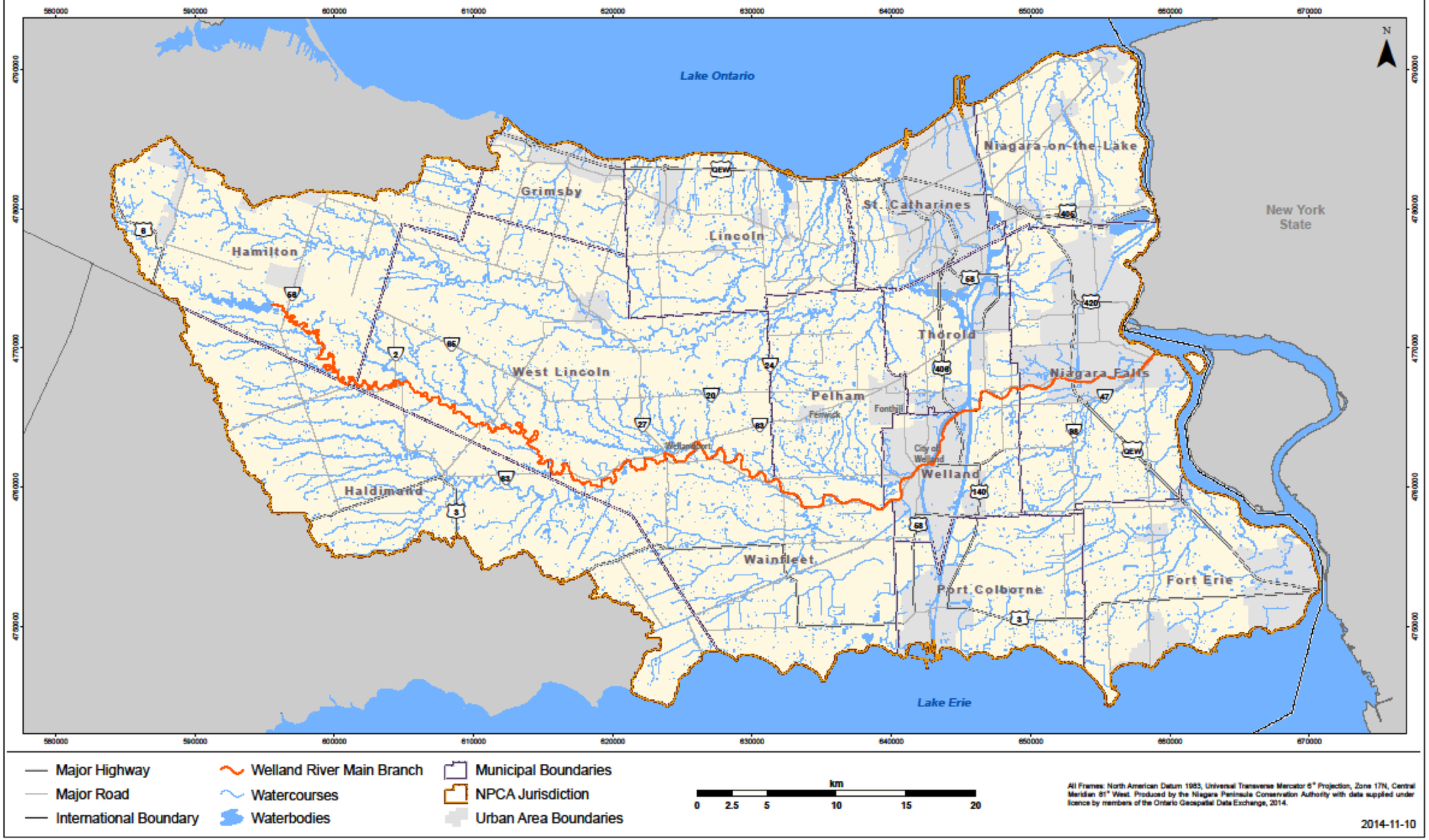
Question today
imagine tomorrow
create for the future

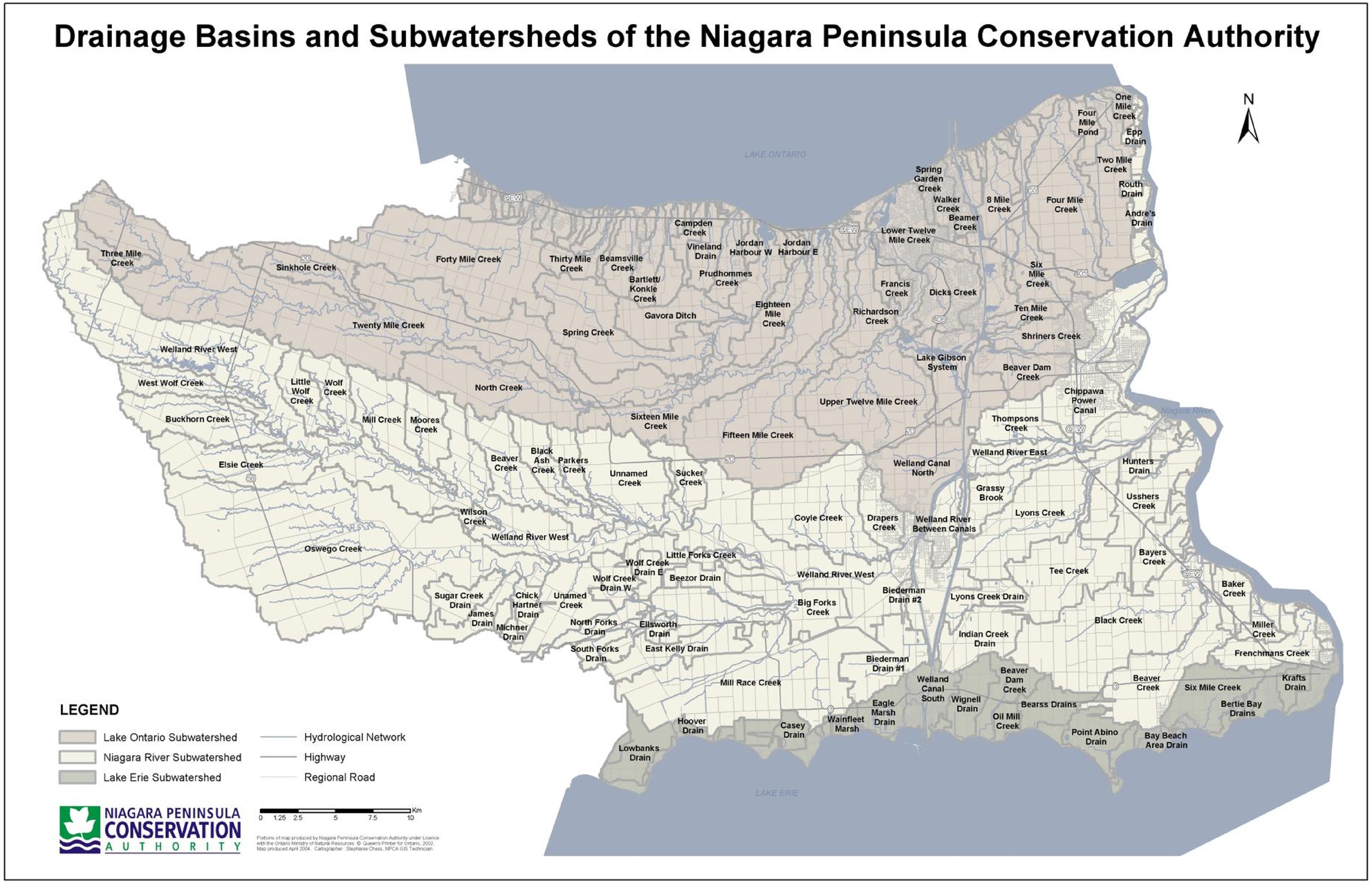
Steven van Haren, P.Eng., Manager, Water Resources

Welland River Watershed: Main Branch, Binbrook Dam to Niagara River

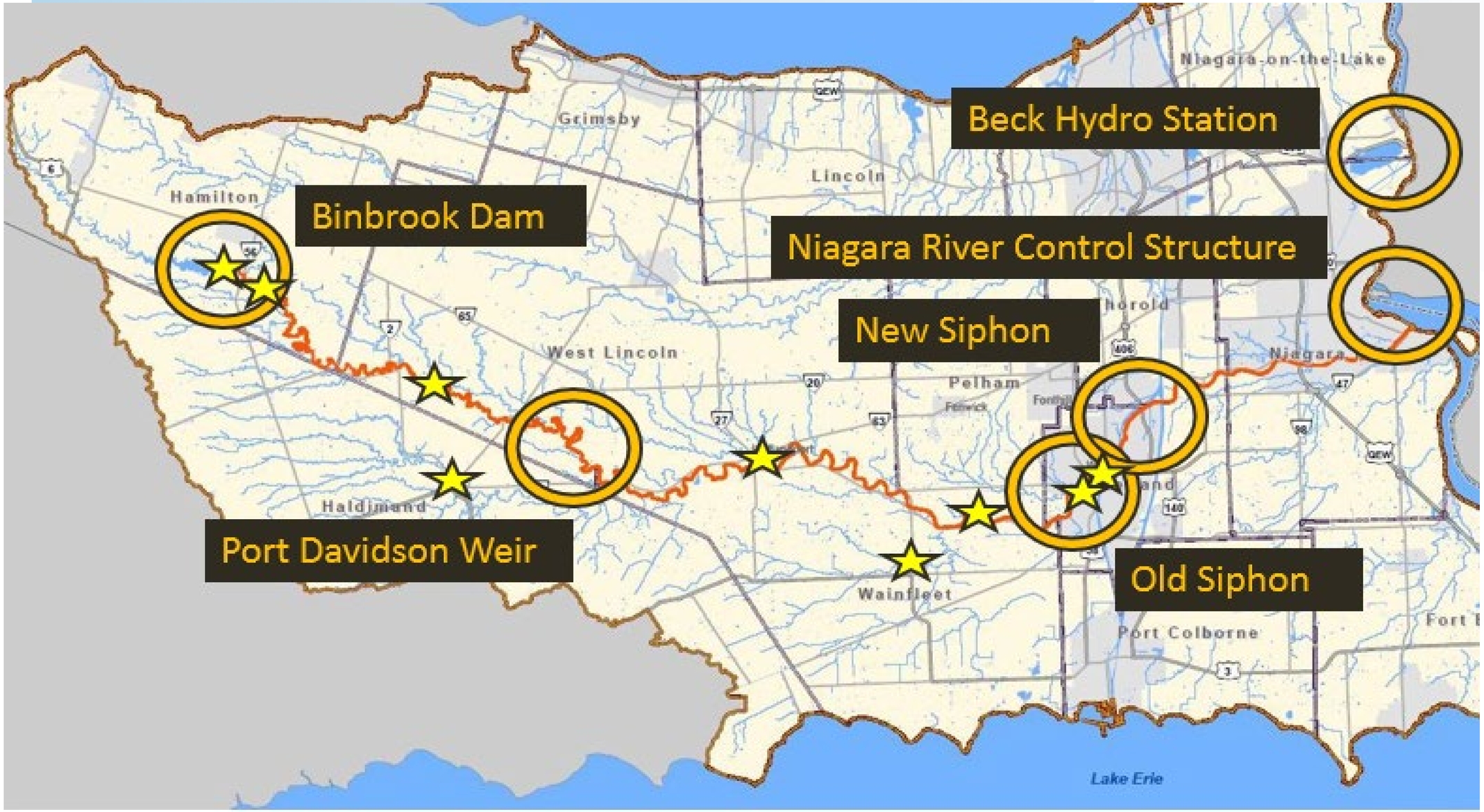
Reaches to Model for Hydraulic Study



- Main branch of the Welland River is approximately 135km long.
- Predominantly rural watershed with pockets of urban development.



- Welland River drains an area of approx. 990 square kilometers.
- Comprised of 36 individual tributaries.
- Mostly clay soils on smooth moderately sloping topography.


Beck Hydro Station
Binbrook Dam
Niagara River Control Structure
New Siphon
Port Davidson Weir
Old Siphon
Niagara-on-the-Lake
Grimsby
Lincoln
Hamilton
West Lincoln
Pelham
Haldimand
Wainfleet
Port Colborne
Lake Erie
Water Level Gauge Station
Major Structure

Floodplain Model for the Welland River

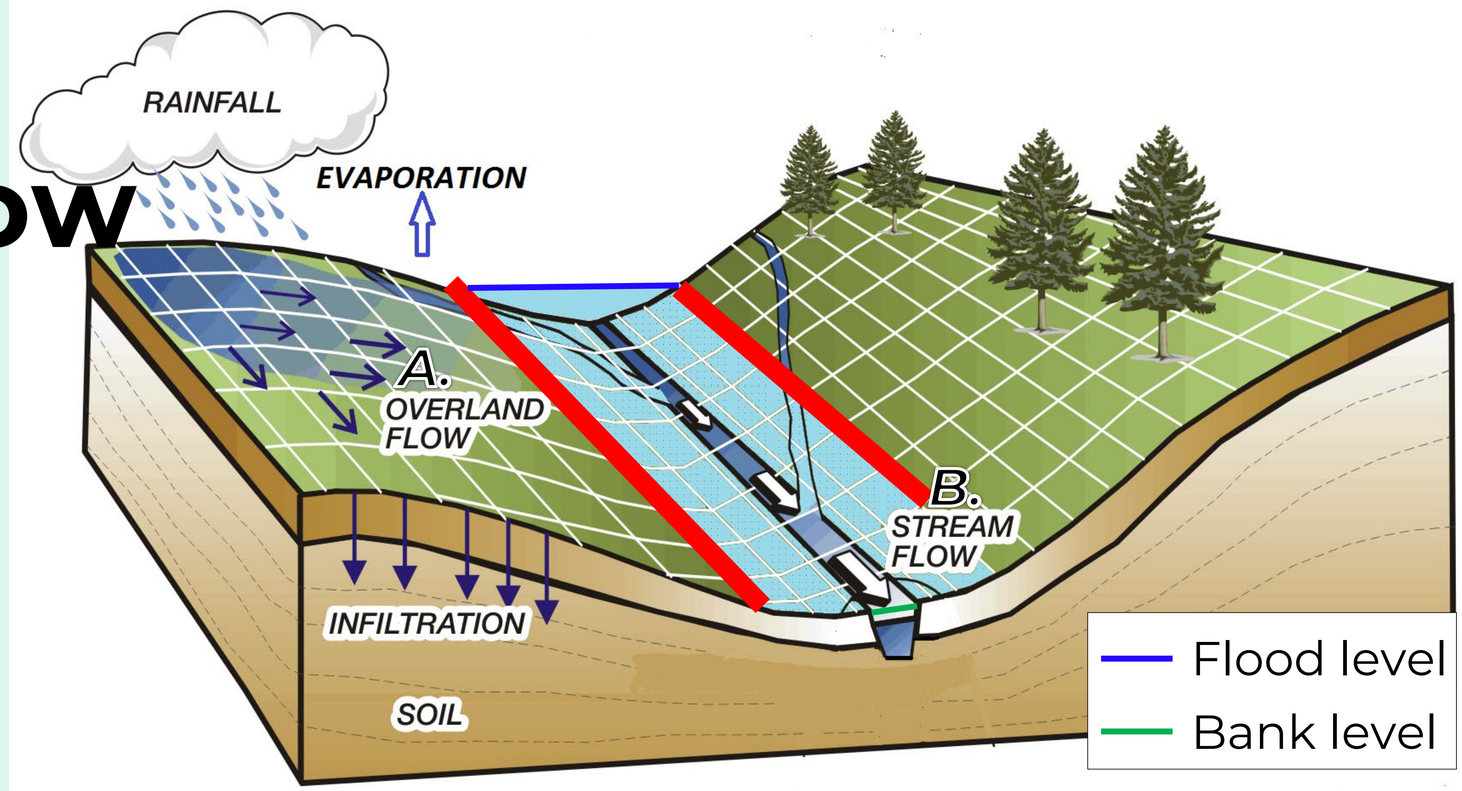
A. Overland Flow (Runoff)

+

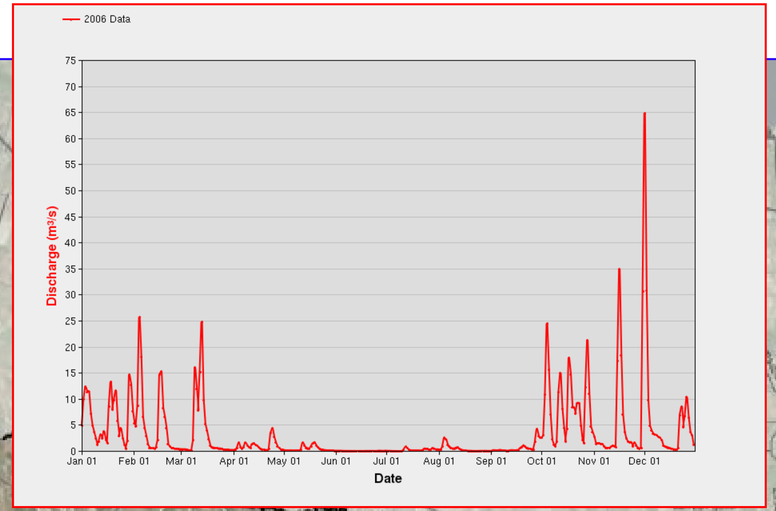
B. Stream Flow (Elevation)

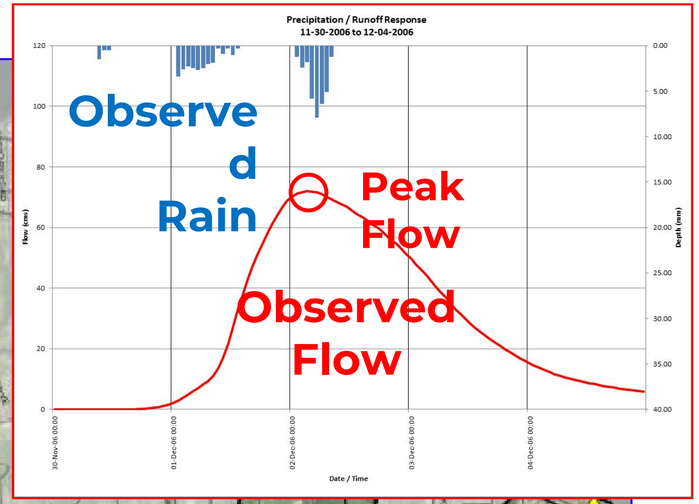
=

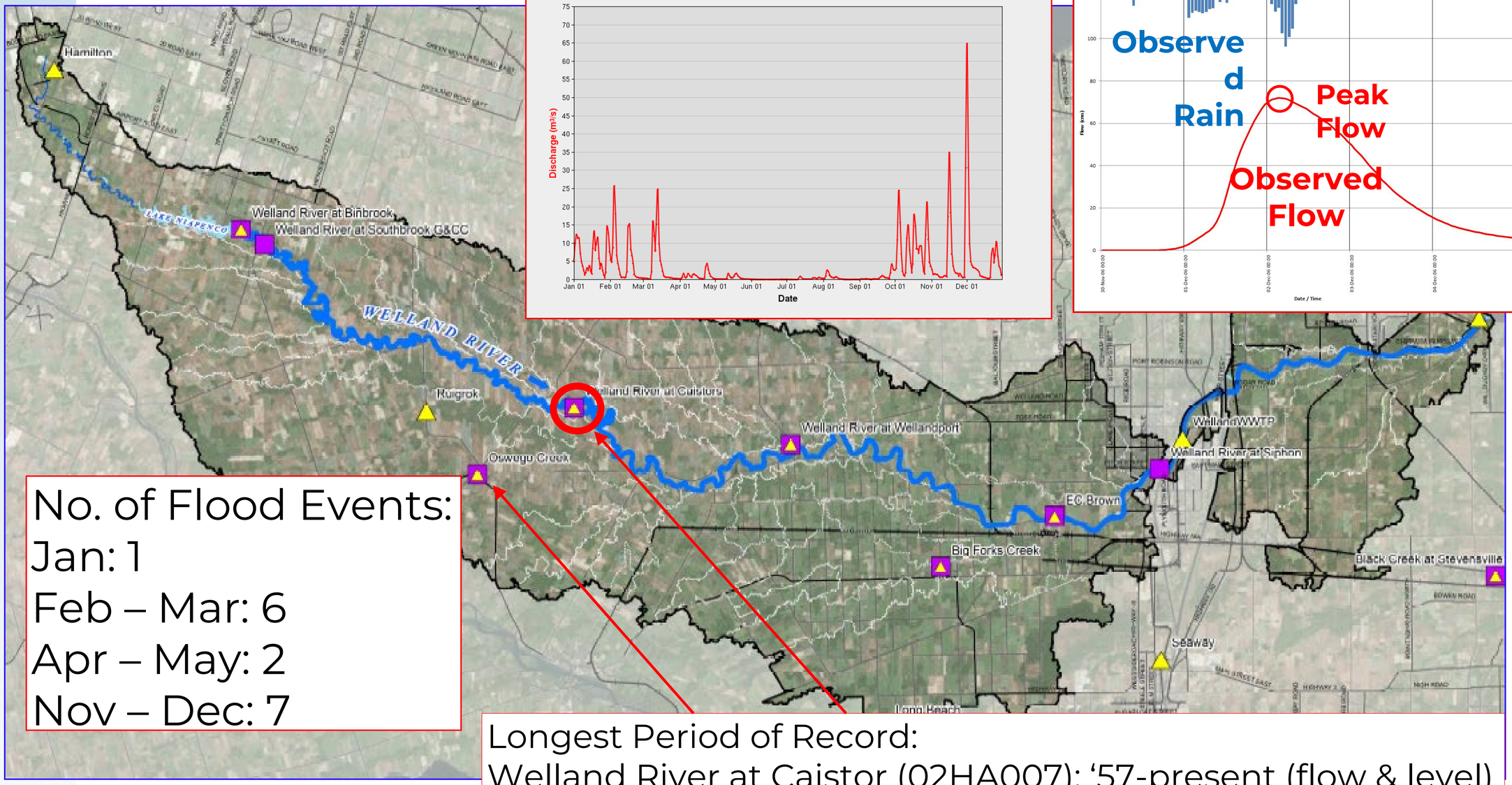
C. Floodline



A. Overland Flow (Rain - Land - Flow)…







No. of Flood Events:
Jan: 1
Feb – Mar: 6
Apr – May: 2
Nov – Dec: 7

Longest Period of Record:
Welland River at Caistor (02HA007): ‘57-present (flow & level)
Oswego Ck at Canboro (02HA024): ‘88-present (level only)

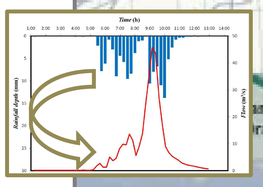
A. Overland Flow (Rain-Land-Flow)

Catchments to Church Road:

- West Wolf/Little Wolf/Wolf
- Buckhorn
- Elsie
- Moores/Mill
- Local

Catchment Characteristics:

- Surface Slope
- Length of overland flow
- Soils/land use



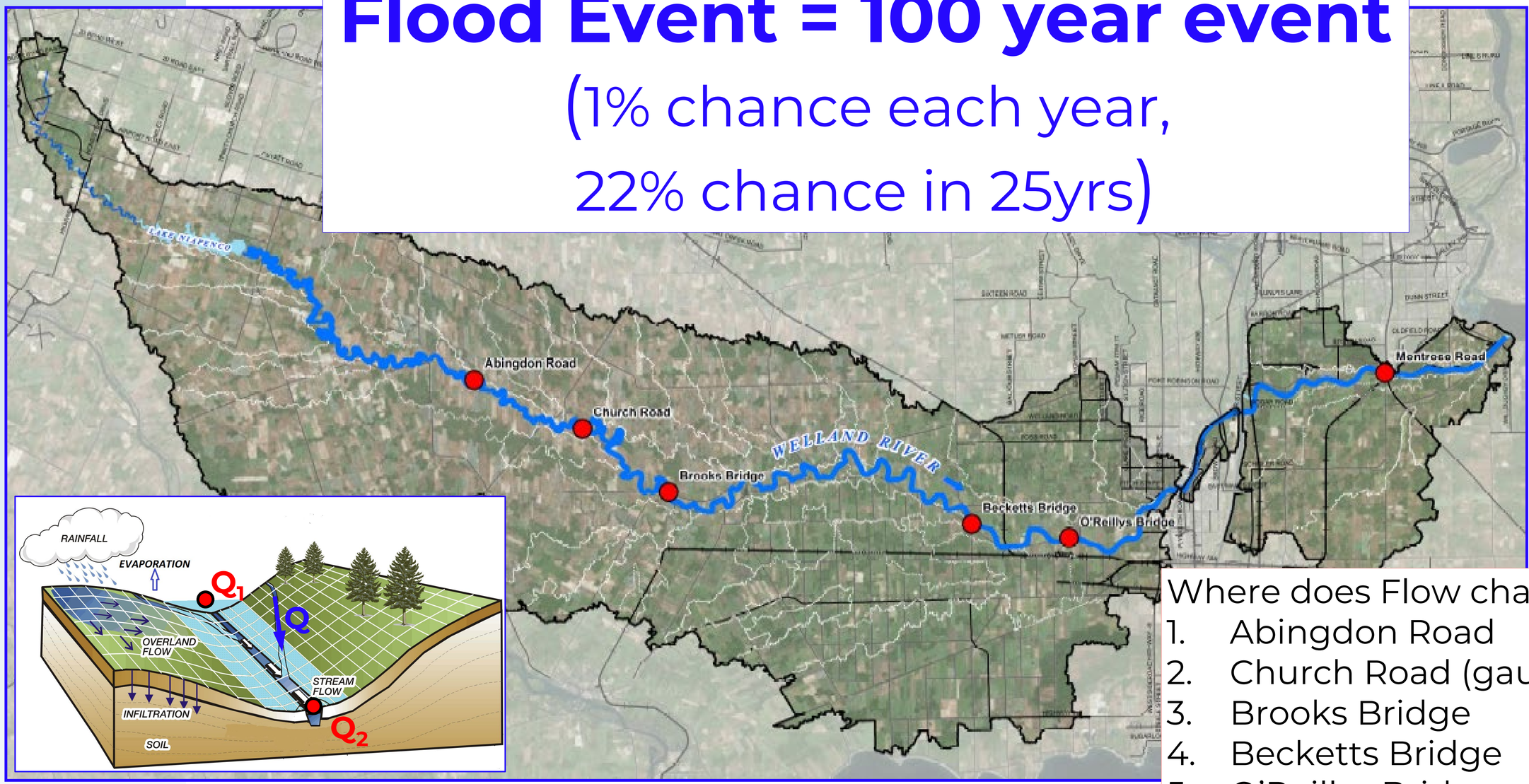
Niagara River Subwatershed

Lake Erie Subwatershed

Linkage to the Stream Flow

Flood Event = 100 year event

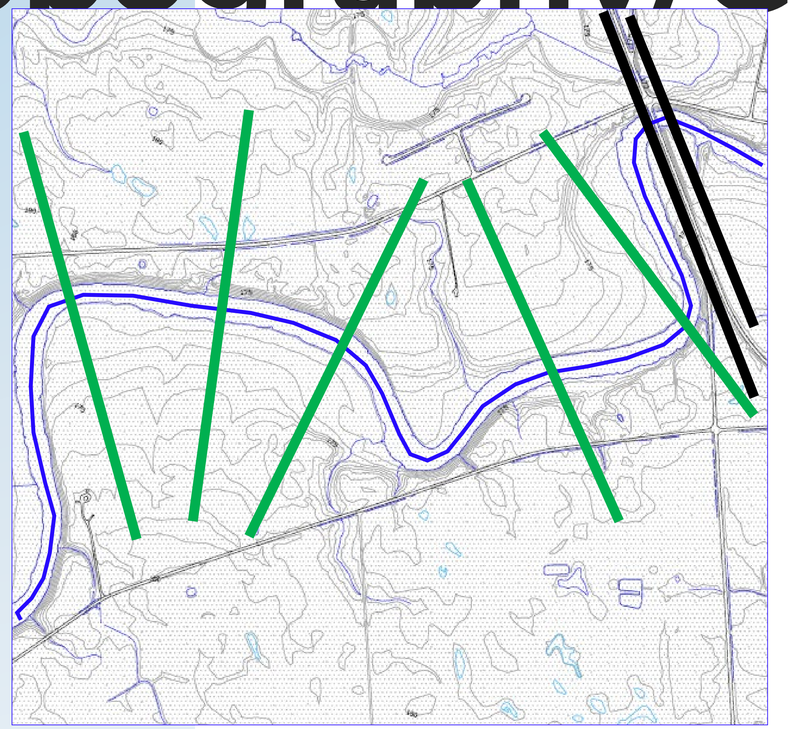
(1% chance each year,
22% chance in 25yrs)

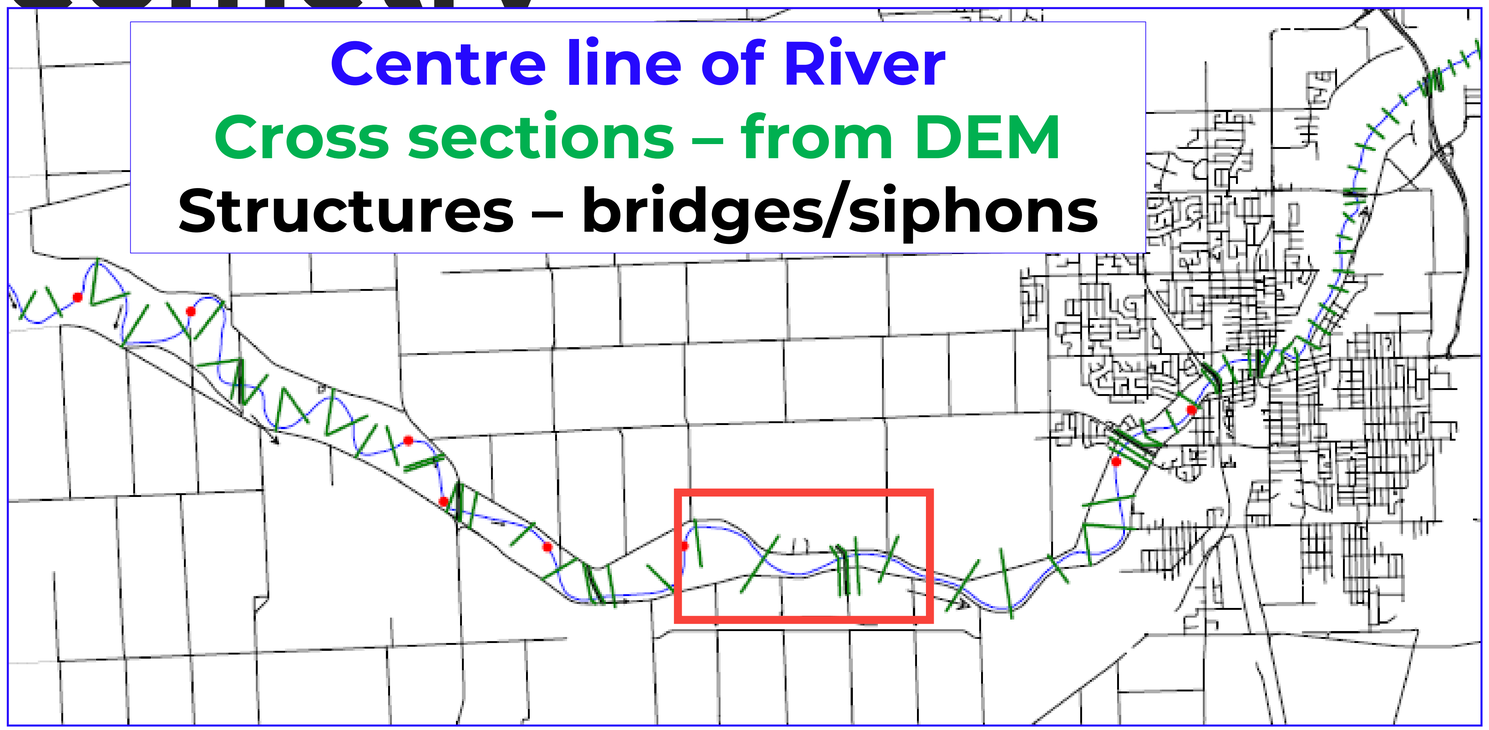


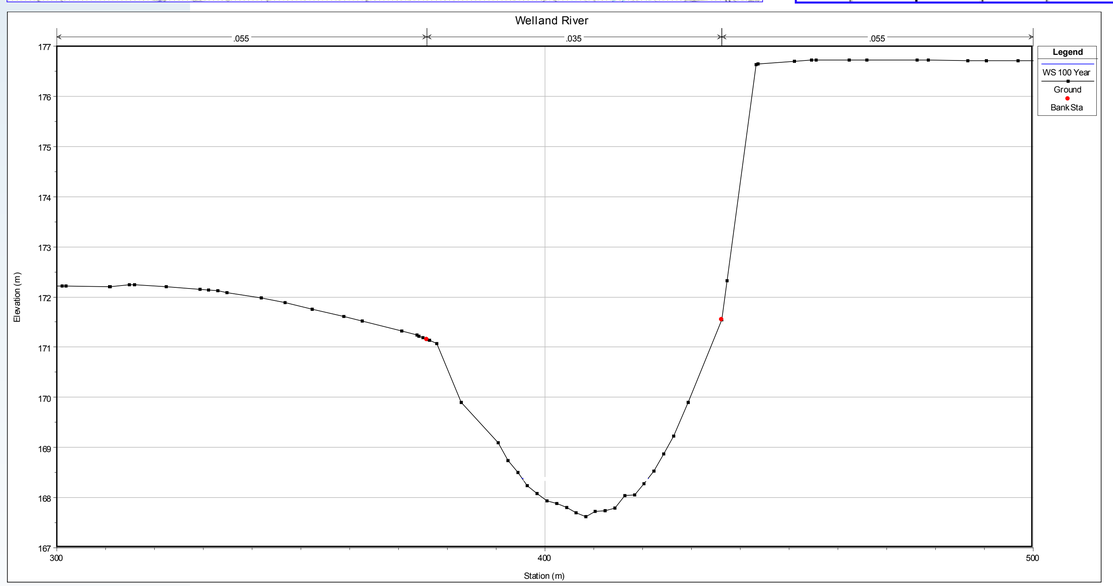
Where does Flow change?:

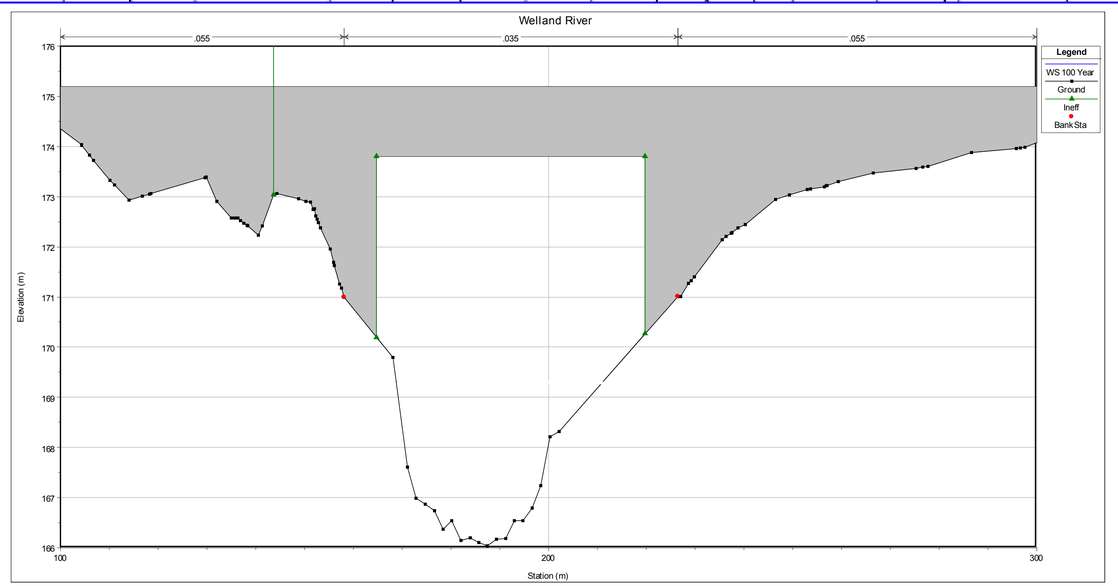
1. Abingdon Road
2. Church Road (gauge)
3. Brooks Bridge
4. Becketts Bridge
5. O'Reillys Bridge
6. Montrose Road

B. Stream Flow – Topography/Geometry



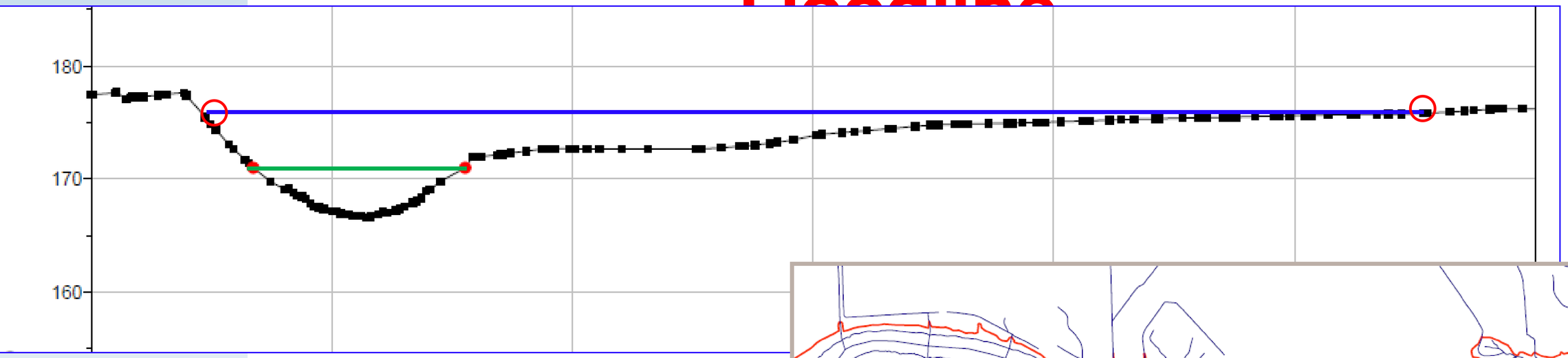


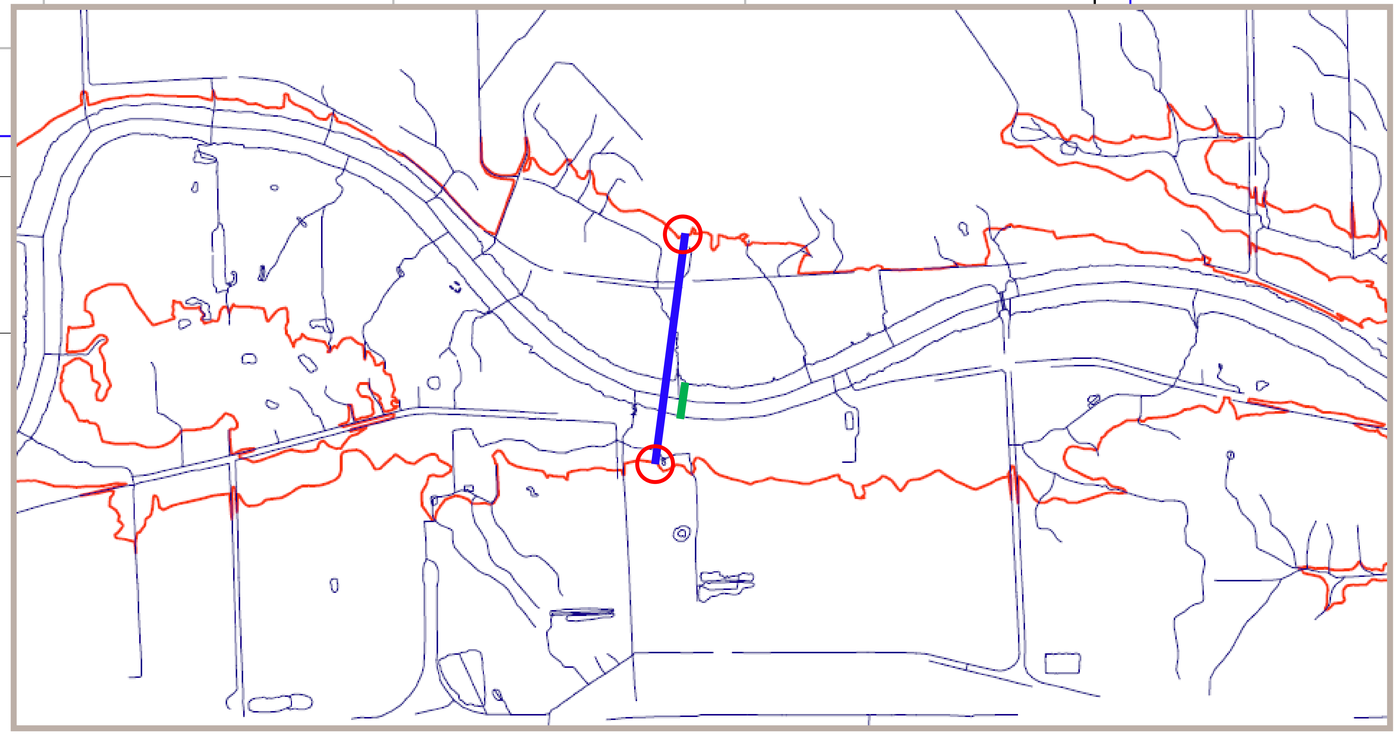




B. Stream Flow – Add Overland Flow

Where **Water Surface** intersects **Ground** = **Floodline**

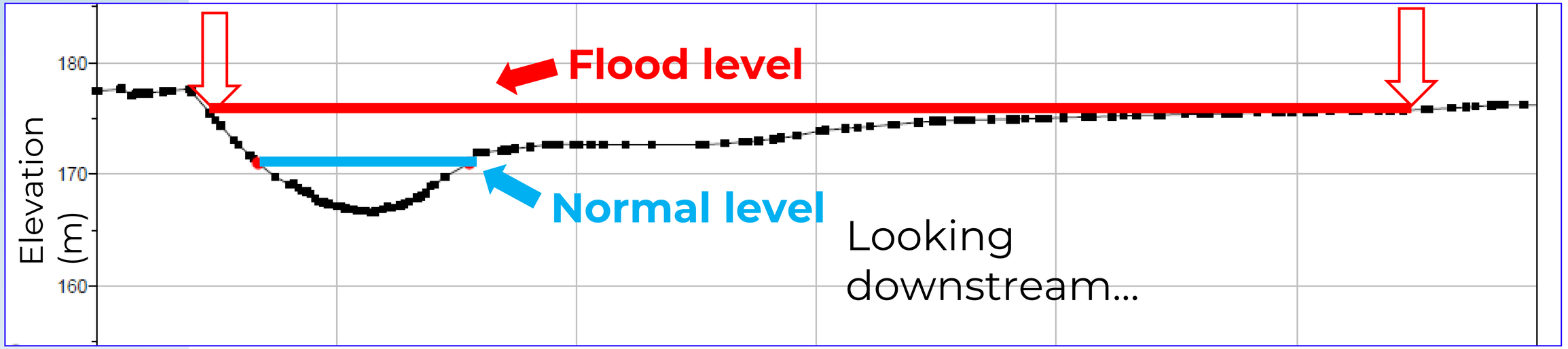




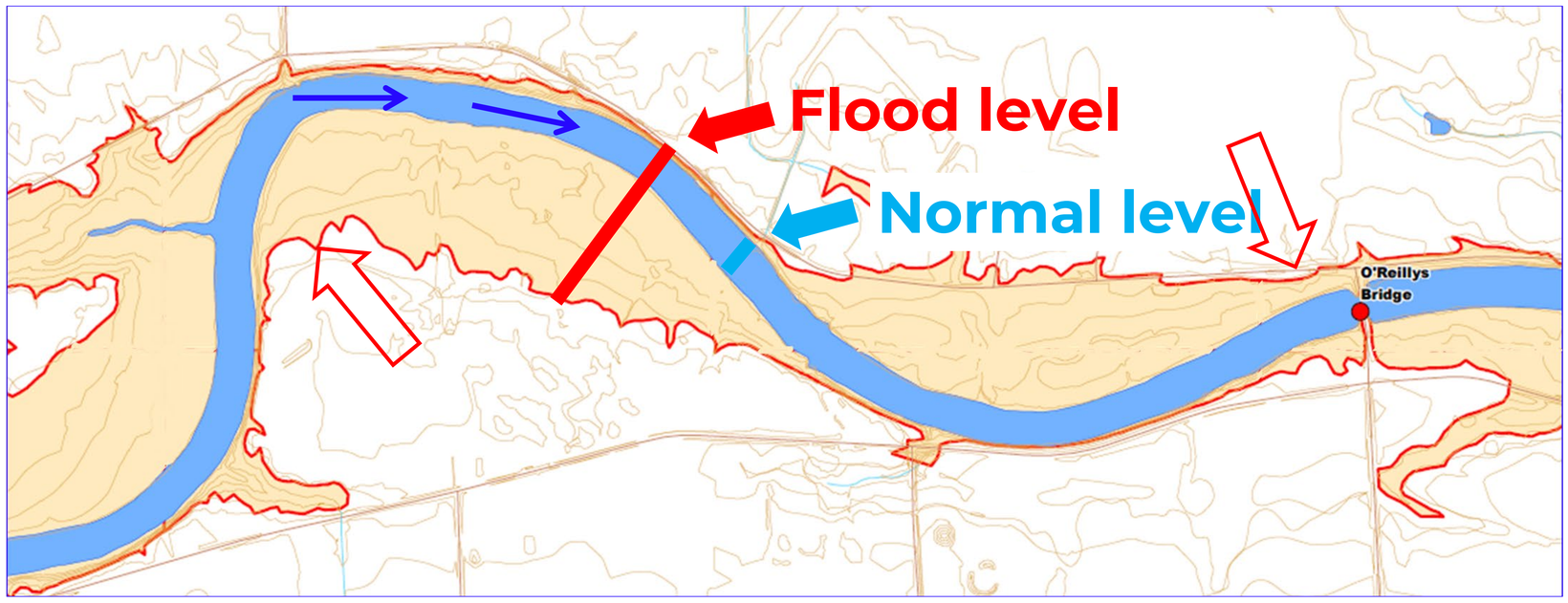
Flood level (±300 cms)

Bank level (±125 cms)

Floodplain Model ➡ Flood Map



- Flood line
- Flood level
- Normal level



N

Lake Ontario

United States

1 - Harrison Road
BIMBROOK DAM
2 - Regional Road 56
3 - Trimble Road
4 - Hall Road
5 - Private Road
6 - Woodburn Road
7 - Sinclairville Road
8 - Westbrook Road
9 - Caistorville Road
10 - Abingdon Road
11 - N Chippawa Road
12 - Caistor Centre Road
13 - Smithville Road
14 - Church Road
15 - S Chippawa Road
16 - Caistor GainsboroughTownline Road
17 - Canborough Road
18 - "Rail 04"(AbandonedTH&B)
19 - Wellandport Road
20 - Boyle Road
21 - Victoria Avenue
22 - Rail 03 (TH&B)
23 - O'Reilly's Road N
24 - Webber Road
25 - Prince Charles Drive
26 - Niagara Street
27 - Old Siphon
28 - Woodlawn Road
29 - Highway 406
30 - Rail 02 (CNR)
31-New Siphon
32 - Rail 01 (CNR)
33 - Moyer Road
34 - Montrose Road
35 - Queen Elizabeth Way
36 - Rail05 (MichiganCentral Railway)
37 - Stanley Avenue
38 - Portage Road

Dunnville

Port Colborne

Lake Erie

Legend

- Floodline Mapping Sheet Locations
- Structure Locations
- City
- Town
- Dam
- Welland River
- Waterbody (OHN)

Source:
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"The year of first publication of the legal materials is to be completed.

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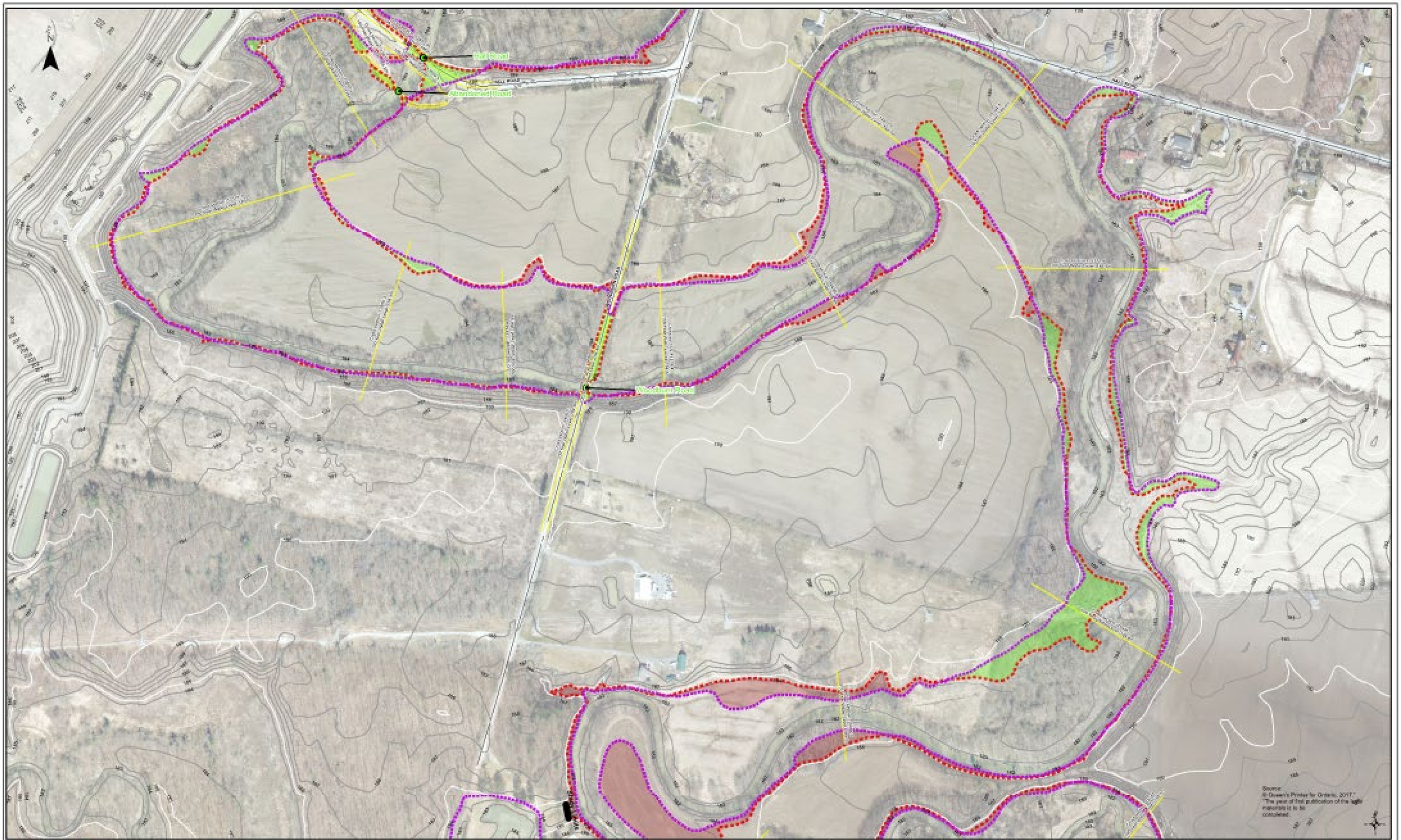
Index Figure
Welland River Hydraulic Model
Floodline Mapping Sheet Locations

0 1 2 3 4 5
kilometres
1:90,000

Date: October 2018

Project No: 3815516



Legend

Floodline — Historical100 Year Flood Line (Dillon, 1985)

Increased Flooded Areas — Reduced Flooded Areas

Mike 11 Cross-sections — Study Limits — Structures

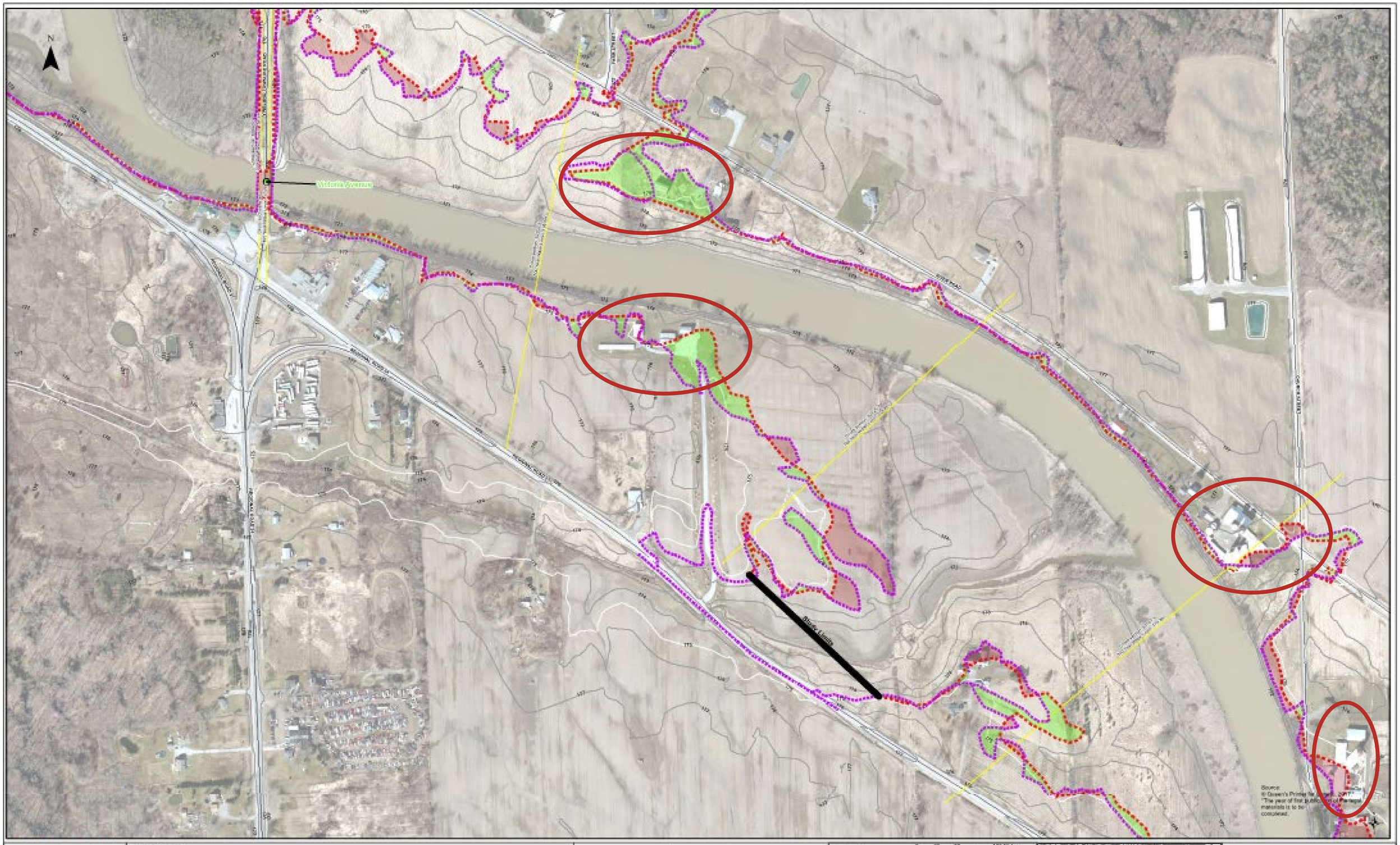
Figure A5
Welland River Watershed
Floodline Mapping

Scale: 1:2,000 (0, 25, 50, 100 Metres)

Date: October 2018 Project No: 3815516

Sources:
Contour - NPCA 2010 1 Meter Contour
Support Digital Terrain Model in 3m tiles drawing
Aerial Photo - NPCA 2010 Ortho 20cm Mosaics

NIAGARA PENINSULA CONSERVATION AUTHORITY



Legend

Floodline — Historical100 Year Flood Line (Dillon, 1985)

Increased Flooded Areas — Reduced Flooded Areas

Mike 11 Cross-sections — Study Limits — Structures

Figure A32
Welland River Watershed
Floodline Mapping

Scale: 1:2,000 (0, 20, 40, 80 Meters)

Date: October 2018 Project No: 3815516

Sources:
Contour - NPCA 2010 1 Meter Contour
Support Digital Terrain Model in 3km tiles drawing
Aerial Photo - NPCA 2010 Ortho 20km Mosaics

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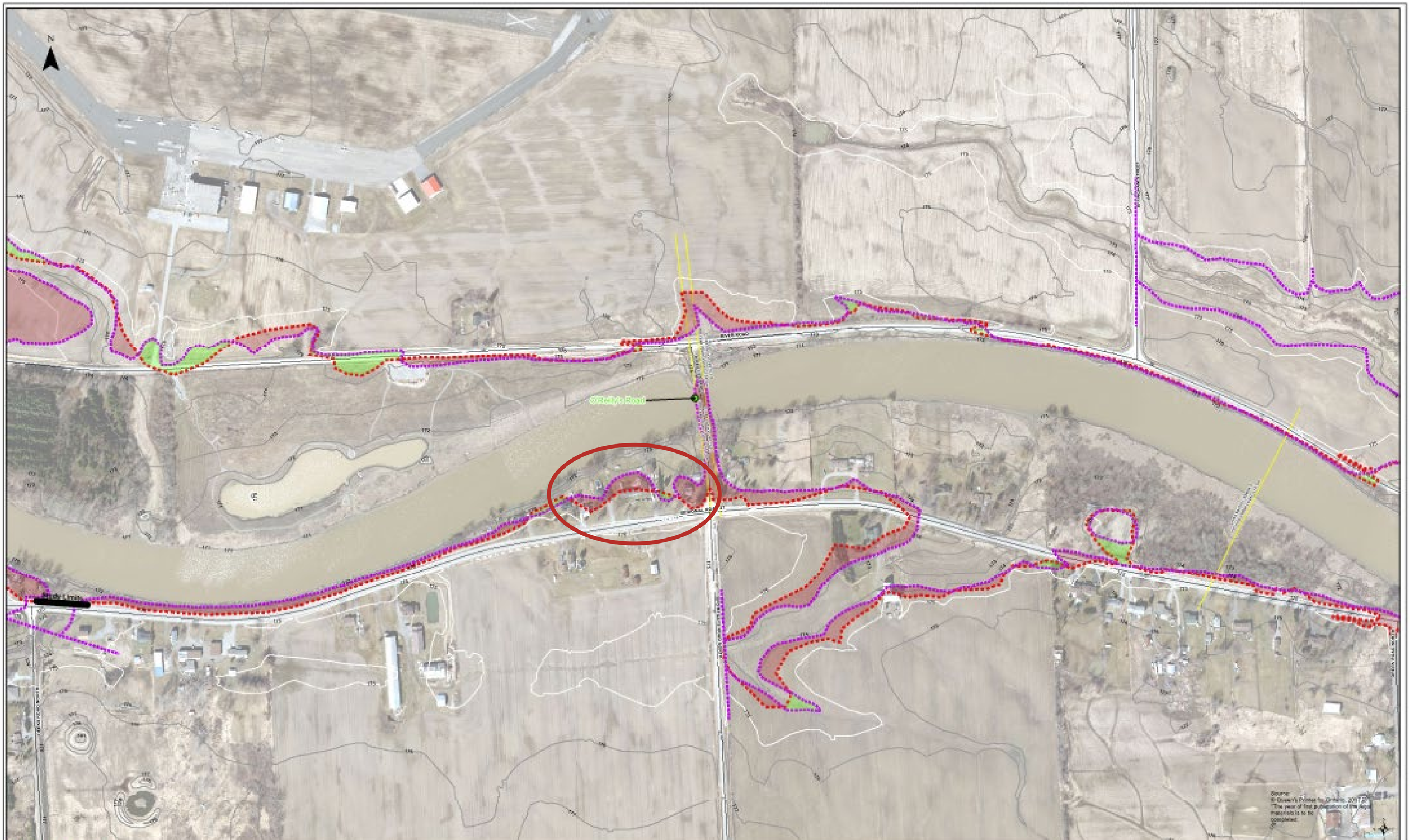

Legend

Floodline — Historical100 Year Flood Line (Dillon, 1985)
Increased Flooded Areas — Reduced Flooded Areas
Mike 11 Cross-sections — Study Limits — Structures

Figure A35
Welland River Watershed
Floodline Mapping

Scale: 1:2,000 (0, 20, 40, 80 Metres)
Date: October 2018 Project No: 38155516
Sources:
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Support Digital Terrain Model in 3km tiles drawing
Aerial Photo - NPCA 2010 Ortho 20km Mosaics

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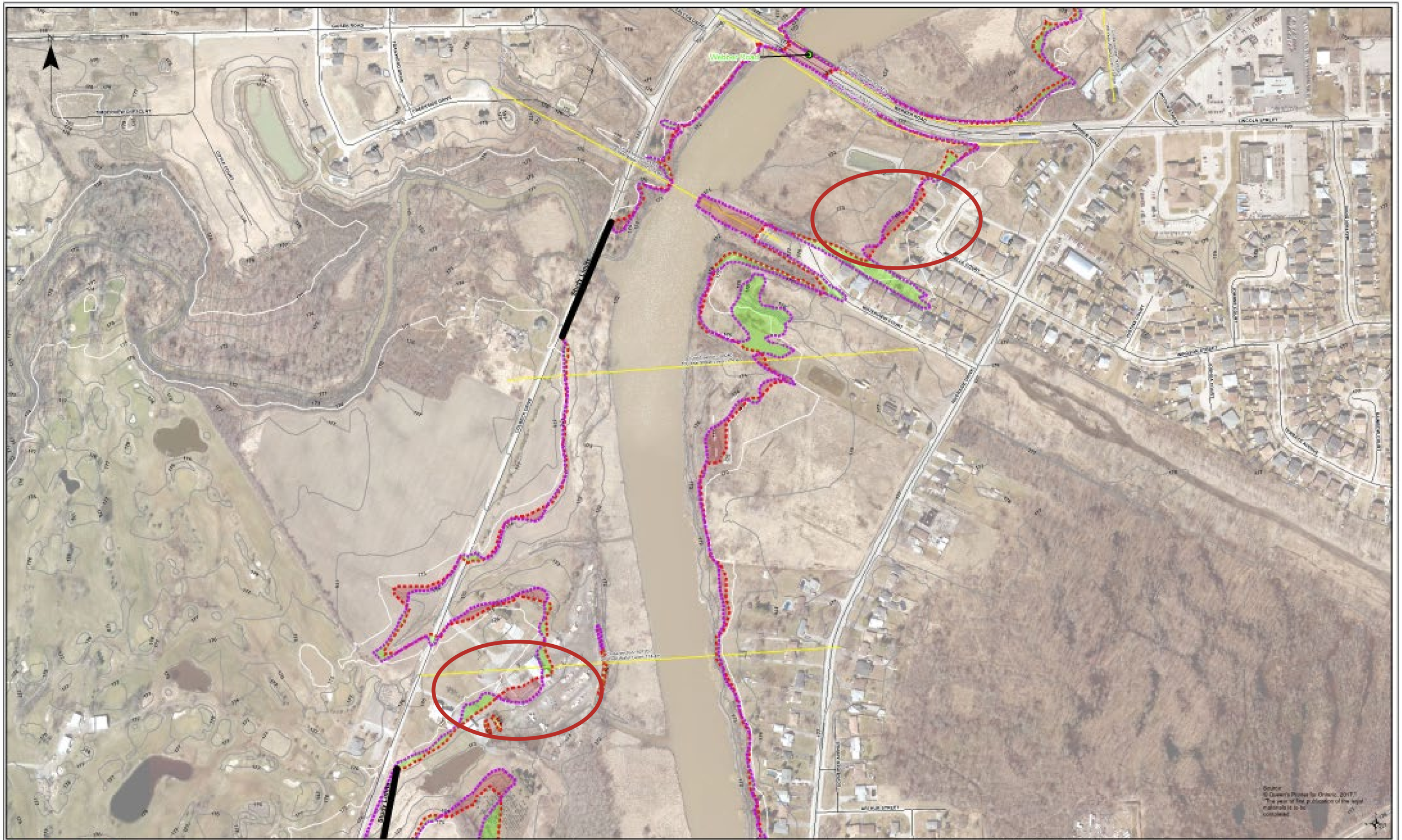

Figure A38
Welland River Watershed
Floodline Mapping

Scale: 1:2,000
Date: October 2018
Project No: 3815516

Sources:
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Support Digital Terrain Model in 3km tiles drawing
Aerial Photo - NPCA 2010 Ortho 20km Mosaics

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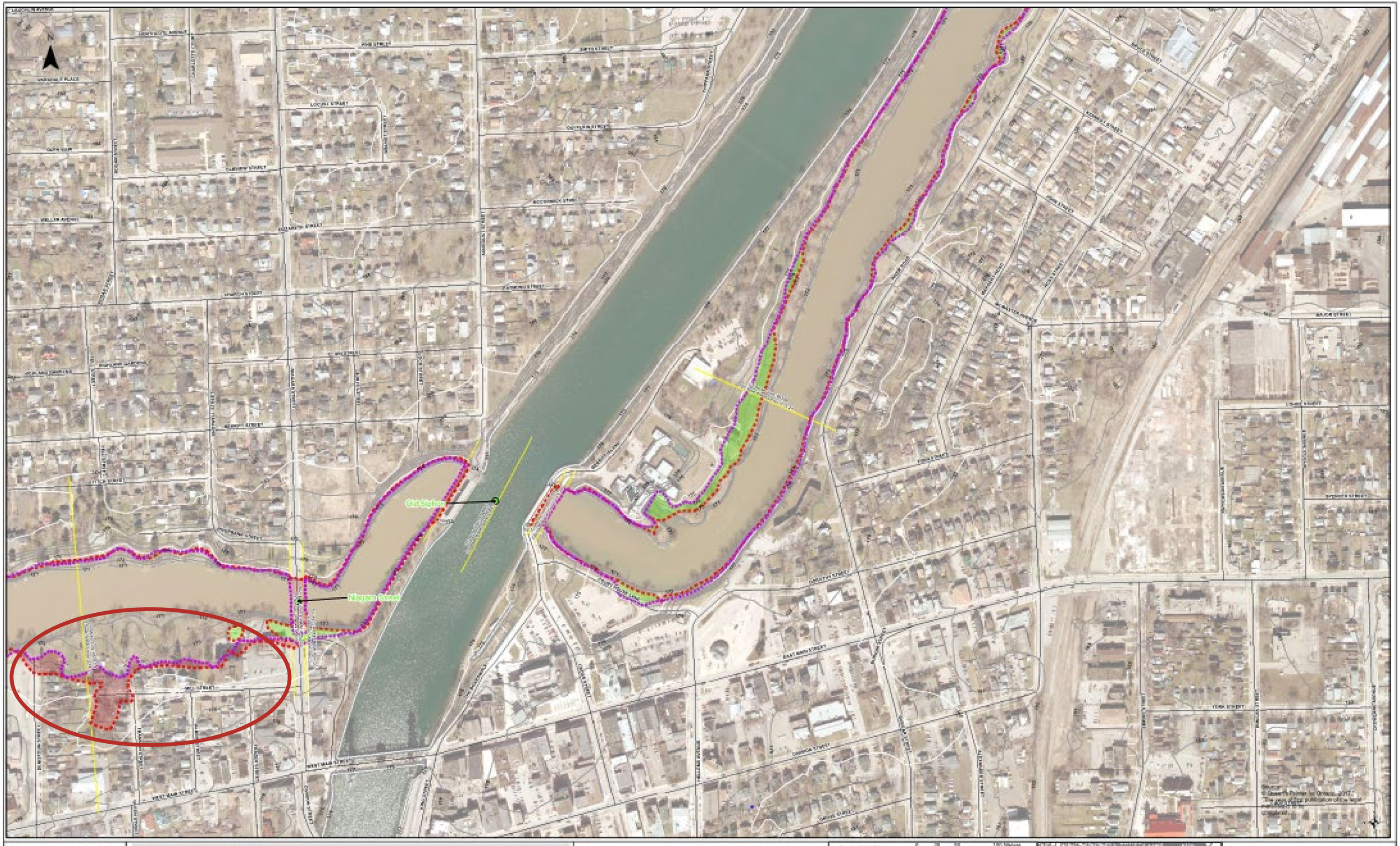

Legend

Floodline — Historical100 Year Flood Line (Dillon, 1985)

Increased Flooded Areas — Reduced Flooded Areas

Mike 11 Cross-sections — Study Limits — Structures

Figure A40
Welland River Watershed
Floodline Mapping

Scale: 1:2,000 (0, 20, 50, 100 Metres)

Date: October 2018 Project No: 3815516

Sources:
Contour - NPCA 2010 1 Meter Contour
Support Digital Terrain Model in 3m tiles drawing
Aerial Photo - NPCA 2010 Ortho 20km Mosaics

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Thank you!

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