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Mount Forest Drainage Study

AREA EAST OF MAIN STREET SOUTH (HWY 6) AND SOUTH OF SOUTH SAUGEEN RIVER

BMROSS PROJECT #25155

JUNE 22, 2026

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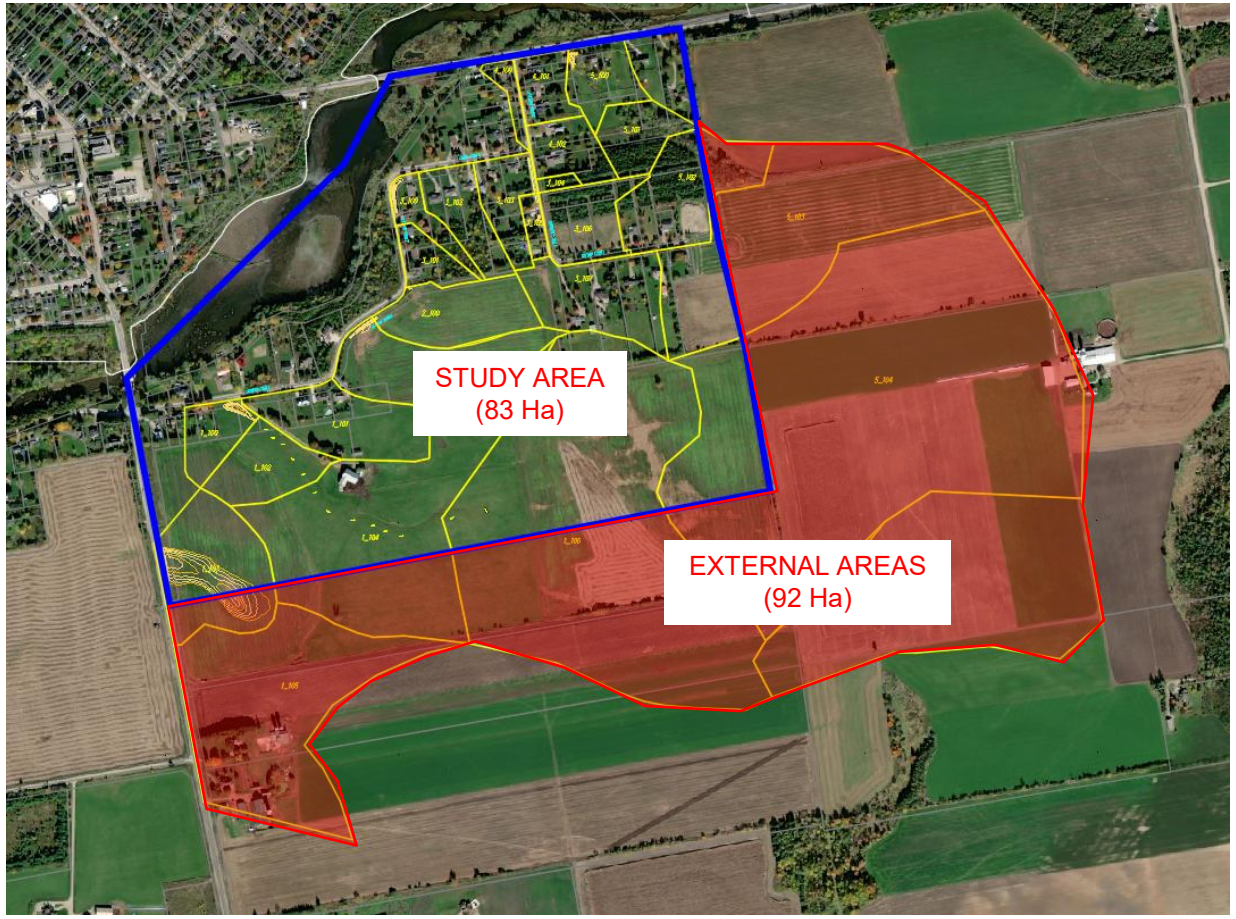
THE TOWNSHIP OF WELLINGTON NORTH

Study Area



- Study Area consists of:
  - Areas within urban boundary of Mount Forest located south of South Saugeen River and east of Main Street South – **83 Ha**
  - Any external drainage areas which flow into the Study Area – **92 Ha**

Study Goals

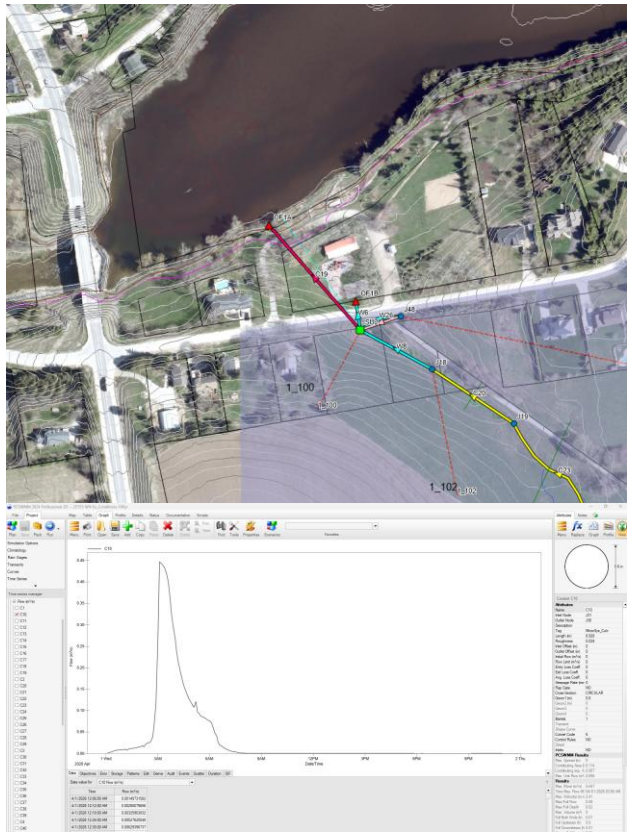
- Use stormwater modelling software to assess Township drainage infrastructure within the Study Area and compare performance to Township standards
- Identify infrastructure that does not meet Township standards
- Identify drainage conditions that, while meeting Township standards, exhibit limited resilience or may be sensitive to operational and maintenance factors
- Develop and evaluate potential solutions to address identified deficiencies and improve overall drainage system performance

Study Exclusion – Condition Assessment

- We did not Conduct a detailed physical condition assessment of all Township infrastructure in the Study Area. The modelling assumes that the Township infrastructure is in good working order.
- If we did observe damaged infrastructure in the field during site visit(s), this was noted and will be discussed

Stormwater Modelling - PCSWMM

- PCSWMM is a widely used engineering software program for analyzing stormwater drainage system
- The software simulates how rainfall runoff moves through ditches, culverts, storm sewers, and other drainage infrastructure
- By comparing simulated flows and water levels against available system capacity, potential drainage issues can be identified and evaluated
- The model can also be used to assess the effectiveness of potential improvements before construction is undertaken



PCSWMM – Existing Conditions Model

- **Model Inputs**
  - Aerial Imagery
  - LIDAR Digital Elevation Model (DEM) Data
  - Field Survey Data at Select Locations
- **Model Construction**
  - Define drainage elements (ditches, culverts, sewers)
  - Define drainage catchments (determine which areas drain to which drainage elements)
  - Assign rainfall data to the catchments

Ex. Conditions Model Drainage Divisions

The overall drainage area was broken into 6 distinct catchments with 6 distinct outlets:

1. Murphy Street – at park (64 Ha)
   750mm Culvert Outlet

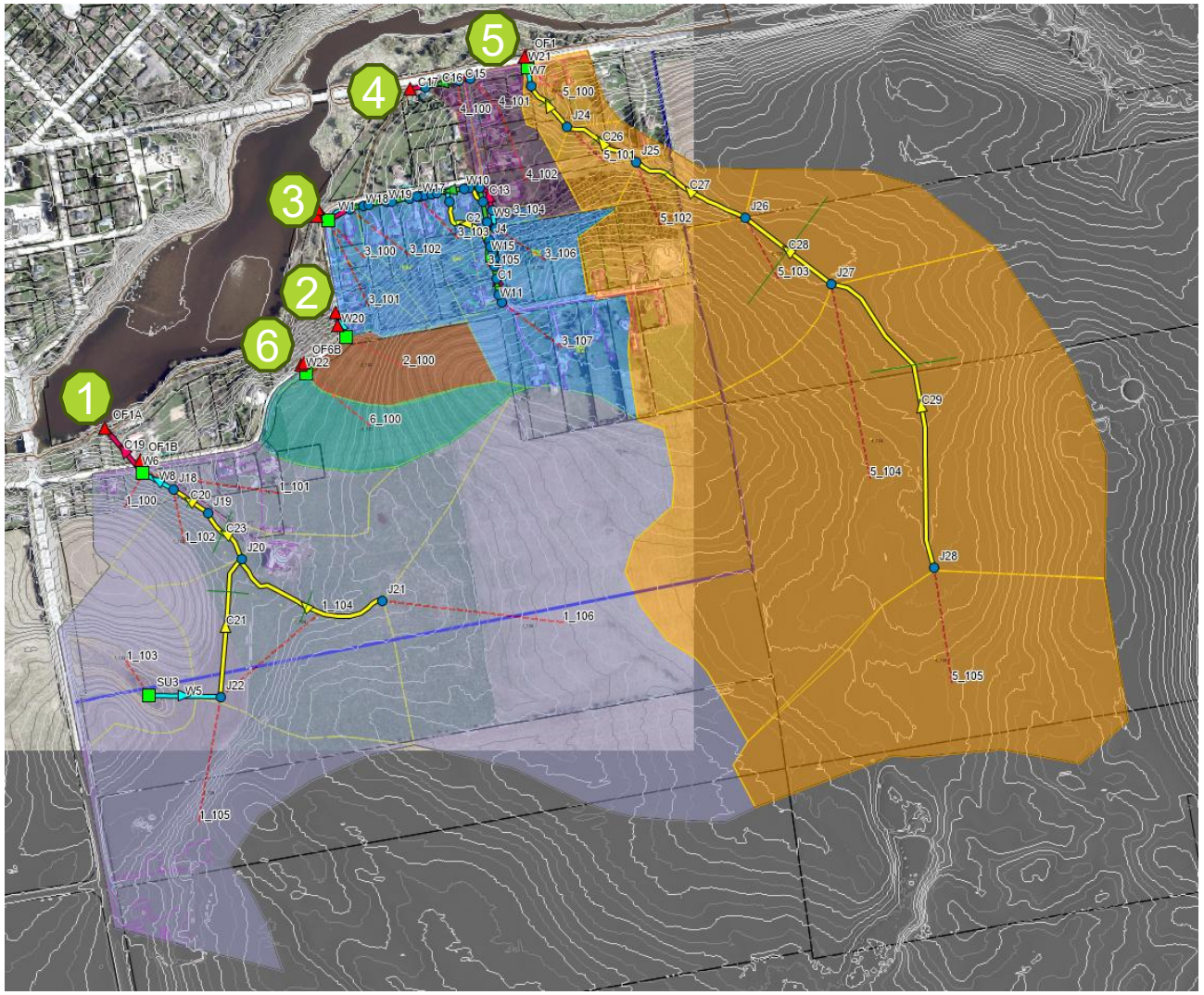
2. Murphy/Glasgow bend (3 Ha)
   450mm Culvert Outlet

3. Glasgow/Clyde bend (12 Ha)
   900mm Culvert Outlet

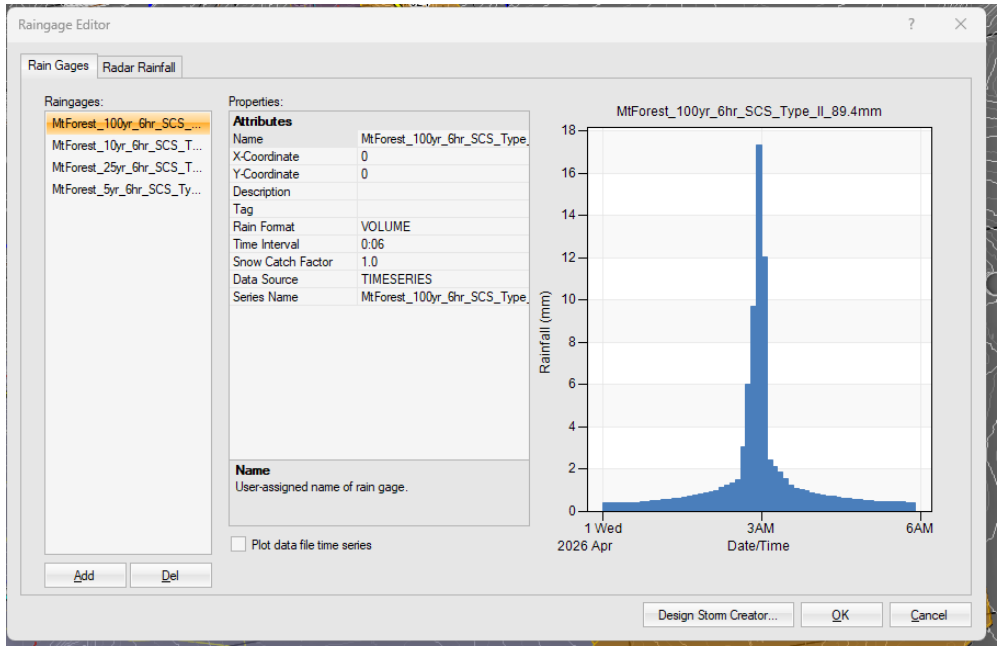
4. Queen St – south side (3 Ha)
   600mm Culvert Outlet

5. Queen St – north side (73 Ha)
   1200mm Culvert Outlet

6. Murphy St – 80m w. of Glasgow (4 Ha)
   450mm Culvert Outlet

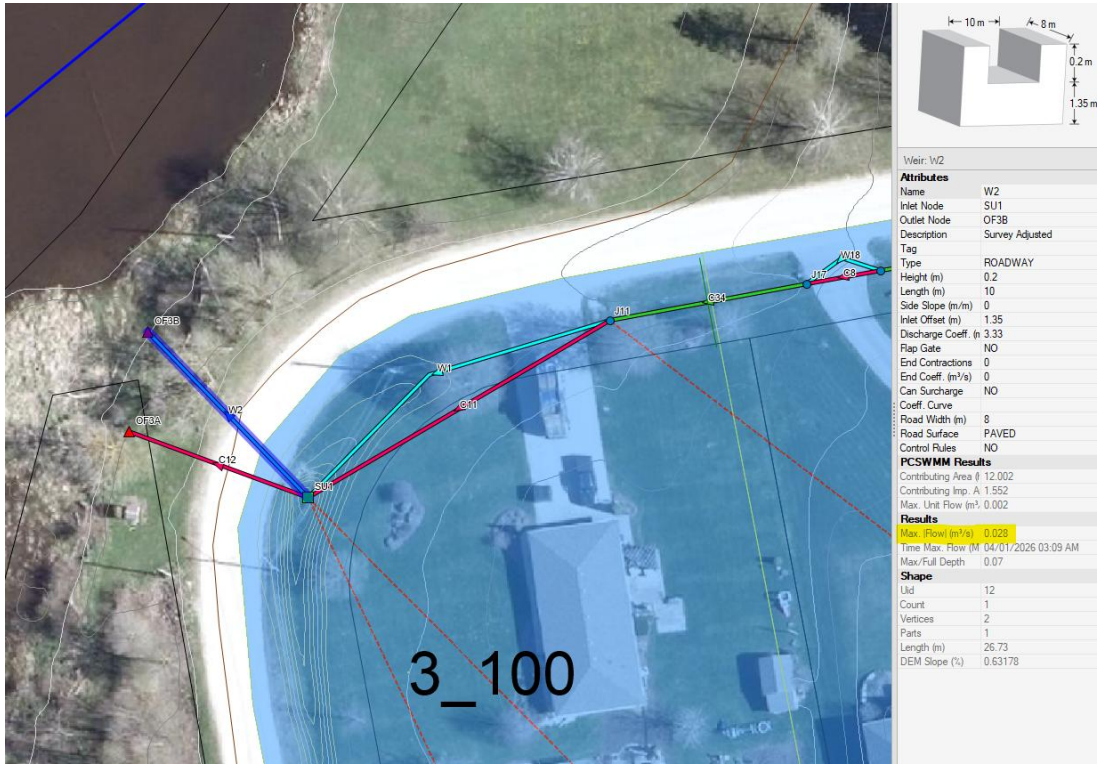


PCSWMM Model – Design Storms



- Rainfall Events Modelled:
  - 5 yr (54mm in 6 hrs)
  - 10 yr (62mm in 6 hrs)
  - 25 yr (73mm in 6 hrs)
  - 100 yr (89mm in 6 hrs)

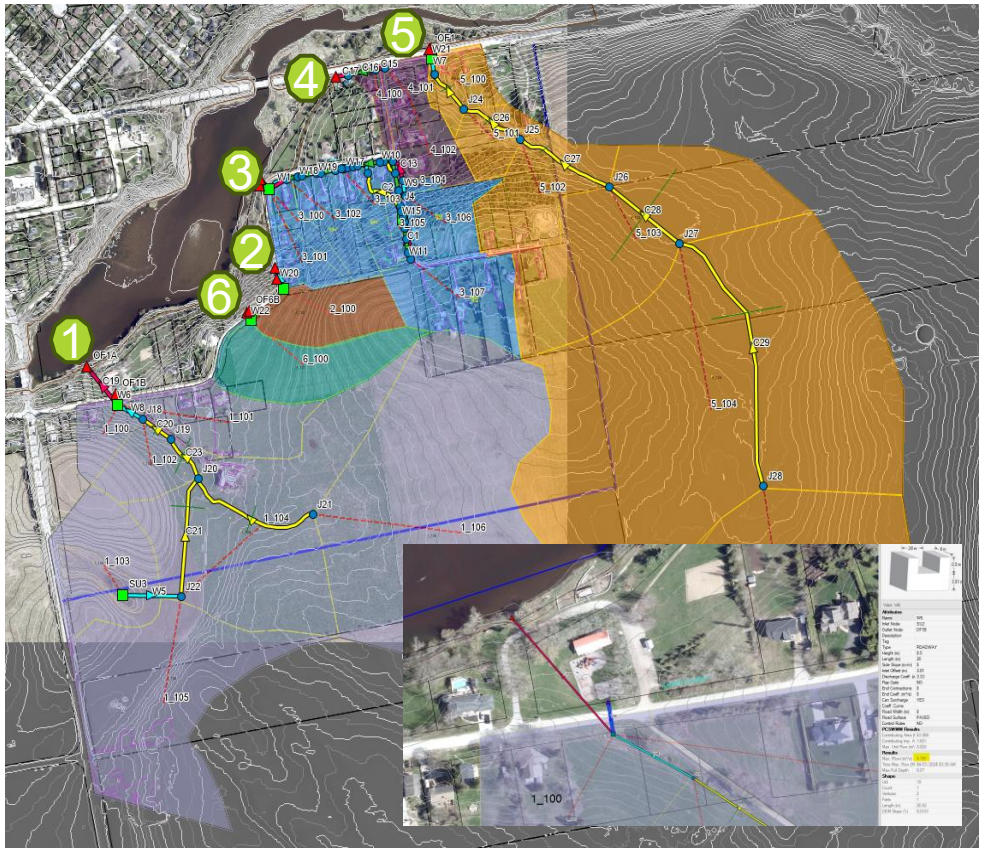
Model Results Evaluation Criteria (Based on Township MSS)



- Driveway culverts to convey 10 yr storm without overtopping
- Road crossing culverts to convey 25 yr storm without overtopping
- 100 yr storm to be conveyed without causing property damage

Existing Conditions Model Results

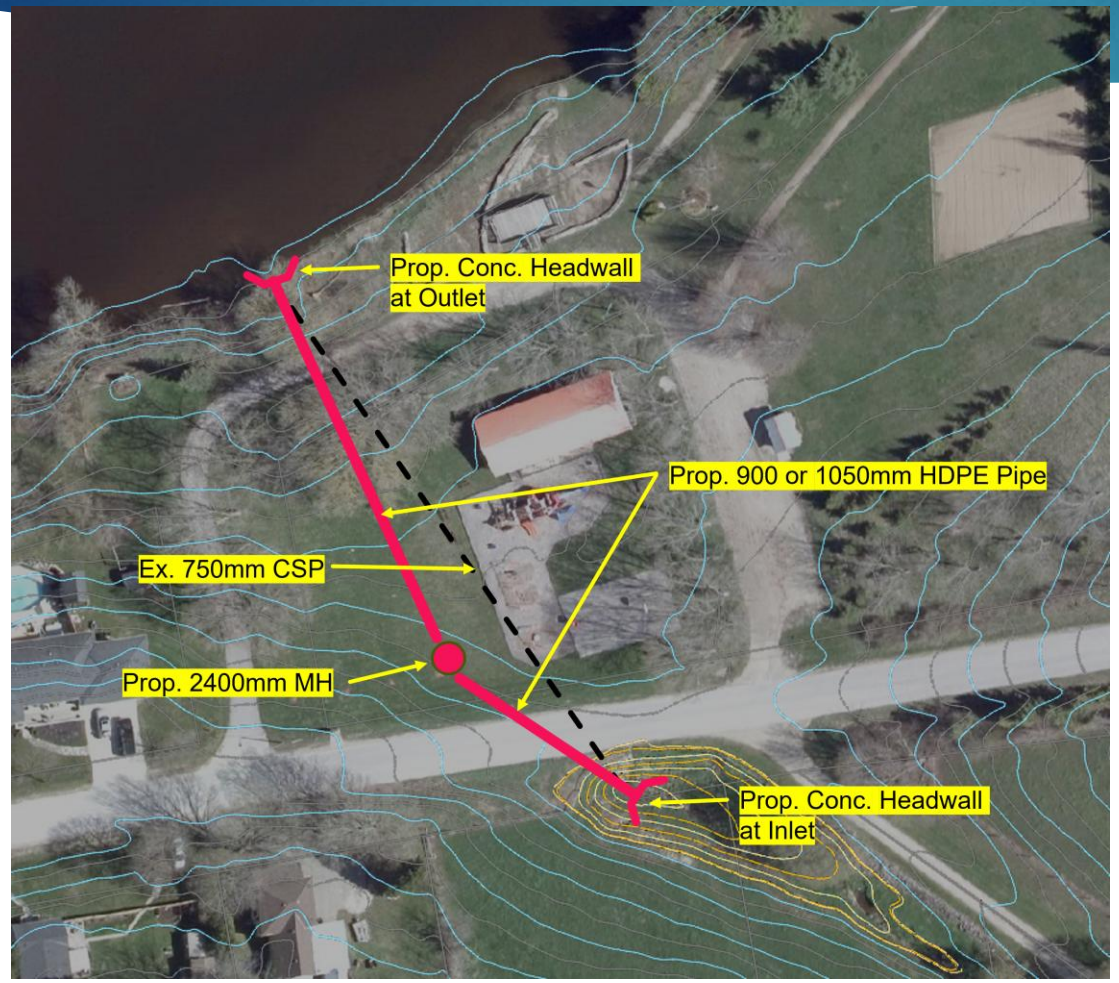
Catchment/Outlet #1 – Murphy St. @ Park - 64 Ha Drainage Area
~750mm Dia. Culvert Outlet



- Murphy Street culvert undersized (cannot convey 25 yr storm without overtopping) ✘
- This culvert is in poor condition near outlet ✘

Potential Solutions / Next Steps

Catchment/Outlet #1 – Murphy St. @ Park - 64 Ha Drainage Area
~750mm Dia. Culvert Outlet



- Additional model refinement
- CCTV inspection of 750mm Culvert
- Culvert replacement – 900 or 1050mm dia.

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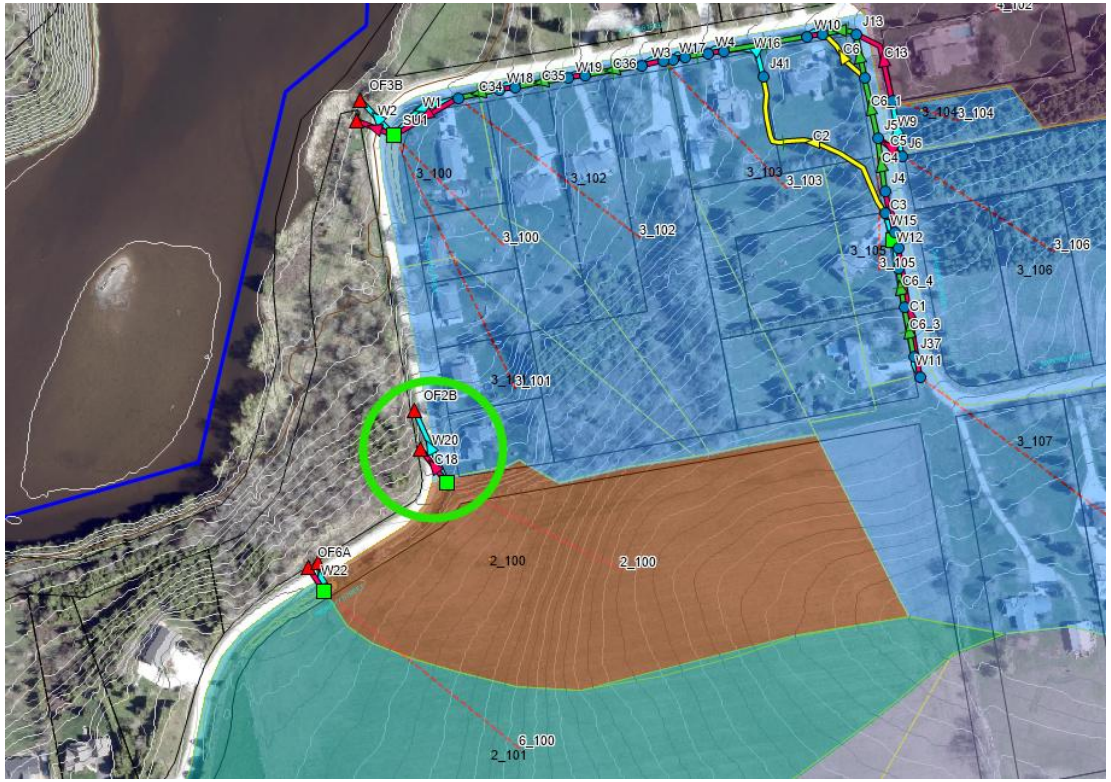
Existing Conditions Model Results

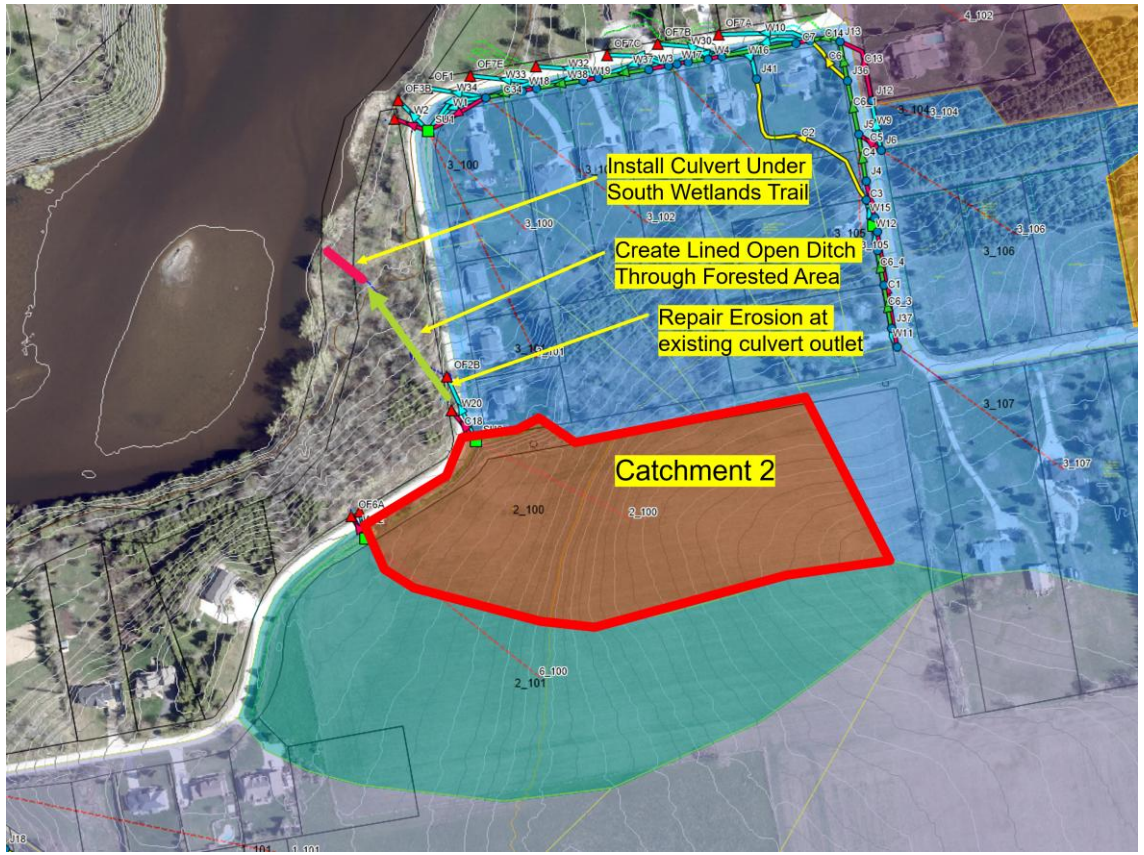
Catchment/Outlet #2 – @ Murphy/Glasgow Bend - 3 Ha Drainage Area
450mm Dia. Culvert Outlet



- Culvert sufficiently sized ✓
- Erosion at outlet ✘
- No defined conveyance from culvert outlet to river, flows across trail ✘

Potential Solutions / Next Steps

Catchment/Outlet #2 – @ Murphy/Glasgow Bend - 3 Ha Drainage Area
450mm Dia. Culvert Outlet



- CCTV inspection of 450mm Culvert
- Repair Outlet Erosion
- Create lined ditch from culvert outlet to river incl. culvert under trail

Existing Conditions Model Results

Catchment/Outlet #3 – @ Glasgow/Clyde Bend - 12 Ha Drainage Area
~900mm Dia. Culvert Outlet

- 900mm culvert at Clyde/Glasgow bend and most driveway culverts in Clyde St south ditch are sufficiently sized ✓
- Two (2) driveway culverts in Clyde St south ditch are undersized ✘
- Flows along Ayrshire St west ditch spill onto private property at south side of driveway to #425 Ayrshire during 100 yr storm ✘
- Ayrshire St west ditch adjacent to #460 Clyde St sufficiently sized but sensitive to conveyance reductions - undesirable
- Spills from Clyde St south ditch across to Clyde St north ditch under several storm scenarios – undesirable
- Clyde St north ditching poorly defined, allowing spills onto private property ✘

Potential Solutions / Next Steps

Catchment/Outlet #3 – @ Glasgow/Clyde Bend - 12 Ha Drainage Area
~900mm Dia. Culvert Outlet

- Identified potential solutions / next steps broken up into two broad categories
  1. Operations, Maintenance & Other
  2. Infrastructure Improvements

Potential Solutions / Next Steps

Catchment/Outlet #3 – @ Glasgow/Clyde Bend - 12 Ha Drainage Area
~900mm Dia. Culvert Outlet

- Operations, Maintenance & Other
  - Implement monitoring program and ensure regular maintenance of drainage infrastructure
    - Infrastructure projects not a substitute for regular maintenance
    - Example: when 50+ mm rainfall is forecasted for a 24-hr period, Township staff to complete sweep of drainage area and check for obvious deficiencies and blockages

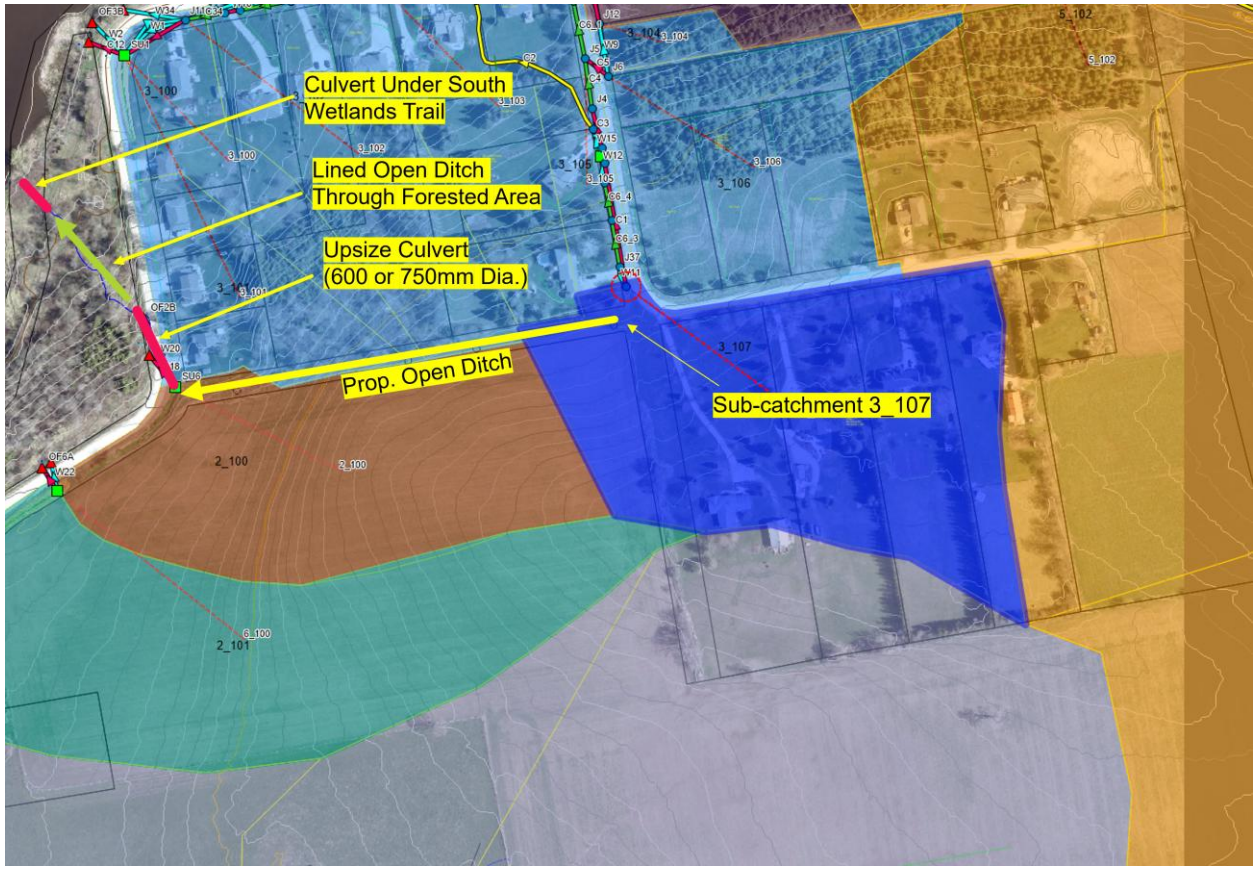
Potential Solutions / Next Steps

Catchment/Outlet #3 – @ Glasgow/Clyde Bend - 12 Ha Drainage Area
~900mm Dia. Culvert Outlet

- <u>Operations, Maintenance & Other</u>
  - CCTV inspect all drainage infrastructure in Catchment Area to assess condition, complete culvert cleaning where required
  - Ensure all ditching is properly defined and complete minor excavation as required to accomplish this
  - Private property upgrades by homeowners can be helpful for extra protection above and beyond design conveyance capacity of Township infrastructure

Potential Solutions / Next Steps

Catchment/Outlet #3 – @ Glasgow/Clyde Bend - 12 Ha Drainage Area
~900mm Dia. Culvert Outlet



- <u>Infrastructure Improvement: Drainage Diversion</u>
  - Divert 3.6 Ha sub-catchment located south of Oxford St. to Outlet #2 via open ditch through unopened ROW.
  - Requires upgrade of Outlet #2 at Murphy/Glasgow
  - Would resolve deficiencies except for spills across Clyde Street

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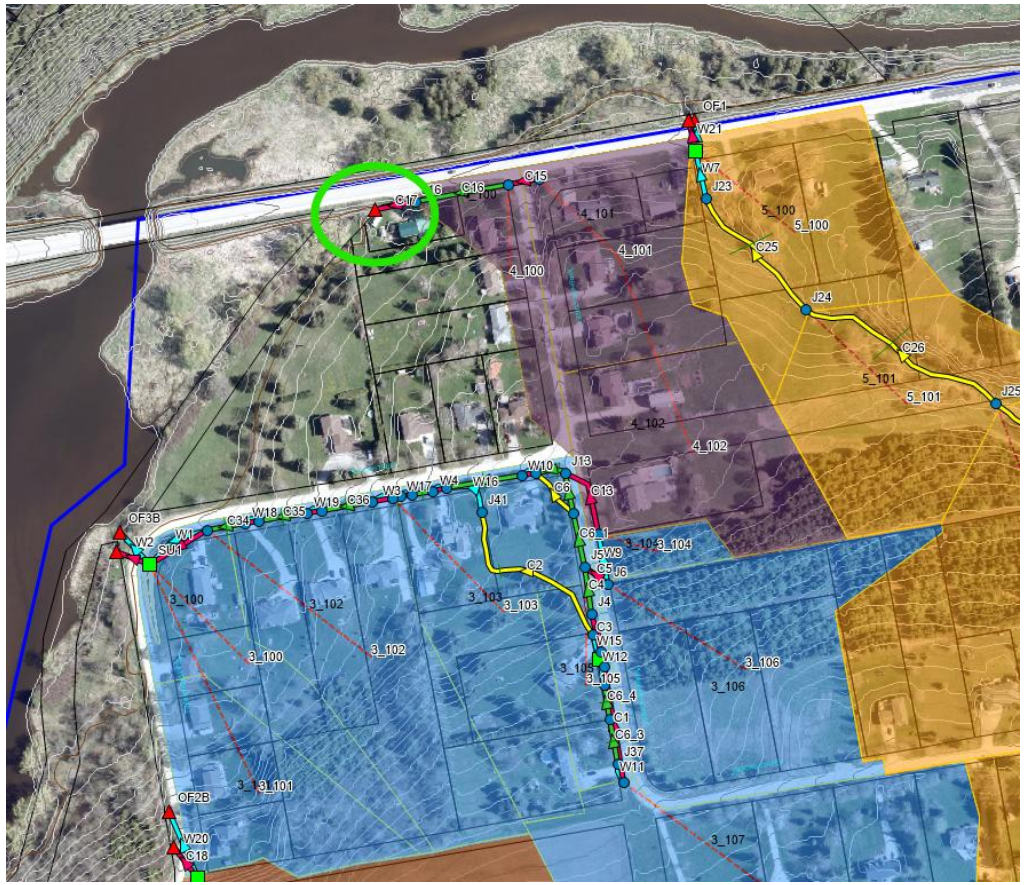
Potential Solutions / Next Steps

Catchment/Outlet #3 – @ Glasgow/Clyde Bend - 12 Ha Drainage Area
~900mm Dia. Culvert Outlet

- Infrastructure Improvement: Clyde Street Culvert/Ditching Upgrades
  - At minimum, consider upgrading undersized culverts in south ditch and improving ditching in north ditch
  - Larger project: uniformly increase south ditch driveway culvert capacity – either increase size or twin
  - Larger project would resolve deficiencies except for private property spills along Ayrshire Street west ditch
  - Combination project (culvert/ditching upgrades coupled with the diversion project) could resolve all deficiencies in this Catchment

Existing Conditions Model Results

Catchment/Outlet #4 – @ Queen St. South Side - 3 Ha Drainage Area
~600mm Dia. Culvert Outlet



- Culvert sizes sufficient to meet Township standards ✓
- Ditching along Ayrshire Street (Clyde to Queen) poorly defined and some culverts buried ✗

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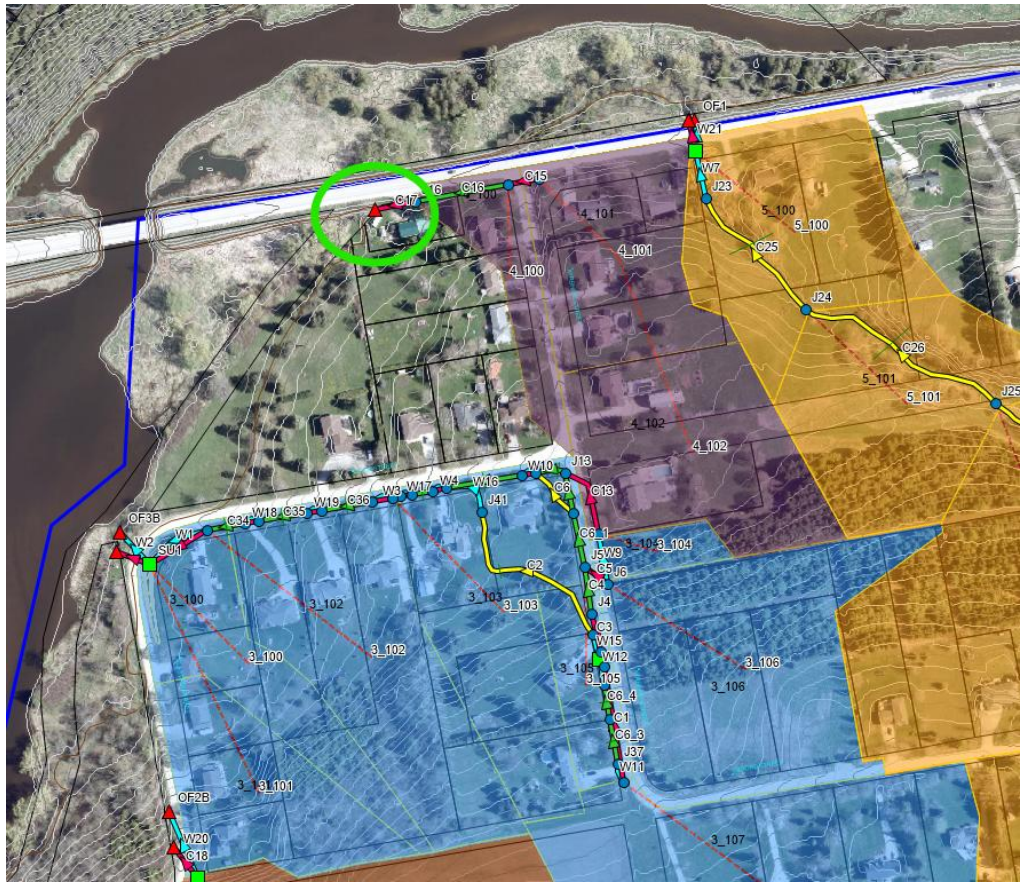
Potential Solutions / Next Steps

Catchment/Outlet #4 – @ Queen St. South Side - 3 Ha Drainage Area
~600mm Dia. Culvert Outlet



- Ditching improvements – minor excavation - along Ayrshire Street (Clyde to Queen) on both sides
- Replace existing driveway culverts

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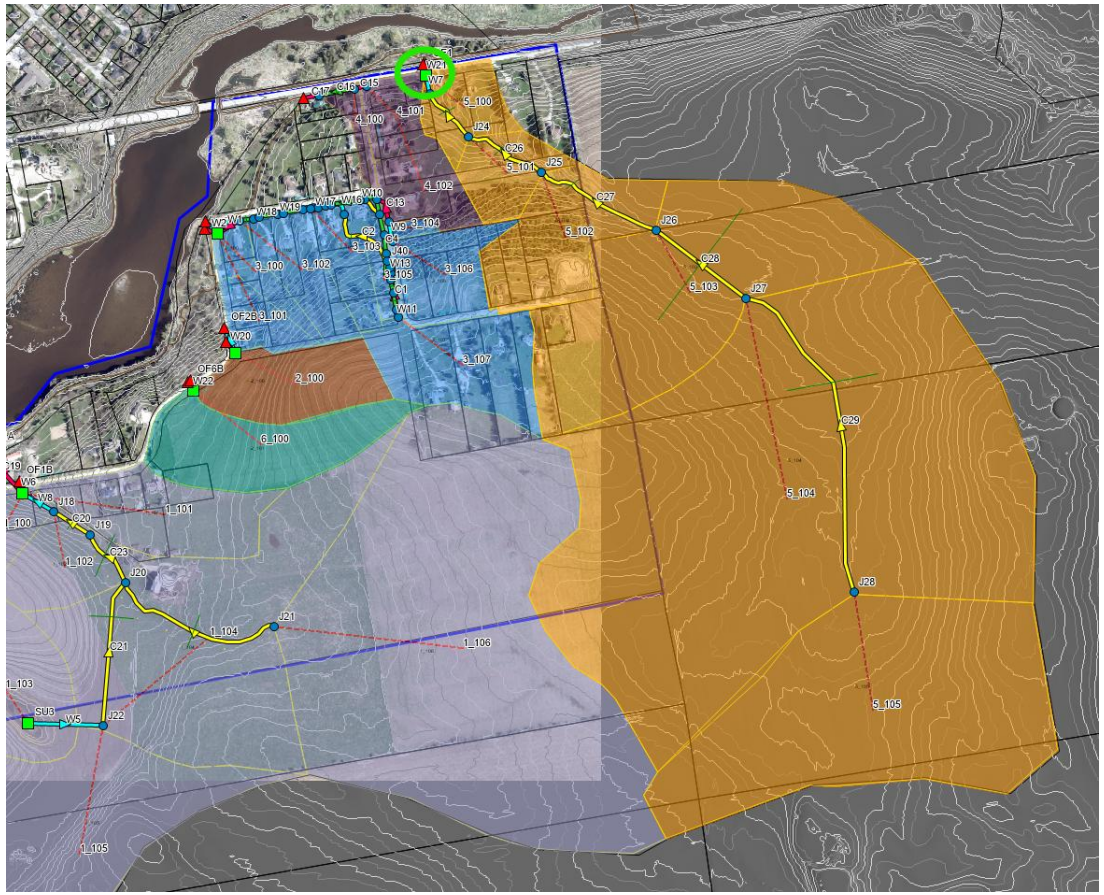
Existing Conditions Model Results

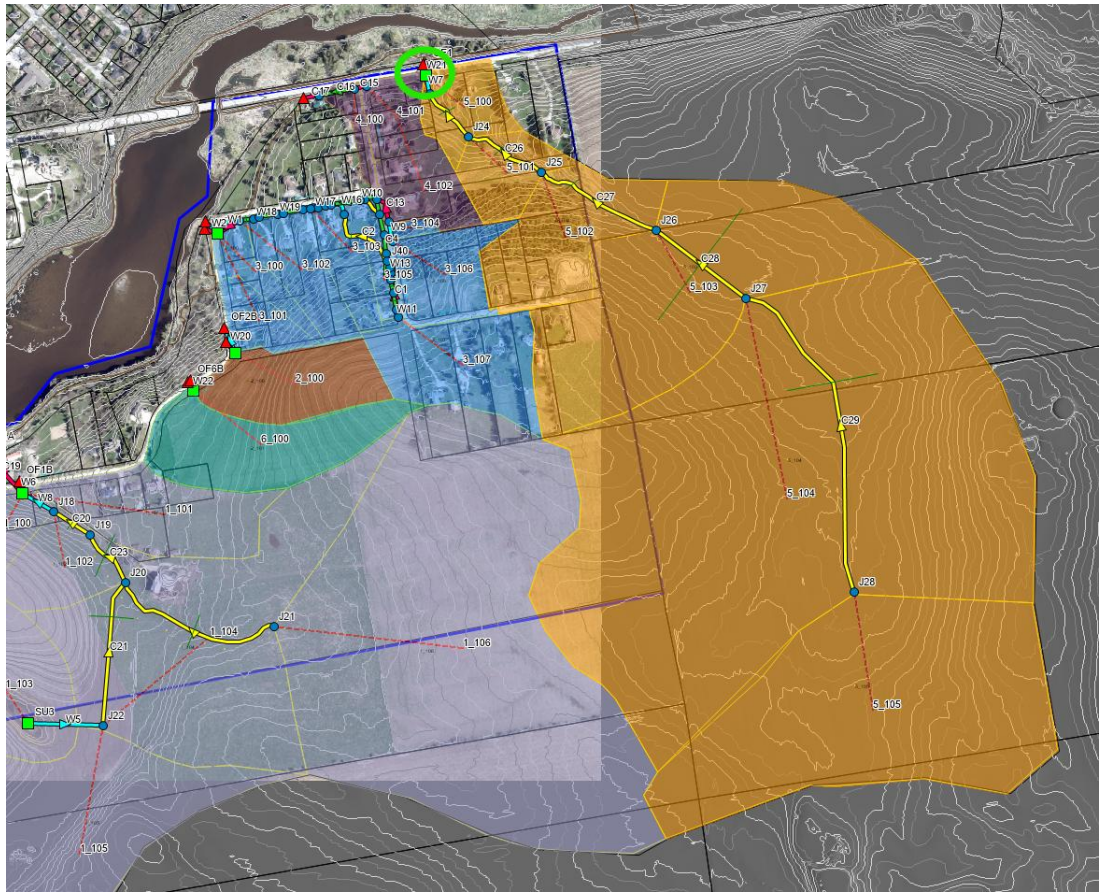
Catchment/Outlet #5 – @ Queen St. North Side - 73 Ha Drainage Area
1200mm Dia. Culvert Outlet



- 1200mm culvert size sufficient to meet Township standards ✓
- Under 100 yr storm, overflow routed to west along South Ditch to Outlet #4 - undesirable
- Significant erosion at downstream end of culvert (culvert is within connecting link) ✘

Potential Solutions / Next Steps

Catchment/Outlet #5 – @ Queen St. North Side - 73 Ha Drainage Area
1200mm Dia. Culvert Outlet



- CCTV inspection of existing 1200mm culvert
- Further model refinement to confirm spill to west
- Repair erosion/scour at downstream end
- Candidate for provincial funding since in connecting link

Existing Conditions Model Results

Outlet #6 – 80m SW of Murphy/Glasgow Bend - 4 Ha Drainage Area
450mm Dia. Culvert Outlet

- Culvert under Murphy Street size is sufficient ✓
- Upstream end of culvert is partially crushed, probably restricting true capacity ✘
- Erosion at culvert outlet across South Wetlands trail ✘

Potential Solutions / Next Steps

Outlet #6 – 80m SW of Murphy/Glasgow Bend - 4 Ha Drainage Area
450mm Dia. Culvert Outlet

- Replace existing culvert under Murphy Street
- Replace existing culvert under South Wetlands Trail

Summary

- Stormwater modelling completed in study area to identify deficiencies
- Several capacity and maintenance deficiencies were discovered
- For large catchments, further model refinement is recommended before commencing major improvements
- An overall physical condition assessment including CCTV inspection of major culverts would provide valuable information to aid in decision making
- Routine monitoring and maintenance are critical to ensure optimal functionality of the system
- Some capital infrastructure improvements could be implemented, especially in Catchment 3 (Ayrshire/Clyde area) to resolve deficiencies

Questions/Comments?

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