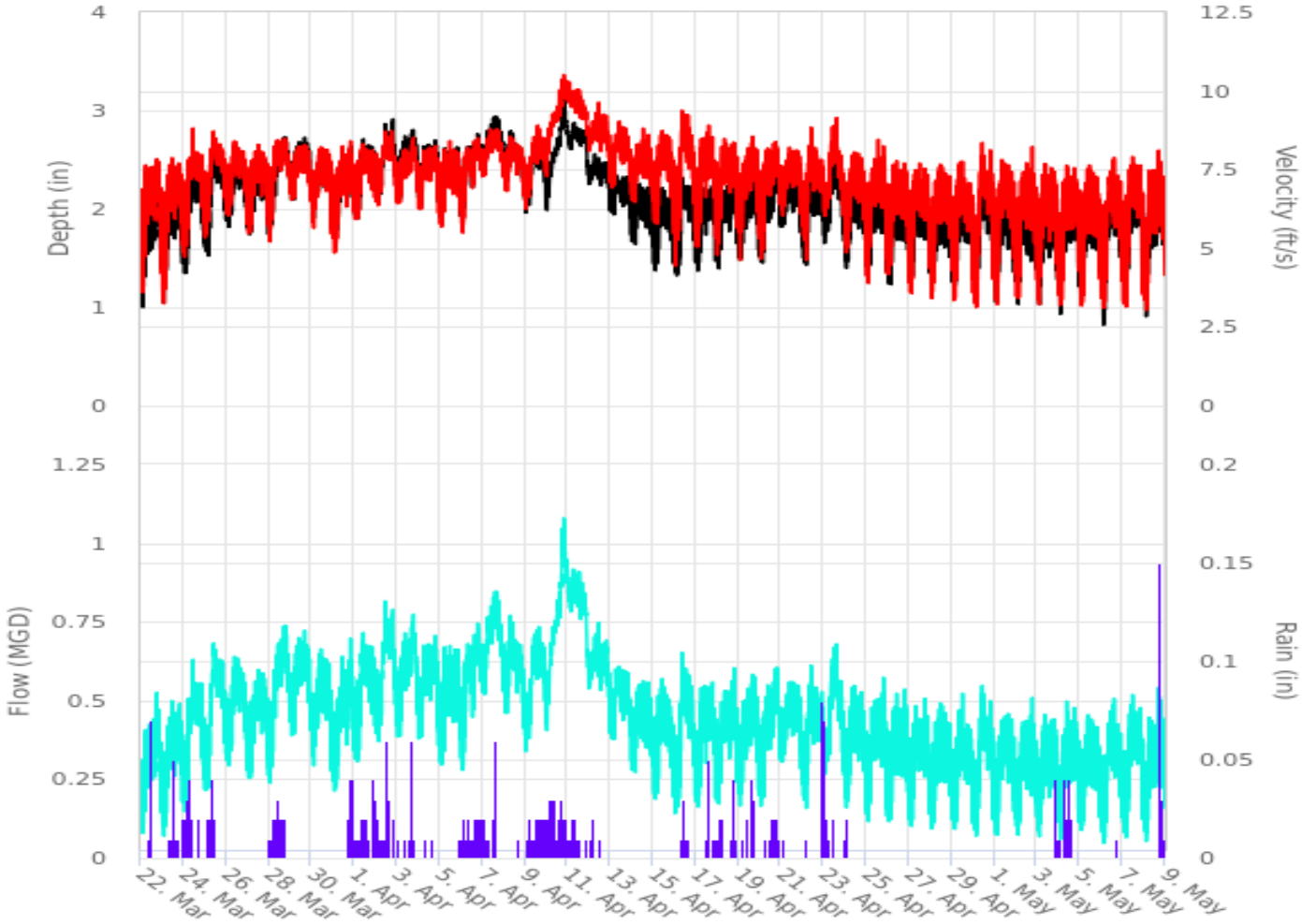
Corrected: Site 5B

Flow Monitor
ORC_S8

Pipe Height
12.00
in

Report Period
03/22/2023
To
05/08/2023

Legend
DFINAL
VFINAL
QFINAL
RAIN FINAL



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Note: data associated with 8 is actually flow from basin historically called 5B. We will be referring to the basin as 5B in our model and documentation.

Scattergraph Report

ORC_~~S8~~

Corrected: Site 5B

Flow Monitor

ORC_S8

Pipe Height
12.00
in

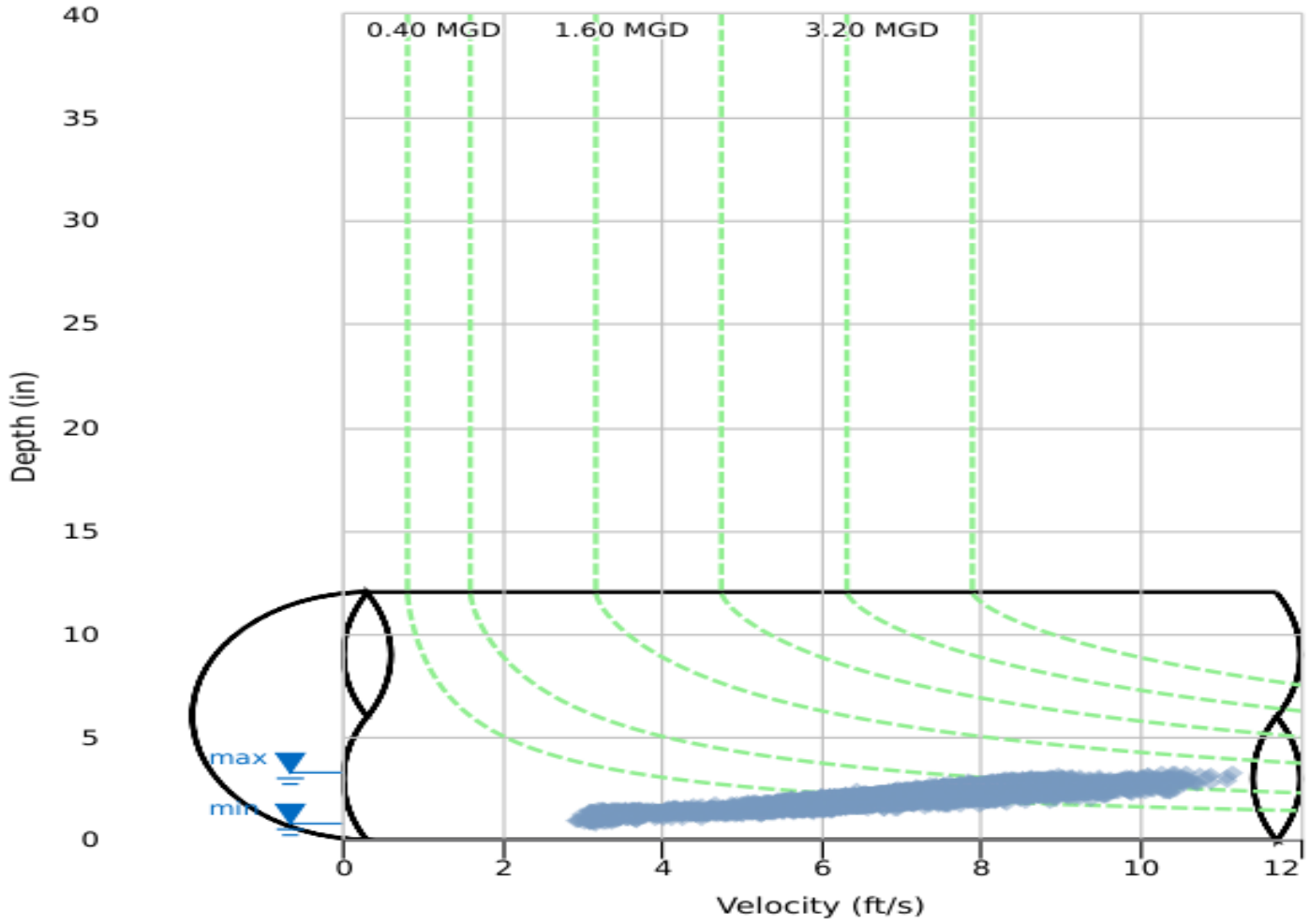
Report Period

03/22/2023
To
05/08/2023

Legend

DFINAL - VFINAL
Iso-Q™
Min-Max Depth

ADS ENVIRONMENTAL SERVICES



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Note: data associated with 8 is actually flow from basin historically called 5B. We will be referring to the basin as 5B in our model and documentation.

Daily Tabular Report

Corrected: Site 5B

03/22/2023 00:00 - 05/08/2023 23:59
ORC_S8Pipe: Elliptical (12 in H x 12 in W), Silt0.00 in

	DFINAL (in)					VFINAL (ft/s)					QFINAL (MGD - Total MG)						RAIN FINAL (in)
Date	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Time	Min	Time	Max	Avg	Total	Total
03/22/2023	02:30	0.98	18:20	2.34	1.74	02:15	3.38	10:15	8.40	6.40	02:30	0.069	18:15	0.570	0.306	0.306	0.16
03/23/2023	02:25	1.01	20:00	2.36	1.82	02:20	2.99	20:00	8.36	6.42	02:20	0.063	20:00	0.588	0.328	0.328	0.24
03/24/2023	04:10	1.31	16:35	2.48	2.01	01:05	4.08	11:05	8.93	7.09	01:05	0.129	11:05	0.678	0.412	0.412	0.34
03/25/2023	03:35	1.49	10:55	2.67	2.20	01:15	5.08	10:05	9.06	7.53	01:15	0.194	10:55	0.750	0.494	0.494	0.34
03/26/2023	03:25	1.75	12:50	2.66	2.23	23:35	5.53	10:10	9.09	7.45	23:35	0.261	11:05	0.733	0.494	0.494	-
03/27/2023	03:10	1.71	18:00	2.58	2.15	01:25	4.96	12:45	9.01	7.18	01:25	0.225	18:00	0.690	0.452	0.452	0.01
03/28/2023	01:55	1.73	18:40	2.90	2.38	01:55	5.07	09:55	8.99	7.62	01:55	0.228	18:40	0.826	0.556	0.556	0.63
03/29/2023	01:30	2.00	11:50	2.83	2.46	23:00	6.00	16:30	8.92	7.59	23:00	0.348	16:30	0.805	0.575	0.575	-
03/30/2023	22:55	1.77	11:40	2.72	2.29	22:55	5.20	11:10	9.07	7.22	22:55	0.241	11:40	0.747	0.496	0.496	-
03/31/2023	02:10	1.67	20:05	2.79	2.23	02:10	4.48	10:25	9.07	7.12	02:10	0.192	20:05	0.778	0.474	0.474	0.43
04/01/2023	01:40	1.86	10:30	2.81	2.39	02:10	5.63	08:45	8.79	7.46	01:40	0.288	08:45	0.782	0.546	0.546	0.28
04/02/2023	02:45	1.95	11:00	3.05	2.53	00:30	6.01	18:05	9.49	7.72	02:45	0.331	11:00	0.964	0.612	0.612	0.25
04/03/2023	03:00	2.02	18:55	3.00	2.54	02:30	5.92	18:50	9.05	7.61	02:30	0.339	18:55	0.886	0.604	0.604	0.23
04/04/2023	04:00	2.00	12:40	2.87	2.46	23:10	5.79	15:55	8.78	7.51	23:10	0.325	12:40	0.812	0.569	0.569	0.02
04/05/2023	02:40	1.87	18:10	2.80	2.36	02:40	5.45	11:45	9.20	7.31	02:40	0.275	18:10	0.792	0.526	0.526	0.05
04/06/2023	01:50	1.84	20:00	2.90	2.45	01:45	5.18	15:30	9.04	7.60	01:45	0.261	18:45	0.839	0.577	0.577	0.58
04/07/2023	00:25	2.20	13:40	3.10	2.71	00:25	6.72	09:30	9.55	8.18	00:25	0.429	14:35	0.941	0.708	0.708	0.33
04/08/2023	23:10	1.99	09:55	2.89	2.52	23:10	6.20	17:45	9.09	7.80	23:10	0.343	08:10	0.848	0.612	0.612	0.01
04/09/2023	23:55	1.89	11:30	2.81	2.40	00:55	5.91	14:35	10.27	7.84	00:55	0.320	14:35	0.878	0.575	0.575	0.49
04/10/2023	01:05	1.89	20:05	3.25	2.61	00:40	6.89	19:50	11.15	9.23	00:40	0.356	19:50	1.228	0.765	0.765	1.16
04/11/2023	23:15	2.18	06:05	3.00	2.70	23:15	7.55	01:40	10.88	9.48	23:15	0.474	06:05	1.029	0.814	0.814	0.18
04/12/2023	23:45	1.90	06:45	2.63	2.37	23:45	7.01	17:25	10.37	8.62	23:45	0.362	11:00	0.806	0.616	0.616	0.10
04/13/2023	23:50	1.58	08:30	2.51	2.16	23:55	6.45	10:30	10.18	8.07	23:50	0.257	10:30	0.739	0.508	0.508	-
04/14/2023	23:15	1.44	12:55	2.46	2.01	22:50	5.82	13:00	10.31	7.71	23:15	0.205	13:00	0.752	0.441	0.441	-
04/15/2023	00:45	1.32	10:30	2.41	1.87	23:50	5.31	10:10	10.06	7.49	05:30	0.174	10:30	0.700	0.391	0.391	-
04/16/2023	04:30	1.19	08:45	2.50	1.90	01:10	4.17	12:40	10.44	7.55	01:10	0.121	08:45	0.782	0.407	0.407	0.26
04/17/2023	02:45	1.37	19:20	2.36	1.92	01:25	4.53	13:40	9.63	7.33	01:25	0.151	13:40	0.651	0.397	0.397	0.17
04/18/2023	02:40	1.35	19:35	2.46	1.98	00:40	4.36	10:50	9.56	7.28	00:40	0.155	09:30	0.655	0.410	0.410	0.24
04/19/2023	04:15	1.37	18:00	2.45	1.98	02:25	4.48	08:40	9.32	7.13	02:10	0.161	16:35	0.674	0.404	0.404	0.21
04/20/2023	00:30	1.42	18:20	2.53	2.04	01:35	4.26	14:25	9.88	7.22	01:35	0.151	18:20	0.689	0.426	0.426	0.36
04/21/2023	23:35	1.60	12:30	2.48	2.09	04:00	5.47	10:10	9.59	7.30	22:40	0.235	10:10	0.705	0.442	0.442	0.01
04/22/2023	03:30	1.35	19:10	2.48	2.01	04:35	4.55	10:00	9.69	7.19	04:35	0.152	19:10	0.667	0.416	0.416	0.25
04/23/2023	02:10	1.55	10:55	2.60	2.11	01:40	5.20	14:45	9.84	7.40	02:20	0.217	11:30	0.757	0.459	0.459	0.11
04/24/2023	01:15	1.35	17:10	2.45	1.98	23:25	4.34	15:05	9.78	6.90	23:25	0.147	15:05	0.707	0.393	0.393	0.03
04/25/2023	02:30	1.21	16:55	2.49	1.90	22:55	3.54	13:35	9.25	6.64	02:30	0.095	19:20	0.634	0.358	0.358	-
04/26/2023	04:25	1.18	19:15	2.51	1.86	03:05	3.68	18:30	8.70	6.47	04:20	0.102	19:15	0.650	0.340	0.340	-
04/27/2023	00:15	1.21	18:00	2.45	1.81	01:35	3.31	12:05	8.93	6.27	00:15	0.094	18:00	0.607	0.320	0.320	-
04/28/2023	01:45	1.22	13:10	2.42	1.79	01:55	3.24	13:10	9.16	6.25	01:45	0.089	13:10	0.668	0.313	0.313	-
04/29/2023	04:10	1.16	10:40	2.40	1.76	03:30	3.14	11:25	8.49	6.13	03:30	0.080	08:20	0.592	0.302	0.302	-
04/30/2023	03:55	1.00	11:15	2.41	1.81	04:30	2.99	10:30	9.52	6.24	03:55	0.064	10:30	0.663	0.322	0.322	-
05/01/2023	02:55	1.02	17:40	2.36	1.74	01:50	3.10	19:45	8.86	6.21	02:55	0.067	17:40	0.588	0.299	0.299	-
05/02/2023	02:55	0.95	18:50	2.31	1.70	03:10	3.16	18:50	9.57	6.16	02:55	0.063	18:50	0.656	0.288	0.288	-
05/03/2023	02:45	0.99	17:40	2.31	1.72	02:40	3.09	18:05	8.93	6.08	02:40	0.062	17:40	0.558	0.289	0.289	0.10
05/04/2023	02:05	0.90	09:30	2.42	1.76	02:15	3.10	16:40	8.60	6.02	02:05	0.054	09:30	0.617	0.295	0.295	0.30
05/05/2023	02:00	1.11	13:30	2.26	1.74	03:10	3.09	11:10	8.58	5.84	02:00	0.074	13:30	0.539	0.279	0.279	-
05/06/2023	02:35	0.78	10:25	2.35	1.73	03:10	3.02	14:15	8.78	5.88	02:35	0.044	10:50	0.583	0.289	0.289	0.01
05/07/2023	04:40	0.87	11:55	2.34	1.79	02:25	3.09	11:55	9.21	6.01	04:40	0.051	11:55	0.642	0.305	0.305	-
05/08/2023	02:45	0.89	17:30	2.44	1.79	03:05	2.93	12:40	8.79	5.98	02:45	0.050	17:30	0.638	0.303	0.303	0.43

03/22/2023 00:00 - 05/08/2023 23:59

	DFINAL (in)	VFINAL (ft/s)	QFINAL (MGD - Total MG)	RAIN FINAL (in)
Total			21.507	8.31
Average	2.09	7.14	0.448	

ORC_RG

Site Commentary

SITE INFORMATION

RainGauge	8” tipping bucket type
Silt	0.00 (in)

OBSERVATIONS

A review of the hydrograph indicates ORC_RG functioned under normal conditions during the study period.

The total rainfall recorded during the study period was 8.31 in.

DATA UPTIME

Data uptime observed during **Wednesday, 22 March 2023 to Monday, 08 May 2023** is provided in the following table:

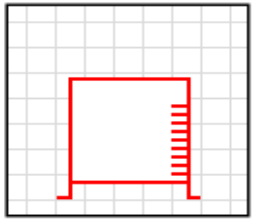
Percent Uptime	
RAINFINAL (in)	100

Hydrograph Report

ORC_RG

Rain Gauge

ORC_RG



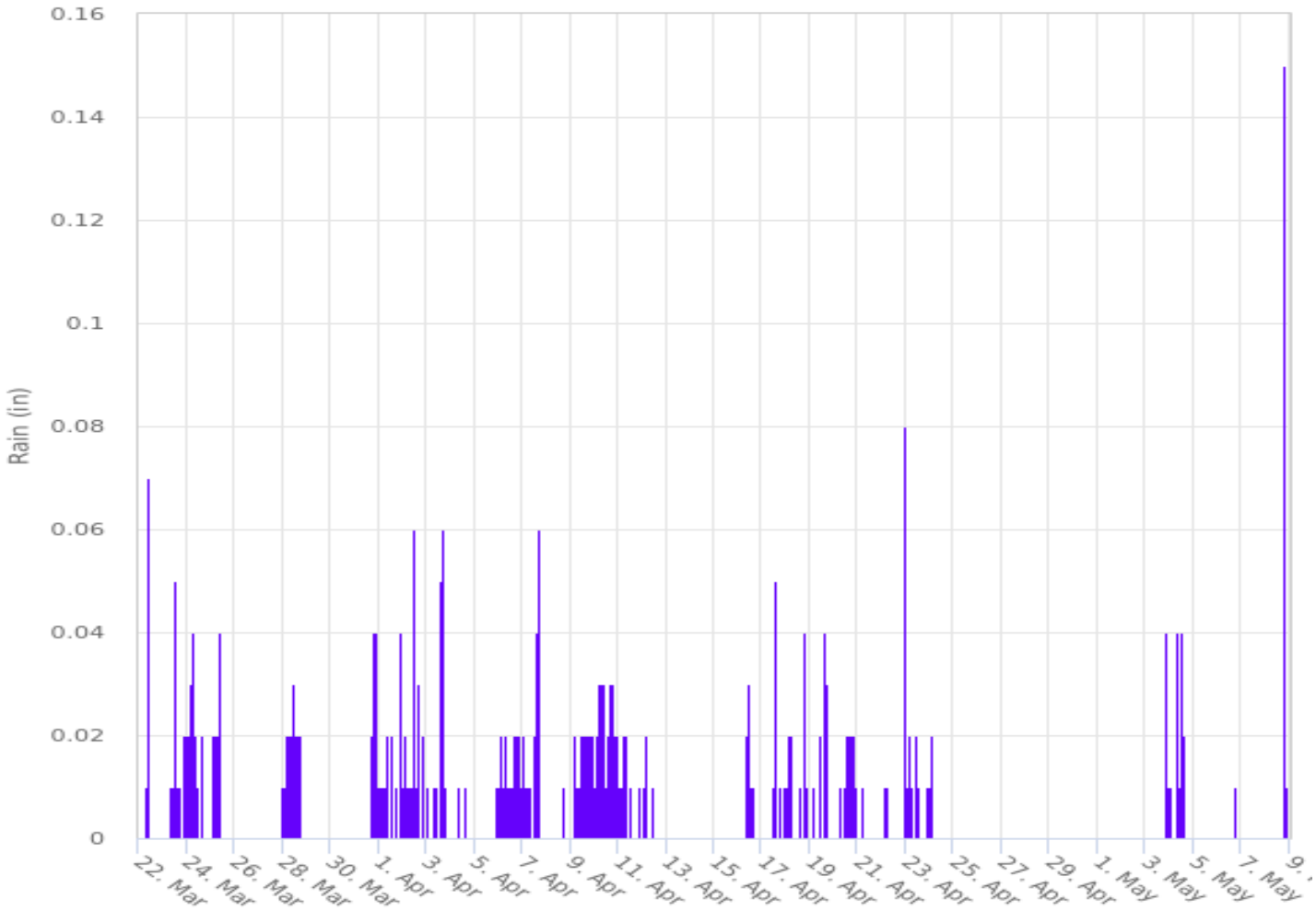
Report Period

03/22/2023
To
05/08/2023

Legend

DFINAL
VFINAL
QFINAL
RAIN FINAL

ADS ENVIRONMENTAL SERVICES



340 The Bridge Street, Suite 204
Huntsville, AL 35806

800-633-7246
www.adsenv.com

Daily Tabular Report

03/22/2023 00:00 - 05/08/2023 23:59
ORC_RGRainGauge: Unknown (0 H x 0 W), Silt0.00

	RAIN FINAL (in)
Date	Total
03/22/2023	0.16
03/23/2023	0.24
03/24/2023	0.34
03/25/2023	0.34
03/26/2023	-
03/27/2023	0.01
03/28/2023	0.63
03/29/2023	-
03/30/2023	-
03/31/2023	0.43
04/01/2023	0.28
04/02/2023	0.25
04/03/2023	0.23
04/04/2023	0.02
04/05/2023	0.05
04/06/2023	0.58
04/07/2023	0.33
04/08/2023	0.01
04/09/2023	0.49
04/10/2023	1.16
04/11/2023	0.18
04/12/2023	0.10
04/13/2023	-
04/14/2023	-
04/15/2023	-
04/16/2023	0.26
04/17/2023	0.17
04/18/2023	0.24
04/19/2023	0.21
04/20/2023	0.36
04/21/2023	0.01
04/22/2023	0.25
04/23/2023	0.11
04/24/2023	0.03
04/25/2023	-
04/26/2023	-
04/27/2023	-
04/28/2023	-
04/29/2023	-
04/30/2023	-
05/01/2023	-
05/02/2023	-
05/03/2023	0.10
05/04/2023	0.30
05/05/2023	-
05/06/2023	0.01
05/07/2023	-
05/08/2023	0.43

03/22/2023 00:00 - 05/08/2023 23:59

	RAIN FINAL (in)
Total	8.31
Average	

APPENDIX H: Budget Spreadsheet

FY 23-24 Budget
City of Oregon City | Inflow Infiltration Program Management
June 2024 | WE# ORCY-II

		FY 2023- - 2024								
Project Name	Project Number	Wallis Contract	Expenses Contract	Subs Contract	Wallis billed (5/24)	Expenses billed (5/24)	Subconsultant billed (5/24)	Wallis Remaining (5/24)	Expenses Remaining (5/24)	Subconsultant Remaining (5/24)
		Wallis	Expenses	Subconsultants	Wallis	Expenses	Subconsultants	Wallis	Expenses	Subconsultants
Inflow / Infiltration Program	OC23-I I	$ 2,055,309.45	$ 3,150.20	$ 1,745,261.37	$ 1,026,685.53	$ 4,818.96	$ 803,736.37	$ 1,028,623.92	$ (1,668.76)	$ 943,230.20
Program Administration	OC23-I I.01	$ 210,750.90	$ 200.00	$ 33,651.50	$ 191,810.97	$ 2,238.55	$ 8,842.43	$ 18,939.93	$ (2,038.55)	$ 24,809.07
Administration	OC23-I I.01.01	$ 124,007.50	$ 100.00	$ 33,651.50	$ 52,694.26	$ 1,503.44	$ 8,842.43	$71,313.24	($1,403.44)	$24,809.07
Program Meetings	OC23-I I.01.02	$ 19,699.20	$ 100.00	$ -	$ 88,727.66	$ 660.92	$ -	($69,028.46)	($560.92)	$0.00
Monthly Reports and Invoicing	OC23-I I.01.03	$ 7,632.20	$ -	$ -	$ 17,886.94	$ -	$ -	($10,254.74)	$0.00	$0.00
Annual Report	OC23-I I.01.04	$ 9,412.00	$ -	$ -	$ 32,502.11	$ 74.19	$ -	($23,090.11)	($74.19)	$0.00
Additional Services - Program Administration	OC23-I I.01.05	$ 50,000.00	$ -	$ -	$ -	$ -	$ -	$50,000.00	$0.00	$0.00
Program Management	OC23-I I.02	$ 612,672.40	$ 100.00	$ 466,340.70	$ 340,948.04	$ 2,403.99	$ 244,353.05	$ 271,724.36	$ (2,303.99)	$ 221,987.65
Public Outreach	OC23-I I.02.01	$ 20,053.40	$ -	$ 112,200.00	$ 57,721.02	$ 1,746.20	$ 25,960.01	($37,667.62)	($1,746.20)	$86,239.99
CCTV Program	OC23-I I.02.02	$ 30,591.00	$ -	$ 183,750.00	$ 41,094.02	$ -	$ 88,604.93	($10,503.02)	$0.00	$95,145.07
Basin Condition Assessment	OC23-I I.02.03	$ 353,769.00	$ -	$ -	$ 107,690.35	$ -	$ -	$246,078.65	$0.00	$0.00
Smoke Testing Program	OC23-I I.02.04	$ 21,046.50	$ -	$ 126,000.00	$ 20,631.82	$ 355.40	$ 109,756.50	$414.68	($355.40)	$16,243.50
Downspout Disconnection	OC23-I I.02.05	$ 45,227.00	$ -	$ -	$ 3,398.35	$ -	$ -	$41,828.65	$0.00	$0.00
Manhole Sealing Pilot Program	OC23-I I.02.06	$ 14,975.50	$ -	$ 11,362.50	$ 58,676.47	$ 282.74	$ 5,796.00	($43,700.97)	($282.74)	$5,566.50
Develop Project Design Criteria	OC23-I I.02.07	$ 52,010.00	$ 100.00	$ 33,028.20	$ 51,736.01	$ 19.65	$ 14,235.61	$273.99	$80.35	$18,792.59
Additional Services - Program Management	OC23-I I.02.08	$ 75,000.00	$ -	$ -	$ -	$ -	$ -	$75,000.00	$0.00	$0.00
Flow Monitoring and Analysis	OC23-I I.03	$ 21,430.00	$ -	$ 115,500.00	$ 44,619.65	$ -	$ 67,272.15	$ (23,189.65)	$ -	$ 48,227.85
Flow Monitoring and Analysis	OC23-I I.03.01	$ 21,430.00	$ -	$ 115,500.00	$ 44,619.65	$ -	$ 67,272.15	($23,189.65)	$0.00	$48,227.85
Design Pkg 1 - Linn Basin SS #1	OC23-I I.04	$ 5,924.70	$ 100.00	$ 288,821.08	$ 79,144.12	$ 8.25	$ 256,287.51	$ (73,219.42)	$ 91.75	$ 32,533.57
Design Services for Construction Pkg 1	OC23-I I.04.01	$ -	$ -	$ 40,600.00	$ 3,907.54	$ -	$ 40,514.44	($3,907.54)	$0.00	$85.56
Pre-Design Investigations / Data Review	OC23-I I.04.02	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
QA/QC Services	OC23-I I.04.03	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Utility Coordination / Survey & Geotechnical	OC23-I I.04.04	$ -	$ -	$ -	$ -	$ -	$ 3,654.00	$0.00	$0.00	($3,654.00)
Right-of-Way and Easement Acquisition Services	OC23-I I.04.05	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Bidding Services	OC23-I I.04.06	$ 1,595.50	$ -	$ 3,110.00	$ 14,053.84	$ -	$ 3,049.26	($12,458.34)	$0.00	$60.74
Construction Management Services	OC23-I I.04.07	$ 3,829.20	$ 100.00	$ 231,911.08	$ 61,182.74	$ 8.25	$ 203,210.28	($57,353.54)	$91.75	$28,700.80
Additional Services - Design	OC23-I I.04.08	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Additional Services - Construction	OC23-I I.04.09	$ 500.00	$ -	$ 13,200.00	$ -	$ -	$ 5,859.53	$500.00	$0.00	$7,340.47

		FY 2023- - 2024								
Project Name	Project Number	Wallis Contract	Expenses Contract	Subs Contract	Wallis billed (5/24)	Expenses billed (5/24)	Subconsultant billed (5/24)	Wallis Remaining (5/24)	Expenses Remaining (5/24)	Subconsultant Remaining (5/24)
		Wallis	Expenses	Subconsultants	Wallis	Expenses	Subconsultants	Wallis	Expenses	Subconsultants
Design Pkg 2 - Linn Basin SS #2	OC23-I I.05	$ 156,066.50	$ 100.00	$ 99,791.09	$ 125,592.25	$ 87.77	$ 40,446.50	$ 30,474.25	$ 12.23	$ 59,344.59
Design Services for Construction Pkg 2	OC23-I I.05.01	$ 30,658.00	$ -	$ -	$ 116,843.07	$ 87.77	$ -	($86,185.07)	($87.77)	$0.00
Pre-Design Investigations / Data Review	OC23-I I.05.02	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
QA/QC Services	OC23-I I.05.03	$ -	$ -	$ 7,000.00	$ 195.60	$ -	$ 4,180.90	($195.60)	$0.00	$2,819.10
Utility Coordination / Survey & Geotechnical	OC23-I I.05.04	$ -	$ -	$ 13,796.97	$ 45.90	$ -	$ 27,715.90	($45.90)	$0.00	($13,918.93)
Right-of-Way and Easement Acquisition Services	OC23-I I.05.05	$ -	$ -	$ 7,994.12	$ 8,507.68	$ -	$ 7,602.39	($8,507.68)	$0.00	$391.73
Bidding Services	OC23-I I.05.06	$ 5,408.50	$ -	$ -	$ -	$ -	$ -	$5,408.50	$0.00	$0.00
Construction Management Services	OC23-I I.05.07	$ 100,000.00	$ 100.00	$ 65,000.00	$ -	$ -	$ -	$100,000.00	$100.00	$65,000.00
Additional Services - Design	OC23-I I.05.08	$ -	$ -	$ 2,000.00	$ -	$ -	$ 947.31	$0.00	$0.00	$1,052.69
Additional Services - Construction	OC23-I I.05.09	$ 20,000.00	$ -	$ 4,000.00	$ -	$ -	$ -	$20,000.00	$0.00	$4,000.00
Design Pkg 3 - Molalla	OC23-I I.06	$ 362,490.00	$ 545.00	$ 119,570.00	$ 175,531.75	$ 80.40	$ 6,120.58	$ 186,958.25	$ 464.60	$ 113,449.42
Design Services for Construction Pkg 3	OC23-I I.06.01	$ 247,552.40	$ 200.00	$ 2,500.00	$ 157,292.60	$ 80.40	$ 1,385.08	$90,259.80	$119.60	$1,114.92
Pre-Design Investigations / Data Review	OC23-I I.06.02	$ 39,158.40	$ 115.00	$ 10,000.00	$ 9,746.46	$ -	$ -	$29,411.94	$115.00	$10,000.00
QA/QC Services	OC23-I I.06.03	$ 7,256.00	$ -	$ 13,650.00	$ 3,156.17	$ -	$ 4,735.50	$4,099.83	$0.00	$8,914.50
Utility Coordination / Survey & Geotechnical	OC23-I I.06.04	$ 10,282.70	$ -	$ 40,000.00	$ 5,336.52	$ -	$ -	$4,946.18	$0.00	$40,000.00
Right-of-Way and Easement Acquisition Services	OC23-I I.06.05	$ 11,608.00	$ 230.00	$ 30,000.00	$ -	$ -	$ -	$11,608.00	$230.00	$30,000.00
Bidding Services	OC23-I I.06.06	$ 4,013.60	$ -	$ -	$ -	$ -	$ -	$4,013.60	$0.00	$0.00
Construction Management Services	OC23-I I.06.07	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Additional Services - Design	OC23-I I.06.08	$ 42,618.90	$ -	$ 12,200.00	$ -	$ -	$ -	$42,618.90	$0.00	$12,200.00
Additional Services - Construction	OC23-I I.06.09	$ -	$ -	$ 11,220.00	$ -	$ -	$ -	$0.00	$0.00	$11,220.00
Design Pkg 4 - Rivercrest Lateral Rehab	OC23-I I.07	$ 36,786.95	$ 1,805.20	$ 159,986.00	$ 10,267.31	$ -	$ 79,858.20	$ 26,519.64	$ 1,805.20	$ 81,833.00
Design Services for Construction Pkg 4	OC23-I I.07.01	$ -	$ -	$ 62,413.05	$ 5,515.01	$ -	$ 53,083.74	($5,515.01)	$0.00	$9,329.31
Pre-Design Investigations / Data Review	OC23-I I.07.02	$ -	$ -	$ 24,912.30	$ -	$ -	$ 23,405.00	$0.00	$0.00	$1,507.30
QA/QC Services	OC23-I I.07.03	$ 5,855.00	$ -	$ -	$ 4,752.30	$ -	$ -	$1,102.70	$0.00	$0.00
Utility Coordination / Survey & Geotechnical	OC23-I I.07.04	$ -	$ -	$ 7,253.40	$ -	$ -	$ 1,278.38	$0.00	$0.00	$5,975.02
1705.2	1705.2	$ 1,705.20	$ 1,705.20	$ 1,705.20	$ -	$ -	$ 1,705.20	$1,705.20	$1,705.20	$1,705.20
Bidding Services	OC23-I I.07.06	$ -	$ -	$ 1,702.05	$ -	$ -	$ -	$0.00	$0.00	$1,702.05
Construction Management Services	OC23-I I.07.07	$ 29,226.75	$ 100.00	$ 35,000.00	$ -	$ -	$ -	$29,226.75	$100.00	$35,000.00
Additional Services - Design	OC23-I I.07.08	$ -	$ -	$ 23,000.00	$ -	$ -	$ 385.88	$0.00	$0.00	$22,614.12
Additional Services - Construction	OC23-I I.07.09	$ -	$ -	$ 4,000.00	$ -	$ -	$ -	$0.00	$0.00	$4,000.00

		FY 2023- - 2024								
Project Name	Project Number	Wallis Contract	Expenses Contract	Subs Contract	Wallis billed (5/24)	Expenses billed (5/24)	Subconsultant billed (5/24)	Wallis Remaining (5/24)	Expenses Remaining (5/24)	Subconsultant Remaining (5/24)
		Wallis	Expenses	Subconsultants	Wallis	Expenses	Subconsultants	Wallis	Expenses	Subconsultants
Design Pkg 5 - Applegate	OC23-I I.08	$ 250,098.00	$ 100.00	$ 394,691.00	$ 6,470.47	$ -	$ 82,549.50	$ 243,627.53	$ 100.00	$ 312,141.50
Design Services for Construction Pkg 5	OC23-I I.08.01	$ 250,098.00	$ 100.00	$ 317,789.00	$ 6,077.82	$ -	$ 23,587.06	$244,020.18	$100.00	$294,201.94
Pre-Design Investigations / Data Review	OC23-I I.08.02	$ -	$ -	$ -	$ 392.65	$ -	$ 26,724.81	($392.65)	$0.00	($26,724.81)
QA/QC Services	OC23-I I.08.03	$ -	$ -	$ -	$ -	$ -	$ 1,493.63	$0.00	$0.00	($1,493.63)
Utility Coordination / Survey & Geotechnical	OC23-I I.08.04	$ -	$ -	$ 34,902.00	$ -	$ -	$ 30,686.25	$0.00	$0.00	$4,215.75
Right-of-Way and Easement Acquisition Services	OC23-I I.08.05	$ -	$ -	$ -	$ -	$ -	$ 57.75	$0.00	$0.00	($57.75)
Bidding Services	OC23-I I.08.06	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Construction Management Services	OC23-I I.08.07	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Additional Services - Design	OC23-I I.08.08	$ -	$ -	$ 2,000.00	$ -	$ -	$ -	$0.00	$0.00	$2,000.00
Additional Services - Construction	OC23-I I.08.09	$ -	$ -	$ 40,000.00	$ -	$ -	$ -	$0.00	$0.00	$40,000.00
Design Pkg 6 - Linn Basin SS #3	OC23-I I.09	$ 285,000.00	$ 100.00	$ -	$ -	$ -	$ -	$285,000.00	$100.00	$0.00
Design Services for Construction Pkg 6	OC23-I I.09.01	$ 285,000.00	$ 100.00	$ -	$ -	$ -	$ -	$285,000.00	$100.00	$0.00
Pre-Design Investigations / Data Review	OC23-I I.09.02	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
QA/QC Services	OC23-I I.09.03	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Utility Coordination / Survey & Geotechnical	OC23-I I.09.04	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Right-of-Way and Easement Acquisition Services	OC23-I I.09.05	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Bidding Services	OC23-I I.09.06	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Construction Management Services	OC23-I I.09.07	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Additional Services - Design	OC23-I I.09.08	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Additional Services - Construction	OC23-I I.09.09	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Design Pkg 7 - Singer Hill	OC23-I I.10	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Design Services for Construction Pkg 7	OC23-I I.10.01	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Pre-Design Investigations / Data Review	OC23-I I.10.02	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
QA/QC Services	OC23-I I.10.03	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Utility Coordination / Survey & Geotechnical	OC23-I I.10.04	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Right-of-Way and Easement Acquisition Services	OC23-I I.10.05	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Bidding Services	OC23-I I.10.06	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Construction Management Services	OC23-I I.10.07	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Additional Services - Design	OC23-I I.10.08	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Additional Services - Construction	OC23-I I.10.09	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00

		FY 2023- - 2024								
Project Name	Project Number	Wallis Contract	Expenses Contract	Subs Contract	Wallis billed (5/24)	Expenses billed (5/24)	Subconsultant billed (5/24)	Wallis Remaining (5/24)	Expenses Remaining (5/24)	Subconsultant Remaining (5/24)
		Wallis	Expenses	Subconsultants	Wallis	Expenses	Subconsultants	Wallis	Expenses	Subconsultants
Design Pkg 8 - Center St Catch Basin Disconnect	**OC23-I I.11**	$ 114,090.00	$ 100.00	$ 66,910.00	$ 52,300.97	$ -	$ 18,006.45	$ 61,789.03	$ 100.00	$ 48,903.55
Design Services for Construction Pkg 8	OC23-I I.11.01	$ 48,516.40	$ -	$ -	$ 35,852.73	$ -	$ -	$12,663.67	$0.00	$0.00
Pre-Design Investigations / Data Review	OC23-I I.11.02	$ 5,400.60	$ 100.00	$ -	$ 10,936.74	$ -	$ -	($5,536.14)	$100.00	$0.00
QA/QC Services	OC23-I I.11.03	$ -	$ -	$ 7,875.00	$ 678.90	$ -	$ -	($678.90)	$0.00	$7,875.00
Utility Coordination / Survey & Geotechnical	OC23-I I.11.04	$ 2,125.30	$ -	$ 23,035.00	$ -	$ -	$ 18,006.45	$2,125.30	$0.00	$5,028.55
Right-of-Way and Easement Acquisition Services	OC23-I I.11.05	$ -	$ -	$ -	$ -	$ -	$ -	$0.00	$0.00	$0.00
Bidding Services	OC23-I I.11.06	$ 2,163.40	$ -	$ -	$ -	$ -	$ -	$2,163.40	$0.00	$0.00
Construction Management Services	OC23-I I.11.07	$ 11,817.50	$ -	$ 30,000.00	$ 4,832.60	$ -	$ -	$6,984.90	$0.00	$30,000.00
Additional Services - Design	OC23-I I.11.08	$ 11,560.60	$ -	$ 2,000.00	$ -	$ -	$ -	$11,560.60	$0.00	$2,000.00
Additional Services - Construction	OC23-I I.11.09	$ 32,506.20	$ -	$ 4,000.00	$ -	$ -	$ -	$32,506.20	$0.00	$4,000.00

Appendix I: 5-Year Look Ahead

		Annual Budgets - Design and Construction									
		23/24	24/25		25/26		26/27		27/28		
		All work	Program mgmt / Design / CM / Insp	Construction / Field Investigation	Program mgmt / Design / CM / Insp	Construction / Field Investigation	Program mgmt / Design / CM / Insp	Construction / Field Investigation	Program mgmt / Design / CM / Insp	Construction / Field Investigation
Program Management	**Project details:**	$ 1,424,000.00	$ 1,000,000.00		$ 500,000.00		$ 500,000.00		$ 500,000.00	
Manhole sealing	First phase: CI 23-011. Construction complete. Anticipated annual construction contract	$ 380,000.00	$ 50,000.00	$ 300,000.00	$ 50,000.00	$ 300,000.00	$ 50,000.00	$ 300,000.00	$ 50,000.00	$ 300,000.00
Design Pkg 1 - Linn Basin SS #1	CI 23-001, Designer: Leeway, design start: 2022, design complete July 23. Construction Complete	$ 4,080,000.00								
Design Pkg 2 - Linn Basin SS #2	CI 23-002, designer: Wallis. Design start: 11/22. Status: 90%. Construction start: 24/25	$ 250,000.00	$ 100,000.00	$ 900,000.00	$ 200,000.00	$ 1,200,000.00				
Design Pkg 3 - Molalla	CI 23-013 Designer: Wallis. Design start: 9/23. Status: out to bid. Construction start: July 2024. Est.	$ 450,000.00	$ 400,000.00	$ 5,000,000.00						
Design Pkg 4 - Rivercrest Lateral Rehab	CI 23-009 Designer: Century West. Design start: 10/23. Status: 100%. Construction Start: August 2024	$ 200,000.00	$ 400,000.00	$ 4,000,000.00						
Design Pkg 5 - Newell 1	CI 23-012 Designer: Keller Design start; February 24. Status: preliminary design. Construction start: TBD - 26/27	$ 100,000.00	$ 350,000.00				$ 150,000.00	$ 1,850,000.00	$ 100,000.00	$ 900,000.00
Design Pkg 6 - Linn Basin SS #3	Not delineated, not assigned. Anticipated design start: December 24. Anticipated Construction: FY 25/26 - FY 26/27		$ 285,000.00		$ 150,000.00	$ 1,350,000.00	$ 100,000.00	$ 900,000.00		
Design Pkg 7 - Singer Hill (McLoughlin #2)	Not delineated, not assigned. Anticipated design start: December 24. Anticipated Construction: FY 26/27-FY27/28		$ 150,000.00		$ 250,000.00		$ 100,000.00	$ 900,000.00	$ 250,000.00	$ 2,750,000.00
Design Pkg 8 - Center St Catch Basin Disconnect*	* Package 8 work is intended to be distributed to other project package delivery as appropriate	$ 100,000.00	$ 25,000.00	$ 225,000.00	$ 25,000.00	$ 225,000.00	$ 25,000.00	$ 225,000.00	$ 25,000.00	$ 225,000.00
Design Pkg 9 - McLoughlin Basin #1	CI 24-005. Designer: Leeway. Anticipated design start July 24. Status: scoping. Anticipated construction: FY 25/26 - FY 26/27		$ 350,000.00	$ 770,000.00	$ 150,000.00	$ 1,530,000.00				
Design pkg 10 -TBD (Linn #4)	Not delineated, not assigned. Anticipated design start: FY 25/26. Extended design allocated for possible envirnomental or right of way challenges. Anticipated Construction: TBD		$ 200,000.00		$ 200,000.00					
pkg 11 -TBD (McLoughlin #3)	Not delineated, not assigned. Anticipated design start: FY27/28 Anticipated Construction FY28/29									$ 200,000.00
Totals		**$ 6,984,000.00**	**$ 3,310,000.00**	**$ 11,195,000.00**	**$ 1,525,000.00**	**$ 4,605,000.00**	**$ 925,000.00**	**$ 4,175,000.00**	**$ 925,000.00**	**$ 4,375,000.00**
			$	**14,505,000.00**	**$**	**6,130,000.00**	**$**	**5,100,000.00**	**$**	**5,300,000.00**
Target totals		**6M**	**15M**		**6M**		**4M**		**4M**	