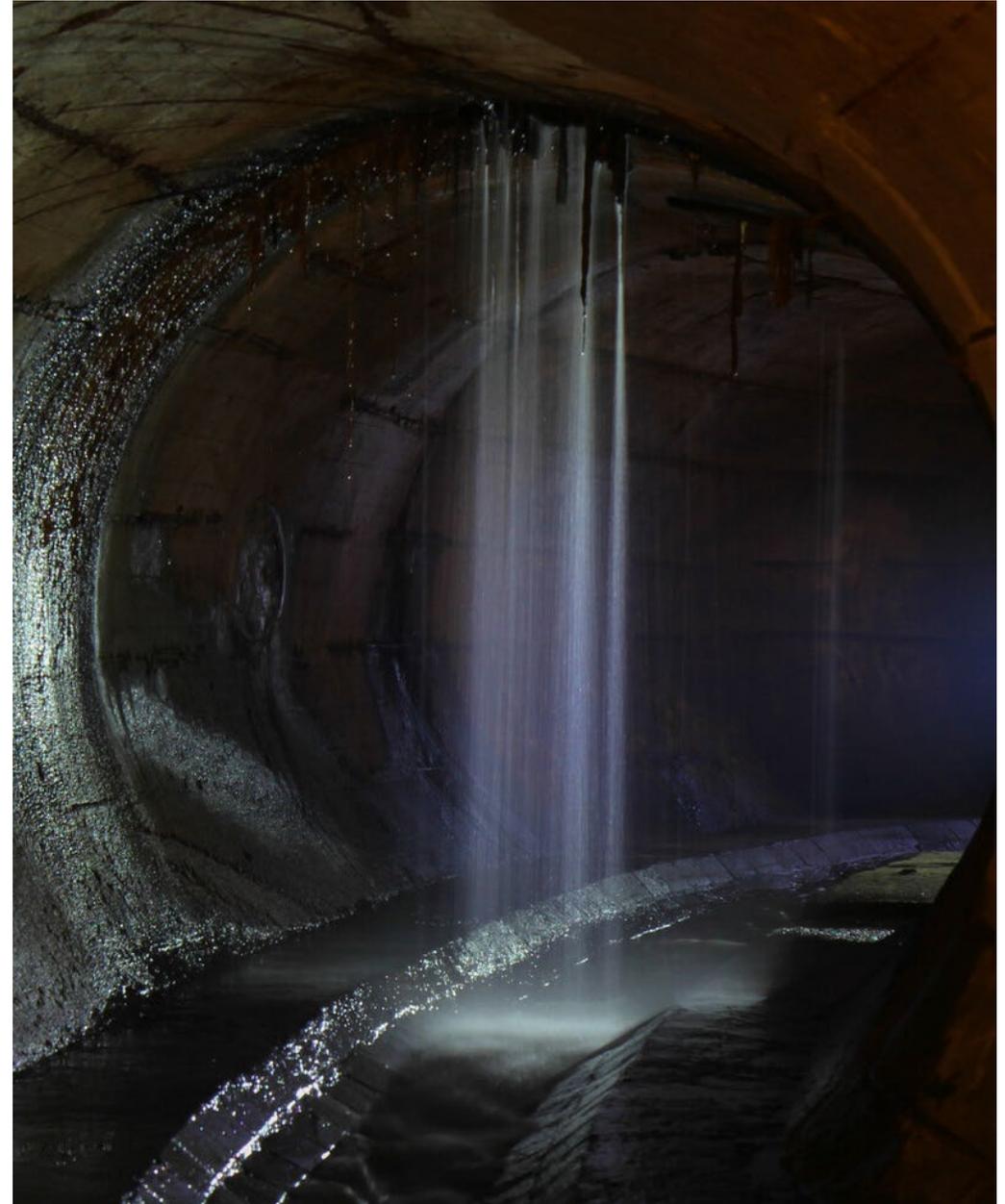


New Technology in Practice:

Using Distributed Temperature Sensors to Discover Sources of I&I

Farshad Salehzadeh

Winter 2023



Summary

Technology: Thermistor String



3

Case Study – Star Crescent

- Separated system:
 - Sanitary system built in 1960s
 - Storm system built in 1970s
- System is in state of good repair:
 - Sewers and manholes are in good condition
 - There are no cross-connections
- Completed inspection:
 - Smoke testing
 - Multiple rounds of CCTV
 - All downspouts are to the surface



6

Lessons learned

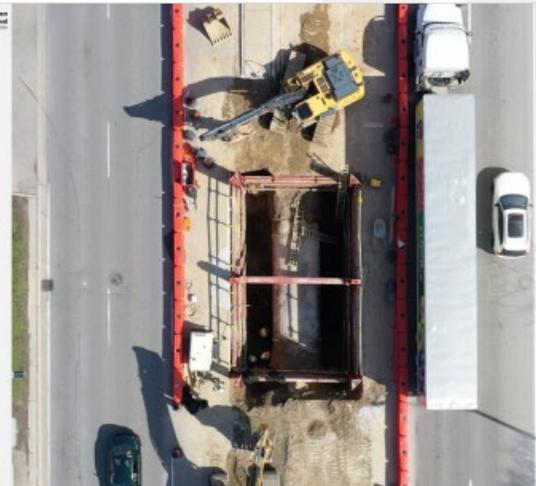
- Need a team of 5 or 6 to install the sensors
- Avoid cold sources (i.e. School)
- Need decent flow to wash the ragging
- Depth and vision sensor to monitor the site



15

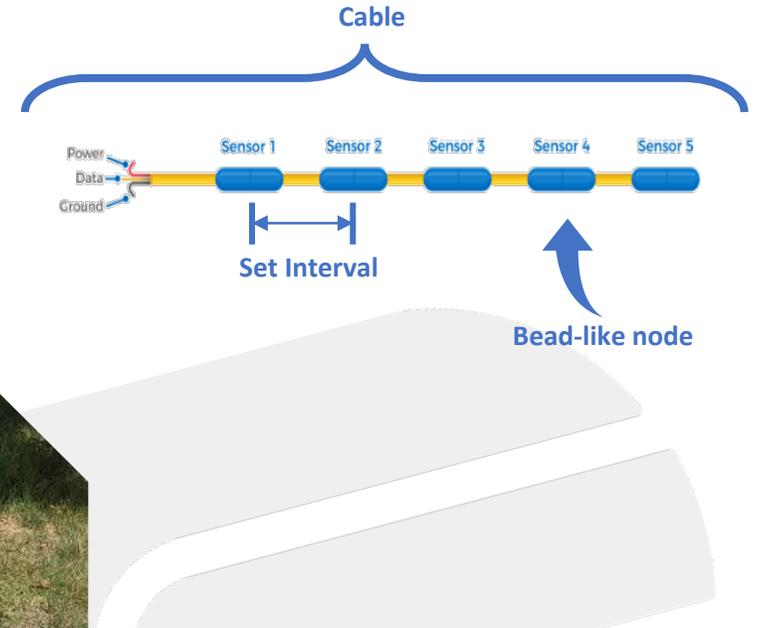
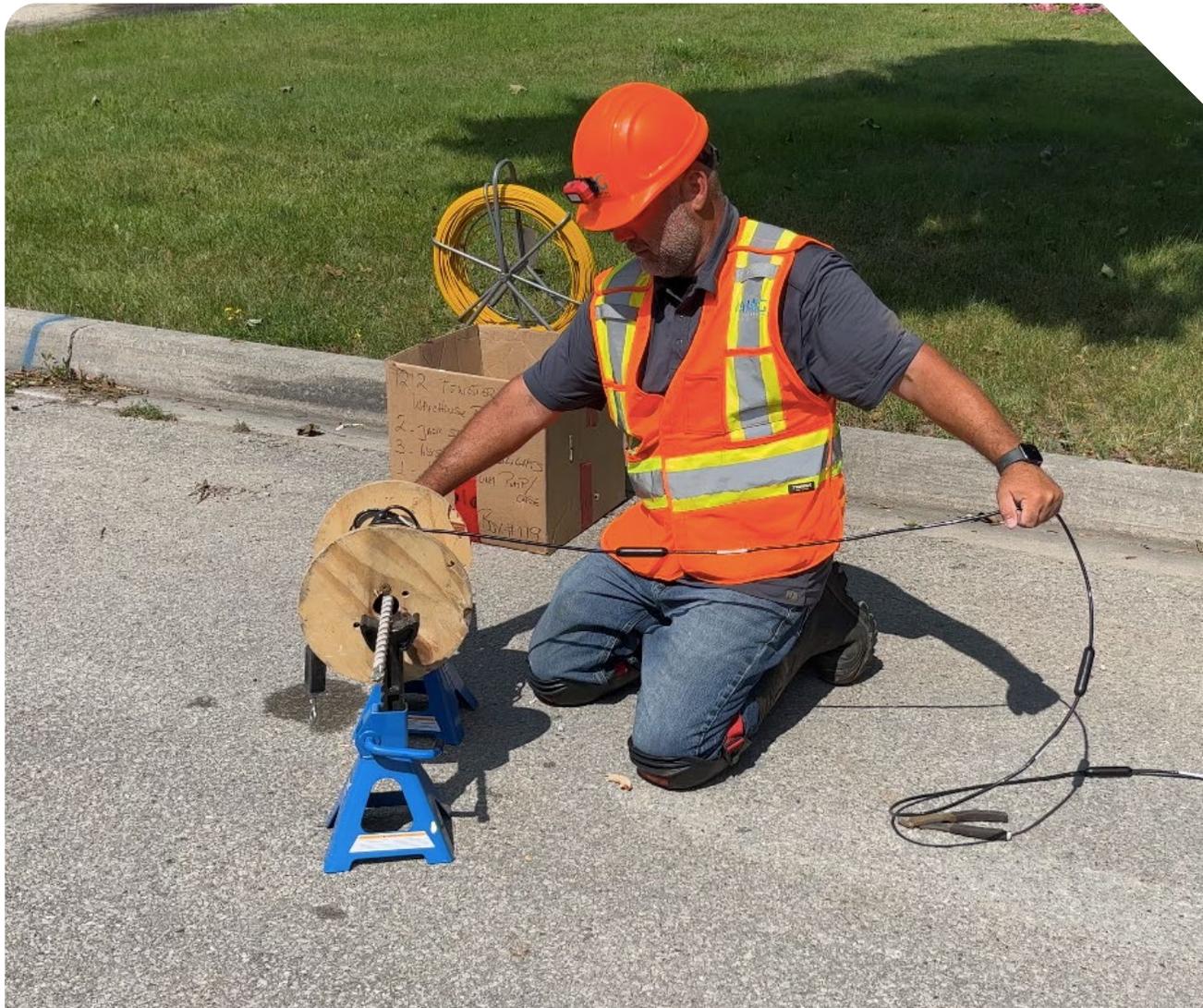
Thank You!

Farshad Salehzadeh
Region of Peel
Farshad.Salehzadeh@PeelRegion.ca
905-791-7800 ext. 4182



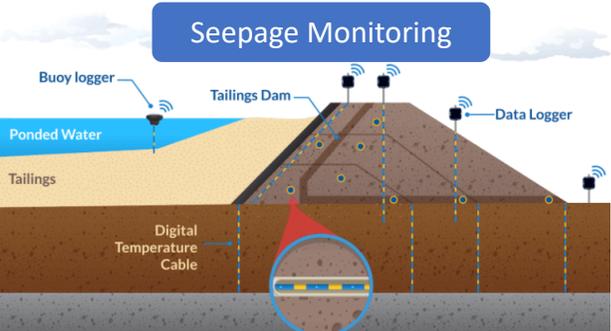
16

Technology: Thermistor String



Applications

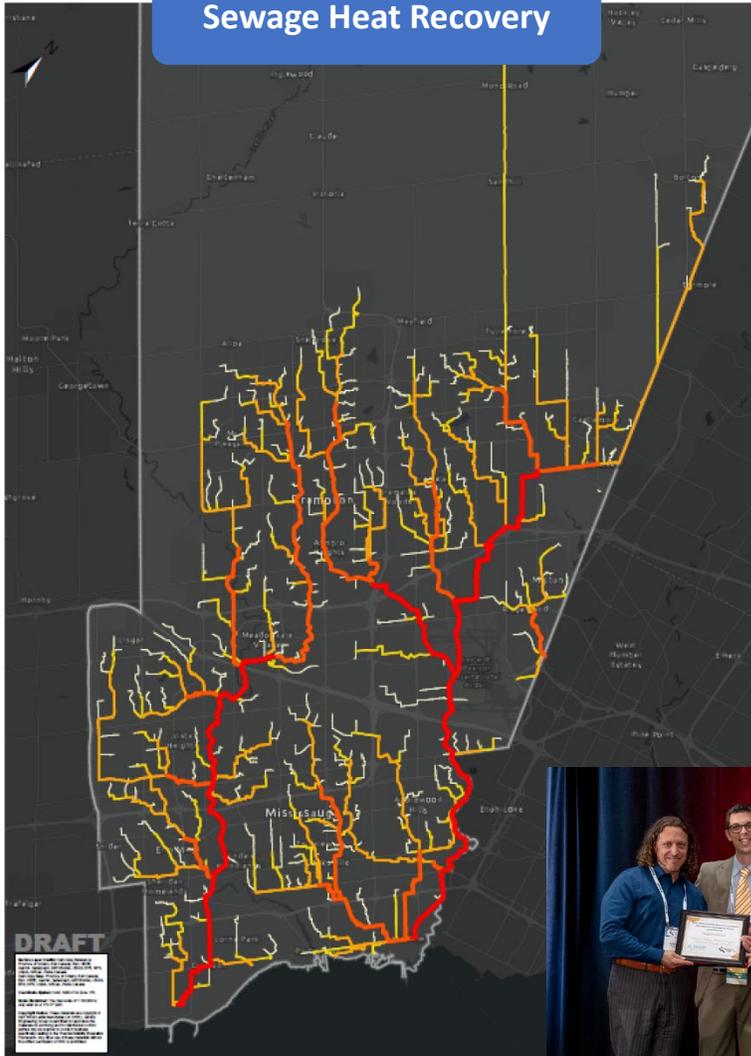
Sewage Temperature Monitoring



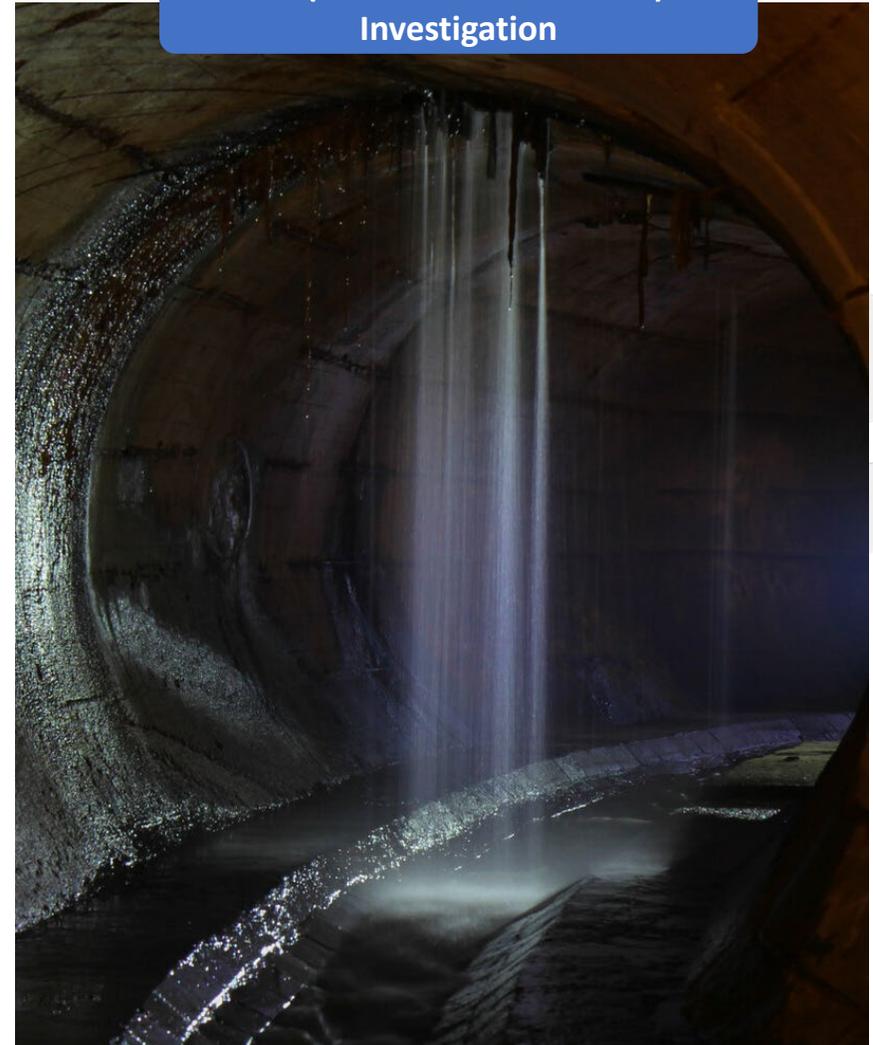
Source: <https://www.beadedstream.com/a-guide-to-thermistor-strings/>

Why Sewage Temperature Monitoring ?

Sewage Heat Recovery



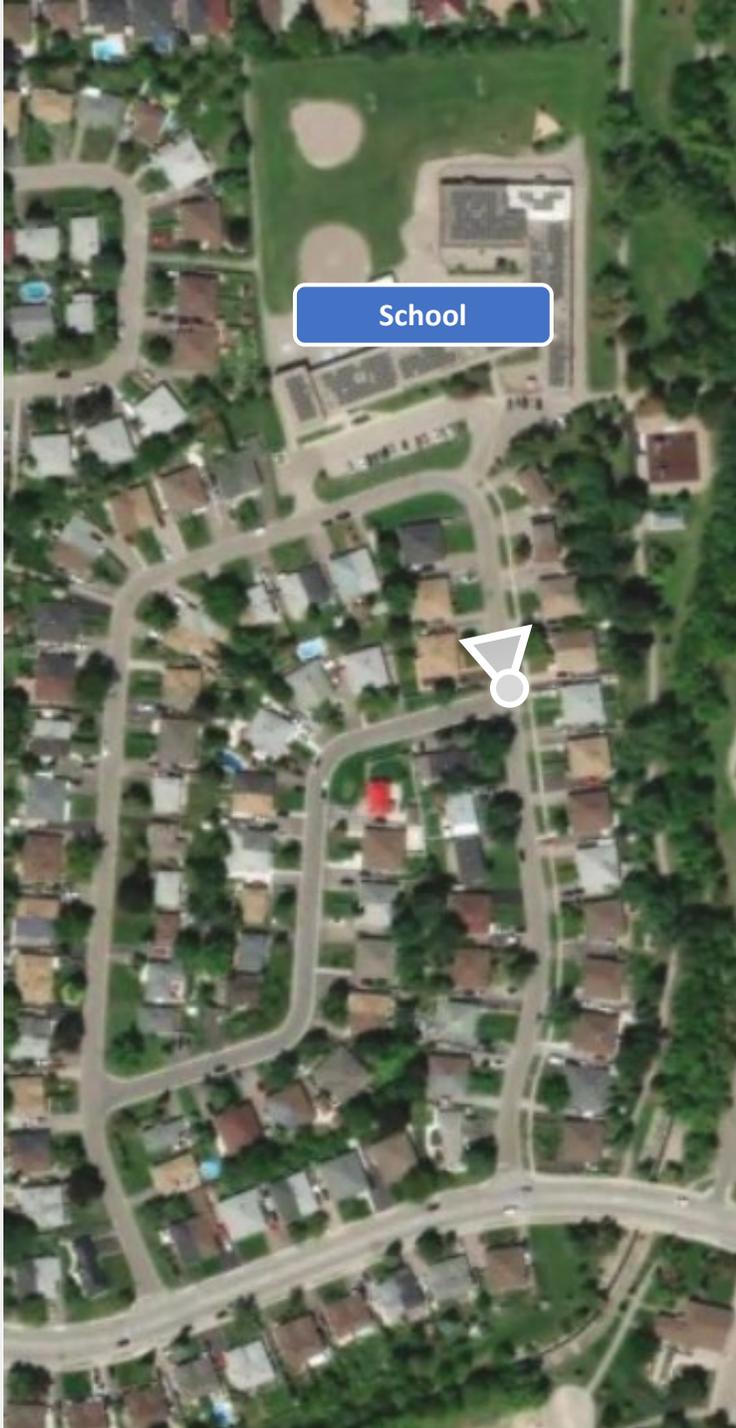
I&I (Inflow and Infiltration) Investigation



Case Study – Star Crescent

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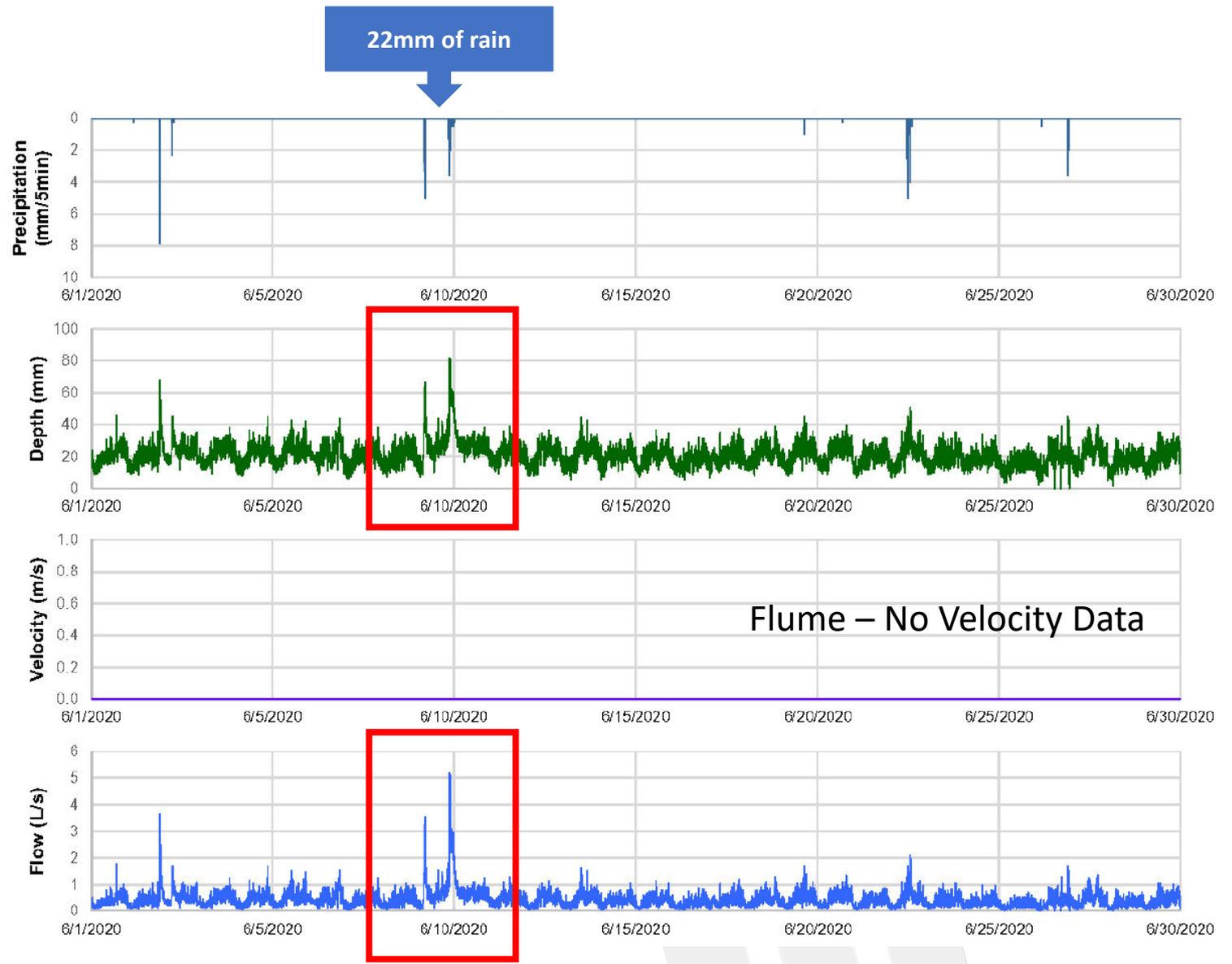


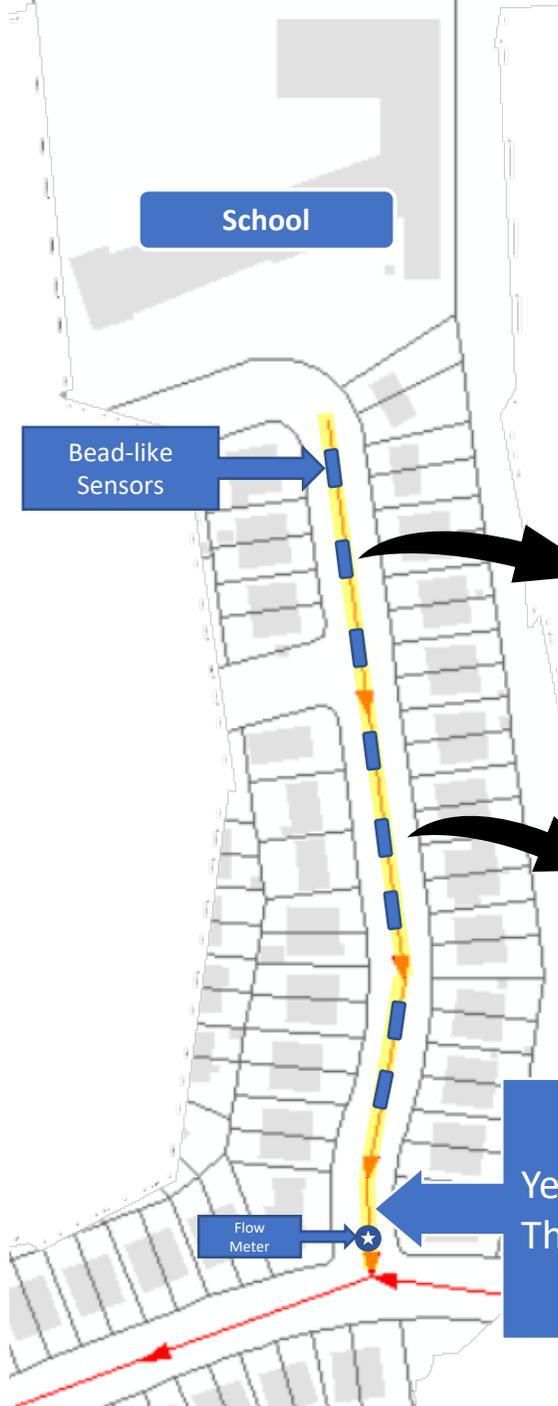
School



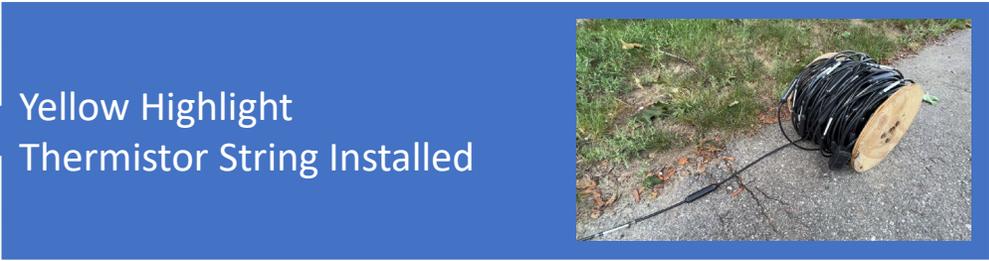
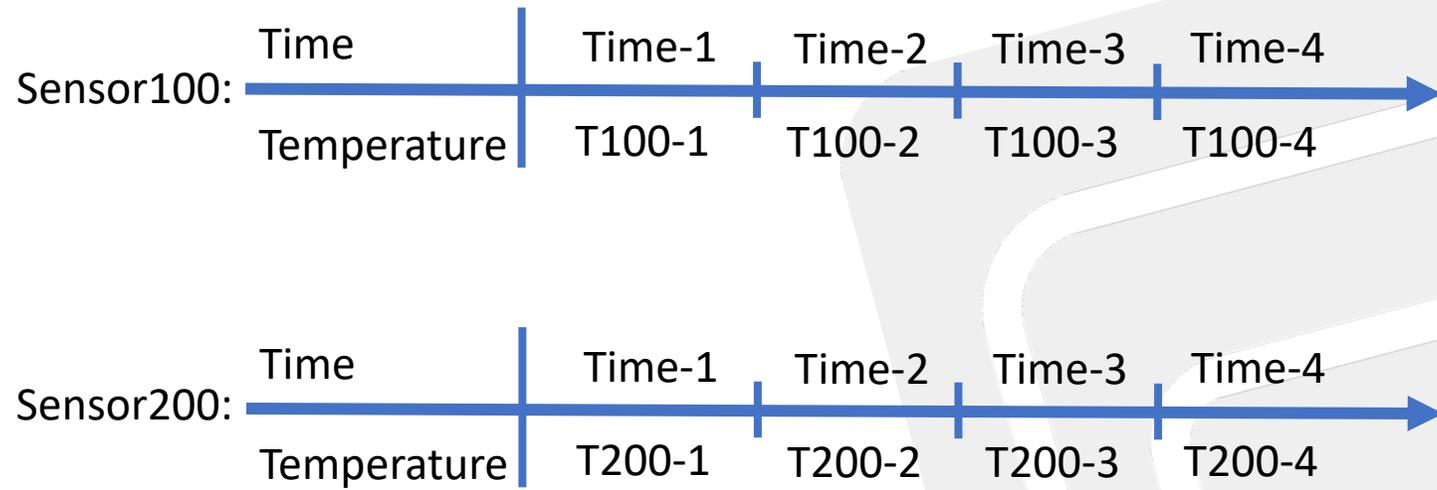
School

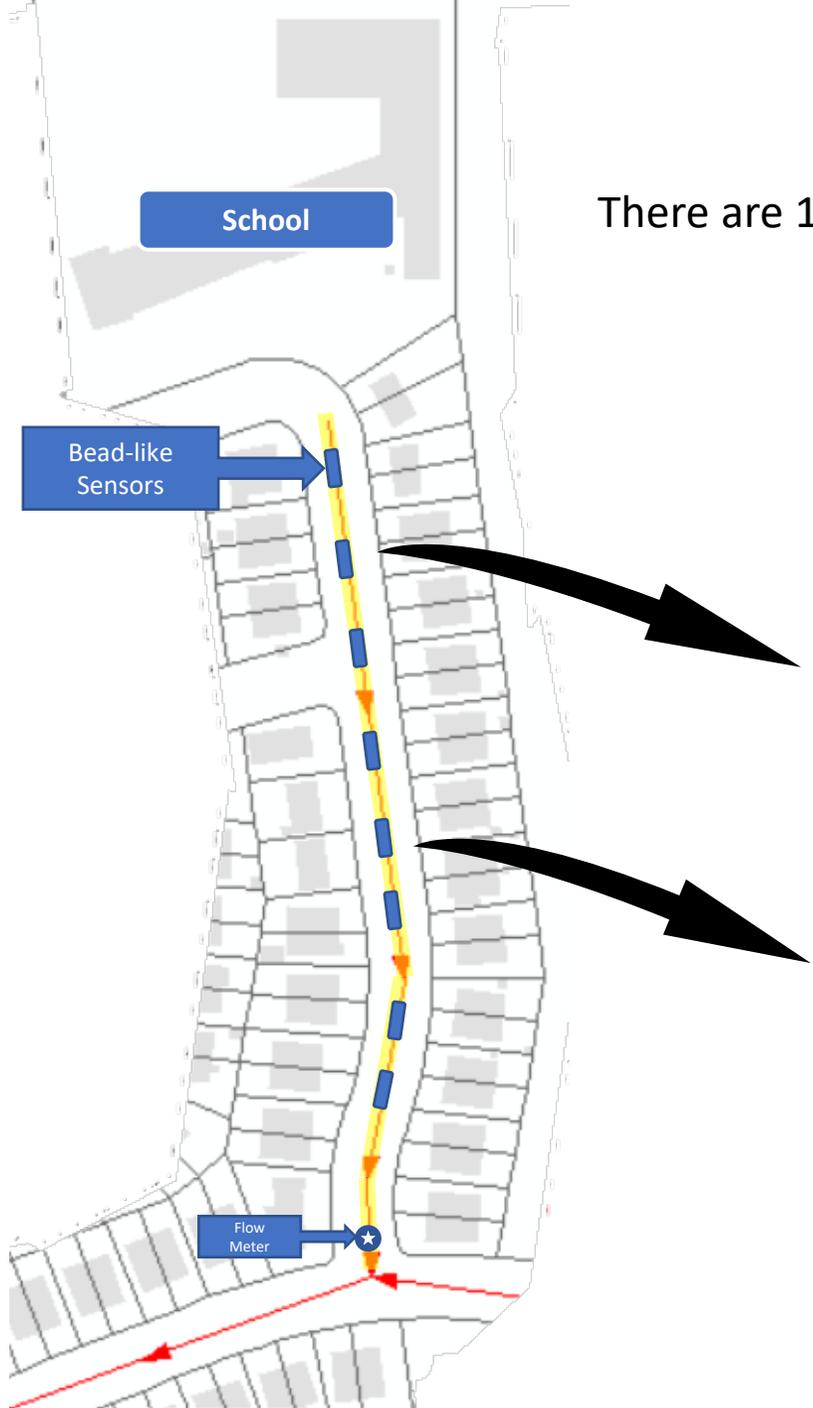
Google





Each sensor records the temperature on regular interval:

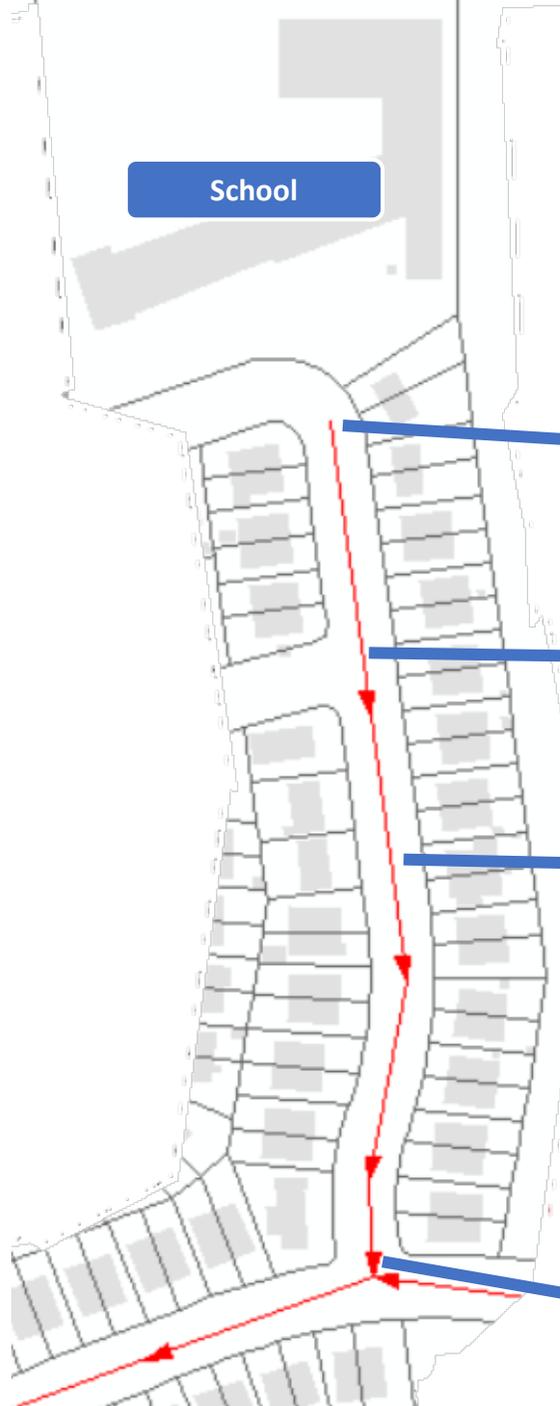




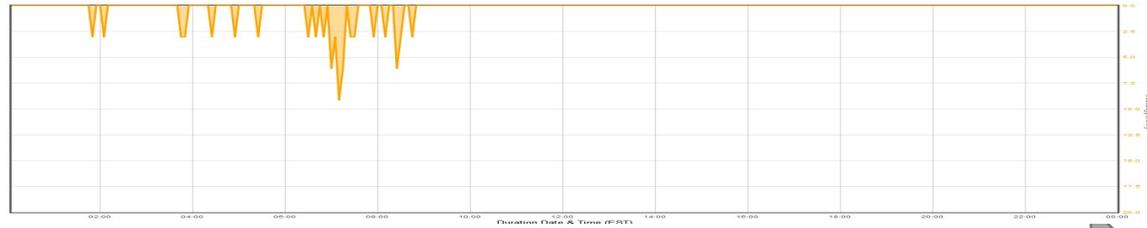
There are 100s of sensors:

Time	Time-1	Time-2	Time-3	Time-4
.
.
.
Sensor 100	T100-1	T100-2	T100-3	T100-4
.
.
.
Sensor 200	T200-1	T200-2	T200-3	T200-4
.
.
.

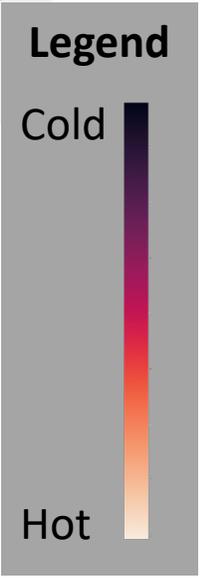
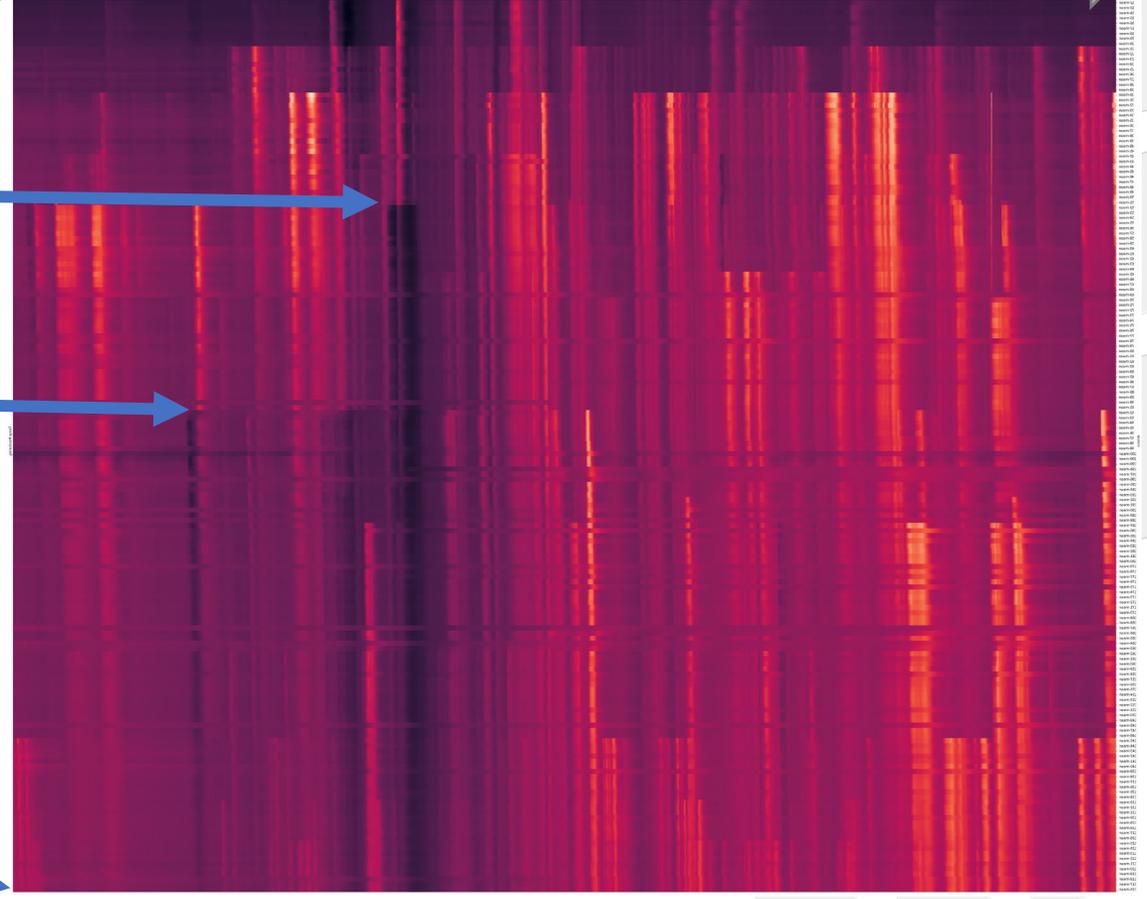
Temperature values

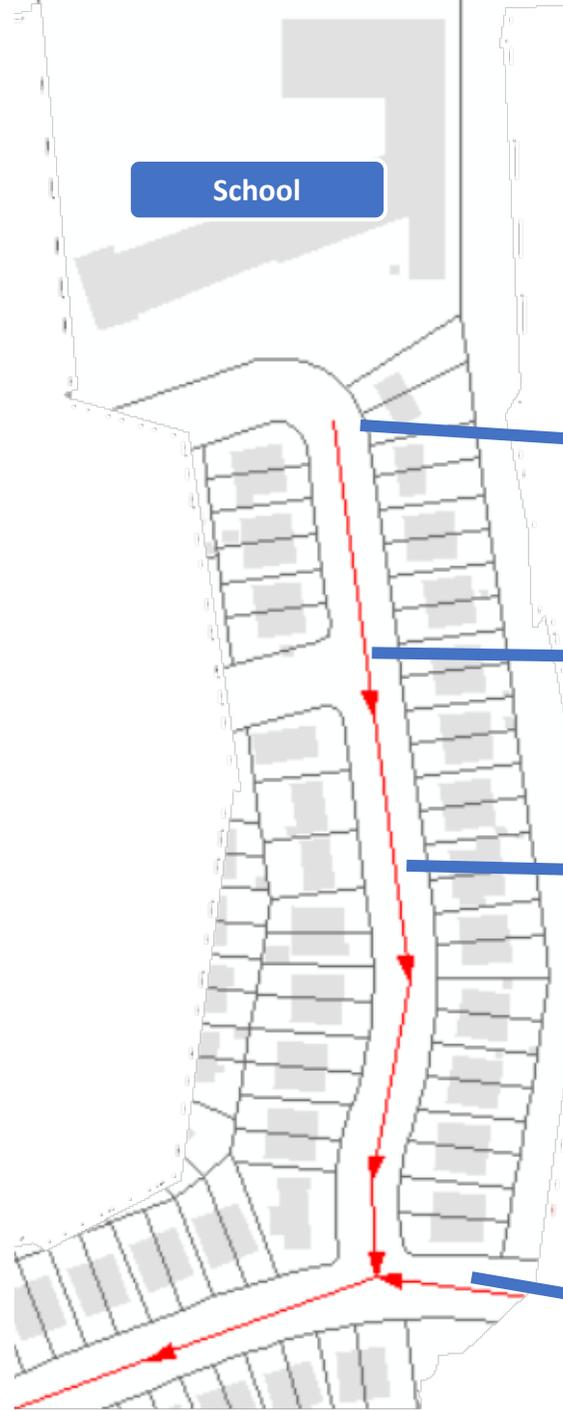


October 21, 2020

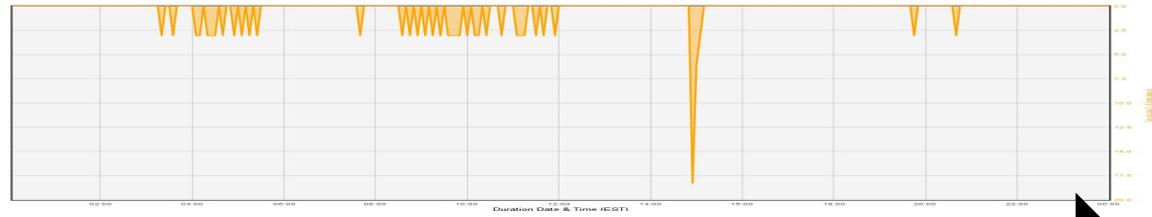


Time

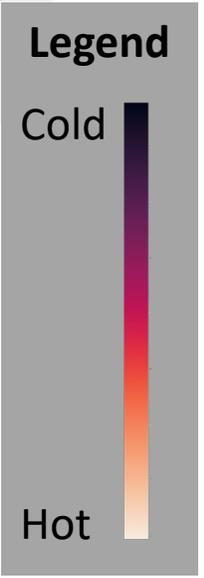
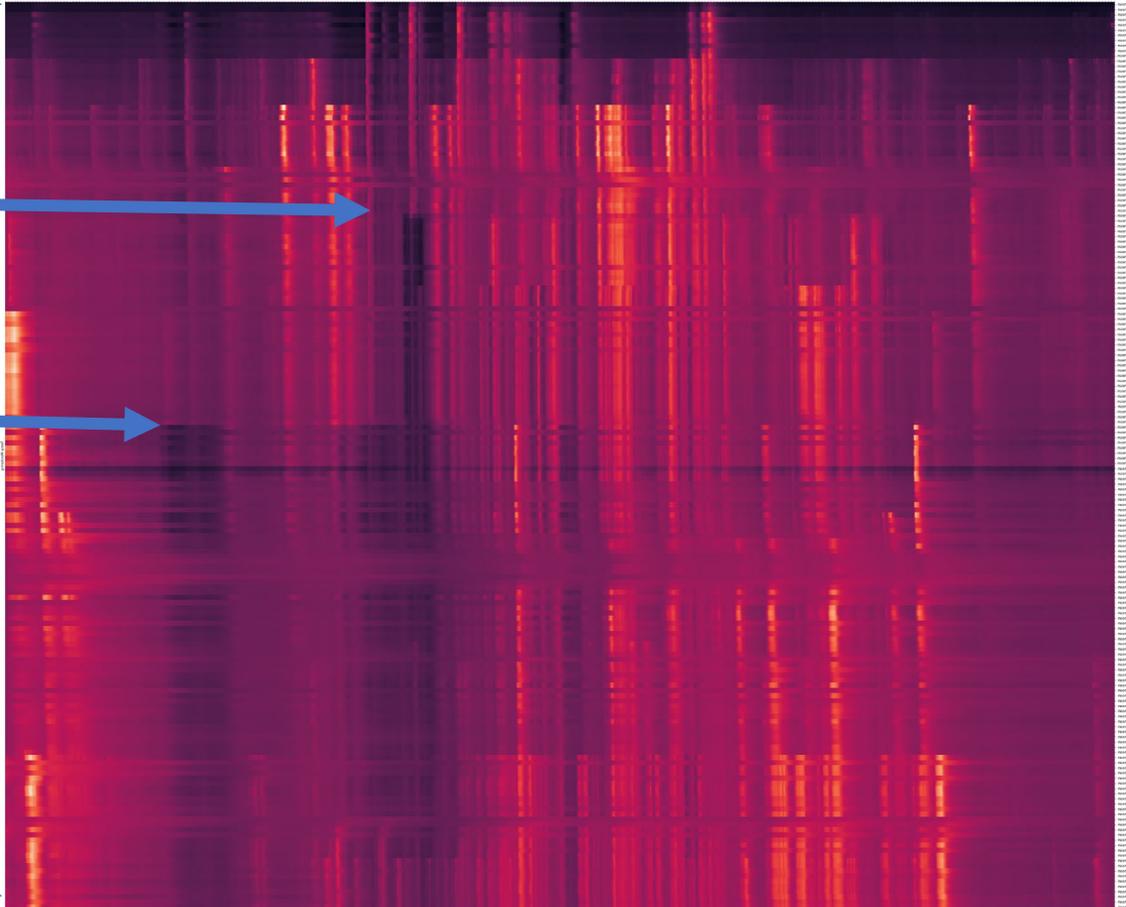




November 15, 2020



Time



Follow up with Wet-CCTV

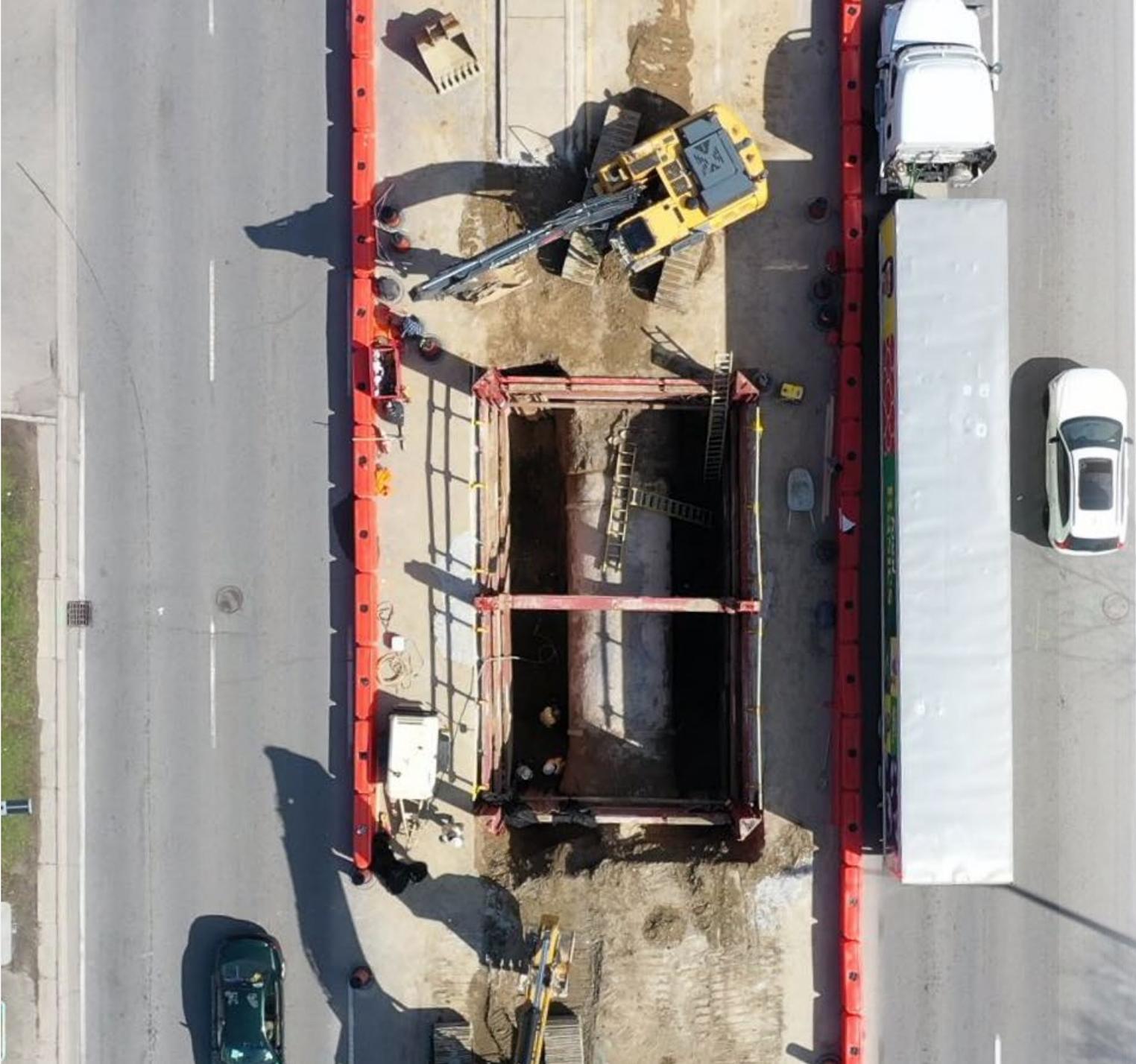
- 9 Attempts
- Confirmed active laterals during storm event

MAINLINE DETAILS							CATEGORIES Y: Completed N: Incomplete - : Not done				
From	To	Tile	Street Name	Length (m)	Material	Diameter (mm)	Light Rain	Moderate Rain	Heavy Rain	Saturated - After Weather Event	Saturated - After Thaw
				90.5	CONP	200	-	Y	-	N	Y
				84	CONP	200	Y	-	-	Y	Y
				63	CONP	200	N	-	-	Y	Y

Lessons learned

- **Need a team of 5 or 6 to install the sensors**
- **Avoid cold sources (i.e. School)**
- **Need decent flow to wash the ragging**
- **Depth and vision sensor to monitor the site**





Thank You!

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