Reichhardt & Ebe
ENGINEERING INC

813 Metcalf Street
Sedro-Woolley, WA 98284

2014 Wastewater System I/I Evaluation

Engineering Report

Washington Administrative Code 173-240-060

September 25, 2014

BENJAMIN E KUIKEN
STATE OF WASHINGTON
48828
REGISTERED
PROFESSIONAL ENGINEER
9-25-14

Submitted to:
Town of Concrete
45672 Main Street
Concrete, WA 98237

Prepared by:

Reichhardt & Ebe
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Sedro-Woolley, WA 98284

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Town of Concrete - 2014 Wastewater System I/I Evaluation

Engineering Report Per WAC 173-240-060

1. Background

In 2012, Stantec Consulting Services, Inc. was hired by the Town of Concrete to assess infiltration and inflow (I/I) in their wastewater system. The results of this assessment are summarized in the I/I Evaluation Report dated April 13, 2012, which is included in Appendix D.

As stated in the Evaluation Report, the Town is required as a condition of their Wastewater Discharge Permit to assess I/I and compare to previously reported I/I. If the amount of I/I has increased by more than 15%, then a plan and schedule need to be developed to correct problems within the collection system.

For this assessment, Stantec compared daily influent flow data from the Town's WWTP monitoring records (for January 2009 through December 2011) to I/I information available in the Town of Concrete Comprehensive Sewer and Wastewater Facility Plan (2000, Gray & Osborne). Stantec found that the Town's wastewater system was experiencing an increase in I/I that could be problematic. In addition, they found that the Town's system was experiencing sufficient infiltration to warrant further investigation. Based on the findings of this assessment, Stantec recommended that the Town develop a plan and schedule to address I/I in their wastewater system.

The Town started the development of a plan by hiring contractors to complete a CCTV inspection of the entire wastewater collection system.

2. Introduction

The purpose of this evaluation was to assess the condition of the Town's wastewater collection system using the CCTV inspection data to identify and categorize locations of infiltration and other deficiencies, and then determine a priority, method, and cost for repairs.

In addition, Stantec was hired by Reichhardt & Ebe (R&E) to prepare an Influent Flow Equalization Analysis. The purpose of this analysis was to determine the equalization storage volume needed to limit peak flows to the WWTP and estimate construction, operational and maintenance costs. This cost information was provided for comparison to cost estimates for repairing I/I problems in the wastewater collection system. A copy of Stantec's report is included in Appendix D.

This report addresses the Washington State Department of Ecology (DOE) requirements and includes the applicable elements listed in the Washington Administrative Code (WAC) 173-240-060.

2.1. Project Description

The Town of Concrete performed CCTV inspection on all accessible wastewater lines for the purpose of identifying I/I locations. The CCTV inspection work was performed in two phases; the first phase was performed in July of 2012 by Emerson's Econo-Vac, and the second phase was performed by Olson Brothers Pro-Vac in April and May of 2014.

Reichhardt & Ebe Engineering (R&E) was contracted by the Town of Concrete to evaluate the CCTV inspection data and prepare an Engineering Report that addressed the applicable elements listed in the Washington Administrative Code (WAC) 173-240-060. R&E coordinated with Town staff, Stantec Consulting Services Inc., and the Department of Ecology (DOE) to prepare this report.

R&E staff reviewed the CCTV inspection data and categorized sections of pipe, as high, medium and low priorities for repair based on the number, type and severity of deficiencies that were identified.

A section of pipe that was identified as a high priority for repair may have large cracks and/or fractures, misaligned joints, slipped gaskets, and there may be existing or a high potential for I/I to enter the pipe. Whereas, a section of pipe categorized as a medium or low priority for repair, would have less severe deficiencies. The wastewater manholes were also categorized based on deficiencies and the presence or high potential for I/I to enter the structure. The categorized pipe sections and manholes are shown on Sheet 2 of 3 in Appendix A.

The categorized list of pipe sections (high, medium and low) was then prioritized based on number, type and severity of deficiencies and number of laterals. The manholes were prioritized based on type and severity of deficiencies. A repair method and cost were provided for each of the pipe sections and manholes on the prioritized list.

After the individual sections of pipe were prioritized, the wastewater system was then divided into areas to create projects. The areas are shown on Sheet 3 of 3 in Appendix A.

3. System Information

The wastewater system that serves the Town of Concrete is owned, operated, and maintained by the Town. The system is located entirely within the municipal Town limits.

3.1. Owner Contact Information

The Public Works Director, Alan Wilkins, is the Town's authorized representative and oversees the day-to-day operation and maintenance of the wastewater system. See below for contact information:

Owner:
Town of Concrete
Address:
Town of Concrete Public Works Department
7285 Baker Street Avenue
Concrete, WA 98237
Representative:
Alan Wilkins, Public Works Director
Telephone Number:
(360) 853-8550

3.2. System Location

Town of Concrete is located along State Route 20 approximately 25 miles east of Sedro-Woolley and 30 miles northeast of Mount Vernon. A location map is provided in Appendix A.

The Town of Concrete is located at the confluence of the Skagit River and Baker River, which flows out of nearby Lake Shannon. The geography of the Concrete area ranges from the Skagit River floodplain in the southeastern part of town to a hilly area on the north side of town. The area displays characteristics of glaciation and alluvial deposits adjacent to the Skagit River. Ground elevations range from 200 to 550 feet on the northern outskirts of Town.

3.3. System Description

The existing wastewater service area is within the Town's municipal limits and includes a combination of residential, commercial, industrial, and public land. In the Town's current *Comprehensive Sewer and Wastewater Facility Plan (Comprehensive Plan)*, it states that the total anticipated service area is approximately 995-acres; this area includes the UGA and the existing 747-acre service area.

The Town's wastewater system includes approximately 24,680 feet of 8-inch gravity sewer pipe and 3,740-feet of pressurized force main. The Town also operates three sewer lift stations and a wastewater treatment plant (WWTP). A map showing the approximate locations of the existing facilities and service area can be found in Appendix A.

4. Comprehensive System Evaluation

A comprehensive analysis of the sewer system was performed by Gray & Osborne, Inc. and documented in the Town's Comprehensive Plan, dated February of 2000. For this Engineering Report, the 2000 Comprehensive Plan was considered to have the most current system capacity analysis of the Town's wastewater system.

The Town is planning to update the Comprehensive Plan in the near future. The information obtained through this I/I Evaluation should be incorporated into the update.

In the sections below, the basic conveyance design and sizing information from the Comprehensive Plan is summarized.

4.1. System Capacity Analysis

In Chapter 5 of the Comprehensive Plan, it states that the Average Annual Flow (AAF) was 90,000 gallons per day (gpd) between 1994 and 1998. For comparisons, the 2020 buildout population was estimated to be 1,343, which results in an AAF of 143,300 gpd. This number was based on residents consuming 100 gallons per capita per day from DOE's Criteria for Sewage Works Design. The projected total design average annual flow rate was determined to be approximately 226,000 gpd, which includes the domestic (134,300 gpd), commercial (21,000 gpd), schools (6,200 gpd), industry (7,300 gpd), and I/I (57,000 gpd).

The projected Maximum Month Flow (MMF), Maximum Daily Flow (MDF) and the Peak Hourly Flow (PHF), are approximately 362,000 gpd, 746,000 gpd, and 904,000 gpd, respectively.

4.2. System Capacity Findings

In Chapter 7 of the Comprehensive Plan, under the Collection System Improvements and Expansion, the sections of sanitary sewer main from manhole A-4 to A-1 are identified as requiring additional capacity in the full buildout condition (year 2020). The Comprehensive Plan recommends the installation of a sewer pipe parallel to the existing main to add capacity and eliminate or reduce potential future surcharging in this pipe run.

4.3. Discussion of Known System Findings

In the Comprehensive Plan, a lift station bypass was identified as discharging to a nearby creek. The Town staff indicated that sewer bypasses that existed around Lift Stations 1 and 2 acted as overflows during large flow events. These bypasses have been plugged so sewage can no longer discharge directly into the nearby creek.

5. Planning

The Town will continue to identify and plan for future improvements to the wastewater system in accordance with DOE requirements.

5.1. Permitting

The Town will comply with all applicable Federal, State and local permitting and environmental review requirements on any future construction work performed on the wastewater system.

This Engineering Report document does not require a SEPA review.

5.2. Investment Grade Efficiency Audit (IGEA)

The work proposed in this Engineering report would not require an Investment Grade Efficiency Audit (IGEA) to be eligible for State and Federal funding. The proposed work is basically "pipes and pavement" with no energy use.

This Engineering Report document does not require an IGEA.

5.3. Town Standards for New Construction

All new wastewater pipe and side sewers must be design and installed in accordance with the Town's Engineering Standards. In addition, all new side sewers must be pressure tested to WSDOT Standards as stated in Chapter 3, Section 8.8 of the Town's Engineering Design Manual. In cases where the tap is made on the main, the joint where the side sewer connects to the main must also be pressure tested. New side sewers that pass pressure testing are less likely to experience I/I.

5.4. Private Properties I/I identification

In September 1997, approximately 7% of the Town's wastewater system was smoke tested. The results from the smoke testing indicated I/I concerns on private properties. See Appendix B for the results. The Town staff should schedule additional smoke testing as funding becomes available to update the 1997 results. In addition, Town staff can work with property owners to come up with solutions to address I/I issues on private property.

6. Sewer Network Inflow and Infiltration

Surface runoff entering the wastewater system during rain events (inflow) and groundwater entering the sewer system (infiltration) generally occur in both public and private portions of the sewer network. This discussion will be limited to the publically owned sewers. However it should be noted that private property side sewers often account for a significant percentage of I/I, according to several recent studies performed in the State of Washington.

Inflow can occur for several reasons; such as sanitary structures located in frequently flooded areas, damage to either the frame or lid of a structure, or missing caps on cleanouts. The recent inspection of the sewer system found several structure lids in need of replacement as well as missing cleanout caps on private side sewers. Though no manholes were found to be flooded during this inspection, several are located within the Federal Emergency Management Agency (FEMA) Special Flood Hazard Area near the Baker and Skagit Rivers. This low area may be more susceptible to I/I due to drainage difficulties and groundwater levels. Further investigation should be performed to identify manhole rims that may become submerged during flooding events.

The Town's existing sewer mains are primarily concrete and have experienced some moderate deterioration. There are locations where the interior walls of the pipes have exposed aggregate and are no longer smooth, gaskets at pipe joints have deteriorated and show signs of infiltration, sags and bellies have formed in some lines, and multiple cracks and fractures were observed within the system. Many of the laterals observed in the CCTV inspections do not have an adequate seal at the connection with the main allowing groundwater to enter the system.

Manhole conditions were also assessed as a part of the CCTV inspections. The manholes exhibited some wall infiltration and at pipe connections. Some chimney joints have shifted and manhole lids allow surface water to enter the system. Groundwater was observed entering the manholes at pipe penetrations, riser joints and cracks in the walls.

In addition, stormwater connections are an undesired flow to wastewater mains. Typically, stormwater can enter the wastewater system through illicit roof or foundation drain connections or even storm sewer cross connections. Aside from large diameter cross connections, these types of inflow are difficult to locate during CCTV inspection. Further smoke testing will aid in locating stormwater inflow within the system.

Currently, the Town does not meter residential water connections which can lead to an overuse of water and delays in making repairs. These practices can cause undue stress on the Town's WWTP by increasing the base wastewater flow rates. The Town is scheduled to be fully metered by 2017 which can provide an incentive for water conservation.

6.1. Network I/I Pipe and Manhole Repair Methods

Taking into account the current condition of the Town's wastewater collection system, several repair alternatives were identified and are discussed below. It should be noted that no rehabilitation program will completely eliminate inflow and infiltration into the sewer system. However, even small low-cost improvements, such as manhole lid liners, can make a difference toward decreasing I/I.

The rehabilitation of deteriorated sewer mains can be performed using either the 1) open cut construction method of removing and replacing the defective sewer line or 2) trenchless technologies, such as Cured-in-Place Pipe, Fold-and-Form pipe, and pipe bursting.

The use of a trenchless method can minimize the overall cost of the pipe rehabilitation, avoid costly excavation and restoration, reduce construction time and impacts to the public and restore the pipe integrity.

Several of the trenchless methods are relatively new to the market and are still being tried and tested; other methods have been around for years and have proven to be a viable, cost effective alternative to removing and replacing pipe.

The trenchless method recommended for the Town's pipe rehabilitation is Cured-in-Place Pipe (CIPP). CIPP is a jointless, seamless pipe-within-a-pipe and is one of the most widely used pipe rehabilitation methods.

There are certain pipe deficiencies that CIPP will not fix, such as a pipe belly or sag. If there is a pipe belly or sag, then it is recommended that the pipe section be removed and replaced.

A repair method and cost were determined for the pipe sections and manholes on the prioritized lists. See Appendix B for the complete list of the pipe sections, repair options and costs.

The repair costs were determined using historic bid prices and suppliers were contacted for price information. All removed, replaced, repaired, and rehabilitated pipe was assumed to be 8-inch diameter, and all manholes were assumed to be 48-inch diameter.

Following is a description of the open cut construction and trenchless methods considered or used as pipe or manhole repair options for prioritized list.

Open Cut Construction Methods

For this method, the defective section of pipe or a manhole is removed and replaced with new material.

Open Cut Sewer Replacement

This approach involves removing and replacing the existing pipe through trench excavation. The scope of sewer replacement can be either a spot repair (installing one length of new pipe), or manhole to manhole. If an open cut spot repair is performed, two couplers will be required to connect to the existing wastewater upstream and downstream of the replaced section.

Open Cut Side Sewer Replacement

This approach involves removing and replacing the existing pipe through trench excavation. The scope of sewer replacement can be either a spot repair (installing one length of new pipe), or the entire length of pipe from main to right-of-way.

Open Cut Manhole Replacement

This approach involves removing and replacing the existing manhole through excavation.

Trenchless Rehabilitation Methods

This is specialty work that requires proprietary equipment and materials. This method is typically considered to be an efficient, effective, and economical way to restore an existing pipe system.

Cured-in-Place Pipe (CIPP) Liner
This approach is a trenchless method of pipe reconstruction which installs a resin-impregnated flexible tube that tightly forms to the original pipe. Although, the CIPP is continuous and tight fitting, it is not designed to bond to the original pipe wall.

Using this method, the entire sewer segment is lined with the CIPP from manhole to manhole. It should be noted that this technology is best used when the existing system has sufficient capacity. This technology is designed to closely match the existing pipe diameter and pipe grade. However, this technology will not remove bellies or provide significant change in the pipe capacity.

As a trenchless technology, there is no excavation necessary which minimizes restoration costs.

The Town's sewer system is comprised mainly of concrete pipe with joints located approximately every 4 feet. Each joint has the potential to leak and is a possible I/I location. CIPP will seal the numerous pipe joints.

The liner will prevent existing and future I/I. The Town is located near major water bodies and natural springs and groundwater can submerge portions of the sewer system.

Also, much of the Town's sewer system is brittle concrete pipe; in locations where a side service enters the main, longitudinal and circumferential cracking were observed. A full CIPP liner in these concrete pipes will help prevent I/I from entering at these existing side service locations. After the CIPP liner is installed, a small portion of the liner is cut and removed to reinstate the side sewers.

Cured-in-Place Pipe (CIPP) Section Repair
This approach is a trenchless method of pipe reconstruction similar to the CIPP technology above. This method installs a resin-impregnated fabric patch in the existing pipe.

It has the benefit of smaller scale repair as opposed to lining a pipe from manhole to manhole. As such, it may be a more economical alternative when a pipe segment exhibits only a few point defects or a short continuous defect. A disadvantage of using this method is the section repair liner is more susceptible to leaking and failure than a manhole to manhole liner. This method is not recommended for I/I repairs because a watertight seal cannot be made. Chemical grouting prior to installing the CIPP section is recommended when using this method.

Pipe Bursting/Reaming
This approach is a trenchless method to replace a pipe. This method involves using the existing pipe as a guide to install a new fully fused HDPE pipe. This method will improve the structural integrity of the pipe section and counter I/I. Reaming and bursting is not a preferred method when there are bellies in the existing line, the existing line was installed with a shallow slope, the existing pipe runs contain materials like ductile iron, and existing pipe contains significantly misaligned joints. Other factors include soil conditions, depth of pipe, pipe diameter, the existing pipe condition, and number of lateral connections. Laterals will have to be excavated and installed through the use of standard construction methods.

Side Service Chemical Grouting
This approach is a trenchless method of restoring lateral connection joints to the sewer main. The method uses a chemical grout that reacts when in contact with water. At each side sewer connection, grout is forced out through any leaks at the lateral connection. All grout that escapes the sewer main and side service expands and solidifies when in contact with water. The grout integrates with the surrounding soils and forms an external plug and sealing the leak.

The CCTV inspection observed I/I entering at locations where laterals connect to the sewer main. In many of these locations, no gasket or grouting was observed allowing groundwater to enter at these locations. Pressure grouting will seal these side sewer locations.

Manhole Lid Liner
In areas where I/I is entering though the lid of the manhole, an economical solution is to install a gasketed pan under the manhole lid. These polymer manhole pans are reusable and easy to install.

Manhole Chemical Grouting
This approach is similar to the side service chemical grouting technique. This method involves assessing each manhole and targeting locations that I/I is entering. The technique forces the chemical grout out at the leaking locations, which reacts with the water, and expands to form an exterior plug. This chemical grout integrates with the native soils and remains flexible so the plug will not likely experience any cracking or leaking. This method is considered an economical and effective way to stop I/I in manholes that are still structurally sound.

The CCTV inspection observed several I/I locations inside manhole structures. I/I typically entered manholes where pipes penetrated the structure. These locations should be re-grouted to stop I/I from entering the structure around the pipes. Manhole grouting may be more effective at stopping I/I at the penetrations than a spray applied manhole liner. A chemical grout is an appropriate solution due to the high groundwater. Grout may also be used to target I/I entering the system through the walls of the manhole.

Manhole Liner
This approach involves applying a cementious and/or resin liner to the manhole interior. The liner waterproofs and adds strength to the manhole interior by repairing spalled areas, holes and cracks in the manhole. A topcoat provides a corrosion barrier against gases often present in wastewater infrastructure.

6.2. Equalization Basin I/I Mitigation Technique

Stantec was contracted by R&E to determine the needed volume of an equalization basin to limit peak flows at the Town's WWTP. The equalization basin would be used to store and then release wastewater at a controlled rate. A copy of Stantec's technical memorandum that was prepared on the equalization storage is included in Appendix D.

It should be noted that the addition of an equalization basin is a method to limit peak flows to the WWTP, but it does not reduce the volume of I/I collected in the sewer system and treated at the WWTP. The I/I in the system has increased since 2000 and will continue to go

up until repairs are made to the collection system. I/I is expensive to treat and uses up future capacity in the collection system, lift stations and WWTP.

Based on the CCTV inspection results, approximately 28% of the Town's 8-inch gravity system (24,560 feet) was considered high priority for repair. Given the age of the 8-inch gravity system, having just a little over a quarter of the system considered high priority for repair, is not unreasonable or an unmanageable amount. If the Town starts to address the high priority repairs, they should be able to achieve positive results fairly quickly.

The percentage of the Town's 8-inch gravity system considered medium and low priority for repair was determined to be 10% and 8%, respectively.

For these reasons and because of the high capital and on-going O&M costs, the use of an equalization basin was not the recommended approach for addressing I/I in the Town's wastewater collection system.

7. Recommended I/I Plan and Schedule

7.1. Priority Pipe Sections and Manholes and Recommended Project Areas

To address the I/I problems in the Town's wastewater collection system, prioritized lists of the pipe sections and manholes were developed based on the CCTV inspection data. The prioritized lists include a recommended repair method and cost and can be found in Appendix B.

In addition to the prioritized list of pipe sections, the following project areas were defined and are shown on Sheet 3 of 3 in Appendix A:

Project 1: Lift Station 2 Service Area.
Project 2: Eastern Gravity Service Area.
Project 3: Western Gravity Service Area.
Project 4: Lift Station 1 Service Area.

If a larger quantity is bid under a single contract, the Town may be able to obtain a lower unit price for CIPP and manhole rehabilitation. When opportunities are available, the Town should consider applying for grants and/or low interest loans to fund some or all of the repair work.

7.2. Recommended Schedule

The Town has approximately $15k to $30k available per year for sewer maintenance repairs. The Town has several options available for scheduling the high priority pipe sections and manholes:

1) For the first year, select a pipe section that is $30k or less. Example: Pipe Section #12, $30k, repair method - chemical grouting.

2) Wait a year, carryover the $30k to the next year, and select a pipe section that is $60k or less. Example: Pipe Section #2, $60k, repair method - full liner.

3) Use the maintenance funds to repair/replace priority manholes. Example: Manholes 1,2,& 3, $24k, repair method - chemical grout.

4) Use the maintenance funds to purchase manhole lid liners. Example: $150/manhole.

Another Option:

5) Apply for grant funds and complete the highest priority project area. Assume this process will take 2 years to obtain grant funds and complete construction work.

As funding becomes available, it is recommended that the Town complete the repair work as prioritized (high, medium and low).

The Town may pursue several low-cost I/I options until funding becomes available for sewer liners and manhole rehabilitation. One option is for the Town to purchase and install manhole lid liners, which have proven to be effective in decreasing surface water I/I. Another option is to continue to smoke test the system to identify problem locations on private property and work with property owners to resolve.

In Stantec's I/I Evaluation Report, they established base year flow data that can serve as the "first year" against which subsequent I/I flow data can be compared. After each I/I repair is completed, the flow information at the WWTP and precipitation data should be assessed to evaluate reductions in I/I flow.

Reichhardt & Ebe
ENGINEERING INC

Appendix

Appendix A. Mapping
A.1 Location Map
A.2 Service Area Map
A.3 2014 CCTV Inspection – Priority Exhibit
A.4 Project Exhibit
Appendix B. Inspection Information
B.1 Prioritized List of Pipe Sections
B.2 Prioritized List of Manholes
B.3 CCTV Inspection Photographs
B.4 Pipe Inspection Reports
B.5 Manhole Inspection Reports
B.6 Smoke Test Results – September 1997
Appendix C. Cost Estimates
C.1 Project 1: Lift Station 2 Service Area
C.2 Project 2: Eastern Gravity Service Area
C.3 Project 3: Western Gravity Service Area
C.4 Project 4: Lift Station 1 Service Area
C.5 Cost Estimate Assumptions
Appendix D. Stantec Technical Memorandums
D.1 Stantec Equalization Basin Technical Memorandum
D.2 Stantec I/I Evaluation
Appendix E. Permitting
E.1 State Environmental Policy Act (SEPA) Permit
E.2 Construction Stormwater General Permit Memo

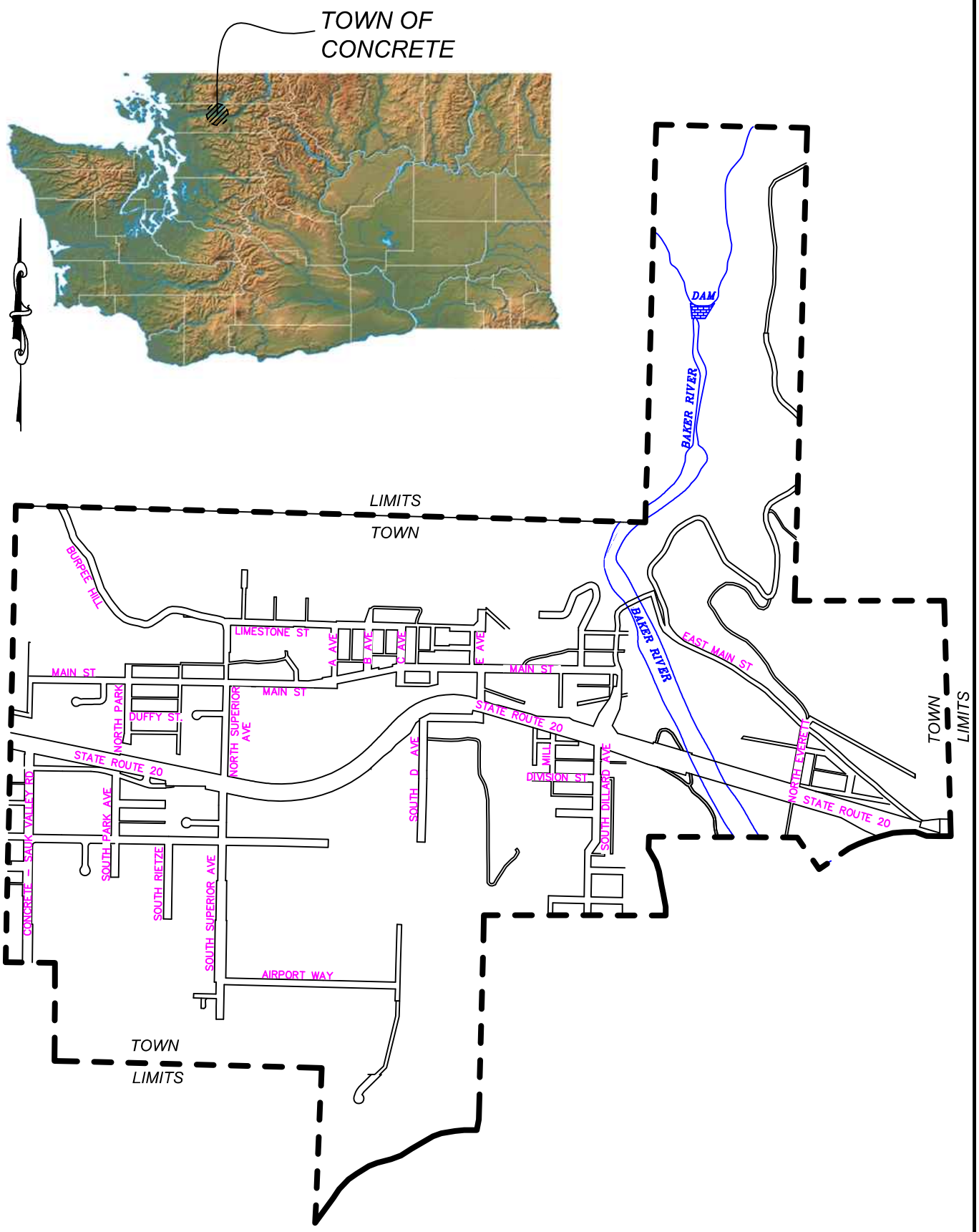
Appendix A. Mapping

A.1 Location Map

A.2 Service Area Map

A.3 2014 CCTV Inspection – Priority Exhibit

A.4 Project Exhibit

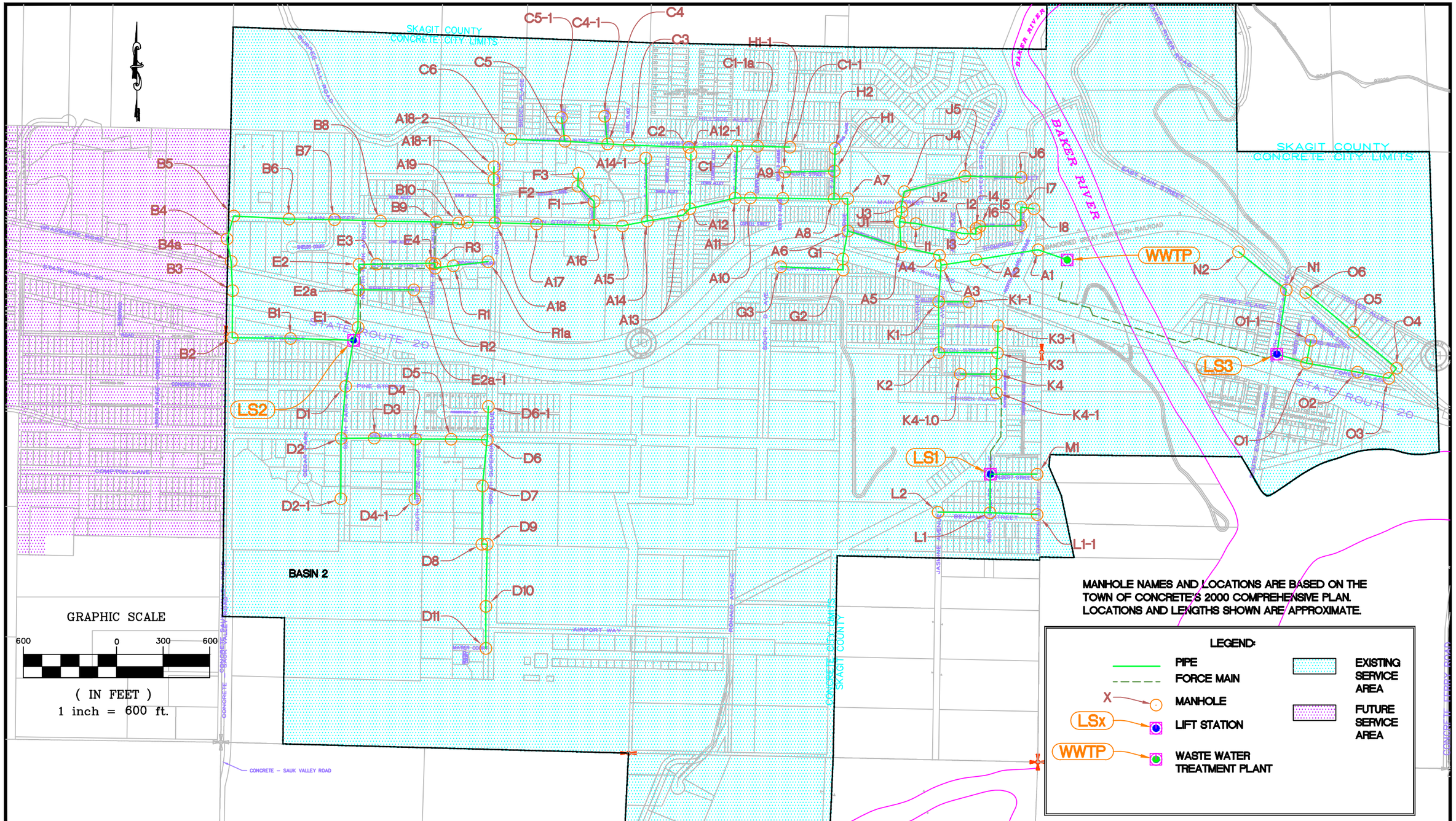


TOWN OF CONCRETE, SKAGIT CO., WA

2014 Sanitary Sewer System I&I Evaluation Engineering Report

A.1 LOCATION MAP

NTS



DESIGNED BY BEK	**R&E Reichhardt & Ebe ENGINEERING INC**	TOWN OF CONCRETE	TOWN OF CONCRETE	JOB# / DWG 14026 2. AREA
DRAWN BY BEK	423 Front St., Lynden, WA 98264 (360) 354-3687	45672 MAIN STREET	2012 SANITARY SEWER	DATE 9/12/2014
CHECKED BY	813 Metcalf St., Sedro-Woolley, WA 98284 (360) 855-1713	CONCRETE, WA 98237	TOWN SANITARY SEWER EXHIBIT	SCALE H:1"=600' V: n/a
				SHEET 1 OF 3

MANHOLE NAMES AND LOCATIONS ARE BASED ON THE TOWN OF CONCRETE'S 2000 COMPREHENSIVE PLAN. LOCATIONS AND LENGTHS SHOWN ARE APPROXIMATE.

LEGEND:

- PIPE - HIGH PRIORITY
- PIPE - MEDIUM PRIORITY
- PIPE - LOW PRIORITY
- PIPE - NO PRIORITY
- FORCE MAIN
- MANHOLE - HIGH PRIORITY
- MANHOLE - MEDIUM PRIORITY
- MANHOLE - NO PRIORITY
- LSx LIFT STATION
- WWTP WASTE WATER TREATMENT PLANT

GRAPHIC SCALE

500 0 250 500

(IN FEET)
1 inch = 500 ft.

DESIGNED BY BEK DRAWN BY BEK CHECKED BY	R&E Reichhardt & Ebe ENGINEERING INC 423 Front St., Lynden, WA 98264 (360) 354-3687 813 Metcalf St., Sedro-Woolley, WA 98284 (360) 855-1713	TOWN OF CONCRETE 45672 MAIN STREET CONCRETE, WA 98237	TOWN OF CONCRETE A.3 2014 CCTV INSPECTION PRIORITY EXHIBIT	JOB# / DWG 14026 2. AREA SCALE H: 1"=500' V: n/a DATE 9/12/2014 SHEET 2 OF 3

MANHOLE NAMES AND LOCATIONS ARE BASED ON THE TOWN OF CONCRETE'S 2000 COMPREHENSIVE PLAN. LOCATIONS AND LENGTHS SHOWN ARE APPROXIMATE.

LEGEND:

- PIPE - HIGH PRIORITY
- PIPE - MEDIUM PRIORITY
- PIPE - LOW PRIORITY
- PIPE - NO PRIORITY
- FORCE MAIN
- MANHOLE - HIGH PRIORITY
- MANHOLE - MEDIUM PRIORITY
- MANHOLE - NO PRIORITY
- LSx LIFT STATION
- WWTP WASTE WATER TREATMENT PLANT
- # PROJECT GROUP

GRAPHIC SCALE

500 0 250 500

(IN FEET)
1 inch = 500 ft.

DESIGNED BY BEK DRAWN BY BEK CHECKED BY	R&E Reichhardt & Ebe ENGINEERING INC 423 Front St., Lynden, WA 98264 (360) 354-3687 813 Metcalf St., Sedro-Woolley, WA 98284 (360) 855-1713	TOWN OF CONCRETE 45672 MAIN STREET CONCRETE, WA 98237	TOWN OF CONCRETE A.4 PROJECT EXHIBIT
JOB# / DWG 14026 2. AREA		DATE 9/12/2014	
SCALE H: 1"=500' V: n/a		SHEET 3 OF 3	

Appendix B. Inspection Information

B.1 Prioritized List of Pipe Sections

B.2 Prioritized List of Manholes

B.3 CCTV Inspection Photographs

B.4 Pipe Inspection Reports

B.5 Manhole Inspection Reports

B.6 Smoke Test Results – September 1997

B.1 Prioritized List of Pipe Sections

Prioritized List of Pipe Sections | Repair Methods and Estimate

High Priority

Rank	Upstream Node	Downstream Node	Diameter (in.)	Material	Length (ft)	Lateral Count	Deficiency Count	Estimated Repair Cost	Repair method 1	Repair method 2	Project Number
1	D4-1	D4	8	CONC	391.4	6	4	$ 220,000.00	Whole Pipe: Remove and replace		1
2	E4	E3	8	CONC	352	5	4	$ 60,000.00	Full Liner		1
3	I6	I5	8	CONC	264.9	14	3	$ 60,000.00	Full Liner		2
4	K2	K1	8	CONC	322.7	10	3	$ 60,000.00	Full Liner		2
5	J6	J5	8	CONC	353.5	7	3	$ 60,000.00	Full Liner		2
6	B10	B9	8	CONC	136.5	1	3	$ 40,000.00	Full Liner		1
7	J5	J4	8	CONC	385.5	8	2	$ 70,000.00	Full Liner		2
8	B7	B6	8	CONC	294.8	4	2	$ 60,000.00	Full Liner		1
9	M1	LS1	8	CONC	298.1	6	2	$ 60,000.00	Full Liner		4
10	J4	J3	8	CONC	102.6	0	2	$ 50,000.00	Spot Repair: Remove and Replace	Chem Grouting	2
11	K3	K2	8	CONC	381.8	10	1	$ 40,000.00	Liner Section		2
12	B9	B8	8	CONC	351.4	9	1	$ 30,000.00	Chem Grouting		1
13	R1a	R1	8	PVC	209.8	9	1	$ 30,000.00	Chem Grouting		1
14	D7	D6	8	CONC	371.6	0	1	$ 40,000.00	Liner Section		1
15	D2-1	D2	8	CONC	385.8	6	2	$ 51,000.00	Liner Section	Lateral Remove and Replace	1
16	E2	E2a	8	CONC	159	3	2	$ 30,000.00	Chem Grouting	Chem Grouting	1
17	G3	G2	8	CONC	399	7	2	$ 30,000.00	Chem Grouting		2
18	A14-1	A14	8	CONC	396.9	7	1	$ 30,000.00	Chem Grouting		3
19	A18-1	A18	8	CONC	279.7	3	1	$ 30,000.00	Chem Grouting		3
20	A18-2	A18-1	8	CONC	179	2	1	$ 30,000.00	Chem Grouting		3
21	L1-1	L1	8	CONC	306.9	6	1	$ 20,000.00	Spot Repair: Remove and Replace		4
22	B5	B4	8	CONC	124	1	3	$ 30,000.00	Chem Grouting		1
23	D6-1	D6	8	CONC	307.2	2	2	$ 18,000.00	Lateral Remove and Replace	Lateral Remove and Replace	1
24	R3	E4	8	PVC	8.7	0	2	$ 30,000.00	Chem Grouting		1
25	E3	E2	8	CONC	114.9	2	1	$ 30,000.00	Chem Grouting		1
TOTAL	**25**			**TOTAL**	**6877.7**	**128**	**50**				

Estimate Note: Prices shown estimate repair costs if the repairs were individually addressed.
Town may experience an over all cost benefit if multiple repairs can be completed with a single contract.

Medium Priority

Rank	Upstream Node	Downstream Node	Diameter (in.)	Material	Length (ft)	Lateral Count	Deficiency Count	Estimated Repair Cost	Repair method 1	Repair method 2	Project Number
26	A10	A9	8	CONC	220.1	4	4	$ 170,000.00	Remove and replace whole pipe		3
27	C6	C5	8	CONC	339.5	6	4	$ 60,000.00	Full Liner		3
28	A9	A8	8	CONC	322	7	3	$ 60,000.00	Full Liner		3
29	C1-1A	C-1	8	CONC	121.1	0	3	$ 40,000.00	Full Liner		3
30	H1-1	H1	8	CONC	308.4	4	2	$ 60,000.00	Full Liner		3
31	H1	A8	8	CONC	171.2	0	2	$ 50,000.00	Full Liner		3
32	H2	H1	8	CONC	144.4	0	2	$ 40,000.00	Full Liner		3
33	I2	I1	8	CONC	142.8	2	1	$ 40,000.00	Liner Section		2
34	C3	C2	8	CONC	387.5	4	1	$ 30,000.00	Chem Grouting		3
35	C5	C4	8	CONC	284.4	0	1	$ 40,000.00	Liner Section		3
36	B4	B4A	8	CONC	153.7	0	1	$ 40,000.00	Liner Section		1
TOTAL	**11**			**TOTAL**	**2595.1**	**27**	**24**				

Estimate Note: Prices shown estimate repair costs if the repairs were individually addressed.
Town may experience an over all cost benefit if multiple repairs can be completed with a single contract.

Low Priority

Rank	Upstream Node	Downstream Node	Diameter (in.)	Material	Length (ft)	Lateral Count	Deficiency Count	Estimated Repair Cost	Repair method 1	Repair method 2	Project Number
37	A5	A4	8	DI	265.6	0	2	$ 160,000.00	Remove and replace whole pipe		2
38	B8	B7	8	CONC	298.5	6	1	$ 20,000.00	Spot Repair: Remove and Replace		1
39	A6	A5	8	CONC	357	2	1	$ 40,000.00	Liner Section		2
40	K1	A3	8	CONC	230.6	1	1	$ 30,000.00	Chem Grouting		2
41	A18	A17	8	CONC	263.6	1	1	$ 30,000.00	Chem Grouting		3
42	B1	LS2	8	CONC	392.6	1	1	$ 20,000.00	Spot Repair: Remove and Replace		1
43	F2	F1	8	CONC	140.4	0	1	$ 40,000.00	Liner Section		3
44	G2	G1	8	CONC	55.8	0	1	$ 40,000.00	Liner Section		2
TOTAL	**8**			**TOTAL**	**2004.1**	**11**	**9**				

Estimate Note: Prices shown estimate repair costs if the repairs were individually addressed.
Town may experience an over all cost benefit if multiple repairs can be completed with a single contract.

Comprehensive Plan Projects

	Upstream Node	Downstream Node	Diameter (in.)	Material	Length (ft)	Lateral Count	Deficiency Count	Comprehensive Plan			Project Number
45	A4	A3	8	DI	57.9	0	0		Increase Capacity Per Comp Plan		
46	A3	A2	8	CONC	295.1	0	0		Increase Capacity Per Comp Plan		
47	A2	A1	8	CONC	234.4	0	1		Increase Capacity Per Comp Plan		
TOTAL	**3**			**TOTAL**	**587.4**	**0**	**1**				

B.2 Prioritized List of Manholes

Prioritized List of Manholes

High Priority					
Rank	MH	Depth (ft)	Estimated Repair Cost	Repair method utilized	Project Number
1	R1	9.5	$ 8,000.00	Chemical Grout	1
2	R1A	10.4	$ 8,000.00	Chemical Grout	1
3	R2	7	$ 8,000.00	Chemical Grout	1
4	R3	8.9	$ 8,000.00	Chemical Grout	1
5	E2a	12.6	$ 8,000.00	Remove and Replace	1
6	G3	5.25	$ 8,000.00	Chemical Grout	2
TOTAL	**6**				

Medium Priority					
Rank	MH	Depth (ft)[1]	Estimated Repair Cost	Repair method utilized	Project Number
7	A18-1	8.5	$ 150.00	Lid Insert	3
8	G1		$ 150.00	Lid Insert	2
9	A5	10.4	$ 8,000.00	Chemical Grout	2
10	B5	7.5	$ 8,000.00	Chemical Grout	1
11	C3	10.4	$ 8,000.00	Chemical Grout	3
12	A7	8	$ 150.00	Lid Insert	3
13	A18	8.4	$ 8,000.00	Chemical Grout	3
14	B8	7	$ 8,000.00	Chemical Grout	1
15	I7		$ 8,000.00	Chemical Grout	2
16	B7	7.4	$ 8,000.00	Chemical Grout	1
17	B4A	8.7	$ 8,000.00	Chemical Grout	1
18	B1	8.7	$ 8,000.00	Chemical Grout	1
19	B2	7	$ 8,000.00	Chemical Grout	1
20	B9	8	$ 8,000.00	Chemical Grout	1
21	B10	8	$ 8,000.00	Chemical Grout	1
22	C4	9.9	$ 8,000.00	Chemical Grout	3
23	D1		$ 8,000.00	Chemical Grout	1
24	H1-1	8	$ 8,000.00	Chemical Grout	3
25	I8		$ 8,000.00	Chemical Grout	2
26	K1-1	7.8	$ 8,000.00	Chemical Grout	2
TOTAL	**20**				

Note:

1. Depth unlisted, 8 ft depth assumed.

B.3 CCTV Inspection Photographs

Reichhardt & Ebe
ENGINEERING INC

CCTV INSPECTION PHOTOGRAPHS

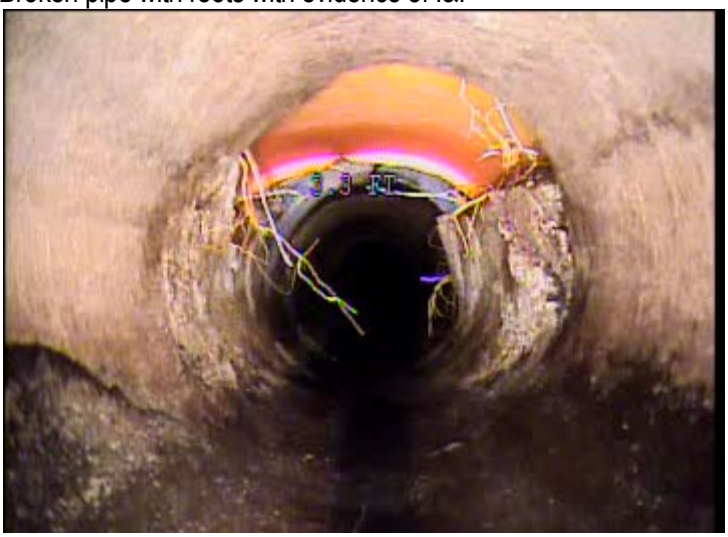
The Town worked with two contractors to perform CCTV inspection on the existing sanitary sewer mains within the service area. The Town worked with Everson's Econo-Vac to perform sanitary sewer inspection services in July 2012, and worked with Pro-Vac in late April / early May 2014. The Contractors submitted CCTV videos and summary logs of sanitary sewer pipe and manholes for all accessible areas within the system. After a review of the videos, the following repair locations were identified as a priority based on observations

CONTENTS

D4-1 - D4 2
E4- E3 5
I6 - I5 8
K2 - K1 10
J6 - J5 11
B10 - B9 13
J5 - J4 15
B7 - B6 16
M1 - LS1 17
J4 - J3 19
K3 - K2 20
B9 - B8 21
R1a- R1 22
D7- D6 23
D2-1 - D2 24
E2 - E2a 26
G3- G2 27
A14-1- A14 29
A18-1- A18 30
A18-2- A18-1 31
L1-1 - L1 32
B5 - B4 33
D6-1 - D6 34
R3- E4 35
E3- E2 37
A2- A1 38

D4-1 - D4

Broken pipe with roots with evidence of I&I



Location: 8.5 feet from D4-1

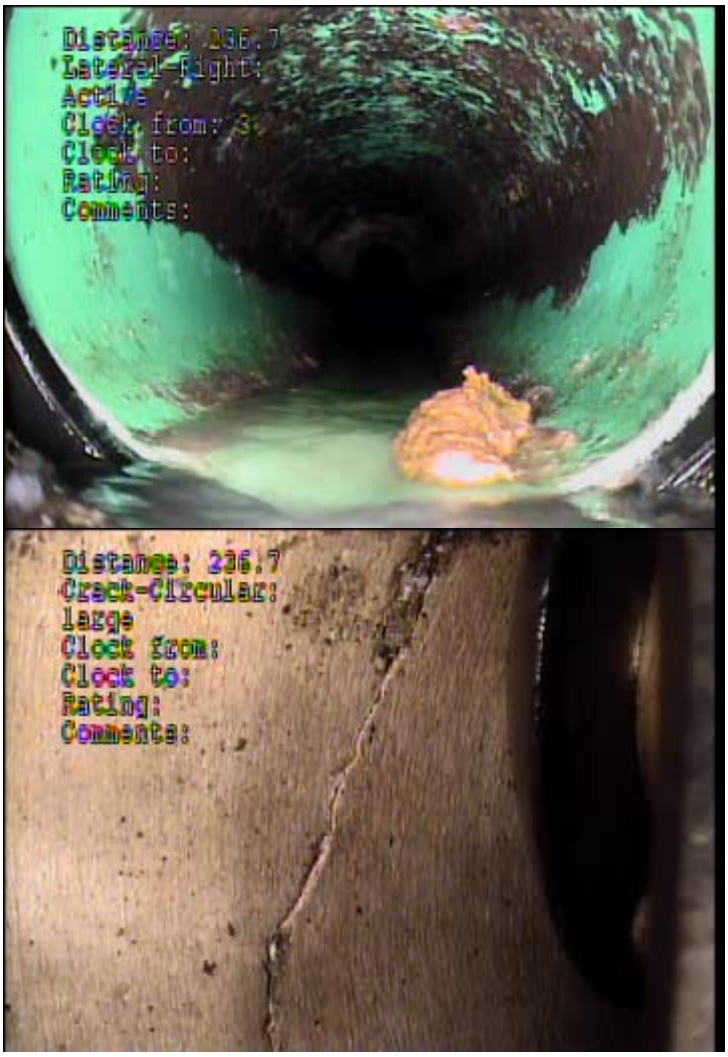
roots within lateral

Location: 12.5 feet from D4-1

Broken pipe with roots with evidence of I&I

Location: 92.5 feet from D4-1

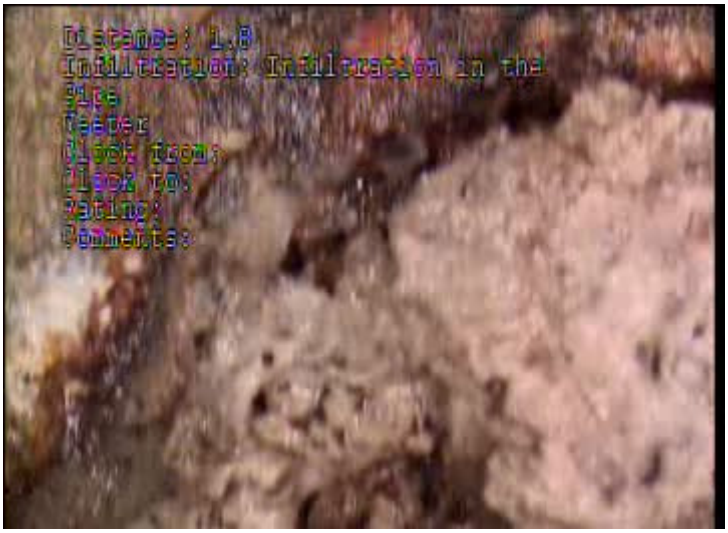
Side sewer with evidence of I&I, broken pipe



Location: 236.7 feet from D4-1

E4- E3

Minor I&I observed

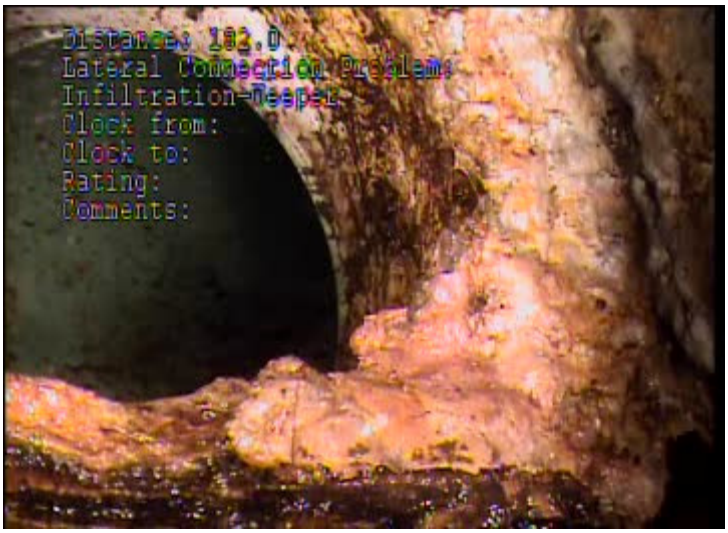


Location: 1.8 feet from E4

I&I observed

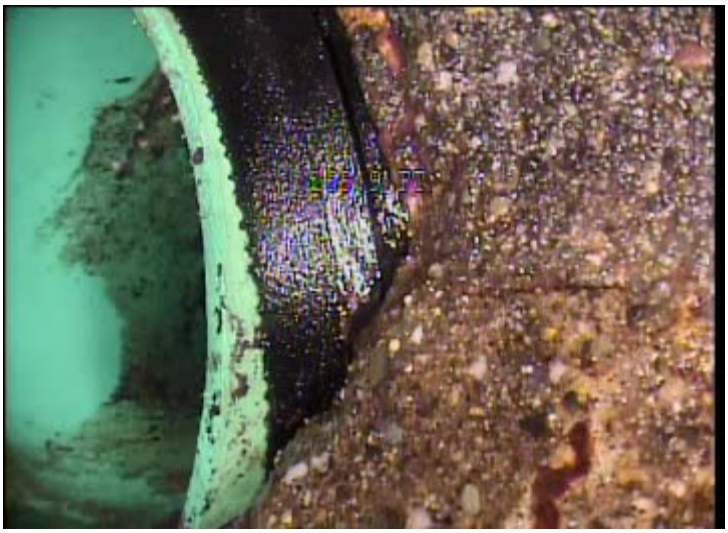
Location: 65.8 feet from E4

Minor I&I observed



Location: 182 feet from E4

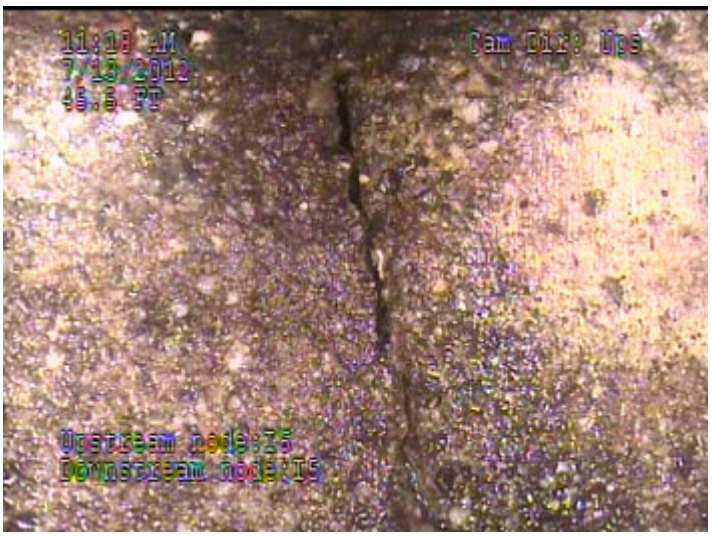
Cracked pipe and I&I observed at side sewer



Location: 265.9 feet from E4

I6 - I5

Minor crack in pipe



Location: 45.5 feet from I6

Side sewer at crack location (see above)

Location: 45.5 feet from I6

Crack in pipe

Location: 147.0 feet from I6

K2 - K1

Minor crack in pipe

Location: 179.0 feet from K2

Possible I&I

Location: 180.1 feet from K2

J6 - J5

Gasket damage, no I&I observed

Location: 39.9 feet from J6

Damage at pipe joint, no I&I observed

Location: 53.4 feet from J6

Damage at pipe joint, see photo above

Location: 53.9 feet from J6

Minor crack in pipe

Location: 256.7 feet from J6

B10 - B9

Minor crack, evidence of I&I

Location: 14.0 feet from B10

Cracks, evidence of I&I

Location: 83.2 feet from B10

Crack with evidence of I&I

Location: 140.2 feet from B10

J5 - J4

Minor crack, no I&I observed

Location: 157.4 feet from J5

Crack, no I&I observed

Location: 390.4 feet from J5

B7 - B6

Crack with evidence of I&I

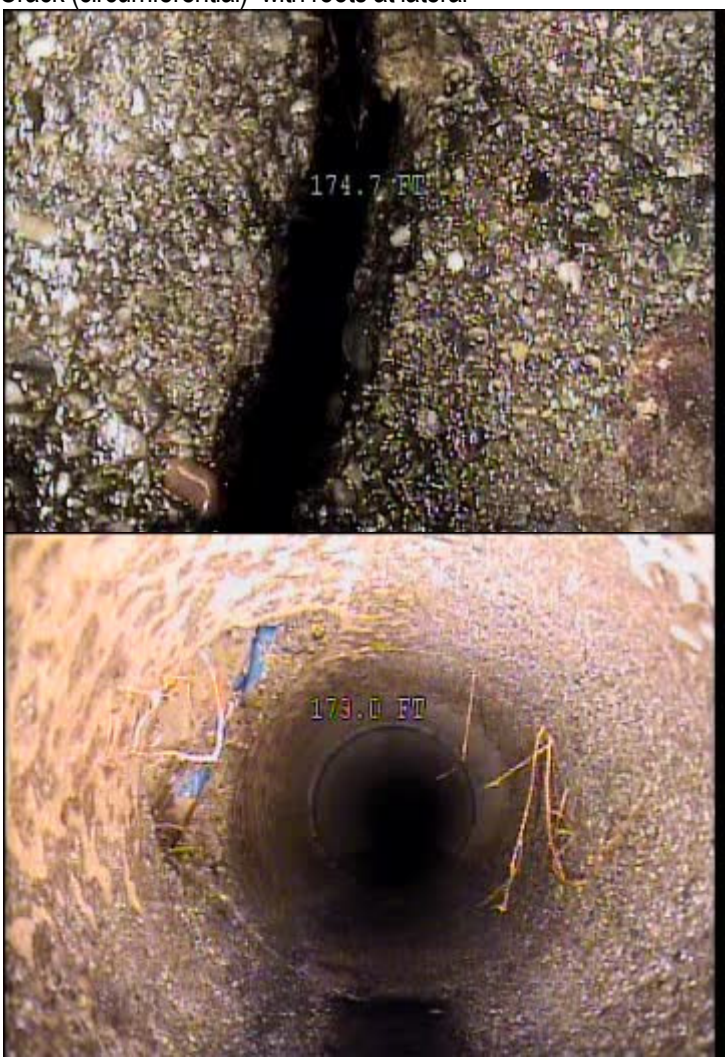
Location: 53.1 feet from B7

Minor crack with evidence of I&I

Location: 196.1 feet from B7

M1 - LS1

Crack (circumferential) with roots at lateral



Location: 174.7 feet from M1

Crack in pipe

Location: 303.5 feet from M1

J4 - J3

Misaligned joint at material change. No I&I observed.

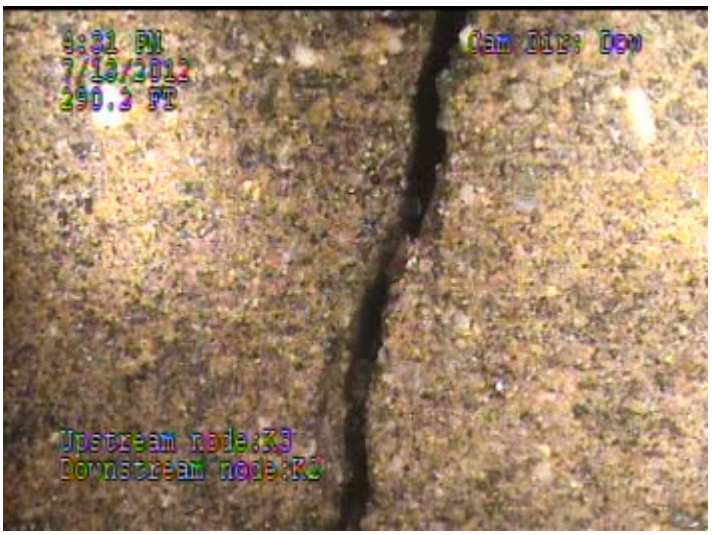
Location: 10.2 feet from J4

I&I at crack

Location: 106.6 feet from J4

K3 - K2

Crack in pipe



Location: 290.2 feet from K3

B9 - B8

I&I at side sewer

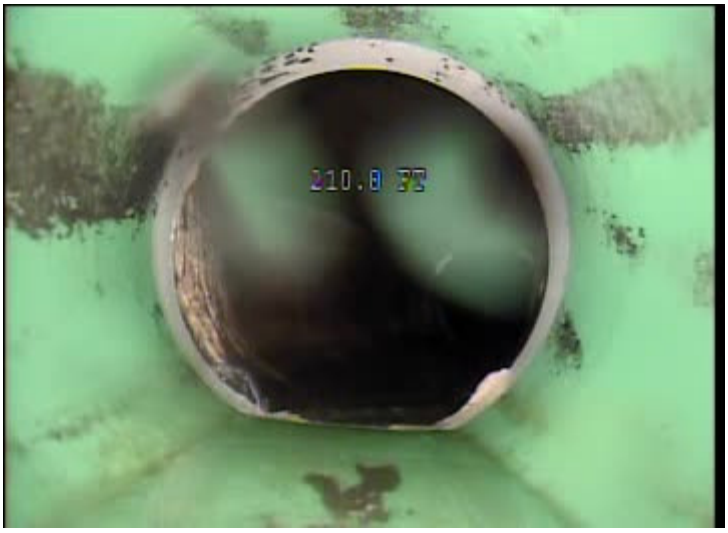
Location: 294.9 feet from B9

R1A- R1

Heavy I&I observed

Location: 0 feet from R1a

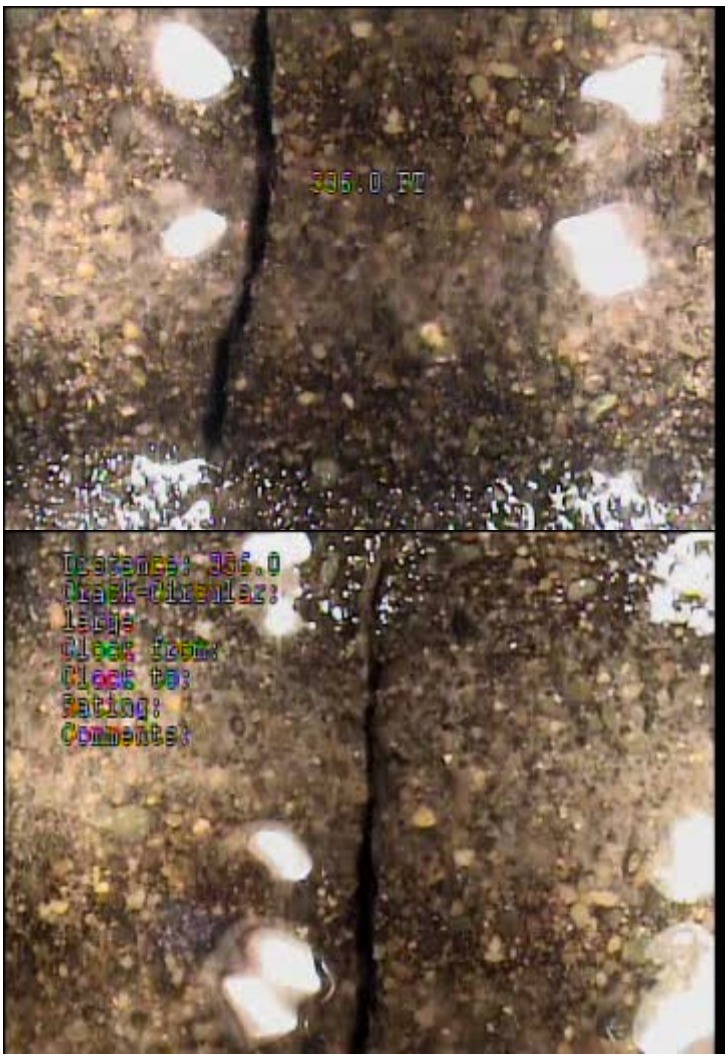
Heavy I&I observed



Location: 212.5 feet from R1a

D7- D6

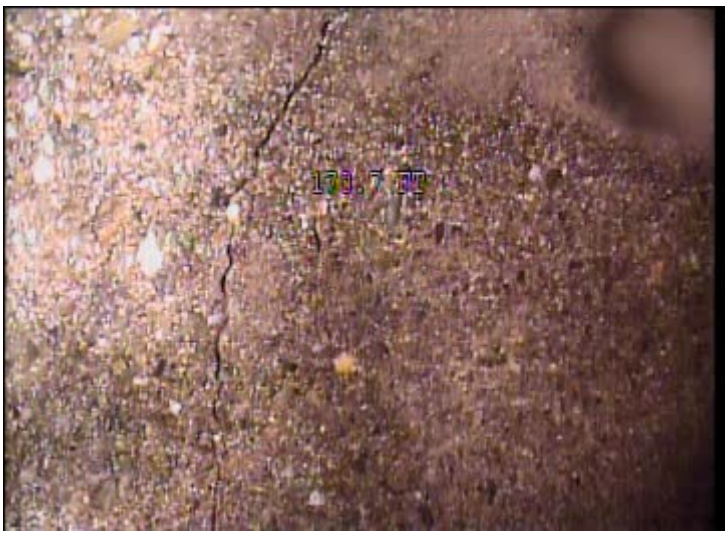
Cracked pipe with roots.



Location: 336 feet from D6

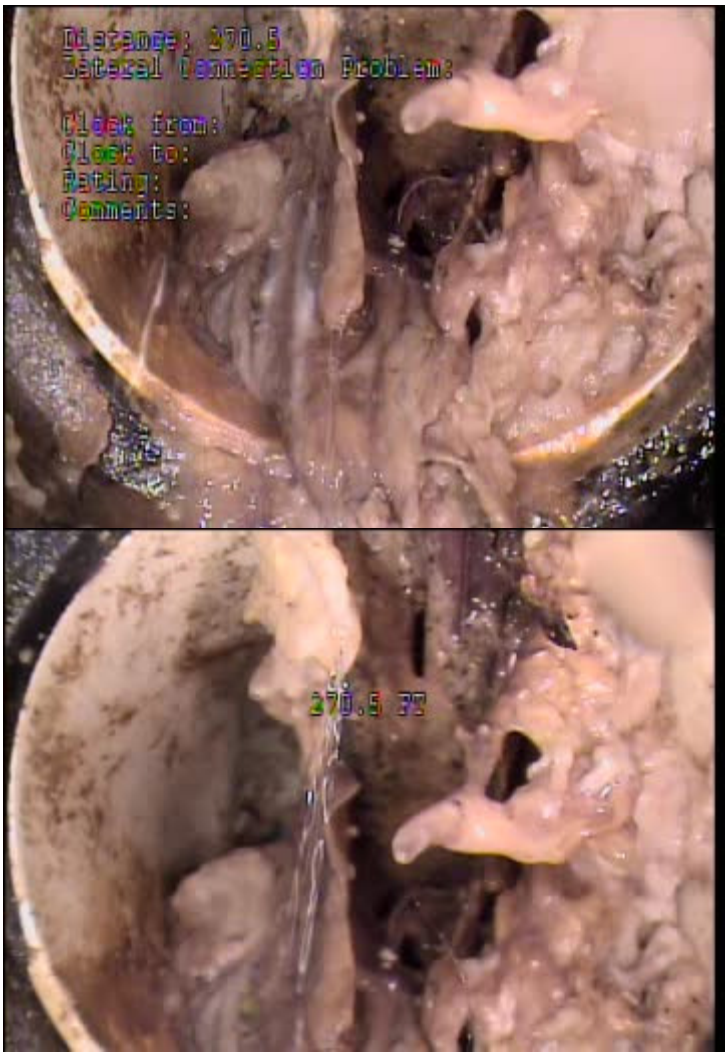
D2-1 - D2

Minor Cracking observed



Location: 173.8 feet from D2-1

Debris in lateral, Evidence of I&I



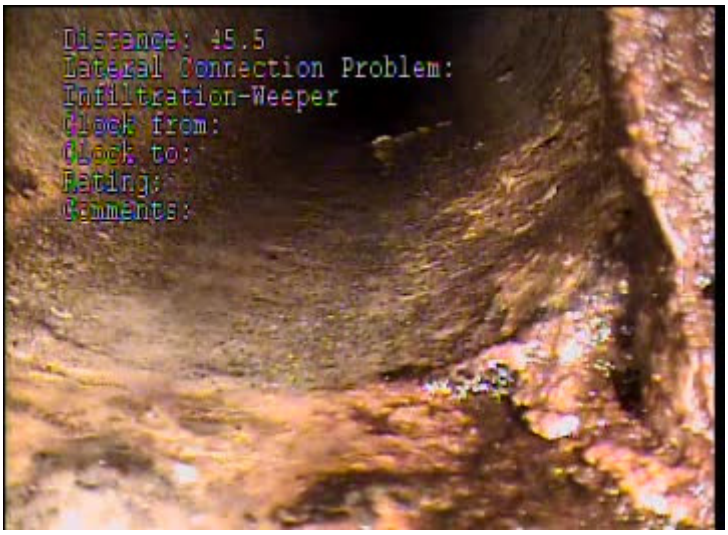
Location: 270.6 feet from D2-1

E2 - E2A

Minor I&I observed

Location: 4 feet from E2

Minor I&I observed



Location: 45.5 feet from E2

G3- G2

I&I observed at Side Sewer

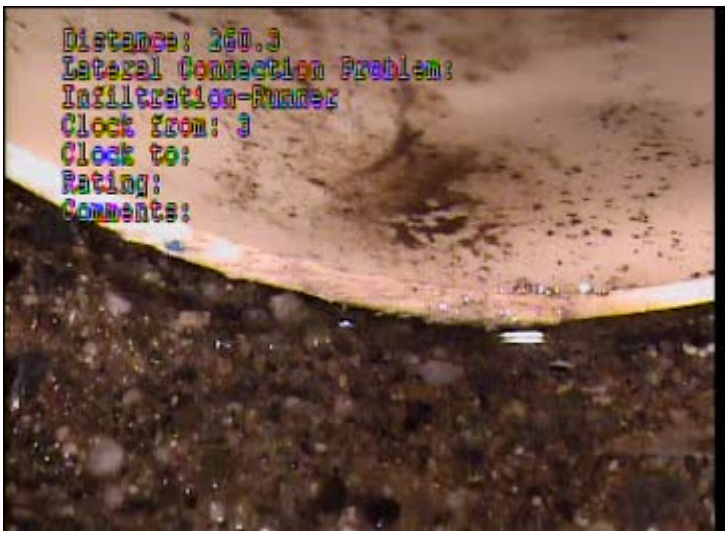
Location: 170 feet from G2

I&I observed at manhole G1

Location: G1

A14-1- A14

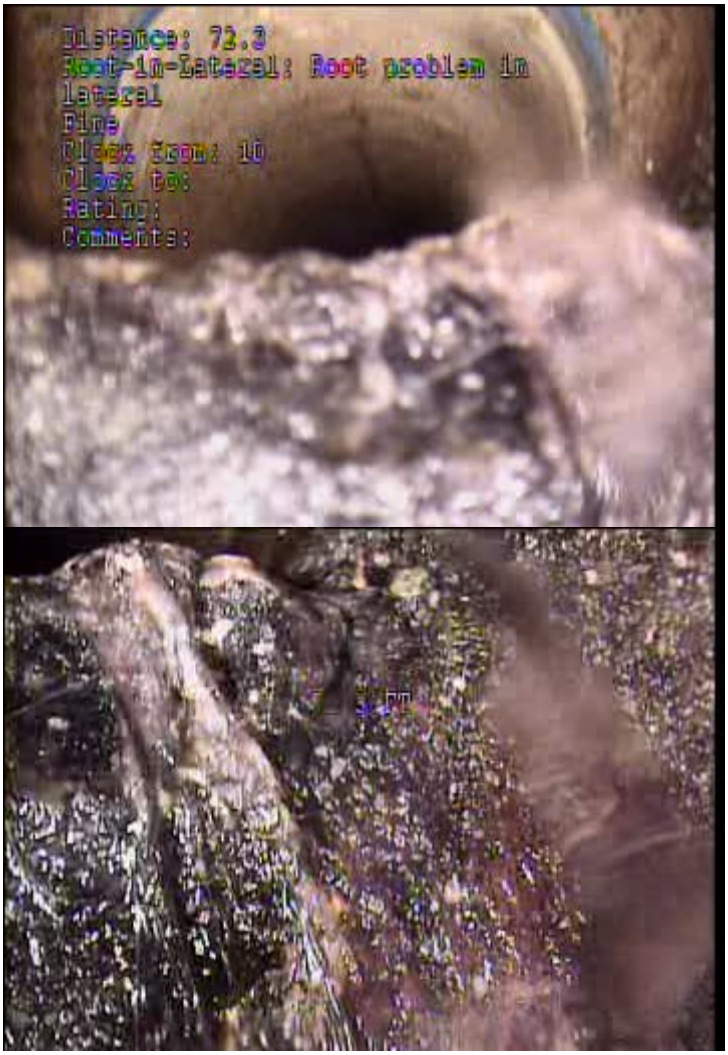
Lateral rocks and gravel



Location: 260.3 feet from A14-1

A18-1- A18

Roots showing at lateral



Location: 72.3 feet from A18-1

A18-2- A18-1

I&I observed

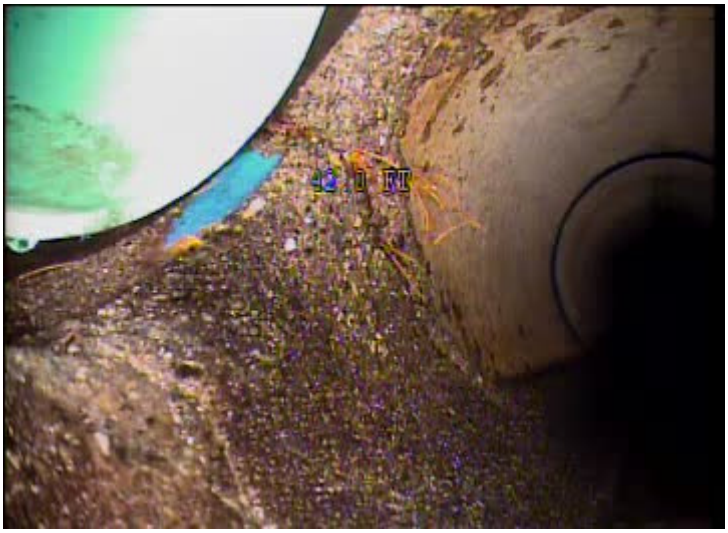
Location: 180.5 feet from A18-2

Heavy I&I observed at manhole A18-1

Location: A18-1

L1-1 - L1

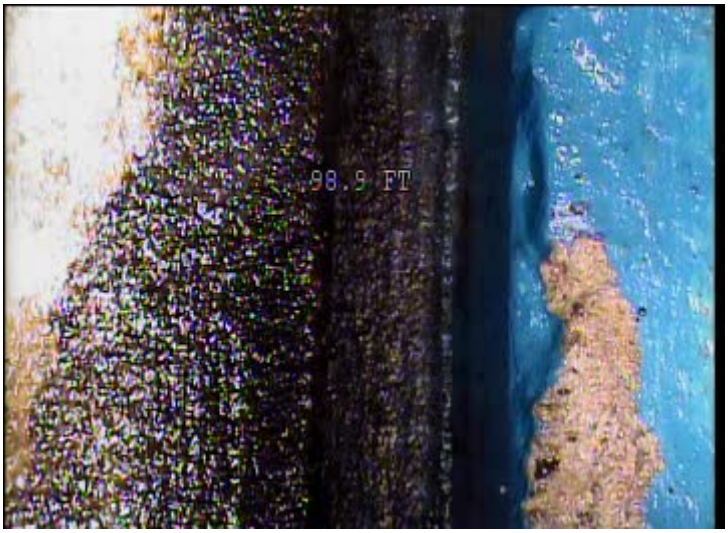
Crack (circumferential) with evidence of I&I



Location: 42 feet from L1

B5 - B4

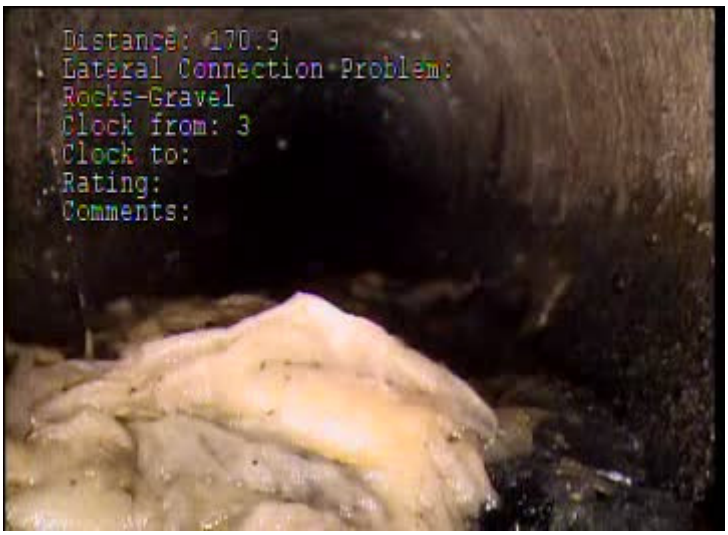
Evidence of I&I at joint (minor)



Location: 98.9 feet from B5

D6-1 - D6

Lateral rocks and gravel



Location: 170 feet from D6

Lateral rocks and gravel

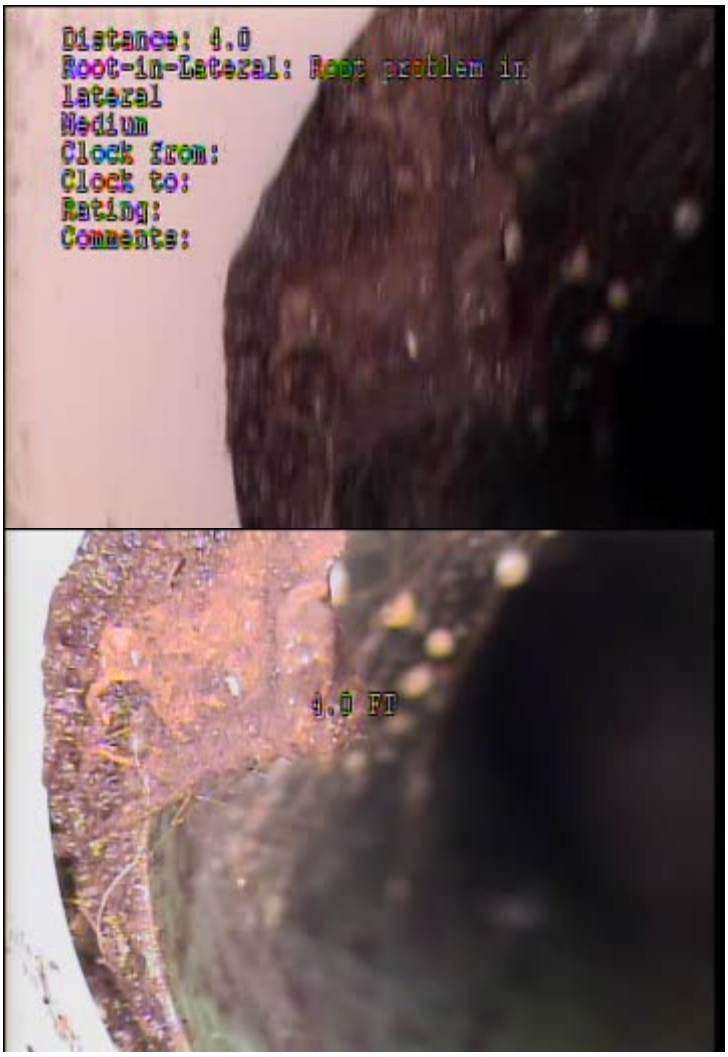
Location: 207.3 feet from D6

R3- E4

I&I observed

Location: 0 feet from R3

Roots



Location: 0 feet from R3

E3- E2

Minor I&I observed

Location: 64.1 feet from E3

A2- A1

Obstructed pipe

Location: 239.3 feet from A2

B.4 Pipe Inspection Reports

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-D4-1	CONCRETE-BASIN 2	RIETZE AV AND CEDAR ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH D4-1	MH D4	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/1/2014 11:30:23 AM	5/1/2014 11:30:54 AM	5/1/2014 12:03:38 PM

Surveyed footage:	Status:	Operator:	Work order no.:
391.4	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream		
0.0	No				Water Level	5%	
8.4	No				Repair Patch	Unknown	
8.4	No				Repair Patch	Defective	
8.4	No				Root	Fine	
8.5	No				Crack-Multiple	Large	
10.0	No				Crack-End Multi		
10.0	No				Repair Patch	End	
12.5	No		2		Lateral-Right	Active	
12.5	No		2		Root-in-Lateral	Ball	
15.6	No		2		Lateral-Left	Active	
92.5	No		9		Lateral-Left	Active	

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
92.5	No		9		Lateral Connection Problem	ropped connectio	
92.5	No		9		Root-in-Lateral	Fine	
149.0	No		9		Lateral-Left	Active	
236.7	No		3		Lateral-Right	Active	
236.7	No				Crack-Circular	large	
322.5	No		9		Lateral-Left	Active	
391.4	No				Manhole-Downstream		
391.4	No				STOP		

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-E4	CONCRETE-BASIN 2	RIETZE AV & DUFFY ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH E4	MH E3	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/2/2014 10:59:23 AM	5/2/2014 10:59:49 AM	5/2/2014 11:34:56 AM

Surveyed footage:	Status:	Operator:	Work order no.:
352.0	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream		
0.0	No				Water Level	10%	
1.8	No				Grout/Concrete in line	Medium	
1.8	No				Infiltration	Weeper	
64.1	No	10.8			Surface Damage	egate Visible-Medi	
64.6	No		8		Crack-Longitudinal	Small	
64.6	No				Infiltration	Runner	
65.1	No		2		Lateral-Right	Active	
66.9	No				Crack-End		
85.3	No		9		Lateral-Left	Active	
182.0	No		3		Lateral-Right	Active	
182.0	No		3		Lateral Connection Problem	Infiltration-Weeper	

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
182.0	No		3		Lateral Connection Problem	eral Deposits-Hea	
218.1	No		9		Lateral-Left	Active	
265.4	No		3		Crack-Longitudinal	Small	
265.9	No				Infiltration	Runner	
266.6	No		3		Lateral-Right	Active	
267.9	No				Crack-End		
352.0	No				Manhole-Downstream		
352.0	No				STOP		

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
I6 I5	Concrete	45968 Main St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
I6	I5	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/13/2012 11:13:54 AM	7/13/2012 11:14:22 AM	7/13/2012 11:32:36 AM

Surveyed footage:	Status:	Operator:	Work order no.:
270.9	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
18.5	Yes	252.4			Water Level		
25.3	Yes		9		Lateral	Live Connection	
33.3	Yes		2		Lateral	Live Connection	
45.5	Yes		12	12	Crack	Circular - Wider	
45.5	Yes		10		Lateral	Live Connection	
73.5	Yes		10		Lateral	Live Connection	
77.5	Yes		2		Lateral	Live Connection	
85.6	Yes		10		Lateral	Live Connection	
105.0	Yes		1		Lateral	Live Connection	
117.5	Yes		10		Lateral	Live Connection	

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
133.7	Yes		2		Lateral	Live Connection	
137.7	Yes		10		Lateral	Live Connection	
147.0	Yes		4	8	Crack	Circular - Wider	
194.0	Yes		10		Lateral	Live Connection	
221.8	Yes		10		Lateral	Live Connection	
225.9	Yes		2		Lateral	Capped	
229.9	Yes		2		Lateral	Live Connection	
270.9	Yes				Manhole		
270.9	Yes				STOP		

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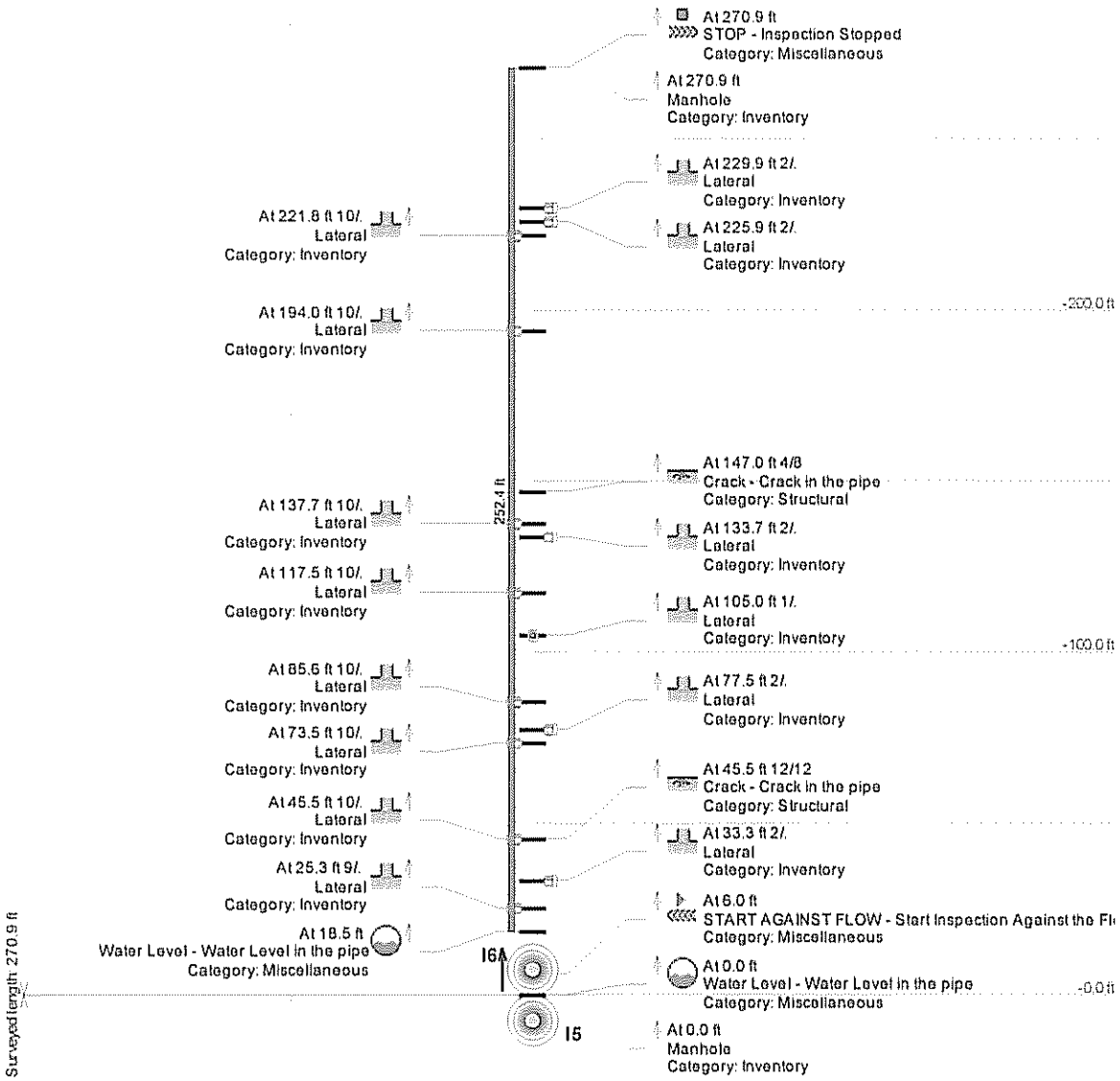
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	I6 I5	Concrete	45968 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/13/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	270.9	Dry	



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Orlando, FL 32805
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Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
K2 K1	Concrete	7453 Mill Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
K2	K1	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/16/2012 11:41:28 AM	7/16/2012 11:41:44 AM	7/16/2012 12:02:40 PM

Surveyed footage:	Status:	Operator:	Work order no.:
328.7	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
17.8	Yes		1		Lateral	Live Connection	
90.1	Yes		1		Lateral	Live Connection	
97.8	Yes		9		Lateral	Live Connection	
114.4	Yes		9		Lateral	Live Connection	
122.7	Yes		2		Lateral	Live Connection	
178.2	Yes		2		Lateral	Live Connection	
179.0	Yes		12	12	Crack	Circular - Wider	
180.1	Yes		10		Infiltration	Light	
188.8	Yes				Joint Offset		
198.5	Yes		10		Lateral	Live Connection	

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OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
206.5	Yes		2		Lateral	Live Connection	
214.5	Yes		10		Lateral	Live Connection	
278.5	Yes		3		Lateral	Live Connection	
328.7	Yes				Manhole		
328.7	Yes				STOP		

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Orlando, FL 32805
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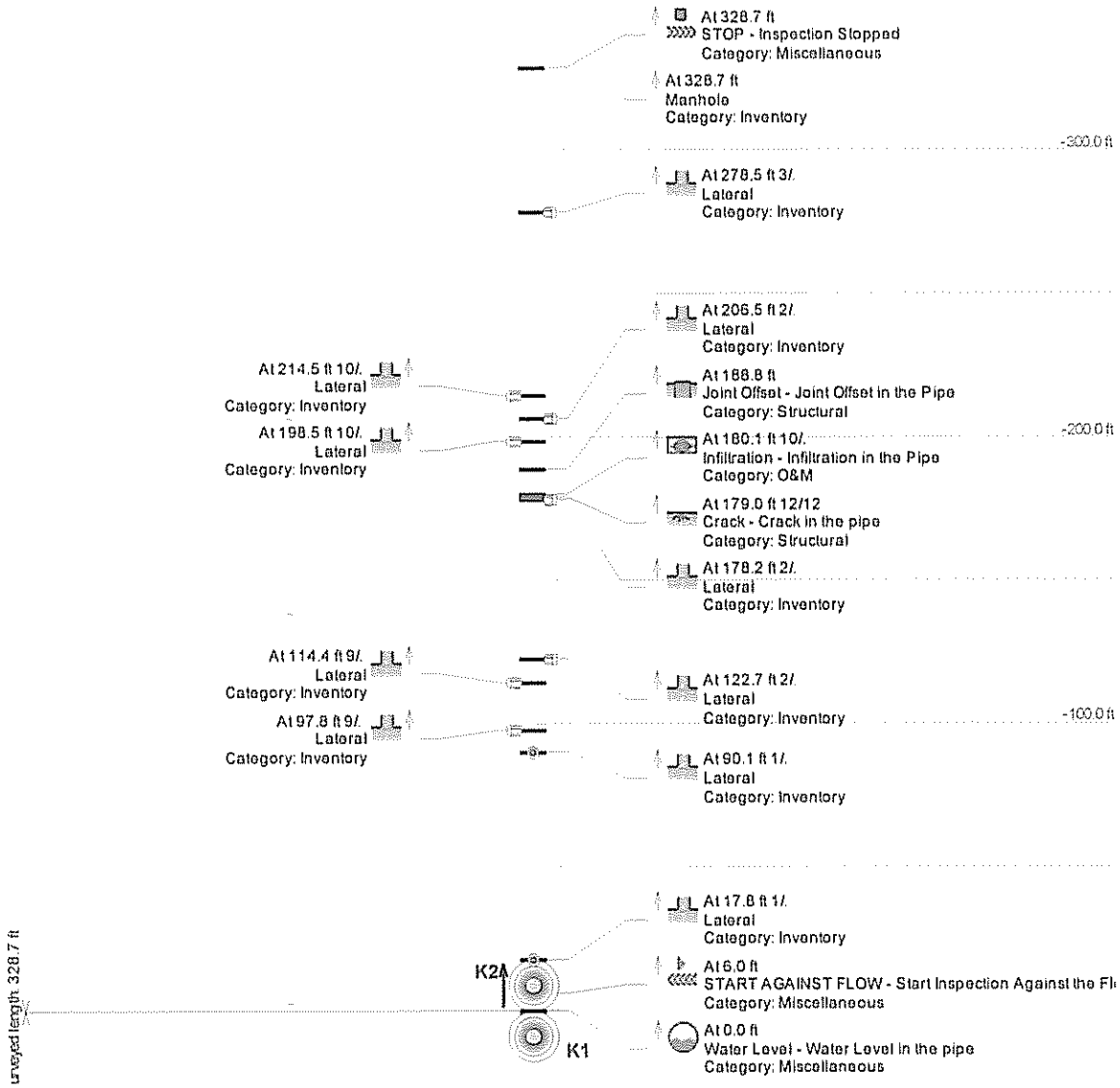
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	K2 K1	Concrete	7453 Mill Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	328.7	Dry	



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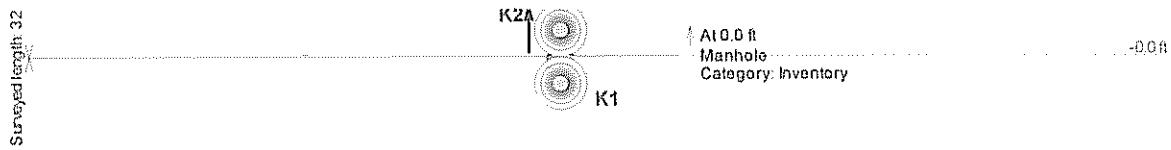
Project Name:	Mainline ID:	City:	Address:
City of Concrete	K2 K1	Concrete	7453 Mill Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	328.7	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
J6 J5	Cancrete	7286 McKee Alley

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
J6	J5	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/13/2012 9:44:17 AM	7/13/2012 9:45:16 AM	7/13/2012 10:05:31 AM

Surveyed footage:	Status:	Operator:	Work order no.:
359.5	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
19.5	Yes		11		Lateral	Live Connection	
41.6	Yes		3	7	Intruding Sealing Ring		
47.5	Yes		1		Lateral	Live Connection	
53.9	Yes		10		Broken		
200.3	Yes		11		Lateral	Live Connection	
256.7	Yes		12	12	Crack	Circular - Wider	
256.7	Yes		1		Lateral	Live Connection	
266.2	Yes				Water Level		
272.9	Yes		2		Lateral	Capped	
276.8	Yes		11		Lateral	Live Connection	

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OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
325.2	Yes		10		Lateral	Live Connection	
329.1	Yes		2		Lateral	Live Connection	
359.5	Yes				Manhole		
359.5	Yes				STOP		

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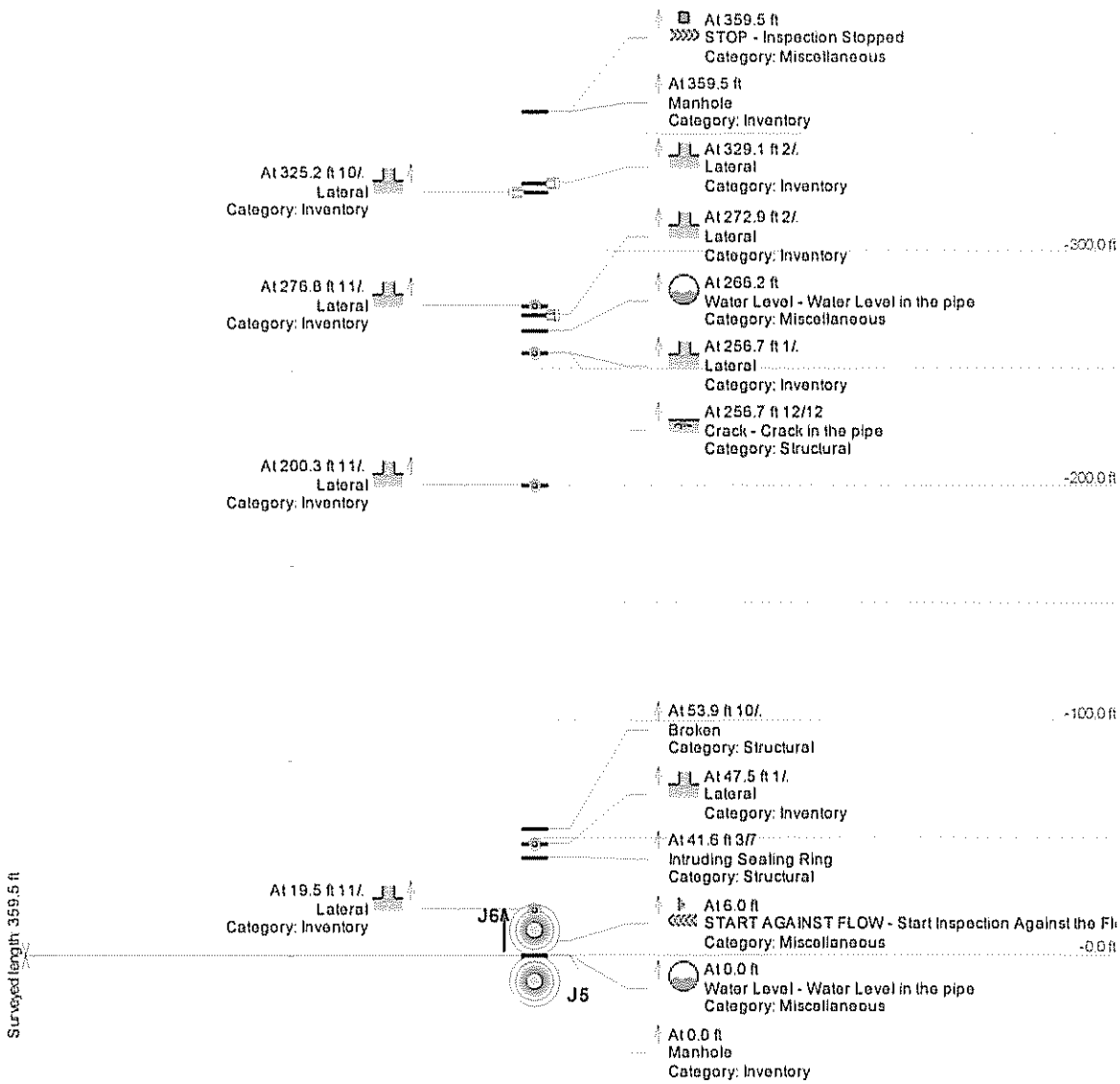
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	J6 J5	Cancrete	7286 McKee Alley

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/13/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	359.5	Dry	



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Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
B10 B9	Concrete	45241 Main St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
B10	B9	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 2:03:03 PM	7/12/2012 2:03:29 PM	7/12/2012 2:12:27 PM

Surveyed footage:	Status:	Operator:	Work order no.:
142.5	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
14.0	Yes		9		Crack	ɔngitudinal - Narro	
46.9	Yes		2		Lateral	Live Connection	
83.2	Yes		12	12	Crack	Circular - Wider	
140.2	Yes		12	12	Crack	Circular - Wider	
142.5	Yes				Manhole		
142.5	Yes				STOP		

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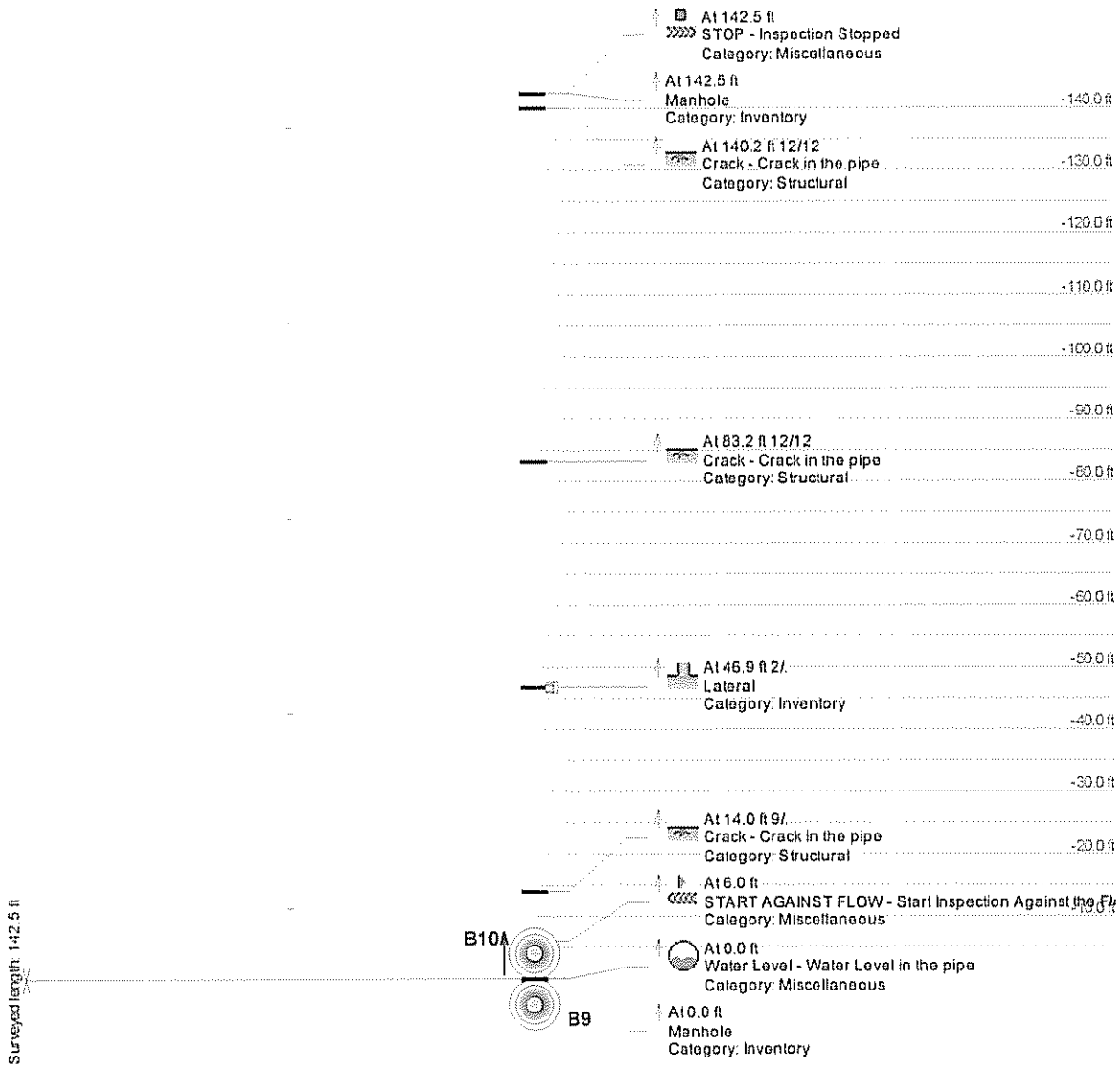
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	B10 B9	Concrete	45241 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	142.5	Dry	



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Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
J5 J4	Concrete	7286 McKee Alley

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
J5	J4	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/13/2012 10:15:56 AM	7/13/2012 10:16:19 AM	7/13/2012 10:33:46 AM

Surveyed footage:	Status:	Operator:	Work order no.:
391.5	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
8.1	No		10		Lateral	Live Connection	
60.2	No		10		Lateral	Capped	
76.5	No		10		Lateral	Live Connection	
100.7	No		10		Lateral	Capped	
108.8	No		10		Lateral	Live Connection	
141.4	No		10		Lateral	Live Connection	
157.4	No		12		Crack		
173.4	No		10		Lateral	Live Connection	
197.7	No		10		Lateral	Live Connection	
390.4	No		12	12	Crack	Circular - Wider	

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Fax: 407-425-1569

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
391.5	No				Manhole		
391.5	No				STOP		

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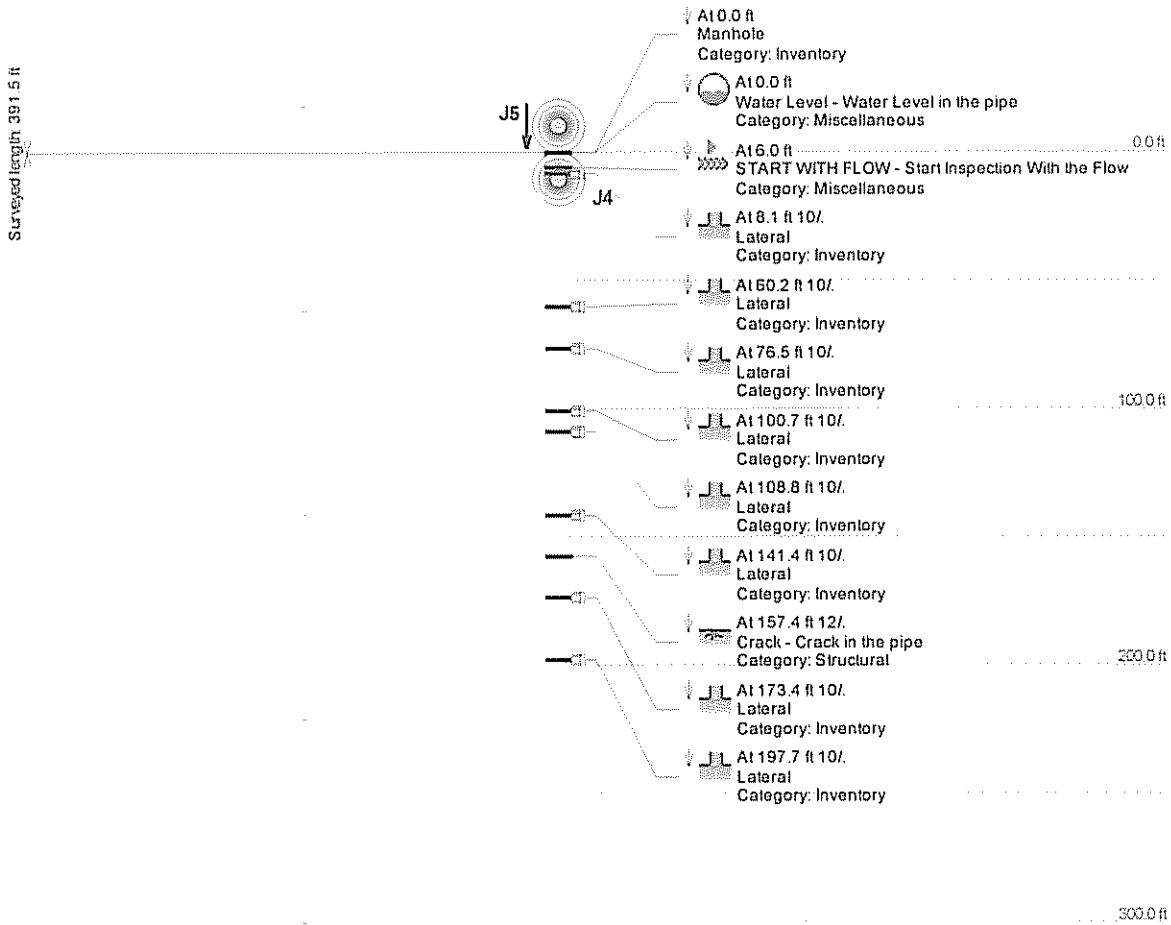
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	J5 J4	Concrete	7286 McKee Alley

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/13/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	391.5	Dry	



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Phone: 407-849-0190
Fax: 407-425-1569

Project Name:	Mainline ID:	City:	Address:
City of Concrete	J5 J4	Concrete	7286 McKee Alley

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/13/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	391.5	Dry	

At 390.4 ft 12/12
Crack - Crack in the pipe
Category: Structural

At 391.5 ft
Manhole
Category: Inventory

At 391.5 ft
STOP - Inspection Stopped
Category: Miscellaneous

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Orlando, FL 32805
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Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
B7 B6	Concrete	45125 Main St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
B7	B6	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 3:08:00 PM	7/12/2012 3:08:22 PM	7/12/2012 3:21:10 PM

Surveyed footage:	Status:	Operator:	Work order no.:
300.8	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
46.7	No		10		Lateral	Live Connection	
53.1	No		12	12	Crack	Circular - Wider	
158.5	No		10		Lateral	Live Connection	
196.1	No		3		Crack	Circular - Wider	
196.1	No		3		Infiltration	Light	
234.7	No		2		Lateral	Live Connection	
250.7	No		10		Lateral	Live Connection	
300.8	No				Manhole		
300.8	No				STOP		

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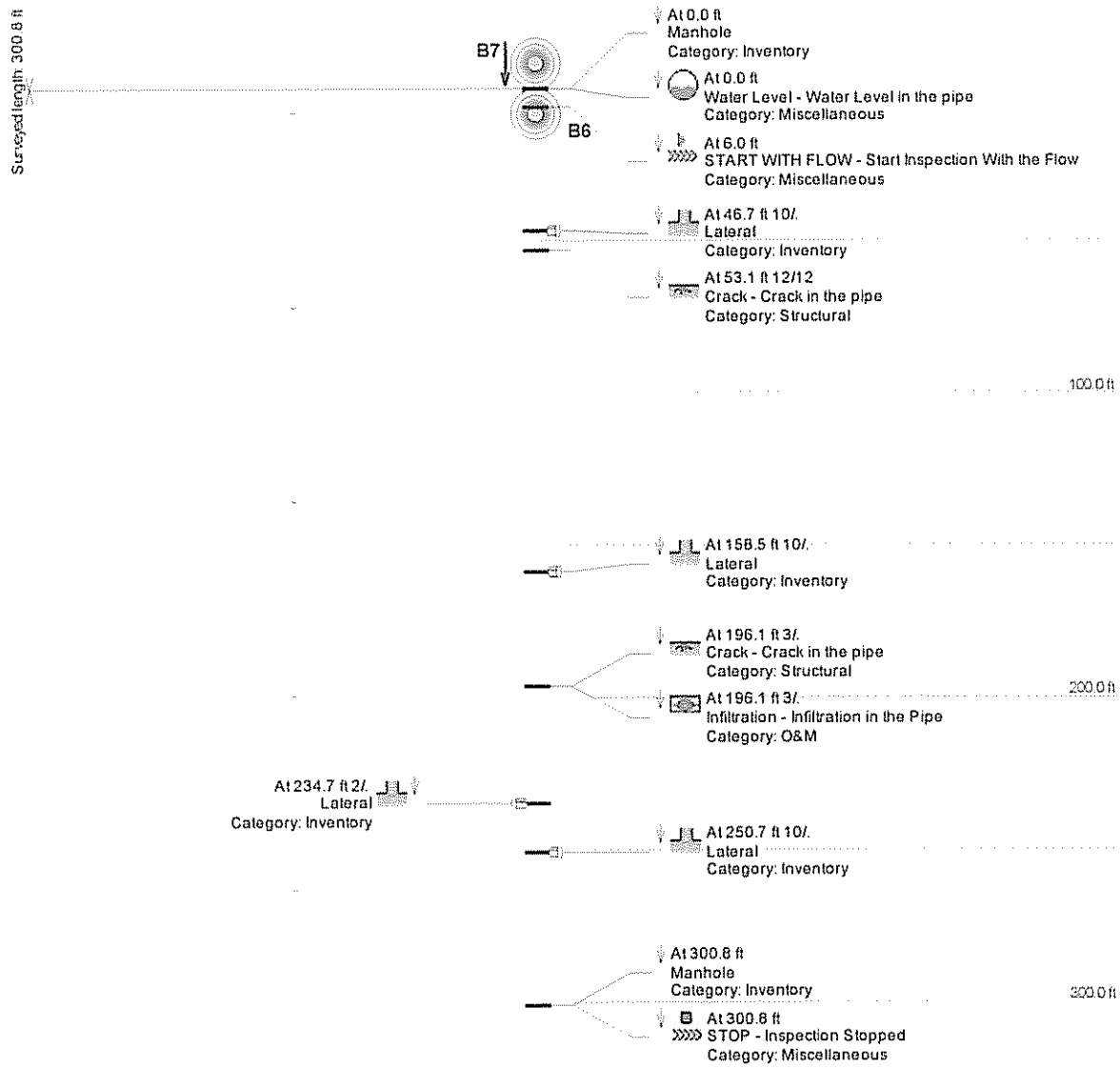
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	B7 B6	Concrete	45125 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	300.8	Dry	



PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B1-M1	CONCRETE-BASIN 1	GARDNER AV & ALBERT ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH M1	LS 1	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
4/30/2014 9:55:06 AM	4/30/2014 9:55:26 AM	4/30/2014 10:16:53 AM

Surveyed footage:	Status:	Operator:	Work order no.:
304.4	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream		
0.0	No				Water Level	5%	
49.4	No		9		Lateral-Left	Active	
85.8	No		3		Lateral-Right	Active	
90.0	No		9		Lateral-Left	Active	
174.5	No		9		Lateral-Left	Active	
174.5	No		3	12	Root-in-Lateral	Fine	
174.7	No		12	11	Crack-Circular	large	
174.7	No				Crack-Circular	Soil Visible	
174.7	No				Root	Fine	
187.0	No		3		Lateral-Right	Active	
222.1	No				Sag	15%	

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
225.3	No				Sag-Begin		
236.5	No				Sag-end		
236.5	No				Water Level	5%	
251.6	No		3		Lateral-Right	In-active	
280.0	No				Sag-Begin		
285.5	No				Sag	15%	
293.7	No				Sag-end		
293.7	No				Water Level	5%	
297.5	No				Sag-Begin		
301.2	No				Sag	20%	
303.5	No		12	11	Crack-Circular	large	
303.5	No				Crack-Circular	Soil Visible	
304.4	No				Lift Station		
304.4	No				STOP		

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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
J4 J3	Concrete	45813 Main St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
J4	J3	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/13/2012 12:35:19 PM	7/13/2012 12:35:38 PM	7/13/2012 12:44:10 PM

Surveyed footage:	Status:	Operator:	Work order no.:
108.6	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
6.0	Yes	6.5			Pipe Type		
7.8	Yes				Water Level		
11.6	Yes				Joint Offset	Medium	
43.7	Yes	10.2			Water Level		
106.6	Yes		4		Infiltration	Medium	
106.6	Yes		12	12	Crack	Circular - Wider	
108.6	Yes				Manhole		
108.6	Yes				STOP		

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Orlando, FL 32805
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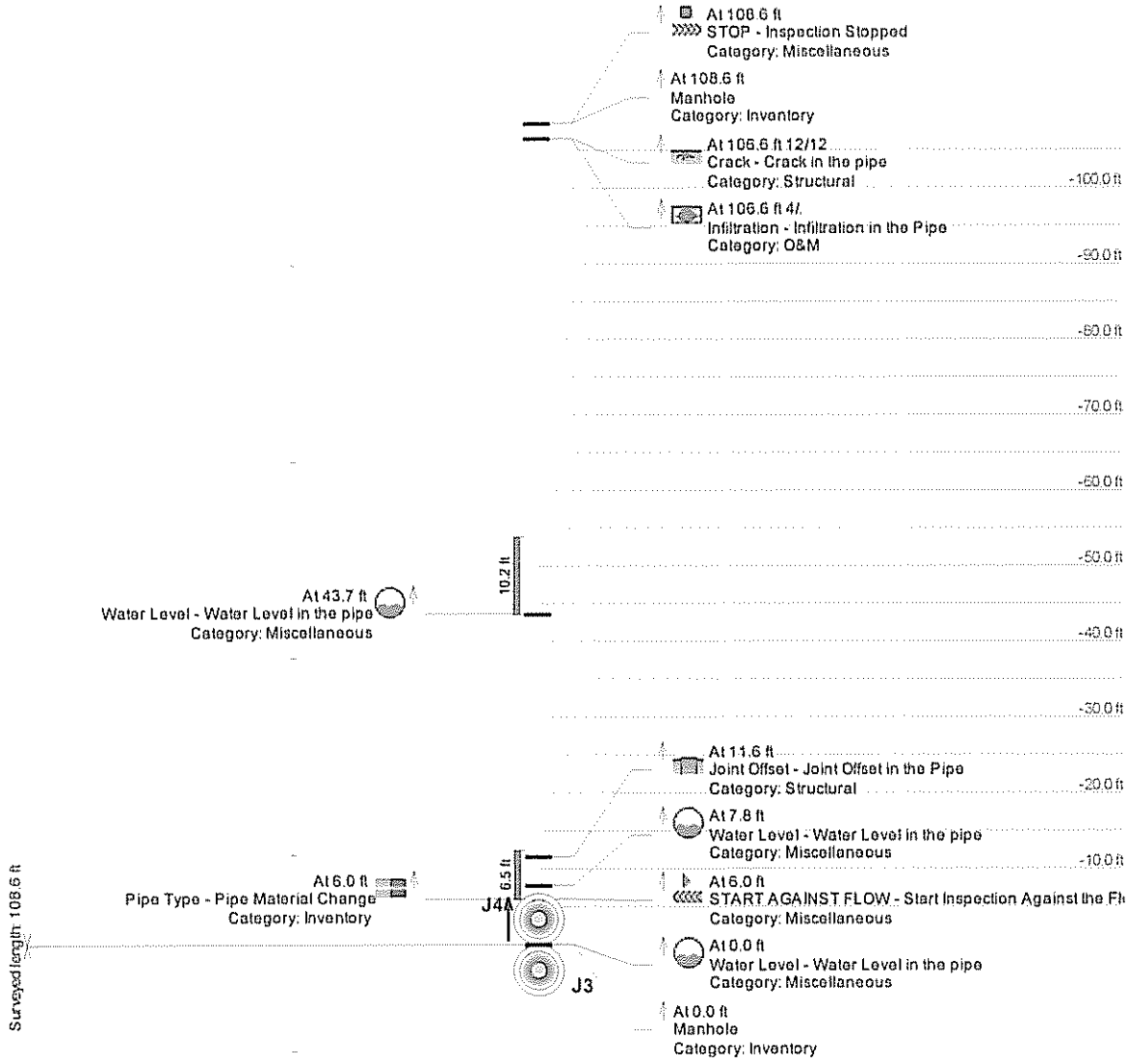
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	J4 J3	Concrete	45813 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/13/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	108.6	Dry	



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Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
K3 K2	Concrete	7552 S Dillard Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
K3	K2	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/13/2012 4:16:46 PM	7/13/2012 4:17:31 PM	7/13/2012 4:35:28 PM

Surveyed footage:	Status:	Operator:	Work order no.:
387.9	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
6.0	No	17.2			Water Level		
61.8	No		10		Lateral	Live Connection	
66.1	No		2		Lateral	Live Connection	
89.3	No	298.6			Water Level		
114.0	No		2		Lateral	Live Connection	
138.1	No		10		Lateral	Live Connection	
146.3	No		10		Lateral	Live Connection	
222.6	No		2		Lateral	Live Connection	
246.6	No		2		Lateral	Live Connection	
258.7	No		10		Lateral	Live Connection	

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Fax: 407-425-1569

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
278.7	No		2		Lateral		
290.2	No		12	12	Crack	Circular - Wider	
290.7	No		10		Lateral	Live Connection	
387.9	No				Manhole		
387.9	No				STOP		

CUES, Inc.
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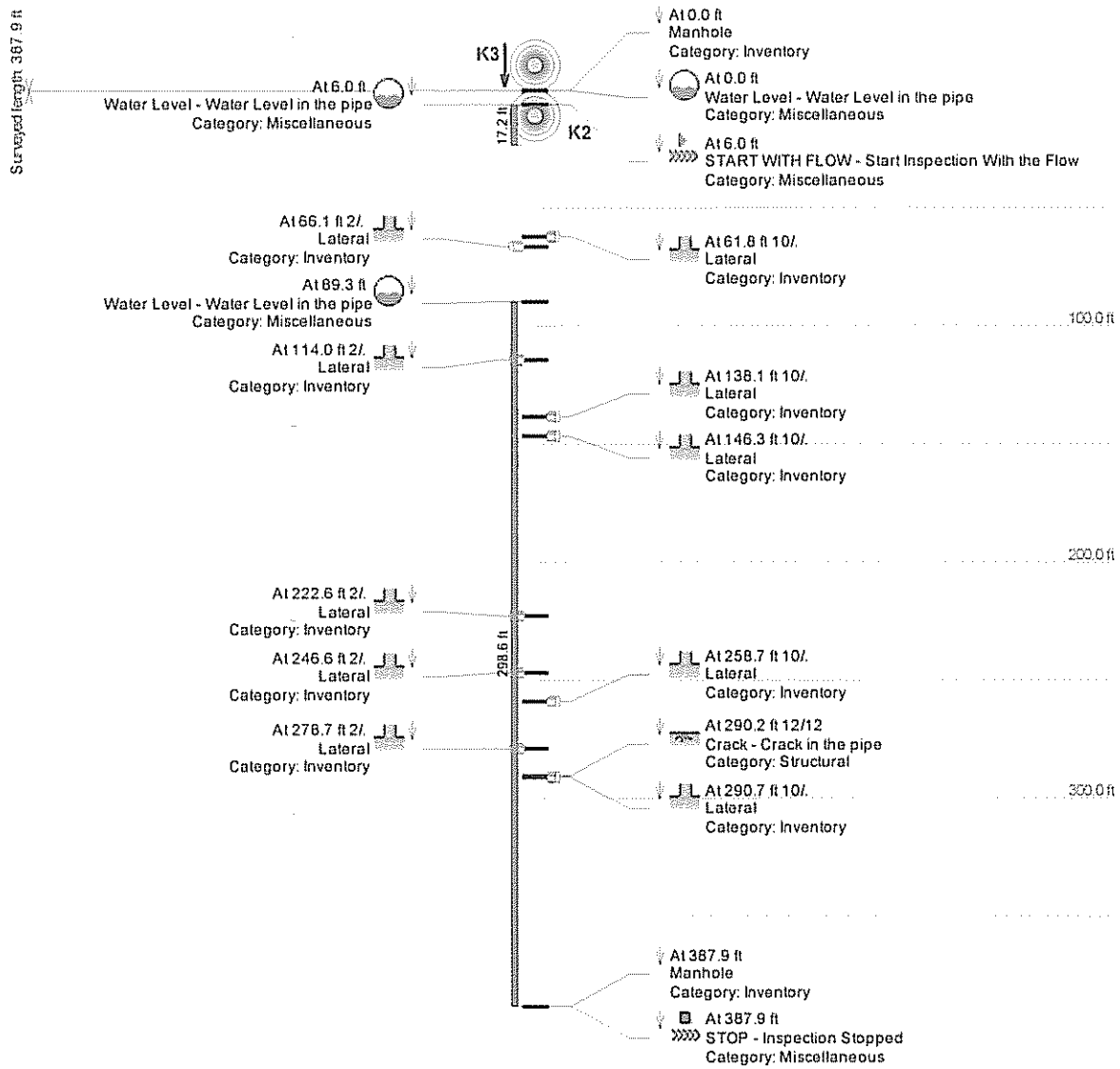
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	K3 K2	Concrete	7552 S Dillard Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/13/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	387.9	Dry	



CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
B9 B8	Concrete	45241 Main St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
B9	B8	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 2:14:45 PM	7/12/2012 2:15:39 PM	7/12/2012 2:35:01 PM

Surveyed footage:	Status:	Operator:	Work order no.:
357.4	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
36.6	No		9		Lateral	Live Connection	
80.5	No		2		Lateral	Live Connection	
132.7	No		2		Lateral	Live Connection	
168.7	No		9		Lateral	Live Connection	
256.6	No		2		Lateral	Live Connection	
264.9	No		9		Infiltration	Medium	
264.9	No		10		Lateral	Live Connection	
296.8	No		10		Lateral	Live Connection	
308.9	No		3		Lateral	Live Connection	
336.7	No		9		Lateral	Live Connection	

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OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
353.5	No				Water Level		
357.4	No				Manhole		
357.4	No				STOP		

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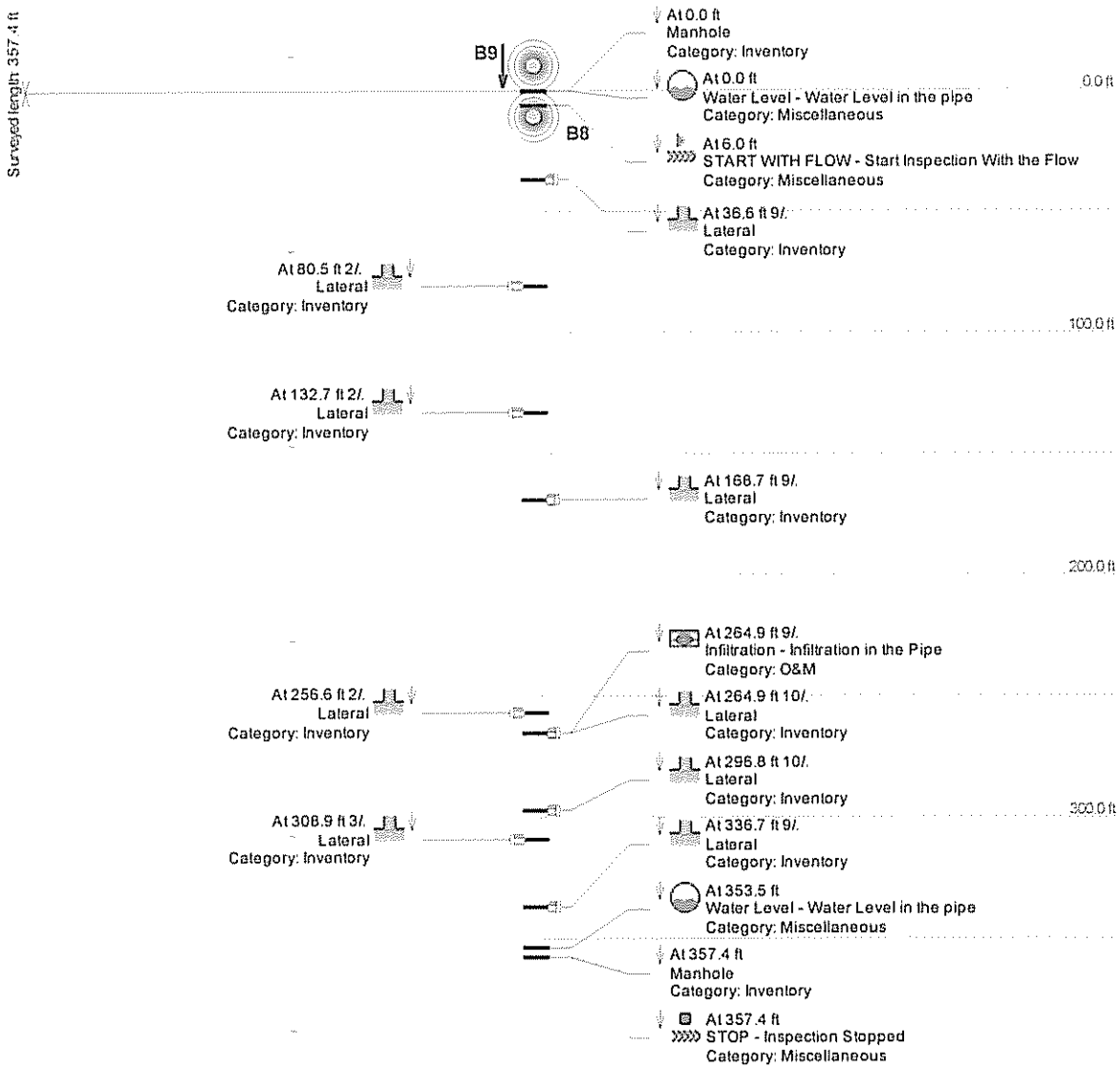
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	B9 B8	Concrete	45241 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	357.4	Dry	



PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-R1a	CONCRETE-BASIN 2	SUPERIOR AV & RIDGEWAY CT

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH R1a	MH R1	PVC	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/2/2014 8:34:49 AM	5/2/2014 8:40:32 AM	5/2/2014 8:55:14 AM

Surveyed footage:	Status:	Operator:	Work order no.:
215.4	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream	Infiltration-Gusher	
0.0	No				Water Level	5%	
10.5	No		2		Lateral-Right	Active	
37.0	No		2		Lateral-Right	Active	
44.8	No		9		Lateral-Left	Active	
87.7	No		2		Lateral-Right	Active	
90.6	No				Sag	30%	
92.8	No		9		Lateral-Left	Active	
99.2	No				Water Level	10%	
150.3	No		2		Lateral-Right	Active	
155.0	No		9		Lateral-Left	Active	
193.1	No				Water Level	20%	

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6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
194.7	No		9		Lateral-Left	Active	
208.3	No		3		Lateral-Right	Active	
212.5	No				Infiltration	Runner	
215.4	No				Manhole-Downstream	Infiltration-Runner	
215.4	No				STOP		

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-D8	CONCRETE-BASIN 2	CEDAR ST & SUPERIOR AV

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH D8	MH D6	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
4/30/2014 3:52:29 PM	4/30/2014 3:53:20 PM	4/30/2014 4:10:23 PM

Surveyed footage:	Status:	Operator:	Work order no.:
378.7	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Cloudy	

Comments

AGAINST THE FLOW

OBSERVATIONS

Footage	Key	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				START AGAINST FLOW		
0.0	Yes				Manhole-Downstream		
0.0	Yes				Water Level	5%	
98.5	Yes		9		Lateral-Left	Active	
150.8	Yes		3		Lateral-Right	Active	
247.9	Yes		3		Lateral-Right	Active	
336.0	Yes		1		Lateral-Right	Active	
336.0	Yes				Root-in-Lateral	Fine	
336.0	Yes				Crack-Circular	large	
378.7	Yes				Manhole-Upstream		
378.7	Yes				STOP		

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-D2-1	CONCRETE-BASIN 2	PARK AV & CEDAR ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH D2-1	MH D2	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/1/2014 2:18:50 PM	5/1/2014 2:19:37 PM	5/1/2014 2:41:13 PM

Surveyed footage:	Status:	Operator:	Work order no.:
391.9	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Key	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream		
0.0	No				Water Level	5%	
146.9	No		10		Lateral-Left	Active	
158.2	No		3		Lateral-Right	Active	
170.4	No		3		Lateral-Right	Active	
173.8	No		10		Lateral-Left	Active	
173.9	No		2	9	Crack-Circular	medium	
270.5	No		10		Lateral-Left	Active	
270.5	No				Lateral Connection Problem	Board in Lateral	
270.6	No				Crack-Circular	medium	
302.9	No		2		Lateral-Right	In-active	
391.9	No				Manhole-Downstream		

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Phone: 253-435 4328
Cell:206-423-2445(Jerry)

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
391.9	No				STOP		

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-E2	CONCRETE-BASIN 2	DUFFY ST & PARK AV

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH E2	MH E2a	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/2/2014 12:05:07 PM	5/2/2014 12:05:26 PM	5/2/2014 12:23:36 PM

Surveyed footage:	Status:	Operator:	Work order no.:
162.7	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream		
0.0	No				Water Level	5%	
4.0	No				Joint - Infiltration	Weeper	
45.5	No		3		Lateral-Right	Active	
45.5	No				Lateral Connection Problem	Infiltration-Weeper	
45.5	No				Lateral Connection Problem	eral Deposits-Medi	
97.8	No		9		Lateral-Left	Active	
130.2	No		2		Lateral-Right	Active	
162.7	No				Manhole-Downstream		
162.7	No				STOP		

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3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
G3 G2	Concret	45732 Short St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
G3	G2	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/13/2012 8:04:51 AM	7/13/2012 8:12:41 AM	7/13/2012 8:30:01 AM

Surveyed footage:	Status:	Operator:	Work order no.:
401.4	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
91.8	Yes	33.2			Water Level		
98.1	Yes		11		Lateral	Live Connection	
158.5	Yes		11		Lateral	Live Connection	
174.7	Yes		11		Lateral	Live Connection	
259.0	Yes	142.4			Water Level		
279.3	Yes		10		Lateral	Live Connection	
279.3	Yes				Debris	<=20%	
331.3	Yes		10		Lateral	Live Connection	
391.4	Yes		10		Lateral	Live Connection	
395.5	Yes		10		Lateral	Live Connection	

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OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
401.4	Yes				Manhole		
401.4	Yes				STOP		

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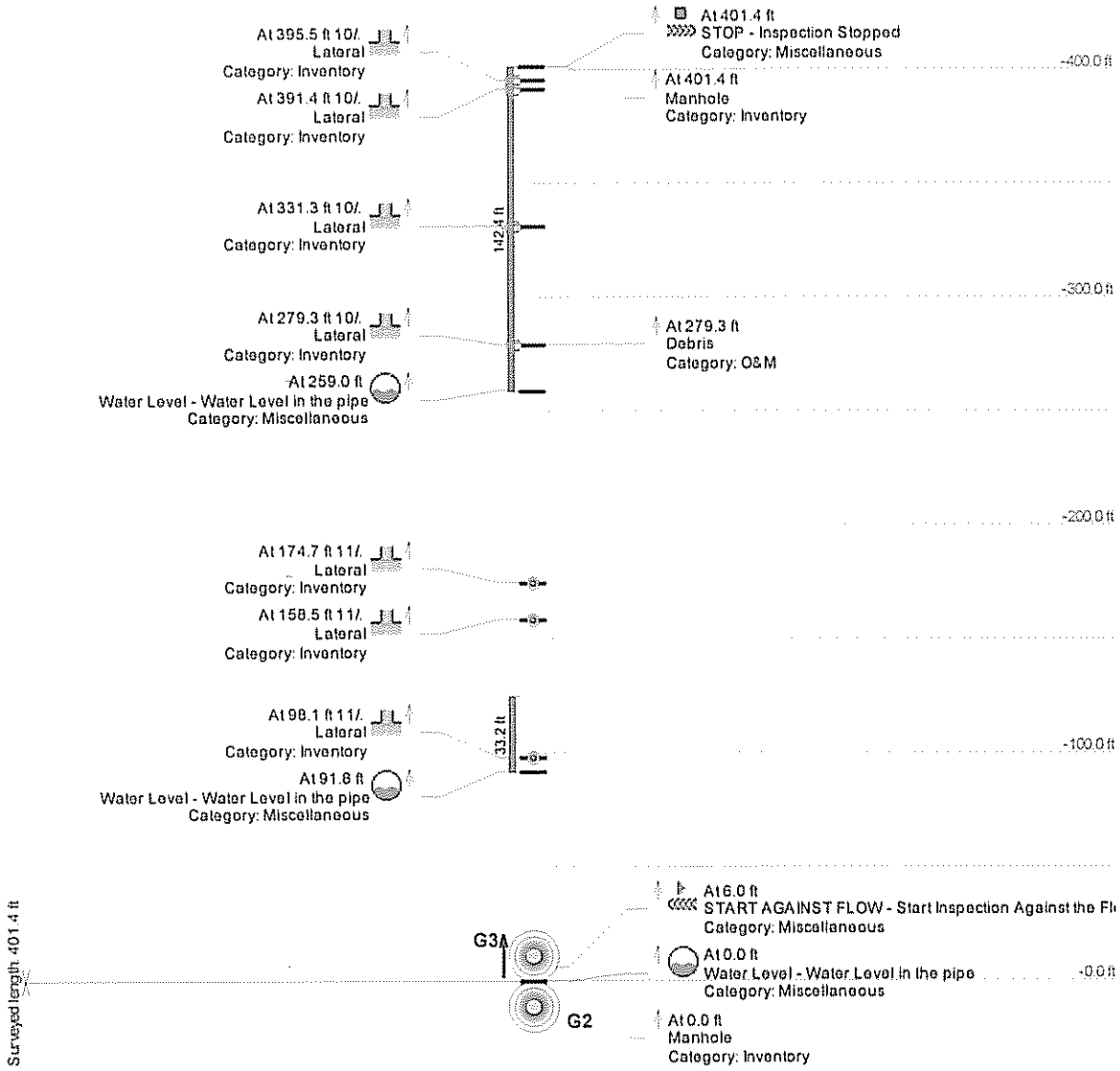
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	G3 G2	Concret	45732 Short St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/13/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	401.4	Dry	



PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B4-A14-1	CONCRETE-BASIN 4	A AV & MAIN ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH A14-1	MH A14	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/5/2014 12:22:43 PM	5/5/2014 12:35:24 PM	5/5/2014 1:00:44 PM

Surveyed footage:	Status:	Operator:	Work order no.:
401.7	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Cloudy	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream		
0.0	No				Water Level	5%	
14.9	No		9		Lateral-Left	Active	
51.1	No		3		Lateral-Right	Active	
75.3	No		9		Lateral-Left	Active	
139.9	No		9		Lateral-Left	Active	
148.2	No		3		Lateral-Right	Active	
260.3	No		9		Lateral-Left	Active	
260.3	No		9		Lateral Connection Problem	Infiltration-Runner	
272.6	No		3		Lateral-Right	Active	
401.7	No				Manhole-Downstream		
401.7	No				STOP		

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B4-A18-1	CONCRETE-BASIN 4	SUPERIOR AV & LIMESTONE ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH A18-1	MH A18	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/5/2014 11:32:24 AM	5/5/2014 11:32:45 AM	5/5/2014 11:44:59 AM

Surveyed footage:	Status:	Operator:	Work order no.:
279.7	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Rain	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream		
0.0	No				Water Level	5%	
72.3	No		10		Lateral-Left	Active	
72.3	No		10		Root-in-Lateral	Fine	
84.2	No		1		Lateral-Right	Active	
196.8	No		9		Lateral-Left	Active	
279.7	No				Manhole-Downstream		
279.7	No				STOP		

PRO-VAC
6622 112th St E
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Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B4-A18-2	CONCRETE-BASIN 4	SUPERIOR AV & LIMESTONE ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH A18-2	MH A18-1	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/5/2014 10:47:32 AM	5/5/2014 10:47:57 AM	5/5/2014 10:56:50 AM

Surveyed footage:	Status:	Operator:	Work order no.:
184.8	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Light Rain	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream		
0.0	No				Water Level	5%	
80.5	No		9		Lateral-Left	Active	
114.0	No		3		Lateral-Right	Active	
180.5	No				Joint Deflection	Left	
184.8	No				Manhole-Downstream		
184.8	No				STOP		

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B1-L1-1	CONCRETE-BASIN 1	BENNJAMIN ST & DILLARD AV

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH L1-1	MH L1	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
4/30/2014 12:10:04 PM	4/30/2014 12:11:00 PM	4/30/2014 12:30:39 PM

Surveyed footage:	Status:	Operator:	Work order no.:
306.9	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

AGAINST THE FLOW

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				START AGAINST FLOW		
0.0	Yes				Manhole-Downstream		
0.0	Yes				Water Level	5%	
42.0	Yes		9		Lateral-Left	Active	
42.0	Yes				Root-in-Lateral	Fine	
42.2	Yes				Crack-Multiple	Large	
58.2	Yes		3		Lateral-Right	Active	
119.0	Yes		9		Lateral-Left	In-active	
163.2	Yes		3		Lateral-Right	Active	
203.7	Yes		9		Lateral-Left	Active	
232.0	Yes		3		Lateral-Right	Active	
306.9	Yes				Manhole-Upstream		
306.9	Yes				STOP		

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3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
B5 B4	Concrete	45022 Main St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
B5	B4	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 3:59:51 PM	7/12/2012 4:00:16 PM	7/12/2012 4:06:07 PM

Surveyed footage:	Status:	Operator:	Work order no.:
126.0	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
2.0	Yes				START AGAINST FLOW		
28.4	Yes		2		Infiltration	Light	
46.0	Yes		2		Lateral	Live Connection	
126.0	Yes				Manhole		
126.0	Yes				STOP		

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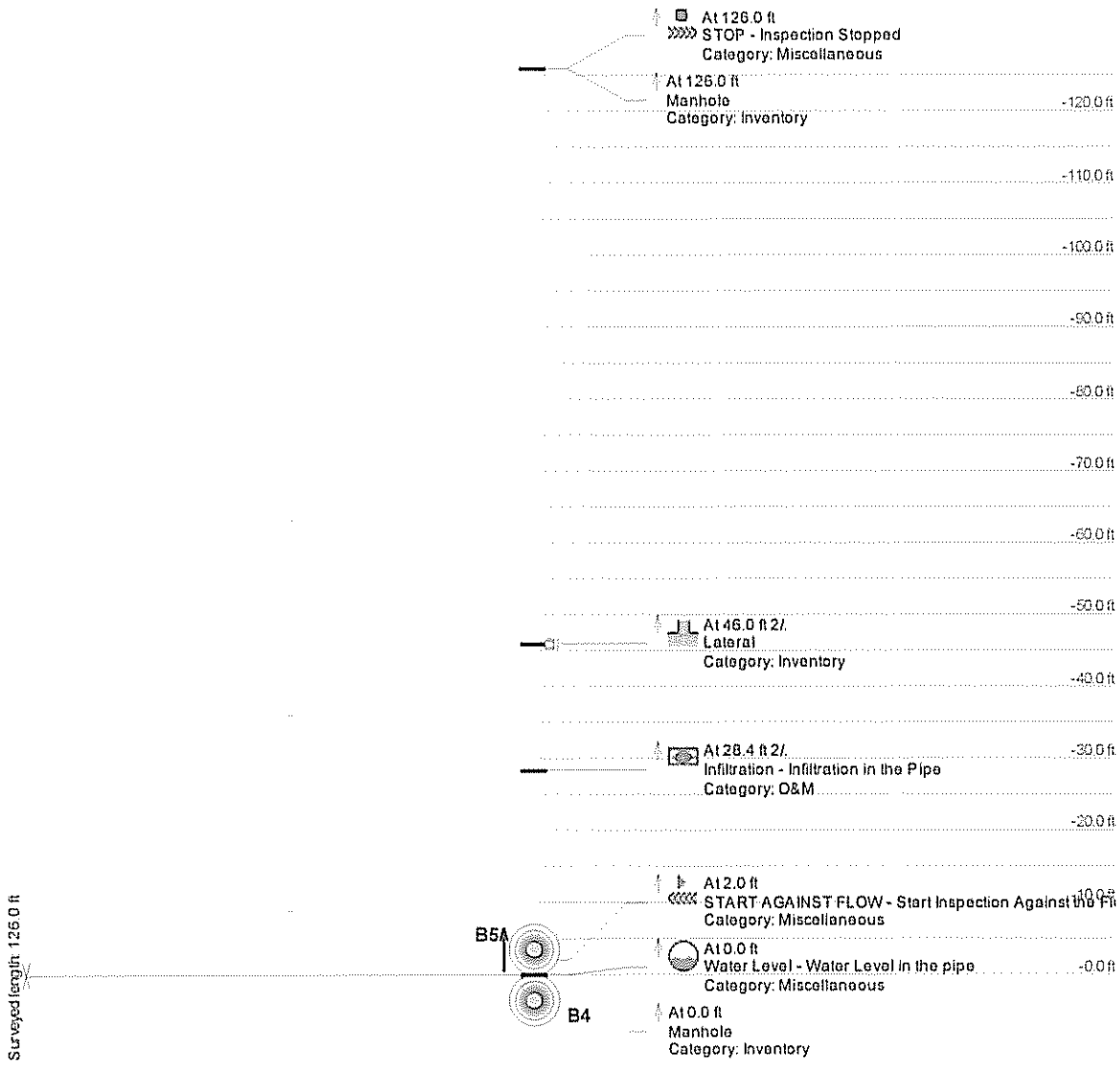
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	B5 B4	Concrete	45022 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	126.0	Dry	



PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-D6-1	CONCRETE-BASIN 2	SUPERIOR AV AND CEDAR ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH D6-1	MH D6	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/1/2014 8:34:26 AM	5/1/2014 8:54:45 AM	5/1/2014 9:11:57 AM

Surveyed footage:	Status:	Operator:	Work order no.:
312.6	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

AGAINST THE FLOW

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				START AGAINST FLOW		
0.0	Yes				Manhole-Downstream		
0.0	Yes				Water Level	5%	
170.9	Yes		3		Lateral-Right	Active	
170.9	Yes		3		Lateral Connection Problem	Rocks-Gravel	
207.3	Yes		9		Lateral-Left	Active	
207.3	Yes		9		Lateral Connection Problem	Rocks-Gravel	
312.6	Yes				Manhole-Upstream		
312.6	Yes				STOP		

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-R3	CONCRETE-BASIN 2	RIETZE AV & DUFFY ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH R3	MH E4	PVC	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/2/2014 10:03:11 AM	5/2/2014 10:03:29 AM	5/2/2014 10:43:06 AM

Surveyed footage:	Status:	Operator:	Work order no.:
0.0	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Key	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
-0.1	No				STOP		
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream	Infiltration-Runner	
0.0	No				Water Level	10%	

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-R3	CONCRETE-BASIN 2	RIETZE AV & DUFFY ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH R3	MH E4	PVC	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/2/2014 10:43:13 AM	5/2/2014 10:51:08 AM	5/2/2014 10:56:36 AM

Surveyed footage:	Status:	Operator:	Work order no.:
15.0	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream	Infiltration-Runner	
0.0	No				Water Level	10%	
4.0	No		2		Lateral-Right	Active	
4.0	No				Root-in-Lateral	Medium	
14.9	No				Manhole-Downstream		
15.0	No				STOP		

PRO-VAC
6622 112th St E
Puyallup, WA 98373
Phone: 253-435 4328
Cell:206-423-2445(Jerry)

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C-B2-E3	CONCRETE-BASIN 2	PARK AV & DUFFY ST

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
MH E3	MH E2	Concrete	Circular	8	

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
5/2/2014 11:37:24 AM	5/2/2014 11:37:45 AM	5/2/2014 11:44:32 AM

Surveyed footage:	Status:	Operator:	Work order no.:
116.6	Stopped	Jerry Hyatt	

Reason:	Weather:	Condition:
Assessment	Clear	

Comments

WITH THE FLOW

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				START WITH FLOW		
0.0	No				Manhole-Upstream		
0.0	No				Water Level	5%	
1.7	No				Grout/Concrete in line	Medium	
5.0	No				Grout/Concrete in line	End	
10.8	No		3		Lateral-Right	Active	
64.1	No		2		Lateral-Right	Active	
64.1	No		2		Lateral Connection Problem	Infiltration-Weeper	
116.6	No				Manhole-Downstream		
116.6	No				STOP		

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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C3 C2	Concrete	45487 Limestone

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
C3	C2	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/11/2012 11:43:27 AM	7/11/2012 11:43:43 AM	7/11/2012 12:03:34 PM

Surveyed footage:	Status:	Operator:	Work order no.:
393.5	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
6.0	No	387.5	5	7	Surface Damage	I Damage - Mechai	
171.3	No		10		Lateral	Live Connection	
243.5	No		2		Lateral	Live Connection	
320.0	No		10		Lateral	Live Connection	
367.2	No		2		Lateral	Live Connection	
393.5	No				Manhole		
393.5	No				STOP		

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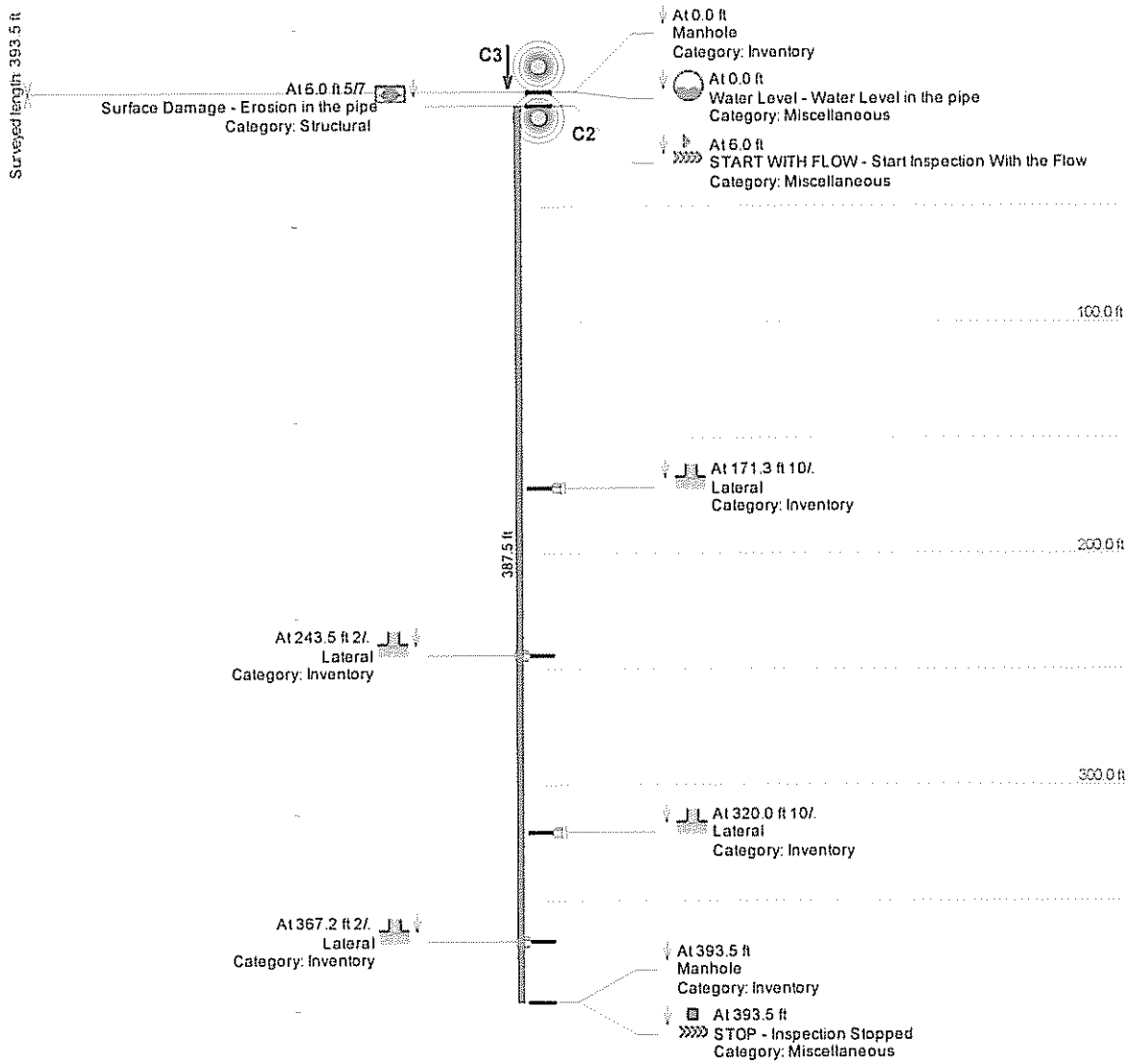
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	C3 C2	Concrete	45487 Limestone

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/11/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	393.5	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C5 C4	Concrete	7245 Nims Pl

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
C5	C4	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/11/2012 10:33:34 AM	7/11/2012 10:34:28 AM	7/11/2012 10:52:58 AM

Surveyed footage:	Status:	Operator:	Work order no.:
286.4	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No				START WITH FLOW		
2.0	No	284.4	5	7	Surface Damage	I Damage - Mechai	
41.6	No		7		Infiltration	Light	
286.4	No				Manhole		
286.4	No				STOP		

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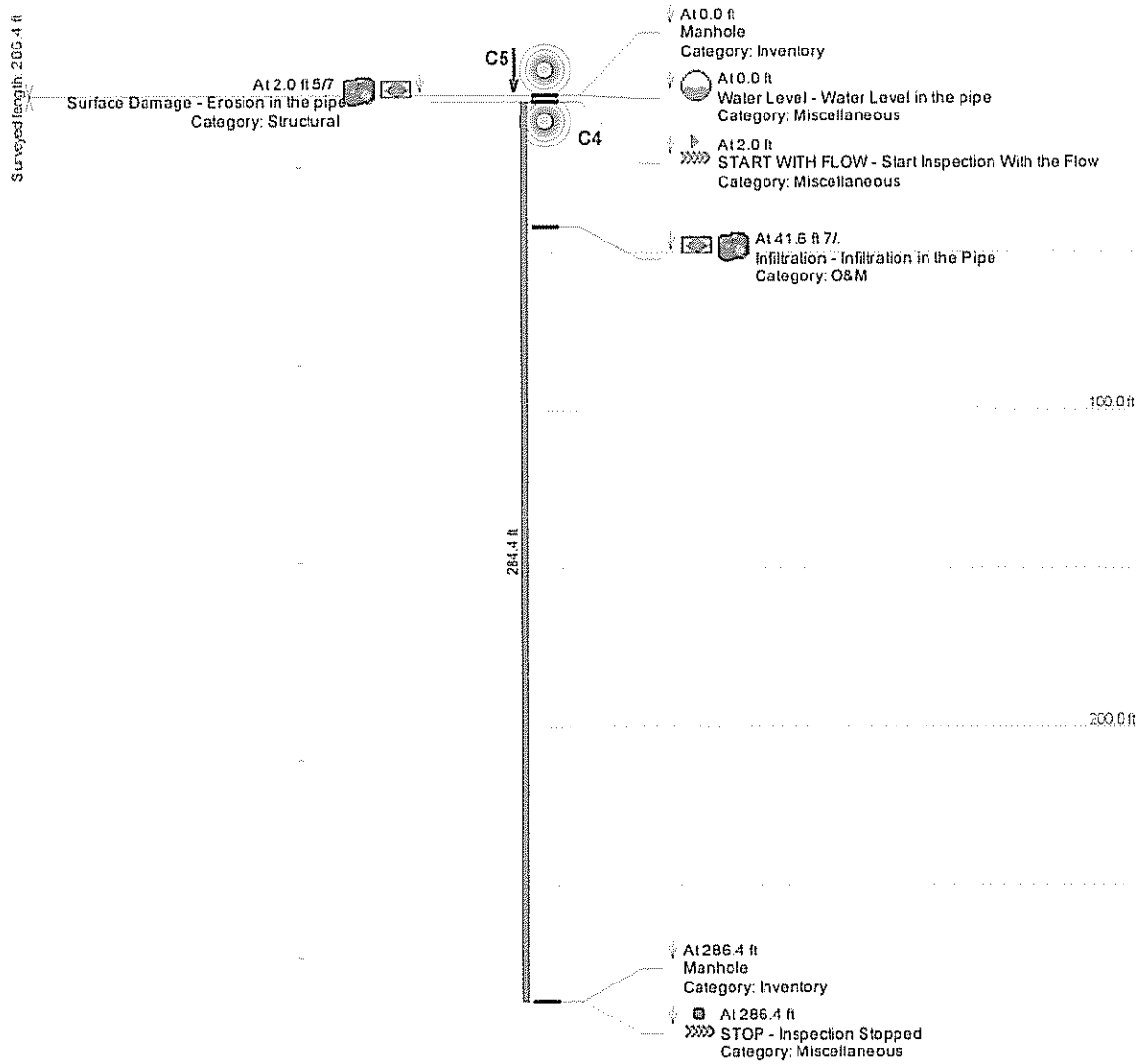
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	C5 C4	Concrete	7245 Nims Pl

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/11/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	286.4	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
B4 B4A	Concrete	44963 Main St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
B4	B4A	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 3:51:58 PM	7/12/2012 3:52:27 PM	7/12/2012 3:59:06 PM

Surveyed footage:	Status:	Operator:	Work order no.:
159.7	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
33.6	Yes	126.1			Water Level		
139.4	Yes		12		Infiltration	Light	
159.7	Yes				Manhole		
159.7	Yes				STOP		

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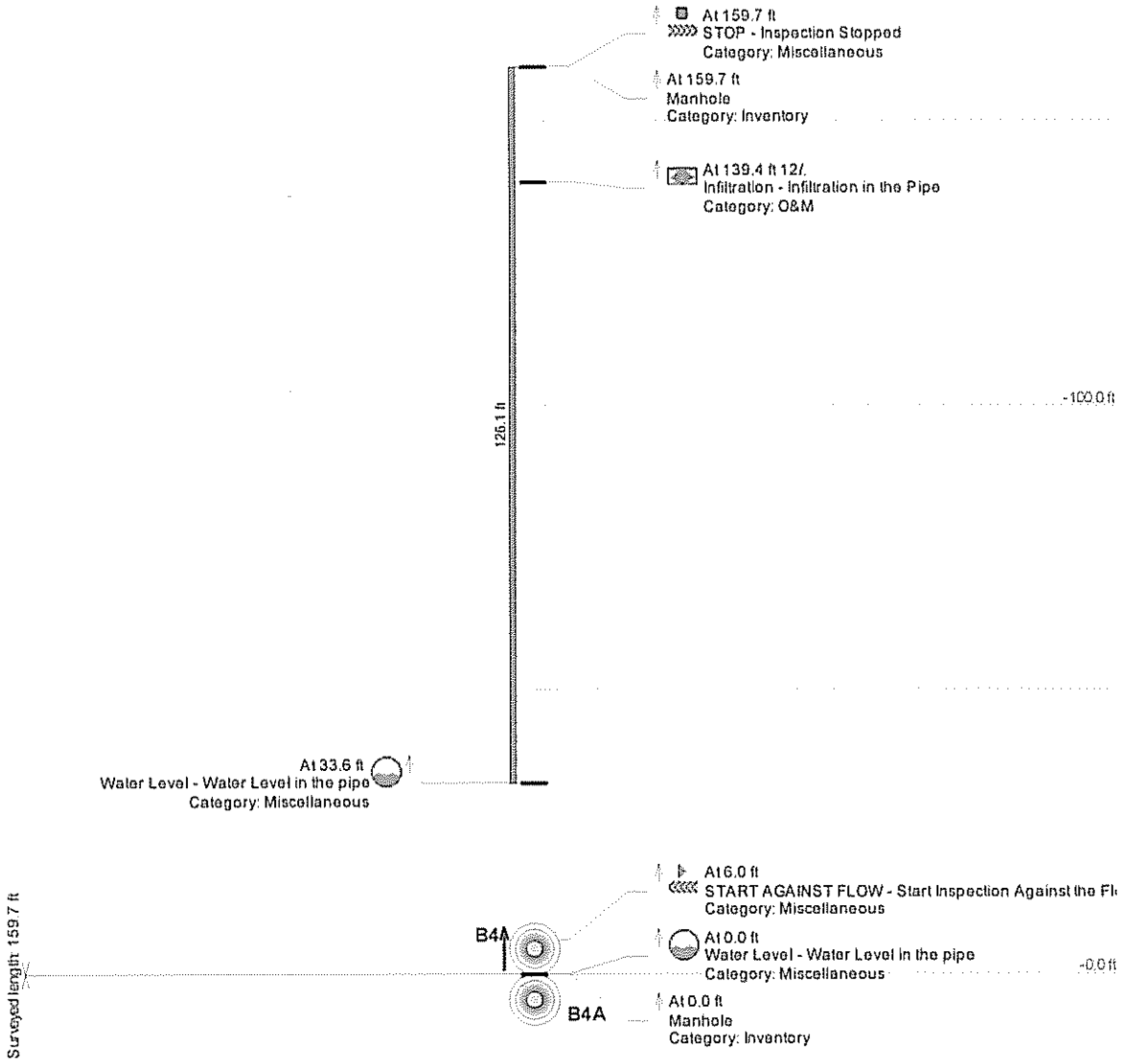
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	B4 B4A	Concrete	44963 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	159.7	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
A10 A9	Concrete	45650 Main St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
A10	A9	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 9:58:08 AM	7/12/2012 10:35:22 AM	7/12/2012 10:55:50 AM

Surveyed footage:	Status:	Operator:	Work order no.:
226.1	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
38.3	No				Water Level		
112.3	No		10		Lateral	Live Connection	
118.2	No	5.2			Water Level		
129.9	No	7.8			Water Level		
132.2	No		10		Lateral	Live Connection	
144.4	No		2		Lateral	Live Connection	
186.3	No		6	12	Broken		
188.6	No		11		Lateral	Live Connection	
221.7	No				Water Level		
226.1	No				Manhole		

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OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
226.1	No				STOP		

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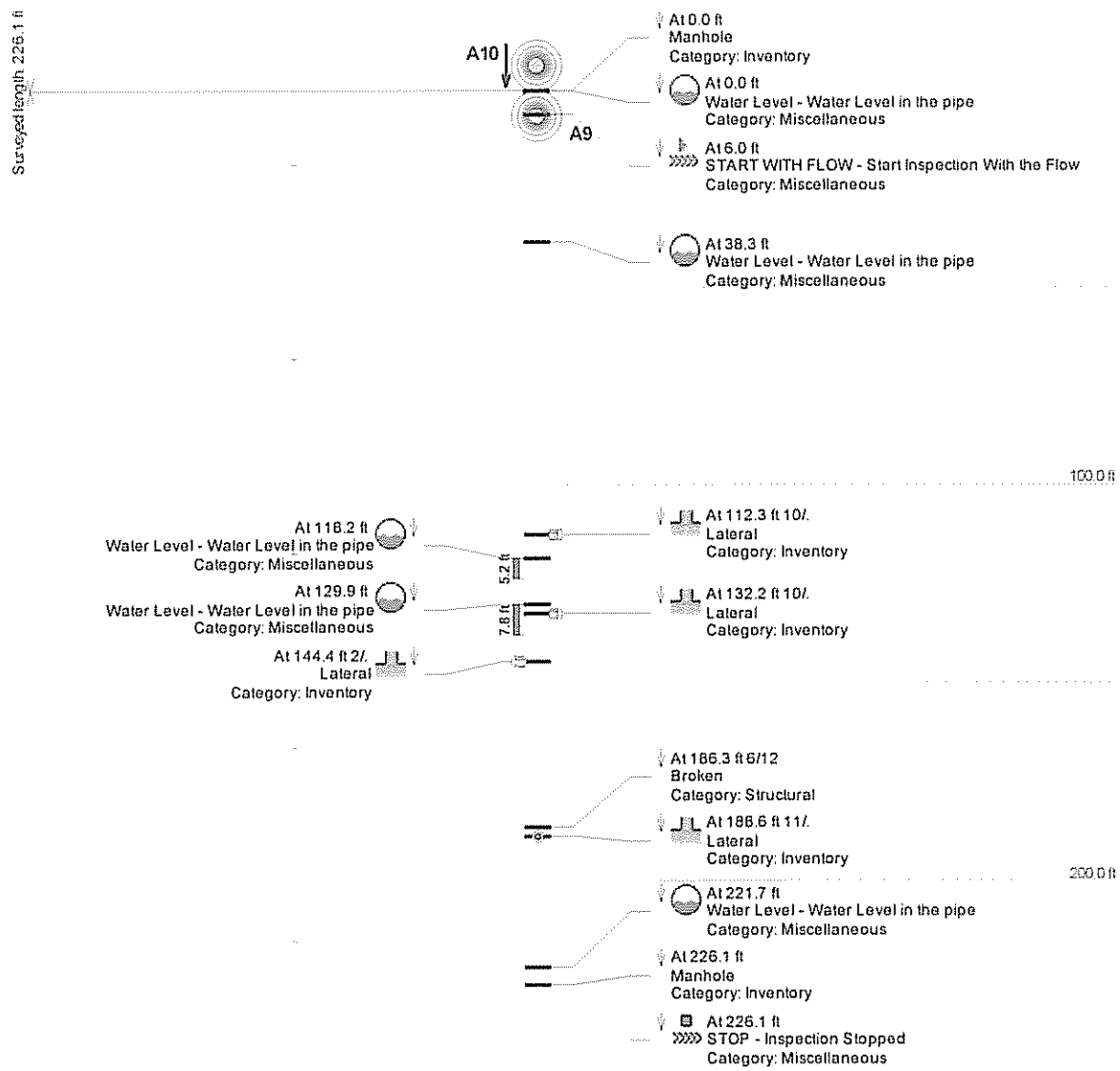
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	A10 A9	Concrete	45650 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	226.1	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C6 C5	Concrete	Limestone St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
C6	C5	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/11/2012 9:01:25 AM	7/11/2012 10:01:54 AM	7/11/2012 10:28:56 AM

Surveyed footage:	Status:	Operator:	Work order no.:
345.5	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No	343.5	5	7	Surface Damage		
6.0	No				START WITH FLOW		
47.5	No		10		Lateral	Live Connection	
57.4	No				Deposits		
119.7	No		1		Lateral	Live Connection	
131.8	No		1		Lateral	Live Connection	
139.6	No		11		Lateral	Live Connection	
197.6	No		2		Infiltration	5%	
207.0	No		10		Lateral	Live Connection	
225.9	No		2		Infiltration	5%	
308.3	No		10		Lateral	Capped	

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OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
325.5	No		10		Infiltration	Light	
325.5	No		10		Crack		
339.4	No				Water Level		
345.5	No				Manhole		
345.5	No				STOP		

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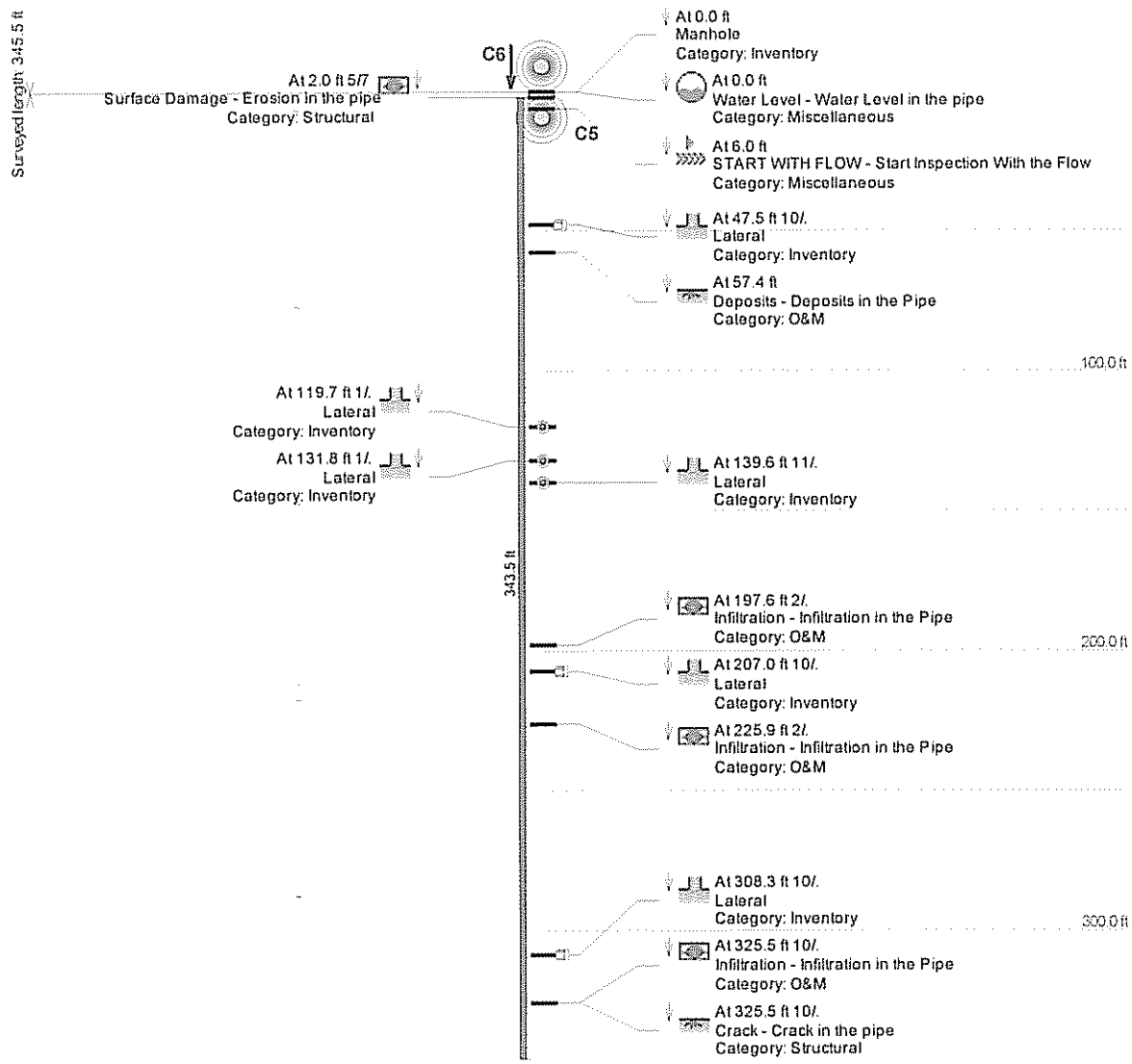
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	C6 C5	Concrete	Limestone St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/11/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	345.5	Dry	



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Project Name:	Mainline ID:	City:	Address:
City of Concrete	C6 C5	Concrete	Limestone St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/11/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	345.5	Dry	

At 339.4 ft
Water Level - Water Level in the pipe
Category: Miscellaneous

At 345.5 ft
Manhole
Category: Inventory

At 345.5 ft
STOP - Inspection Stopped
Category: Miscellaneous

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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
A9 A8	Concrete	45734 Main St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
A9	A8	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 10:57:54 AM	7/12/2012 11:05:32 AM	7/12/2012 11:25:39 AM

Surveyed footage:	Status:	Operator:	Work order no.:
324.0	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No				START WITH FLOW		
21.8	No	8.3			Water Level		
49.5	No		10		Lateral	Live Connection	
73.7	No	10.4			Water Level		
79.3	No		8		Infiltration	Medium	
93.3	No	7.4			Water Level		
97.7	No		10		Lateral	Live Connection	
113.9	No		10		Lateral	Live Connection	
140.3	No				Water Level		
146.0	No		2		Lateral	Live Connection	
148.5	No				Water Level		

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OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
178.3	No		10		Lateral	Live Connection	
178.3	No	18.2			Water Level		
200.1	No		7		Crack		
242.4	No		10		Lateral	Live Connection	
294.6	No		2		Lateral	Live Connection	
298.8	No	11.9			Water Level		
324.0	No				Manhole		
324.0	No				STOP		

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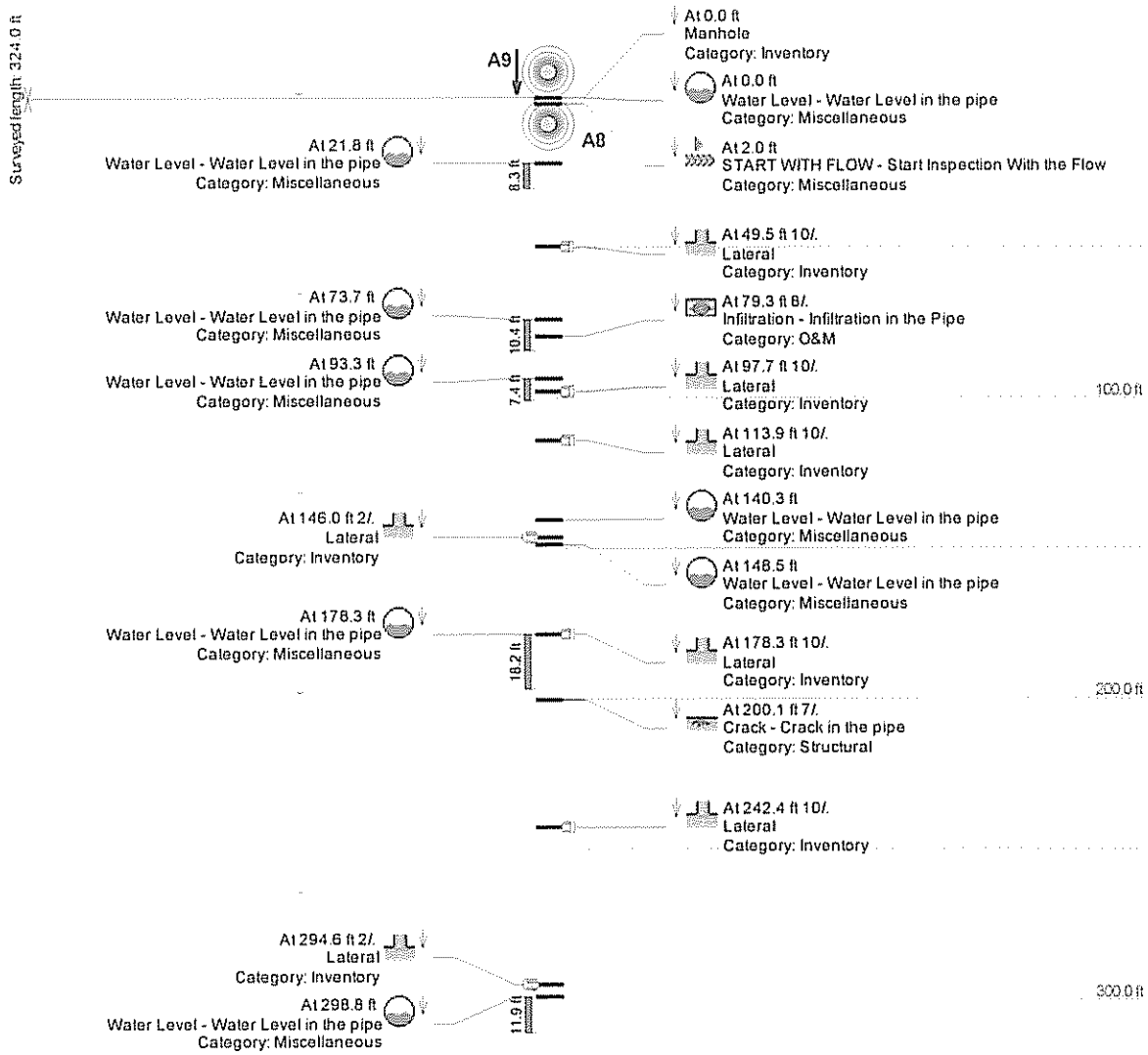
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	A9 A8	Concrete	45734 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	324.0	Dry	



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Project Name:	Mainline ID:	City:	Address:
City of Concrete	A9 A8	Concrete	45734 Main St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	324.0	Dry	

At 324.0 ft
Manhole
Category: Inventory

At 324.0 ft
STOP - Inspection Stopped
Category: Miscellaneous

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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
C1-1A C-1	Concrete	45657 Limestone St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
C1-1A	C-1	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/11/2012 12:33:33 PM	7/11/2012 12:35:17 PM	7/11/2012 12:44:16 PM

Surveyed footage:	Status:	Operator:	Work order no.:
123.1	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No				START WITH FLOW		
2.0	No	121.1	5	7	Surface Damage	I Damage - Mechai	
2.0	No				Water Level		
112.7	No	9.1			Water Level		
123.1	No				Manhole		
123.1	No				STOP		

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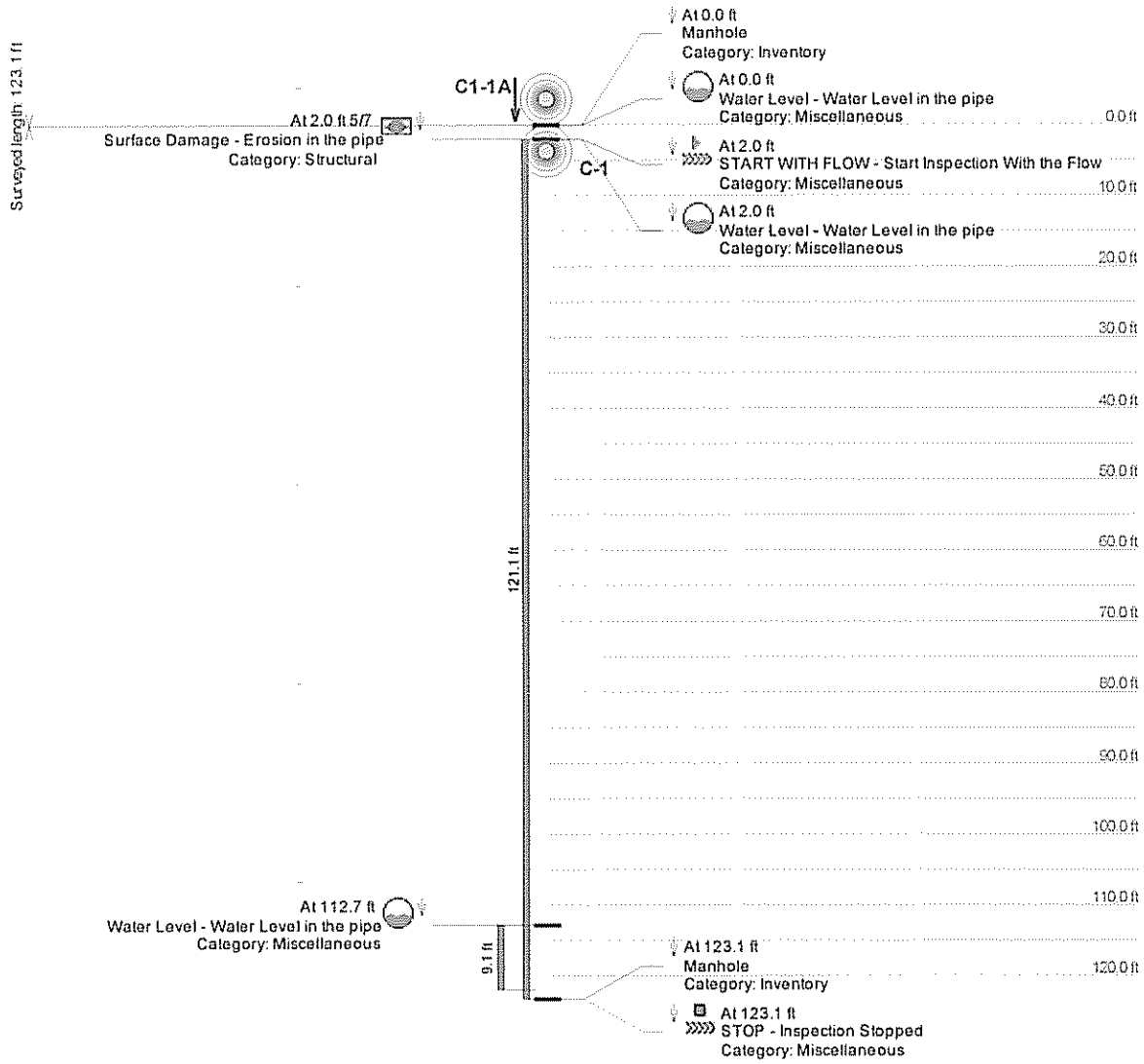
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	C1-1A C-1	Concrete	45657 Limestone St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/11/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	123.1	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
H1-1 H1	Concrete	45721 Calcite St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
H1-1	H1	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/11/2012 1:40:52 PM	7/11/2012 1:42:32 PM	7/11/2012 1:57:27 PM

Surveyed footage:	Status:	Operator:	Work order no.:
314.5	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
6.0	Yes	308.5	5	7	Surface Damage	I Damage - Mechai	
83.4	Yes		1		Crack		
83.4	Yes		1		Infiltration	Medium	
96.8	Yes		3		Lateral	Live Connection	
113.0	Yes		2		Lateral	Live Connection	
118.7	Yes		4		Infiltration	5%	
172.9	Yes		2		Lateral	Live Connection	
276.9	Yes		2		Lateral	Live Connection	
314.5	Yes				Manhole		
314.5	Yes				STOP		

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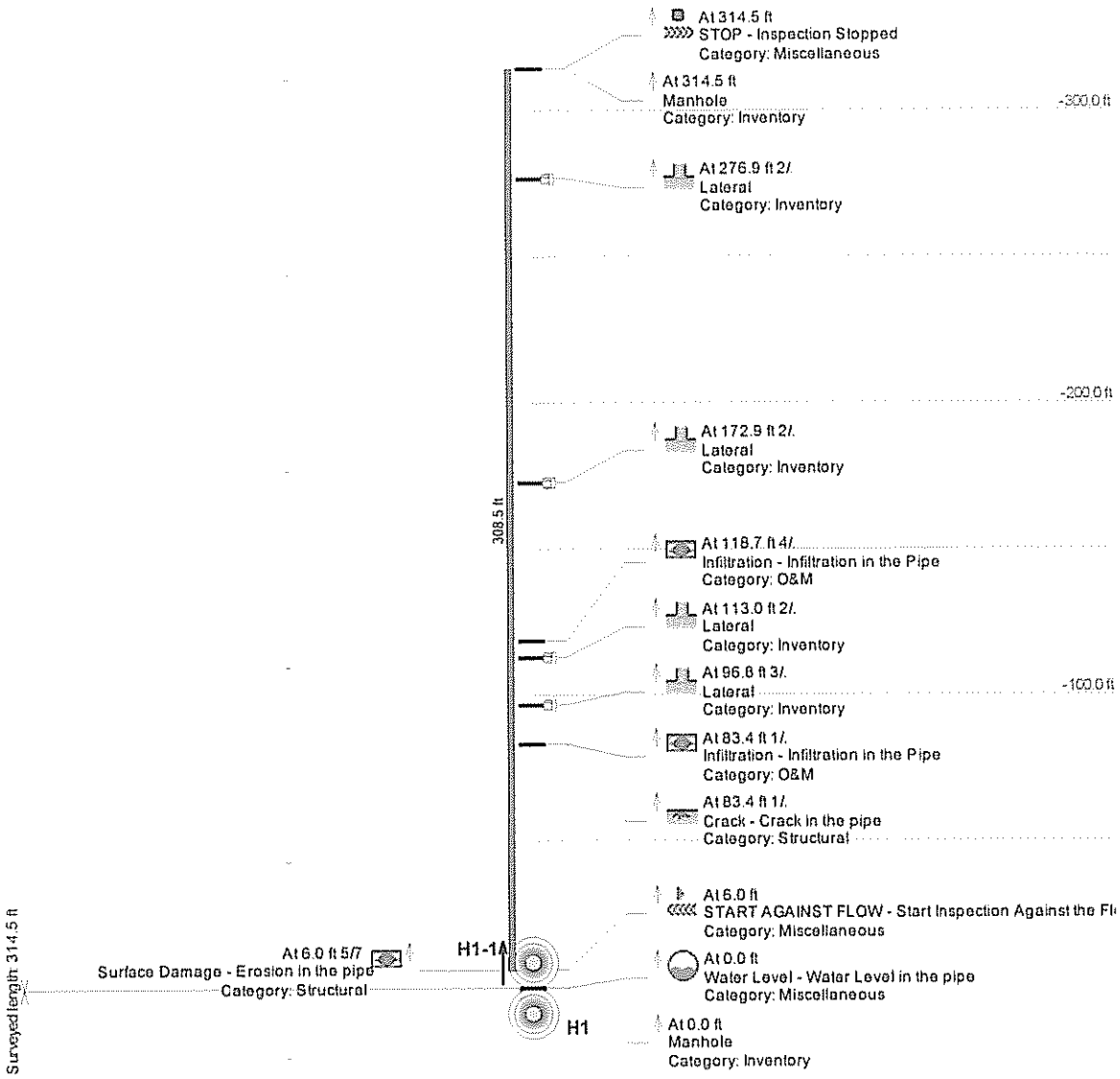
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	H1-1 H1	Concrete	45721 Calcite St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/11/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	314.5	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
H1 A8	Concrete	45721 Calcite St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
H1	A8	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 11:44:31 AM	7/12/2012 11:53:41 AM	7/12/2012 12:01:04 PM

Surveyed footage:	Status:	Operator:	Work order no.:
177.2	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
152.4	No		12		Crack		
152.4	No		12		Infiltration	Light	
177.2	No				Manhole		
177.2	No				STOP		

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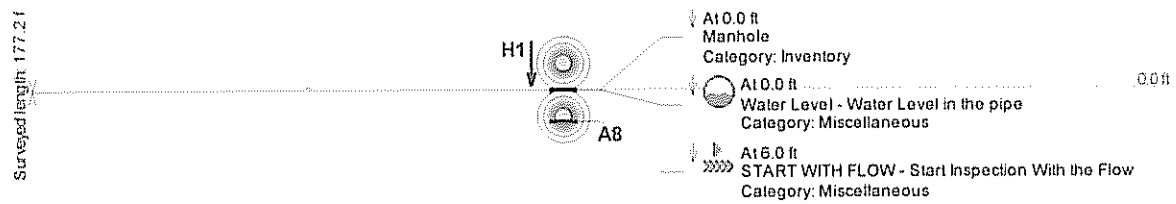
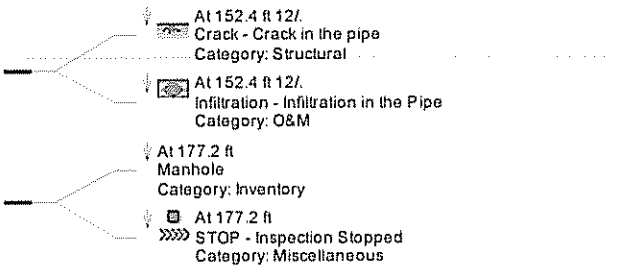
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	H1 A8	Concrete	45721 Calcite St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	177.2	Dry	





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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
H2 H1	Concrete	45721 Calcite St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
H2	H1	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/11/2012 1:26:39 PM	7/11/2012 1:27:07 PM	7/11/2012 1:35:05 PM

Surveyed footage:	Status:	Operator:	Work order no.:
150.4	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
6.0	Yes	144.4	5	7	Surface Damage	I Damage - Mechai	
128.5	Yes		8		Crack	Multiple - Wider	
128.5	Yes		8		Infiltration	Medium	
147.4	Yes		5		Infiltration	Light	
150.4	Yes				Manhole		
150.4	Yes				STOP		

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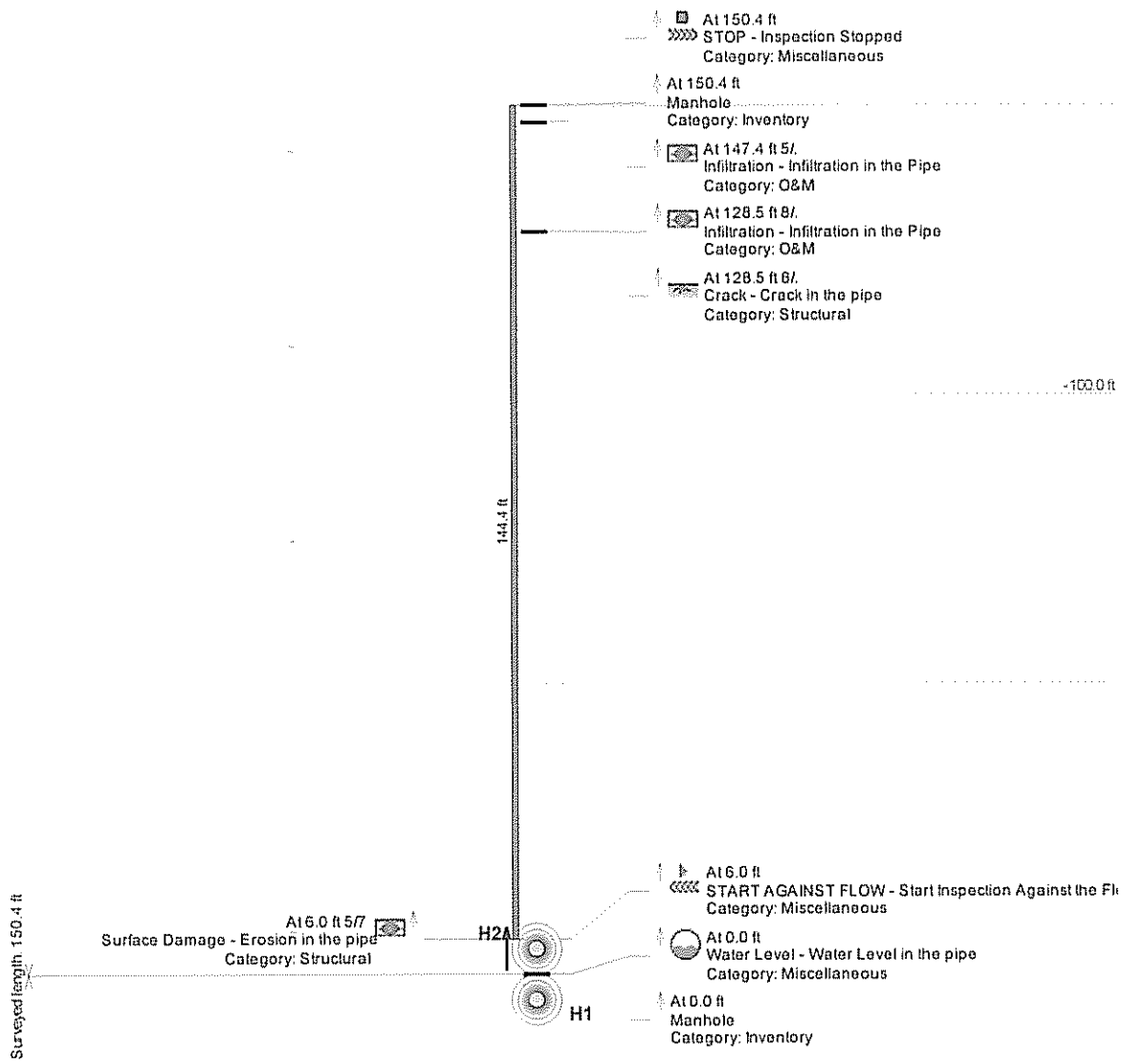
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	H2 H1	Concrete	45721 Calcite St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/11/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	150.4	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
I2 I1	Concrete	45821 Railroad Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
I2	I1	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/13/2012 1:20:09 PM	7/13/2012 1:20:28 PM	7/13/2012 1:30:53 PM

Surveyed footage:	Status:	Operator:	Work order no.:
144.8	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
2.0	Yes				START AGAINST FLOW		
69.3	Yes		9		Lateral	Live Connection	
117.2	Yes		10		Lateral	Live Connection	
142.6	Yes		12	12	Crack	Circular - Wider	
142.6	Yes		12	12	Infiltration	Light	
144.8	Yes				Manhole		
144.8	Yes				STOP		

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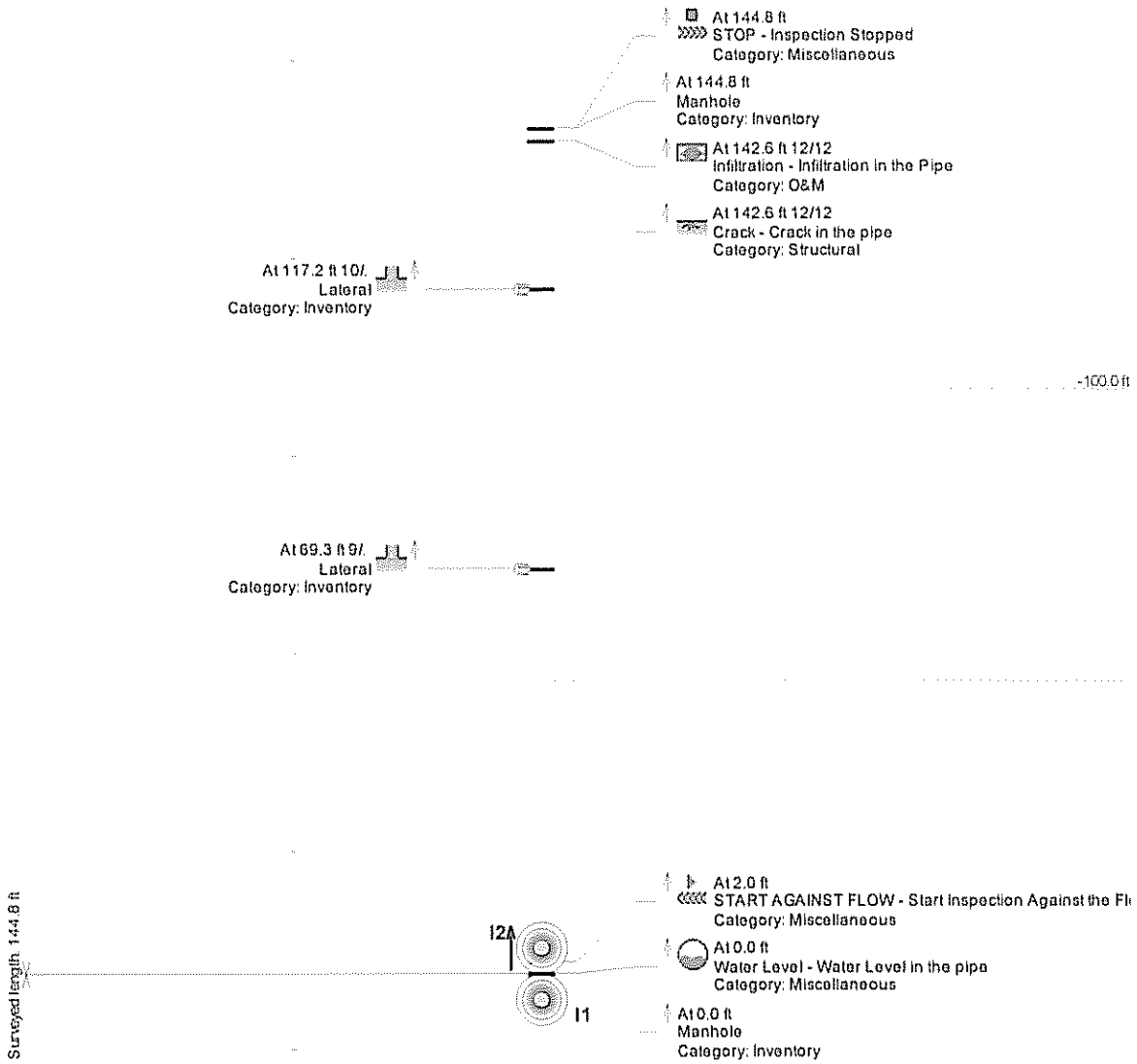
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	I2 I1	Concrete	45821 Railroad Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/13/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	144.8	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
A18 A17	Concrete	7362 N Superior Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
A18	A17	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/11/2012 2:46:53 PM	7/11/2012 2:47:32 PM	7/11/2012 3:06:07 PM

Surveyed footage:	Status:	Operator:	Work order no.:
265.6	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No				START WITH FLOW		
2.0	No	263.6	9	3	Surface Damage	al Damage - Chem	
4.1	No				Joint - Separated		
31.6	No				Water Level		
158.4	No		9		Lateral	Live Connection	
265.6	No				Manhole		
265.6	No				STOP		

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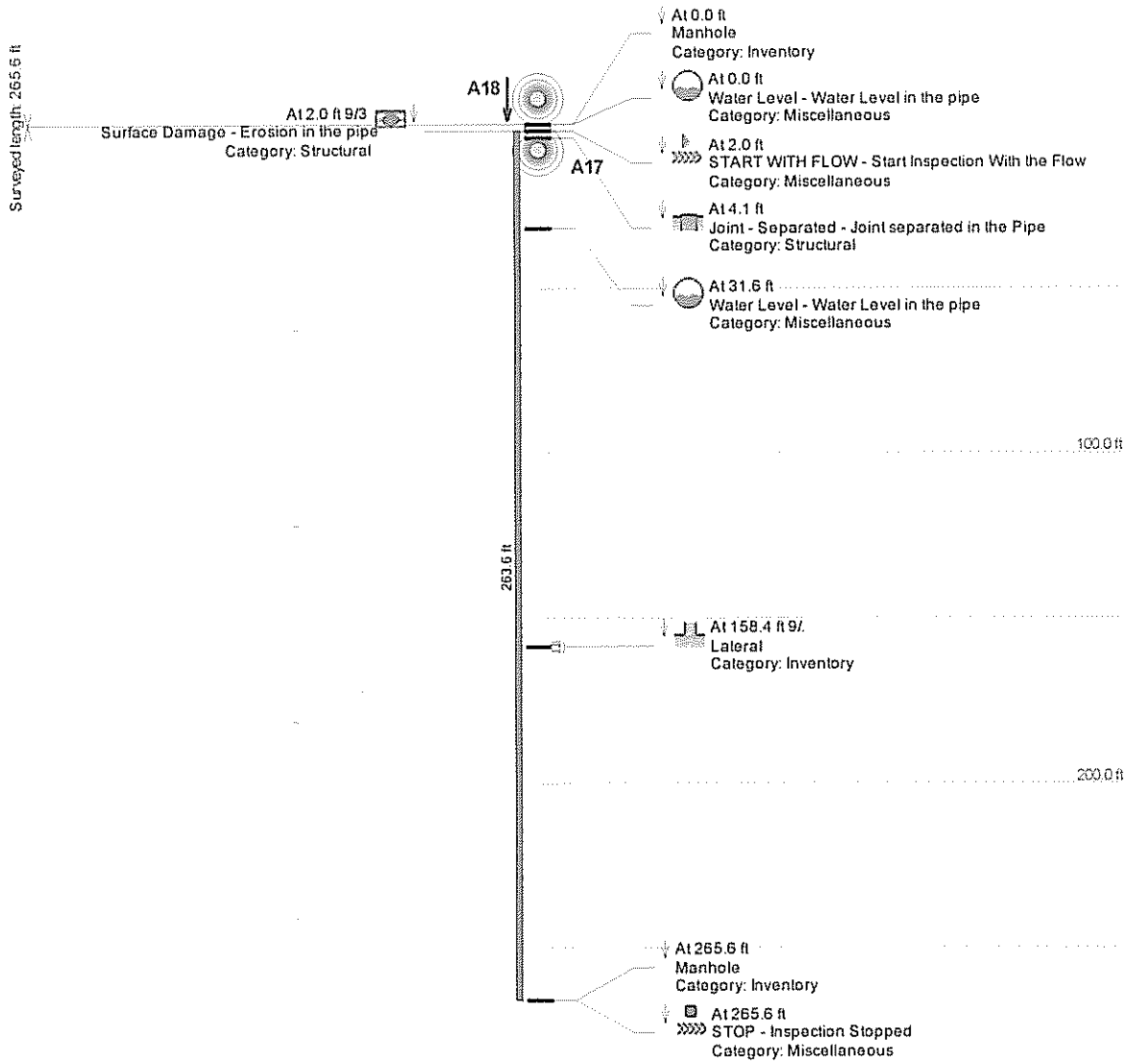
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	A18 A17	Concrete	7362 N Superior Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/11/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	265.6	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
B1 LS2	Concrete	45080 Fir St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
B1	LS2	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/16/2012 5:07:10 PM	7/16/2012 5:07:49 PM	7/16/2012 5:21:01 PM

Surveyed footage:	Status:	Operator:	Work order no.:
398.7	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Mark		
6.0	No				START WITH FLOW		
21.3	No		1		Lateral	Live Connection	
398.7	No				Discharge Point		
398.7	No				STOP		

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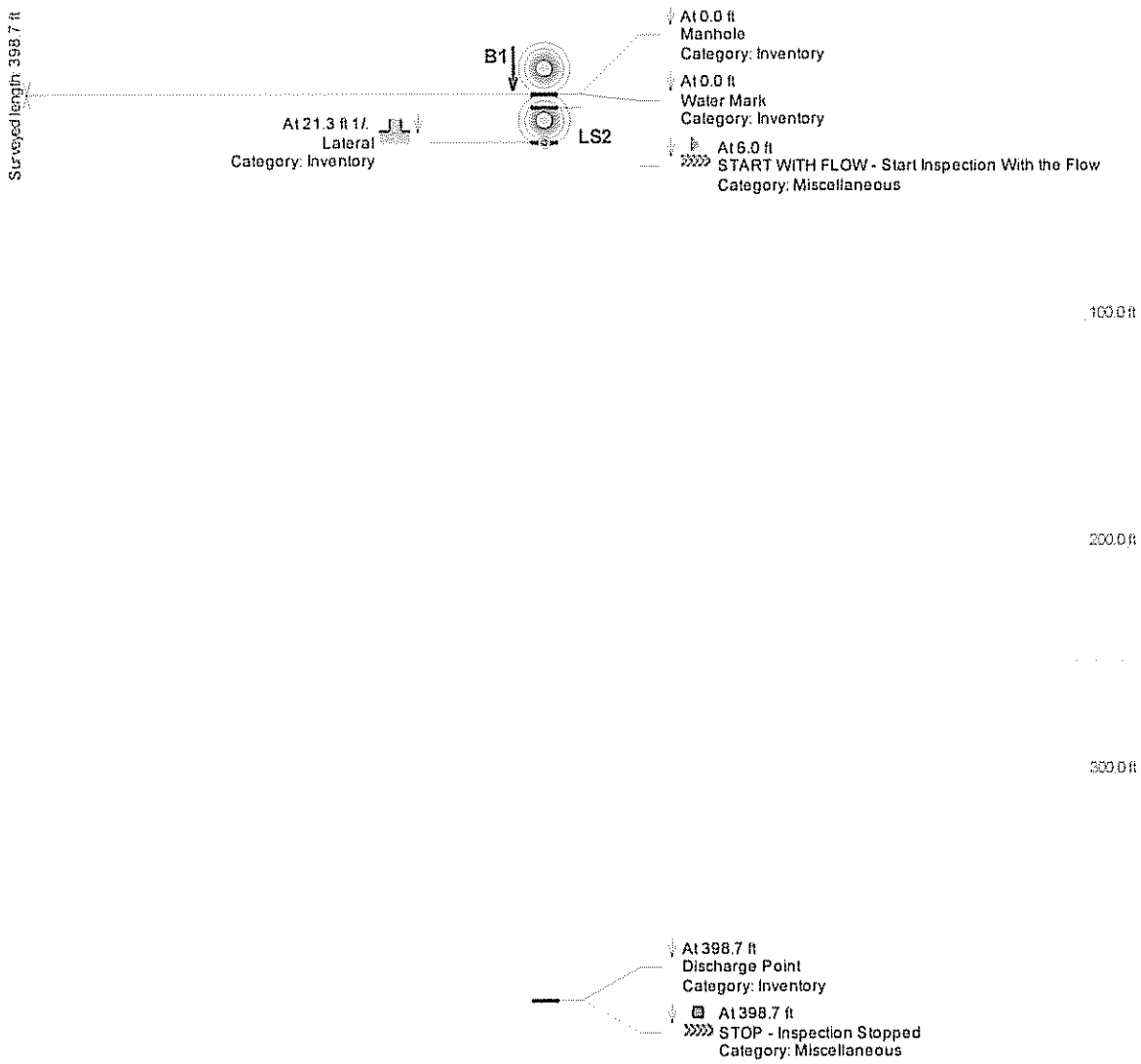
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	B1 LS2	Concrete	45080 Fir St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	398.7	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
F2 F1	Concrete	45401 Nellie Ln

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
F2	F1	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 8:32:08 AM	7/12/2012 8:32:24 AM	7/12/2012 8:38:43 AM

Surveyed footage:	Status:	Operator:	Work order no.:
142.4	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No				START WITH FLOW		
16.5	No		5		Cavity		
142.4	No				Manhole		
142.4	No				STOP		

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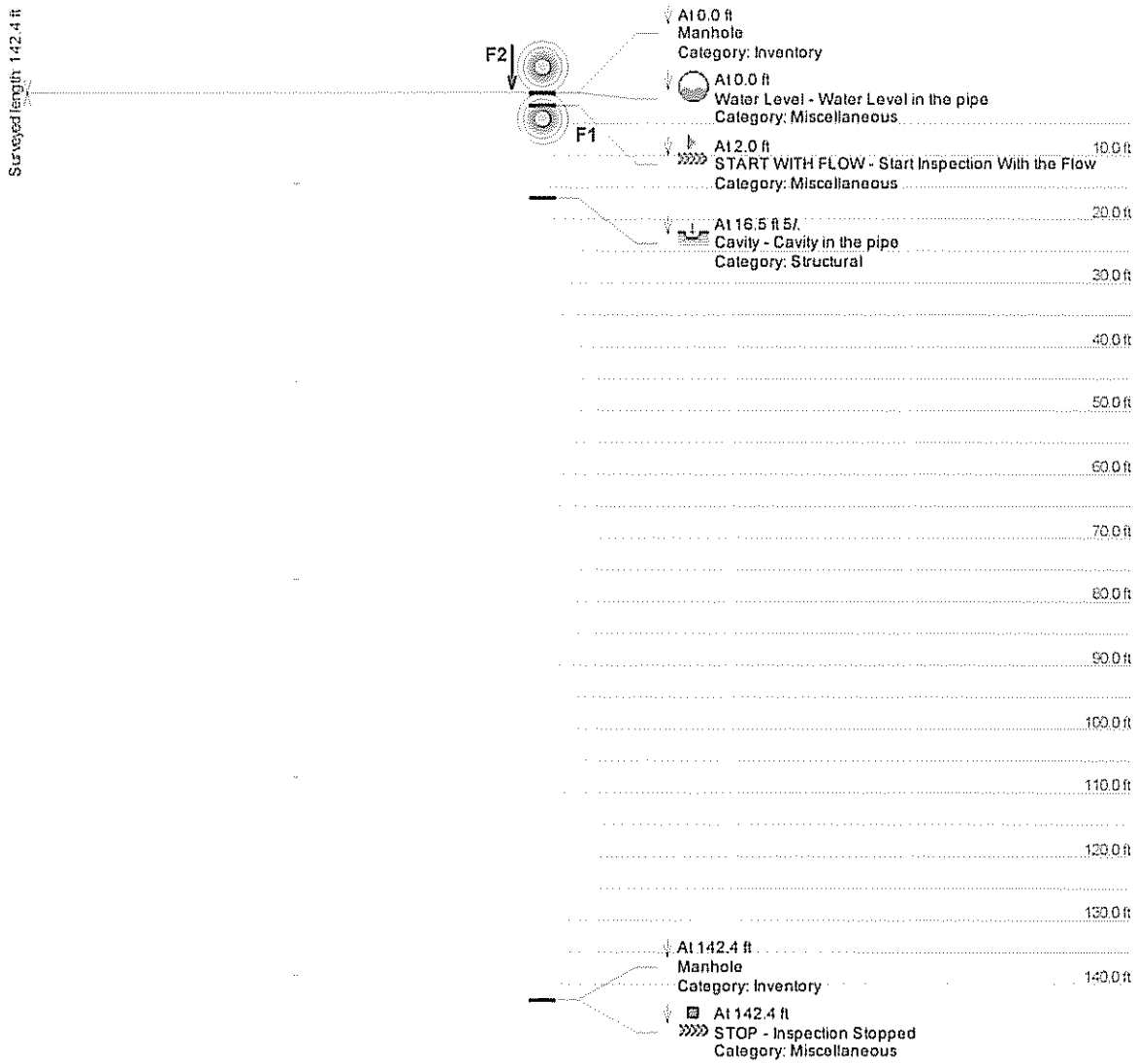
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	F2 F1	Concrete	45401 Nellie Ln

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	142.4	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
G2 G1	Concrete	45732 Short St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
G2	G1	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 12:50:54 PM	7/12/2012 12:55:59 PM	7/12/2012 1:00:07 PM

Surveyed footage:	Status:	Operator:	Work order no.:
61.8	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
10.8	Yes		12	12	Crack	Circular - Wider	
61.8	Yes				Manhole		
61.8	Yes				STOP		

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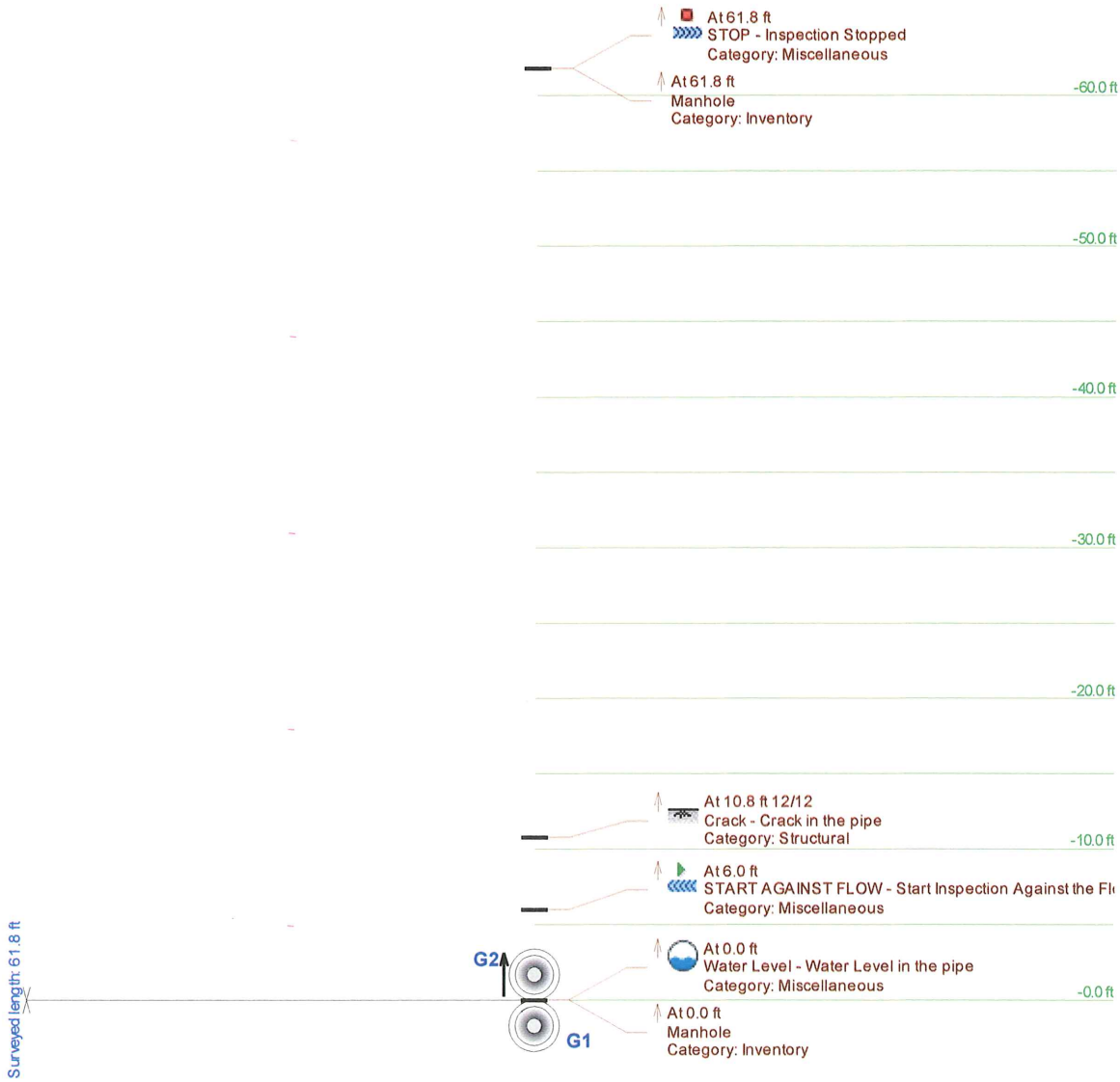
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	G2 G1	Concrete	45732 Short St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	61.8	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
A5 A4	Concrete	45821 Railroad Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
A5	A4	Ductile	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/16/2012 2:05:48 PM	7/16/2012 2:06:26 PM	7/16/2012 2:28:57 PM

Surveyed footage:	Status:	Operator:	Work order no.:
271.6	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
6.0	No	12.7			Water Level		
95.7	No	11.5			Water Level		
137.5	No	23.6			Water Level		
271.6	No				Manhole		
271.6	No				STOP		

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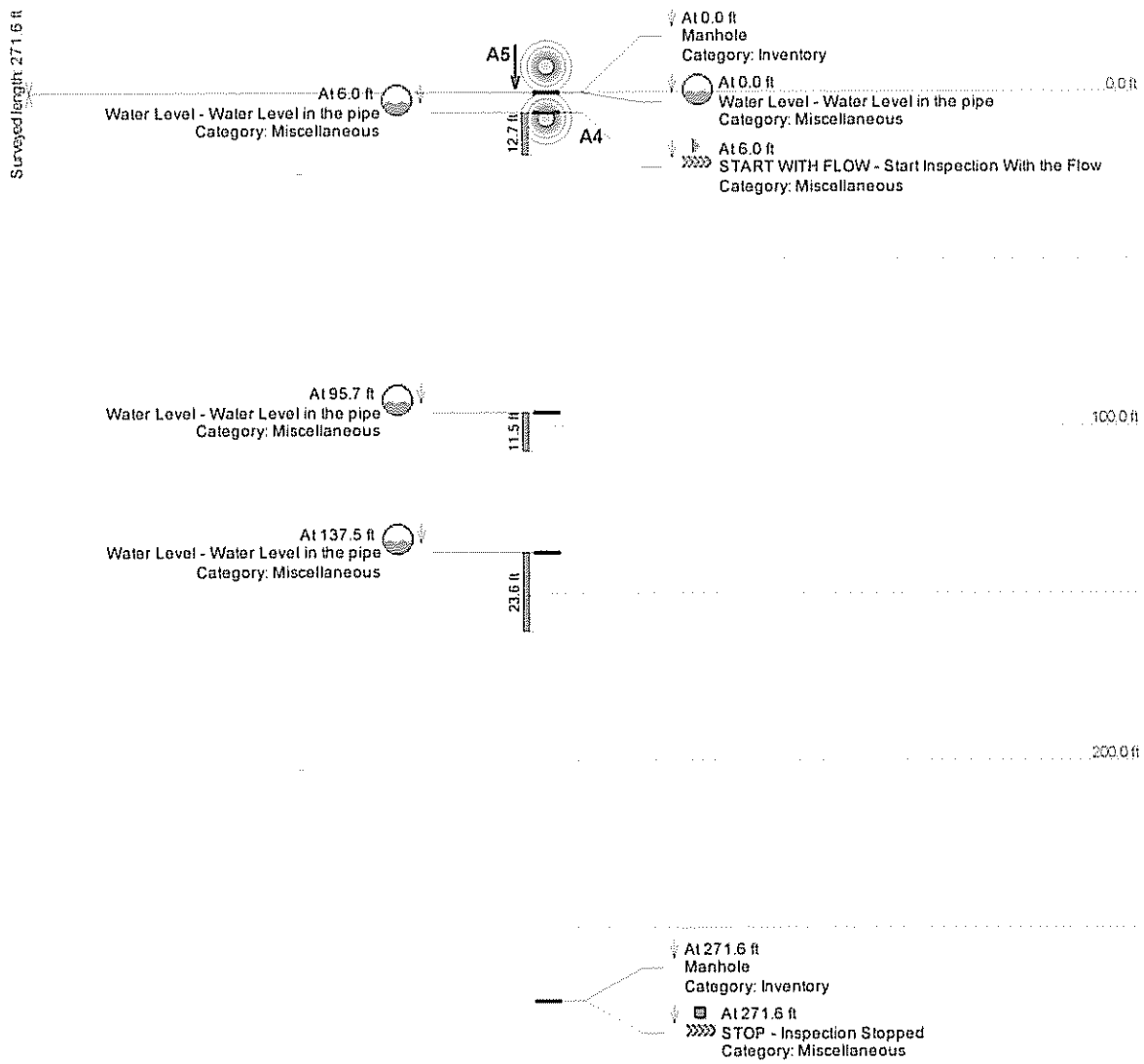
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	A5 A4	Concrete	45821 Railroad Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Ductile	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	271.6	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
B8 B7	Concrete	45182

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
B8	B7	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 2:38:13 PM	7/12/2012 2:38:51 PM	7/12/2012 2:53:40 PM

Surveyed footage:	Status:	Operator:	Work order no.:
300.6	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No				START WITH FLOW		
14.8	No		2		Lateral	Live Connection	
26.8	No		2		Lateral	Live Connection	
166.6	No		2		Lateral	Live Connection	
182.4	No		2		Lateral	Live Connection	
226.7	No		10		Lateral	Live Connection	
290.8	No		2		Lateral	Live Connection	
296.2	No				Water Level		
300.6	No				Manhole		
300.6	No				STOP		

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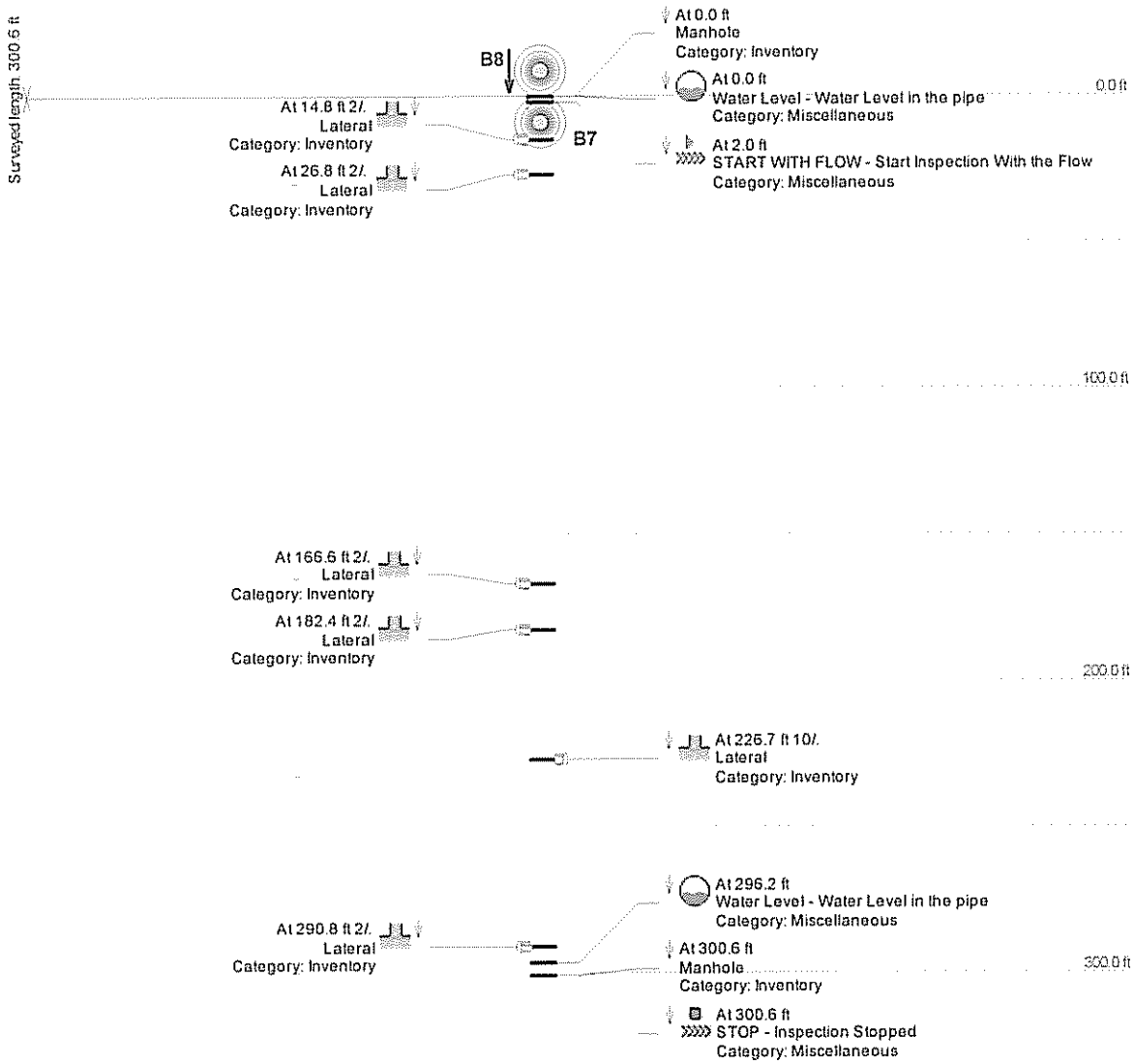
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	B8 B7	Concrete	45182

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	300.6	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
A6 A5	Concrete	45821 Railroad Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
A6	A5	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/16/2012 10:50:06 AM	7/16/2012 11:00:59 AM	7/16/2012 11:15:55 AM

Surveyed footage:	Status:	Operator:	Work order no.:
363.0	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
6.0	No	357.0	9	3	Surface Damage	al Damage - Chem	
6.0	No	231.0			Water Level		
107.9	No		9		Lateral	Live Connection	
187.8	No		9		Lateral	Live Connection	
244.4	No	55.6			Water Level		
360.5	No		12	12	Crack	Circular - Wider	
363.0	No				Manhole		
363.0	No				STOP		

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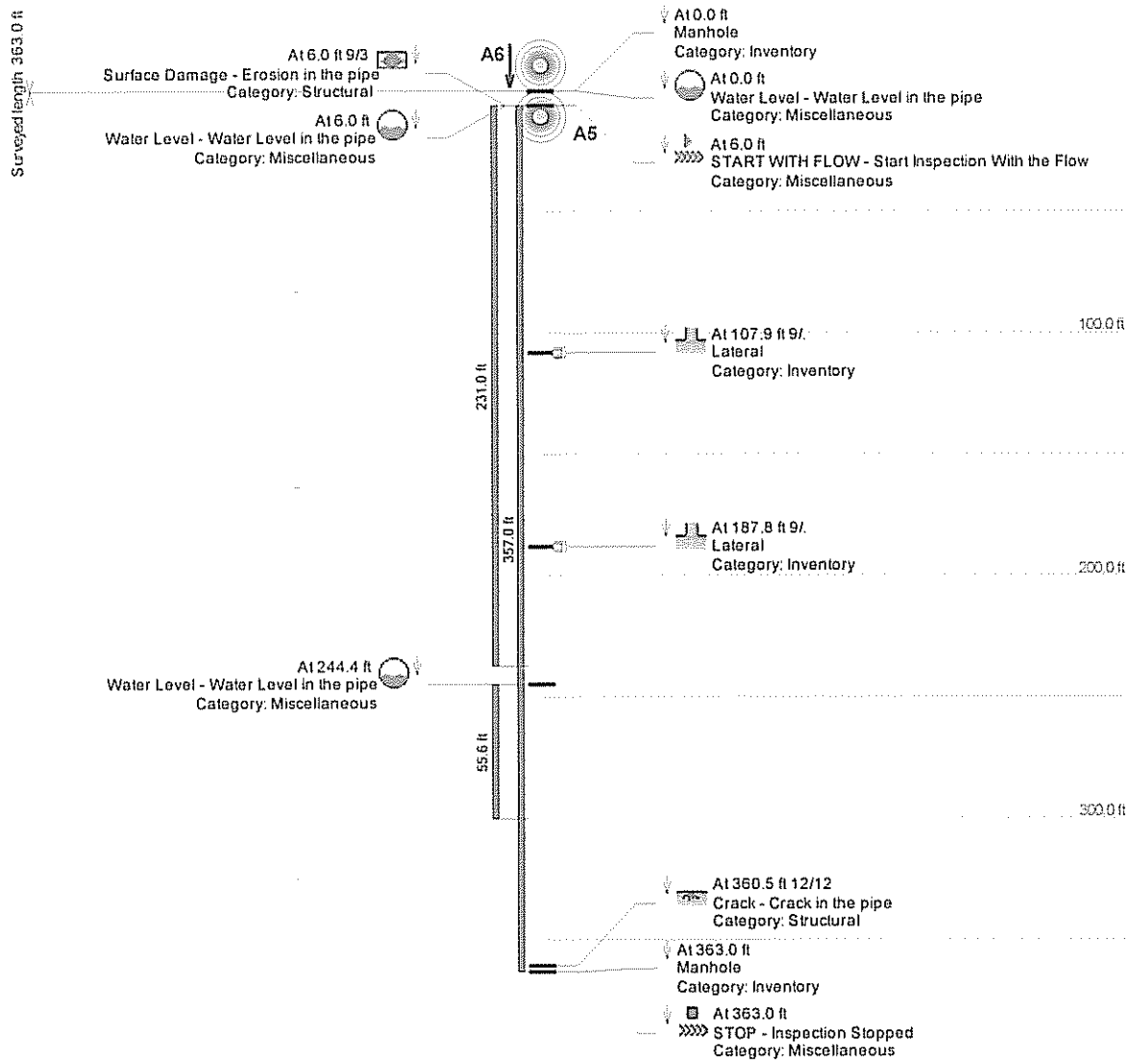
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	A6 A5	Concrete	45821 Railroad Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	363.0	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
K1 A3	Concrete	7453 Mill Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
K1	A3	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/16/2012 1:24:50 PM	7/16/2012 1:26:05 PM	7/16/2012 1:49:14 PM

Surveyed footage:	Status:	Operator:	Work order no.:
236.7	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
77.5	No		10		Lateral	Live Connection	
104.0	No	132.7			Pipe Type		
104.0	No	132.7	12	12	Surface Damage		
184.7	No				Water Level		
236.7	No				Manhole		
236.7	No				STOP		

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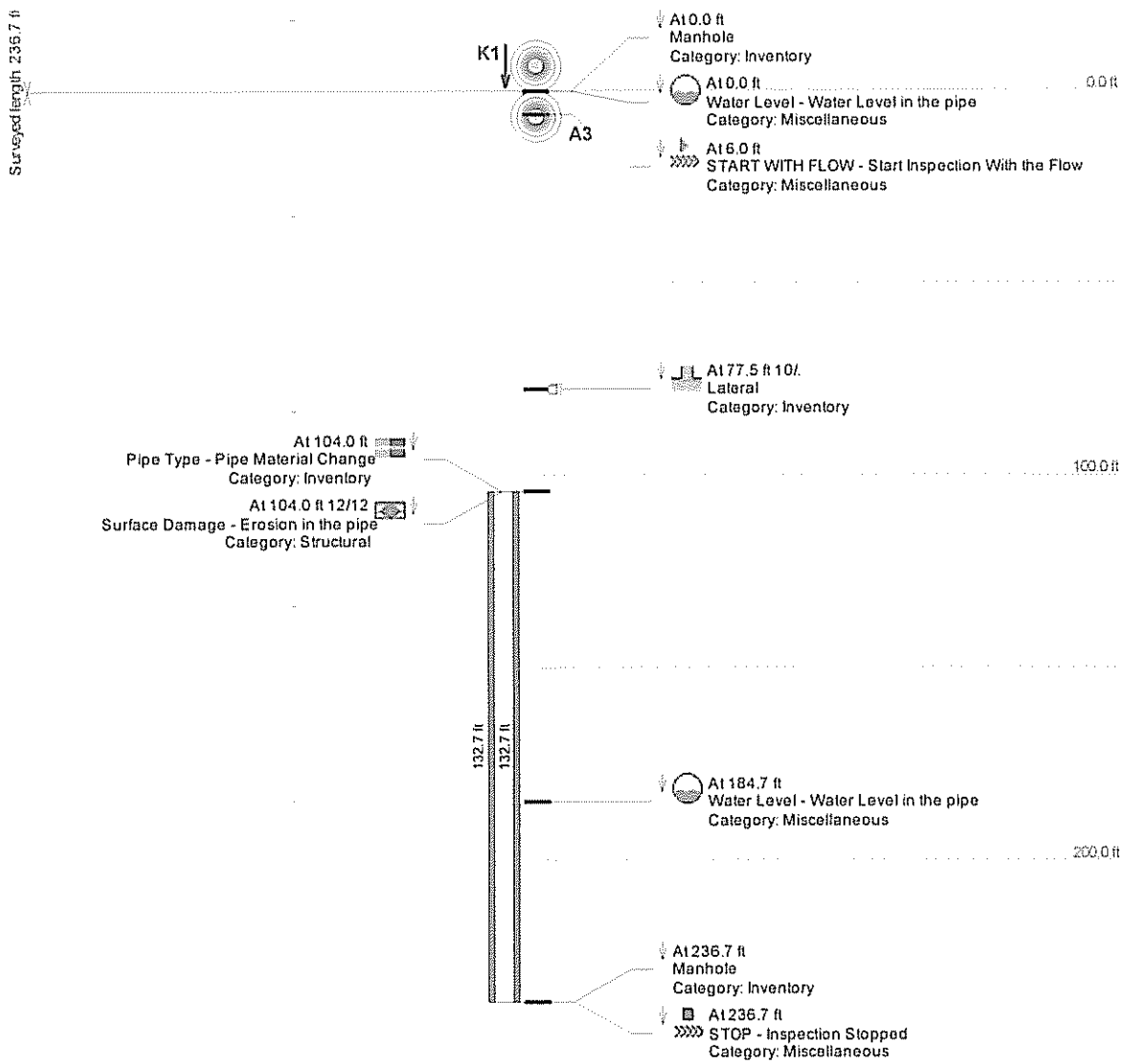
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	K1 A3	Concrete	7453 Mill Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	236.7	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
A18 A17	Concrete	7362 N Superior Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
A18	A17	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/11/2012 2:46:53 PM	7/11/2012 2:47:32 PM	7/11/2012 3:06:07 PM

Surveyed footage:	Status:	Operator:	Work order no.:
265.6	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No				START WITH FLOW		
2.0	No	263.6	9	3	Surface Damage	al Damage - Chem	
4.1	No				Joint - Separated		
31.6	No				Water Level		
158.4	No		9		Lateral	Live Connection	
265.6	No				Manhole		
265.6	No				STOP		

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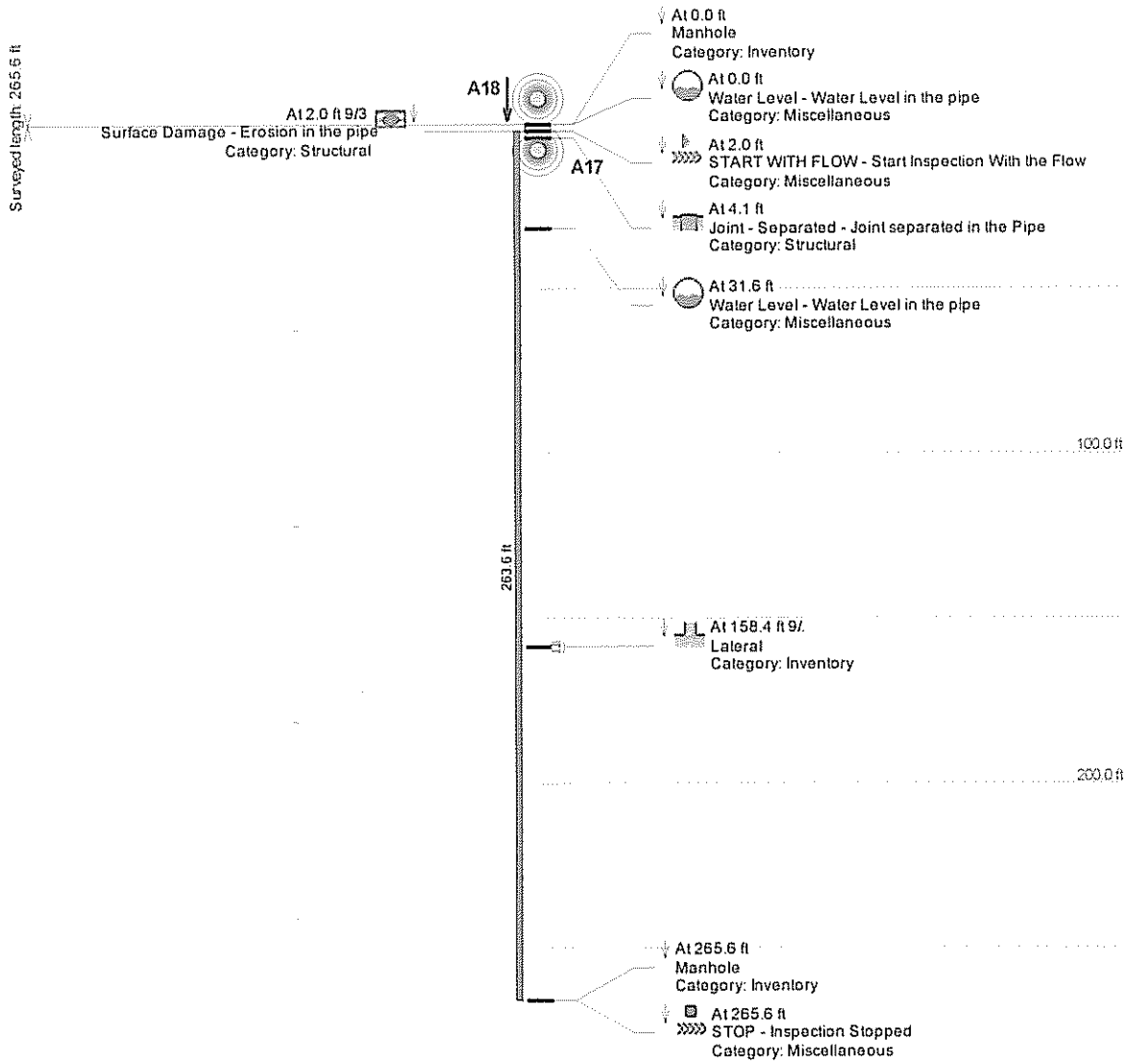
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	A18 A17	Concrete	7362 N Superior Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/11/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	265.6	Dry	



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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
B1 LS2	Concrete	45080 Fir St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
B1	LS2	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/16/2012 5:07:10 PM	7/16/2012 5:07:49 PM	7/16/2012 5:21:01 PM

Surveyed footage:	Status:	Operator:	Work order no.:
398.7	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Mark		
6.0	No				START WITH FLOW		
21.3	No		1		Lateral	Live Connection	
398.7	No				Discharge Point		
398.7	No				STOP		

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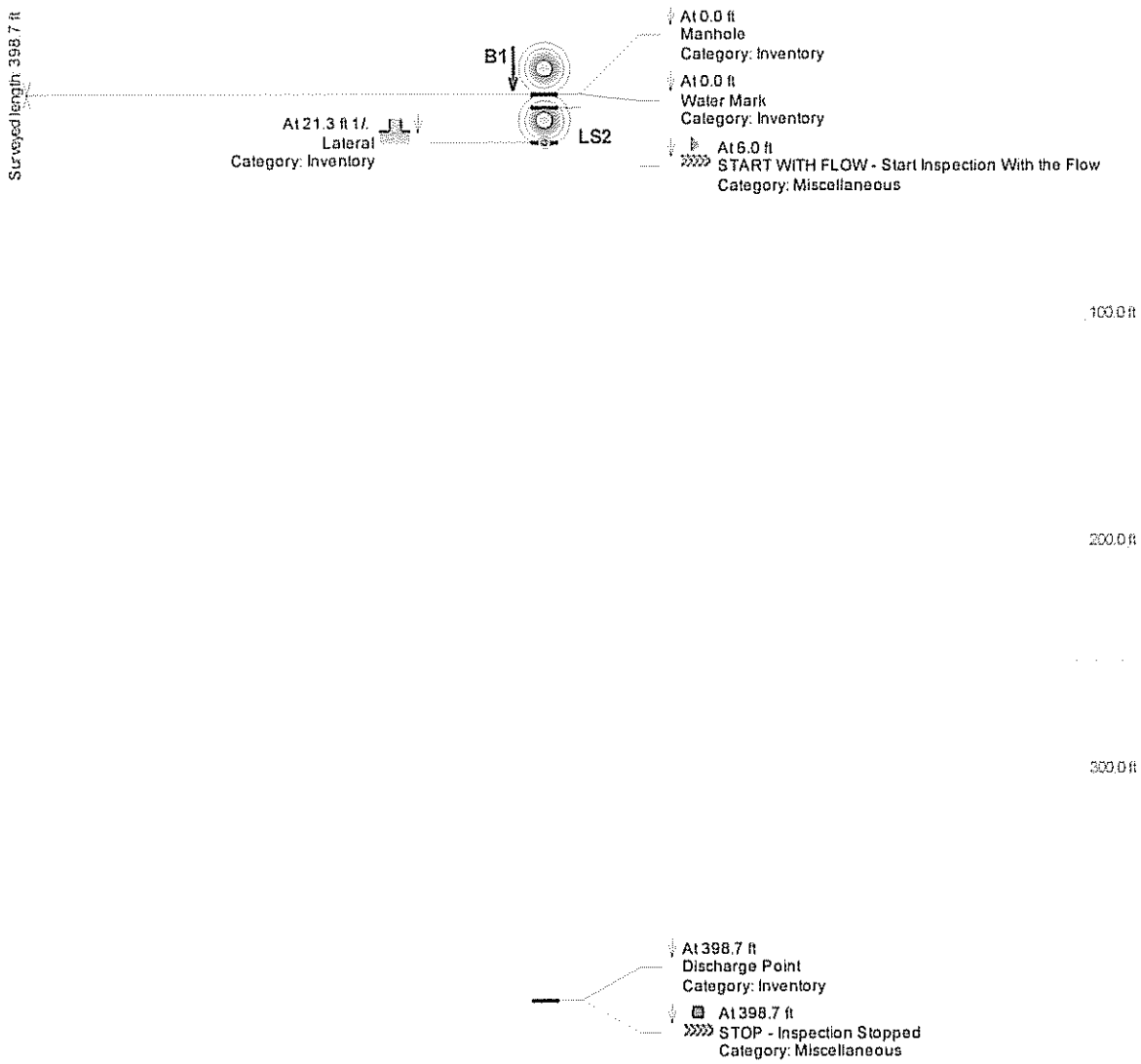
Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	B1 LS2	Concrete	45080 Fir St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	398.7	Dry	



CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
F2 F1	Concrete	45401 Nellie Ln

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
F2	F1	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 8:32:08 AM	7/12/2012 8:32:24 AM	7/12/2012 8:38:43 AM

Surveyed footage:	Status:	Operator:	Work order no.:
142.4	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No				START WITH FLOW		
16.5	No		5		Cavity		
142.4	No				Manhole		
142.4	No				STOP		

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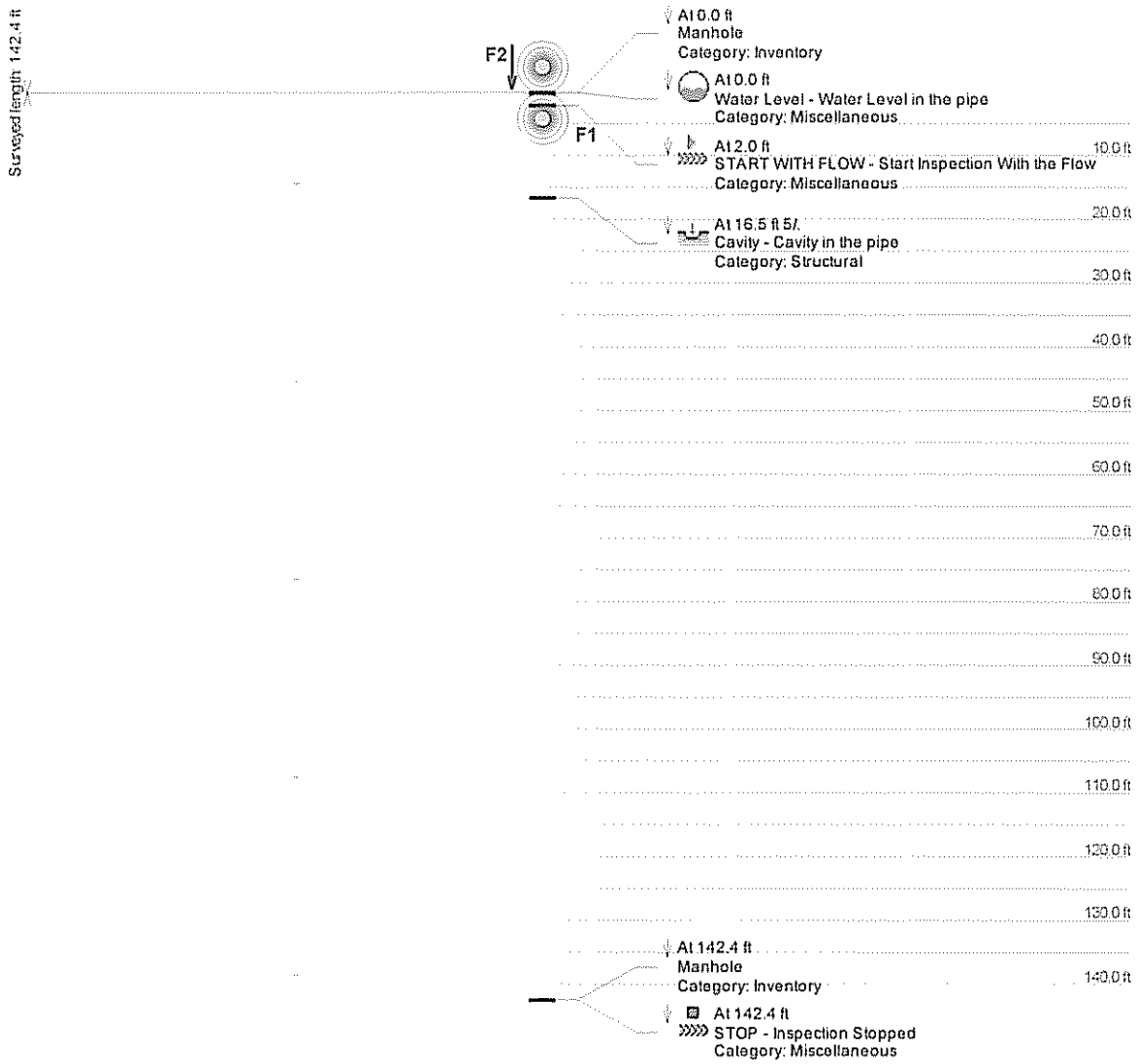
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	F2 F1	Concrete	45401 Nellie Ln

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	142.4	Dry	



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Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
G2 G1	Concrete	45732 Short St

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
G2	G1	Concrete	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/12/2012 12:50:54 PM	7/12/2012 12:55:59 PM	7/12/2012 1:00:07 PM

Surveyed footage:	Status:	Operator:	Work order no.:
61.8	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	Yes				Manhole		
0.0	Yes				Water Level		
6.0	Yes				START AGAINST FLOW		
10.8	Yes		12	12	Crack	Circular - Wider	
61.8	Yes				Manhole		
61.8	Yes				STOP		

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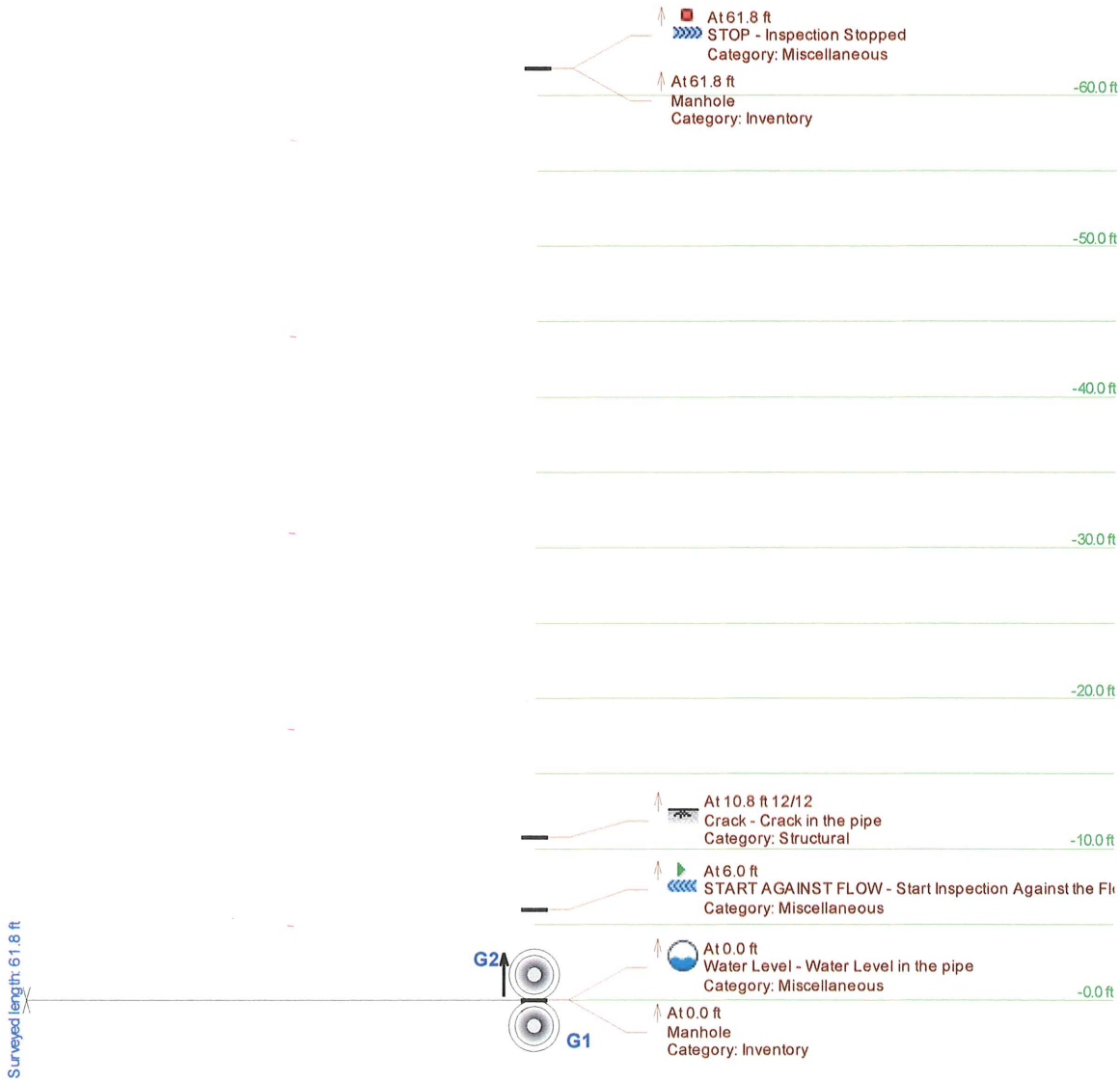
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	G2 G1	Concrete	45732 Short St

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/12/2012	8	8	Concrete	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Upstream	61.8	Dry	



CUES, Inc.
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Orlando, FL 32805
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Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
A4 A3	Concrete	45821 Railroad Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
A4	A3	Ductile	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/16/2012 2:33:55 PM	7/16/2012 2:44:44 PM	7/16/2012 2:47:59 PM

Surveyed footage:	Status:	Operator:	Work order no.:
63.9	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
63.9	No				Manhole		
63.9	No				STOP		

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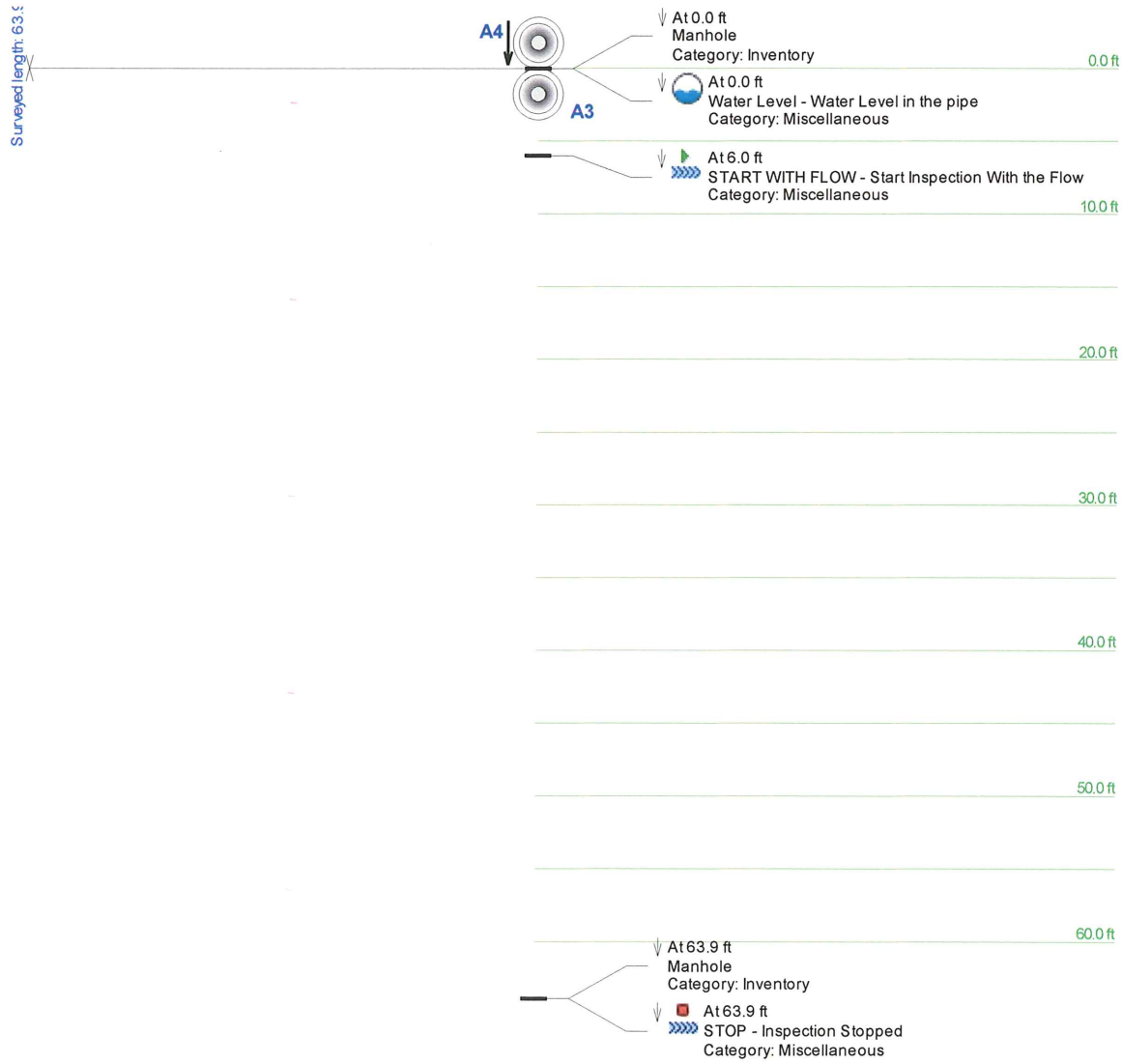
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	A4 A3	Concrete	45821 Railroad Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Ductile	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	63.9	Dry	



CUES, Inc.
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Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
A3 A2	Concrete	45821 Railroad Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
A3	A2	Ductile	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/16/2012 3:51:28 PM	7/16/2012 4:12:44 PM	7/16/2012 4:23:52 PM

Surveyed footage:	Status:	Operator:	Work order no.:
301.1	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
6.0	No				START WITH FLOW		
6.0	No	22.1			Water Level		
301.1	No				Manhole		
301.1	No				STOP		

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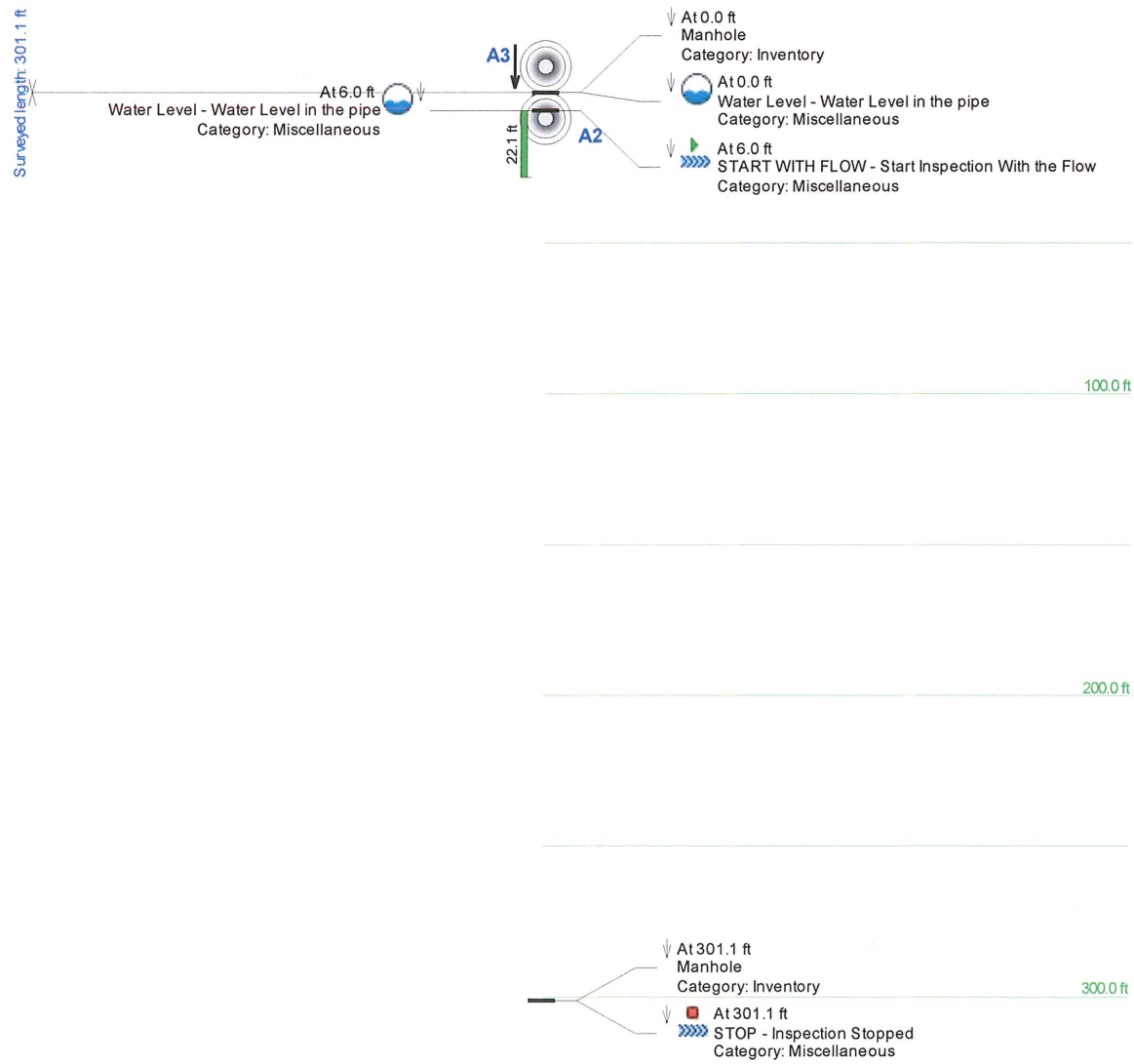
Phone: 407-849-0190
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	A3 A2	Concrete	45821 Railroad Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Ductile	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	301.1	Dry	



CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Observations by Inspections

SITE DATA

Mainline ID:	City:	Address:
A2 A1	Concrete	45821 Railroad Ave

Upstream node:	Downstream node:	Pipe type:	Pipe shape:	Pipe height:	Pipe width:
A2	A1	Ductile	Circular	8	8

INSPECTION DATA

Scheduled date:	Start date/time:	End date/time:
7/16/2012 4:25:13 PM	7/16/2012 4:25:42 PM	7/16/2012 4:50:13 PM

Surveyed footage:	Status:	Operator:	Work order no.:
236.4	Stopped	Valentin R. 253-405-1592	

Reason:	Weather:	Condition:
Assessment	Dry	

Comments

OBSERVATIONS

Footage	Rev.	Length	Clock From	Clock To	Code	Modifiers/Severity	Rating
0.0	No				Manhole		
0.0	No				Water Level		
2.0	No				START WITH FLOW		
236.4	No				Abandoned Survey		
236.4	No				STOP		

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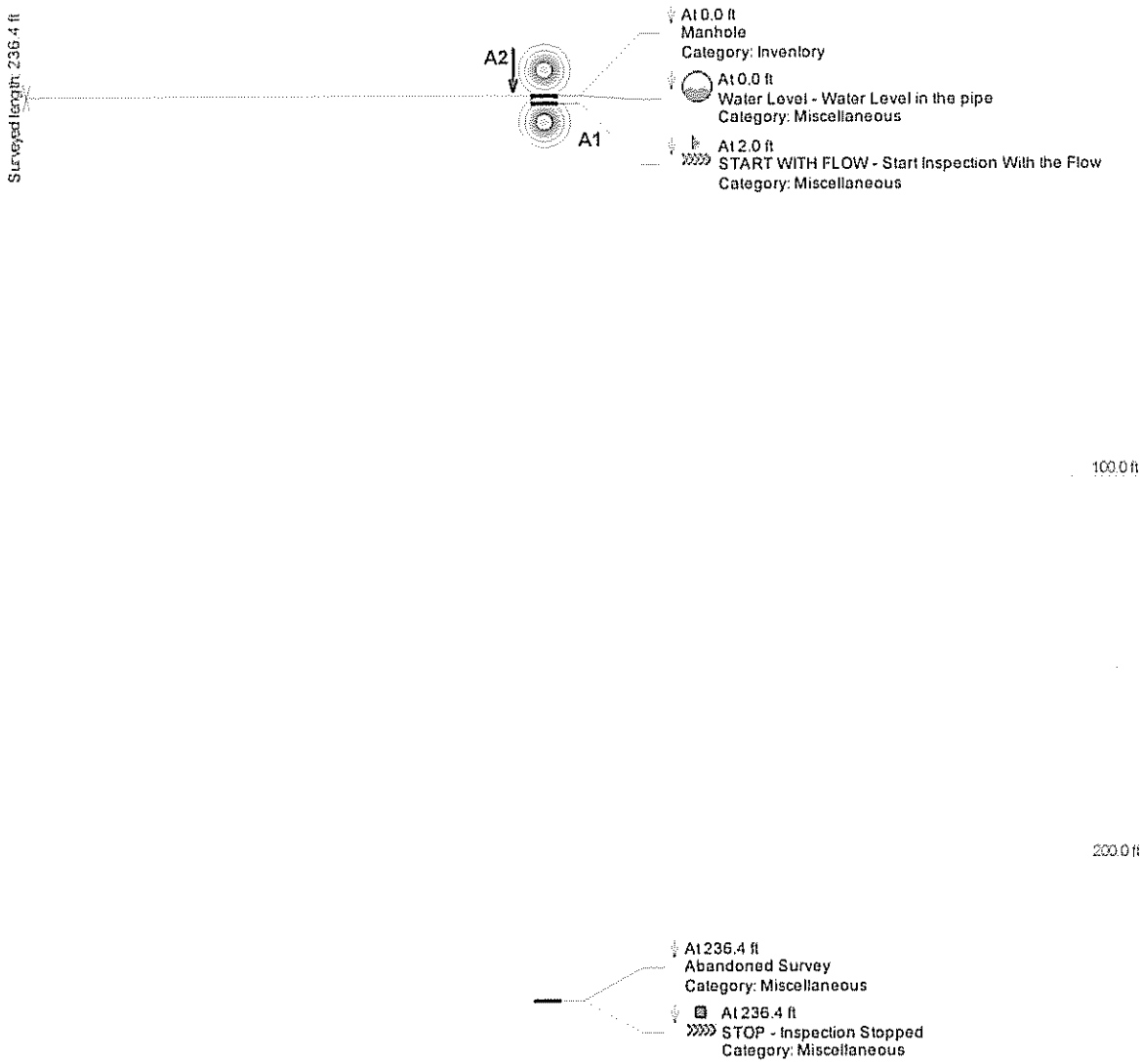
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Main Inspection with Pipe-Run Graph

Project Name:	Mainline ID:	City:	Address:
City of Concrete	A2 A1	Concrete	45821 Railroad Ave

Start date/time:	Pipe width:	Pipe height:	Pipe type:	Surface condition:
7/16/2012	8	8	Ductile	

Direction:	Surveyed footage:	Weather:	MEDIA_LABEL
Towards Downstream	236.4	Dry	



B.5 Manhole Inspection Reports

Manhole Inspection Report

M/H Number: R3 Client: CITY OF CONCRETE Job No:
M/H Address: 7393 N. RIETZE Inspection Date: 5/2/14
Cross Street: DUFFY Area: BASIN 2
Time: 1008 Weather: clear rain overcast sunny technician CHRIS

COMMENTS:
LEAK ON BENCH.
11 O'CLOCK FROM LADDER

Surface Ponding: Y / N

Problem: Y / N

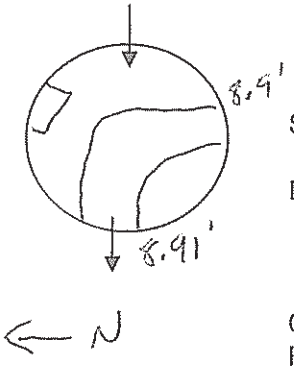
Initial

Traffic: Medium Heavy
M/H Depth: 8.9'
Flow Depth:
Drop M/H: Y / N

Pipe	Diameter	Type	Deterioration Condition	Drop M/H
IN	8"	ACP VCP CON CIP OTHER PVC	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
OUT	8"	ACP VCP CON CIP OTHER PVC	Lgt. Med.Hvy. Satisfactory	In Out

Structural

	Diameter	Type	Deterioration Condition
Casting	24"	Concealed Pickholes Other	Light Med. Heavy Satisfactory
Riser	25"	Below Grade	Light Med. Heavy Satisfactory
Cone		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Wall	48"	ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Bench		ACP VCP CIP Other	Light Med. Heavy Satisfactory
Invert		ACP VCP CIP Other	Light Med. Heavy Satisfactory
Steps	Yes No		Unsafe Safe



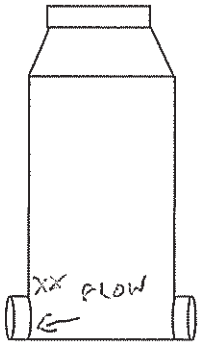
Hydraulic

Surcharge: Evidence Y / N Depth:

Debris/Slit: Build-up Y / N Depth:

Qty (gpm)

Cover:
Ring:
Riser:
Cone:
Wall:
Bench: RUNNER
Pipe Collar: RUNNER



Leaks: Yes X No
Leak Locations = X

Distance to Fire Hydrant:
Manhole Type: SMH CB Other

Surface Cover: Asphalt-Concrete-Gravel-Other
Ability to Access M/H: Poor Satisfactory
Manhole Material: BRK-VCP-Conc-PRC-Other

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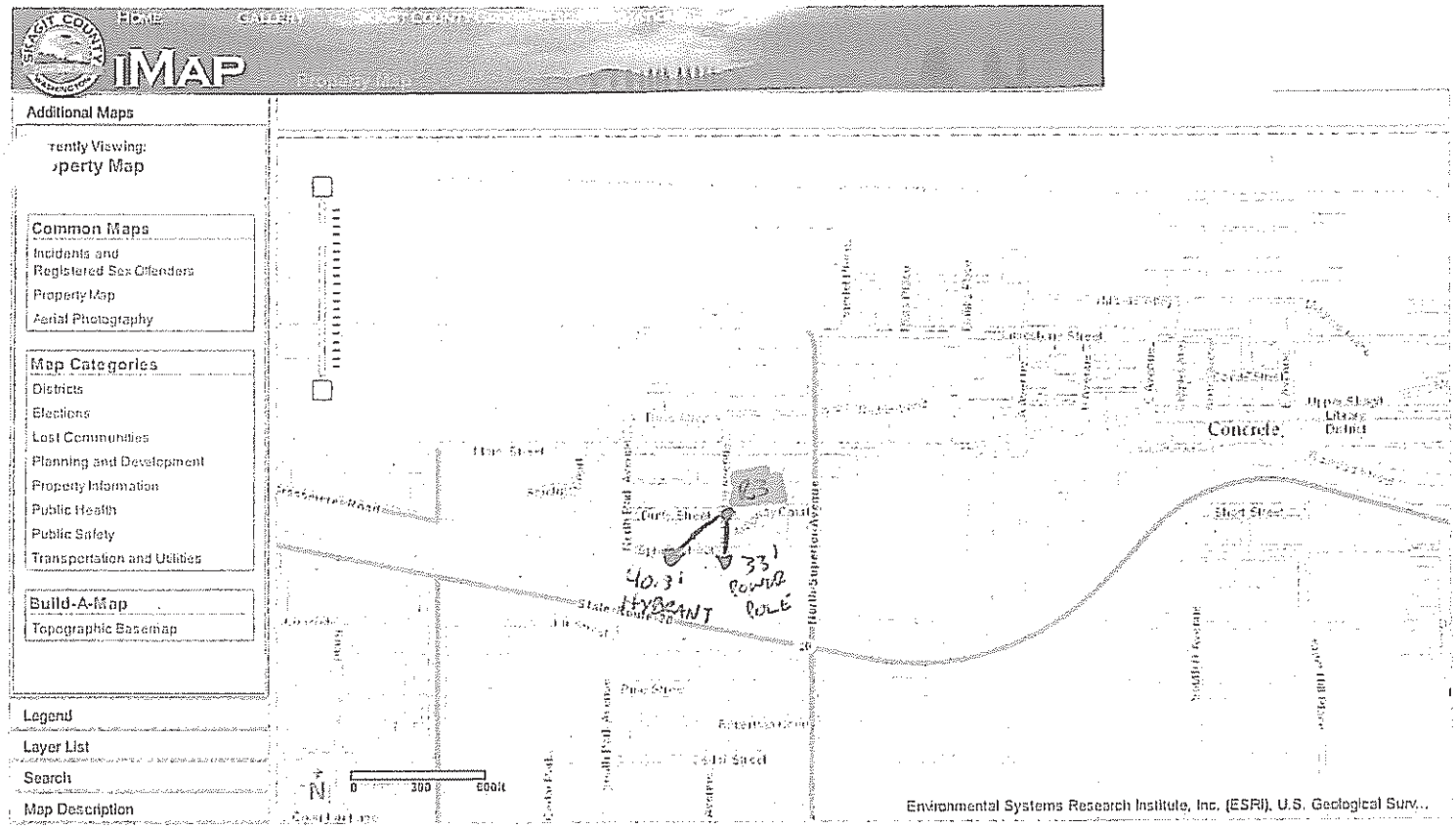
phone #; 253-435-4328


HOME
iMAP
Additional Maps
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Common Maps
Incidents and Registered Sex Offenders
Property Map
Aerial Photography
Map Categories
Districts
Elections
Lost Communities
Planning and Development
Property Information
Public Health
Public Safety
Transportation and Utilities
Build-A-Map
Topographic Basemap
Legend
Layer List
Search
Map Description
Concrete
40.3'
33'
POWER POLE
HYDRANT
N
0 300 600ft
Environmental Systems Research Institute, Inc. (ESRI), U.S. Geological Surv...

Manhole Inspection Report

M/H Number: E2a Client: CITY OF CONCRETE Job No:
M/H Address: 7428 N. PARK AVE Inspection Date: 5/5/14
Cross Street: SPRING ST. Area: BASIN 2
Time: 1407 Weather: clear rain overcast sunny technician CHRIS

COMMENTS: STRANGELY CHANNELED
MULTIPLE LEAKS IN WALL -

Surface Ponding: Y / N

Problem: Y / N

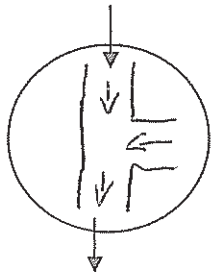
Initial

Traffic: Medium Heavy
M/H Depth: 12.6'
Flow Depth: 15 %
Drop M/H: Y / N

Pipe	Diameter	Type	Deterioration Condition	Drop M/H
IN	8"	ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN	8"	ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
OUT	8"	ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out

Structural

	Diameter	Type	Deterioration Condition
Casting		Concealed Pickholes Other	Light Med. Heavy Satisfactory
Riser		Below Grade	Light Med. Heavy Satisfactory
Cone		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Wall		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Bench		ACP VCP CON CIP Other	Light Med. Heavy Satisfactory
Invert		ACP VCP CON CIP Other	Light Med. Heavy Satisfactory
Steps	Yes No		Unsafe Safe



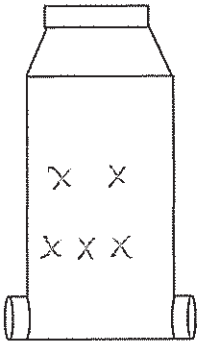
Hydraulic

Surcharge: Evidence Y / N Depth: _____

Debris/Slit: Build-up Y / N Depth: _____

Qty (gpm)

Cover: _____
Ring: _____
Riser: _____
Cone: _____
Wall: WEEPERS
Bench: _____
Pipe Collar: _____

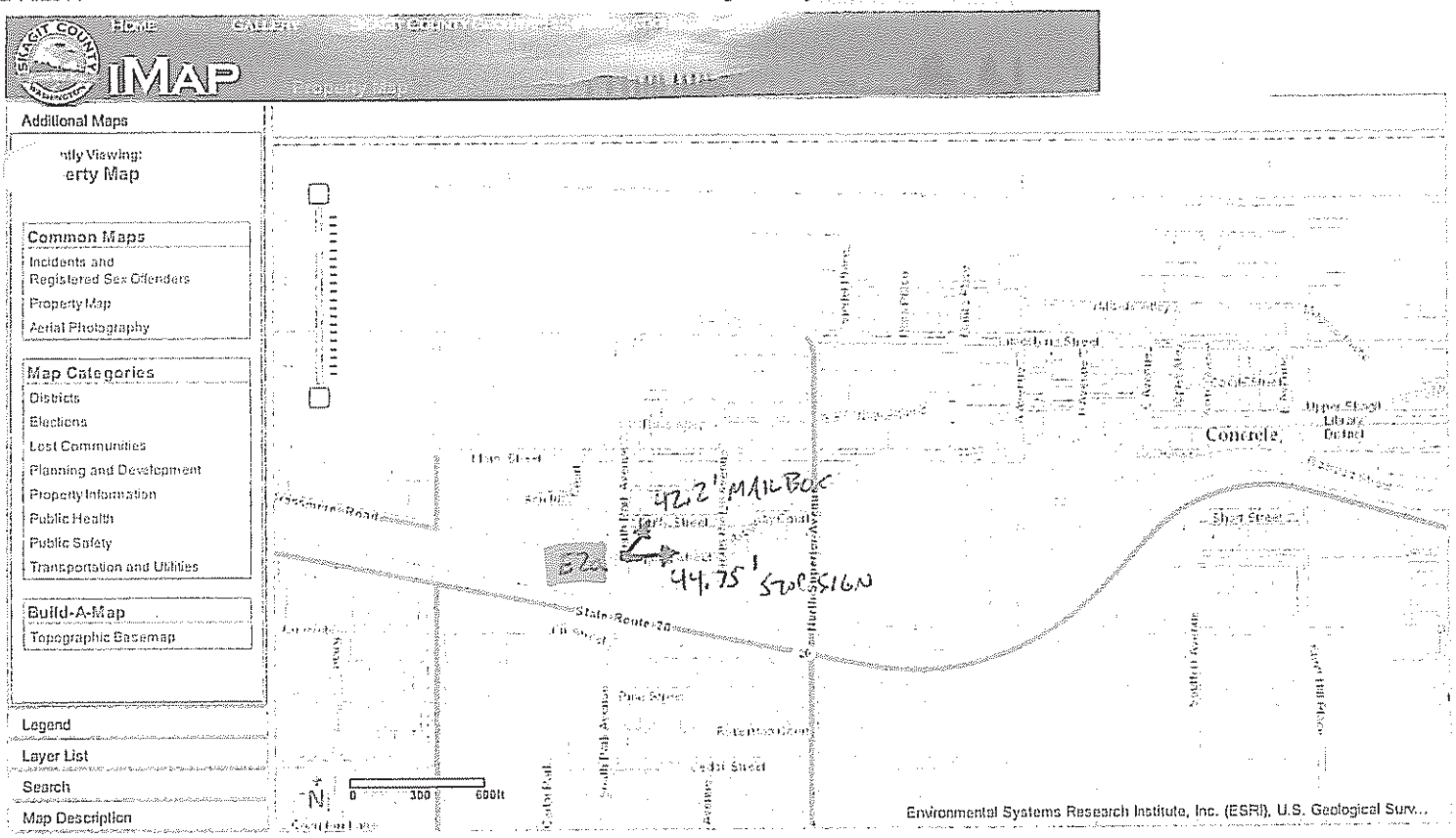


Leaks: Yes X No____
Leak Locations = X

Distance to Fire Hydrant: _____
Manhole Type: SMH CB Other _____

Surface Cover: Asphalt-Concrete-Gravel-Other _____
Ability to Access M/H: Poor Satisfactory
Manhole Material: BRK-VCP-Conc-PRC-Other

phone #; 253-435-4328


IMAP
Additional Maps
Common Maps
Incidents and Registered Sex Offenders
Property Map
Aerial Photography
Map Categories
Districts
Elections
Lost Communities
Planning and Development
Property Information
Public Health
Public Safety
Transportation and Utilities
Build-A-Map
Topographic Basemap
Legend
Layer List
Search
Map Description
42.2' MAILBOX
44.75' STOP SIGN
Concrete,
State Route 20
North Superior Avenue
Environmental Systems Research Institute, Inc. (ESRI), U.S. Geological Surv...

Manhole Inspection Report

M/H Number: 63 Client: CITY OF CONCRETE Job No:
M/H Address: 45680 S. D AVE Inspection Date: 5/6/14
Cross Street: HWY 20 Area: BASIN 4
Time: 1059 Weather: clear rain overcast sunny technician CHRIS

COMMENTS: ROOTS AROUND PIPE COLLAR FROM INFLUENT PIPE

Surface Ponding: Y / N

Problem: Y / N

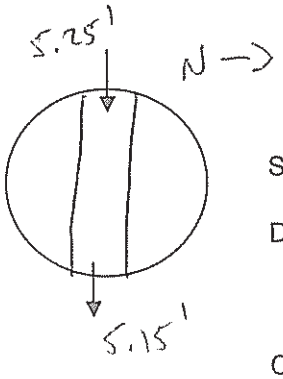
Initial

Traffic: Light Medium Heavy
M/H Depth: 5.25'
Flow Depth: 5 %
Drop M/H: Y / N

Pipe	Diameter	Type	Deterioration Condition	Drop M/H
IN	6"	ACP VCP CON CIP OTHER PVC	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
OUT	8"	ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out

Structural

	Diameter	Type	Deterioration Condition
Casting		Concealed Pickholes Other	Light Med. Heavy Satisfactory
Riser		At Grade Below Grade	Light Med. Heavy Satisfactory
Cone		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Wall		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Bench		ACP VCP CIP Other	Light Med. Heavy Satisfactory
Invert		ACP VCP CIP Other	Light Med. Heavy Satisfactory
Steps	Yes No		Unsafe Safe



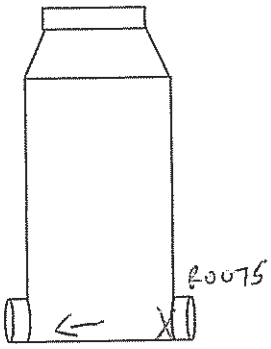
Hydraulic

Surcharge: Evidence Y / N Depth: _____

Debris/Slit: Build-up Y / N Depth: _____

Qty (gpm)

Cover: _____
Ring: _____
Riser: _____
Cone: _____
Wall: _____
Bench: _____
Pipe Collar: ROOTS



Leaks: Yes X No____
Leak Locations = X

Distance to Fire Hydrant: _____
Manhole Type: Std CB Other _____

Surface Cover: Asphalt-Concrete-Gravel-Other DIRT + BRUSH
Ability to Access M/H: Poor Satisfactory
Manhole Material: BRK-VCP-Conc-PRC-Other

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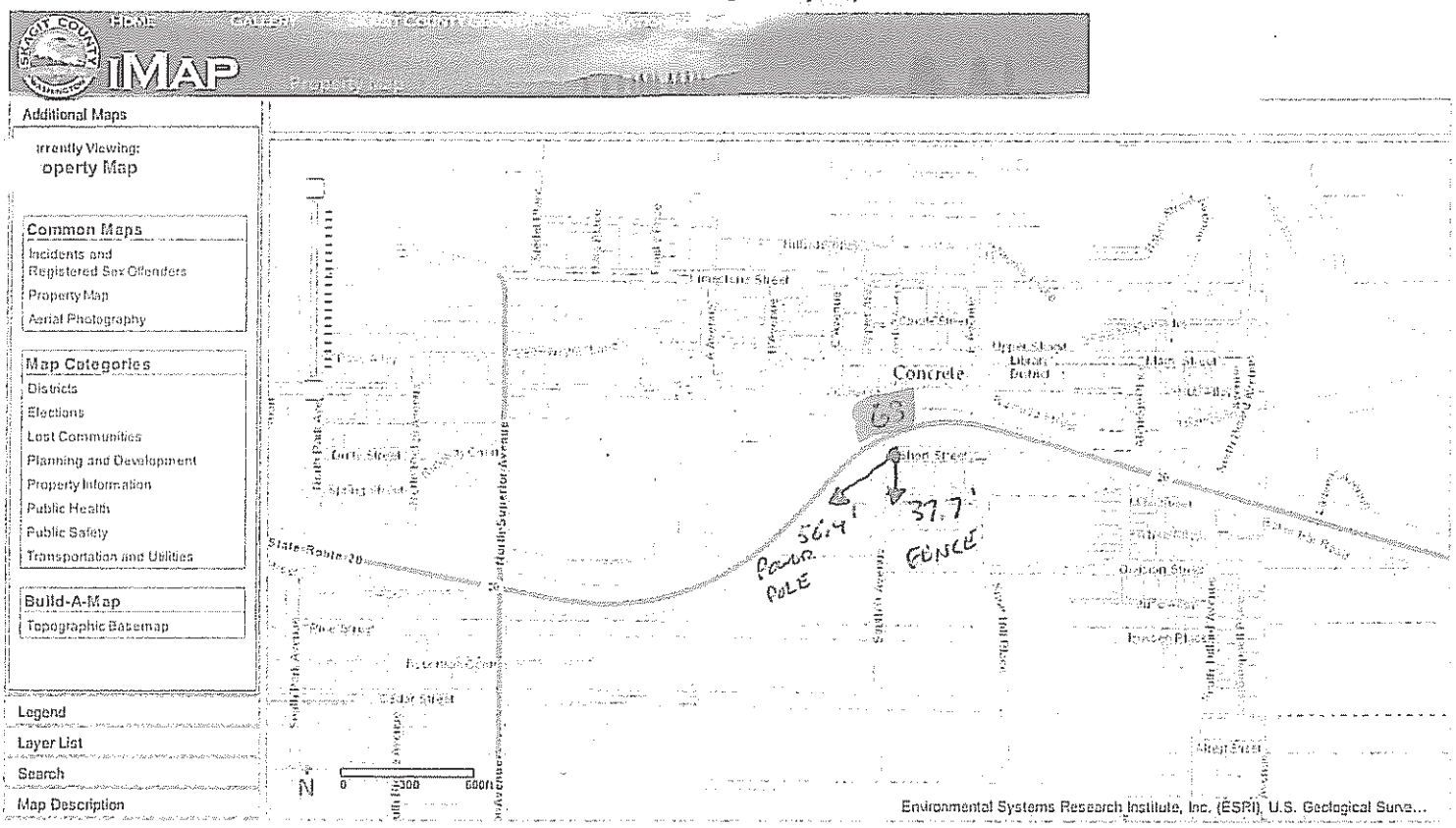
phone #; 253-435-4328


HELP
CONTACT
IMAP
Additional Maps
Currently Viewing:
Property Map
Common Maps
Incidents and Registered Sex Offenders
Property Map
Aerial Photography
Map Categories
Districts
Elections
Lost Communities
Planning and Development
Property Information
Public Health
Public Safety
Transportation and Utilities
Build-A-Map
Topographic Basemap
Legend
Layer List
Search
Map Description
Concrete
63
56.4'
37.7'
POLE
FENCE
N
0
300
600ft
Environmental Systems Research Institute, Inc. (ESRI), U.S. Geological Surve...

Manhole Inspection Report

M/H Number: R1 Client: City of Concrete Job No:
M/H Address: 45276 Ridgeway Court Inspection Date: 5/2/14
Cross Street: N. Superior Area: Basin 3
Time: 0924 Weather: clear rain overcast sunny technician Chris

COMMENTS: lid frame offset 3.5" from top riser - risers have visible gaps

Surface Ponding: Y / N
Problem: Y / N

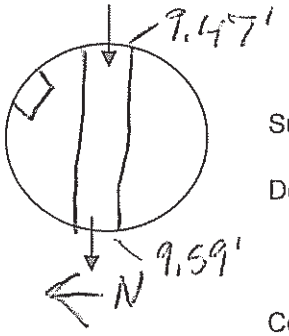
Initial

Traffic: Light Medium Heavy
M/H Depth: 9.5'
Flow Depth: 20%
Drop M/H: Y / N

Pipe	Diameter	Type	Deterioration Condition	Drop M/H
IN	8"	ACP VCP CON CIP OTHER PVC	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
OUT	8"	ACP VCP CON CIP OTHER PVC	Lgt. Med.Hvy. Satisfactory	In Out

Structural

	Diameter	Type	Deterioration Condition
Casting	24"	Multi-Hole Concealed Pickholes Other	Light Med. Heavy Satisfactory
Riser	25"	At Grade Below Grade	Light Med. Heavy Satisfactory
Cone		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Wall	48"	ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Bench		ACP VCP Con CIP Other	Light Med. Heavy Satisfactory
Invert		ACP VCP Con CIP Other	Light Med. Heavy Satisfactory
Steps	Yes No		Unsafe Safe



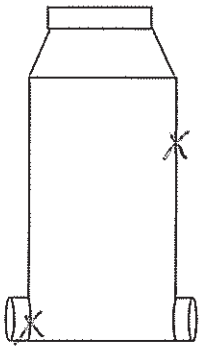
Hydraulic

Surcharge: Evidence Y / N Depth: _____

Debris/Slit: Build-up Y / N Depth: _____

Qty (gpm)

Cover: _____
Ring: _____
Riser: _____
Cone: _____
Wall: weepers
Bench: _____
Pipe Collar: weeped



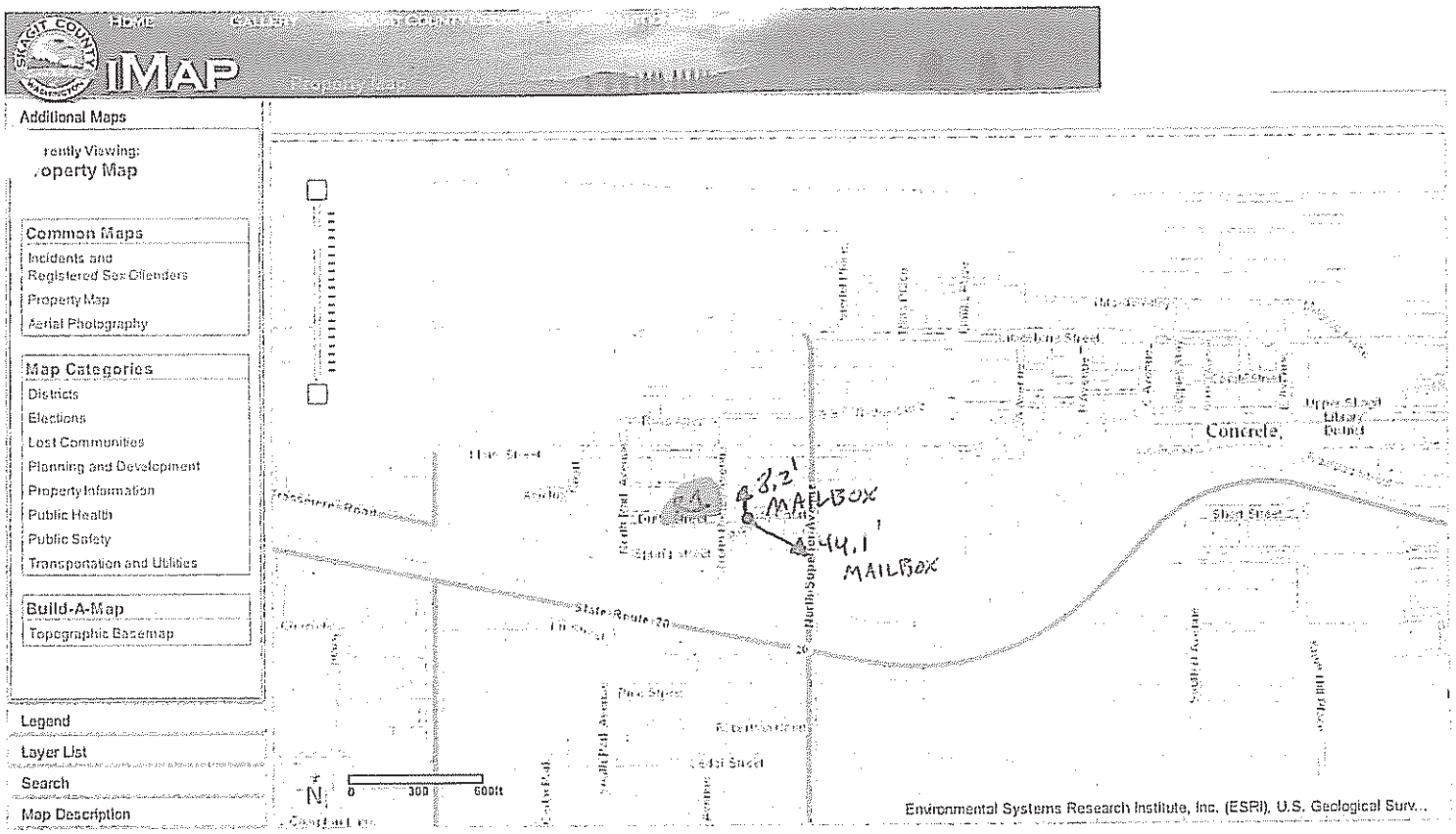
Leaks: Yes X No____
Leak Locations = X

Distance to Fire Hydrant: _____
Manhole Type: SMH CB Other _____

Surface Cover: Asphalt-Concrete-Gravel-Other Dirt/grass
Ability to Access M/H: Poor Satisfactory
Manhole Material: BRK-VCP-Conc-PRC-Other

pro-vac

phone #; 206-423-2445


Home
iMap
Additional Maps
Common Maps
Incidents and Registered Sex Offenders
Property Map
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Map Description
Concrete
State Route 20
48.2'
MAILBOX
44.1'
MAILBOX
N
0 300 600ft
Environmental Systems Research Institute, Inc. (ESRI), U.S. Geological Surv...

Manhole Inspection Report

M/H Number: [redacted] R1A
Client: City of Concrete
Job No:
M/H Address: 45311 Ridgeway Court
Inspection Date: 5/2/14
Cross Street: N. Superior Ave
Area: Basin 2
Time: 0832
Weather: clear rain overcast sunny
technician Chris

COMMENTS: lid frame offset from top riser 2.5"

Surface Ponding: Y / N

Problem: Y / N

Initial

Traffic: Light Medium Heavy

M/H Depth: 10.4'

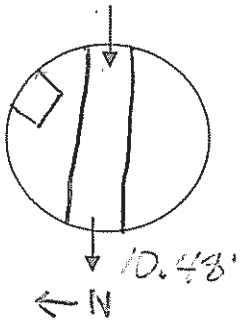
Flow Depth: 5%

Drop M/H: Y / N

Pipe	Diameter	Type	Deterioration Condition	Drop M/H
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
OUT	8"	ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out

Structural

	Diameter	Type	Deterioration Condition
Casting	24"	Multi-Hole Concealed Pickholes Other	Light Med. Heavy Satisfactory
Riser	25"	At Grade Below Grade	Light Med. Heavy Satisfactory
Cone		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Wall	48"	ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Bench		ACP VCP Con CIP Other	Light Med. Heavy Satisfactory
Invert		ACP VCP Con CIP Other	Light Med. Heavy Satisfactory
Steps	Yes No		Unsafe Safe



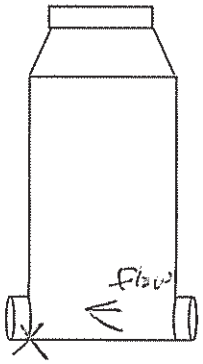
Hydraulic

Surcharge: Evidence Y / N Depth: _____

Debris/Slit: Build-up Y / N Depth: _____

Qty (gpm)

Cover: _____
Ring: _____
Riser: _____
Cone: _____
Wall: _____
Bench: _____
Pipe Collar: 5 gpm est. Gasher



Leaks: Yes X No

Leak Locations = X

Distance to Fire Hydrant: _____

Manhole Type: SMH CB Other _____

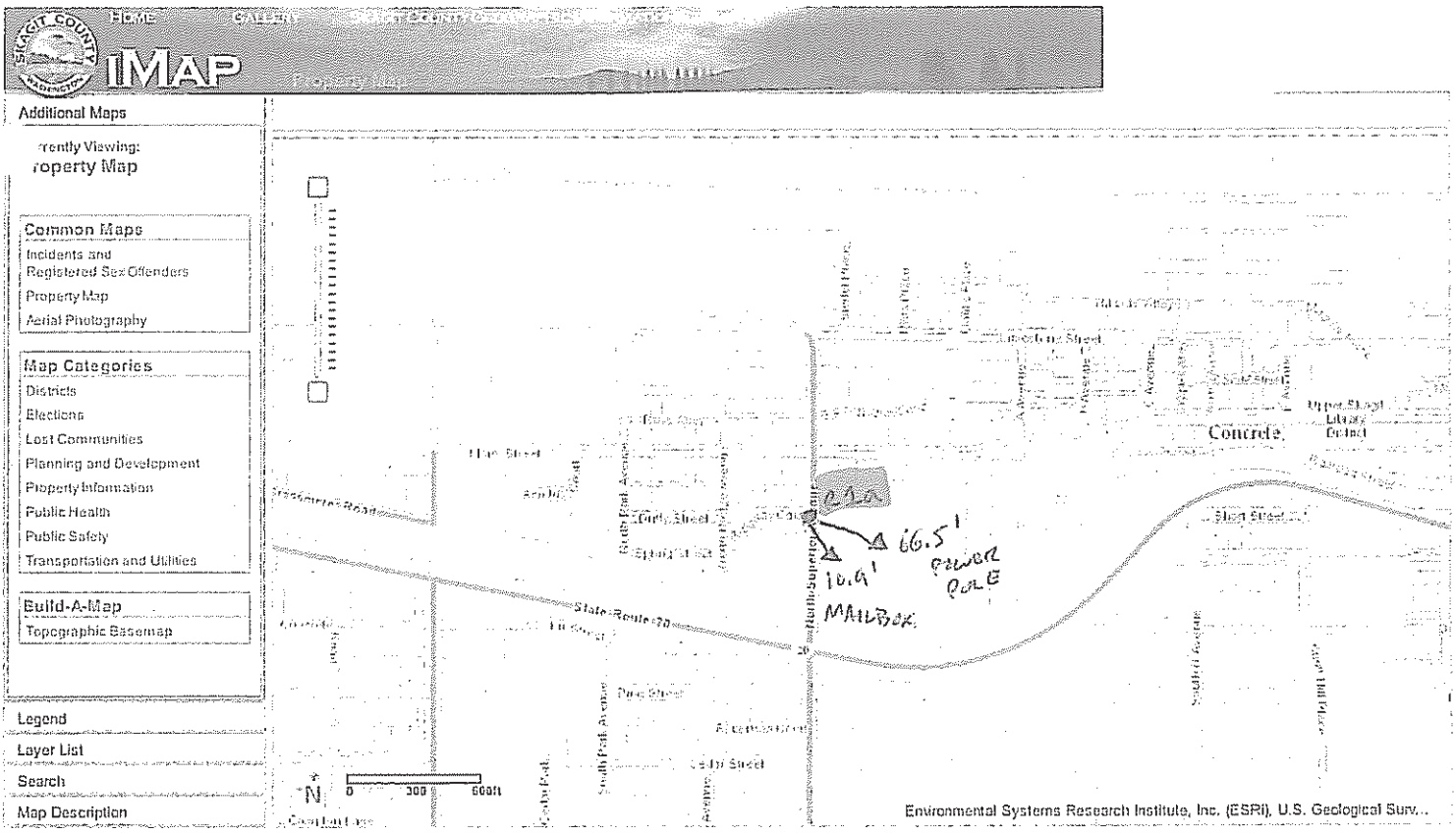
Surface Cover: Asphalt-Concrete-Gravel-Other

Ability to Access M/H: Poor Satisfactory

Manhole Material: BRK-VCP-Conc-PRC-Other

pro-vac

phone #; 206-423-2445


HOME
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Additional Maps
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Property Map
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Districts
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Lost Communities
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Public Safety
Transportation and Utilities
Build-A-Map
Topographic Basemap
Legend
Layer List
Search
Map Description
Concrete
State Route 20
66.5'
power pole
10.9'
MAILBOX
N
0 300 600ft
Environmental Systems Research Institute, Inc. (ESRI), U.S. Geological Surv...

Manhole Inspection Report

M/H Number: R2 Client: City of Concrete Job No:
M/H Address: 7429 N. Rietze Inspection Date: 5/2/14
Cross Street: Duffy Street Area: Basin 2
Time: 1011 Weather: clear rain overcast sunny technician Clark

COMMENTS:

Surface Ponding: Y / N

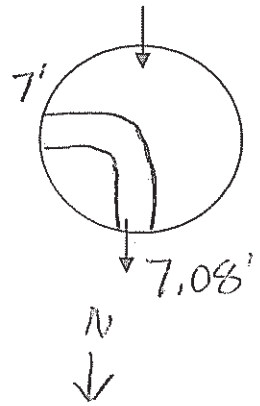
Problem: Y / N

Traffic: Light Medium Heavy (Initial)
M/H Depth: 7'
Flow Depth: 15%
Drop M/H: Y / N

Pipe	Diameter	Type	Deterioration Condition	Drop M/H
IN	8"	ACP VCP CON CIP OTHER PVC	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
OUT	8"	ACP VCP CON CIP OTHER PVC	Lgt. Med.Hvy. Satisfactory	In Out

Structural

	Diameter	Type	Deterioration Condition
Casting	24"	Multi-Hole Concealed Pickholes Other	Light Med. Heavy Satisfactory
Riser	25"	At Grade Below Grade	Light Med. Heavy Satisfactory
Cone		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Wall	48"	ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Bench		ACP VCP Con CIP Other	Light Med. Heavy Satisfactory
Invert		ACP VCP Con CIP Other	Light Med. Heavy Satisfactory
Steps	Yes No		Unsafe Safe



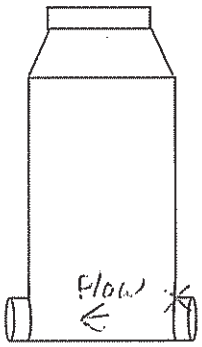
Hydraulic

Surcharge: Evidence Y / N Depth: _____

Debris/Slit: Build-up Y / N Depth: _____

Qty (gpm)

Cover: _____
Ring: _____
Riser: _____
Cone: _____
Wall: _____
Bench: _____
Pipe Collar: Gasket



Leaks: Yes X No____
Leak Locations = X

Distance to Fire Hydrant: _____
Manhole Type: SMH CB Other _____

Surface Cover: Asphalt-Concrete-Gravel-Other: Dirt/grass
Ability to Access M/H: Poor Satisfactory
Manhole Material: BRK-VCP-Conc-PRC-Other

pro-vac

phone #; 206-423-2445

Home

iMAP

Additional Maps

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Common Maps
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- Aerial Photography

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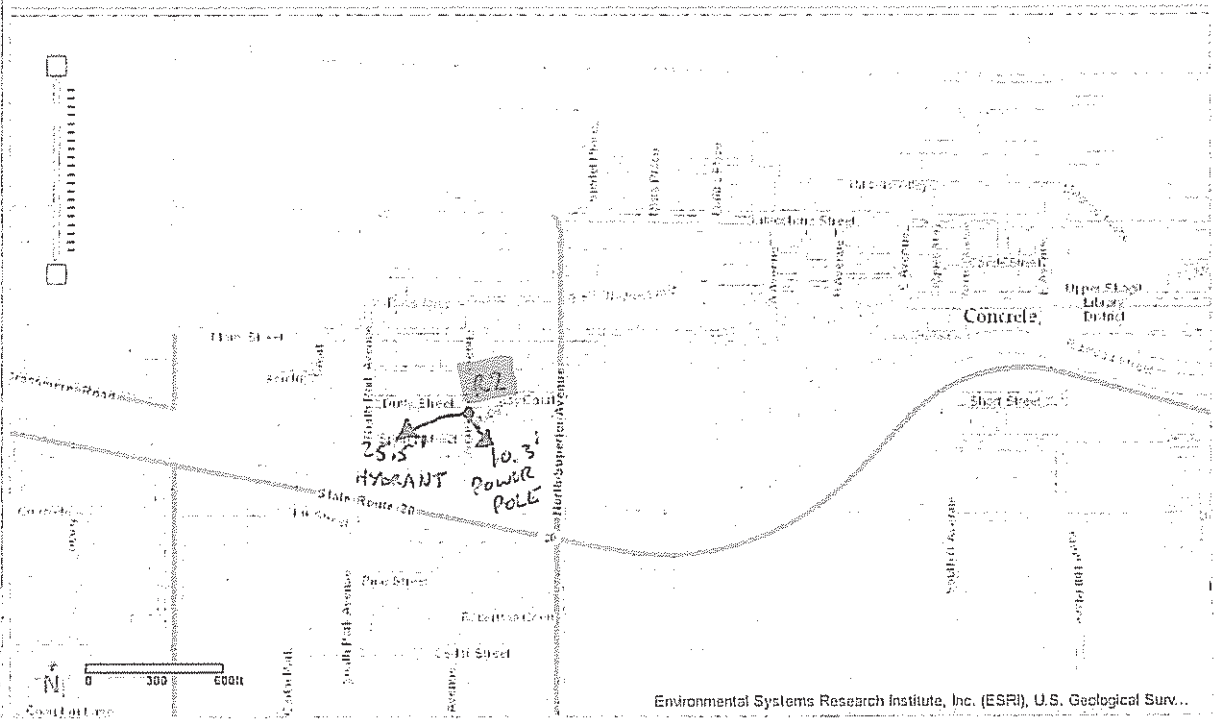
Map Description



CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time: 7/17/2012 10:52:14
Project: City of Concrete
Surveyor's name: Valentin R. 253-405-1592

Work order:
Purpose: Assessment
Weather: Dry

Additional info:

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number: C3
Access type: Manhole
Year laid:

City: Concrete
Street: 45487 Limestone St

GPS from GIS: Latitude: Longitude:

GPS collected: Latitude: Longitude: Height:

Rim to invert: 10.4	Pre-cast	Cone material: Precast	Channel material: Concrete
Cover size: 2	Other	Wall material: Precast	Precast
Wall diameter: 4	Solid	Bench material: Concrete	Steps material: Other
DIST_2_HYDRANT	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

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Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/17/2012 10:41:36	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Dry
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	C4	Access type:	Manhole	Year laid:	
City:	Concrete	Street:	7250 Franks Pl		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
9.9	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Other	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/20/2012 12:07:42	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Light Rain
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	D1	Access type:	Manhole	Year laid:	
City:	Concrete	Street:	45080 S Park Ave		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
9.9	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Driveway	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time: 7/17/2012 12:27:14
Project: City of Concrete
Surveyor's name: Valentin R. 253-405-1592

Work order:
Purpose: Assessment
Weather: Dry

Additional info:

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number: H1-1
Access type: Manhole
Year laid:

City: Concrete
Street: 7282 Calcite St

GPS from GIS: Latitude: Longitude:

GPS collected: Latitude: Longitude: Height:

Rim to Invert: 8	Pre-cast	Cone material: Precast	Channel material: Concrete
Cover size: 2	Street	Wall material: Precast	Precast
Wall diameter: 4	Solid	Bench material: Concrete	Steps material: Other
DIST_2_HYDRANT	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
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Node Inspection Small Photo Report

Start date/time:	7/18/2012 2:05:19	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Dry
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	I7	Access type:	Manhole	Year laid:	
City:	Concrete	Street:	48978 Main St		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
6.5	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Street	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
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Node Inspection Small Photo Report

Start date/time: 7/18/2012 1:56:18
Project: City of Concrete
Surveyor's name: Valentin R. 253-405-1592

Work order:
Purpose: Assessment
Weather: Dry

Additional info:

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number: I8
Access type: Manhole
Year laid:

City: Concrete
Street: S Dillard Ave & Main St

GPS from GIS: Latitude: Longitude:

GPS collected: Latitude: Longitude: Height:

Rim to invert: 6	Pre-cast	Cone material: Precast	Channel material: Concrete
Cover size: 2	Sidewalk	Wall material: Precast	Precast
Wall diameter: 4	Solid	Bench material: Concrete	Steps material: Other
DIST_2_HYDRANT	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
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Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/20/2012 8:45:36	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Dry
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	K1-1	Access type:	Manhole	Year laid:	
City:	Concrete	Street:	45908 Miller St		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
7.8	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Street	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

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Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time: 7/18/2012 4:20:54
Project: City of Concrete
Surveyor's name: Valentin R. 253-405-1592

Work order:
Purpose: Assessment
Weather: Dry

Additional info:

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number: A5
Access type: Manhole
Year laid:

City: Concrete
Street: 45821 Railroad Ave

GPS from GIS: Latitude: Longitude:

GPS collected: Latitude: Longitude: Height:

Rim to invert: 10.4	Pre-cast	Cone material: Precast	Channel material: Concrete
Cover size: 2	Street	Wall material: Precast	Precast
Wall diameter: 4	Solid	Bench material: Concrete	Steps material: Other
DIST_2_HYDRANT	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

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Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time: 7/17/2012 4:12:22
Project: City of Concrete
Surveyor's name: Valentin R. 253-405-1592

Work order:
Purpose: Assessment
Weather: Dry

Additional info:

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number: A7
Access type: Manhole
Year laid:

City: Concrete
Street: 45734 Main St

GPS from GIS: Latitude: Longitude:

GPS collected: Latitude: Longitude: Height:

Rim to invert: 8	Pre-cast	Cone material: Precast	Channel material: Concrete
Cover size: 2	Sidewalk	Wall material: Precast	Precast
Wall diameter: 4	Solid	Bench material: Concrete	Steps material: Other
DIST_2_HYDRANT	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

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Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/17/2012 2:07:50	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Dry
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	A18	Access type:	Manhole	Year laid:	
City:	Concrete	Street:	45317 Main St		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
8.4	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Street	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

Manhole Inspection Report

M/H Number: AB-1 Client: City of Concrete Job No:
M/H Address: 7315 N. Superior Inspection Date: 5/5/14
Cross Street: Limestone Area: Basin 4
Time: 1430 Weather: clear rain overcast sunny technician Chris

COMMENTS:

Surface Ponding: Y / N

Problem: Y / N

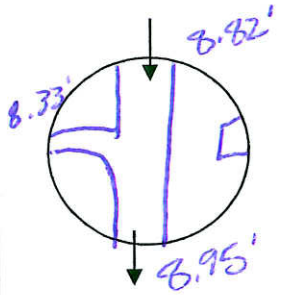
Initial

Traffic: Light Medium Heavy
M/H Depth: 8.5'
Flow Depth: 0%
Drop M/H: Y / N

Pipe	Diameter	Type	Deterioration Condition	Drop M/H
IN	8"	ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN	6"	ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
IN		ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out
OUT	8"	ACP VCP CON CIP OTHER	Lgt. Med.Hvy. Satisfactory	In Out

Structural

	Diameter	Type	Deterioration Condition
Casting		Multi-Hole Concealed Pickholes Other	Light Med. Heavy Satisfactory
Riser		At Grade Below Grade	Light Med. Heavy Satisfactory
Cone		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Wall		ACP VCP Con PRC BRK	Light Med. Heavy Satisfactory
Bench		ACP VCP Con CIP Other	Light Med. Heavy Satisfactory
Invert		ACP VCP Con CIP Other	Light Med. Heavy Satisfactory
Steps	Yes No		Unsafe Safe



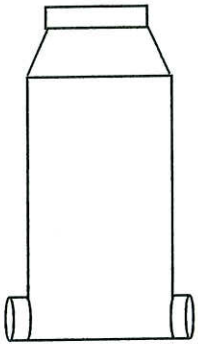
Hydraulic

Surcharge: Evidence Y / N Depth: _____

Debris/Slit: Build-up Y / N Depth: _____

Qty (gpm)

Cover: _____
Ring: _____
Riser: _____
Cone: _____
Wall: _____
Bench: _____
Pipe Collar: _____



Leaks: Yes_____ No X
Leak Locations = X

Distance to Fire Hydrant: _____
Manhole Type: SMH CB Other _____

Surface Cover: Asphalt-Concrete-Gravel-Other
Ability to Access M/H: Poor Satisfactory
Manhole Material: BRK-VCP-Conc-PRC-Other

pro-vac

phone #; 206-423-2445

HOME GALLERY

iMAP

Property Map

Additional Maps

rently Viewing:
. roperty Map

Common Maps
- Incidents and Registered Sex Offenders
- Property Map
- Aerial Photography

Map Categories
- Districts
- Elections
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- Planning and Development
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- Public Safety
- Transportation and Utilities

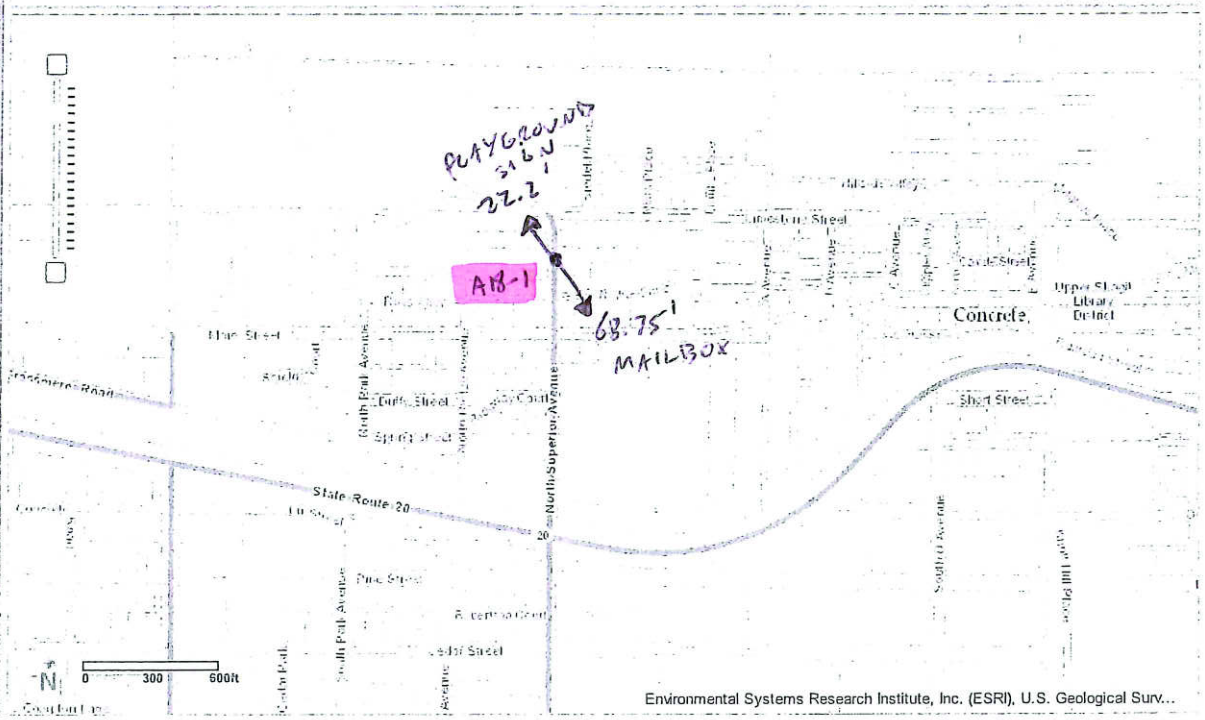
Build-A-Map
- Topographic Basemap

Legend

Layer List

Search

Map Description



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3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/20/2012 11:57:17	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Light Rain
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	B1	Access type:	Manhole	Year laid:	
City:	Concrete	Street:	45080 Fir St		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to Invert:		Cone material:	Channel material:
8.7	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Street	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time: 7/20/2012 11:37:47
Project: City of Concrete
Surveyor's name: Valentin R. 253-405-1592

Work order:
Purpose: Assessment
Weather: Heavy Rain

Additional info:

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number: B2
Access type: Manhole
Year laid:

City: Concrete
Street: 44511 Fir St

GPS from GIS: Latitude: Longitude:

GPS collected: Latitude: Longitude: Height:

Rim to invert:		Cone material:	Channel material:
7	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Street	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/20/2012 11:09:48	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Light Rain

Additional info:

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	B4A	Access type:	Manhole	Year laid:	
City:	Concrete	Street:	44963 Main St		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
8.7	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Field	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/20/2012 11:00:27	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Heavy Rain
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	B5	Access type:	Manhole	Year laid:	
City:	Concrete	Street:	44989 Main St		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
7.5	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Street	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/20/2012 10:40:42	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Light Rain
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	B7	Access type:	Manhole	Year laid:	
City:	Cancrete	Street:	45125 Main St		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
7.4	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Street	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/20/2012 10:33:28	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Light Rain
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	B8	Access type:	Manhole	Year laid:	
City:		Street:	45182 Main St		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
7	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Street	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time: 7/20/2012 10:25:44
Project: City of Concrete
Surveyor's name: Valentin R. 253-405-1592

Work order:
Purpose: Assessment
Weather: Light Rain

Additional info:

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number: B9
Access type: Manhole
Year laid:

City: Concrete
Street: 45259 Main St

GPS from GIS: Latitude: Longitude:

GPS collected: Latitude: Longitude: Height:

Rim to invert: 8	Pre-cast	Cone material: Precast	Channel material: Concrete
Cover size: 2	Street	Wall material: Precast	Precast
Wall diameter: 4	Solid	Bench material: Concrete	Steps material: Other
DIST_2_HYDRANT	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

Node Inspection Small Photo Report

Start date/time:	7/20/2012 10:11:43	Project:	City of Concrete	Surveyor's name:	Valentin R. 253-405-1592
Work order:		Purpose:	Assessment	Weather:	Light Rain
Additional info:					

Reference point for node observation clock position is Largest outlet pipe at 6 o'clock

Manhole number:	B10	Access type:	Manhole	Year laid:	
City:	Concrete	Street:	45284 Main St		
GPS from GIS:	Latitude:		Longitude:		
GPS collected:	Latitude:		Longitude:	Height:	

Rim to invert:		Cone material:	Channel material:
8	Pre-cast	Precast	Concrete
Cover size:		Wall material:	
2	Street	Precast	Precast
Wall diameter:		Bench material:	Steps material:
4	Solid	Concrete	Other
DIST_2_HYDRANT			
	Precast	Cast Iron	METERED ☐ DROP_MANHOLE ☐

B.6 Smoke Test Results – September 1997

Town of Concrete
Smoke Testing Event, September 17-19, 1997

New Address	Former Address	Problem Description
Not Reported	431 Main Street	Smoke from Roof Vent
45191 Main Street	429 Main Street	Smoke in yard near front of door
45191 Main Street	503 Main Street	Fish pond hooked up to sewer
45185 Duffy Street	431 Duffy Street	Smoke from vents under house
45199 Duffy Street	427 Duffy Street	Possible broken line or cleanout?
45303 Main Street	405 Main Street	Broken sewer pipe, NE corner by the wall
45309 Main Street	403 Main Street	Need to extend vent pipe up through the roof
45284 Main Street	400 Main Street	Need to extend two vents through roof
7362 N. Superior Avenue	300 N. Superior Avenue	South side by oil tank
7258 B. Street	200 B. Street	Bad venting NE corner under downspout
7263 A Street	203 A Street	Bad venting
7259 B Street	201 B Street	Possible cleanout problem
45659 Limestone	225 Limestone	Uncapped cleanout by tree and fence
Old High School	Old High School	70'x70' roof connected to sewer
Legion	Legion	Poor venting in attic
45670 Short	228 Short	Uncapped Extension

Appendix C. Cost Estimates

C.1 Project 1: Lift Station 2 Service Area

C.2 Project 2: Eastern Gravity Service Area

C.3 Project 3: Western Gravity Service Area

C.4 Project 4: Lift Station 1 Service Area

C.5 Cost Estimate Assumptions

Reichhardt & Ebe Engineering, Inc.
423 Front Street, Suite 201
Lynden, WA 98264
Phone: (360) 354-3687

PROJECT 1

Location:	Town of Concrete
Ref Doc:	**2014 WASTEWATER SYSTEM I&I EVALUATION ENGINEERING REPORT**
Project 1	**LIFT STATION 2 SERVICE AREA**

PRELIMINARY

STANDARD CONSTRUCTION METHODS: OPEN CUT

PRELIMINARY ENGINEER'S ESTIMATE

By: B. Kuiken — Approximate Days 120
Date: September 12, 2014

Sch. A BASE BID

Item No.	Item	Quantity	Unit	Unit Price	Amount
1	Mobilization	1	LS	$ 132,000.00	$ 132,000.00
2	Spill Prevention, Control, and Countermeasures (SPCC) Plan	1	LS	$ 1,000.00	$ 1,000.00
3	Project Temporary Traffic Control	1	LS	$ 155,520.00	$ 155,520.00
4	ESC Lead	120	DAY	$ 100.00	$ 12,000.00
5	Erosion/Water Pollution Control	1	EST	$ 18,000.00	$ 18,000.00
6	Repair Existing Public and Private Facilities	1	EST	$ 25,500.00	$ 25,500.00
				Schedule A Subtotal:	$ 344,020.00
				Sales Tax (8.5%):	$ 29,241.70
				SCH A TOTAL	$ 373,261.70
				CONTINGENCY (20%)	$ 447,914.04

Sch. B PIPE REPAIR — 435 LF — $ 205.00 per LF

Item No.	Item	Quantity	Unit	Unit Price	Amount
7	Removal of Structure and Obstruction	1	LS	$ 1,500.00	$ 1,500.00
8	Sawcut ACP	1,305	LF-IN	$ 1.00	$ 1,305.00
9	Gravel Base	2,065	TON	$ 10.00	$ 20,650.00
10	Crushed Surfacing Top Course	100	TON	$ 20.00	$ 2,000.00
11	HMA for Pavement Repair Cl. 1/2 In, PG 64-22	100	TON	$ 140.00	$ 14,000.00
12	PVC Sanitary Sewer Pipe 8 In. Diam	435	LF	$ 55.00	$ 23,925.00
13	Repair Existing Public and Private Facilities	1	EST	$ 5,100.00	$ 5,100.00
				Schedule B Subtotal:	$ 68,480.00
				Sales Tax (8.5%):	$ 5,820.80
				SCH B TOTAL	$ 74,300.80
				CONTINGENCY (20%)	$ 89,160.96

Sch. C MANHOLE REPLACE — 1 EA — $ 27,600.00 Per EA

Item No.	Item	Quantity	Unit	Unit Price	Amount
14	Removal of Structure and Obstruction	1	LS	$ 500.00	$ 500.00
15	Sawcut ACP	145	LF-IN	$ 1.00	$ 145.00
16	Gravel Base	65	TON	$ 10.00	$ 650.00
17	Crushed Surfacing Top Course	5	TON	$ 20.00	$ 100.00
18	HMA for Pavement Repair Cl. 1/2 In, PG 64-22	5	TON	$ 140.00	$ 700.00
19	Manhole 48 In. Diam Type 1	5	EA	$ 3,500.00	$ 17,500.00
20	Repair Existing Public and Private Facilities	1	EST	$ 1,600.00	$ 1,600.00
				Schedule C Subtotal:	$ 21,195.00
				Sales Tax (8.5%):	$ 1,801.58
				SCH C TOTAL	$ 22,996.58
				CONTINGENCY (20%)	$ 27,595.89

Sch. D SIDE SEWER REPLACEMENT — 180 LF — $ 170.00 per LF

Item No.	Item	Quantity	Unit	Unit Price	Amount
21	Removal of Structure and Obstruction	1	LS	$ 700.00	$ 700.00
22	Gravel Base	320	TON	$ 10.00	$ 3,200.00
23	Crushed Surfacing Top Course	30	TON	$ 20.00	$ 600.00
24	HMA for Pavement Repair Cl. 1/2 In, PG 64-22	30	TON	$ 140.00	$ 4,200.00
25	PVC Sanitary Sewer Pipe 4 In. Diam	180	LF	$ 40.00	$ 7,200.00
26	Sewer Cleanout	9	EA	$ 600.00	$ 5,400.00
27	Repair Existing Public and Private Facilities	1	EST	$ 1,800.00	$ 1,800.00
				Schedule D Subtotal:	$ 23,100.00
				Sales Tax (8.5%):	$ 1,963.50
				SCH D TOTAL	$ 25,063.50
				CONTINGENCY (20%)	$ 30,076.20

TRENCHLESS CONSTRUCTION METHODS: LINERS / GROUTING					
	PRELIMINARY ENGINEER'S ESTIMATE				
By:	B. Kuiken	Approximate Days		15	
Date:	September 12, 2014				
Sch. E	**BASE BID**				
Item No.	Item	Quantity	Unit	Unit Price	Amount
28	Mobilization	1	LS	$ 22,500.00	$ 22,500.00
29	Spill Prevention, Control, and Countermeasures (SPCC) Plan	1	LS	$ 1,000.00	$ 1,000.00
30	Project Temporary Traffic Control	1	LS	$ 19,440.00	$ 19,440.00
31	ESC Lead	15	DAY	$ 100.00	$ 1,500.00
32	Erosion/Water Pollution Control	1	EST	$ 2,250.00	$ 2,250.00
33	Repair Existing Public and Private Facilities	1	EST	$ 1,500.00	$ 1,500.00
				Schedule E Subtotal:	$ 48,190.00
				Sales Tax (8.5%):	$ 4,096.15
				SCH E TOTAL	$ 52,286.15
				CONTINGENCY (20%)	$ 62,743.38

Sch. F	**PIPE LINER**	785	LF	$ 65.00	per LF
Item No.	Item	Quantity	Unit	Unit Price	Amount
34	CIPP Liner	785	LF	$ 45.00	$ 35,325.00
35	Laterals	10	EA	$ 200.00	$ 2,000.00
36	Repair Existing Public and Private Facilities	1	EST	$ 1,100.00	$ 1,100.00
				Schedule F Subtotal:	$ 38,425.00
				Sales Tax (8.5%):	$ 3,266.13
				SCH F TOTAL	$ 41,691.13
				CONTINGENCY (20%)	$ 50,029.35

Sch.G	**PIPE LINER SECTION**	3	EA	$ 8,400.00	per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
37	CIPP Liner Section	3	LF	$ 6,000.00	$ 18,000.00
1	Chemical Grouting	3	EA	$ 250.00	$ 750.00
2	Repair Existing Public and Private Facilities	1	EST	$ 600.00	$ 600.00
				Schedule G Subtotal:	$ 19,350.00
				Sales Tax (8.5%):	$ 1,644.75
				SCH G TOTAL	$ 20,994.75
				CONTINGENCY (20%)	$ 25,193.70

Sch. H	**MANHOLE REHABILITATION**	13	EA	$ 1,085.00	Per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
37	Chemical Grouting	13	EA	$ 800.00	$ 10,400.00
38	Repair Existing Public and Private Facilities	1	EST	$ 400.00	$ 400.00
				Schedule H Subtotal:	$ 10,800.00
				Sales Tax (8.5%):	$ 918.00
				SCH H TOTAL	$ 11,718.00
				CONTINGENCY (20%)	$ 14,061.60

Sch. I	**PIPE PRESSURE GROUTING**	7	EA	$ 345.00	per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
39	Chemical Grouting	7	EA	$ 250.00	$ 1,750.00
40	Repair Existing Public and Private Facilities	1	EST	$ 100.00	$ 100.00
				Schedule I Subtotal:	$ 1,850.00
				Sales Tax (8.5%):	$ 157.25
				SCH I TOTAL	$ 2,007.25
				CONTINGENCY (20%)	$ 2,408.70

This estimate was prepared without the benefit of a complete design and therefore shall be considered preliminary and subject to change due to the possibility of changes in the quantity and nature of work and changes in unit prices overtime.

TOTAL CONSTRUCTION COSTS	$ 575,410.00
TOTAL SALES TAX	$ 48,909.85
PROJECT TOAL	$ 624,319.85
CONTINGENCY (20%)	$ 749,183.82

Reichhardt & Ebe Engineering, Inc.
423 Front Street, Suite 201
Lynden, WA 98264
Phone: (360) 354-3687

PROJECT 2

Location:	Town of Concrete
Ref Doc:	**2014 WASTEWATER SYSTEM I&I EVALUATION ENGINEERING REPORT**
Project 2	**EASTERN GRAVITY SERVICE AREA**

PRELIMINARY

STANDARD CONSTRUCTION METHODS: OPEN CUT

PRELIMINARY ENGINEER'S ESTIMATE

By: B. Kuiken — Approximate Days 10
Date: September 12, 2014

Sch. A **BASE BID**

Item No.	Item	Quantity	Unit	Unit Price	Amount
1	Mobilization	1	LS	$ 48,000.00	$ 48,000.00
2	Spill Prevention, Control, and Countermeasures (SPCC) Plan	1	LS	$ 1,000.00	$ 1,000.00
3	Project Temporary Traffic Control	1	LS	$ 12,960.00	$ 12,960.00
4	ESC Lead	10	DAY	$ 100.00	$ 1,000.00
5	Erosion/Water Pollution Control	1	EST	$ 1,500.00	$ 1,500.00
6	Repair Existing Public and Private Facilities	1	EST	$ 5,200.00	$ 5,200.00

Schedule A Subtotal: $ 69,660.00
Sales Tax (8.5%): $ 5,921.10
SCH A TOTAL $ 75,581.10
CONTINGENCY (20%) $ 90,697.32

Sch. B **PIPE REPAIR** 290 LF $ 210.00 per LF

Item No.	Item	Quantity	Unit	Unit Price	Amount
7	Removal of Structure and Obstruction	1	LS	$ 1,500.00	$ 1,500.00
8	Sawcut ACP	870	LF-IN	$ 1.00	$ 870.00
9	Gravel Base	1,375	TON	$ 10.00	$ 13,750.00
10	Crushed Surfacing Top Course	65	TON	$ 20.00	$ 1,300.00
11	HMA for Pavement Repair Cl. 1/2 In, PG 64-22	65	TON	$ 140.00	$ 9,100.00
12	PVC Sanitary Sewer Pipe 8 In. Diam	290	LF	$ 55.00	$ 15,950.00
13	Repair Existing Public and Private Facilities	1	EST	$ 3,400.00	$ 3,400.00

Schedule B Subtotal: $ 45,870.00
Sales Tax (8.5%): $ 3,898.95
SCH B TOTAL $ 49,768.95
CONTINGENCY (20%) $ 59,722.74

TRENCHLESS CONSTRUCTION METHODS: LINERS / GROUTING

PRELIMINARY ENGINEER'S ESTIMATE

By: B. Kuiken — Approximate Days 10
Date: September 12, 2014

Sch. C **BASE BID**

Item No.	Item	Quantity	Unit	Unit Price	Amount
14	Mobilization	1	LS	$ 15,000.00	$ 15,000.00
15	Spill Prevention, Control, and Countermeasures (SPCC) Plan	1	LS	$ 1,000.00	$ 1,000.00
16	Project Temporary Traffic Control	1	LS	$ 12,960.00	$ 12,960.00
17	ESC Lead	10	DAY	$ 100.00	$ 1,000.00
18	Erosion/Water Pollution Control	1	EST	$ 1,500.00	$ 1,500.00
19	Repair Existing Public and Private Facilities	1	EST	$ 1,000.00	$ 1,000.00

Schedule C Subtotal: $ 32,460.00
Sales Tax (8.5%): $ 2,759.10
SCH C TOTAL $ 35,219.10
CONTINGENCY (20%) $ 42,262.92

Sch. D **PIPE LINER** 1,330 LF $ 70.00 per LF

Item No.	Item	Quantity	Unit	Unit Price	Amount
20	CIPP Liner	1,330	LF	$ 45.00	$ 59,850.00
21	Laterals	39	EA	$ 200.00	$ 7,800.00
22	Repair Existing Public and Private Facilities	1	EST	$ 1,800.00	$ 1,800.00

ScheduleD Subtotal: $ 69,450.00
Sales Tax (8.5%): $ 5,903.25
SCH D TOTAL $ 75,353.25
CONTINGENCY (20%) $ 90,423.90

Sch. E	PIPE LINER SECTION	4	EA	$ 11,070.00	per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
23	CIPP Liner Section	4	LF	$ 8,000.00	$ 32,000.00
1	Chemical Grouting	4	EA	$ 250.00	$ 1,000.00
2	Repair Existing Public and Private Facilities	1	EST	$ 1,000.00	$ 1,000.00
				Schedule E Subtotal:	$ 34,000.00
				Sales Tax (8.5%):	$ 2,890.00
				SCH E TOTAL	$ 36,890.00
				CONTINGENCY (20%)	$ 44,268.00

Sch. F	MANHOLE REHABILITATION	5	EA	$ 1,095.00	Per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
23	Chemical Grouting	5	EA	$ 800.00	$ 4,000.00
24	Repair Existing Public and Private Facilities	1	EST	$ 200.00	$ 200.00
				Schedule F Subtotal:	$ 4,200.00
				Sales Tax (8.5%):	$ 357.00
				SCH F TOTAL	$ 4,557.00
				CONTINGENCY (20%)	$ 5,468.40

Sch. G	PIPE PRESSURE GROUTING	3	EA	$ 370.00	per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
25	Chemical Grouting	3	EA	$ 250.00	$ 750.00
26	Repair Existing Public and Private Facilities	1	EST	$ 100.00	$ 100.00
				Schedule G Subtotal:	$ 850.00
				Sales Tax (8.5%):	$ 72.25
				SCH G TOTAL	$ 922.25
				CONTINGENCY (20%)	$ 1,106.70

This estimate was prepared without the benefit of a complete design and therefore shall be considered preliminary and subject to change due to the possibility of changes in the quantity and nature of work and changes in unit prices overtime.

TOTAL CONSTRUCTION COSTS	$ 256,490.00
TOTAL SALES TAX	$ 21,801.65
PROJECT TOAL	$ 278,291.65
CONTINGENCY (20%)	$ 333,949.98

Reichhardt & Ebe Engineering, Inc.
423 Front Street, Suite 201
Lynden, WA 98264
Phone: (360) 354-3687

PROJECT 3

Location:	Town of Concrete
Ref Doc:	**2014 WASTEWATER SYSTEM I&I EVALUATION ENGINEERING REPORT**
Project 3	**WESTERN GRAVITY SERVICE AREA**

PRELIMINARY

STANDARD CONSTRUCTION METHODS: OPEN CUT

PRELIMINARY ENGINEER'S ESTIMATE

By: B. Kuiken — Approximate Days 10
Date: September 12, 2014

Sch. A BASE BID

Item No.	Item	Quantity	Unit	Unit Price	Amount
1	Mobilization	1	LS	$ 38,000.00	$ 38,000.00
2	Spill Prevention, Control, and Countermeasures (SPCC) Plan	1	LS	$ 1,000.00	$ 1,000.00
3	Project Temporary Traffic Control	1	LS	$ 12,960.00	$ 12,960.00
4	ESC Lead	10	DAY	$ 100.00	$ 1,000.00
5	Erosion/Water Pollution Control	1	EST	$ 1,500.00	$ 1,500.00
6	Repair Existing Public and Private Facilities	1	EST	$ 4,400.00	$ 4,400.00

Schedule A Subtotal: $ 58,860.00
Sales Tax (8.5%): $ 5,003.10
SCH A TOTAL $ 63,863.10
CONTINGENCY (20%) $ 76,635.72

Sch. B PIPE REPAIR — 225 LF — $ 210.00 per LF

Item No.	Item	Quantity	Unit	Unit Price	Amount
7	Removal of Structure and Obstruction	1	LS	$ 1,000.00	$ 1,000.00
8	Sawcut ACP	675	LF-IN	$ 1.00	$ 675.00
9	Gravel Base	1,070	TON	$ 10.00	$ 10,700.00
10	Crushed Surfacing Top Course	50	TON	$ 20.00	$ 1,000.00
11	HMA for Pavement Repair Cl. 1/2 In, PG 64-22	50	TON	$ 140.00	$ 7,000.00
12	PVC Sanitary Sewer Pipe 8 In. Diam	225	LF	$ 55.00	$ 12,375.00
13	Repair Existing Public and Private Facilities	1	EST	$ 2,700.00	$ 2,700.00

Schedule B Subtotal: $ 35,450.00
Sales Tax (8.5%): $ 3,013.25
SCH B TOTAL $ 38,463.25
CONTINGENCY (20%) $ 46,155.90

TRENCHLESS CONSTRUCTION METHODS: LINERS / GROUTING

PRELIMINARY ENGINEER'S ESTIMATE

By: B. Kuiken — Approximate Days 10
Date: September 12, 2014

Sch. C BASE BID

Item No.	Item	Quantity	Unit	Unit Price	Amount
14	Mobilization	1	LS	$ 15,000.00	$ 15,000.00
15	Spill Prevention, Control, and Countermeasures (SPCC) Plan	1	LS	$ 1,000.00	$ 1,000.00
16	Project Temporary Traffic Control	1	LS	$ 12,960.00	$ 12,960.00
17	ESC Lead	10	DAY	$ 100.00	$ 1,000.00
18	Erosion/Water Pollution Control	1	EST	$ 1,500.00	$ 1,500.00
19	Repair Existing Public and Private Facilities	1	EST	$ 1,000.00	$ 1,000.00

Schedule C Subtotal: $ 32,460.00
Sales Tax (8.5%): $ 2,759.10
SCH C TOTAL $ 35,219.10
CONTINGENCY (20%) $ 42,262.92

Sch. D PIPE LINER — 1,410 LF — $ 65.00 per LF

Item No.	Item	Quantity	Unit	Unit Price	Amount
20	CIPP Liner	1,410	LF	$ 45.00	$ 63,450.00
21	Laterals	17	EA	$ 200.00	$ 3,400.00
22	Repair Existing Public and Private Facilities	1	EST	$ 2,000.00	$ 2,000.00

Schedule D Subtotal: $ 68,850.00
Sales Tax (8.5%): $ 5,852.25
SCH D TOTAL $ 74,702.25
CONTINGENCY (20%) $ 89,642.70

Sch.E	PIPE LINER SECTION	2	EA	$ 5,730.00	per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
23	CIPP Liner Section	2	LF	$ 4,000.00	$ 8,000.00
1	Chemical Grouting	2	EA	$ 250.00	$ 500.00
2	Repair Existing Public and Private Facilities	1	EST	$ 300.00	$ 300.00
				Schedule E Subtotal:	$ 8,800.00
				Sales Tax (8.5%):	$ 748.00
				SCH E TOTAL	$ 9,548.00
				CONTINGENCY (20%)	$ 11,457.60

Sch. F	MANHOLE REHABILITATION	4	EA	$ 1,075.00	Per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
23	Chemical Grouting	4	EA	$ 800.00	$ 3,200.00
24	Repair Existing Public and Private Facilities	1	EST	$ 100.00	$ 100.00
				Schedule F Subtotal:	$ 3,300.00
				Sales Tax (8.5%):	$ 280.50
				SCH F TOTAL	$ 3,580.50
				CONTINGENCY (20%)	$ 4,296.60

Sch. G	MANHOLE LID LINER	4	EA	$ 100.00	Per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
2	Lid Liner	2	EA	$ 100.00	$ 200.00
3	Repair Existing Public and Private Facilities	1	EST	$ 100.00	$ 100.00
				Schedule G Subtotal:	$ 300.00
				Sales Tax (8.5%):	$ 25.50
				SCH G TOTAL	$ 325.50
				CONTINGENCY (20%)	$ 390.60

Sch. H	PIPE PRESSURE GROUTING	6	EA	$ 350.00	per EA
Item No.	Item	Quantity	Unit	Unit Price	Amount
25	Chemical Grouting	6	EA	$ 250.00	$ 1,500.00
26	Repair Existing Public and Private Facilities	1	EST	$ 100.00	$ 100.00
				Schedule H Subtotal:	$ 1,600.00
				Sales Tax (8.5%):	$ 136.00
				SCH H TOTAL	$ 1,736.00
				CONTINGENCY (20%)	$ 2,083.20

This estimate was prepared without the benefit of a complete design and therefore shall be considered preliminary and subject to change due to the possibility of changes in the quantity and nature of work and changes in unit prices overtime.

TOTAL CONSTRUCTION COSTS	$ 209,320.00
TOTAL SALES TAX	$ 17,792.20
PROJECT TOAL	$ 227,112.20
CONTINGENCY (20%)	$ 272,534.64

Reichhardt & Ebe Engineering, Inc.
423 Front Street, Suite 201
Lynden, WA 98264
Phone: (360) 354-3687

PROJECT 4

Location:	Town of Concrete
Ref Doc:	**2014 WASTEWATER SYSTEM I&I EVALUATION ENGINEERING REPORT**
Project 4	**LIFT STATION 1 SERVICE AREA**

PRELIMINARY

STANDARD CONSTRUCTION METHODS: OPEN CUT

PRELIMINARY ENGINEER'S ESTIMATE

By: B. Kuiken — Approximate Days 10
Date: September 12, 2014

Sch. A BASE BID

Item No.	Item	Quantity	Unit	Unit Price	Amount
1	Mobilization	1	LS	$ 6,000.00	$ 6,000.00
2	Spill Prevention, Control, and Countermeasures (SPCC) Plan	1	LS	$ 1,000.00	$ 1,000.00
3	Project Temporary Traffic Control	1	LS	$ 12,960.00	$ 12,960.00
4	ESC Lead	10	DAY	$ 100.00	$ 1,000.00
5	Erosion/Water Pollution Control	1	EST	$ 1,500.00	$ 1,500.00
6	Repair Existing Public and Private Facilities	1	EST	$ 1,800.00	$ 1,800.00

Schedule A Subtotal: $ 24,260.00
Sales Tax (8.5%): $ 2,062.10
SCH A TOTAL $ 26,322.10
CONTINGENCY (20%) $ 31,586.52

Sch. B PIPE REPAIR — 20 LF — $ 245.00 per LF

Item No.	Item	Quantity	Unit	Unit Price	Amount
7	Removal of Structure and Obstruction	1	LS	$ 500.00	$ 500.00
8	Sawcut ACP	60	LF-IN	$ 1.00	$ 60.00
9	Gravel Base	95	TON	$ 10.00	$ 950.00
10	Crushed Surfacing Top Course	5	TON	$ 20.00	$ 100.00
11	HMA for Pavement Repair Cl. 1/2 In, PG 64-22	5	TON	$ 140.00	$ 700.00
12	PVC Sanitary Sewer Pipe 8 In. Diam	20	LF	$ 55.00	$ 1,100.00
13	Repair Existing Public and Private Facilities	1	EST	$ 300.00	$ 300.00

Schedule B Subtotal: $ 3,710.00
Sales Tax (8.5%): $ 315.35
SCH B TOTAL $ 4,025.35
CONTINGENCY (20%) $ 4,830.42

TRENCHLESS CONSTRUCTION METHODS: LINERS / GROUTING

PRELIMINARY ENGINEER'S ESTIMATE

By: B. Kuiken — Approximate Days 10
Date: September 12, 2014

Sch. C BASE BID

Item No.	Item	Quantity	Unit	Unit Price	Amount
14	Mobilization	1	LS	$ 15,000.00	$ 15,000.00
15	Spill Prevention, Control, and Countermeasures (SPCC) Plan	1	LS	$ 1,000.00	$ 1,000.00
16	Project Temporary Traffic Control	1	LS	$ 12,960.00	$ 12,960.00
17	ESC Lead	10	DAY	$ 100.00	$ 1,000.00
18	Erosion/Water Pollution Control	1	EST	$ 1,500.00	$ 1,500.00
19	Repair Existing Public and Private Facilities	1	EST	$ 1,000.00	$ 1,000.00

Schedule C Subtotal: $ 32,460.00
Sales Tax (8.5%): $ 2,759.10
SCH C TOTAL $ 35,219.10
CONTINGENCY (20%) $ 42,262.92

Sch. D PIPE LINER — 300 LF — $ 70.00 per LF

Item No.	Item	Quantity	Unit	Unit Price	Amount
20	CIPP Liner	300	LF	$ 45.00	$ 13,500.00
21	Laterals	6	EA	$ 200.00	$ 1,200.00
22	Repair Existing Public and Private Facilities	1	EST	$ 500.00	$ 500.00

Schedule D Subtotal: $ 15,200.00
Sales Tax (8.5%): $ 1,292.00
SCH D TOTAL $ 16,492.00
CONTINGENCY (20%) $ 19,790.40

This estimate was prepared without the benefit of a complete design and therefore shall be considered preliminary and subject to change due to the possibility of changes in the quantity and nature of work and changes in unit prices overtime.

TOTAL CONSTRUCTION COSTS $ 75,630.00
TOTAL SALES TAX $ 6,428.55
PROJECT TOAL $ 82,058.55
CONTINGENCY (20%) $ 98,470.26

COST ESTIMATING ASSUMPTIONS

TRADITIONAL CONSTRUCTION METHODS

PIPE REPAIR:

- All Repairs will take place within the Roadway
- Existing Pavement is 3 Inches deep
- It will cost about $20 per Cubic Yard to dispose of the existing pavement
- Existing Pavement will be sawcut with a 6 foot offset from trench centerline (12 foot total width)
- Trench width is 8 feet, depth to invert of 10 feet, and a pipe zone bedding of 2 feet (8 feet of imported backfill)
- Trench will be backfilled with gravel base
- Repair Pipe will be 8 inch diameter PVC pipe, purchased and installed in 20 foot lengths.
- Surface restoration will be 3 inches of Crushed Surfacing Top Coarse (CSTC) and 3 inches of Commercial Hot Mix Asphalt (HMA) for pavement repair.
- Contractor can install a pipe run per day.

MANHOLE REMOVAL AND REPLACEMENT:

- All Repairs will take place within the Roadway
- It will cost about $400 to remove structures and obstructions
- Existing Pavement is 3 Inches deep
- Existing Pavement will be sawcut with a 12 foot by 12 foot square
- Trench is 10 feet deep and 10 wide
- Manhole is 48 Inch diameter
- Trench will be backfilled with gravel base
- Surface restoration will be 3 inches of Crushed Surfacing Top Coarse (CSTC) and 3 inches of Commercial Hot Mix Asphalt (HMA) for pavement repair.
- Repair Public and Private Facilities will cost about 8% of the associated work
- Contractor can install about 2 per day

MANHOLE LID REMOVAL AND REPLACEMENT:

- All Repairs will take place within the Roadway
- Only needed if manhole is not replaced and if Lid is known to be submerged
- It will cost about $200 to remove and dispose of Pavement and Lid
- Existing Pavement is 3 Inches deep
- Existing Pavement will be sawcut with a 6 foot by 6 foot square
- Manhole is lid is about $450 each
- Trench will be backfilled with gravel base
- Surface restoration will be 3 inches of Crushed Surfacing Top Coarse (CSTC) and 3 inches of Commercial Hot Mix Asphalt (HMA) for pavement repair.
- Repair Public and Private Facilities will cost about 8% of the associated work
- Contractor can install about 5 per day

SIDE SEWER REMOVAL AND REPLACEMENT:

- All Repairs will take place within the Roadway
- Existing Pavement is 3 Inches deep
- It will cost about $20 per Cubic Yard to dispose of the existing pavement
- Existing Pavement will be sawcut with a 4 foot offset from trench centerline (8 foot total width)
- Trench width is 6 feet, depth to invert of 6 feet, and a pipe zone bedding of 2 feet (4 feet of imported backfill)
- Trench will be backfilled with gravel base
- Repair Pipe will be 4 inch diameter PVC pipe, purchased and installed in 20 foot lengths.
- Surface restoration will be 3 inches of Crushed Surfacing Top Coarse (CSTC) and 3 inches of Commercial Hot Mix Asphalt (HMA) for pavement repair.
- A Sanitary Sewer Cleanout will be installed
- Repair Public and Private Facilities will cost about 8% of the associated work
- Contractor can install about 2 per day

TRENCHLESS METHODS

CIPP PIPE LINER:

- Repairs from manhole to manhole is about $45 per foot
- Reinstating Laterals was estimated to be $200 per each
- Repair Public and Private Facilities will cost about 3% of the associated work
- Contractor can install about 800 feet per day

CIPP PIPE SECTION REPAIR:

- CIPP section repair (not a manhole to manhole repair) is $400 per foot and is not ideal to mitigate against I/I.
- Contractor will need to pressure grout prior to installing section repair to help seal I/I, approximately $250 each.
- Repair Public and Private Facilities will cost about 3% of the associated work
- Contractor can install about 4 per day

MANHOLE REHABILITATION:

- Chemical grouting $800 per manhole
- Manhole lid insert is $50 per manhole
- Repair Public and Private Facilities will cost about 3% of the associated work
- Contractor can grout 4 per day

MANHOLE LINER:

- Corrosion resistant liner is $180 per vertical foot
- Manhole lid insert is $50 per manhole
- Repair Public and Private Facilities will cost about 3% of the associated work
- Contractor can line 4 per day

SIDE SEWER PRESSURE GROUTING:

- Costs $250 per side sewer
- Contractor can grout about 40 per day

**Estimate Note: Base bid items included mobilization, traffic control items, environmental items, and a general repair public and private force account item. These costs were estimated based on anticipated working days, project costs, equipment needed, and impacts local traffic.*

Appendix D. Stantec Technical Memorandums

D.1 Stantec Equalization Basin Technical Memorandum

D.2 Stantec I/I Evaluation

Town of Concrete WWTP Peak Flow Equalization

Technical Memorandum
Influent Flow Equalization Analysis

Prepared for:
Town of Concrete

Prepared by:
Stantec Consulting Services Inc.

July 29, 2014

Sign-off Sheet

This document entitled Town of Concrete WWTP Peak Flow Equalization was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of Town of Concrete (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____
(signature)

Akram Botrous, PhD, PE, BCEE

Reviewed by _____
(signature)

Dave Price, PE

DAVID PRICE
STATE OF WASHINGTON
34836
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES 09/17/2014

07/29/2014

Stantec

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1.0 INFLUENT FLOW EQUALIZATION ANALYSIS

1.1 PURPOSE AND OVERVIEW

The purpose of this Technical Memorandum (TM) is to determine the volume of the equalization storage required to limit peak flows to the Town of Concrete (Town) Wastewater Treatment Plant (WWTP). To accomplish this objective, historical influent flows to the WWTP were analyzed to determine the volumes of equalization storage that would have been required for peak flow trimming to various limiting flows in previous years. The results of the historical analysis were then used to determine the equalization storage required to prevent flows from exceeding critical WWTP design criteria. This analysis is based on the information available to the Town, primarily influent flow data contained in the discharge monitoring report (DMR) database for the WWTP. It is presumed that the influent flow data in the DMR reports are the total flows before any flow diversion. No projection of future flows or storm events were assumed in this analysis.

It is also presumed that the flow equalization tank will be located downstream of the existing influent pump station and that the capacities of the upstream facilities (headworks, influent pump station) are adequate to accommodate incoming peak flows.

1.2 ANALYSIS OF HISTORICAL FLOWS AND EQUALIZATION REQUIREMENTS

Daily influent flow data was obtained and analyzed for the period from January 1, 2008 through October 30, 2013. Peak flow events generally occur during the winter and spring wet seasons as shown in Figure1. For various selected limiting flows, the volumes of wastewater that would have been accumulated in storage on a day-to-day basis over the entire period were determined. For each day in which the influent flow was greater than the limiting flow, the increment of flow over the limit was presumed to be stored and was added to the volume, if any, remaining in the required storage from previous days. When the influent flow decreased below the limiting flow, the difference between the limiting flow and the influent flow was presumed to be removed from storage and was subtracted from the volume, if any, remaining in storage from previous days, until the storage volume was depleted.

The lower the flow rate allowed to the MBR, the larger required equalization storage volume and vice versa. According to the WWTP O&M manual, the MBR design maximum month flow rate is 0.16 million gallons per day (Mgal/d). To show how sensitive the equalization volume is to the MBR maximum flow, limiting flow rates of 0.10 through 0.24 Mgal/d were investigated. Graphs showing accumulated storage volumes over the entire period of analysis for limiting flows in this range are shown in Appendix A (Figures A1 through A8). A summary graph showing maximum storage volumes as a function of the limiting flow is presented in Figure 2. Based on this analysis, limiting the maximum flow to the MBR to 0.16 Mgal/d results in a required storage volume of about 0.51 million gallons (Mgal).

The evaluation of historical equalization volume requirements presented above is an idealized analysis. Using the historical data, it is possible to accurately determine the storage volume that would have been required to equalize flows to specific limits in specific events. In actual operations, however, more severe storms could trigger higher influent flows. Therefore, a reasonable margin of safety in sizing an equalization tank is prudent. An active volume of 0.6 Mgal is recommended. If the Town or the Department of Ecology desire further assessment of potential storm scenarios, rather than application of a safety factor, this is possible.

Ideally, a model of the collection system calibrated using historical flow data would be used to estimate influent flows at the plant under different storm conditions. Other simplified assessment approaches could also be utilized; however, regardless of the means, the level of additional analysis required is not included in the scope of Stantec's authorization for this TM.

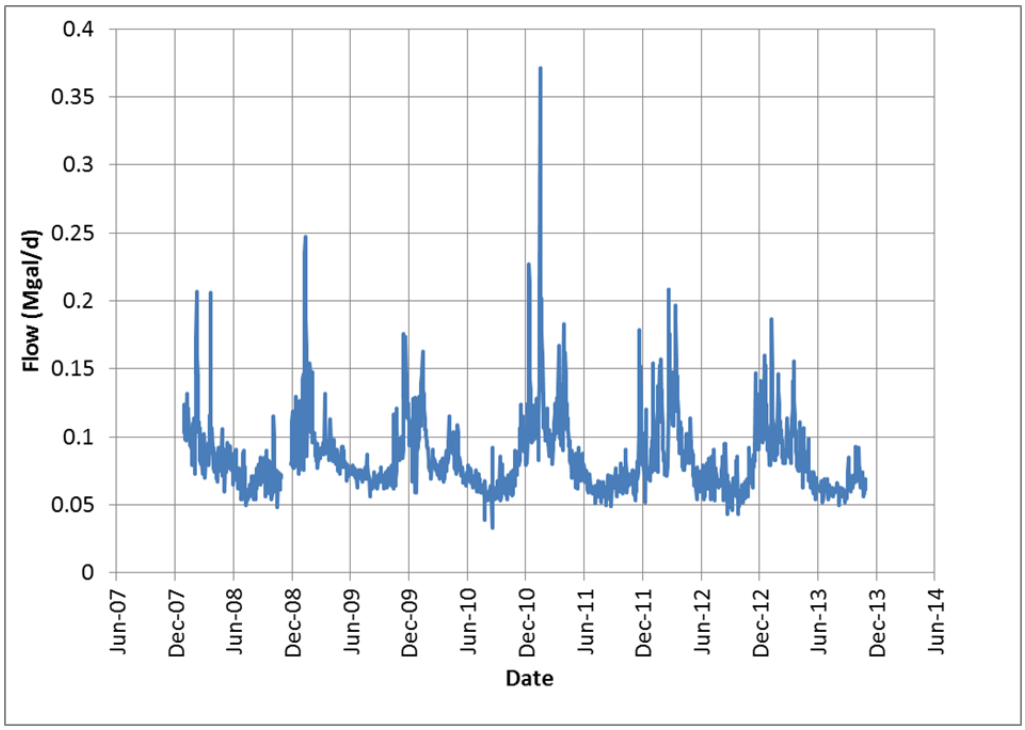


Figure 1 Influent Flows

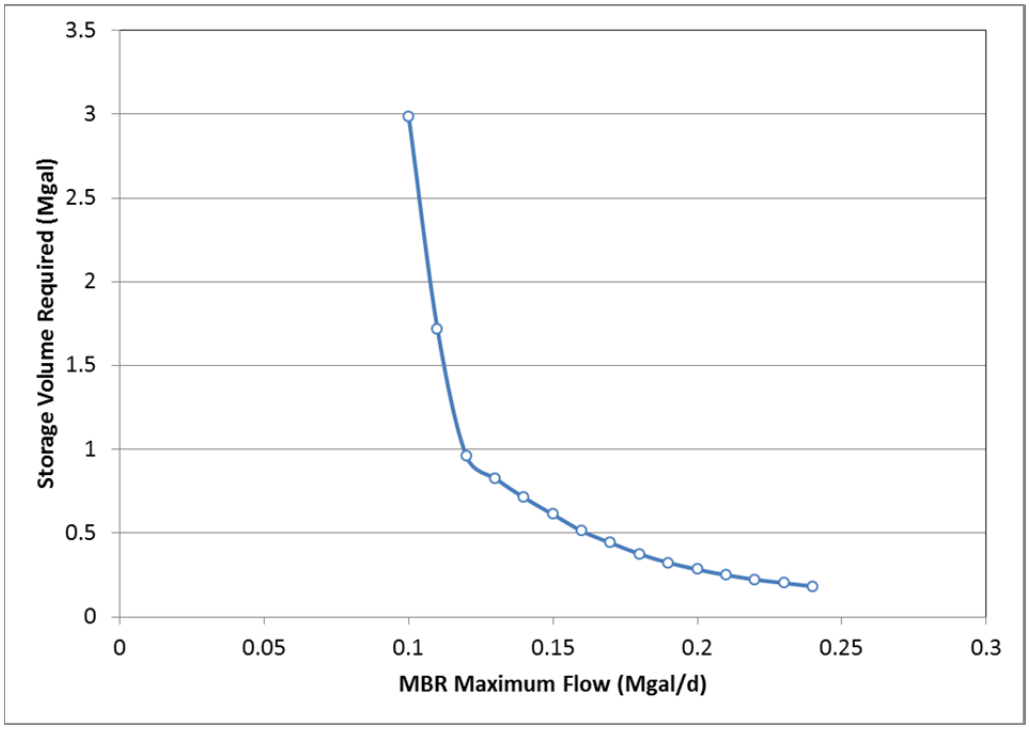


Figure 2 Summary of Maximum Storage Requirements for Various Limiting Flows

1.3 ACTIVE VOLUME VERSUS TOTAL VOLUME

The discussion of equalization volumes presented above is based on active volume. Active volume is the volume between the minimum and maximum desired liquid levels in the tank.

The contents of the equalization tank will have to be aerated and mixed to reduce odors and prevent settling of solids. Active odor control may also be necessary. For aeration and/or mixing to occur, there must be a minimum depth of wastewater in the tank, which will depend on the type of aeration and mixing equipment used. Typically, at least 2 to 3 feet of depth is required. The volume represented by this minimum depth would be added to the active storage volume when determining the total tank volume.

Similarly, near the top of the tank, there will be a freeboard requirement. Under normal operations, it would be desirable to keep the maximum wastewater level in the tank at least six inches below any overflow outlet. Furthermore, the top of the tank should be at least a foot or two above the maximum emergency liquid level in the tank. The total necessary equalization tank volume (including the non-active volume) would be approximately 0.75 Mgal.

1.4 INFLUENT FLOW CORRELATION TO RAINFALL

Rainfall data at the Concrete PPL Fish Station, WA was obtained from the Desert Research Institute. The data set included daily precipitation from 1931 till July 2014. Statistical analysis was performed on the data set to determine the return frequencies for 24-hour, 2 day, 3 day, 7 day, 14 day, and 30 day precipitation. The return frequency curves are shown in Appendix B.

The analysis of wastewater flows and their correlation to rainfall amounts developed herein are based on six (6) peak flow events that occurred from 2008 through 2014. For each peak flow occurrence, the 24-hr, 2 day, 3 day, 7 day, 14 day, and 30 day precipitation were calculated and the corresponding return frequencies were determined as shown in Table 1. After evaluating several different possibilities for correlation between peak flow events and rainfall, it was determined that the best parameter that could be used to correlate peak wastewater flow was a three-day running total. In other words, the peak flow event on a particular day correlates to the total rainfall for that day and the two days before. The influent flow and the 3-day precipitation correlation is illustrated in Figure 3.

The maximum recorded peak flow from 2008 to 2014 (0.371 Mgal/d recorded on 1/17/2011) was a result of a 2 day precipitation of 4.51 inches with a return frequency of 6 years, whereas the second largest peak flow (0.236 Mgal/d recorded on 1/13/2009) was a result of 7 day precipitation of 10.52 inches with a return frequency of 25 years. Since the largest peak flow in the data set (0.371 Mgal/d recorded on 1/17/2011) is a result of 6 year 2d storm, it is reasonable to assume that the equalization volume determined based on this particular storm will be adequate for a 2d storm with return frequency of 6-year. This correlates to a probability of occurrence in any given year of 10 to 15 %.

Table 1 Rainfall Statistics and Peak Flows

Date	Flow Mgal/d	24-hr Precip (in)	RF, years (a)	2d Precip (in) (b)	RF, years (a)	3d Precip (in) (b)	RF, years (a)	7d Precip (in) (b)	RF, years (a)	14d Precip (in) (b)	RF, years (a)	30d Precip (in) (b)	RF, years (a)
2/10/2008	0.207	0.33	< 1	1.74	< 1	3.17	< 1	5.08	< 1	7.62	< 1	9.29	< 1
3/14/2008	0.206	0.33	< 1	0.33	< 1	0.58	< 1	1.25	< 1	3.44	< 1	3.88	< 1
1/13/2009	0.236	0.08	< 1	0.21	< 1	1.23	< 1	10.52	25	14.36	20	20.4	< 1
12/13/2010	0.227	1.97	< 1	3.57	< 1	3.66	< 1	6.43	< 2	8.35	< 1	13.63	< 1
1/17/2011	0.371	2.83	3.5	4.51	6	5.13	3	7.39	2	9.79	1.5	12.42	< 1
2/22/2012	0.208	3.18	6.5	3.66	2	3.68	< 1	5.09	< 1	5.57	< 1	10.27	< 1

(a) RF = Return Frequency.
(b) Precipitation data is for the date listed in the first column on the left, as recorded, or the running total for the days preceding ending with the date in the first column.

(c)

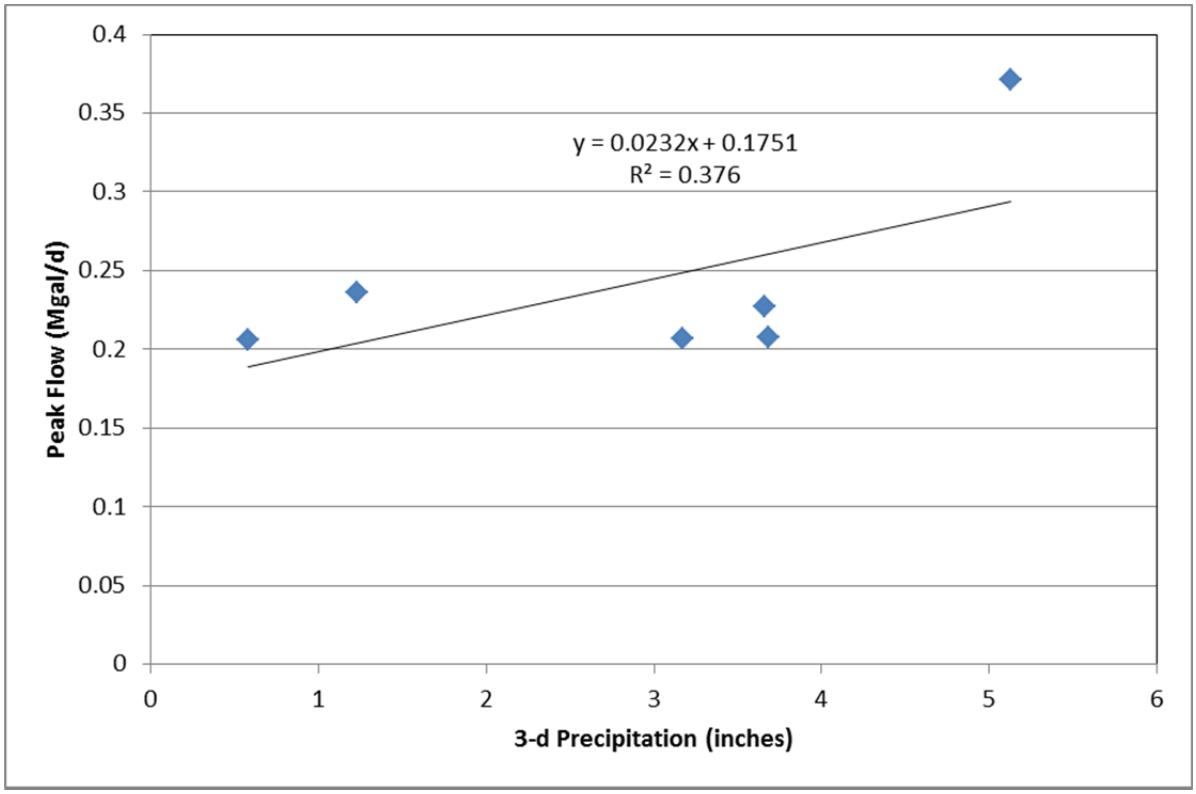


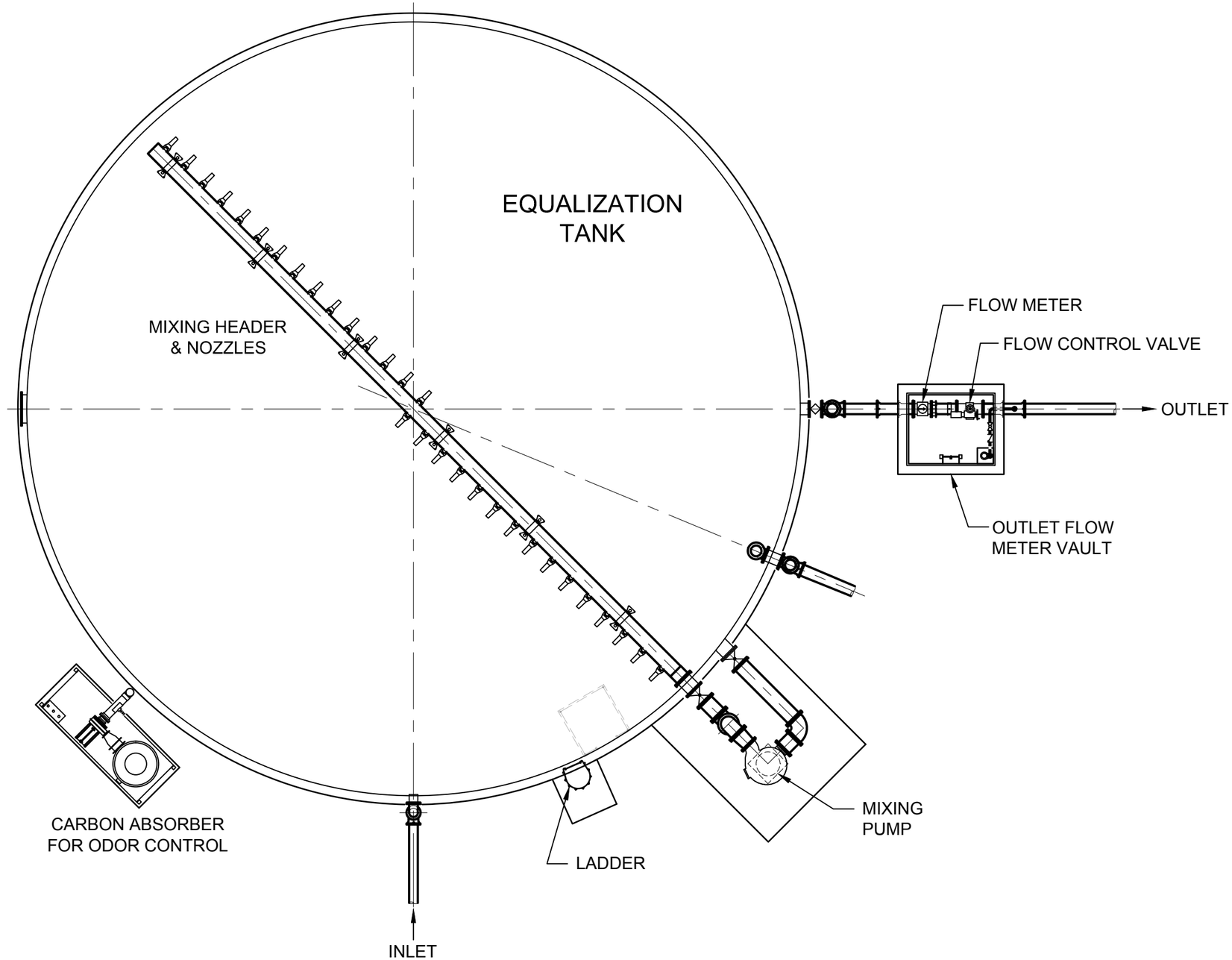
Figure 3 Peak Influent Flow versus Three Day Precipitation

1.5 OPINION OF PROBABLE COSTS

1.5.1 Capital Cost

The capital cost would include the tank itself, a mixing system, an odor control system, outlet control valve and a meter. A layout of the equalization tank is shown in Figure 4 and a cost estimate for construction of the proposed project is presented in Table 2. The base construction cost includes the materials and labor costs. The costs for compliance with contract general conditions, overhead, and profit are collectively estimated to be 20% of the base construction cost. General Conditions cover miscellaneous costs directly related to the project, such as those for bonds, insurance, field office, storage, permit fees, and temporary utilities. Overhead covers items such as home office management and administrative personnel, bidding costs, home office rent and expenses, and general costs for running the company.

A contingency allowance of 25% has been included in the overall construction cost estimate to cover project issues that are currently unforeseen at this conceptual design stage and issues that could arise during bidding and construction.



PLAN

SCALE: NONE

V:\1840\active\184030419_Town_of_Concrete\o&m\graphics\cad\EQ Tank.dwg
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FIGURE 4 : EQUALIZATION TANK

Table 2 Opinion of Probable Construction Costs for Equalization Tank [(a)]

Item	Cost, $
Equalization Tank	
Earthwork	50,000
Metals	11,000
Equipment (includes taxes, markup, and installation)	
Jet mixing pump and nozzles	175,000
Special Construction	
Carbon adsorber	80,000
Welded steel tank, 0.75 Mgal	375,000
Piping, fittings, and valves	138,000
Electrical	100,000
Subtotal Base Construction Cost	**929,000**
General Conditions, Overhead, and Profit @ 20% of Subtotal 1	186,000
Subtotal 2	**1.115.000**
Contingencies @ 25%	279,000
Total Construction Cost	**1,394,000**
Environmental, Engineering and Administration @ 25%	349,000
Total Project Cost	**1,743,000**

(a) Rough cost estimate based on conceptual design.

Engineering and administration costs include the effort to design the project, bid services, engineering services during construction, and construction management. Effort to complete necessary environmental documentation (SEPA) and obtain clearances (permits) is also included in this line item. This cost is estimated at 25% of the total construction cost.

1.5.2 Operational and Maintenance Cost

A cost estimate for operation and maintenance (O&M) includes the cost of mixing, running the odor control system, and maintaining the coating on the tank. The O&M cost estimate is presented in Table 3. It is presumed that the labor required for preventative maintenance and operation of the equalization tank is negligible. Therefore, the labor cost is not included in the O&M cost estimate.

1.5.3 Life Cycle Cost

The present worth of the project includes the capital cost and the present worth of the O&M cost. The present worth of the O&M is calculated based on a 20 year time period and 3% interest rate to account for inflation. The total present worth of the project is estimated at $2.1 M.

Table 3 Opinion of Probable O&M Costs for Equalization Tank

	Unit	Value
Mixing Energy	HP	40
Odor Control	HP	1
Total Power	HP	41
Total Power	Kw	30
Annual Energy Consumed	kwh	192,962
Energy Cost	$ / kwh	0.1
Annual Energy Cost	$ / Year	19,000
Tank Coating(1)	$ / Year	6,000
Total Annual Cost	$ / Year	25,000
Present Worth of O&M (2)	$	$372,000

(1) Assuming tank coating costs $60,000 and the tank will need to be coated every 10 years.

(2) Assuming 20 years, 3% interest adjusted for inflation

This analysis is intended solely for the purpose of developing a possible cost for providing equalization storage at the WWTP. Stantec understands that the Town will be using the cost information presented here to compare to cost estimates for rehabilitating the sewer collection system to reduce inflow and infiltration in the hope of reducing peak influent flows to the WWTP. As such, the scope of this evaluation is limited.

If the Town determines that constructing equalization storage is a cost effective way to reduce peak influent flows at the WWTP, further evaluation would be required, including assessment of alternative project components, materials, facility siting, etc. This would be accomplished as part of a preliminary design effort intended to provide information sufficient for construction documents to be prepared and necessary environmental permitting to be obtained.

Appendix A EQUALIZATION VOLUME ANALYSIS

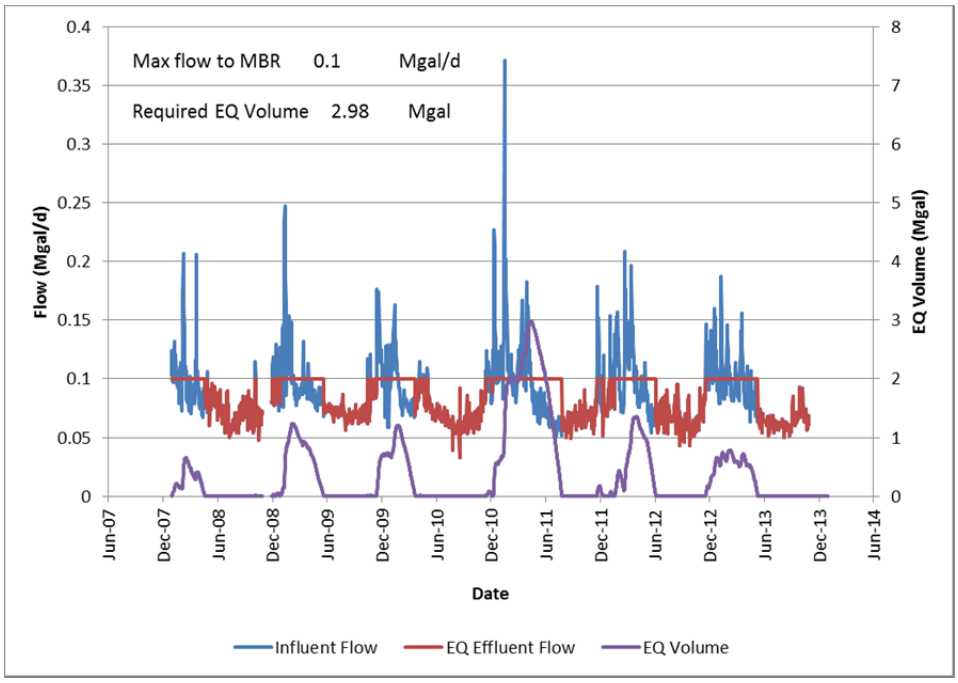

Figure A1 Influent Flow, Equalized Flow, and Required Active Storage Volume at Max MBR Flow 0.1 Mgal/d

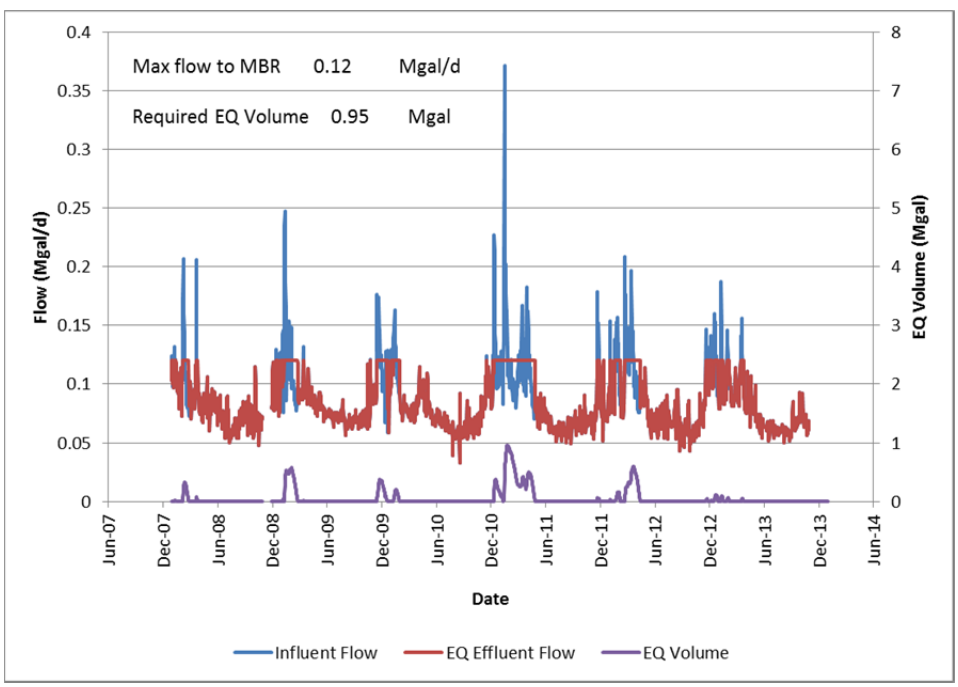

Figure A2 Influent Flow, Equalized Flow, and Required Active Storage Volume at Max MBR Flow 0.12 Mgal/d

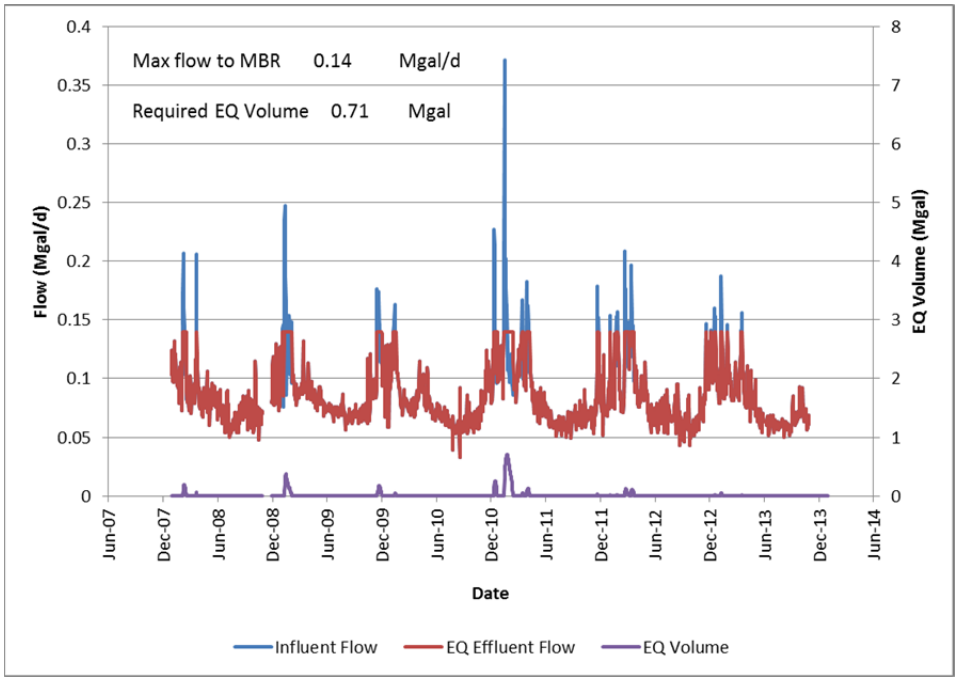

Figure A3 Influent Flow, Equalized Flow, and Required Active Storage Volume at Max MBR Flow 0.14 Mgal/d

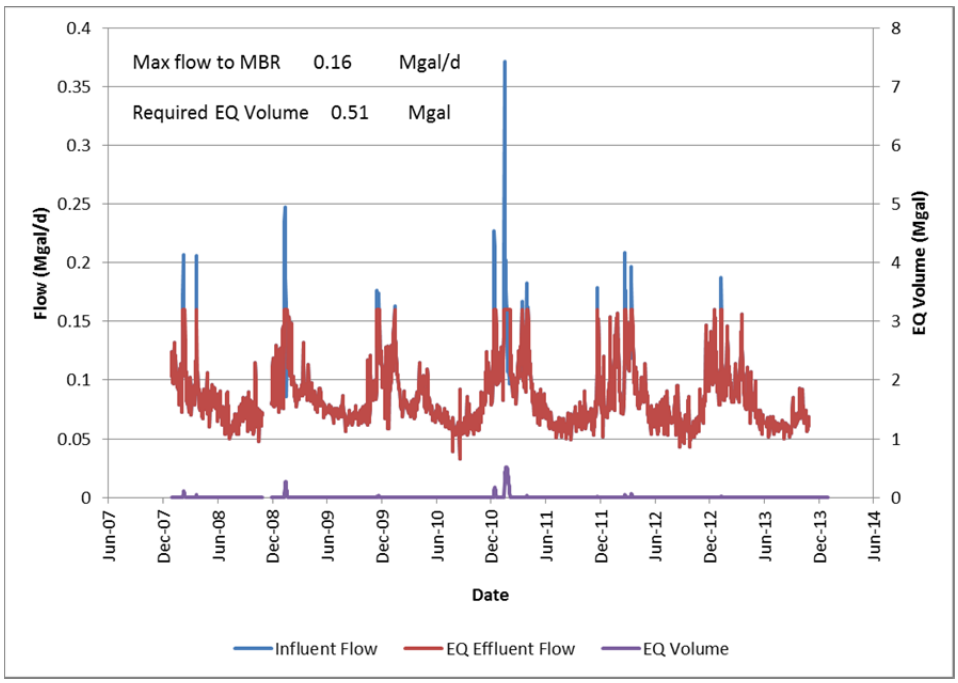

Figure A4 Influent Flow, Equalized Flow, and Required Active Storage Volume at Max MBR Flow 0.16 Mgal/d

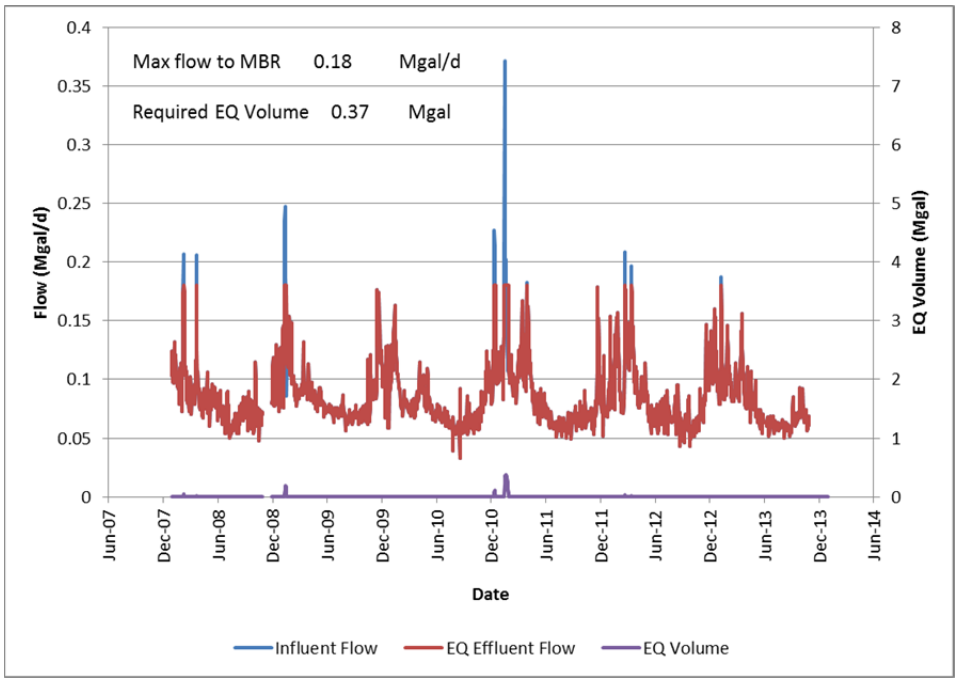

Figure A5 Influent Flow, Equalized Flow, and Required Active Storage Volume at Max MBR Flow 0.18 Mgal/d

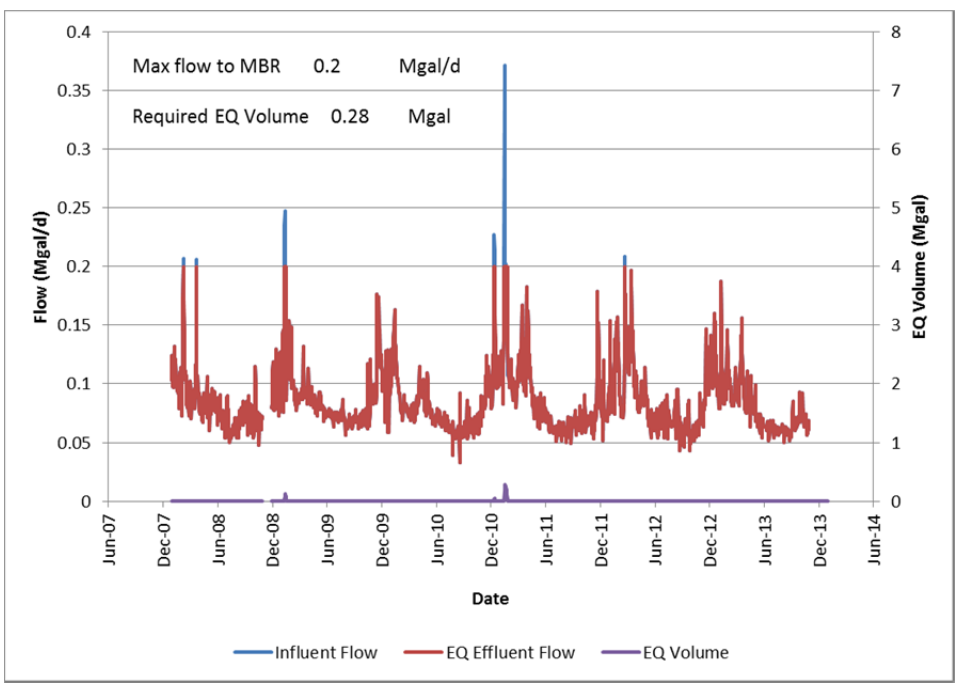

Figure A6 Influent Flow, Equalized Flow, and Required Active Storage Volume at Max MBR Flow 0.20 Mgal/d

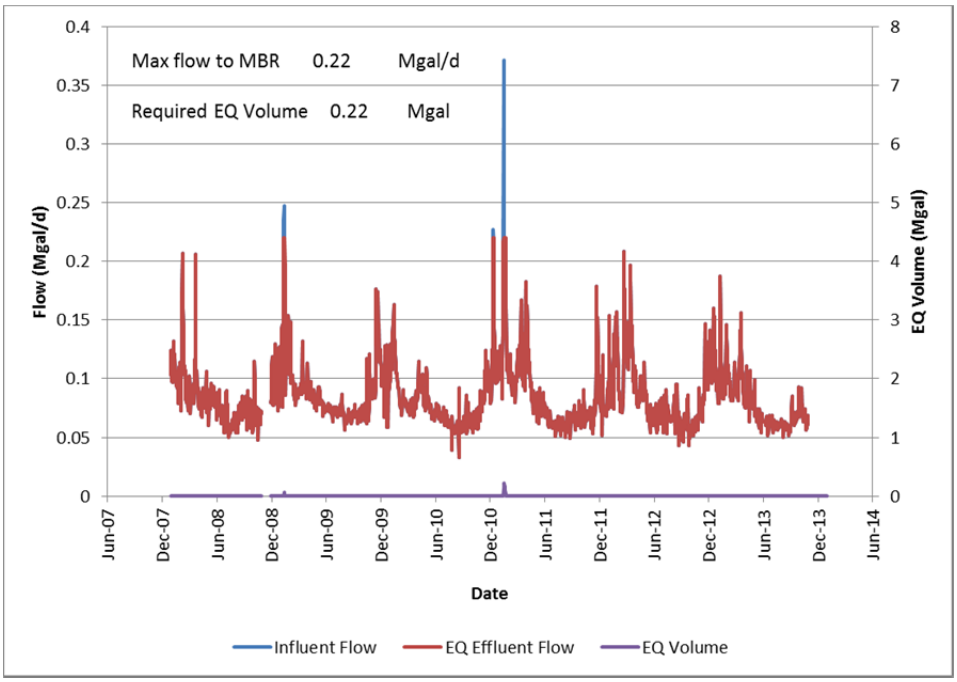

Figure A7 Influent Flow, Equalized Flow, and Required Active Storage Volume at Max MBR Flow 0.22 Mgal/d

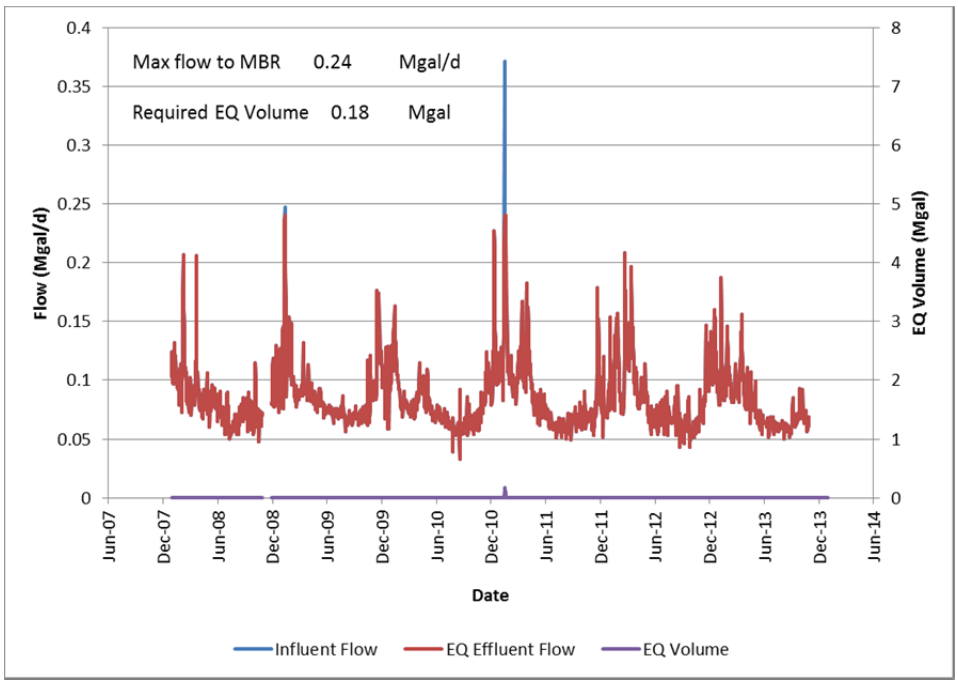

Figure A8 Influent Flow, Equalized Flow, and Required Active Storage Volume at Max MBR Flow 0.24 Mgal/d

Appendix B PRECIPITATION RETURN FREQUENCIES

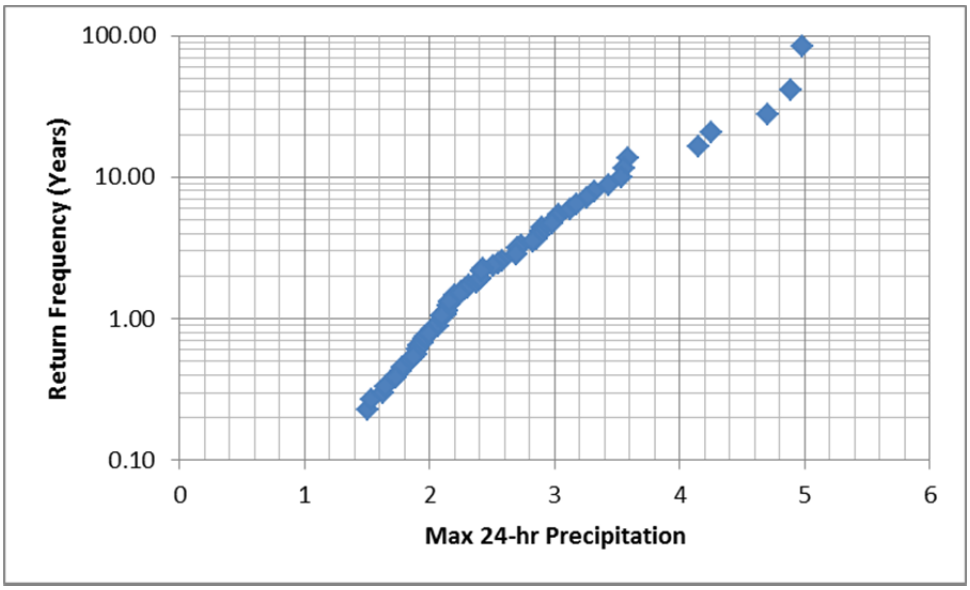

Figure B1 Storm Return Frequency for 24-hr Precipitation

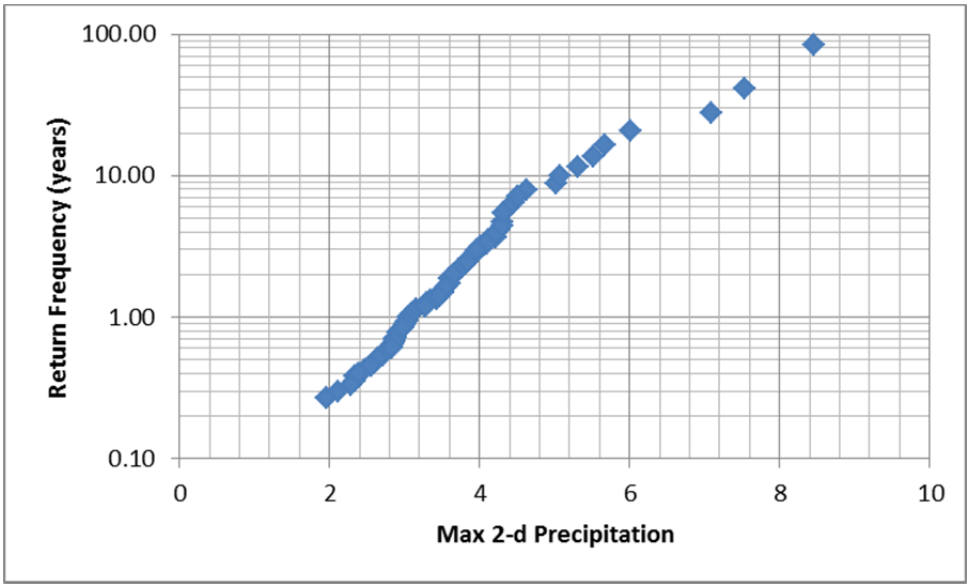

Figure B2 Storm Return Frequency for 2-day Precipitation

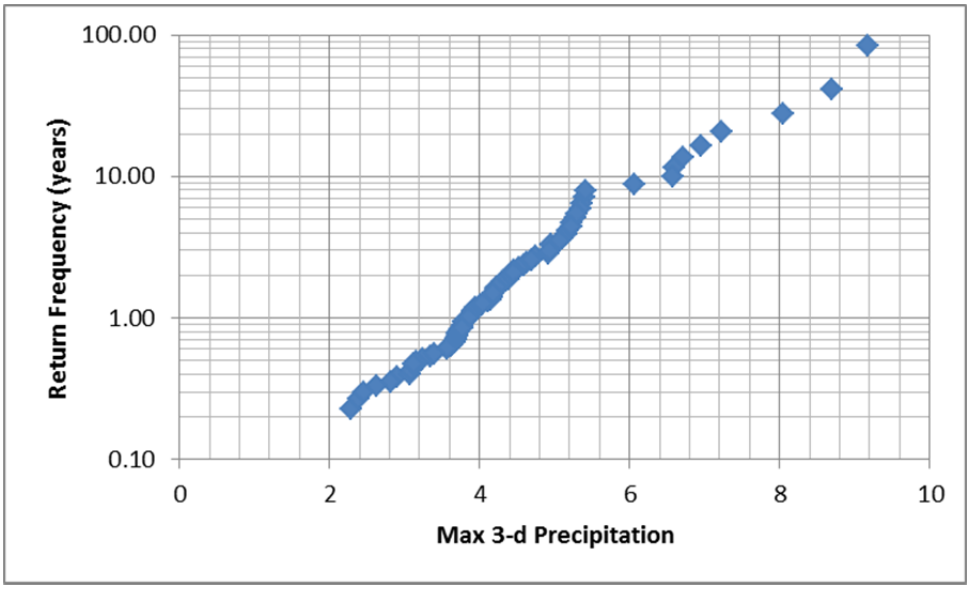

Figure B3 Storm Return Frequency for 3-day Precipitation

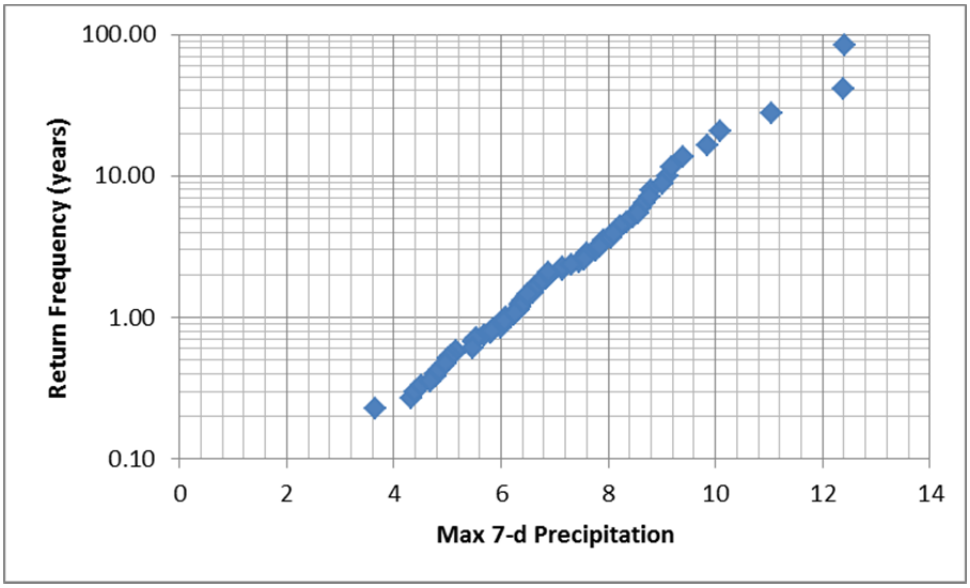

Figure B4 Storm Return Frequency for 7-day Precipitation

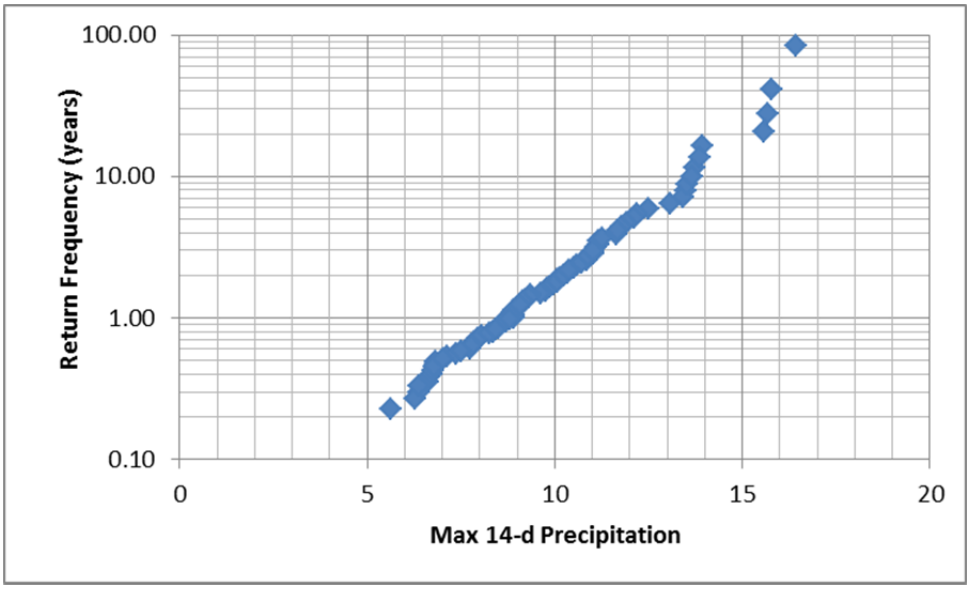

Figure B5 Storm Return Frequency for 14-day Precipitation

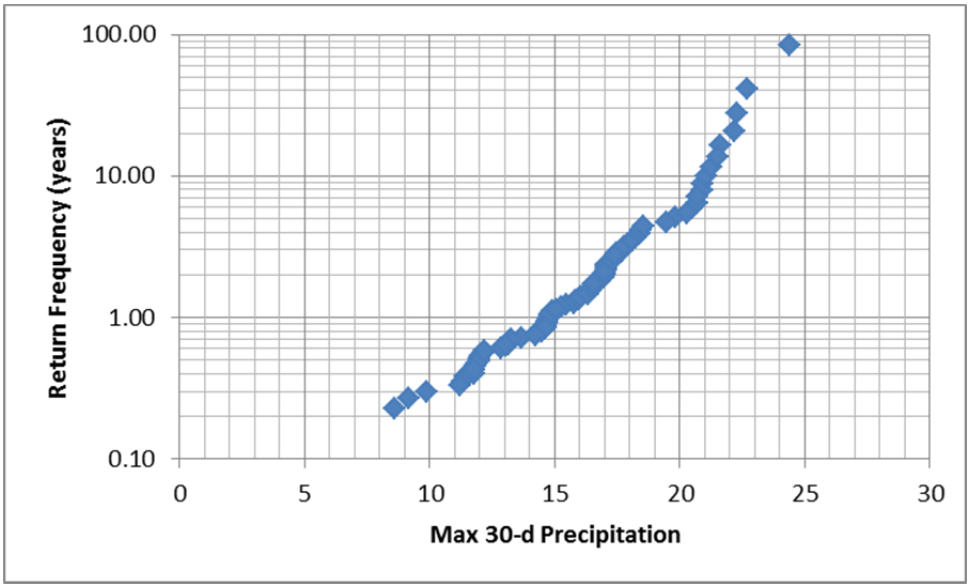

Figure B6 Storm Return Frequency for 30-day Precipitation

Town of Concrete

I/I Evaluation Report

Stantec

April 13, 2012

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Sign-off Sheet

Stantec

This document entitled I/I Evaluation Report was prepared by Stantec Consulting Services Inc. for the Town of Concrete. The material in it reflects Stantec's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Stantec Consulting Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Prepared by Amanda Thompson Meza
(signature)

Amanda Thompson-Meza, E.I.T.

Reviewed by David Price
(signature)

Dave Price, P.E.

DAVID PRICE
STATE OF WASHINGTON
34836
REGISTERED
PROFESSIONAL ENGINEER

04-13-12

EXPIRES 09/17/2012

1.0 Background

The Town of Concrete (Town) is required by Waste Discharge Permit (WDP) No. WA-002085-1 issued by the Department of Ecology (Ecology) for their wastewater treatment plant (WWTP) to assess infiltration and inflow (I/I) in their system. This report summarizes the methodology and findings of that assessment. In addition, next steps for the Town to address collection system condition are summarized.

2.0 I/I Evaluation

2.1 METHODOLOGY

To perform a cost effective assessment of the magnitude of I/I in the Town's collection system, Stantec utilized daily influent flow data from the Town's WWTP monitoring records for the period January 2009 through December 2011.

WDP No. WA-002085-1 requires the assessment be compared to prior reported I/I and if an increase greater than 15% is found, a plan and schedule to identify and correct problems within the collection system is to be prepared. This report assesses I/I in comparison to a similar evaluation conducted and summarized in the *Town of Concrete Comprehensive Sewer and Wastewater Facility Plan* (2000, Gray & Osborne).

In evaluating I/I in the Town's system, Stantec employed two means to provide reasonable context to the data generated beyond the 15% criteria. In the first case, elevated influent flow events were assessed and plotted against rainfall data. Rainfall data was obtained from NOAA for the Marblemount, WA monitoring station. The elevated influent events were then compared to average dry weather flows and an estimated peaking factor developed. This peaking factor was then compared to industry standard, or typical, factors for the rainfall event return period. This allows I/I in the Town's collection system to be put into a broader context.

The second tool utilized for assessing the magnitude of I/I within the collection system was the standard described in the U.S. EPA publication, *I/I Analysis and Project Certification (Ecology Publication 97-03).* This approach involves the development of per capita unit flows which are then compared to specified standards. This method is often utilized by funding agencies to determine whether it is more cost effective to reduce I/I through collection system improvements, or fund treatment plant improvements that will accommodate wet weather flows.

The approaches to assessing the magnitude of I/I in a wastewater system inherently require the application of engineering experience and judgment. Accepted standards or industry norms alone do not lend themselves to determining the best approach to managing wastewater for a particular system. Site specific environmental, community and facility conditions must always be taken into consideration

2.2 ANALYSIS

A summary of the results of data analysis are provided in this section. Three time periods exhibiting elevated influent flow were identified using the WWTP data provided by the Town. These included periods in January 2009, December 2010 and January 2011. In each instance daily flow exceeded 0.1 Mgal/d for a number of days and the eventual peak daily flow exceeded

0.2 Mgal/d (in one case exceeding 0.37 Mgal/d) before gradually dropping below 0.1 Mgal/d. The average dry weather flow (ADWF) at the WWTP is approximately 60,000 gpd. The daily influent flows for the three events of interest are presented in Table 2.2-1.

Table 2.2-1
Daily Influent During Elevated Flow

Date	Plant Daily Flow (Mgal/d)
January 2009	
1/10/2009	0.132
1/11/2009	0.130
1/12/2009	0.236
1/13/2009	0.247
1/14/2009	0.241
1/15/2009	0.186
1/16/2009	0.165
1/17/2009	0.151
1/18/2009	0.120
December 2010	
12/9/2010	0.108
12/10/2010	0.125
12/11/2010	0.104
12/12/2010	0.215
12/13/2010	0.227
12/14/2010	0.213
12/15/2010	0.160
January 2011	
1/13/2011	0.118
1/14/2011	0.138
1/15/2011	0.137
1/16/2011	0.217
1/17/2011	0.371
1/18/2011	0.291
1/20/2011	0.204
1/21/2011	0.170
1/22/2011	0.202
1/23/2011	0.176
1/24/2011	0.163
1/28/2011	0.126
1/29/2011	0.108

2.2.1 Precipitation and Influent Flow

Precipitation data from the Marblemount station was available for the December 2010 and January 2011 time periods. Similar data was not available for the January 2009 data. As result, only the 2010 and 2011 time periods referenced were analyzed for this report.

Precipitation data for December 2010 and January 2011 just preceding and during the periods of elevated influent flow are presented in Table 2.2-2. A plot of daily influent flow and Marblemount precipitation are presented in Figure 2.2-1.

Table 2.2-2
Precipitation Data Preceding and During Elevated Influent Flow

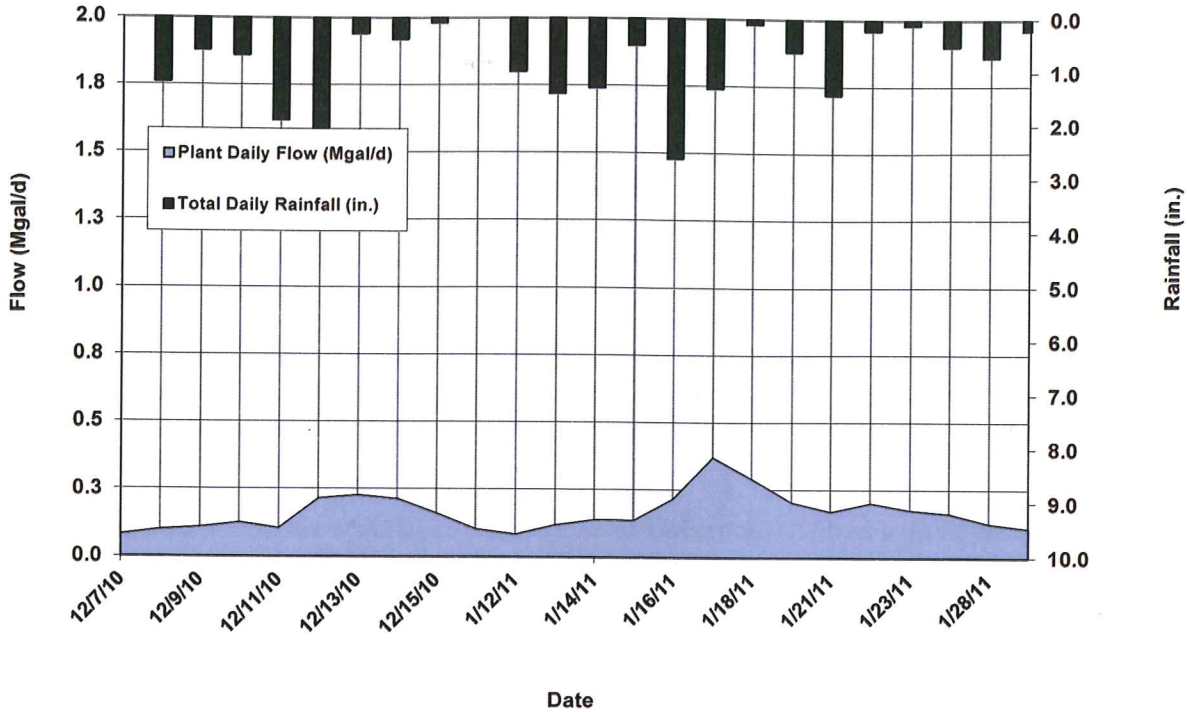
December 2010		
Date	Total Daily Rainfall (in.)	Plant Daily Flow (Mgal/d)
12/7/2010	0.00	0.081
12/8/2010	1.20	0.099
12/9/2010	0.60	0.108
12/10/2010	0.70	0.125
12/11/2010	1.90	0.104
12/12/2010	2.70	0.215
12/13/2010	0.30	0.227
12/14/2010	0.40	0.213
12/15/2010	0.10	0.160
January 2011		
Date	Total Daily Rainfall (in.)	Plant Daily Flow (Mgal/d)
1/11/2011	0.00	0.102
1/12/2011	1.00	0.083
1/13/2011	1.40	0.118
1/14/2011	1.30	0.138
1/15/2011	0.50	0.137
1/16/2011	2.60	0.217
1/17/2011	1.30	0.371
1/18/2011	0.10	0.291
1/20/2011	0.60	0.204
1/21/2011	1.40	0.170
1/22/2011	0.20	0.202
1/23/2011	0.10	0.176
1/24/2011	0.50	0.163
1/28/2011	0.70	0.126
1/29/2011	0.20	0.108

The data indicates that increases in influent flow lag rain events. This type of pattern suggests a system with a higher proportion of infiltration as compared to inflow. The rainfall data for these events is indicative of slightly less than a 2-year return period for a 24-hour event.

The resulting peaking factor (total daily flow/ADWF) for these two events ranges from 3.8 to 6.2 for the maximum daily flow during each period (0.227 Mgal/d and 0.371 Mgal/d respectively).

It is common to utilize a 10-year, 6-hour storm event when modeling collection systems to determine hydraulic capacity. A peaking factor of 6.2 for a system in such an event, which is more intense than the events associated with the Town's 2010 and 2011 elevated influent flows, would be considered moderately high. Given that the relative increase in influent flow for a 2-

Figure 2.2-1
Daily Influent Flow and Marblemount Precipitation Data



year, 24-hour event is 4 to 6 times the ADWF provides some reason to suspect that I/I could be problematic in the Town's system.

It should be noted that the design criteria for the Town's WWTP is based on an average day maximum month flow (ADMMF) of 0.16 Mgal/d. The December 2010 and January 2011 average daily flow for the month was 0.12 and 0.14 Mgal/d respectively. This would suggest that more intense precipitation events could create challenges for the Town WWTP operations. A review of data for the recent wet 2011/2012 winter period may reveal whether or not more intense events have indeed resulted in influent flows which exceeded the WWTP design criteria.

The 2000 Comprehensive Plan describes the soils in the Concrete area as largely well drained to excessively drained. This would tend to lead to infiltration in areas where pipeline or manhole condition is such that structural defects or separation of materials provides an entry point to the system. The soil conditions may also tend to exacerbate infiltration when Baker and Skagit River stage elevations are high and surrounding groundwater tables are elevated as a result.

2.2.2 U.S. EPA Criteria

The U.S. EPA has established specific per capita flow criteria for use in determining whether a collection system is experiencing excessive I/I. There are two established criteria. During

periods of dry weather, but seasonal high groundwater, if flows (highest average daily flow recorded over a 7 to 14 day dry period with seasonal high groundwater) are less than 120 gpcd, the amount of infiltration into the system is considered non-excessive. During wet conditions when seasonal groundwater is high, if flows are less than 275 gpcd, inflow into the system is considered non-excessive.

In the 2000 Comprehensive Plan, the U.S. EPA per capita flow criteria were referenced and the Town's influent flows compared to determine if there was excessive I/I occurring. That evaluation concluded that during extended dry periods, when groundwater is elevated, the Town's records indicate a slight exceedance of the 120 gpcd criteria. This suggests a potential infiltration problem. The same evaluation concluded that per capita flows during wet periods were less than 275 gpcd, which suggests the system does not experience excessive inflow.

During one dry period in January 2010, daily flows reached 0.103 Mgal/d. This correlates to a 145 gpcd flow when divided by the current population estimate for the Town's sewer service area of 710. This supports the 2000 finding that the Town's system experiences some degree of excessive infiltration.

Similarly, daily flow during the somewhat wet periods of December 2010 and January 2011 reached 0.227 Mgal/d and 0.371 Mgal/d respectively. These correlate to per capita flows of 319 gpcd and 522 gpcd. This suggests a somewhat greater tendency for inflow than was reported in 2000.

2.2.3 WDP Requirement

Section S.4.E of the Town's Waste Discharge Permit (WDP) No. WA-002085-1 states that if a 15% increase from prior reporting is identified, that the Town will need to prepare a plan and schedule to address I/I in their system. In the 2000 Comprehensive Plan, dry and wet weather per capita flow was reported to be 127 gpcd and 164 gpcd respectively. The increase in dry weather per capita flow based on the analysis presented in section 2.2.2 is approximately 114% of the 2000 estimate. The recent wet weather per capita flow is approximately 194 to 318% of the flows reported in the 2000 Comprehensive Plan.

3.0 Findings

Based on the results of the I/I evaluation conducted by Stantec, it is apparent that the Town of Concrete wastewater system experiences some level of I/I which may potentially be problematic. The results of the analysis of precipitation and influent flow data suggest the Town's system is likely to be experiencing sufficient infiltration to warrant further investigation. Assessment of WWTP influent flows relative to the EPA per capita flow criteria suggest infiltration may be excessive and that inflow may be a more significant concern than previously considered, or suggested by the assessment of precipitation data.

As a result of these findings, it is suggested the Town develop a plan and schedule to address I/I in their system in accordance with the WDP for the WWTP. As a starting point, the work plan should confirm whether the collection system improvements recommended in the 2000 Comprehensive Plan were completed and Town staff should attempt to assess the effectiveness of those improvements.

Currently, the Town is embarking upon a program to assess the condition of their collection system. They are preparing to award a contract for the CCTV assessment of their entire system. The results of this condition assessment effort should be incorporated into the suggested I/I plan and schedule.

Appendix E. Permitting

E.1 State Environmental Policy Act (SEPA) Permit

E.2 Construction Stormwater General Permit Memo

Reichhardt & Ebe
ENGINEERING INC

MEMORANDUM

TO:	FROM:
Planning Dept.	B. Kuiken
COMPANY:	**DATE:**
Town of Concrete	7-7-2014
ADDRESS:	**TOTAL NO. OF PAGES INCLUDING COVER:**
45672 Main Street P.O. Box 39 Concrete WA 98237	3

RE:

2014 Sanitary Sewer and I&I Evaluation Engineering Report
SEPA Exemption Memo

NOTES/COMMENTS:

It is currently anticipated that this project will not require a SEPA permit per WAC 197-11-800(22)(b). This document was prepared for the Town of Concrete and is based on the current known information and the assumed cost effective approach for the Town to reduce the amount of Inflow and Infiltration (I/I) entering the sanitary sewer system.

Project Description

This project does not anticipate performing work on lands covered with water. The project is considered to be a maintenance project to reduce inflow and infiltration (I/I) into the sanitary sewer system and will use technologies that will minimize the need for land disturbance construction activities. The project proposes to use technologies like Cured in Place Pipe (CIPP), manhole spray-on liners, and chemical grouting, which do not require trenches or excavation. The goal of this project is to reduce the amount of stormwater discharged to the waters of the state through the municipal sanitary sewer system which should have a beneficial impact on the environment. All pipe that will be maintained will be less than 12 inches diameter and all work will be performed within the Right-of Way.

SEPA Review Requirements

Title 197 of the Washington Administration Code (WAC) addresses State Environmental Policy Act (SEPA) requirements. The SEPA defines goals and requires the lead agency to interpret and enforce goals defined in the WAC 197-11.

Agencies are required to review the project per WAC 197-11-060. The environmental review is described in 197-11-060(1), see below:

> "*Environmental review consists of the range of proposed activities, alternatives, and impacts to be analyzed in an environmental document, in accordance with SEPA's goals and policies. This section specifies the content of environmental review common to all environmental documents required under SEPA.*"

SEPA exemptions

Per WAC 197-11-720 a project can be categorically exempt if it does not significantly affect the environment and comply with the categorical exemption rules found in Part Nine of the SEPA Rules (WAC 197-11). See below for WAC 197-11-720 discussion of categorical exemption.

> *"Categorical exemption" means a type of action, specified in these rules, which does not significantly affect the environment; categorical exemptions are found in Part Nine of these rules. Neither a threshold determination nor any environmental document, including an environmental checklist or environmental impact statement, is required for any categorically exempt action. These rules provide for those circumstances in which a specific action that would fit within a categorical exemption shall not be considered categorically exempt.*

Categorical Exemption Eligibility

If a project complies with any part of Part Nine, of the WAC 197-11, then the project is exempt.
Section 1 of the categorical exemptions describes if a project can be considered for categorical exemption. A narrative is provided on WAC 197-11-800(1) below to document this project is eligible to be categorically exempt from the SEPA. Narrative comments can be found in **BOLD**

> *(1) If a proposal fits within any of the provisions in Part Nine of these rules, the proposal shall be categorically exempt from threshold determination requirements (WAC 197-11-720) except as follows:*
> ***See Below***
> *(a) The proposal is not exempt under WAC 197-11-908, critical areas.*
> ***This project will not take place on any known critical areas.***
> *(b) The proposal is a segment of a proposal that includes:*
> ***See Below***
> *(i) A series of actions, physically or functionally related to each other, some of which are categorically exempt and some of which are not; or*
> ***All actions associated with this work are considered to be categorically exempt.***
> *(ii) A series of exempt actions that are physically or functionally related to each other, and that together may have a probable significant adverse environmental impact in the judgment of an agency with jurisdiction. If so, that agency shall be the lead agency, unless the agencies with jurisdiction agree that another agency should be the lead agency. Agencies may petition the department of ecology to resolve disputes (WAC 197-11-946).*
> ***No significant adverse environmental impact will take place as a result of this project. This project should benefit the environment by reducing the amount of contaminated wastewater contacting groundwater and will reduce the amount of wastewater released to nearby surface waters.***
> *For such proposals, the agency or applicant may proceed with the exempt aspects of the proposals, prior to conducting environmental review, if the requirements of WAC 197-11-070 are met.*
> ***The memorandum is prepared for the Town to review.***

Categorical Exemptions

Two categorical exemptions that apply to this project can be found below. The proposed work will be performed on sanitary sewer pipes and manholes. A project can be considered categorically exempt if fits within any of the rules of Part Nine of the SEPA rules.

WAC197-11-800(3): Repair, Remodel, and Maintenance Activities

Below is Section 3 of this SEPA's Categorical Exemptions portion of the WAC (WAC 197-11-800(3))

> *(3) **Repair, remodeling and maintenance activities.** The following activities shall be categorically exempt: The repair, remodeling, maintenance, or minor alteration of existing private or public structures, facilities or equipment, including utilities, recreation, and transportation facilities involving no material expansions or changes in use beyond that previously existing; except that, where undertaken wholly or in part on lands covered by water, only minor repair or replacement of structures may be exempt (examples include repair or replacement of piling, ramps, floats, or mooring buoys, or minor repair, alteration, or maintenance of docks). The following maintenance activities shall not be considered exempt under this subsection:*
>
> *(a) Dredging of over fifty cubic yards of material;*
>
> *(b) Reconstruction or maintenance of groins and similar shoreline protection structures;*
>
> *(c) Replacement of utility cables that must be buried under the surface of the bedlands; or*
>
> *(d) Repair/rebuilding of major dams, dikes, and reservoirs shall also not be considered exempt under this subsection.*

Commentary: This project will not take place on land covered by water. The work will be performing maintenance on a existing utility which complies with the SEPA exemptions

WAC 197-11-800 (22): Utilities

Under Part Nine, Section 22, of the SEPA requirements, utilities under 12 inches diameter are exempt. Below is a portion of WAC 197-11-800(22) which describes the exemption.

> *(23) **Utilities.** The utility-related actions listed below shall be exempt, except for installation, construction, or alteration on lands covered by water. The exemption includes installation and construction, relocation when required by other governmental bodies, repair, replacement, maintenance, operation or alteration that does not change the action from an exempt class.*
>
> *...*
>
> *(b) All storm water, water and sewer facilities, lines, equipment, hookups or appurtenances including, utilizing or related to lines twelve inches or less in diameter.*
>
> *...*

Commentary: This project will not take place on lands covered by water. The work will be performing maintenance on a existing sewer lines less than 12 inches diameter.

Reichhardt & Ebe
ENGINEERING INC

MEMORANDUM

TO:	FROM:
File	B. Kuiken
COMPANY:	**DATE:**
Town of Concrete	6-18-2014
ADDRESS:	**TOTAL NO. OF PAGES INCLUDING COVER:**
Town of Concrete	2

RE:

2014 Sanitary Sewer and I&I Evaluation Engineering Report
Construction Stormwater General Permit

NOTES/COMMENTS:

It is currently anticipated this project will not require a stormwater permit. This project does not anticipate any stormwater discharge to the waters of the state. This is considered to be a maintenance project to reduce inflow and infiltration (I/I) into the sanitary sewer system, this project will utilize technologies that will minimize the need for land disturbance construction activities. Technologies like Cured in Place Pipe (CIPP) and Manhole Spray-on liners do not require trenches or excavation. The goal of this project is to reduce the amount of stormwater discharged to the waters of the state through the municipal sanitary sewer system. In locations where spot repairs are necessary, the total amount of land disturbance anticipated is less than 1 acre. In all areas where excavation is necessary, the surface will be replaced to match existing conditions and therefore the project does not anticipate adding any impervious surface. It is not anticipated that local government stormwater permitting is required for this project

The Town has prepared applicable environmental permitting documentation for this project, environmental permit requirements or exemptions are not documented within this memorandum.

The following language is taken from the "Permit Coverage" section of the Department of Ecology *Construction General Stormwater Permit.* Comments supporting project exemption can be found in **Bold.**

Operators Required to Seek Coverage Under this General Permit:

1. Operators of the following construction activities are required to seek coverage under this CSWGP:
See below

a. Clearing, grading and/or excavation that results in the disturbance of one or more acres and discharges stormwater to surface waters of the State; and clearing, grading and/or excavation on sites smaller than one acre that are part of a larger common plan of development or sale, if the common plan of development or sale will ultimately disturb one acre or more and discharge stormwater to surface waters of the State.
This project will not disturb an area great than 1 acre.

i. This includes forest practices (including, but not limited to, class IV conversions) that are part of a construction activity that will result in the

disturbance of one or more acres, and discharge to surface waters of the State (that is, forest practices that prepare a site for construction activities); and

This project does not anticipate deforesting activities.

b. Any size construction activity discharging stormwater to waters of the State that the Department of Ecology (—Ecologyll):

This project will not discharge stormwater directly to water of the State. The goal of this project is to reduce the amount of stormwater received by the municipal sanitary sewer system

i. Determines to be a significant contributor of pollutants to waters of the State of Washington.

ii. Reasonably expects to cause a violation of any water quality standard.

This project will not discharge stormwater directly to water of the State. The Goal of this project is to reduce the amount of stormwater entering the sewer system.

2. Operators of the following activities are not required to seek coverage under this CSWGP (unless specifically required under Special Condition S1.B.1.b. above):

See below

a. Construction activities that discharge all stormwater and non-stormwater to ground water, sanitary sewer, or combined sewer, and have no point source discharge to either surface water or a storm sewer system that drains to surface waters of the State.

This project will not discharge stormwater directly to water of the State. The goal of this project is to reduce the amount of stormwater and groundwater (I/I) entering the sewer system.

b. Construction activities covered under an Erosivity Waiver (Special Condition S2.C).

N/A

c. Routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility

This project is considered to be a maintenance project, utilizing technologies like CIPP that minimize the need for excavation.