

Beaver Dam Drain Public Information Centre

November 19, 2019 18:00

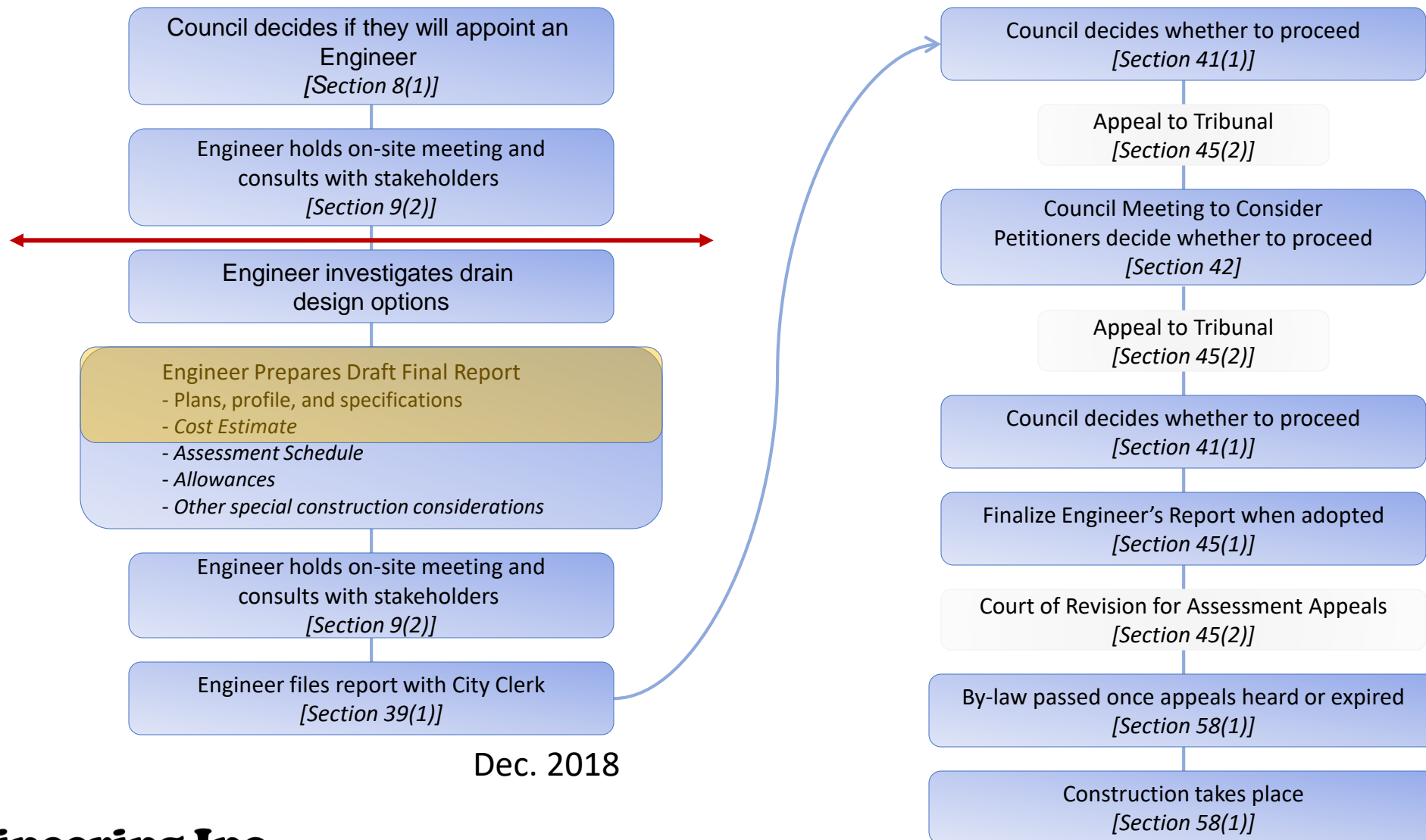
Council Chambers CITY HALL

66 Charlotte St, Port Colborne, ON L3K 3C8

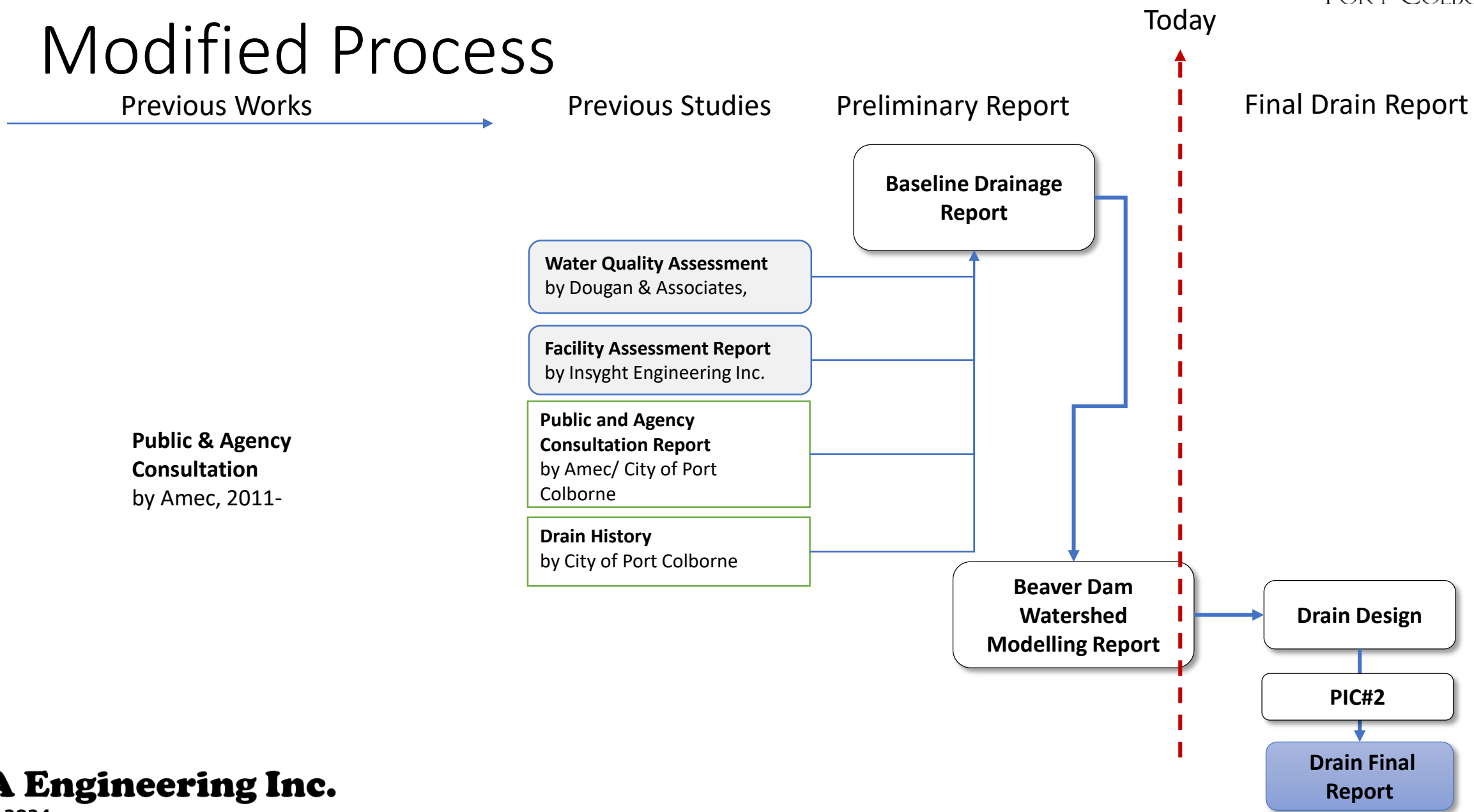
Agenda

- Role of Public Information Centre in the Drainage Act
- Drainage History
- Baseline Report Highlights
- Beaver Dam Watershed Modelling
- Baseline Report Review and Public Input / Comments
- Next Steps
 - PIC #2

The Ontario Drainage Act Process



Modified Process



Drain Composition

West Branch

ROW Drainage

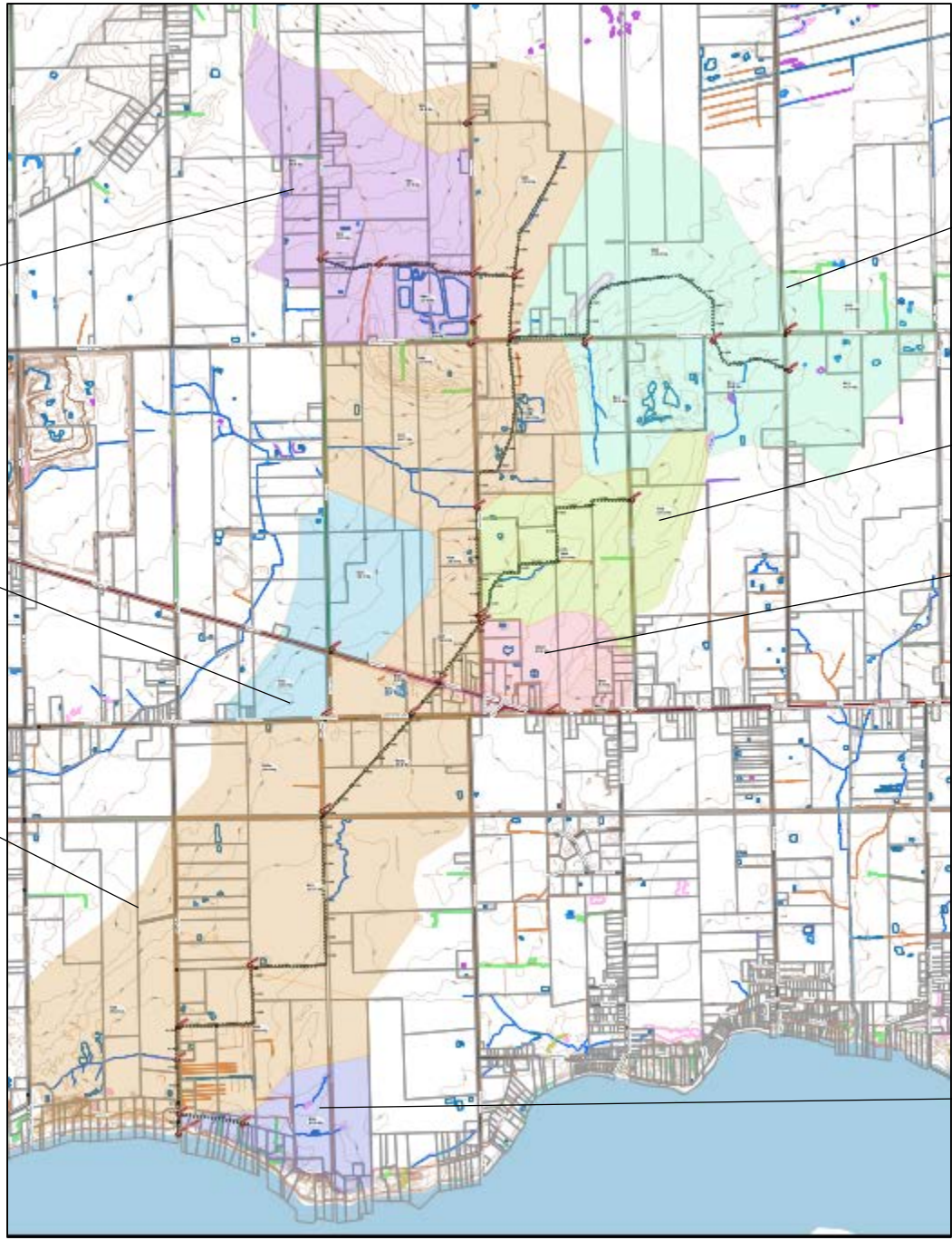
Beaver Dam Drain

East Branch

James Craig Agreement

David Michener Award

CIP Arch Catchment



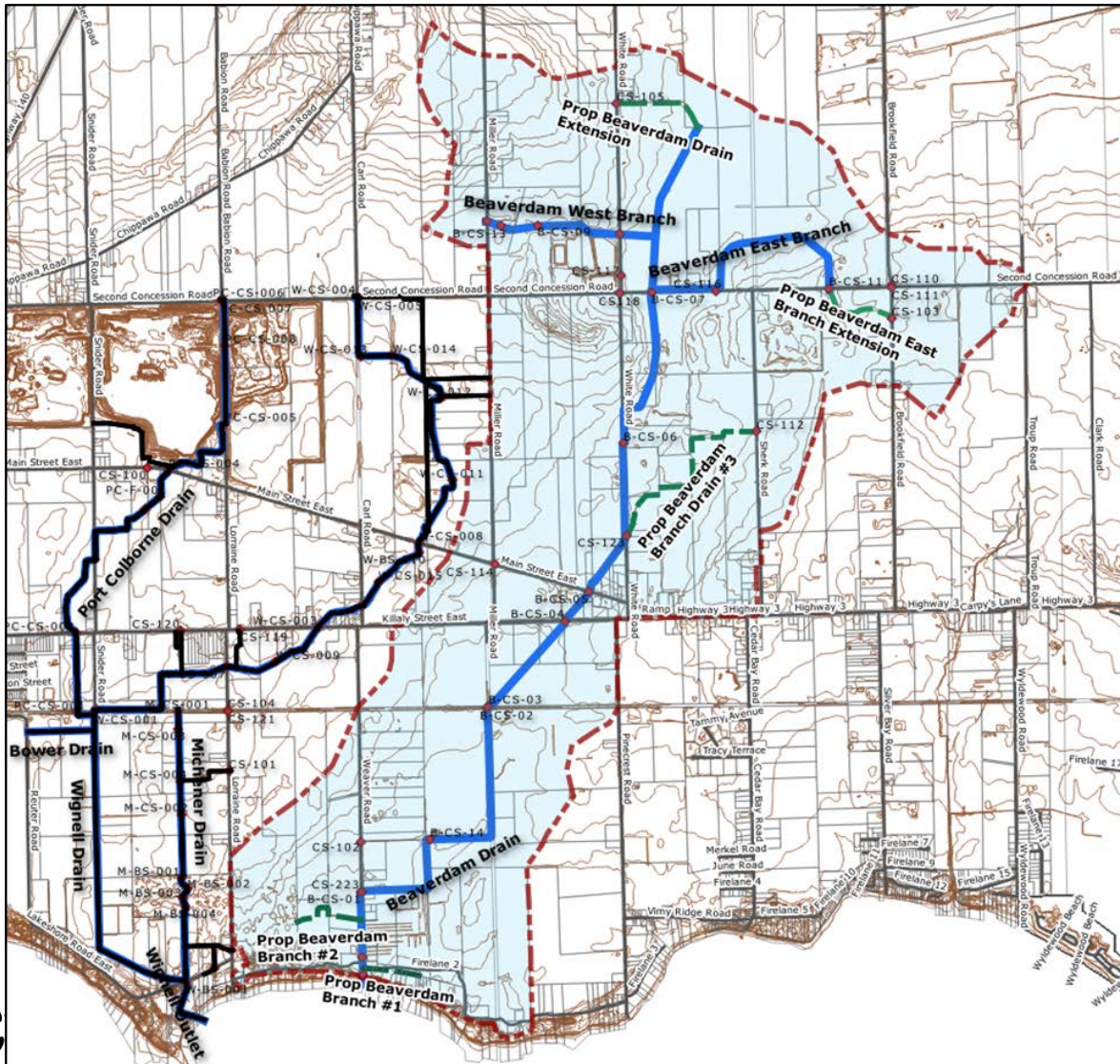
Baseline Report – Overview

Baseline Report

Baseline Plan & Profile Drawings

Environmental Conditions

Baseline Report

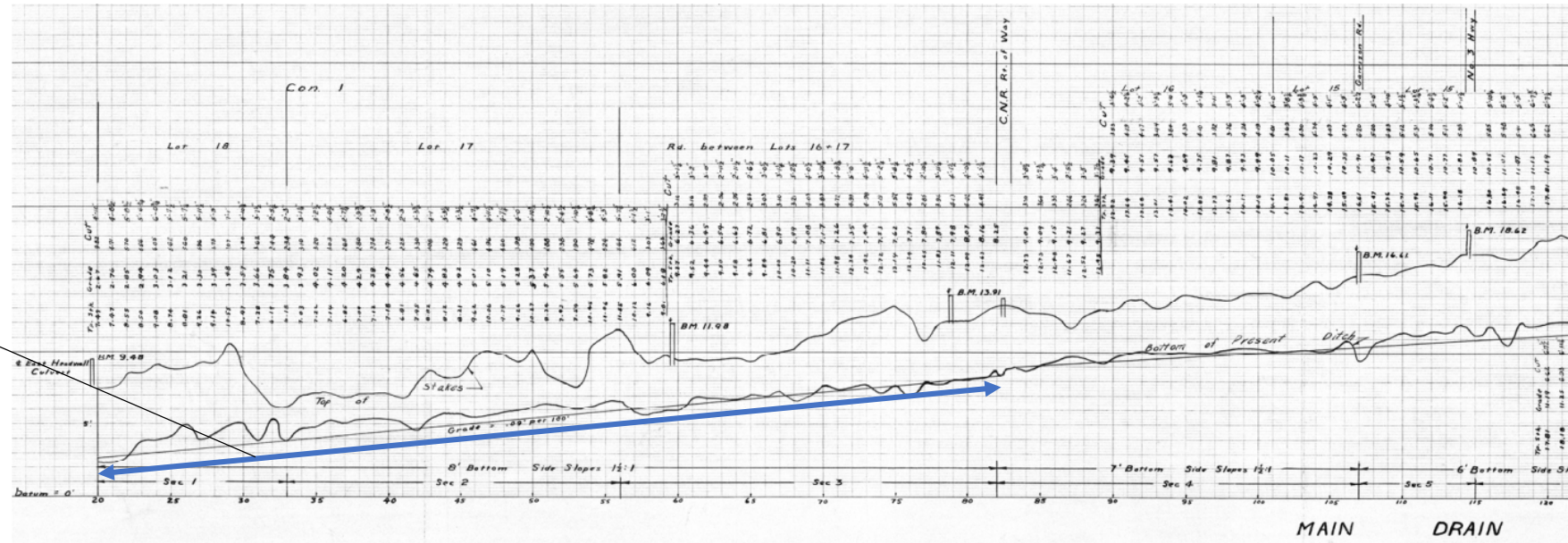


- Serves an area of 1236 hectares based on the defined drain boundary.
- The main branch of the drain is 6,650m in length from 1000m north of Second Concession Rd. to the outlet into Lake Erie.
- The watershed boundary or high point is 194m. The average lake level is 174.15. The lake level fluctuates and for the month of June, 2019 has been at record levels 1.6 & 1.8 above chart datum, 173.5m (175.1m to 175.3)
- Control Gate Sill elevations;
 - East side is 174.05
 - West side is 174.45
- This Beaver Dam drain slope characterises as low slope or slow watershed.
 - Watershed average fall (slope) is given as 0.24% or 2.4m per 1000m
 - Drain average fall (slope) is given as 0.062% or 0.62m per 1000m

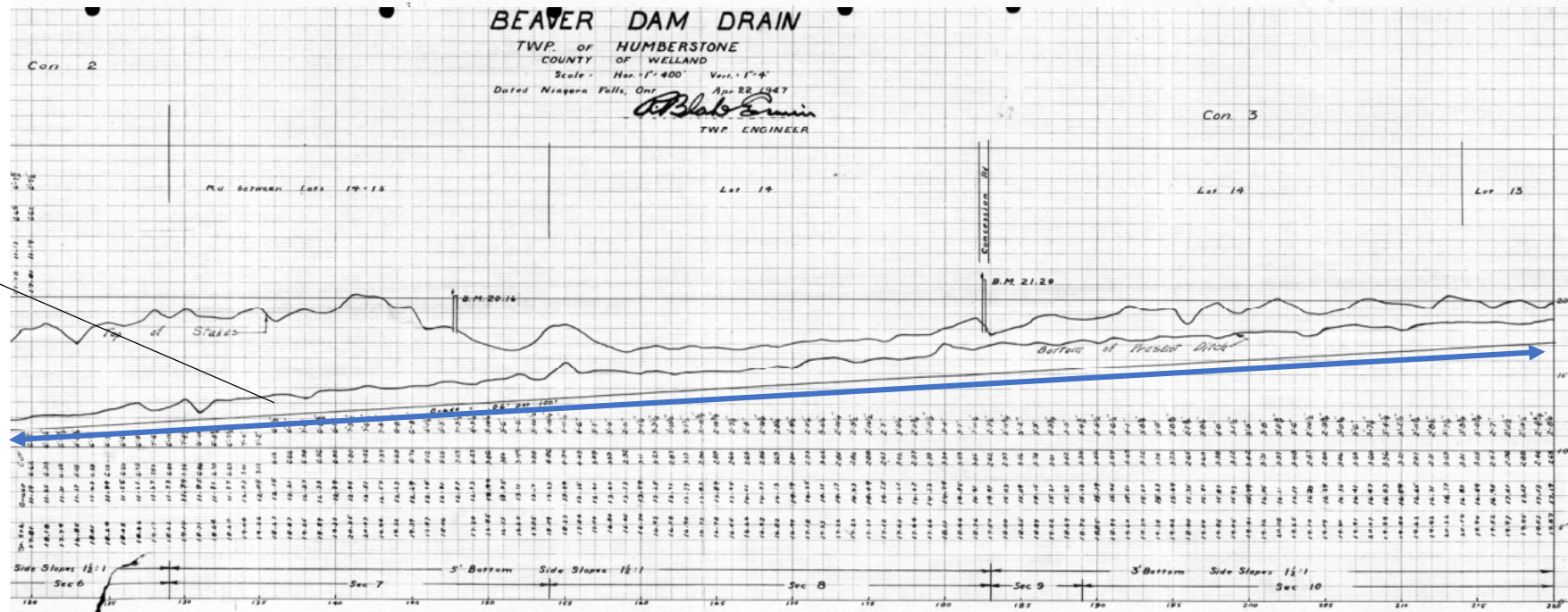
Drain History

- Dates back to 1885
 - earliest record of the Beaver Dam Drain dates back to 1885 in the requisition by Samuel Knisley, Frederick Knoll & others in the Geo. Ross award for the deepening and maintaining of the Beaver Dam Ditch. Later, the Geo. Ross petition of 1890 was awarded for the Deterling-Noxel extension of the Beaver Dam Ditch that later became the West Branch Drain
- 1905 - the James Craig Agreement Ditch
- April 27, 1916
 - repairs to the northern part of the Drain and to the East Branch, along Second Concession Road.
- Engineer's Report of 1947
 - - drainage area of 2550 acres (1000 ha).
 - flooded constantly
 - the drain width was 0.9 m at the north and 2.4 m at Lake Erie.
- Flood control gates
 - 1954, the first petition by Lawrence F. Townsend & others
 - Engineer's Report dated May 28, 1973 was prepared by C.J. Clarke regarding the flood control for the Beaver Dam Drain ARDA Grant.
 - In 1982, maintenance works on the flood control gates was undertaken

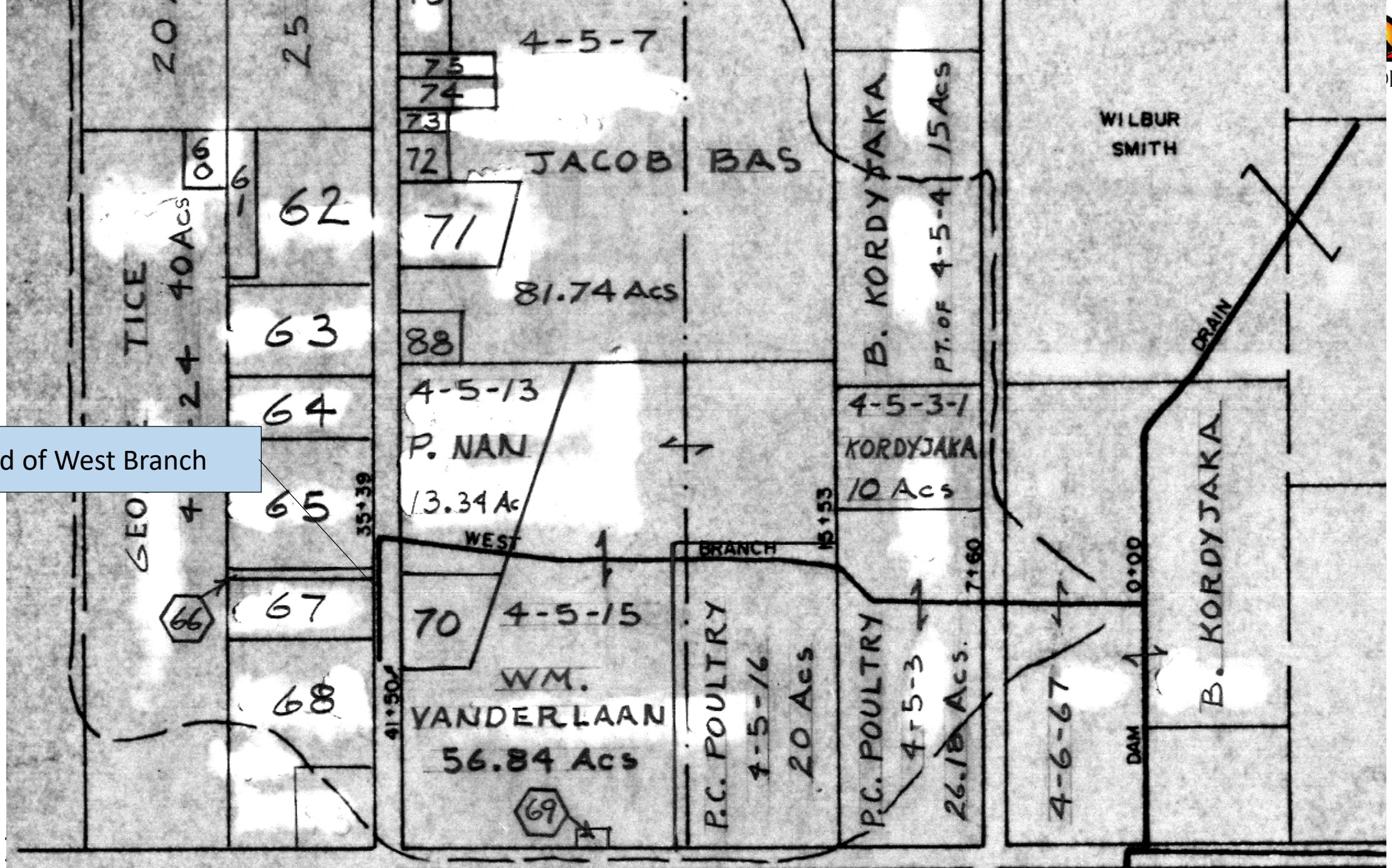
South of CNR/ Friendship Trail
Grade = .09' per 100'



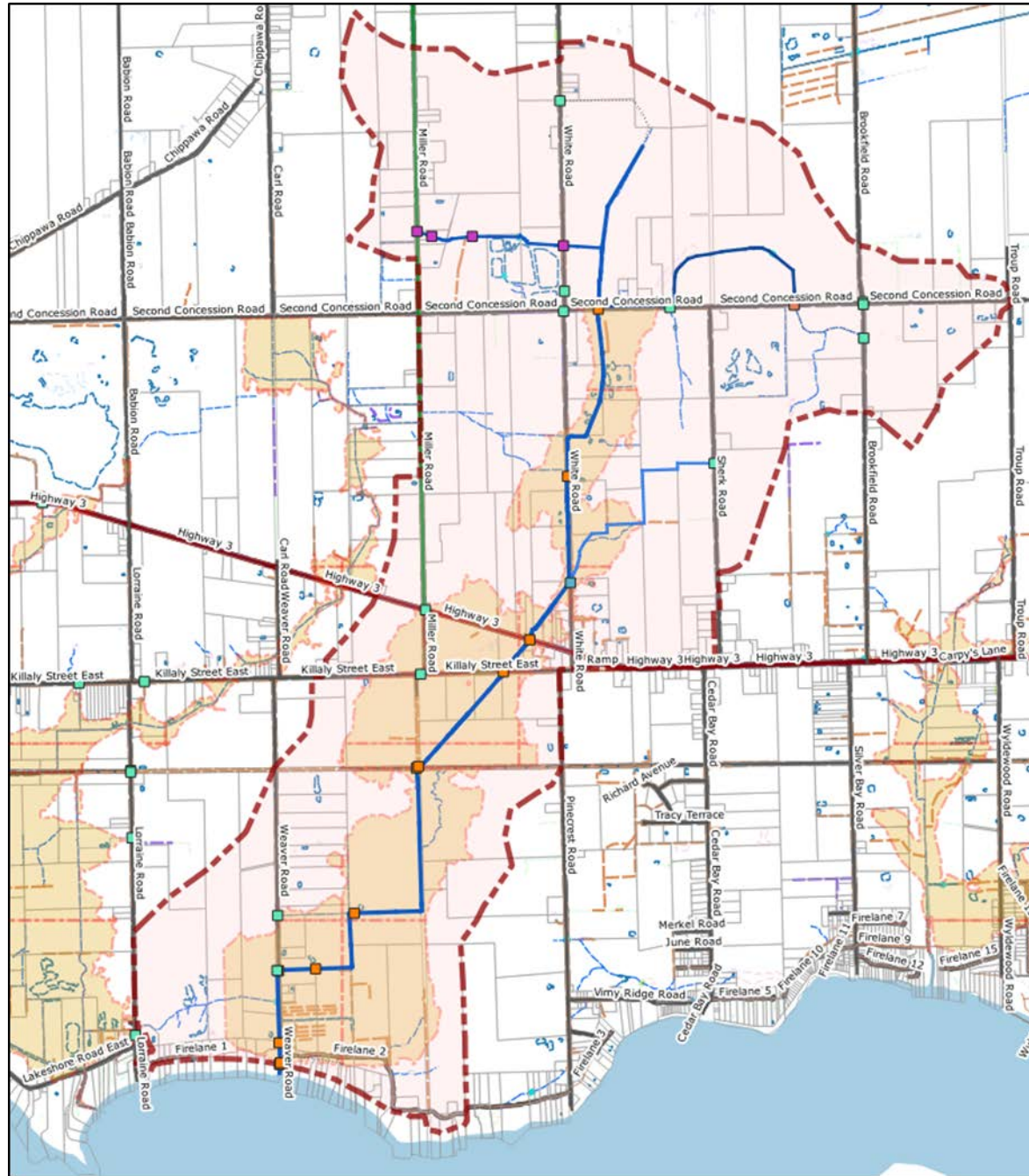
North of CNR/ Friendship Trail
Grade = .06' per 100'



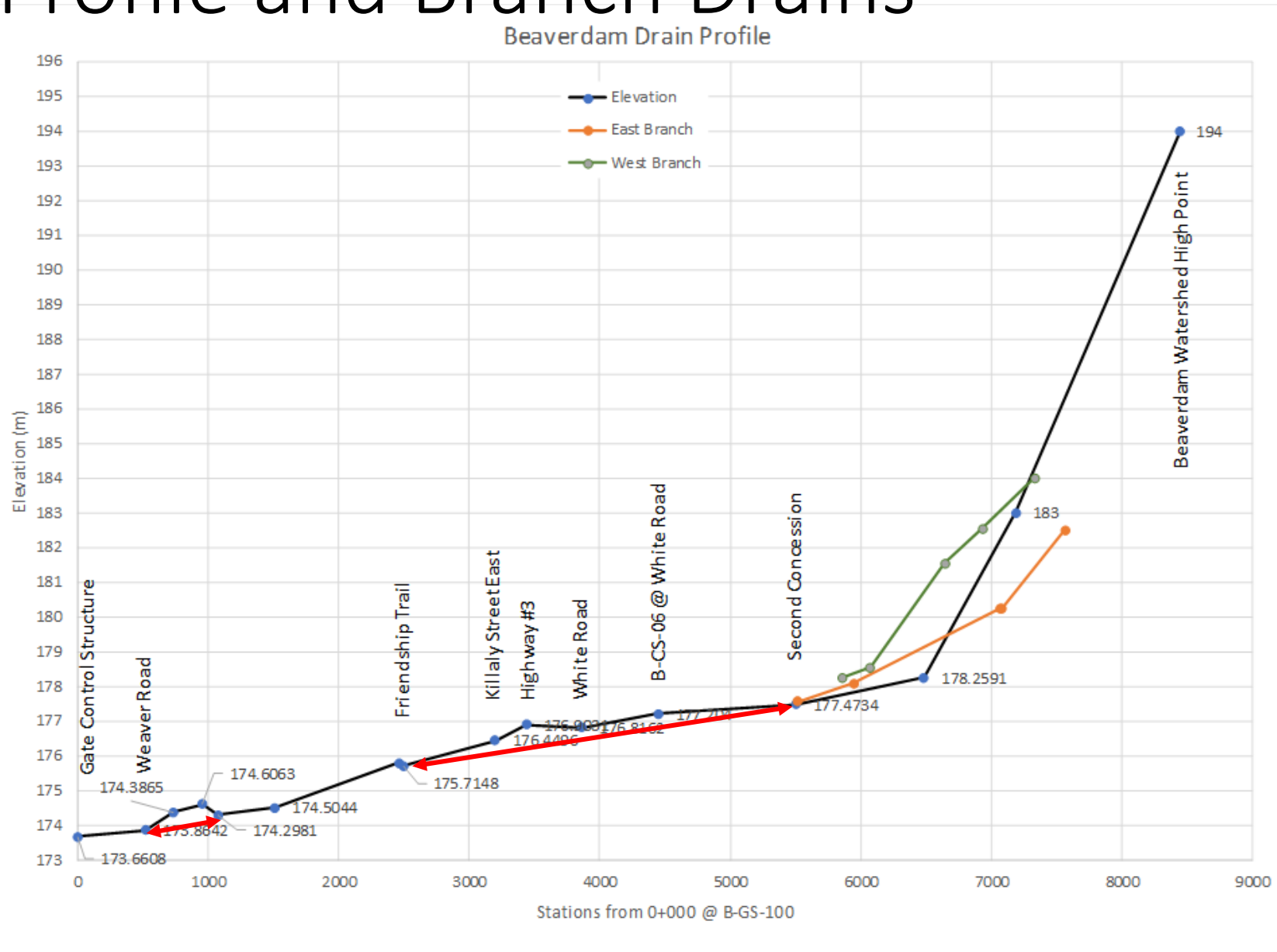
End of West Branch



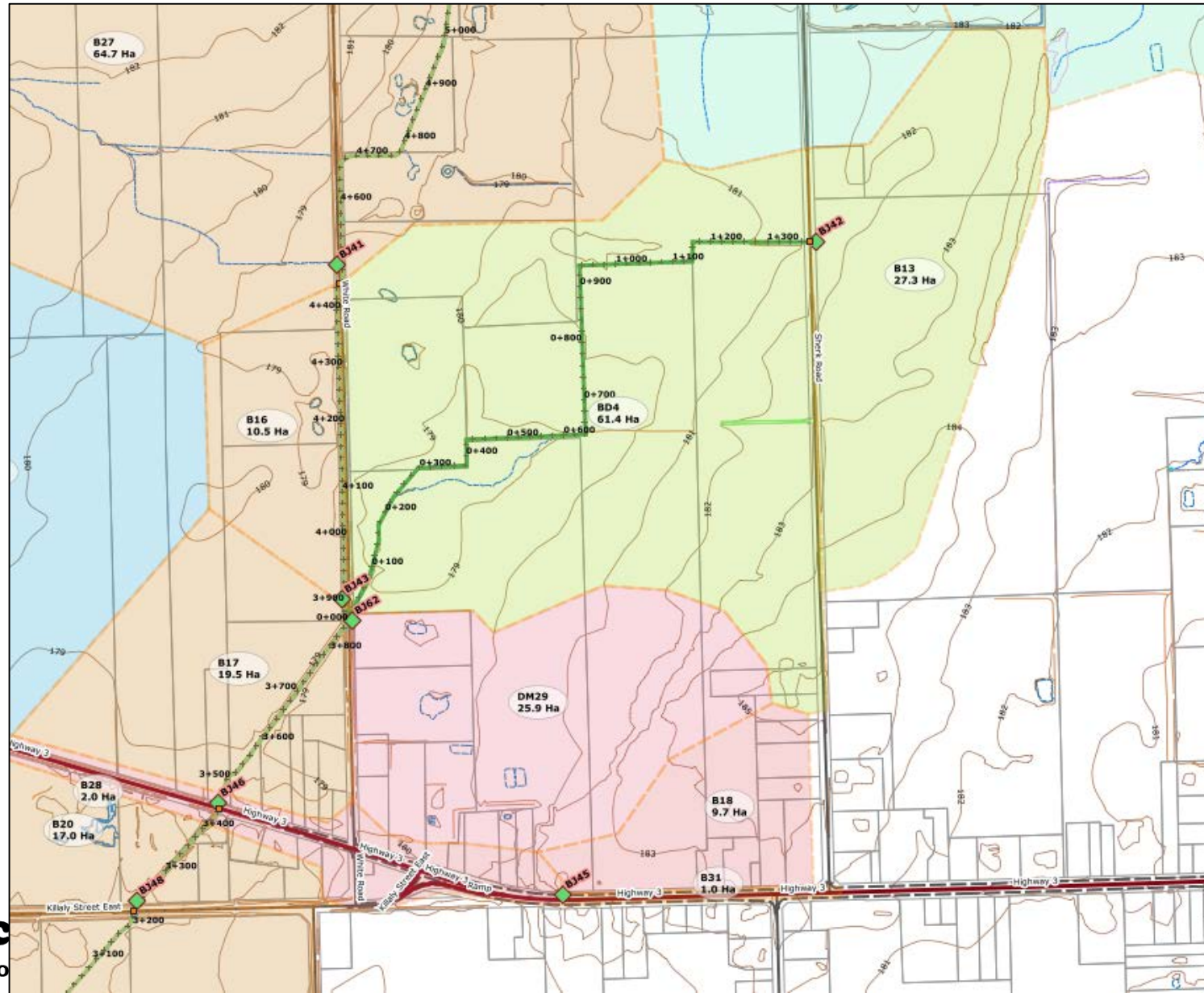
NPCA determined Floodlines



Drain Profile and Branch Drains



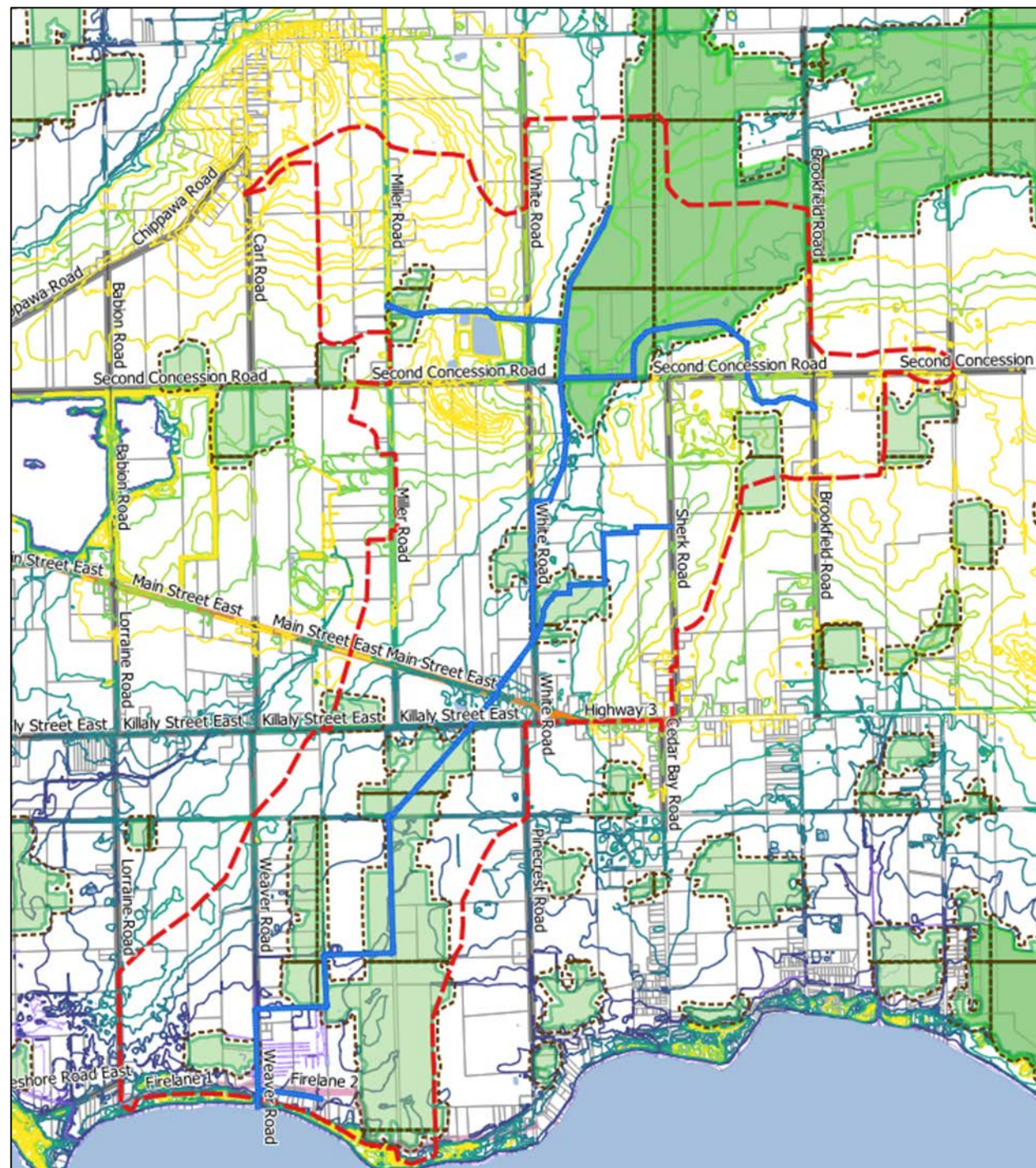
Agreement & Award Drains



Environment



PORT COLBORNE



Drain Status – Issues, Problems & Opportunities

- Has maintenance been regularly performed? Are the channels free and clear of obstructions.
- Are the culverts in good condition? Do they cause flooding? Is there a history of flooding.
- Is the existing infrastructure new or old?
- Are there environmental impacts that would affect the drain?
- Are there specific petition based improvements requested?
- Are there opportunities for improvement?

Channel Improvements



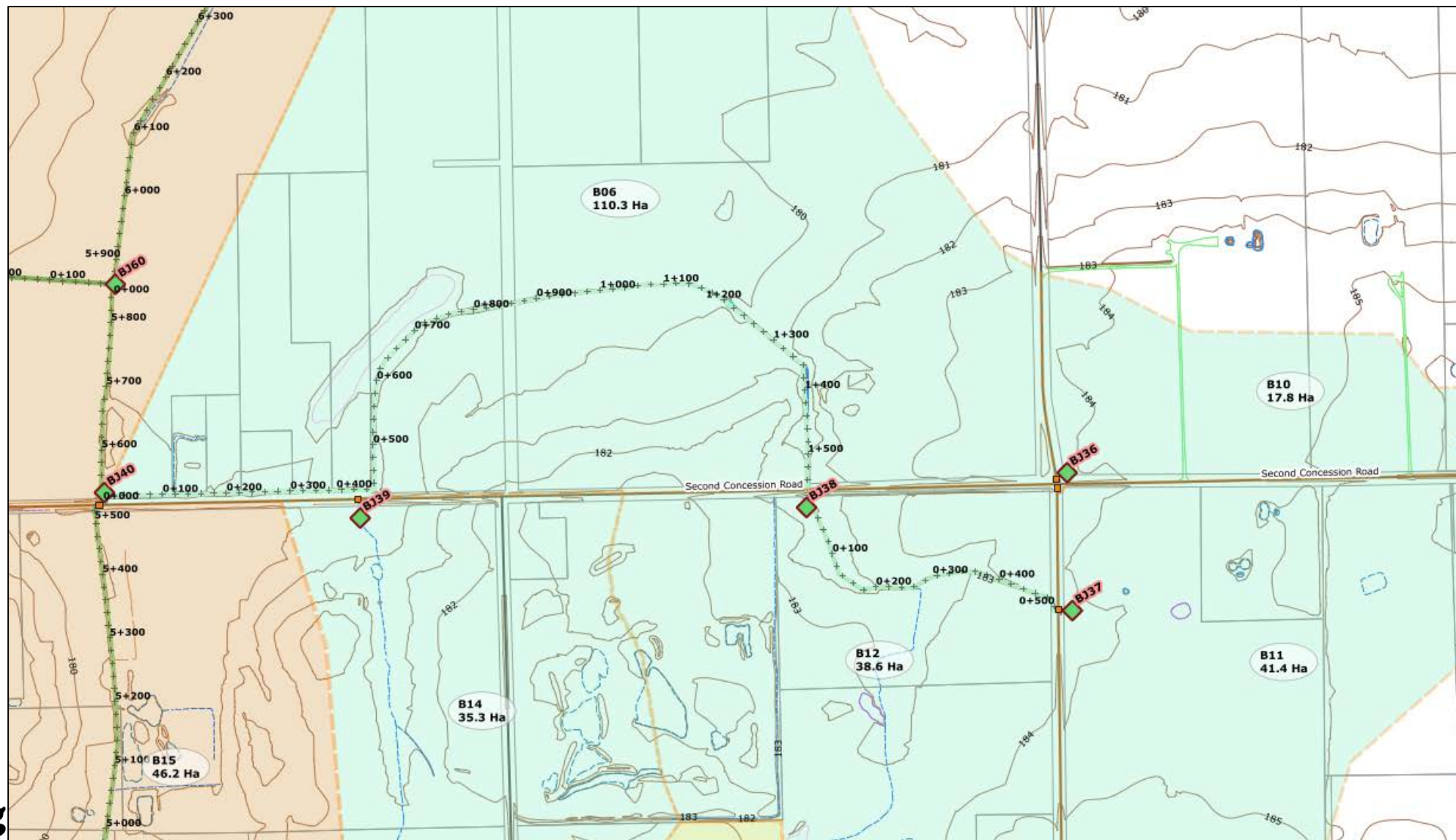
Good



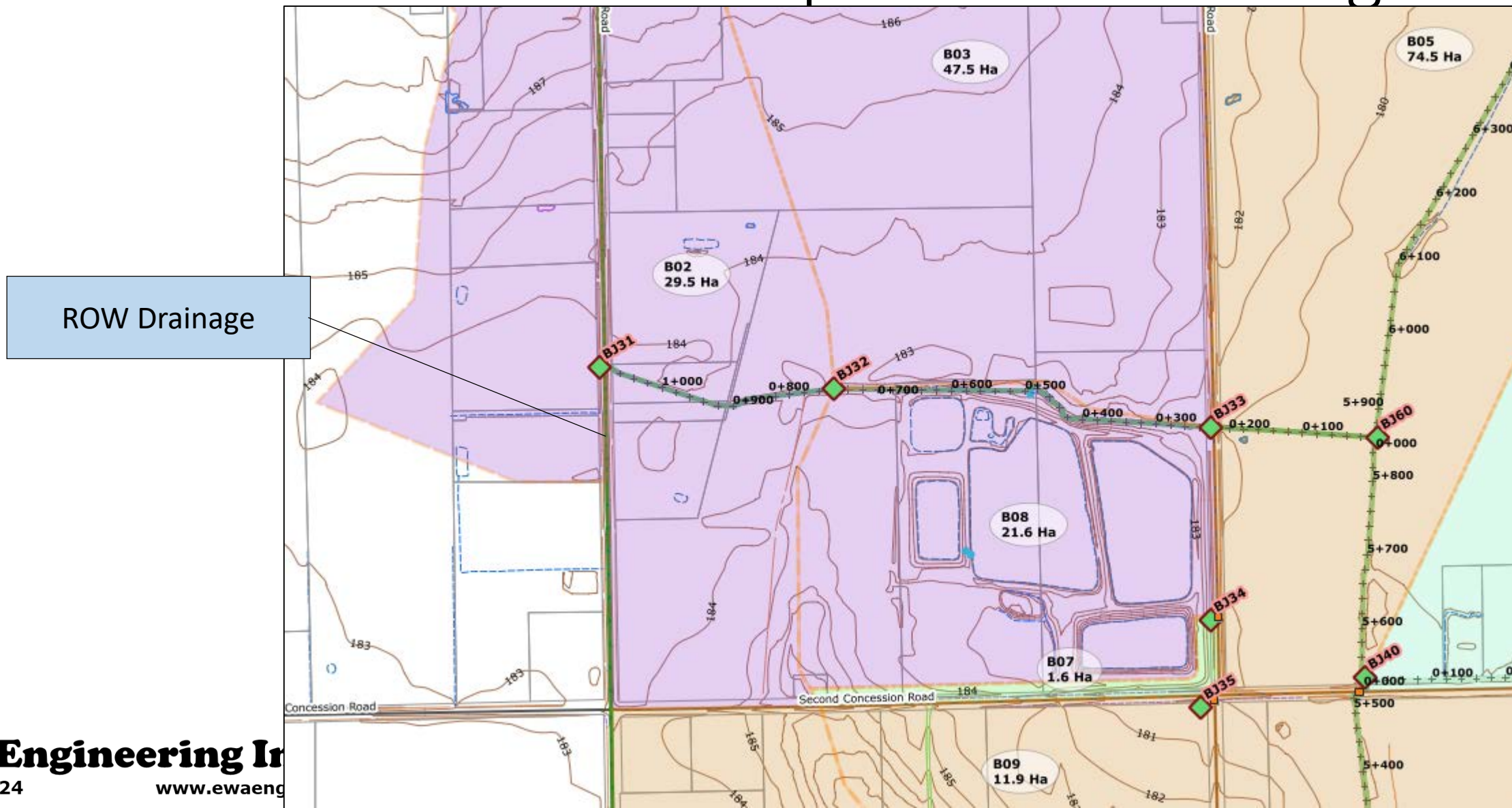
Beaver Dam looking Southwest from White Rd.



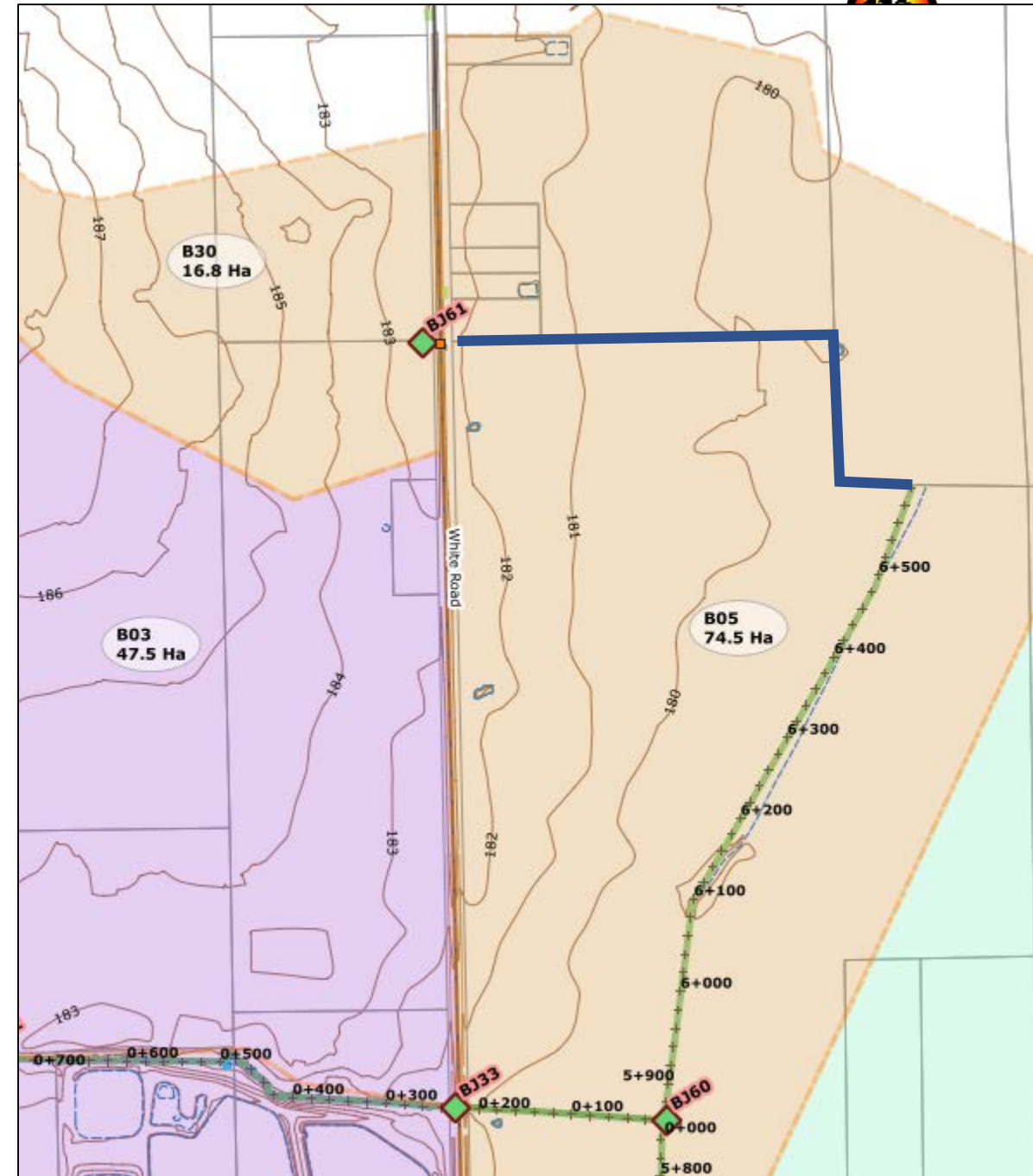
Extension Conversion to Closed Conduit Option



West Branch – Abandon portion of existing



Main Branch Extension

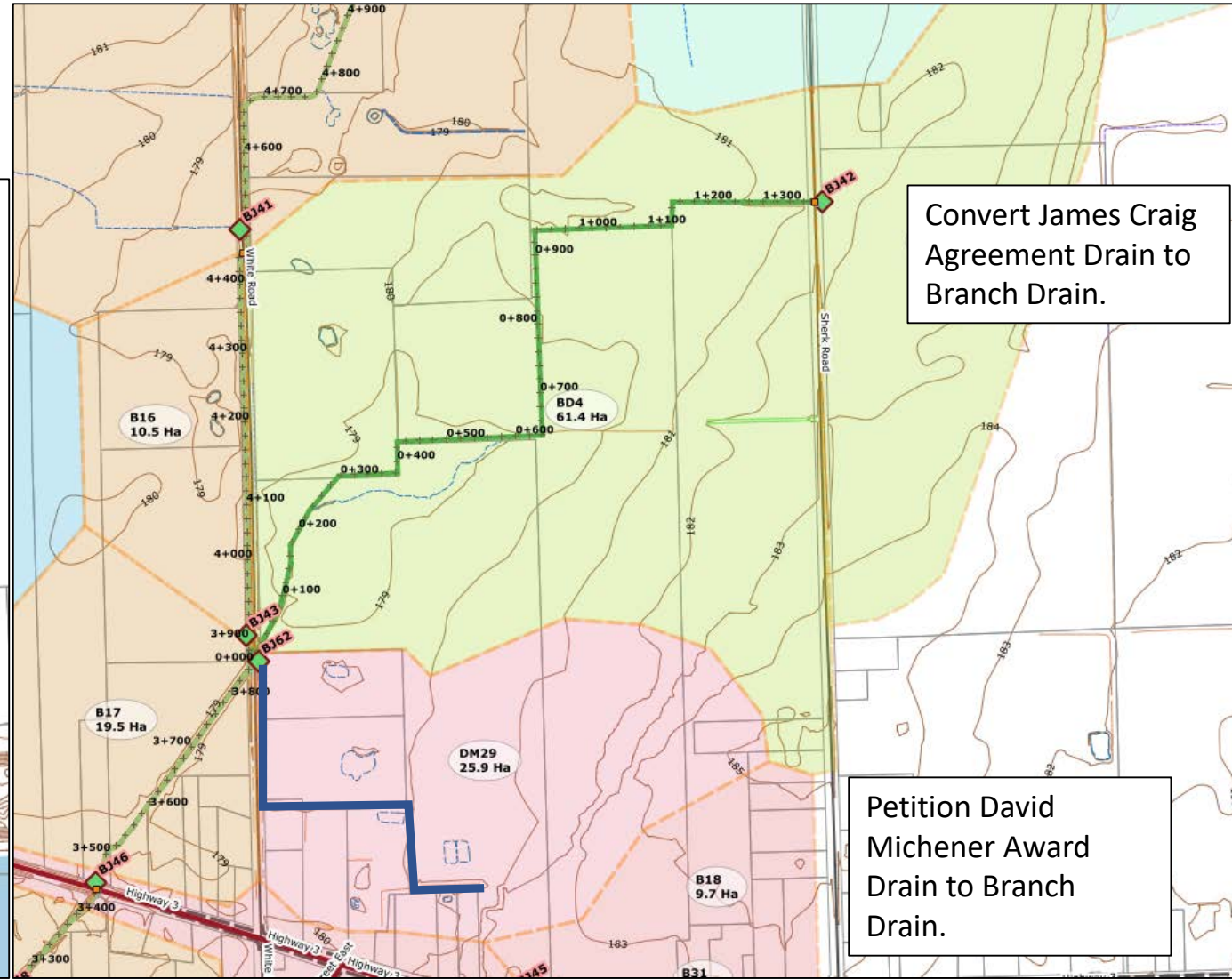


Branch Drains

Petition CIP Channel
to Branch Drain.

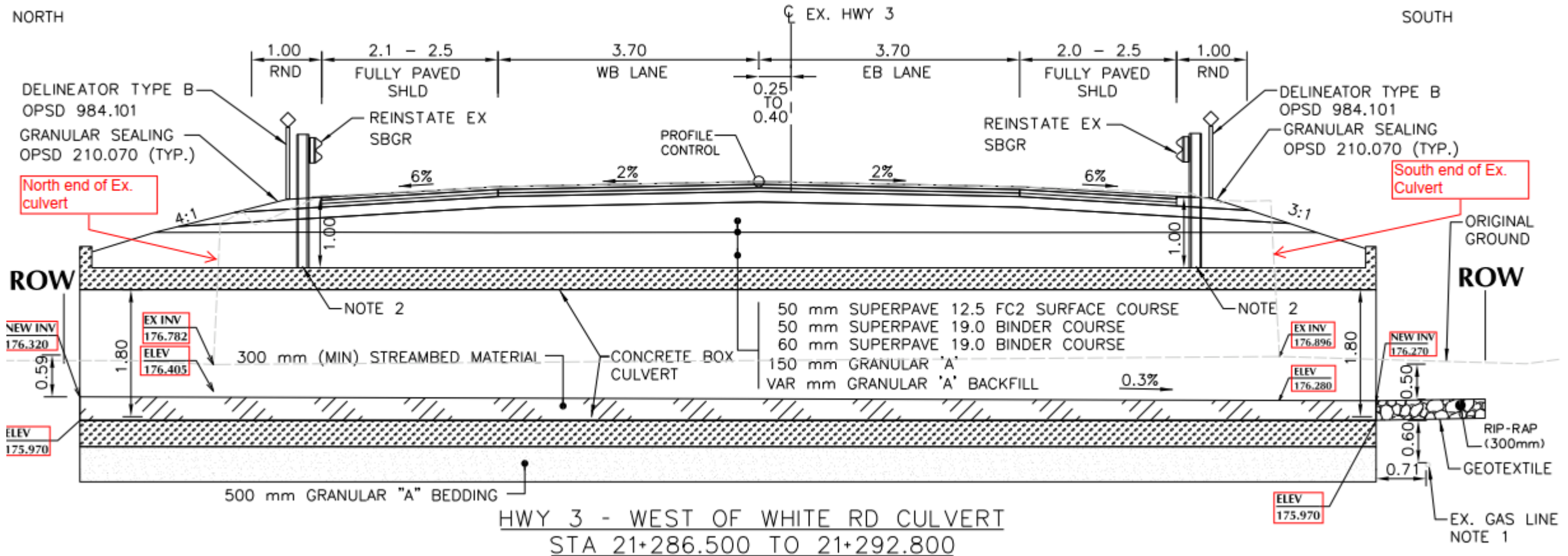


Convert James Craig
Agreement Drain to
Branch Drain.

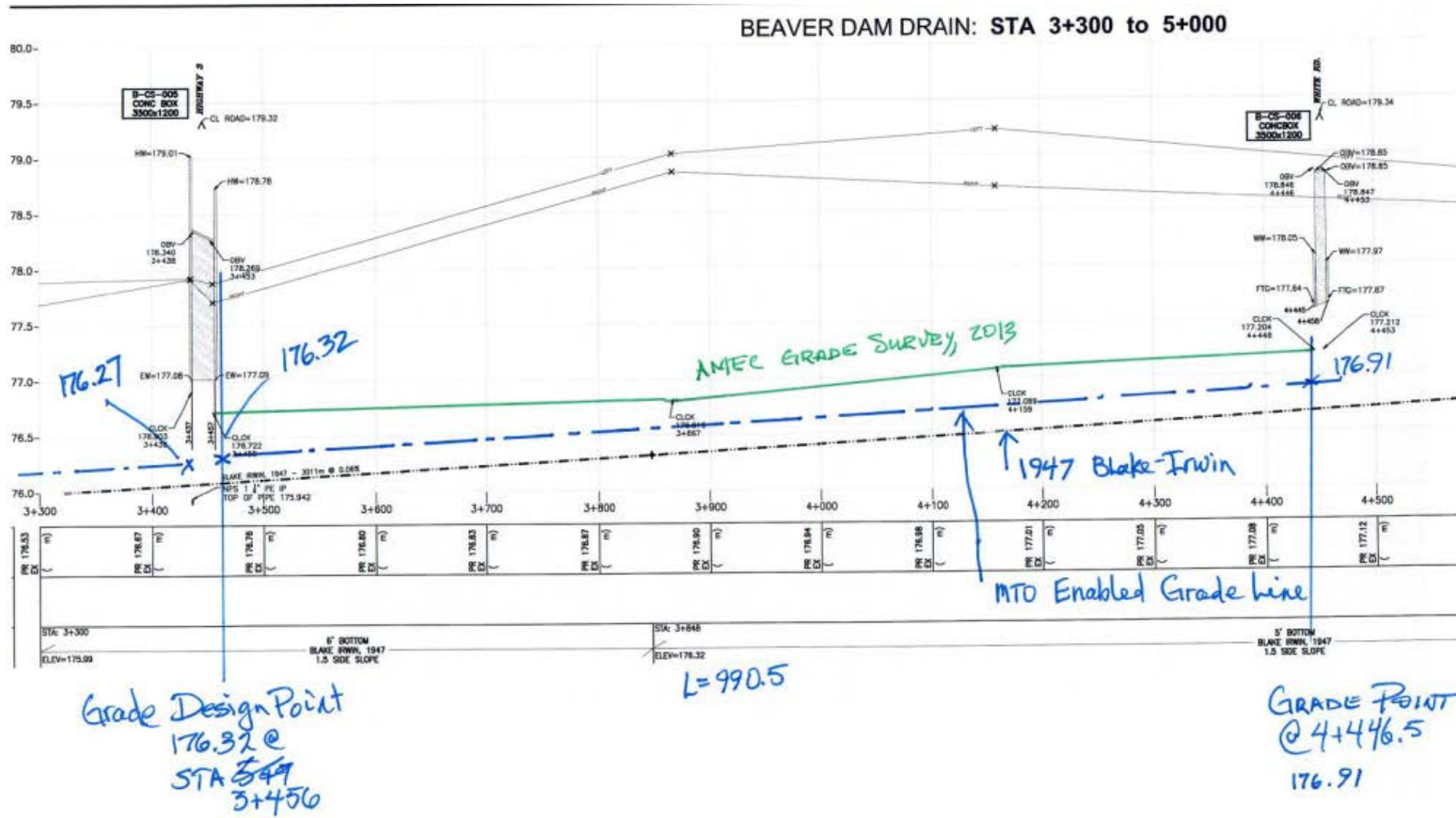


Petition David
Michener Award
Drain to Branch
Drain.

MTO Hwy 3 Culvert Replacement, 2020

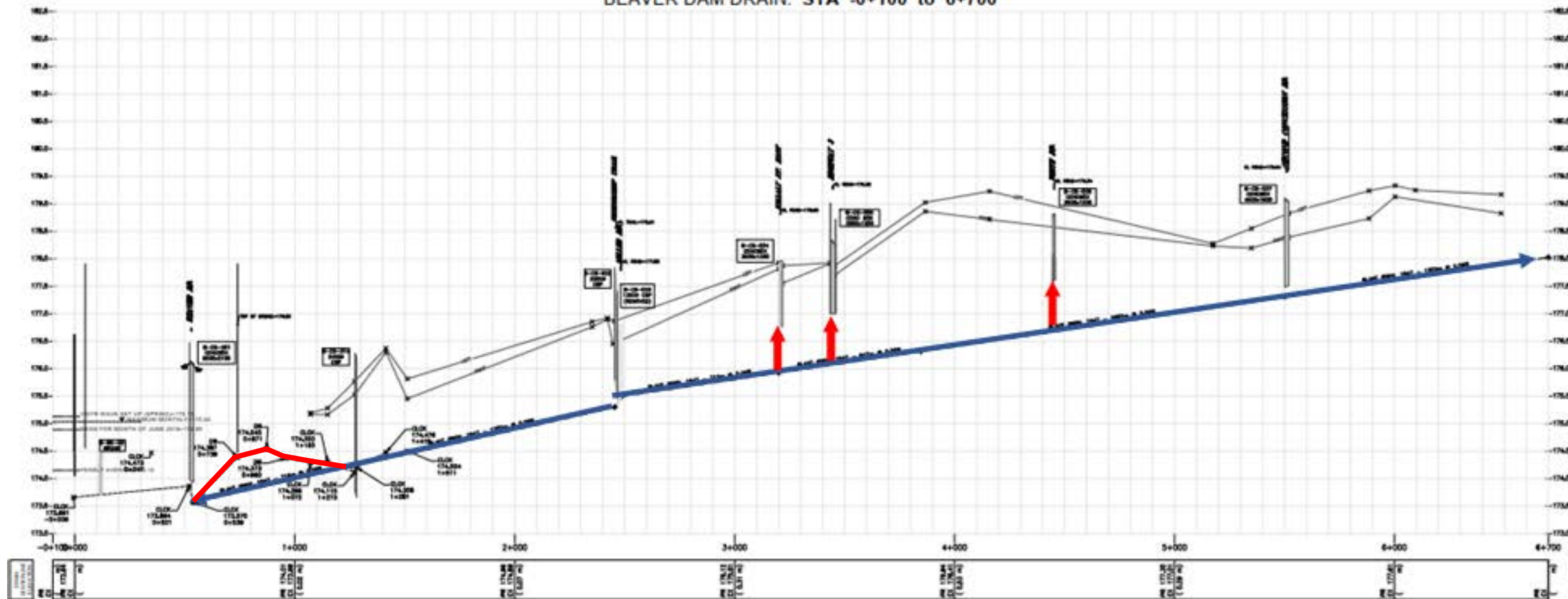


Lower Hwy 3 Culvert impacts



MTO culvert lowering impacts

BEAVER DAM DRAIN: STA -0+100 to 6+700

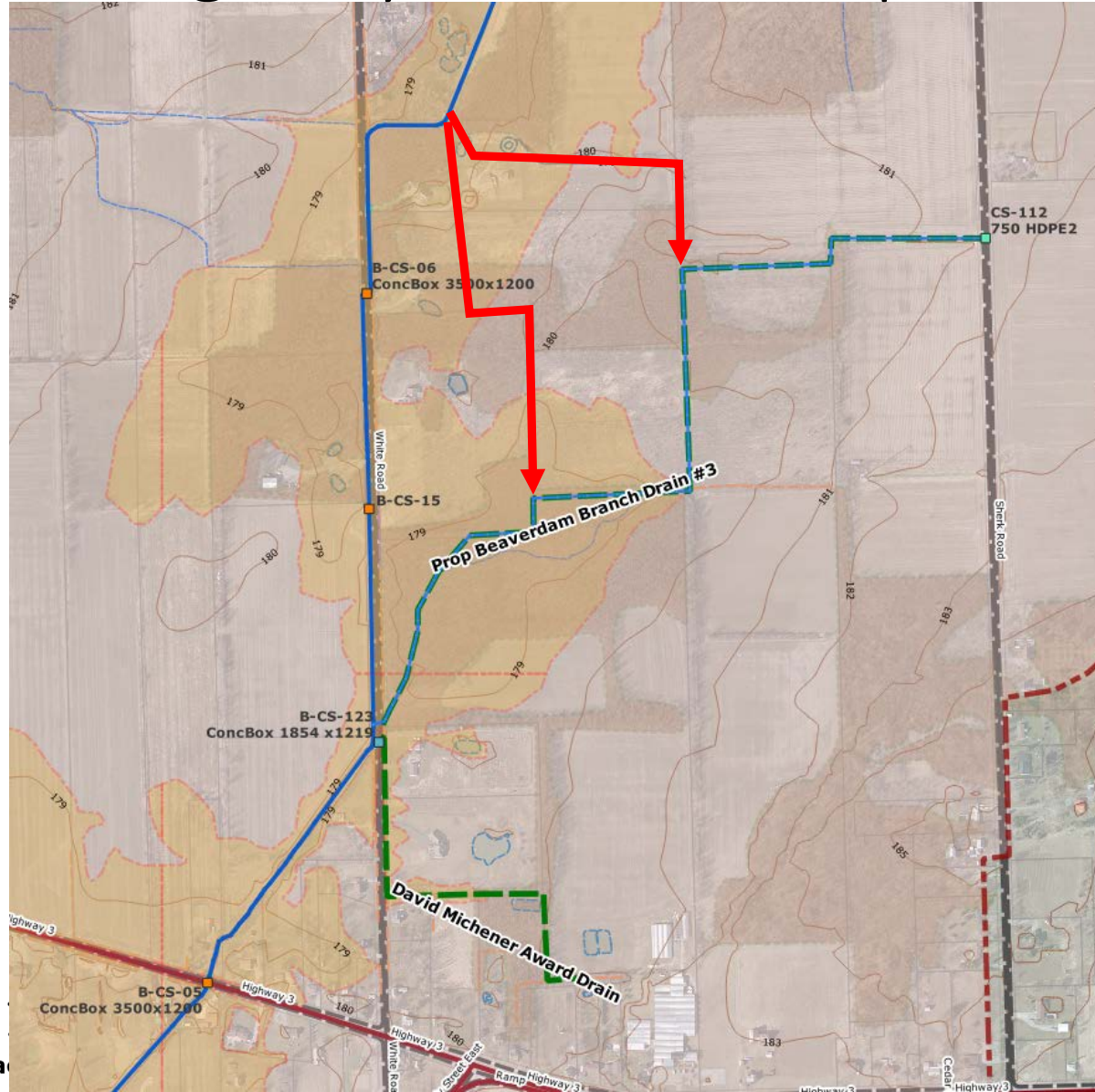


1,200m @ 0.09%

4,200m @ 0.06%

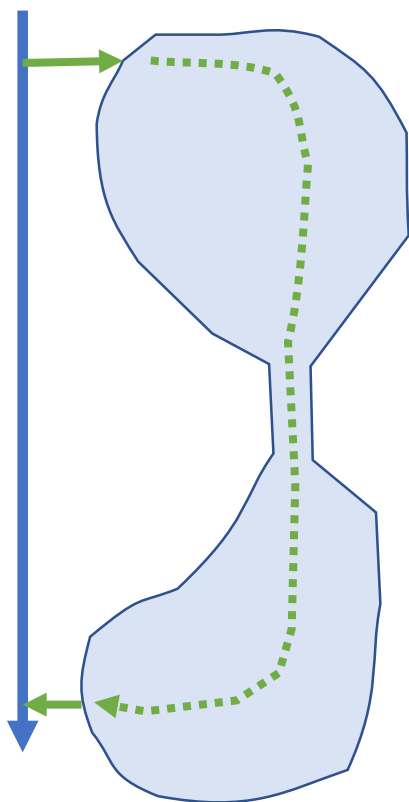
Re-alignment

Based on MTO Highway #3 culvert replacement

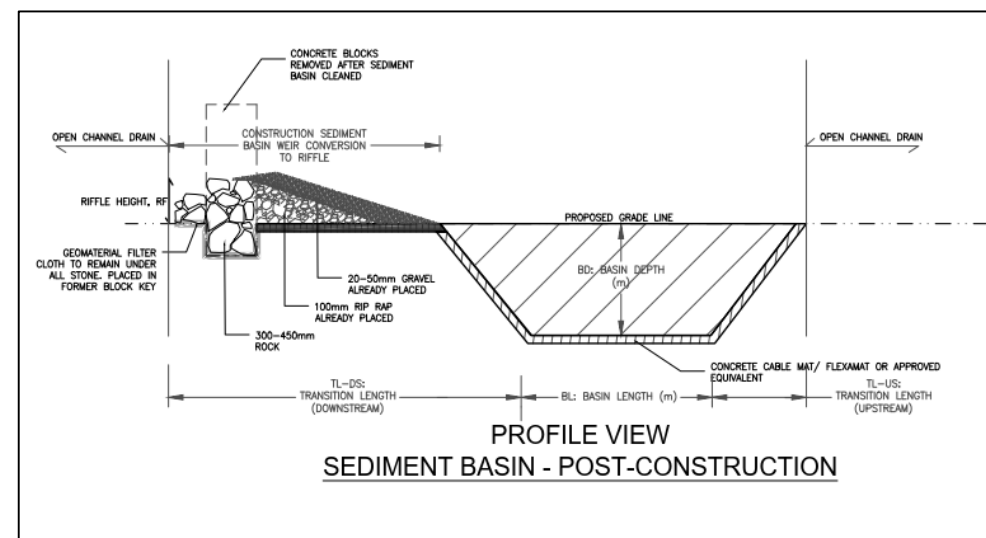


Drain Water Quality Improvements

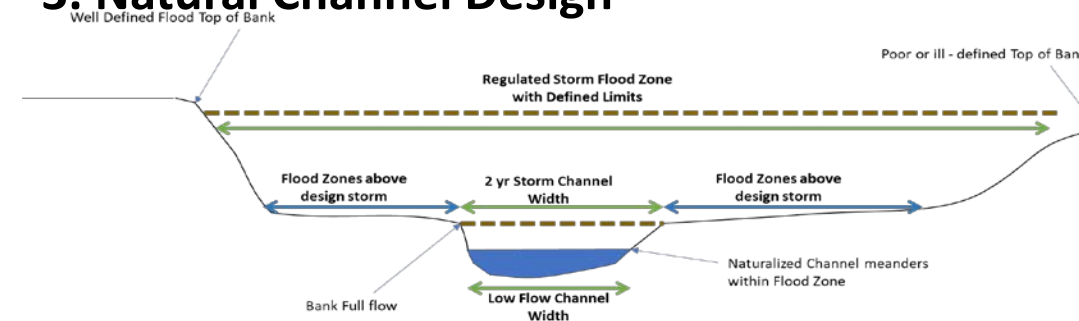
1. Possible Wetland or Pond implementation



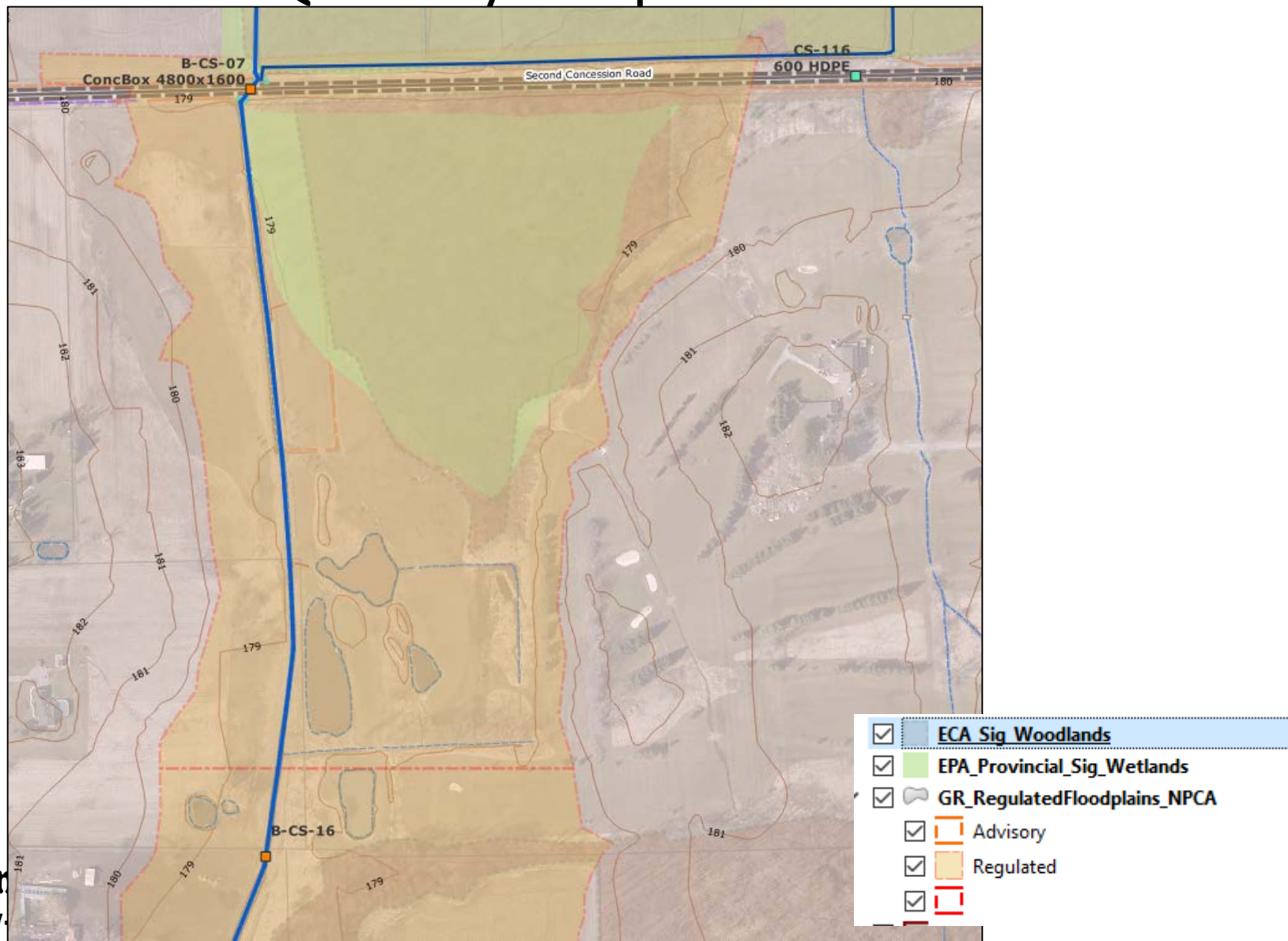
2. Sediment Basins



3. Natural Channel Design



Drain Water Quality Improvements



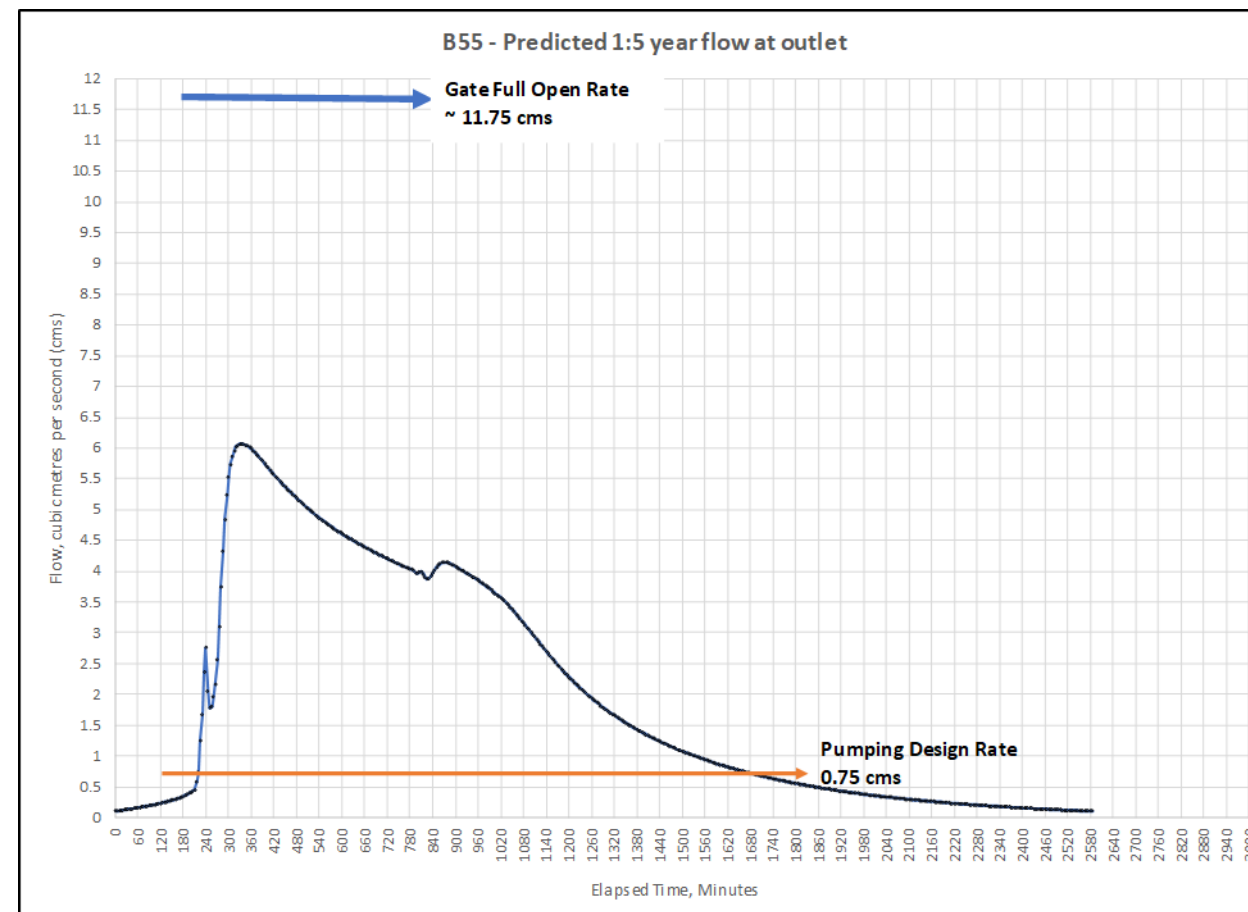
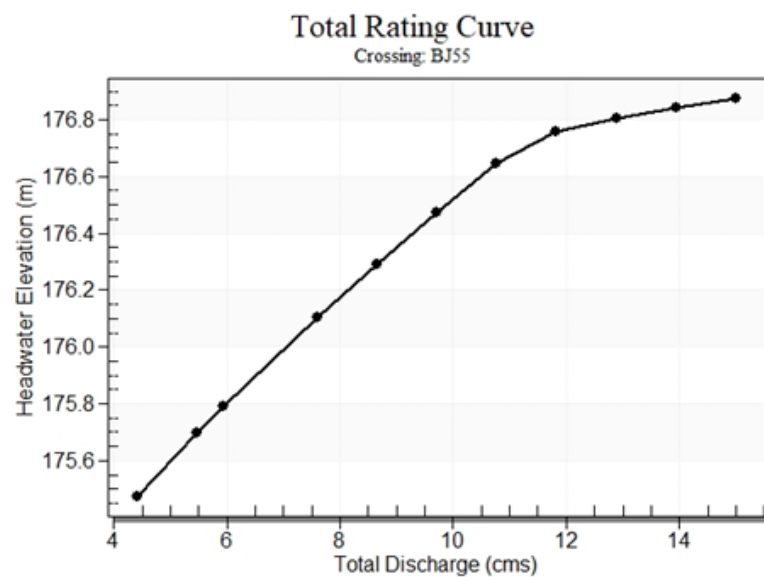
Drain Control Structure

Control Structure Considerations:

1. Pumping
 1. Report in 1997, 20 years
2. Control Structure Gate flow capacity
 1. Runoff flow through openings 1:100 year storm
 2. Storm surge level control
3. Modernization of Actuators; remote operation
4. Addition of flow level monitoring and water quality parameters
5. Stationary Motor to power pump
 1. Electrical, diesel, gas
6. Site improvements

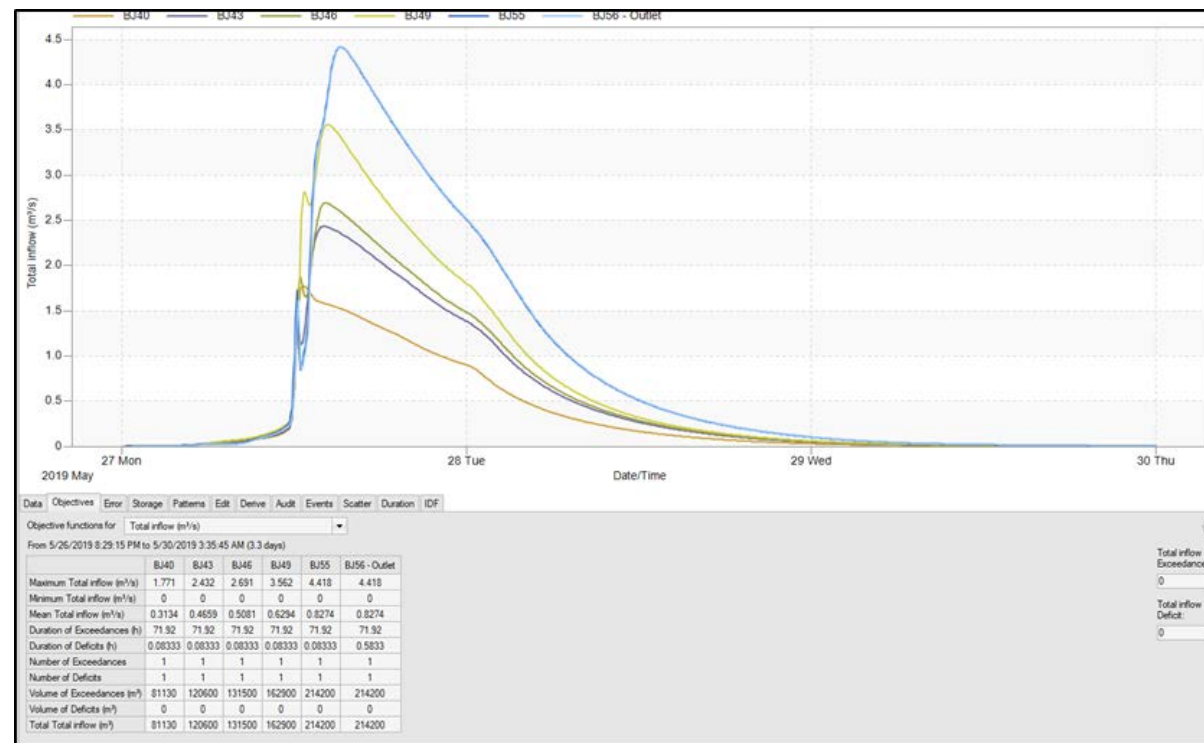
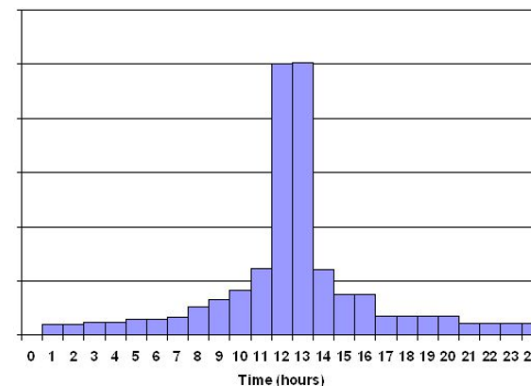
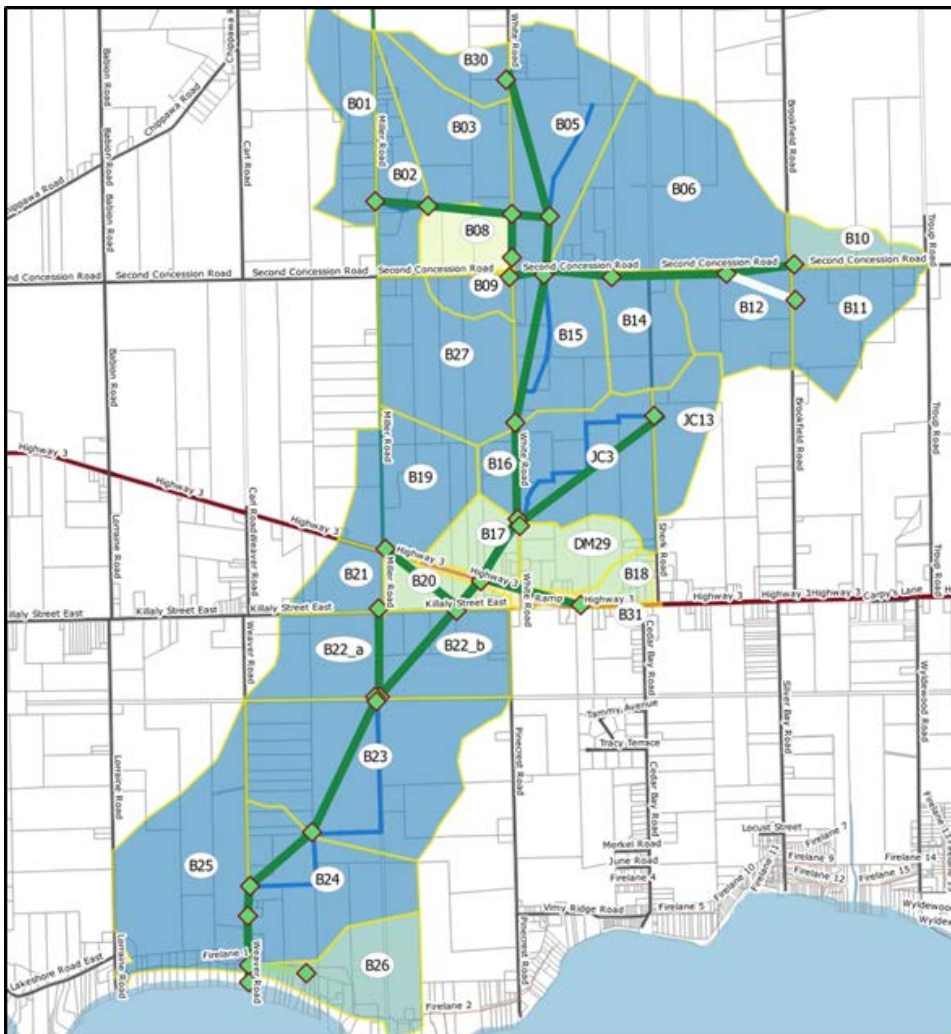


Gate Flow vs. Pumping



Watershed Analysis

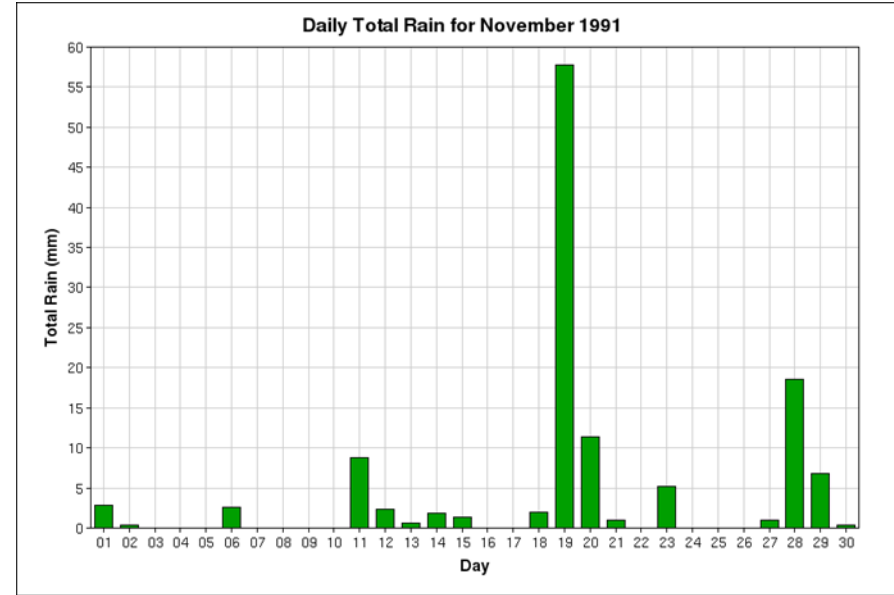
SCS Type II 24 hour Design Storm



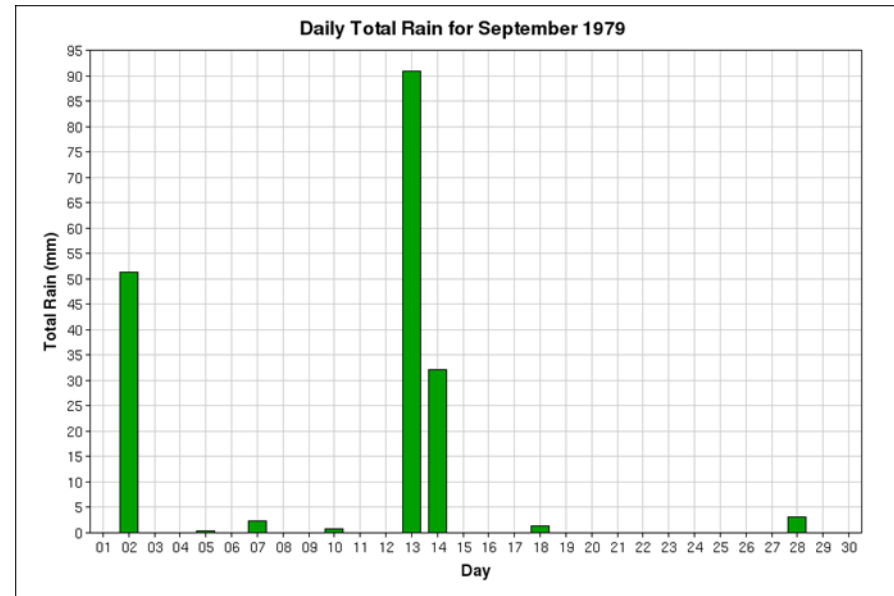
Some Storms

Design Storm	Probability return period	Volume, mm
SCS Type – 24 hour	1:2	49.8
	1:5	68.9
	1:10	81.5
	1:25	97.5
	1:50	109.3
	1:100	121.1

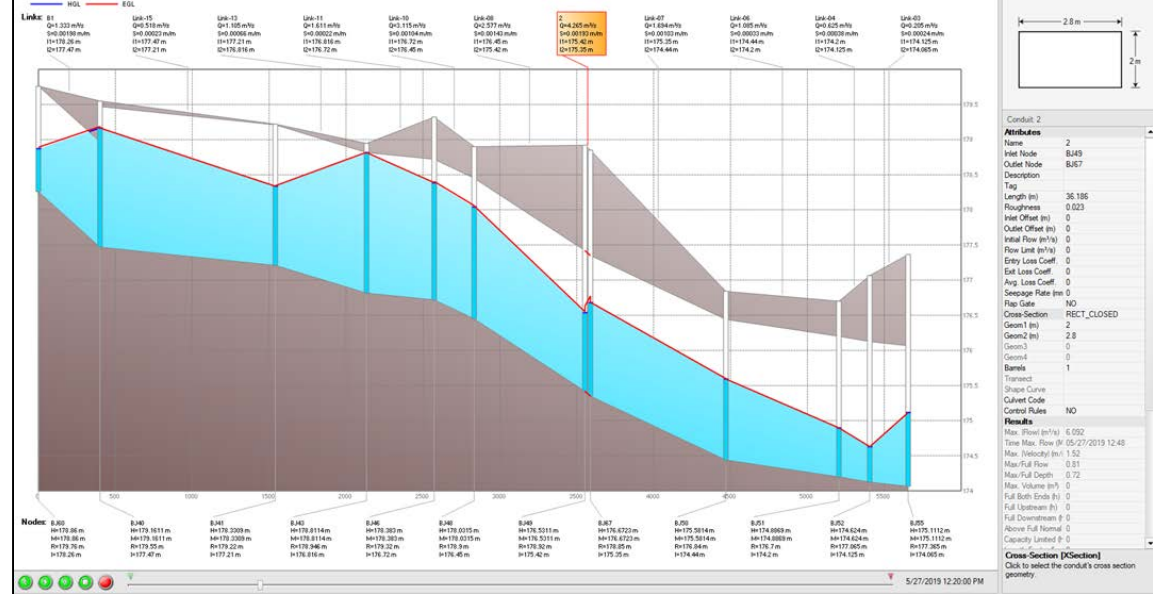
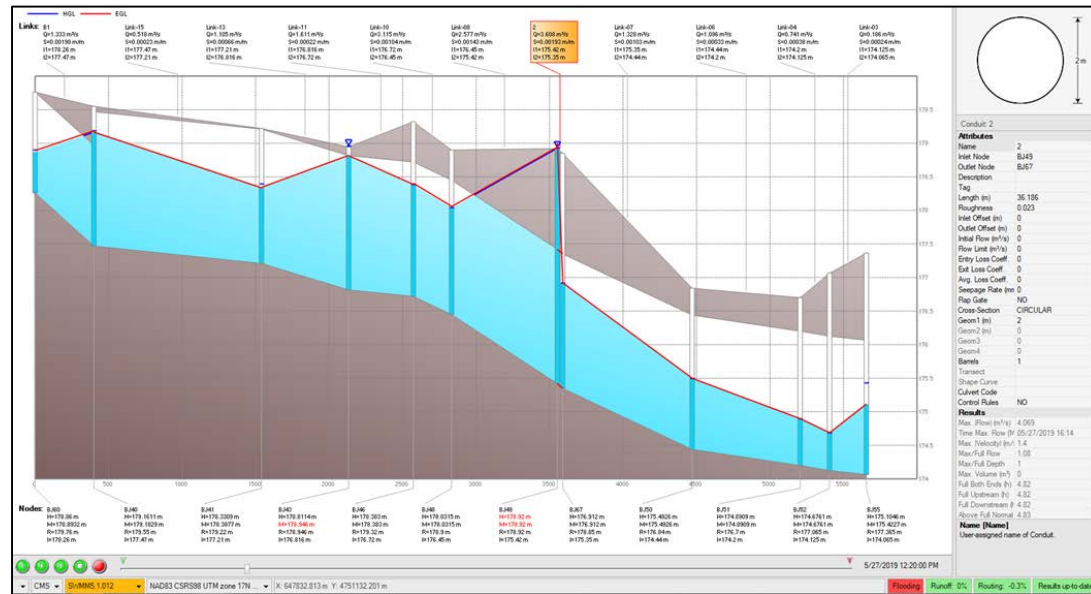
Year 1991 had a value greater than the 100 year storm. Data 64.2mm
100 year = 63.1 - 2 hour storm comparable event



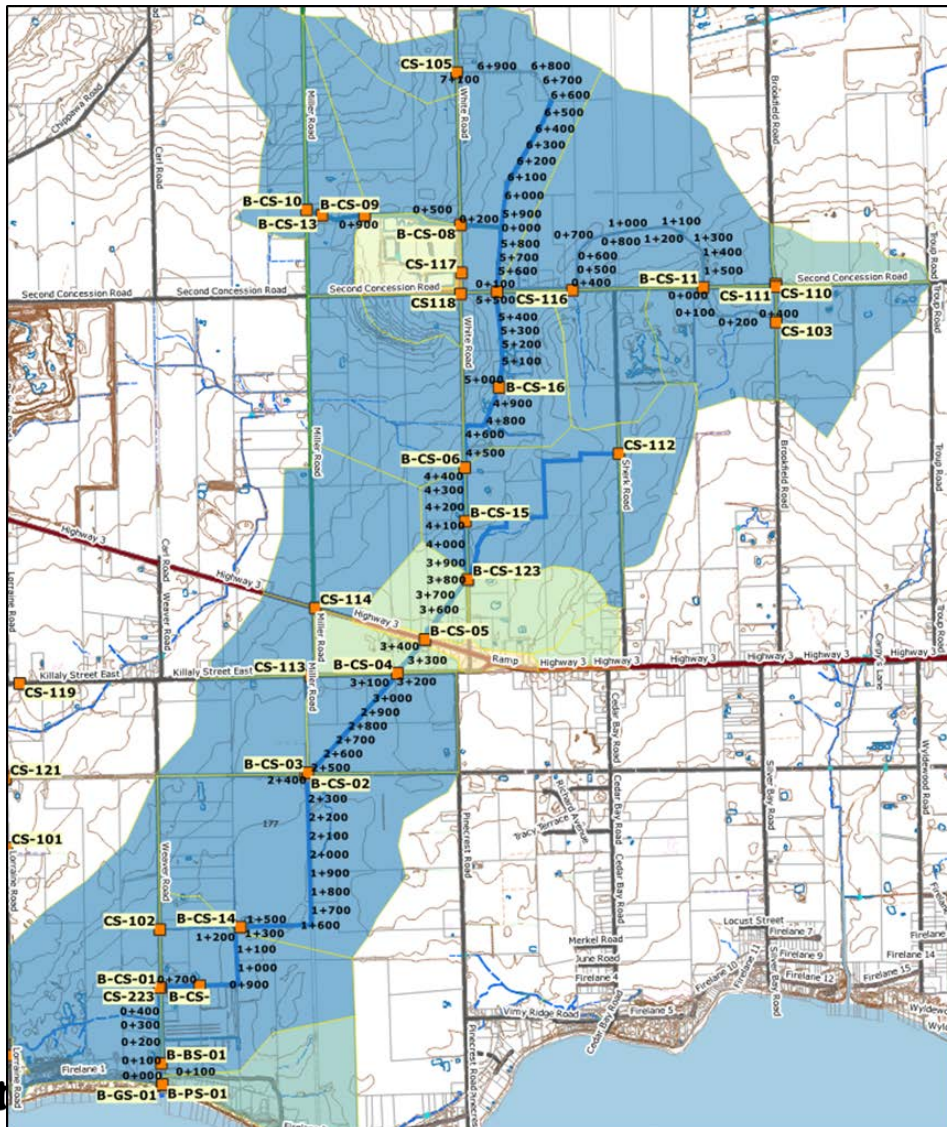
Year 1979 had a value greater than the 100 year storm. Data 116.4mm
100 year = 105.9 - 12 hour storm comparable value



Hydrologic and Hydraulic Model results



Beaver Dam Design Issues



1. New Branch Drain & Extensions
 1. David Michener Award Drain
 2. Cast In Place Drain
2. Abandon West Branch stub
3. MTO culvert replacement
4. Friendship Trail Culvert replacement & other culverts
5. New Alignment Options along White Road
6. Control Gate & Pumping Improvement Program
7. Water Quality Program

Next Steps

- Engineer's Report:
 - Beaver Dam Drain
 - Resolution of Branch Drains
- Public Information Centre #2: Design and Assessments
- Report Adoption by Council – Provisional
 - 40 day period for appeals
- By-law is passed – tendering and construction to proceed

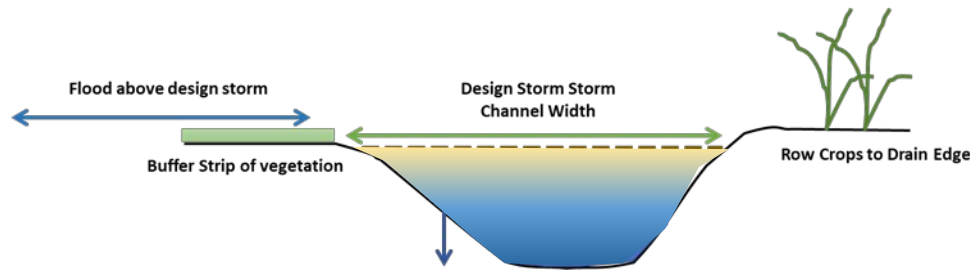
Thank you

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alanavanderveen@portcolborne.ca

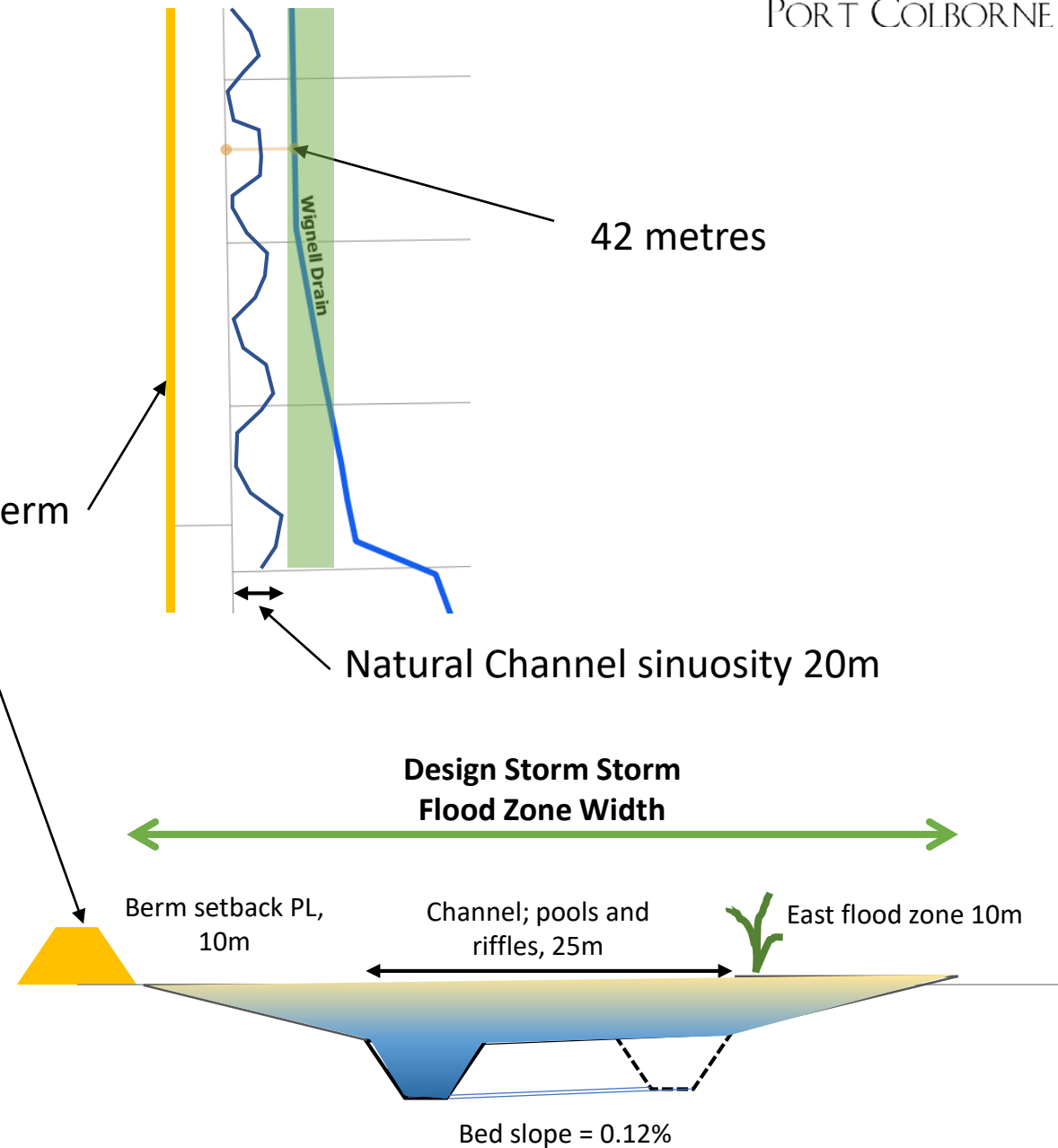
Chris Lee, Director of Engineering & Operations

Ditch vs Natural Channel



Traditional Ditch Design

Future berm



The Ontario Drainage Act Process

