

MINUTES
BERRYVILLE TOWN COUNCIL
Berryville-Clarke County Government Center
Regular Meeting
March 14, 2023
7:00 p.m.

Town Council: Present—Harry Lee Arnold, Jr., Mayor; Erecka L. Gibson, Vice Mayor; William Steinmetz; Diane Harrison; Grant Mazzarino; Ryan Tibbens.

Staff: Present--Keith Dalton, Town Manager; Jean Petti, Deputy Town Manager; Paul Culp, Town Clerk; Chief Neal White, Berryville Police Department

Press: Mickey Powell, *The Winchester Star*

1. Call to Order

Mayor Arnold called the meeting to order at 7:00 p.m.

2. Pledge of Allegiance

3. Approval of Agenda

Vice Mayor Gibson moved to approve the agenda. The motion passed by unanimous voice vote.

4. Presentations, Awards, and Recognitions

None.

5. Public Hearings

Beach Carpenter Properties LLC, Scott N. Carpenter, Agent, requests a special use permit to allow a contractor's establishment with outdoor storage (Section 609.3(a) of the Town of Berryville Zoning Ordinance) on the property located at 25 Cattleman's Lane, identified as Tax Map Parcel number 14A3-((A))-17A, zoned L-1 Industrial. SUP 01-23.

Ms. Dunkle briefly described the matter, noting that the Planning Commission had approved the request. Mayor Arnold opened the public hearing at 7:03 p.m. In the absence of any comment, he then closed it at 7:03 p.m.

6. Discussion of Public Hearing Items

None.

Mr. Tibbens moved that the Council of the Town of Berryville approve a special use permit to allow outdoor storage for a contractor's supply business at 25 Cattleman's Lane, identified as Tax Map Parcel number 14A3-((A))-17A, under Section 609.3(a) of the Berryville Zoning Ordinance in accordance with the site plan as presented. The motion passed by unanimous voice vote.

7. Citizens' Forum

Stephanie Jones, owner of the blighted property at 203 Josephine Street that had been discussed in previous meetings, said she had requested an extension and was acquiring estimates for the required work. She said she was concerned about matters related to setback and width and that she would work with the Town to assure that she would be able to rebuild on the same footprint without any code violations.

Washington, D.C., attorney Amanda Koman, having recently become legal counsel for the owner of the blighted property at 112 Josephine Street that had been discussed in numerous previous meetings, introduced herself and said she looked forward to working with the Town on the preservation of the historic structure.

Kurt Baker said some residents do not receive their utility bills sufficiently in advance of the due date and are incurring penalties for late payment. Mayor Arnold said he would look into the matter.

8. Consent Agenda

The consent agenda comprised the minutes of the 02.14.2023 Town Council regular meeting, the minutes of the 02.23.2023 meeting of the Public Safety Committee, the minutes of the 02.27.2023 meeting of the Personnel Committee, the minutes of the 02.28.2023 meeting of the Budget and Finance Committee, and the minutes of the 02.28.2023 meeting of the Community Development Committee.

Mr. Steinmetz moved to adopt the consent agenda as presented. The motion passed by unanimous voice vote.

9. Unfinished Business

None.

10. New Business

None.

11. Council Member Reports

Mayor

Mayor Arnold said he had attended a discussion event at Barns of Rose Hill for the Town's 225th birthday celebration, and complimented Ms. Dunkle on the presentation she had given.

The other members had nothing to report.

12. Staff Reports

Nothing was added to the written report for Public Works.

Utilities

Mr. Dalton said that recent testing indicated the Town's return to compliance with standards following the discovery of excessive disinfectant byproducts in the Town's water supply, and that a notice to that effect would be posted on the Town website the next day.

Police Department

Mayor Arnold thanked Mr. Powell of *The Winchester Star* for his recent coverage of Chief White's annual report to the Council.

Community Development

Ms. Dunkle said the warehouse construction project at 410 Jack Enders Boulevard, discussed in previous meetings, would begin soon.

Ms. Dunkle said the Community Development Committee had discussed applications for the annual Virginia Commission for the Arts Creative Communities Partnership Grant, a \$4,500 line item in the Town budget accompanied by matching funds from the VCA. She said the committee had received applications from Barns of Rose Hill, the Blue Ridge Studio for the Performing Arts, Main Street Chamber Orchestra, and the Northern Shenandoah Valley Quilt Show, and had determined that each applicant should receive \$1,125 from the Town. Committee members Mr. Tibbens and Ms. Harrison said all four applicants were worthy of assistance.

Ms. Harrison moved that the Council of the Town of Berryville approve the recommended subrecipients, each receiving \$1,125 for the Creative Communities Partnership Grant as follows:

- Barns of Rose Hill
- Blue Ridge Studio for the Performing Arts
- Main Street Chamber Orchestra, Inc.
- Northern Shenandoah Valley Quilt Show

The motion passed by unanimous vote with the exception of an abstention by Mr. Tibbens.

Ms. Dunkle told the Council that in order to maintain its Tree City USA status, the Town must submit an annual application including an Arbor Day resolution.

Mr. Tibbens moved that the Council of the Town of Berryville adopt the **attached** proclamation for Arbor Day 2023. The motion passed by unanimous voice vote.

Administration and Finance

Nothing was added to Treasurer Cynthia Poulin's written report.

Deputy Town Manager

Ms. Petti said she had nothing to add to last month's report on short-term rentals. Mr. Dalton said the Public Safety and Community Development Committees had discussed the matter separately and that staff would like to present the recommended zoning ordinance amendments to the full Council in April.

Town Manager

Mr. Dalton said the Personnel Committee had reviewed the draft of a revised staff handbook based on a model obtained from the Virginia Risk Sharing Association. A brief discussion determined that the Council could address the matter in its next regular meeting rather than needing a work session.

Mr. Dalton added nothing to his written report on projects undertaken with funding from the American Rescue Plan Act of 2021 other than saying that work was proceeding on Josephine Street and that North Church Street would be next.

Mr. Dalton briefly updated the Council on blight abatement projects. He said the next milestone for 112 Josephine Street would be December 15, 2023; that the owner of 225 Josephine Street had obtained some but not all of the necessary permits and that staff had met with the owner in order to facilitate compliance; that the owner of 114 Josephine Street had demolished the structure but had not yet cleaned up the site; that the owner of 12 First Street had complied with all deadlines thus far; and that the owner of 229 Josephine Street wished to speak with Ms. Dunkle about the permissibility of rebuilding in a non-conforming manner. He said he also had been in contact with the owner of 203 Josephine Street and asked Council to allow additional time for discussion with that owner.

13. Committee Updates

Budget and Finance

Vice Mayor Gibson said the Council needed to set a public hearing, to occur in its next regular meeting, on proposed tax rates for Tax Year 2023.

Vice Mayor Gibson moved that the Council of the Town of Berryville set a public hearing for its April 11, 2023 meeting to hear public comment on the proposed tax rates for Tax Year 2023. The motion passed by unanimous voice vote.

Community Development

Mr. Tibbens said the committee had met in February to discuss Hogan's Alley, short-term rentals, and the aforementioned arts grant. Ms. Harrison said Ms. Dunkle had recently provided committee members with the design for the wayfinding signage previously approved by the Council, and asked for a vote to proceed with that design. She said there had been a question about whether brick would be permissible in a Virginia Department of Transportation right of way, but that signs in such locations would be constructed of brick veneer on breakaway posts. There was a brief discussion of the not-yet-determined location of the signs.

Mr. Tibbens moved that the Council of the Town of Berryville approve the design for the wayfinding signage recommended by the Wayfinding Task Group as presented. The motion passed by unanimous voice vote.

Personnel

Mayor Arnold noted the need to fill vacancies on the Tree Board and Planning Commission, and said the committee would meet on April 24 at 2:00 p.m.

Public Safety

Mr. Mazzarino said the committee had met in February and had discussed handicapped parking,

police staffing, and short-term rentals. He said the Town currently allows the use of handicapped parking for two hours at a time, while the state recommends four, and that the committee recommends the latter, with two hours for other parking.

Mr. Dalton said that if the Town retains a two-hour policy for handicapped parking, the public should be formally notified.

Ms. Harrison asked if the limit is four hours for vehicles with handicapped placards, and Mr. Dalton said yes, the Virginia Code default is four hours in any metered space.

Mr. Tibbens asked whether the Town has sufficient spaces to comply with requirements. Ms. Dunkle and Mr. Dalton explained that there are no requirements but that the Town exceeds guidelines and that mindfulness of safety is essential in deciding where to locate handicapped spaces.

Mssrs. Mazzarino and Dalton agreed that the Council in its April meeting should discuss the time limit for handicapped parking.

Streets and Utilities

Ms. Harrison said the committee would meet the following day at 3:00 p.m. for a presentation on the results of the recently completed inflow and infiltration study of the sewer system.

14. Closed Session

None.

15. Adjourn

The Council adjourned at 7:36 p.m. on a motion by Vice Mayor Gibson

Erecka L. Gibson, Vice Mayor

Paul Culp, Town Clerk

BERRYVILLE TOWN COUNCIL SIGN-UP SHEET

Citizens' Forum

Tuesday, March 14, 2023

7:00 p.m.

Name:

Town of Berryville Resident?

S.D. Jones Yes No

Amunda Koman Yes No

Kurt Belm Kurt Baker Yes No

_____ Yes No



TREE CITY USA
An Arbor Day Foundation Program

Official Proclamation

- Whereas, In 1872, J. Sterling Morton proposed to the Nebraska Board of Agriculture that a special day be set aside for the planting of trees; and
- Whereas, this holiday, called Arbor Day, was first observed with the planting of more than a million trees in Nebraska; and
- Whereas, Arbor Day is now observed throughout the nation and the world; and
- Whereas, trees can reduce the erosion of our precious topsoil by wind and water, cut heating and cooling costs, moderate the temperature, clean the air, produce life-giving oxygen, and provide habitat for wildlife; and
- Whereas, trees are a renewable resource giving us paper, wood for our homes, fuel for our fires, and countless other wood products; and
- Whereas, trees in our town increase property values, enhance the economic vitality of business areas, and beautify our community; and
- Whereas trees, wherever they are planted, are a source of joy and spiritual renewal.

Now, therefore be it resolved that the Council of the Town of Berryville does hereby proclaim May 6, 2023 as Arbor Day in the Town of Berryville.

Town Council urges all citizens to celebrate Arbor Day and to support efforts to protect our trees and woodlands and urge all citizens to plant trees to promote the well-being of this and future generations.

By order of the Town Council this 14th day of March, 2023.



Harry Lee Arnold, Jr., Mayor



Erecka L. Gibson, Vice Mayor

BERRYVILLE TOWN COUNCIL

MOTION TO SET PUBLIC HEARING FOR APRIL 11, 2023 ON
PROPOSED TAX RATES 2023

Date: March 14, 2023

Motion By: *Gibson*

Second By:

I move that the Council of the Town of Berryville set a public hearing for its April 11, 2023 meeting to hear public comment on the proposed Tax rates for 2023.

VOTE:

Aye: *Unanimous voice vote*

Nay:

Absent:

ATTEST:

Erecka L. Gibson, Vice Mayor

MINUTES
BERRYVILLE TOWN COUNCIL
Berryville-Clarke County Government Center
Work Session
March 6, 2023
3:00 p.m.

Town Council: Present--Harry Lee Arnold, Jr., Mayor; Erecka L. Gibson, Vice Mayor; William Steinmetz; Grant Mazzarino; Ryan Tibbens. Absent—Diane Harrison

Staff: Present—Keith Dalton, Town Manager; Paul Culp, Town Clerk; Cynthia Poulin, Treasurer; Jean Petti, Deputy Town Clerk

1. Call to Order

Mayor Arnold called the meeting to order at 3:03 p.m.

2. Approval of Agenda

Mayor Arnold invited a motion to approve the agenda.

Vice Mayor Gibson moved to approve the agenda. The motion passed by unanimous voice vote.

3. Unfinished Business

None.

4. New Business

Review of Proposed Fiscal Year 2024 Budget

Ms. Poulin briefly summarized the **attached** budget highlights.

There was a short discussion of the Public Works salt building and snow removal needs.

Mr. Dalton said the Town would be drawing on reserves to a considerable extent in the coming fiscal year, having accumulated savings in the year previous because a contractor had pre-paid numerous availability fees. He said membrane replacement for the wastewater treatment plant would account for a large planned expense.

Mr. Dalton then directed the Council's attention to the agenda materials addressing capital improvement projects. He said the planned upgrade to the water treatment plant would require indebtedness and that he would apply to the Virginia Department of Health for assistance but that

the Council would have to act before the Town could incur debt. He noted the need also for a water distribution system upgrade, water meter replacement, sewer system upgrades, a new bar screen and harmonic balancer at the wastewater treatment plant, computer replacement in multiple departments, improvements to Rose Hill Park and Hogan's Alley, and possible street repairs on Virginia Avenue and surrounding area, East Fairfax, and Mosby Boulevard.

Mr. Dalton also noted the need to create a position for a second chief water treatment plant operator so as to have one each for water and sewer. There was a discussion of the need to fill the vacant position of Utilities Director and of changing criteria and industry standards for such positions.

Mr. Tibbens asked how the planned payroll increases would be possible without higher taxes and utility rates. Mr. Dalton said the increased user fees for water and sewer made this possible. Ms. Poulin noted that revenue from personal property taxes, meals taxes, and business license fees had exceeded expectations in the previous fiscal year.

There was a discussion of personal property tax relief, which Mr. Dalton said had been unusually high for several years but would now fall from 70 percent to 35 percent.

Mayor Arnold noted that the coming increase in utility user fees would be the fifth in a five-year planned escalation motivated largely by the need for treatment plant upgrading.

Mr. Tibbens asked whether revenue from other sources could be used for water and sewer, and Mr. Dalton explained that water and sewer enterprise funds are to be self-funding. He said no funds may flow to other funds from enterprise funds, and that while the general fund could be used for water/sewer needs, this was not recommended.

There was a discussion of when to schedule the public hearings on tax rates, personal property tax relief, and utility fees, and Mr. Dalton said he would consult the Town attorney to ensure that the timing was in line with legal requirements.

Mayor Arnold said the Council should remind the public of the historical background of personal property tax relief percentages in order to provide perspective on the coming reduction.

Vice Mayor Gibson asked whether the planned payroll increase was a cost-of-living matter. Mr. Dalton said the rationale was primarily one of aligning the Town's compensation packages with contemporary norms, inasmuch as favorable salaries and benefits are less expensive than turnover and recruitment and training, especially for the police force.

There was a discussion of in-car cameras for the police, which are provided via a maintenance contract and which therefore do not appear as a separate budget item.

Mr. Dalton and Ms. Poulin said the public hearing on the budget must occur in May, with adoption in June.

Vice Mayor Gibson returned to the topic of utility charges, noting that all consumers share equally in the cost of operating the system and that rates *per se* have not changed at all, a fact not always obvious to consumers displeased by their bills. Mr. Dalton said the Council's decision about user fees had allowed for large projects without sudden large increases in fees and charges. Mayor Arnold and Vice Mayor Gibson agreed that anticipation and education had been important in addressing the matter.

5. Other

None.

6. Closed Session

There was no closed session.

7. Adjourn

Mayor Arnold requested a motion to adjourn.

Recorder Gibson moved to adjourn. The motion passed by consensus at 4:21 p.m.

Erecka L. Gibson, Vice Mayor

Paul Culp, Town Clerk

FY 2023-2024 DRAFT BUDGET PREPARATION HIGHLIGHTS

REVENUES

GENERAL FUND

- No increase in Real Estate tax rate.
- No increase in Personal Property tax rate.
- PPTRA will change to 35%.
- No increase in Machinery & Tools tax rate.
- No increase in Vehicle License Fees.
- No increase in Business & Professional License rates.
- Water Tank Site Lease adjustments per agreements.
- No increase in Lodging Tax, Meals Tax or Cigarette Tax.

WATER FUND

- Revenues reflect programmed increase in Admin/Facility fees in late November 2023.
- Two residential Availability Fees projected.

SEWER FUND

- Revenues reflect programmed increase in Admin/Facility fees in late November 2023.
- Two residential and Availability Fees projected.

OPERATING EXPENSES

ALL FUNDS

- 7.1% increase in payroll.
- Police Dept CDP payroll increases included.
- 8.84% increase in Health Insurance costs.
- Employer contribution to VRS did not increase.
- TOTAL BUDGET decrease of 4.41%.

GENERAL FUND

- Decrease in Maintenance & Operational Expenses of 36.63%.
- Contingency is 3% of the Operating Budget.
- General Fund total decrease of 30.62 %.

WATER FUND

- Increase in Maintenance & Operational Expenses of 3.72%.
- There is currently no Debt Service in the Water Fund.
- New Utility Chief Operator position budgeted.
- Contingency is 3 % of the Operating Budget.
- Water Fund total increase of 43.71%.

SEWER FUND

- Increase in Maintenance & Operational Expenses of 11.38%.
- Debt service reflects payments to VRA.
- New Utility Chief Operator budgeted.
- Contingency is 3% of the Operating Budget.
- Sewer Fund total Increase of 13.61%.

BERRYVILLE TOWN COUNCIL STREETS AND UTILITIES COMMITTEE
Berryville-Clarke County Government Center
MINUTES
March 15, 2023

A meeting of the Berryville Town Council Streets and Utilities Committee was held on Wednesday, March 15, 2023 at 3:00 p.m. in the Berryville-Clarke County Government Center, located at 101 Chalmers Court in Berryville, Virginia.

Members of the committee present: Diane Harrison, Chair; Ryan Tibbens

Other Council member present: Mayor Jay Arnold

Staff present: Keith Dalton, Town Manager; Paul Culp, Town Clerk

Also participating: Matt Youngblood, Director of Municipal Services for Pennoni Associates; Mike Ping, Project Engineer, Duke's Root Control (participating remotely)

1. Call to Order

Ms. Harrison called the meeting to order at 3:00 p.m.

2. Approval of Agenda

The agenda was approved by consensus on a motion by Mr. Tibbens.

3. Unfinished Business

Results of Sewer System Inflow and Infiltration Study

Mr. Youngblood explained that the Town had engaged Pennoni Associates for flow monitoring and that Pennoni had then called upon Duke's for the study. Mr. Ping then gave the committee a step-by-step presentation of the attached report.

Mr. Ping said the Berryville system is in very good condition in comparison with other systems throughout the country, especially in the East, and that inflow and infiltration are minimal.

Mr. Dalton asked whether the time-frame and conditions had provided sufficient opportunity to acquire data on infiltration. Mr. Ping said yes, that the study would have detected any existing problems. Mr. Dalton asked whether an unusually protracted rain event would create inflow and infiltration that was not seen during monitored rain events, and Mr. Ping said this was not likely.

Mr. Dalton and Ms. Harrison discussed pump stations.

Mr. Dalton asked what should be done to determine the source of inflow that occurred without infiltration. Mr. Ping said smoke testing would be desirable and likely would result in a practical repair schedule.

Mr. Tibbens and Mr. Dalton discussed the relative responsibilities of the Town and homeowners. Mr. Dalton said the Town likely would bear the cost of correcting infiltration, while inflow likely would require correction by property owners. There was a discussion of how to estimate the cost of inflow and infiltration to the Town.

Mr. Dalton asked what other recommendations Mr. Ping had, and Mr. Ping said the Town's own crew with its own cameras could monitor the system during a rain event. He said dye testing probably was not necessary and that inflow and infiltration cannot be entirely eliminated.

Ms. Dalton said the value of the study is that it provides a picture of the condition of the system at a particular fixed time.

Ms. Harrison said it might be necessary to undertake a small expenditure sooner in order to avoid a large one later. Mr. Dalton said the important thing is to remain in compliance with regulations and avoid problems with regulatory authorities. He also noted that inflow and infiltration adversely affect not only pumps and other equipment but also the biological treatment process.

4. New Business

None.

5. Other

None.

6. Closed Session

None.

7. Adjournment

The meeting adjourned at 4:29 p.m. on a motion by Mr. Tibbens.



PROJECT FINDINGS

Duke's Microdetection I&I Study

Study Period: September 1, 2022 to December 7, 2022

Prepared For:

Berryville, VA



800.447.6687 | dukes.com

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Executive Summary Report

Berryville VA — Microdetection I&I Study



Purpose of Study:

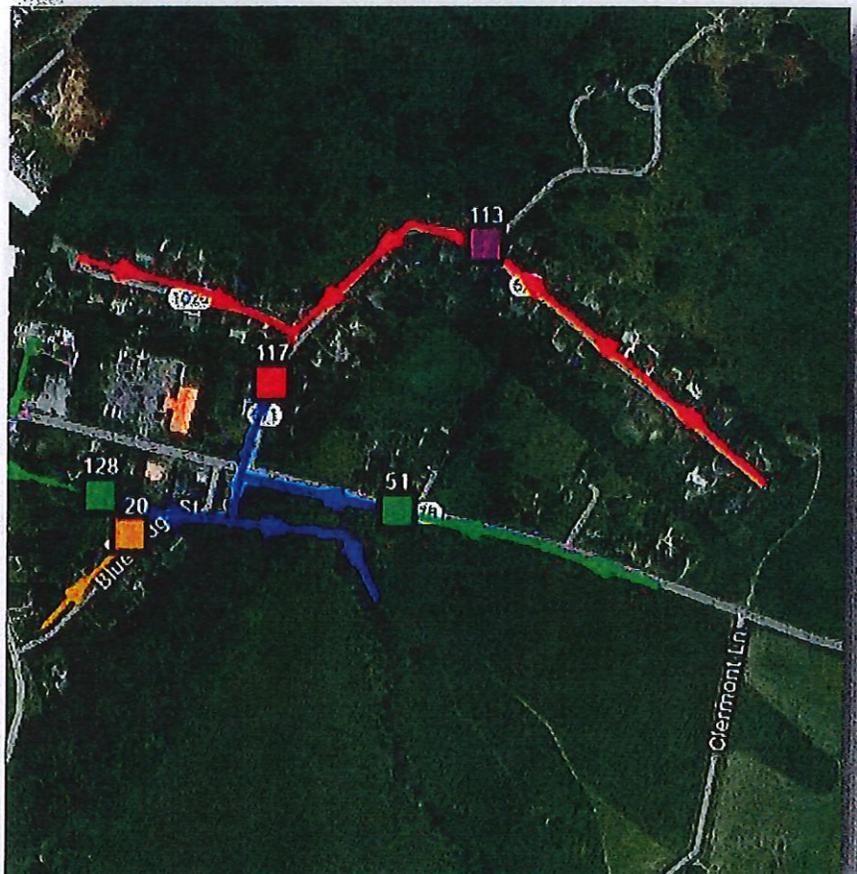
Dukes Microdetection seeks to identify and prioritize areas of most concern, while also eliminating certain areas that are less likely to need additional resources. Specific follow up actions are identified and can be applied strategically to a much more concentrated area, resulting in cost effective and efficient next steps.

Methods:

This study seeks to identify sources of Inflow and Infiltration due to rain events as well as potential O&M defects causing reduced capacity. Three technologies were deployed for this study. Ultrasonic level microdetection meters, known as iTrackers, which continuously measure level changes in 15 minute increments were deployed throughout the study area. This level data is compared during times of dry weather versus selected wet weather periods in order to determine which areas show the greatest impact. Volumetric flow estimates are calculated in order to provide context in the overall evaluation.

In addition to the iTracker Microdetection, (3) area velocity meters were installed in strategic locations in order to measure volumetric flow.

Study Quick Glance Statistics	
iTrackers Installed	88
Linear Feet (LF)	17,086
Study Length (days)	98
Number Rain Days	28
Total Rainfall (inches)	8.92
Average Rainfall (inches)	0.32
Average Wet Period	29%
Heaviest Rainfall (24 hours)	1.21
Good/Fair Rating	73
Moderate/Severe Rating	15
Burcharged or Not Measured	0



Manhole 177 and upstream noted as SEVERE, along Bettlestown Drive

iTracker Study Findings:

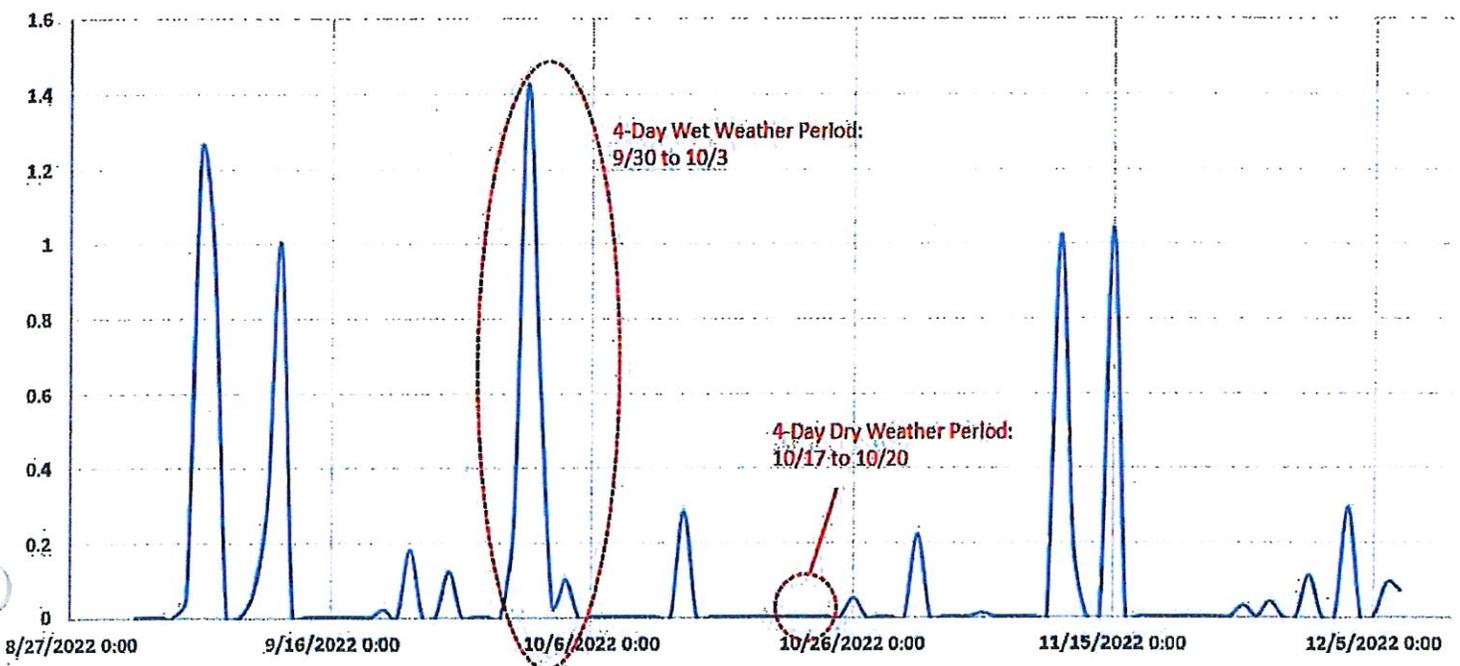
The purpose of a microdetection metering study is to pinpoint and isolate key contributor lines within a collection system that are prone to respond to rain events with increases in level, and corresponding flow. Those additional wet weather flows increase WWTP costs, reduce system capacity and have the potential to cause surcharging, overflows and backups in the system. Dukes deployed microdetection meters, called ITrackers, throughout the system.

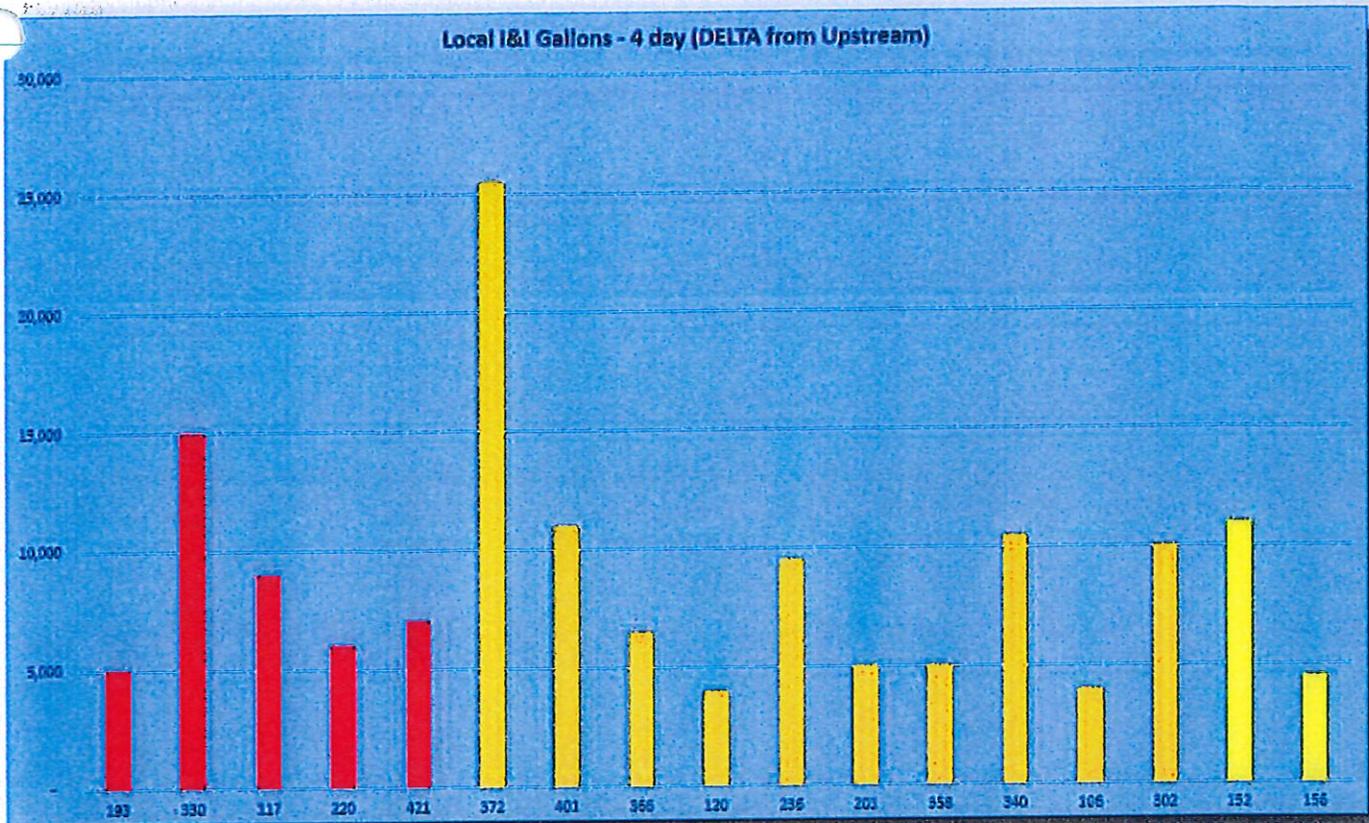
It was observed that this area experiences relatively small amounts of inflow. Surcharge conditions did not exist throughout the study period. Each area just upstream of each iTracker receives a final priority rating of; good, fair, moderate, or severe. All data is available and provided in a .csv file.

Method of Analysis: Flow levels during wet weather are compared with flow levels during dry weather in order to compare the collection system's reaction, and determine potential areas of I&I sources. The dry weather period used for this study is a 4-day period beginning June 20 through June 23. The 4-day wet weather period is defined during the dates between May 23 and May 26. A four day wet weather flow estimate will capture both inflow (1 day of heaviest rain) and infiltration (plus 3 days).

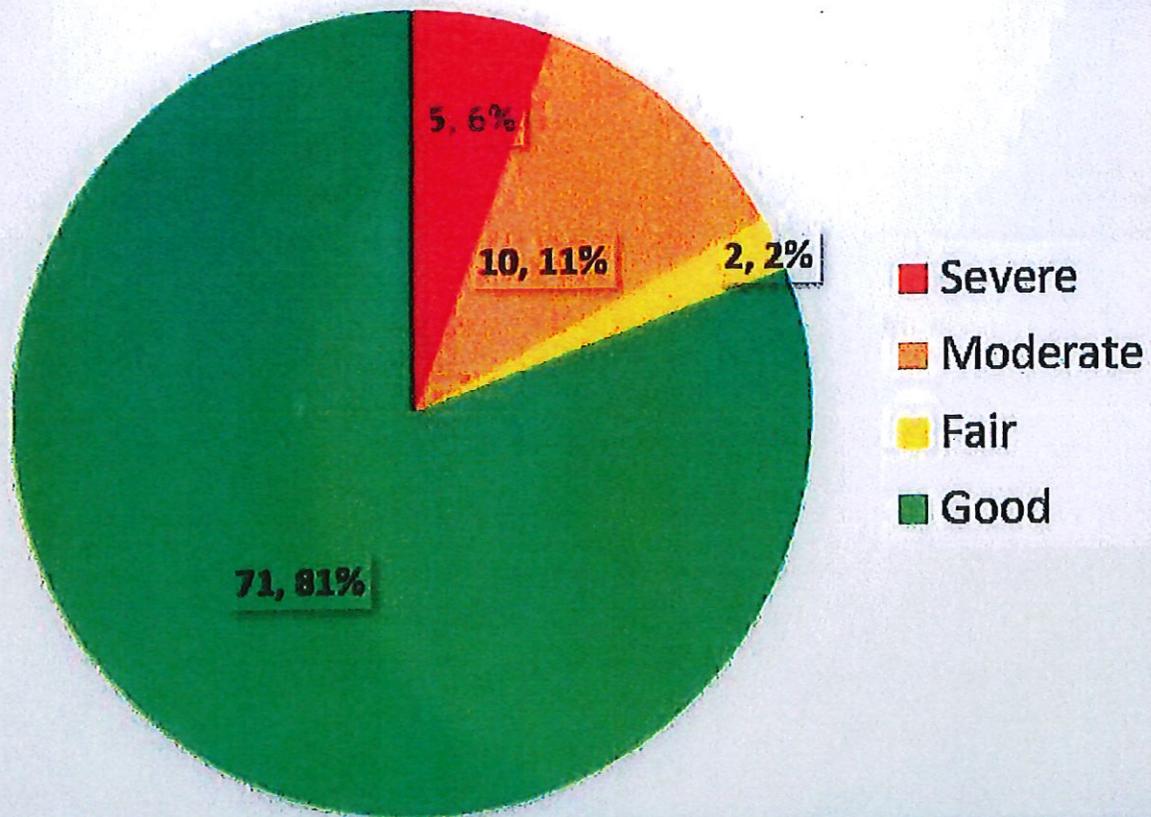
The 4 day wet weather volume is compared with the 4-day dry weather volume. Consideration is given towards upstream values in order to differentiate and not include upstream contributions. Results are scored based on the relative severity of estimated inflow and infiltration volumes as compared with the estimated average dry weather flows (ADWF). For example, a pipe segment with relatively small ADWF showing large amounts of I&I would generate a high score of severity. The intent of the score is to help determine pipe segments that would be better candidates for further investigative or rehabilitation efforts. Recommended follow up action steps would include smoke testing of areas with a SEVERE or MODERATE score. Often, smoke tests can generate relatively quick and cost effective repairs that can significantly reduce sources of inflow, such as cross connections and illegal roof/gutter connections.

24-Hour Rainfall Totals – Berryville VA (inches)



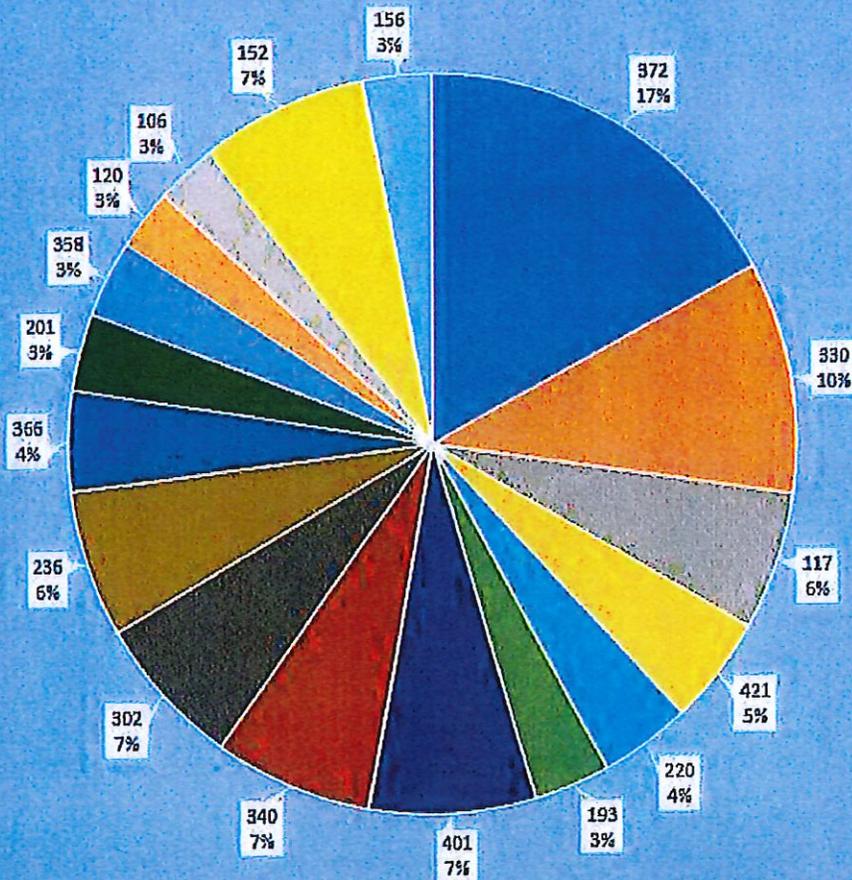


Severity Rating Distribution



Tracker Results:

Estimated I&I Distribution - 4 day (DELTA from Upstream)



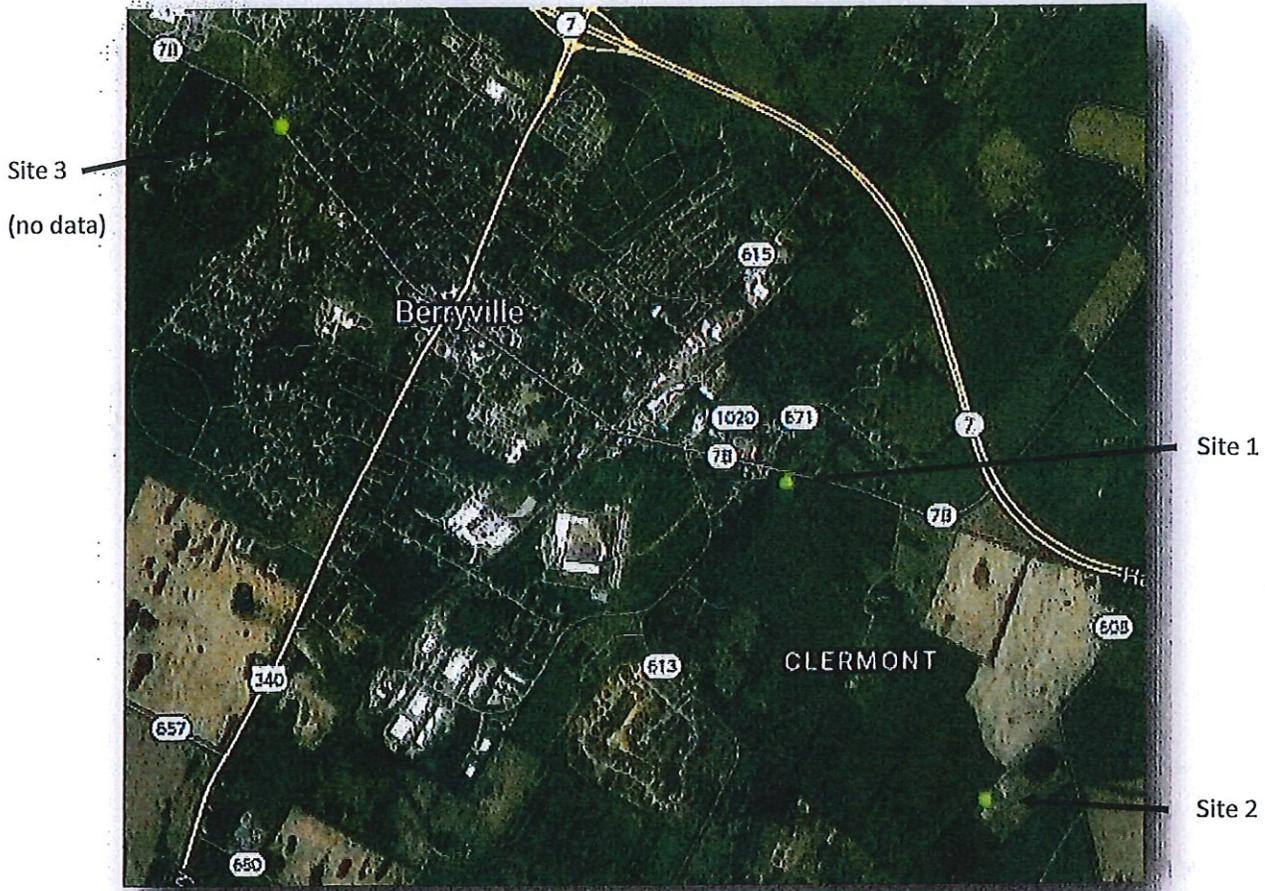
Flow Meter Summary:

A detailed appendix of flow data is provided as an electronic .csv file. The equipment utilized were Hach FL900 series, with a submerged area velocity sensor that measures level and velocity in 5 minute intervals. Data is sent via cellular modem to a server in 2 hour increments. All raw data is available via the Claros web platform. The data appendix contains data that is lightly edited to account for "pops" and "drops" within the data. All installation and maintenance logs are provided separately within the flow meter portion of the report. An overall summary of findings is included within this section of the report.



It should be noted that Site 3 had site conditions that were such that intended results were not possible to obtain. This was noted during the time of equipment installation. However, it was decided to make an attempt in order to get the best results possible, with the possibility that pump cycles could be determined and analyzed. Level and velocity characteristics were outside of the manufacturer's recommendations. Post study, this data was analyzed further in order to assess whether or not it would be possible to draw a conclusion based on recognizing individual pump cycles, in order to determine a higher pumping frequency during rain events. While it is possible to determine some pump cycles, the data quality is not sufficient to determine a final conclusion regarding increased pumping during rain event time periods. Therefore the data for Site 3 was removed.

Flow Meter Summary:



Locations of Flow Meter Installations

TABLE 1: 1st RAIN EVENT - 3.55 in of RAINFALL
 DRY WEATHER FLOW (11/5/2022 - 11/8/2022), WET WEATHER FLOW (11/11/2022 - 11/14/2022)

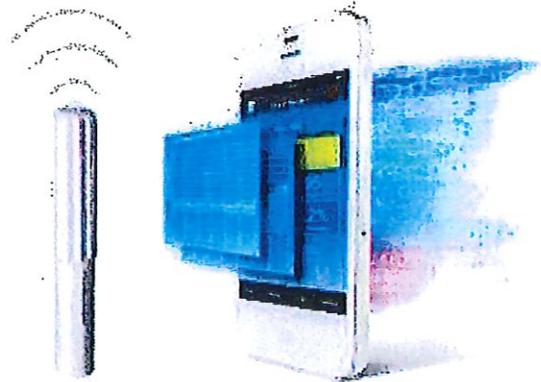
METER	PIPE DIAMETER (in)	AVERAGE LEVEL (in)	AVERAGE VELOCITY (in)	AVERAGE FLOW (gpm)	TOTAL FLOW FOR ENTIRE PERIOD (gal)	DRY WEATHER FLOW (gal)	WET WEATHER FLOW (gal)	RDII (gal)	PEAK WET WEATHER FLOW (gpm)	PEAKING FACTOR (PEAK WET WEATHER FLOW/AVERAGE FLOW)	TOTAL RAINFALL DURING WET WEATHER EVENT (in)
Berryville VA 1	18	4.02	1.77	246.35	14,544,385	1,205,019	1,571,353	366,334	543.14	2.20	1.55
Berryville VA 2	24	3.50	1.94	255.47	15,082,860	1,308,766	1,623,411	314,645	679.45	2.66	1.55

TABLE 2: 2nd RAIN EVENT - 0.94 in of RAINFALL
 DRY WEATHER FLOW (11/5/2022 - 11/8/2022), WET WEATHER FLOW (11/16/2022 - 11/19/2022)

METER	PIPE DIAMETER (in)	AVERAGE LEVEL (in)	AVERAGE VELOCITY (in)	AVERAGE FLOW (gpm)	TOTAL FLOW FOR ENTIRE PERIOD (gal)	DRY WEATHER FLOW (gal)	WET WEATHER FLOW (gal)	RDII (gal)	PEAK WET WEATHER FLOW (gpm)	PEAKING FACTOR (PEAK WET WEATHER FLOW/AVERAGE FLOW)	TOTAL RAINFALL DURING WET WEATHER EVENT (in)
Berryville VA 1	18	4.02	1.77	246.35	14,544,385	1,205,019	1,494,425	289,405	397.32	1.61	0.94
Berryville VA 2	24	3.50	1.94	255.47	15,082,860	1,308,766	1,567,291	258,525	453.90	1.78	0.94

PRECISION I&I MICRODETECTION

Precision I&I Microdetection seeks to identify sources of Inflow and Infiltration due to rain events, which is classified of RDII – Rain Derived Inflow and Infiltration. Other anomalies such as reduced flow capacity due to pipe structural or O&M conditions can also be identified. Ultrasonic level detectors, known as iTrackers, continuously measure sewer levels in 15-minute increments are deployed throughout the study area. Our algorithms prioritize areas of most concern by looking at dry weather levels, wet weather levels, pipe sizes, and pipe connectivity. All data is reviewed to eliminate occurrences of erroneous data that can impact the final priority score.

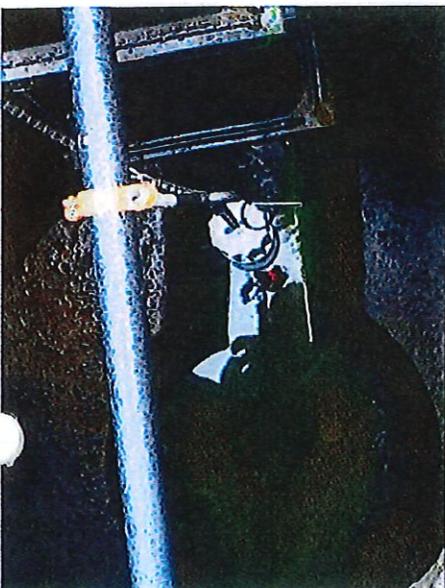


FIELD DATA COLLECTION

Basin isolation studies utilize iTrackers in key outfalls within a study area to determine which basin(s) may be contributing I&I within a system.

Microdetection studies utilize the installation of iTrackers in manholes canvassing the study area in an effort to pinpoint which pipe segments may be contributing I&I within a basin or system.

Study durations are dependent on major (>1 inch) rain events. Minimum study length is typically 30 days.



This section contains definitions and abbreviations commonly used throughout this report.

Base Flow— sustained or dry weather flows not directly generated by rainfall. It commonly constitutes flows generated by domestic and industrial discharge and also infiltration.

CCTV— Closed Circuit Television

Direct Cross Connection— a connection of a collector of storm water, e.g. area drain or inlet, to the sanitary sewer main line or building lateral.

Drop Pipe Connection— A vertical connection to or near the invert level of a manhole from a sewer or drain at a higher level.

GIS— Geographical Information System

GPD— Gallons per day

GPM— Gallons per minute

GPS— Global Positioning System

Gravity System (or Gravity Sewer)— a drain or sewerage system whereby flow is created by the action of gravity and where the pipeline is designed to operate partially full.

Hydrograph— a graph showing, for a given point on a stream or conduit, the discharge, stage, velocity, available power or other property of water with respect to time.

Indirect Cross Connection— the storm sewer is not directly connected to the sanitary sewer main line or building lateral, but there are leaks in both storm sewer and the sanitary sewer allowing storm water to migrate to the sanitary sewer.

Infiltration (as defined by USEPA) - the water entering a sewer system and service connections from the ground through such means as, but not limited to, defective pipe, pipe joints, service connections, service laterals, or manhole walls.

Inflow (as defined by USEPA) - the water discharge into a sewer system, including service connections, from such sources as downspouts; sump pumps; cellar, yard, and area drains; foundation drains; cooling water discharges; drains from springs and swampy areas; manhole covers; cross connections from storm sewers, combined sewers, or catch basins; storm waters; surface runoff; or drainage.

Inflow and Infiltration I&I— the extraneous clean water from rainfall that enters the sanitary sewer system that can be eliminated on a cost-effective basis.

Invert— The lowest point of the internal surface of a drain, sewer or channel at any cross section.

Lagoon— a pond in which algae, sunlight, and oxygen interact to restore wastewater to a quality often equal to that of the effluent from the secondary treatment stage.

MACP— Manhole Assessment Certification Program

Manhole— A working chamber with cover constructed on a drain or sewer within which a person may inspect, test or clear and remove obstructions.

MGD— Million gallons per day

Outfall— the point, location or structure where wastewater or drainage discharges from a pipe, channel, weir, drain or other conduit.

Overflow— the intentional or unintentional discharge of sewage to the environment before it has been treated.

NASSCO— National Association of Sewer Service Companies

PACP— Pipeline Assessment Certification Program

Pump Station— a structure containing pumps and appurtenant piping, valves and other mechanical and electrical equipment for pumping water, wastewater and other liquids.

PVC— Polyvinyl Chloride

Sanitary Sewer Evaluation Survey (SSES) - the study of a sanitary system through various investigation techniques, to identify sources of extraneous rainwater that are entering the sewers. These investigations may include flow monitoring, precision I&I microdetection, dye testing, smoke testing, television inspection, manhole inspection and flood prevention inspection.

Sewage— wastewater and/or surface water conveyed by a drain or sewer

Sewer System— the network of pipelines and ancillary works, which conveys wastewater and/or surface water from drains to a treatment works or other place of disposal.

Silt— sediment (often soil) consisting of particles which is carried in the waterflow and may settle to the bottom of a pipe.

Standard Deviation 2- Two standard deviations represent 95% of all observations within the data population.

Storm Sewer— a sewer that carries only runoff from storm events

Surcharge— overloading of the sewer beyond its design capacity. The channel entrance and exit are submerged and the pipe is flowing full.

VCP— Vitrified Clay Pipe

Wastewater- water changed by use and discharged to a drain or sewer system

WWTP-Wastewater Treatment Plant

OVERALL RESULTS SUMMARY & DEFINITIONS



Site ID	Pipe Diam	Depth-Max (In)	Depth-Min (In)	Average Dry Level (In)	% of full pipe DRY (Capacity or O&M)	Time In Surge (hours)	ADWF (GPM)	GW (GPM)	4 day Rain Event (In) Gallons (Estimated)	Local (In) Gallons - 4 day (DELTA from Upstream)	Peak Factor	Relative Severity	Priority
193	8	1.22	0.17	0.40	0.05	0	0.23	0.23	5,000	5,000	17.60	1.25	Very Poor
330	8	1.35	0.44	0.65	0.08	0	2.72	1.35	15,000	15,000	5.40	1.13	Very Poor
117	8	1.12	0.25	0.52	0.06	0	1.31	1.02	9,000	9,000	5.84	0.81	Very Poor
220	8	0.78	0.25	0.41	0.05	0	0.73	0.43	6,000	6,000	4.44	0.72	Very Poor
421	8	1.02	0.25	0.45	0.06	0	1.22	0.82	8,000	7,000	6.31	0.61	Very Poor
372	8	2.81	0.6	2.20	0.28	0	22.97	11.93	52,000	25,500	2.39	0.55	Moderate
401	8	1.04	0.5	0.50	0.06	0	4.46	4.46	11,000	11,000	5.76	0.48	Moderate
366	8	1.45	0.46	0.69	0.09	0	1.63	0.90	7,000	6,500	5.32	0.42	Moderate
120	8	0.84	0.14	0.31	0.04	0	0.73	0.53	5,000	4,000	9.79	0.32	Moderate
236	8	2.42	1.01	1.48	0.19	0	4.98	3.39	10,000	9,500	2.83	0.30	Moderate
201	8	1.15	0.52	0.69	0.09	0	1.69	1.26	6,000	5,000	3.20	0.25	Moderate
358	8	1.21	0.68	0.87	0.11	0	2.15	2.38	5,000	5,000	2.12	0.25	Moderate
340	8	0.95	0.25	0.54	0.07	0	7.75	4.65	21,000	10,500	3.35	0.22	Moderate
106	8	0.83	0.34	0.54	0.07	0	1.40	1.20	4,000	4,000	2.70	0.20	Moderate
302	8	2.48	0.17	0.95	0.12	0	11.19	3.77	10,000	10,000	3.70	0.20	Moderate
152	6	2.55	0.93	1.36	0.23	0	14.53	9.79	30,000	11,000	3.49	0.14	Fair
156	8	1.49	0.75	0.94	0.12	0	3.05	2.96	10,000	4,500	4.80	0.10	Fair
324	15	4.24	1.49	2.38	0.16	0	73.72	49.84	197,000	20,000	3.41	0.09	Good
59	8	1.67	1.04	1.24	0.16	0	7.54	6.44	10,000	6,000	1.94	0.09	Good
285	8	2.63	1.25	0.25	0.03	0	4.66	4.18	3,000	3,000	2.87	0.09	Good
261	12	2.14	1.2	1.78	0.15	0	26.10	17.17	50,000	10,000	1.48	0.06	Good
326	8	1.62	0.41	0.90	0.11	0	6.07	1.31	20,000	5,000	3.25	0.06	Good
379	8	1.62	0.86	1.13	0.14	0	21.55	14.22	52,000	10,000	2.25	0.06	Good
284	15	5.19	3.1	3.73	0.25	0	112.37	81.34	230,000	20,000	2.07	0.06	Good
424	18	0.52	0.24	0.30	0.02	0	0.72	1.00	2,000	2,000	5.92	0.06	Good
141	8	1.43	1.25	1.25	0.16	0	21.80	22.08	60,000	10,000	1.35	0.06	Good
283	18	4.74	1.9	2.75	0.15	0	97.80	48.77	254,000	20,000	3.27	0.06	Good
8	8	0.61	0.25	0.29	0.04	0	0.51	0.37	1,500	1,500	5.70	0.06	Good
249	8	2.06	0.83	1.47	0.18	0	29.70	28.44	70,000	10,000	2.03	0.07	Good
383	8	0.91	0.35	0.62	0.08	0	15.56	6.13	35,000	2,000	1.90	0.07	Good
315	8	1.11	0.5	0.83	0.10	0	19.18	10.25	45,000	10,000	1.83	0.07	Good
83	8	1.85	1.04	1.34	0.17	0	4.50	4.35	4,000	4,000	2.04	0.06	Good
384	8	0.88	0.25	0.50	0.06	0	3.90	1.33	6,000	4,000	3.33	0.06	Good
299	18	1.22	0.72	5.60	0.31	0	4.55	3.69	8,000	5,000	1.70	0.06	Good
277	8	0.99	0.5	0.52	0.07	0	4.16	3.94	4,000	3,500	4.59	0.06	Good
293	18	4.51	1.55	3.14	0.17	0	128.31	61.83	375,000	21,000	3.64	0.06	Good
144	15	1.08	0.4	0.73	0.05	0	2.43	1.27	3,000	3,000	2.43	0.06	Good
142	8	2.04	0.85	1.29	0.16	0	30.22	17.54	84,000	10,000	2.64	0.06	Good
411	8	0.63	0.25	0.30	0.04	0	0.59	0.41	3,000	1,500	5.59	0.06	Good
374	8	1.6	0.5	1.05	0.13	0	25.36	11.79	60,000	8,000	2.43	0.06	Good
232	12	1.57	0.63	1.15	0.10	0	10.31	4.44	15,000	5,000	1.94	0.05	Good
295	8	1.24	0.59	0.73	0.09	0	7.32	6.65	13,000	5,000	3.46	0.05	Good
321	8	0.41	0.72	5.60	0.70	0	0.21	0.20	1,000	1,000	3.32	0.05	Good
328	18	5.78	1.08	2.36	0.13	0	150.69	34.64	432,000	20,000	4.08	0.05	Good
291	18	4.77	1.98	2.83	0.16	0	100.42	75.60	270,000	16,000	3.11	0.05	Good
225	15	1.73	0.25	0.85	0.06	0	10.59	3.14	20,000	5,000	4.31	0.04	Good
56	8	1.41	1.01	1.14	0.14	0	11.39	15.21	15,000	5,000	1.80	0.04	Good
204	8	0.6	0.25	0.28	0.04	0	0.48	0.36	1,000	1,000	6.04	0.03	Good
470	8	0.27	0.25	0.25	0.03	0	0.38	0.38	1,000	1,000	1.19	0.03	Good
16	8	1.01	0.84	0.88	0.11	0	2.19	2.27	2,000	2,000	1.37	0.03	Good
172	8	1.93	1.06	1.49	0.19	0	13.13	10.44	25,000	4,500	1.74	0.03	Good
130	8	0.25	0.25	0.25	0.03	0	0.15	0.15	1,000	1,000	1.00	0.02	Good
419	8	0.53	0.25	0.25	0.03	0	0.82	0.82	1,000	1,000	6.26	0.02	Good
182	8	0.7	0.25	0.44	0.05	0	3.44	1.85	12,000	2,000	2.92	0.02	Good
442	8	1.11	0.35	0.71	0.09	0	9.51	4.87	10,000	3,000	2.39	0.02	Good
102	8	0.46	0.25	0.25	0.03	0	0.34	0.34	500	500	4.41	0.01	Good
70	10	1.05	0.42	0.54	0.05	0	1.35	1.24	1,000	1,000	4.66	0.01	Good
88	8	1.02	0.26	0.76	0.10	0	1.85	2.62	1,000	1,000	1.87	0.01	Good
191	8	2.12	1.07	1.57	0.20	0	2.18	1.75	8,000	1,000	1.72	0.01	Good
390	6	0.64	0.43	0.54	0.09	0	1.19	0.84	1,000	1,000	1.43	0.01	Good
436	8	1.01	0.33	0.65	0.08	0	1.67	0.90	1,000	1,000	2.56	0.01	Good
473	8	0.39	0.28	0.34	0.04	0	0.61	0.72	500	500	1.43	0.01	Good
413	18	6.47	6	6.00	0.33	0	694.25	694.25	1,000	500	1.11	0.01	Good
43	8	0.82	0.35	0.72	0.09	0	1.89	1.31	2,000	1,000	1.29	0.01	Good
176	8	1.07	0.67	0.87	0.11	0	2.71	2.46	7,000	1,000	1.58	0.01	Good
189	8	0.25	0.25	0.25	0.03	0	0.41	0.41	9,000	1,000	1.00	0.01	Good
385	8	0.76	0.25	0.44	0.06	0	1.50	1.09	2,000	1,000	3.22	0.01	Good
465	15	0.9	0.47	0.73	0.05	0	1.85	2.13	3,000	1,000	1.63	0.01	Good
6	8	0.59	0.25	0.35	0.04	0	0.45	0.50	2,000	500	3.51	0.01	Good
79	8	0.45	0.25	0.29	0.04	0	1.12	0.73	500	500	2.76	0.01	Good
170	8	0.44	0.25	0.25	0.03	0	0.84	0.82	500	500	3.89	0.01	Good
186	8	1.17	0.58	0.82	0.10	0	4.76	3.40	10,000	1,000	2.22	0.01	Good
242	8	0.92	0.27	0.56	0.07	0	1.42	0.65	500	500	2.83	0.01	Good
397	8	6	0.25	1.30	0.16	0	16.04	36.05	500	500	5.45	0.01	Good
410	18	0.74	0.34	0.51	0.03	0	1.88	1.43	3,500	500	2.45	0.01	Good
460	8	0.77	0.35	0.49	0.06	0	2.14	1.61	4,000	1,000	2.95	0.01	Good
20	6	1.39	1.28	1.31	0.22	0	4.45	1.00	3,000	1,000	1.14	0.00	Good
212	8	4.3	1.79	2.47	0.31	0	123.81	85.98	386,000	5,000	2.08	0.00	Good
255	18	3.44	2.22	2.65	0.15	0	134.52	105.14	391,000	5,000	1.80	0.00	Good
178	8	1.26	0.73	1.01	0.13	0	6.23	4.72	13,000	1,000	1.61	0.00	Good
361	8	0.76	0.32	0.38	0.07	0	4.09	1.34	5,500	1,000	1.79	0.00	Good
455	8	1.55	0.5	0.69	0.09	0	5.55	2.23	5,000	1,000	5.41	0.00	Good
275	8	1.03	0.79	0.89	0.11	0	2.52	2.20	500	500	1.39	0.00	Good
448	8	0.5	0.5	0.50	0.06	0	3.19	3.19	6,000	1,000	1.00	0.00	Good
445	8	1.35	1.22	1.59	0.20	0	10.77	5.20	7,000	1,000	1.53	0.00	Good
51	10	0.89	0.7	0.76	0.08	0	2.36	2.05	500	500	1.44	0.00	Good
349	8	1.56	0.93	1.13	0.14	0	3.63	2.82	4,500	500	2.05	0.00	Good
426	8	0.72	0.51	0.63	0.08	0	6.68	5.53	5,500	500	1.94	0.00	Good

 **Manhole ID** – The unique identifier of the manhole where the iTracker was installed.

Pipe Diameter – Diameter of Pipe

Depth Max – The maximum water level across the data set

Depth Min – The minimum water level across the data set

Average Dry Level – The average dry level associated during a two-day period with no rain events

Surcharge – The condition in which the water has exceeded the pipe diameter, or anything more than full pipe

Time in surcharge – The total amount of time that the site experienced a surcharge condition

% of full pipe DRY – This value represents the level as compared with diameter during dry weather conditions

Dry Weather Average Flow – The estimated flow value in a defined dry weather period. Flow is calculated with Eastech algorithm

Priority Level – Indicates the level of priority in terms of the reaction to wet weather based on all data collected

 **Manhole ID** – The unique identifier of the manhole where the iTracker was installed.

Pipe Diameter – Diameter of Pipe

Depth Max – The maximum water level across the data set

Depth Min – The minimum water level across the data set

Average Dry Level – The average dry level associated during a two-day period with no rain event

Surcharge – The condition in which the water has exceeded the pipe diameter, or anything more than full pipe

Time in surcharge – The total amount of time that the site experienced a surcharge condition

Surcharge Max – The maximum amount of surcharge observed over full pipe (note that levels above the measuring device cannot be measured)

Estimated 4 Day Dry Weather - the volume during dry weather pattern that is representative of flow without impacts of inflow and infiltration

 **4 Day Rain Event I&I** - The estimated value of total inflow and infiltration measured. This total would include both I&I that is determined to be adjacent/local AND "carrier" I&I from sources determined to be further upstream

Delta Q - A calculated value utilizing local I&I values, ADWF, and total I&I. This score determined the relative severity

