



uOttawa

Higher Learning – University Condition Assessment

Infra 2017 – December 5, 2017

PARSONS



**CLEAN WATER
WORKS INC.**

c o r e v a l u e s

Sustainability

innovation

integrity

safety

*@
diversity*

quality



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AGENDA

- Background
- Inspection Work and Condition Assessments
- Condition Assessment Ratings
- Deliverables

BACKGROUND

- University of Ottawa - 1848
 - The Main Campus - roughly 30 hectares in downtown Ottawa
 - The Lees Campus - roughly 8 hectares located at the intersection of Highway 417 and the Rideau River
 - The Alta Vista Campus - roughly 8 hectares located off of Smyth Road neighbouring the Children's Hospital of Eastern Ontario (CHEO)
- Condition assessment of water and sewer infrastructure, campus wide
- Included both private (University) and public (City of Ottawa) infrastructure
- Approximately 2.4 km of watermain, 5.5 km of storm infrastructure and 5.2 km of sanitary infrastructure were inspected

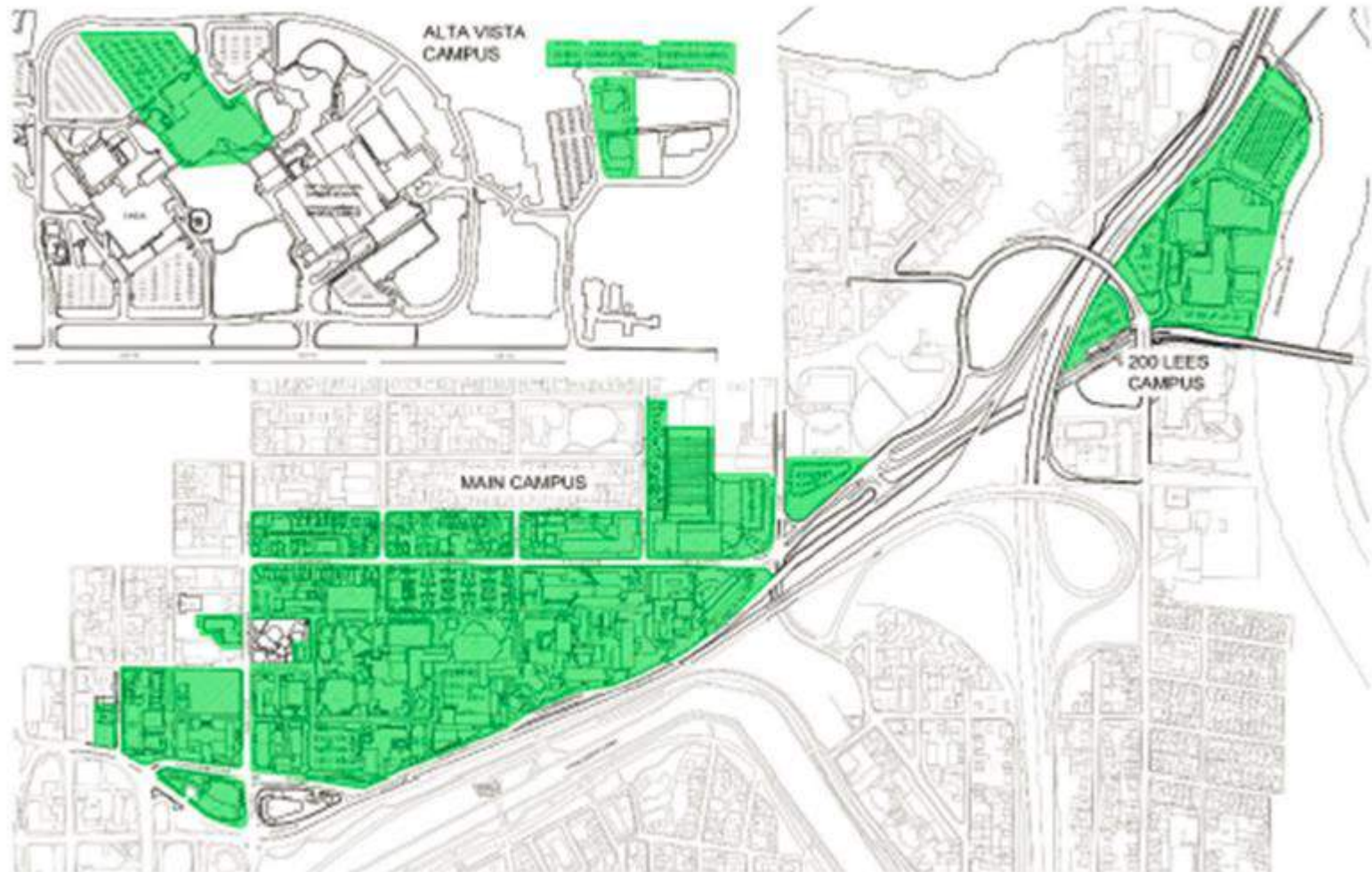
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■ Team

- University of Ottawa (Owner)
- Parsons Inc. (Prime Consultants)
- GAME Trenchless Consultants (Sub-Consultant - Watermains)
- Clean Water Works (Sub-Consultant - Sewers)

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Ottawa University



WATERMAIN INSPECTION

- JD7 Investigator+™
 - Sonde, HD CCTV, acoustic leak detection on live watermain
 - 100 mm – 300 mm diameter
 - Access through hydrants
 - Up to 50 m in each direction
- Limitations
 - Not feasible when no isolation valve or hydrant is seized



WATERMAIN CONDITION ASSESSMENT

- Preparation
 - Interviews with University Staff
 - Site Inspection/Hydrant Assessment
- Assessment
 - 53 Fire Hydrants Identified (38 Accessed)
 - Over 2,400 m Inspected Campus-Wide
 - Main Campus (1,250 m), 200 Lees (700 m), Alta Vista (400 m)
- Observations
 - Material Transitions
 - Tuberculation
 - Surface Damage
 - Debris

SEWER INSPECTION

- CCTV
- Limitations
 - Protruding service connections
 - Lack of access due to parking
 - Grease build-up outside restaurant
 - Broken pipes
 - Coordination with ongoing construction (on campus and LRT)



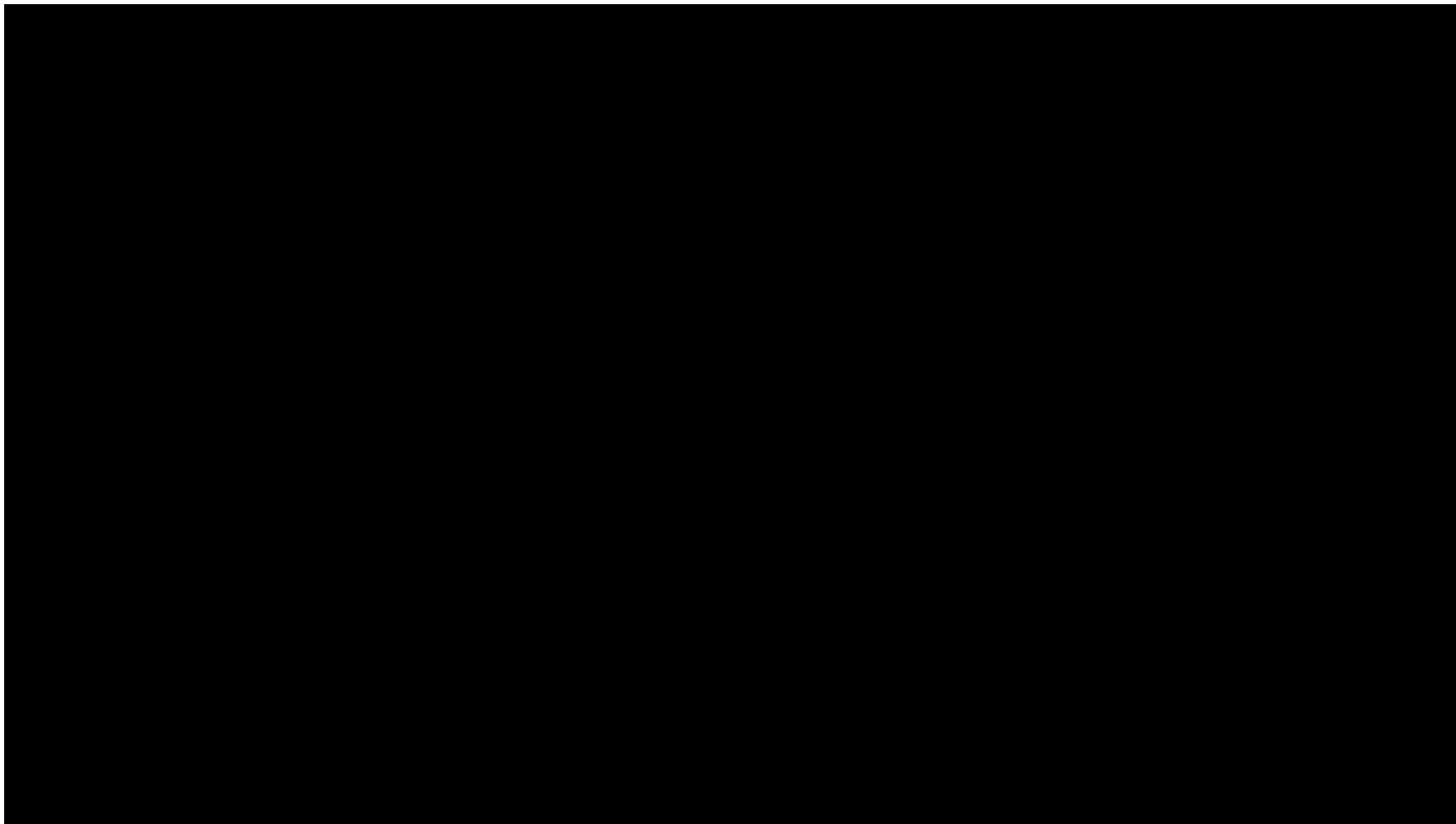
SEWER CONDITION ASSESSMENT

- Preparation
 - Interviews with University Staff
- Assessment
 - Over 10,700 m Inspected Campus-Wide for sanitary and storm including sewers, laterals and catchbasin leads
- Observations
 - Debris, broken pipes, grease build-up, displaced joints, etc.

CONDITION ASSESSMENT RATING

- **Watermain Ratings**
 - No widely accepted industry standard for watermain ratings
 - Developed operation and maintenance rating
- **5 – Immediate Attention – Defects with more than 50% reduction**
- **4 – Poor – Defects with 36 – 50% reduction or inaccessible hydrant**
- **3 – Fair – Defects with 21 – 35% reduction**
- **2 – Good – Defects with 5 – 20% reduction**
- **1 – Excellent – Minor Defects with <5% reduction**





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■ Sewer Ratings

- Assessed and coded using the Manual of Sewer Condition Classification published by the Water Research Centre
- Rated separately for structural condition and for operation and maintenance defects

Structural Rating

- **5 – Immediate Attention – Collapsed or collapse imminent**
- **4 – Poor – Collapse likely in foreseeable future**
- **3 – Fair – Collapse unlikely in near future although future deterioration likely**
- **2 – Good – Minimal collapse likelihood in short term but potential for further deterioration**
- **1 – Excellent – Acceptable structural condition**

Operation and Maintenance Rating

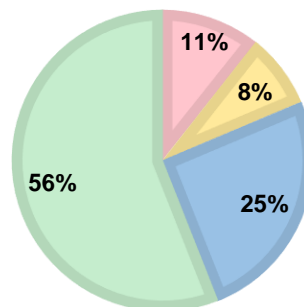
- **5 – Immediate Attention – Defects requiring immediate attention**
- **4 – Poor – Severe defects that become a 5 in the near future**
- **3 – Fair – Moderate defects that continue to deteriorate**
- **2 – Good – Defects that have begun to deteriorate**
- **1 – Excellent – Minor defects**

WATERMAIN RESULTS

- Generally in good condition (No leaks!)
- Various levels of tuberculation
 - PVC Sections range <5-15% reduction
 - Iron Sections (Ductile or Cast) range 5-35% reduction
- Slight surface damage and debris noted (not critical)
- Flushing/Cleaning and Relining of Iron Sections
 - Campus Wide program recommended

MAIN CAMPUS WATERMAINS OPERATION & MAINTENANCE RATING

■ 5 Immediate Attention ■ 4 Poor ■ 3 Fair ■ 2 Good ■ 1 Excellent



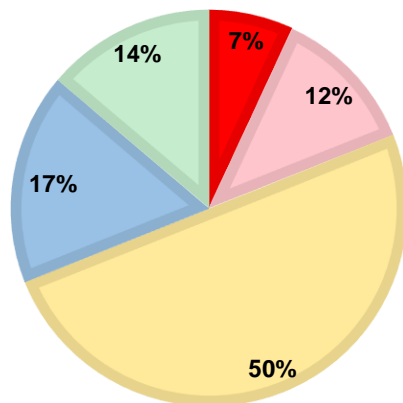
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SEWER RESULTS

- Typical observations
 - Cracks, debris, displaced joints, surface damage, attached deposits, sags, visible rebar
- Materials
 - Concrete, PVC, Vitrified clay, asbestos cement

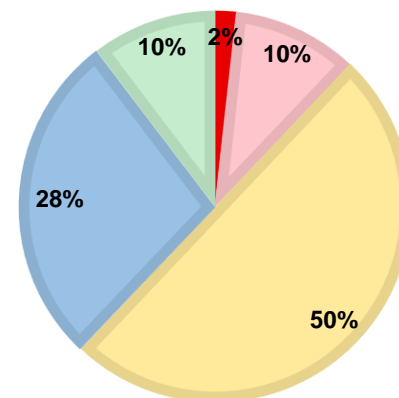
MAIN CAMPUS
SANITARY SEWERS
STRUCTURAL RATING

■ Immediate Attention ■ Poor ■ Fair ■ Good ■ Excellent



MAIN CAMPUS
SANITARY SEWERS
OPERATION & MAINTENANCE
RATING

■ Immediate Attention ■ Poor ■ Fair ■ Good ■ Excellent

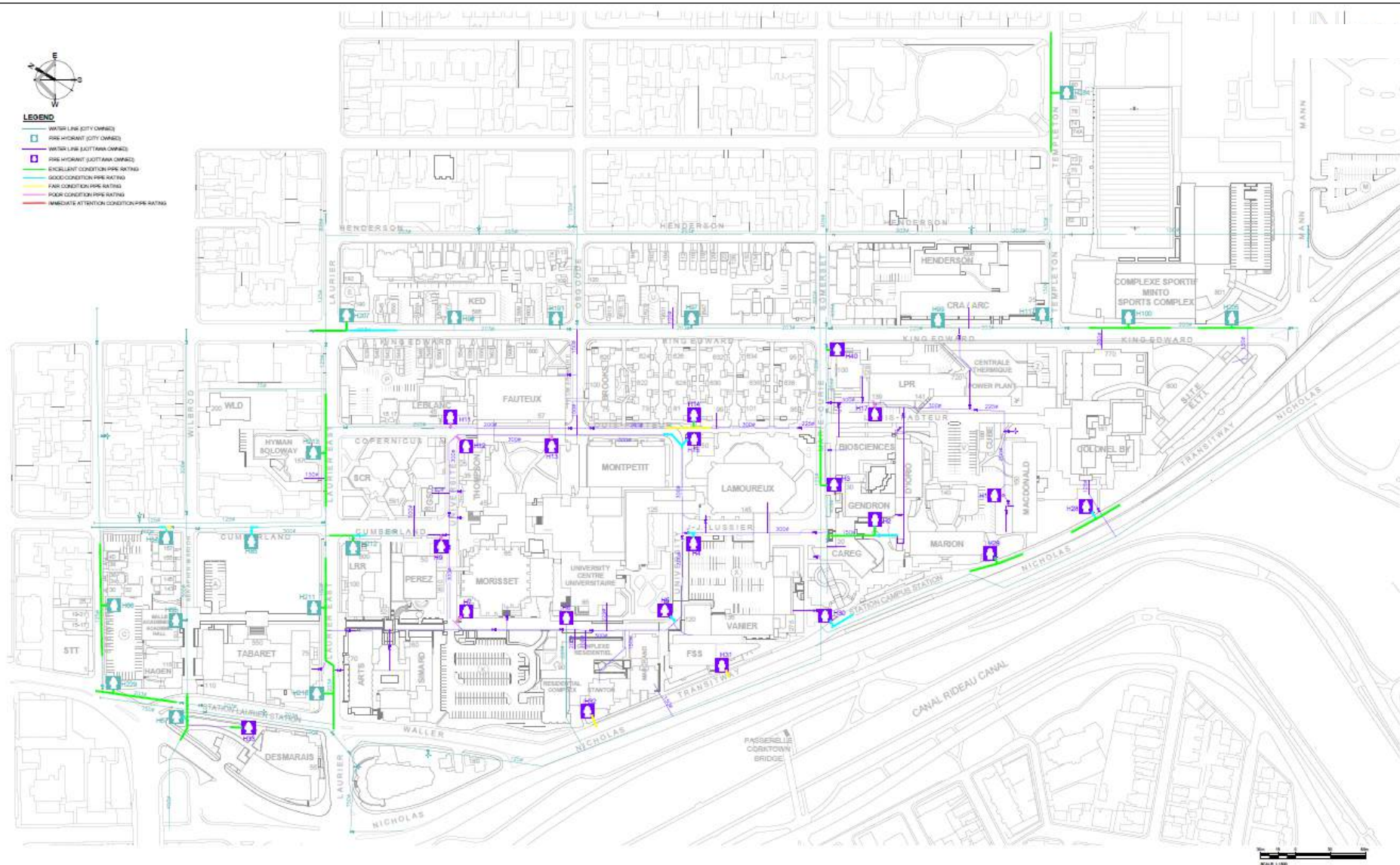


DELIVERABLES

- Recommendations for Repairs/Replacement and Class 'D' Estimates of Probable Cost
 - Watermains - \$600,000 (not including flushing program)
 - Storm Infrastructure - \$1.2 M (for infrastructure rated 4 or 5)
 - Sanitary Infrastructure - \$1.7 M (for infrastructure rated 4 or 5)
- Color Coded Digital Mapping
- Excel Spreadsheets with results
- Update Base Plans (ACAD)



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University of Ottawa Assessment of Sewer and Watermain Conditions

Table 1: Main Campus – Watermains

CAMPUS	LOCATION		SECTION		MAIN/ LEAD	OWNERSHIP	PIPE CHARACTERISTICS						CONDITION							RECOMMENDATIONS	
	STREET	HYDRANT ID	DIRECTION	DIAMETER (mm)			MATERIAL	HYDRANT MAKE AND MODEL	FLOW DIRECTION	MEASURED WATER PRESSURE (PSI)	INSPECTED LENGTH (m)	DEFECT TYPE	DISTANCE (m)	TIME CODE (hr:min:sec)	REDUCTION (%)	LOCATION (o'clock to o'clock)	NOTES	RATING	TYPE	EXPECTED COST (\$)	
Main	Transitway	H30	Left of Hydrant	Main	University	N/A	Cement Lined Iron	Mc Avity M67	Against flow	62	19.8	Tuberculation or debris at 45° bend down	2.10	11:25:38	5-10			2	Flush pipe		
Main	Transitway	H30	Right of Hydrant	Main	University	N/A	Cement Lined Iron	Mc Avity M67	With Flow	62	2.1	Debris	5.6 to 26.9	11:26:20 to 11:26:34	<5	06		2	Flush pipe		
Main	Transitway	H31		Main	University	N/A	N/A	Mc Avity M67		N/A		No inspection was conducted through this hydrant as the isolation valve box is full of mud.						3	Clean valve box and complete inspection	\$ 3,000.00	
Main	Transitway	H32		Main	University	N/A	N/A	Canada valve Century		N/A		No inspection was conducted through this hydrant as the isolation valve box is full of mud.						3	Clean valve box and complete inspection	\$ 3,000.00	
Main	Laurier Station	H33		Lead	University	750	PVC	Mc Avity M67 Brigadier		58	10.1	Nothing to report for the inspected hydrant lead						1			
Main	Laurier Station	H33	Left of Hydrant	Main	University	750	PVC	Mc Avity M67 Brigadier		58	0.0	Could not turn camera at cross place						-			
Main	300 Marie-Curie	H40		Lead	University	400	PVC	Darling 850-B-18		64	3.0	Nothing to report for the inspected hydrant lead						1			
Main	300 Marie-Curie	H40	Left	Main	City of Ottawa	400	PVC	Darling 850-B-18		64	0.0	Could not turn tee in 400mm PVC main						-			
Main	17 Stewart	H66		Lead	City of Ottawa	N/A	PVC	McAvity M67 Brigadier		64	4.0	Nothing to report for the inspected hydrant lead						1			
Main	17 Stewart	H66	Left of Hydrant	Main	City of Ottawa	N/A	PVC	Mc Avity M67 Brigadier	Against flow	64	43.2	Tuberculation along joint	43.20	09:15:05	<5			1	Flush pipe		
Main	17 Stewart	H66	Right of Hydrant	Main	City of Ottawa	N/A	PVC	Mc Avity M67 Brigadier	With flow	64	52.6	Nothing to report for inspected watermain						1			
Main	Water / Nicholas	H67		Lead	City of Ottawa	300	Cement Lined Iron/ PVC	Concord D67M		62	9.0	Turbid water reduced visuals	0.00	12:39:50	30			3	Flush pipe		
												Tuberculation at Hydrant Tee joint	8.40	12:41:00	20						
												Hydrant Tee, End of tuberculation	9.00	12:41:58	20						
Main	Water / Nicholas	H67	Left of Hydrant	Main	City of Ottawa	300	Cement Lined Iron/ PVC	Concord D67M	Against flow	62	22.2	Tuberculation around joint	2.00	12:53:49	<5			1	Flush pipe		
												Tuberculation	2.6 to 6.6	12:53:55 to 12:54:32	<5						
												Change of Material	6.60	12:54:32			Iron to PVC				
												Change in material	14.50	12:58:20			PVC to Iron				
												Change in material	14.60	12:59:10			Iron to PVC				
Main	Water / Nicholas	H67	Right of Hydrant	Main	City of Ottawa	300	Cement Lined Iron/ PVC	Concord D67M	With flow	62	18.4	Particle buildup on the bottom of the pipe	1.10	12:43:03	<5			1	Flush pipe		
Main	135 Siraphin-Marion	H68		Lead	City of Ottawa	300	Cast Iron	Mc Avity M67 Brigadier		62	2.9	Tuberculation	0.7 to 2.9	07:43:30 to 07:44:05	20-30			-	Watermain to be replaced as part of Siraphin-Marion Road reconstruction project		
												Tuberculation in tee piece	2.90	07:44:05	20-30			-	Watermain to be replaced as part of Siraphin-Marion Road reconstruction project		
Main	135 Siraphin-Marion	H68	Left of Hydrant	Main	City of Ottawa	300	Cast Iron	Mc Avity M67 Brigadier	With flow	62	10.8	Turbid water reduced visibility	0.80	08:00:56				-	Watermain to be replaced as part of Siraphin-Marion Road reconstruction project		
												Tuberculation	2.2 to 10.8	08:01:31 to 08:07:26	10-15			-	Watermain to be replaced as part of Siraphin-Marion Road reconstruction project		
Main	135 Siraphin-Marion	H68	Right of Hydrant	Main	City of Ottawa	300	Cast Iron	Mc Avity M67 Brigadier	Against flow	62	12.5	Tuberculation	0.6 to 3.1	07:45:04 to 07:45:46	<5-5			-	Watermain to be replaced as part of Siraphin-Marion Road reconstruction project		
												Tuberculation	3.1 to 12.6	07:45:46 to 07:55:15	5-10			-	Watermain to be replaced as part of Siraphin-Marion Road reconstruction project		
Main	505 Cumberland	H84		Lead	University	300	Cast Iron	Concord D67M		62	4.5	Tuberculation in the Bend	2.60	11:04:35	5			2	Clean and line watermain	\$ 1,625.00	
												Tuberculation in the Bend	3.70	11:05:40	10			2	Clean and line watermain	\$ 19,500.00	
Main	505 Cumberland	H84	Left of Hydrant	Main	City of Ottawa	300	Cast Iron	Concord D67M	Against flow	62	5.8	Tuberculation	3.90	11:07:18	10-15			2	Clean and line watermain	\$ 13,000.00	
												Tuberculation in hydrant tee	4.50	11:08:14				2	Clean and line watermain	\$ 19,500.00	
Main	505 Cumberland	H84	Right of Hydrant	Main	City of Ottawa	300	Cast Iron	Concord D67M	With flow	62	4.3	Tuberculation	1.2 to 5.8	11:20:01 to 11:27:01	5-10			2	Clean and line watermain	\$ 19,500.00	
												Tuberculation	1.2 to 4.3	11:36:55 to 11:43:00	15-25			3	Clean and line watermain	\$ 13,000.00	
												Tuberculation	4.30	11:43:00	25-35			3	Clean and line watermain	\$ 13,000.00	
Main	550 Cumberland	H85		Lead	City of Ottawa	300	Cast Iron	Darling 850-B-18		65	6.4	Tuberculation at the valve	0.30	08:55:50	<5			2	Clean and line watermain	\$ 1,950.00	
												Tuberculation	0.4 to 3.8	08:55:52 to 08:56:45	5-10			2	Clean and line watermain	\$ 1,950.00	
												Tuberculation	3.8 to 6.4	08:56:45 to 08:58:55	15-20			2	Clean and line watermain	\$ 1,950.00	
Main	550 Cumberland	H85	Left of Hydrant	Main	City of Ottawa	300	Cast Iron	Darling 850-B-18	Against flow	65	1.3	Tuberculation	0.3 to 1.3	08:59:52 to 09:04:12	5-10			2	Clean and line watermain	\$ 14,625.00	
												Tuberculation	1.30	09:04:12	10-15			2	Clean and line watermain	\$ 14,625.00	
Main	550 Cumberland	H85	Right of Hydrant	Main	City of Ottawa	300	Cast Iron	Darling 850-B-18	With flow	65	5.6	Tuberculation	0.6 to 2.8	09:07:33 to 09:10:14	<5-10			2	Clean and line watermain	\$ 17,875.00	
												Tuberculation	2.8 to 5.6	09:10:14 to 09:15:10	10-15			2	Clean and line watermain	\$ 17,875.00	
Main	577 King Edward	H96		Main	City of Ottawa	N/A	N/A	Canada Valve Century		N/A		No inspection was conducted through this hydrant as there was no isolation valve.						-	Install isolation valve and complete inspection	\$ 10,000.00	
Main	641 King Edward	H97		Main	City of Ottawa	N/A	N/A	Canada Valve Century		N/A		No inspection was conducted through this hydrant as there was no isolation valve.						-	Install isolation valve and complete inspection	\$ 10,000.00	
Main	721 King Edward	H99		Main	City of Ottawa	N/A	N/A	Concord-Daigle		N/A		No inspection was conducted through this hydrant as there was no isolation valve.						-	Install isolation valve and complete inspection	\$ 10,000.00	
Main	770 King Edward	H100		Lead	City of Ottawa	450	Cement Lined Iron	Canada Valve Century		80	3.6	Tuberculation at the bend's joint	1.10	11:37:51	<5			1	Flush pipe		
												Tuberculation around the valve	2.60	11:38:21	<5			1	Flush pipe		
												Tuberculation around the joint	3.60	11:38:34	<5			1	Flush pipe		
Main	770 King Edward	H100	Left of Hydrant	Main	City of Ottawa	450	Cement Lined Iron	Canada Valve Century	With flow	80	36.2	Loose Debris at joint	1.60	11:54:34	<5			1	Flush pipe		
												Angled joint downwards	4.80	11:55:16				1	Flush pipe		
												Cement Liner buildup, spot tuberculation	8.40	11:55:54	<5			1	Flush pipe		
Main	770 King Edward	H100	Right of Hydrant	Main	City of Ottawa	450	Cement Lined Iron	Canada Valve Century	Against flow	80	33.6	Loose Debris at joint	0.80	11:42:55	<5			1	Flush pipe		
Main	25 Templeton	H117		Main	City of Ottawa	N/A	N/A	Concord D67M		N/A		No inspection was conducted through this hydrant as there was no isolation valve.						-	Install isolation valve and complete inspection	\$ 10,000.00	

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- Do you have any questions or comments?

