Cardiff Sanitary Sewer Assessment

Inflow & Infiltration

Committee of the Whole

January 23, 2018

Sturgeon County

Background

- Prior to the Cardiff lift station Upgrade in 2015, the previous lift station was unable to convey peak wet weather flows depending on the rain event.

- July 2012 saw a major rainfall which overwhelmed the lift station, and resulted in several homes experiencing sewer backups.

- As part of the construction of the new Cardiff lift station, it was recommended to investigate where rainwater is entering the sanitary sewer, to reduce flows to the wet well.

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Background

- Inflow is stormwater that enters the sanitary system from points of direct connection such as roof leaders, downspouts and pick holes in manholes.

- Infiltration refers to groundwater that enters the sanitary system through leaks and cracks in the sanitary collection pipes and manholes.

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Background

- In 2016, Utility Services hired Cam-Trac to flush and camera the sanitary sewer system in Cardiff Echoes to determine where issues might exist.

- In 2017, ISL was retained to review the camera footage of the sanitary collection system and prepare a condition assessment for the underground infrastructure.

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ISL Assessment Objectives

Cardiff Sanitary Sewer Condition Assessment

- Assess system inflow/infiltration.
- Complete a detailed sewer condition assessment.
- Identify and recommend rehabilitation needs.

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Inflow/Infiltration Study

Site-Specific Data Analysis:

- Objective to understand and quantify the extent of inflow and infiltration on Cardiff's sanitary system.

- Made use of:
  - Flow meter data from station
  - Pump run times from station
  - Rainfall data for Namao

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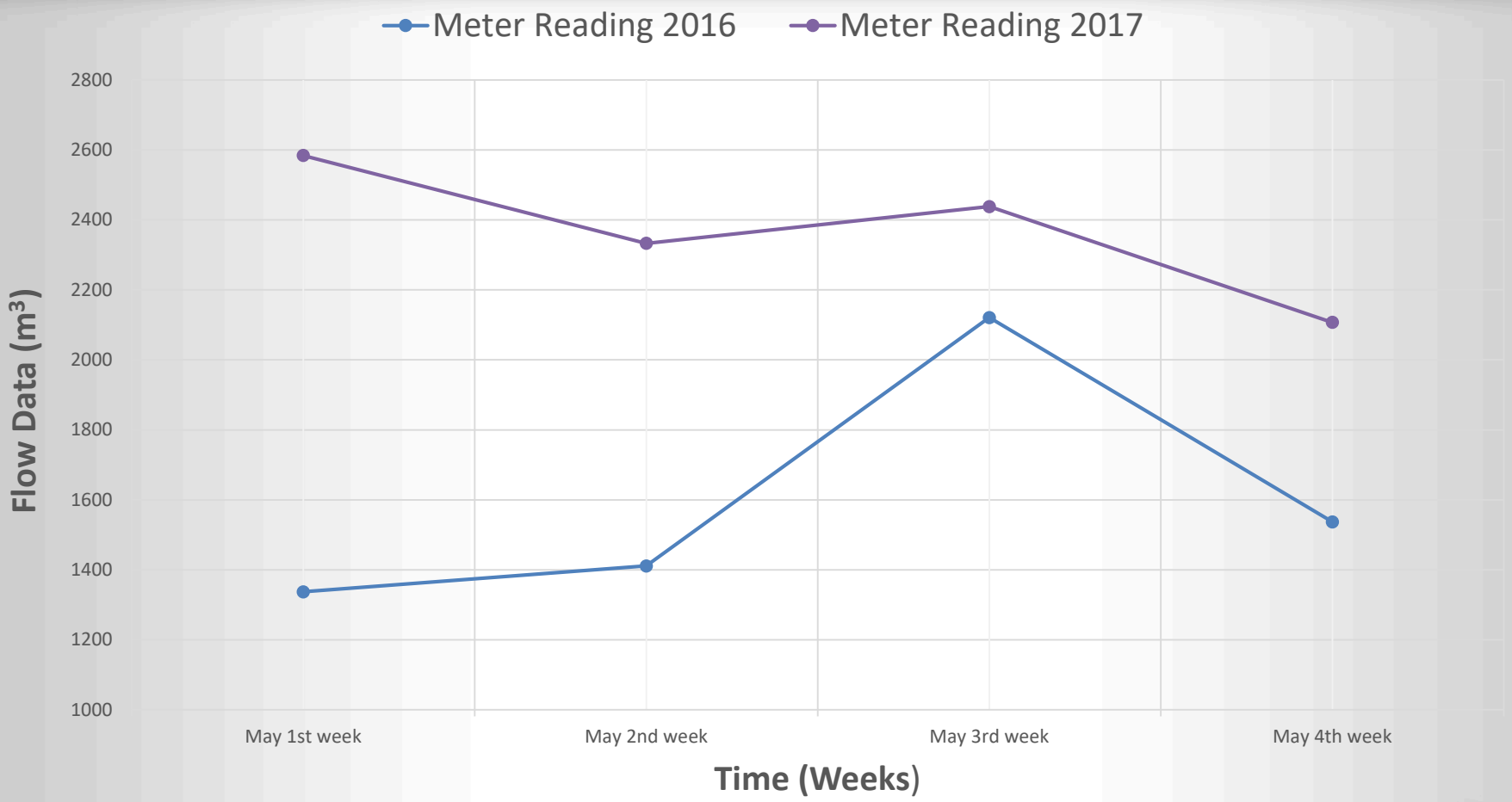
Inflow/Infiltration Study



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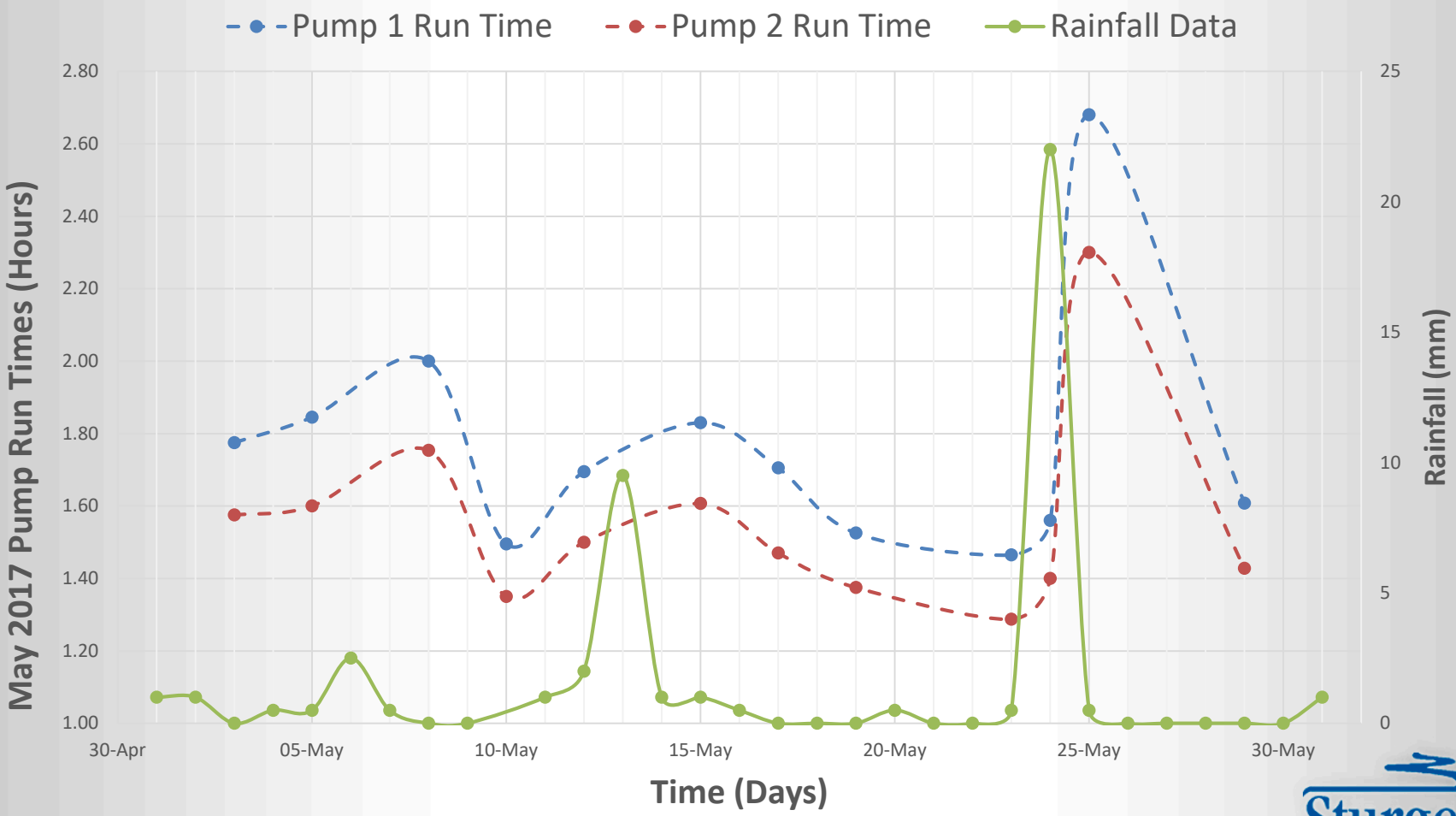
Inflow/Infiltration Study



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Inflow/Infiltration Study

Field Investigations:

- Objective to further examine surface inflow.
- Two main areas of concern:
  - Manhole covers
  - Private storm connections
    - Downspouts
    - Weeping tiles
    - Sump pump connections

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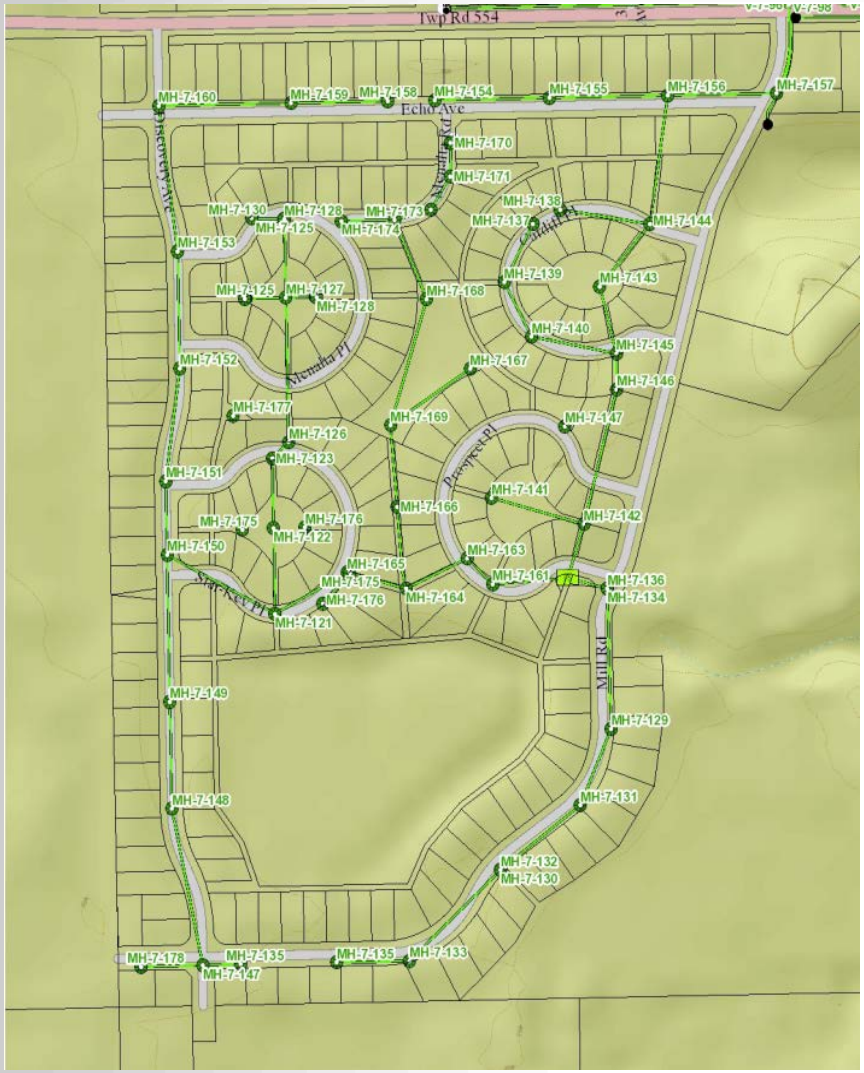

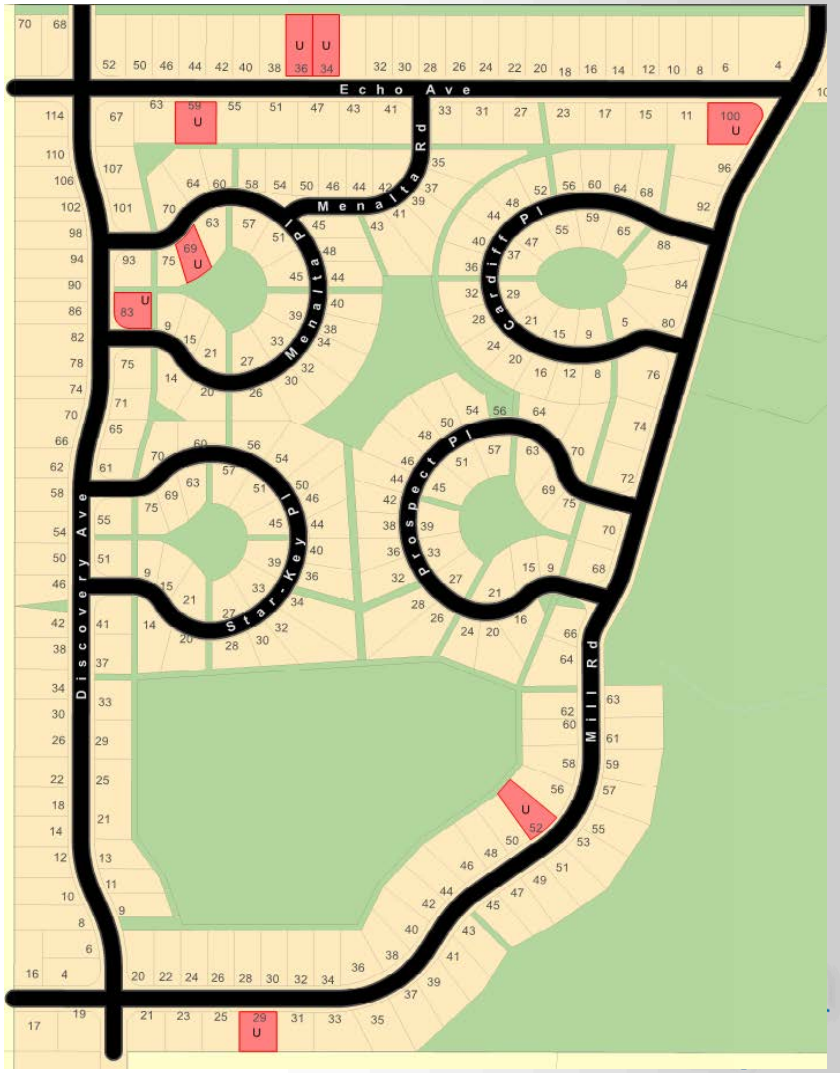

Inflow/Infiltration Study

Inflow/Infiltration Study

Condition Assessment

System:

- Age: Early 1970s
- Length: Over 3.5km of sanitary sewer
- Sizes: 150 to 200mm
- Material: PVC

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Condition Assessment

Assessment Criteria:

1. Structural Condition Grade

Grade	Implication
5	Failed or failure imminent
4	Very poor condition / High structural risk
3	Poor condition / Moderate structural risk
2	Fair condition / Minimal Structural risk
1	Acceptable condition

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Condition Assessment

Assessment Criteria:

2. Operational Condition Grade

Grade	Condition	Remaining CSA
5	Severe	<75%
4	Heavy	50-75%
3	Medium	20-50%
2	Light	5-25%
1	Acceptable	<5%

Typical Issues:
Roots / encrustations / debris / sags / grease / intruding laterals / infiltration

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Condition Assessment

Assessment Criteria:

3. Rehabilitation Priority

Ref.	Timeline
1	Repair or service immediately
2	Repair or service within the next 5 years
3	Repair, service or re-inspect within the next in 5 to 10 years

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Condition Assessment

Findings:

Priority	# Issues	Estimate of Rehabilitation Costs
1	6	$30-35k
2	19	$65-70k
3	52	$170-175k

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Conclusions

- Sewers generally in good condition.
- Infiltration is evident and further investigation is required to determine rates and impact and any additional actions.
- Rehabilitation needs not significant enough to warrant a capital project and should be funded by operation and maintenance budgets (2018-2020).

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Recommendations

- Utilize existing equipment and available data at the Cardiff pump station to further assess infiltration.
- Implement an asset management program based on the findings of this study and consistent with Council-approved Asset Management Policy.
- Ensure unobstructed access to PULs is available for ongoing maintenance requirements.

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Next Steps

- Utility Services has developed a three-year workplan and budget to address the ISL's recommended areas of repair (2018-2020).
- CCTV and flushing program will look to inspect once every five years.

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