

Bruce Beach Road Drainage Issues
Township of Huron-Kinloss

Public Meeting – November 30, 2019

Huron - Kinloss

DEL

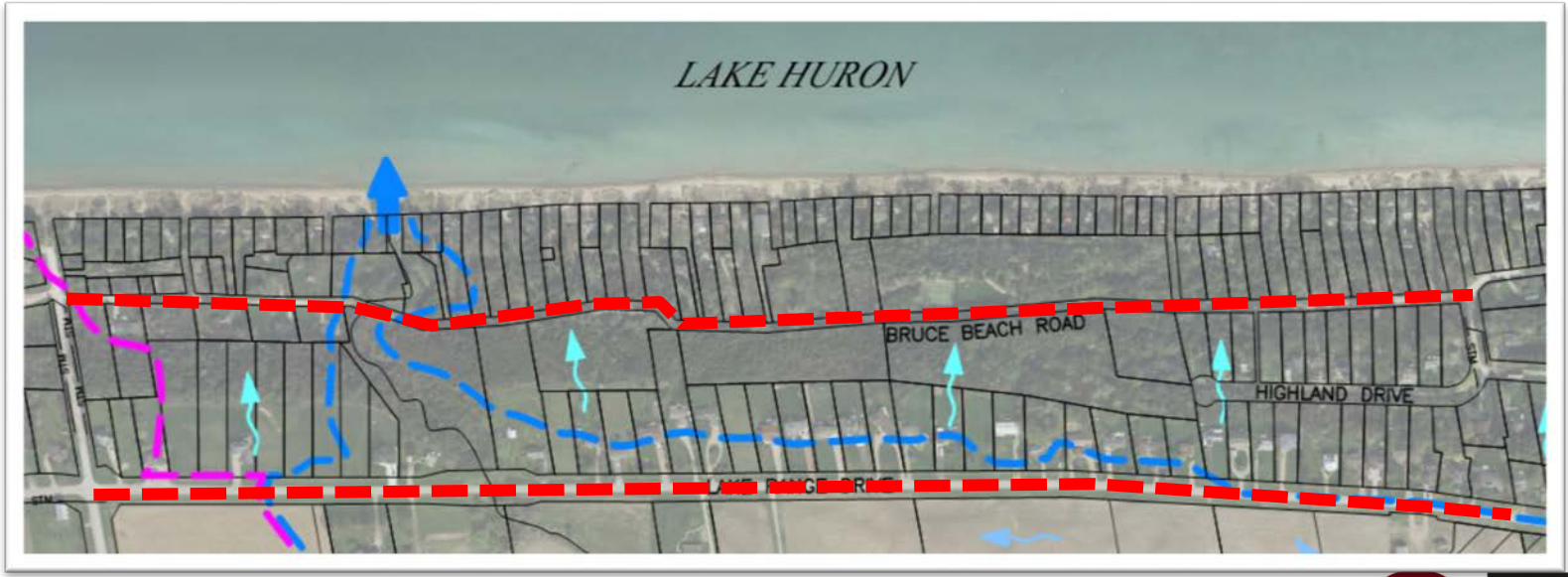
Presentation Overview

- Brief Recap
- Purpose of this Meeting
- Review of Design Priorities
- Design Considerations
- Cost Estimates
- Preliminary Assessments
- Questions
- Next Steps

Brief Recap

Introduction

- Dietrich Engineering Limited Appointed by the **Council** of the Township of Huron-Kinloss on November 19, 2018 under Section 4 (1)(c) of the Drainage Act.
  - To provide a drainage works for Bruce Beach Road between Concession 8 road and Highland Drive and Lake Range Road between Lots 40 and 49.



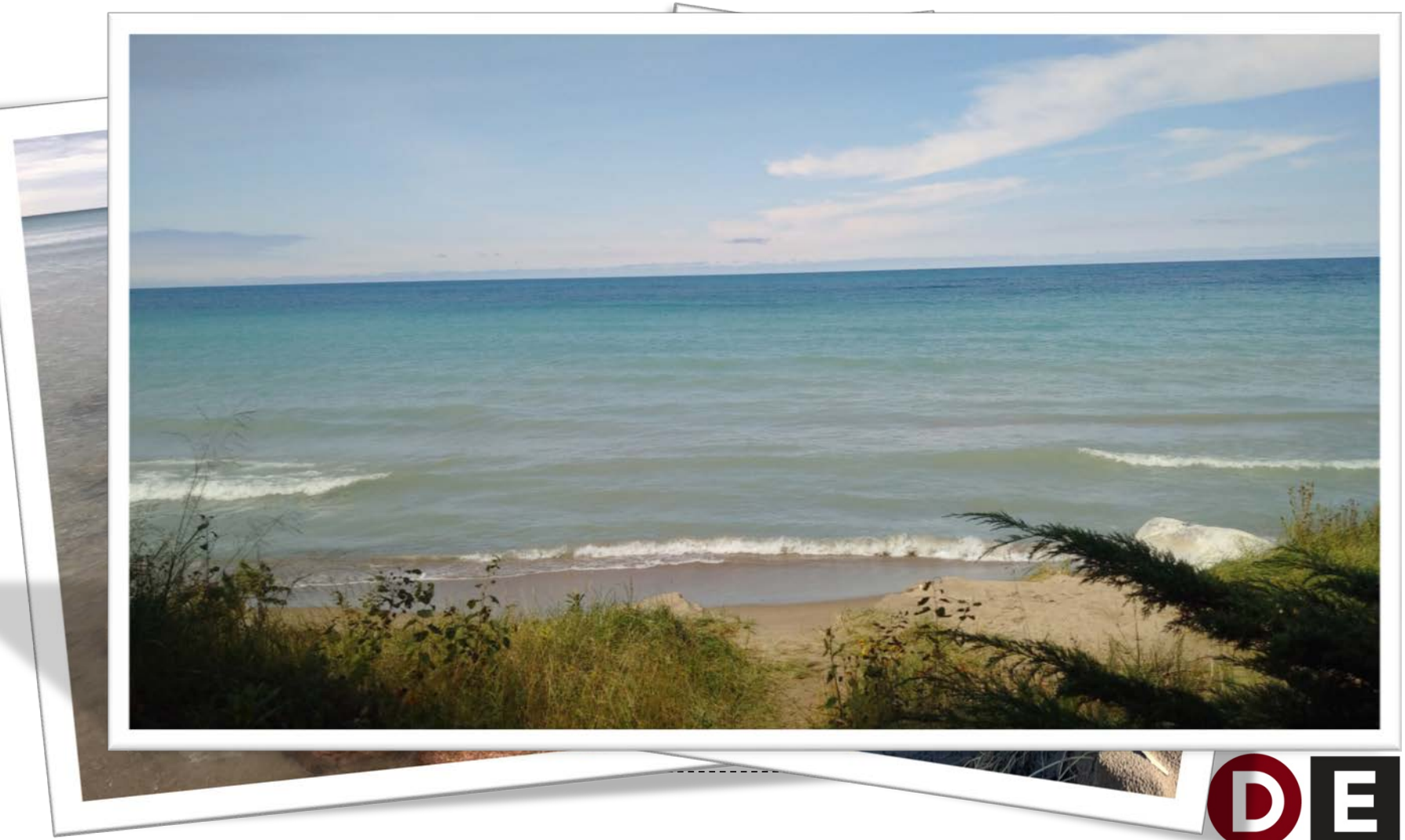
Problems

- Flooding



Criteria for Solutions

- Maintain/Improve Water Quality in the Lake



Requirements from the Public

- No increased number of outlets to the Beach



Summary

- Solve the Flooding Problems while…
  - Protecting the Beach, and
  - Protecting Bruce Beach Road





Public Consultation & Council Presentations

- February 11, 2019 – **Council Meeting**
  - Dietrich Engineering Limited presented:
    - Summary of Project Goals & Values (as presented to HK Council on December 3, 2018)
    - An Overview of the Watershed Areas
    - Five Conceptual Level Solutions
    - Project Plan
- April 5 to May 4, 2019 – HaveYourSayHK forum for Public Consultation
- May 25, 2019 – **Township hosted an Open House** where Dietrich Engineering Limited attended.
  - The purpose of the open house was for the Engineer to receive public input about the project.
- October 21, 2019 – **Council Meeting**
  - Dietrich Engineering Limited presented:
    - Preliminary details of a preferred design, including preliminary cost estimates and assessments
- Early November to November 22 – HaveYourSayHK forum for public Consultation
- November 30, 2019 (Today) - **Township hosts a second Open House**

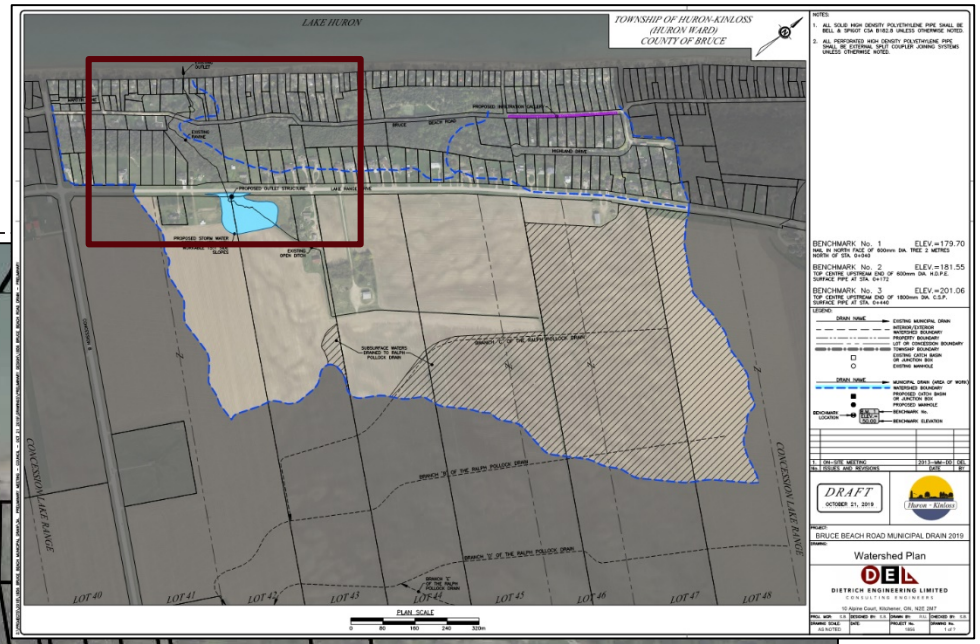
Purpose of this Meeting

Purpose of this Meeting

- For Dietrich Engineering Limited present design recommendations to the public, including cost estimates, and estimated assessments, and to receive feedback.

Findings

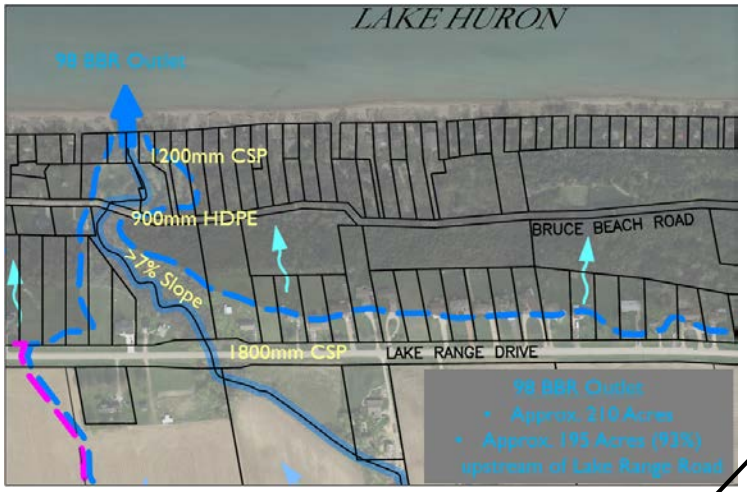
Findings
(previously presented)



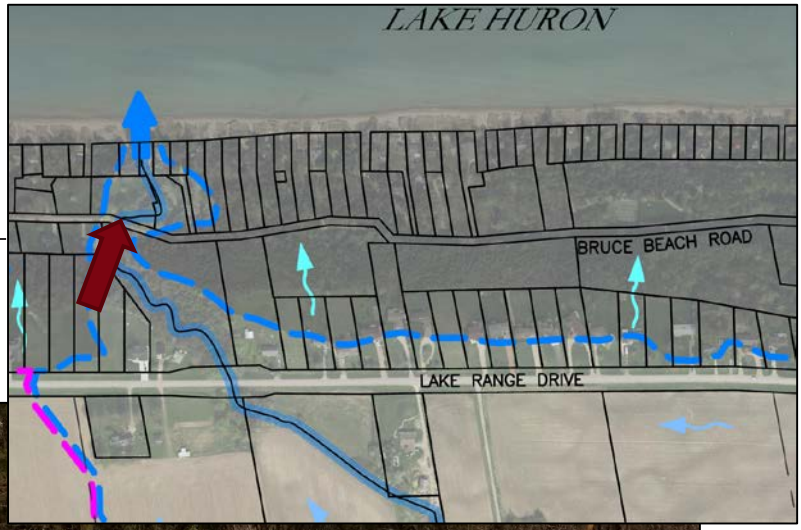
98 BBR Outlet

- Approx. 210 Acres
- Approx. 195 Acres (93%) upstream of Lake Range Road

Findings (Previously Presented)



Findings
(previously presented)

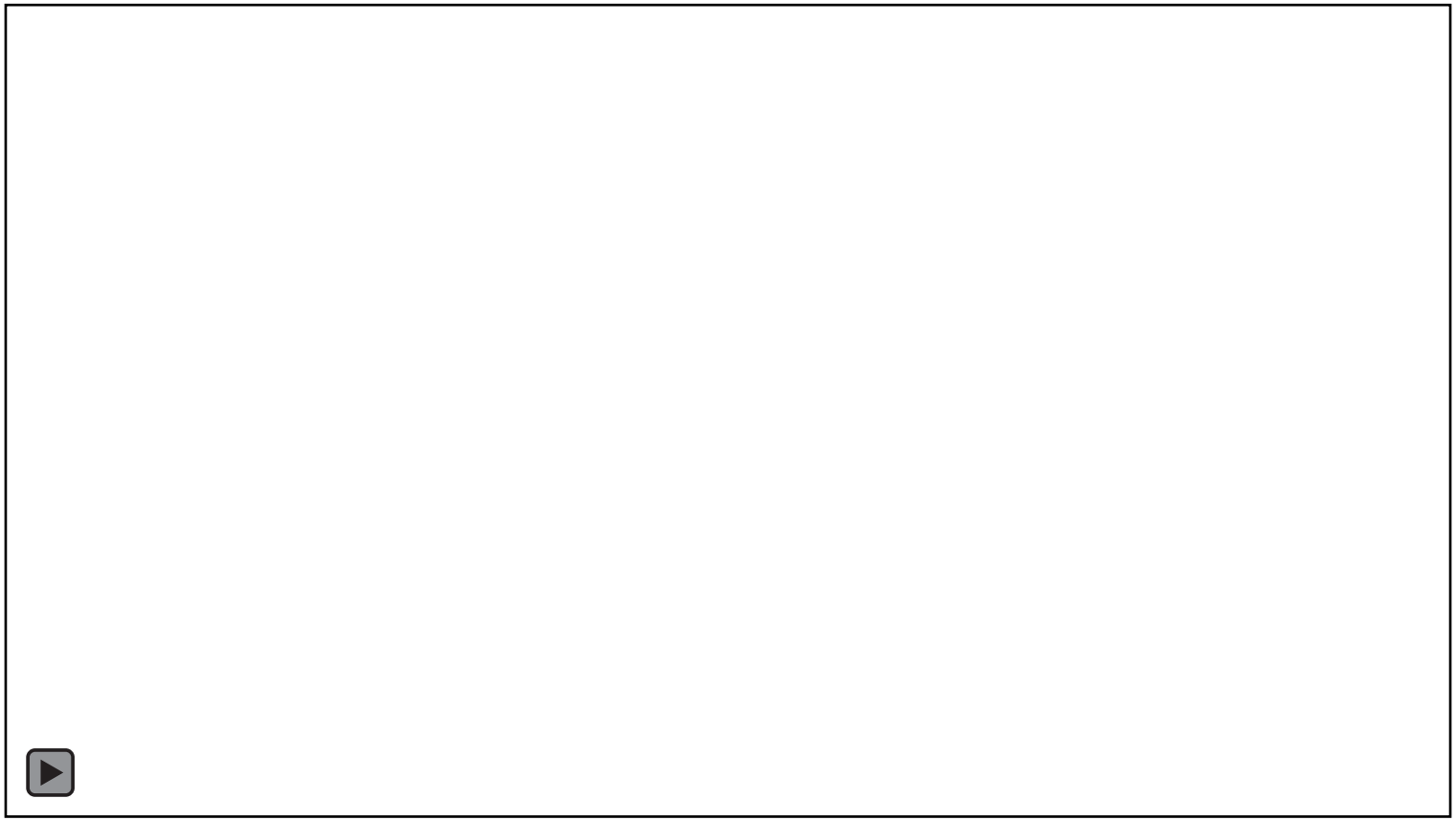


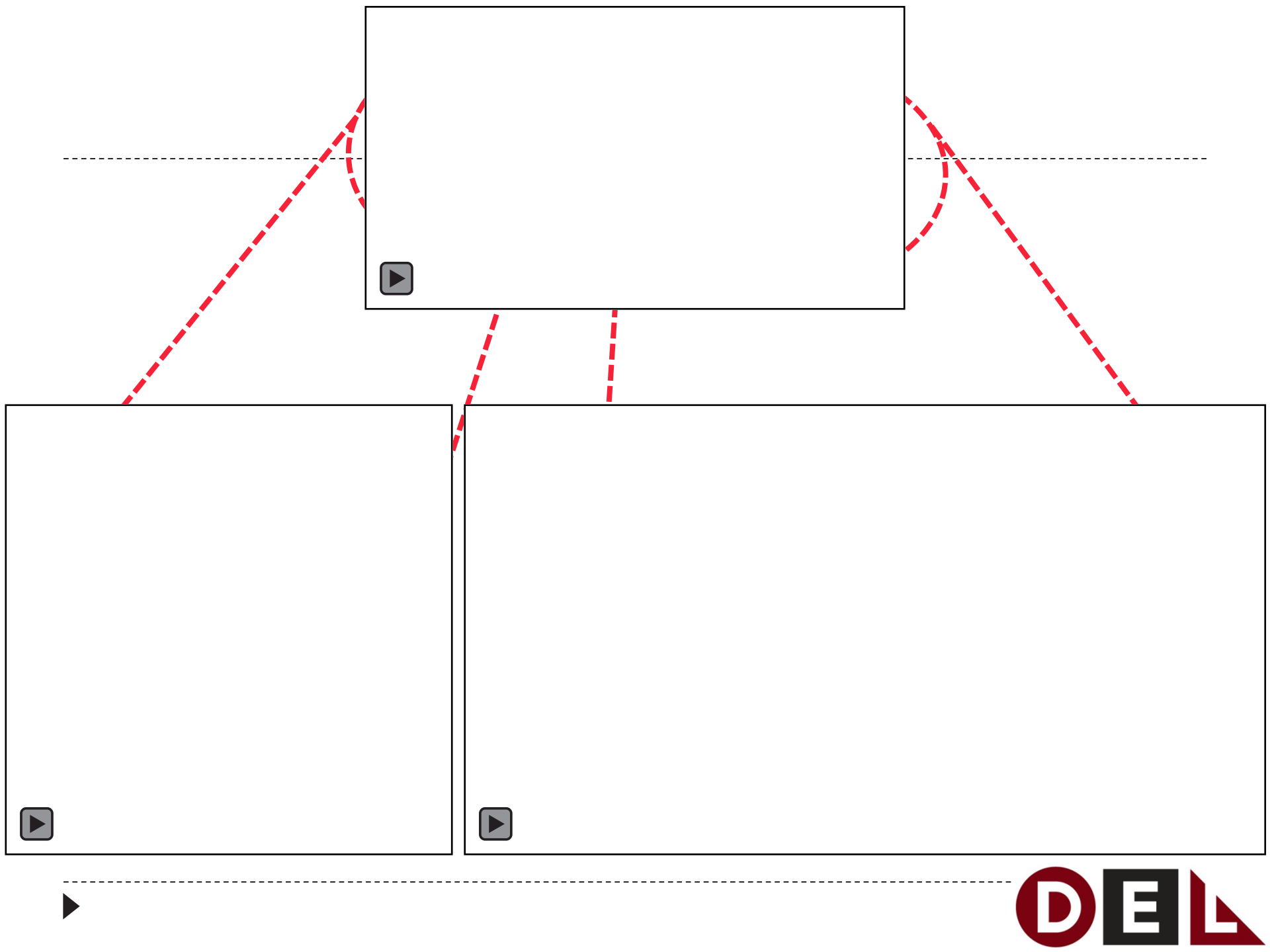




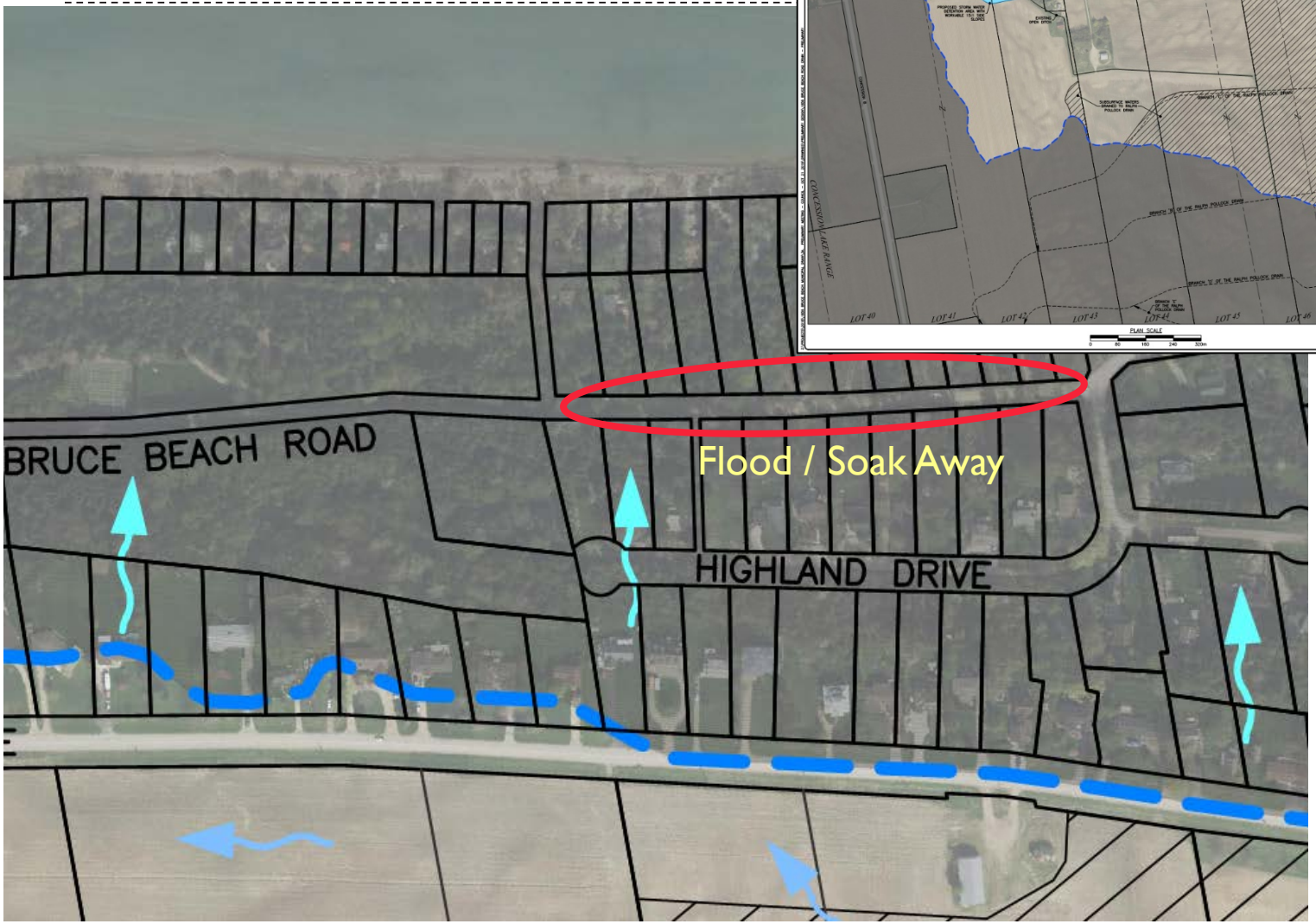
Findings

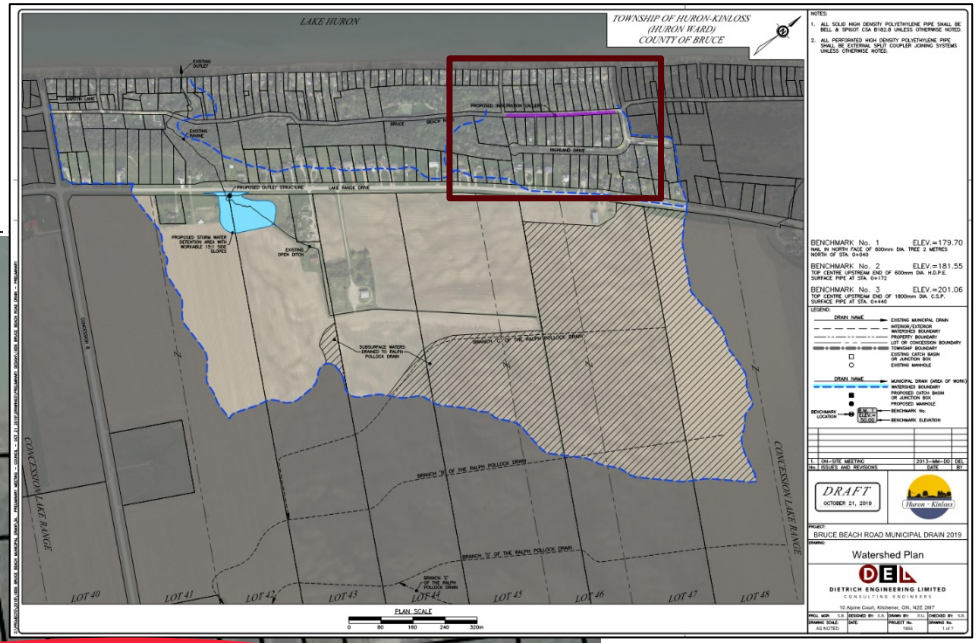
- Existing Conditions Modelling
  - 5, 10, 25, 50, 100Year Rainfall Events *(50 Year Event animated below)*





Findings
(previously presented)





Findings
(previously presented)



Findings
(previously presented)



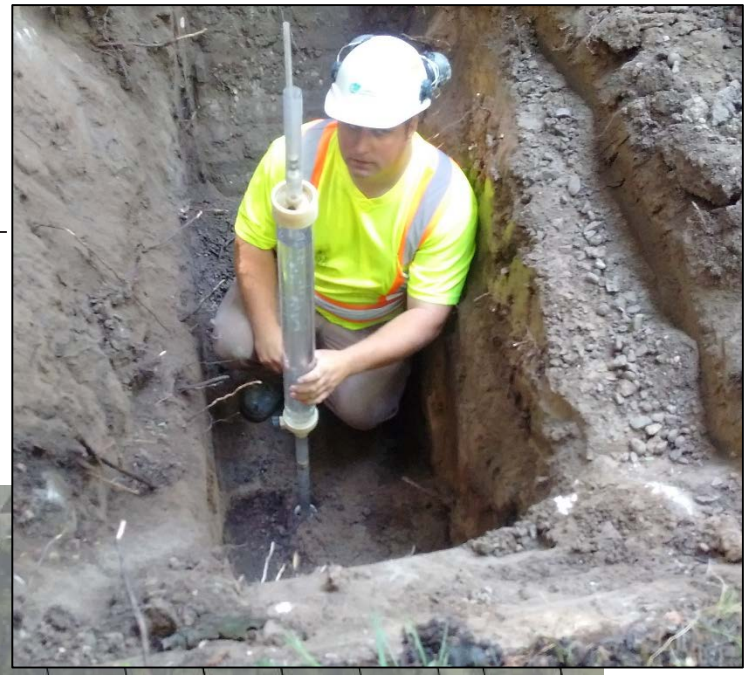


Findings



Findings

- Soils Investigation
  - Assess soils ability to infiltrate runoff.

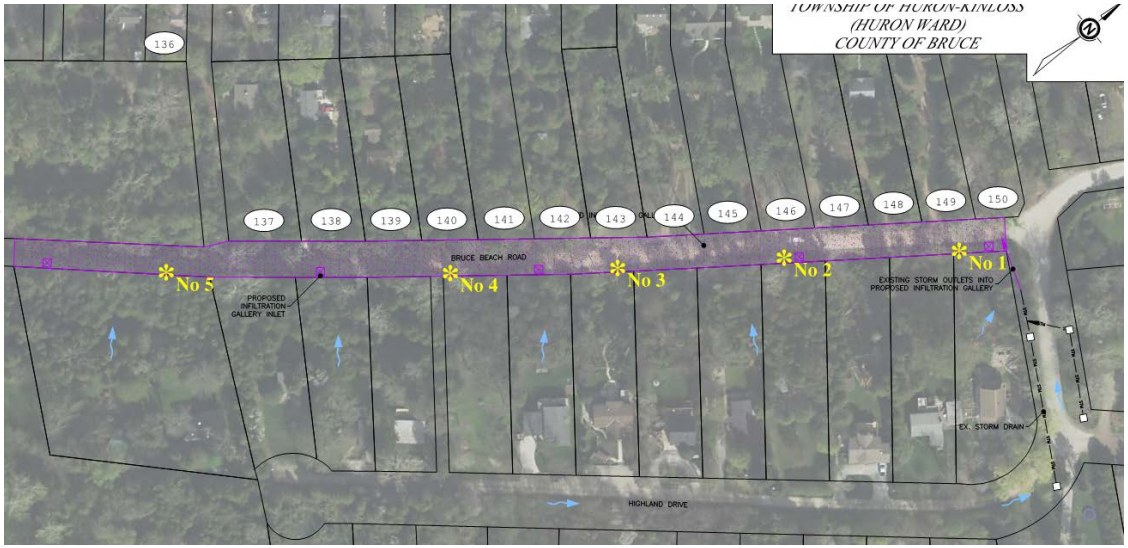




Findings

- Soils Investigation

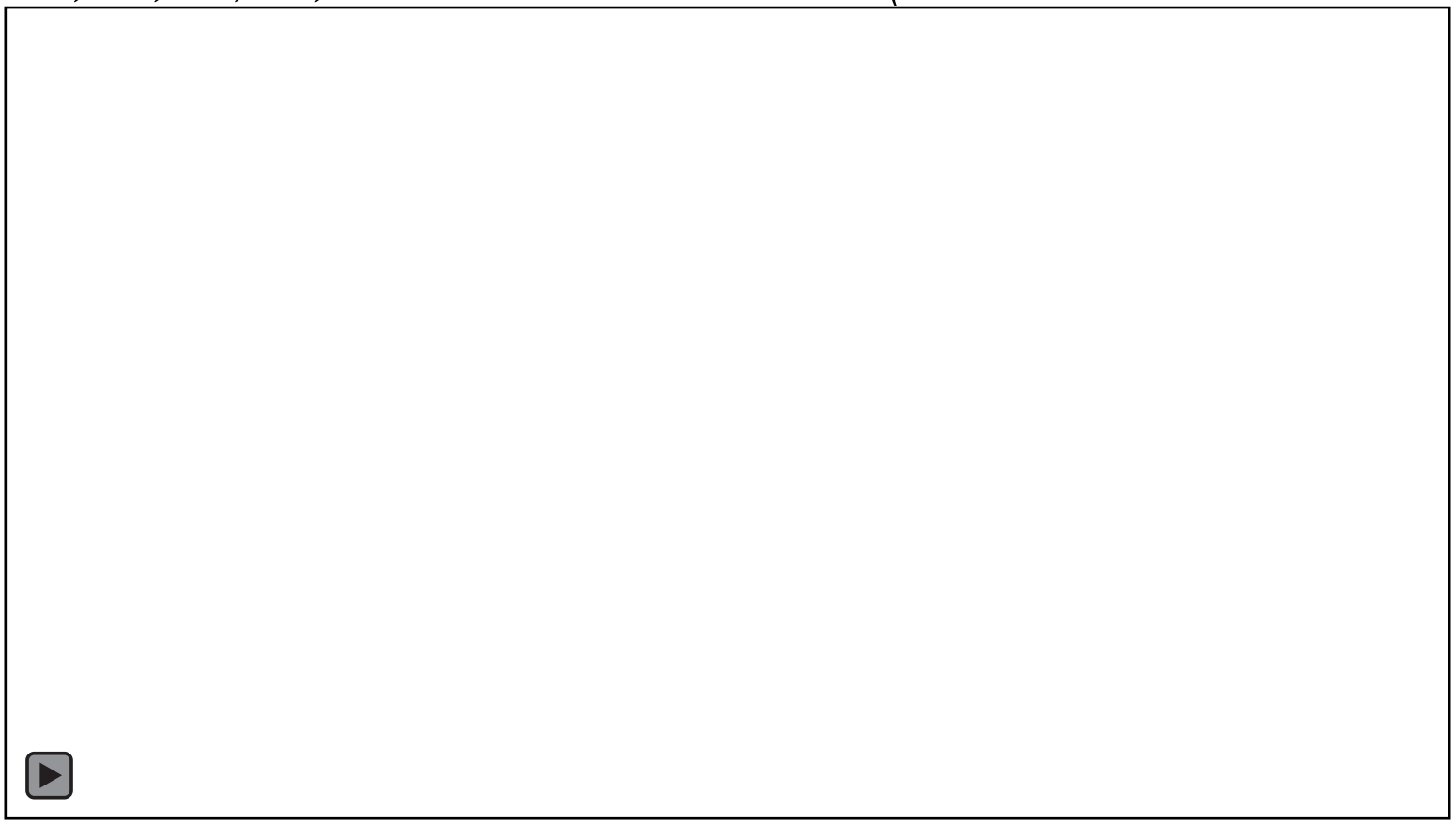
Hydraulic Conductivity of Clay: 1 foot per year



Test Pit No.	Soil Strata	Location	Hydraulic Conductivity
1	Fine to Medium SAND (1.16m to 2.48m)	Cottage No. 149	**975mm/hr (3.2ft/hr)**
2	Fine to Medium SAND (0.60m to 2.13m)	Cottage No. 146	**875mm/hr (2.8ft/hr)**
3	Fine to Medium SAND (0.60m to 2.13m)	Cottage No. 143	**875mm/hr (2.8ft/hr)**
4	Fine to Medium SAND (0.91m to 1.82m)	Cottage No. 140	**605mm/hr (2.0ft/hr)**
5	Fine to Medium SAND (1.27m to 2.13m)	Cottage No. 136	**875mm/hr (2.8ft/hr)**

Findings

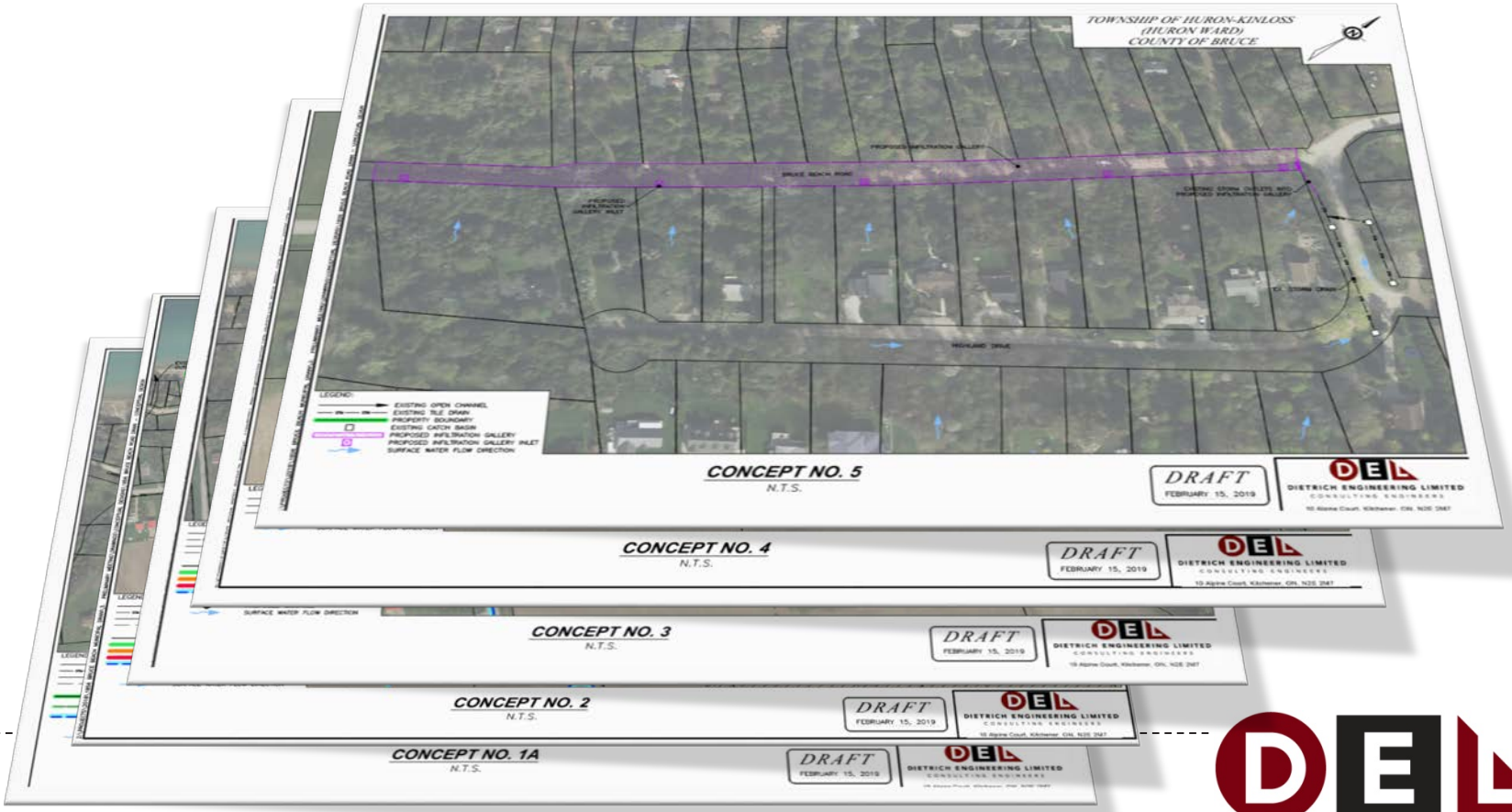
- Existing Conditions Modelling
  - 5, 10, 25, 50, 100Year Rainfall Events *(50 Year Event animated below)*



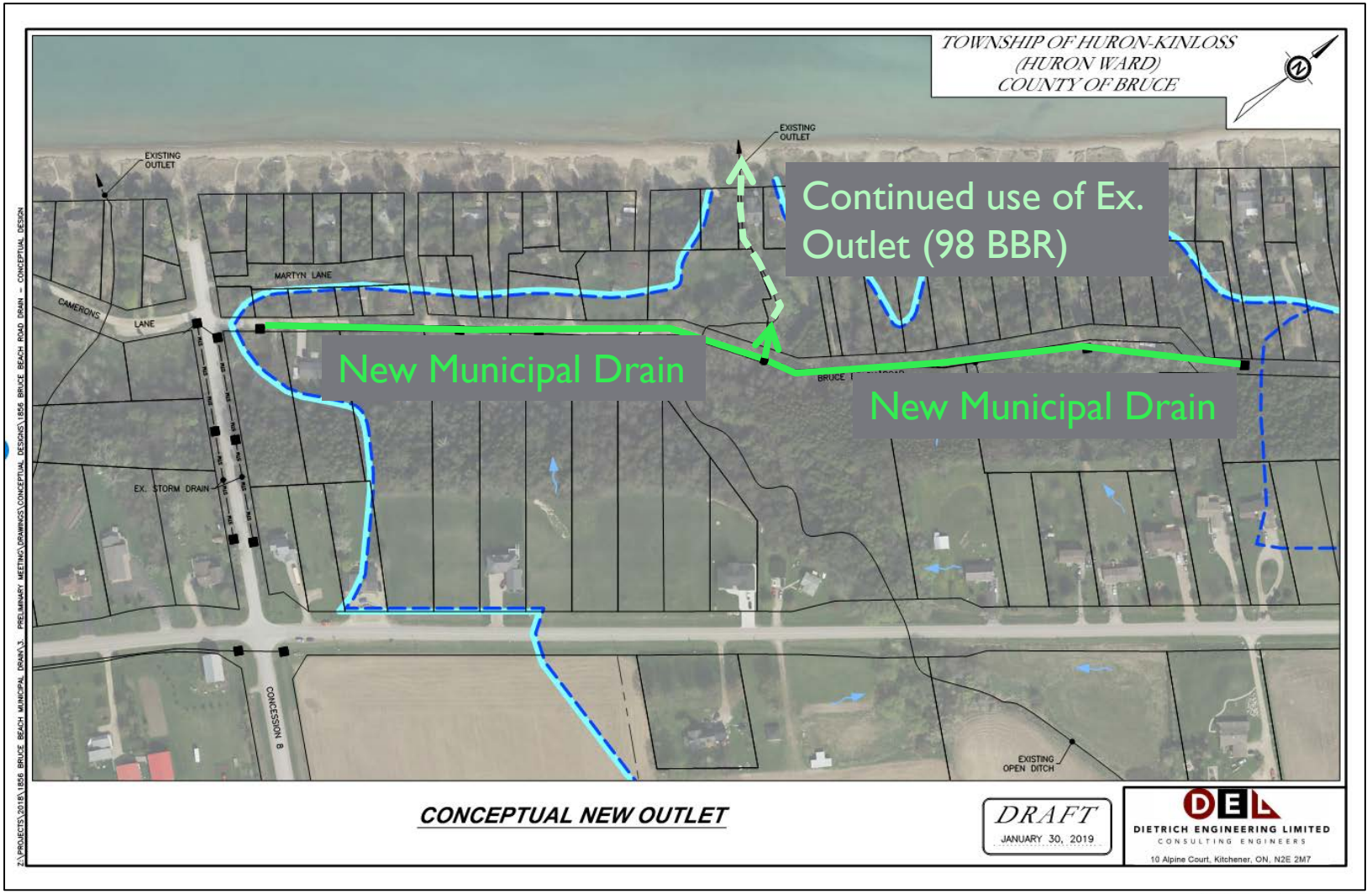
Review of Concepts

Conceptual Designs

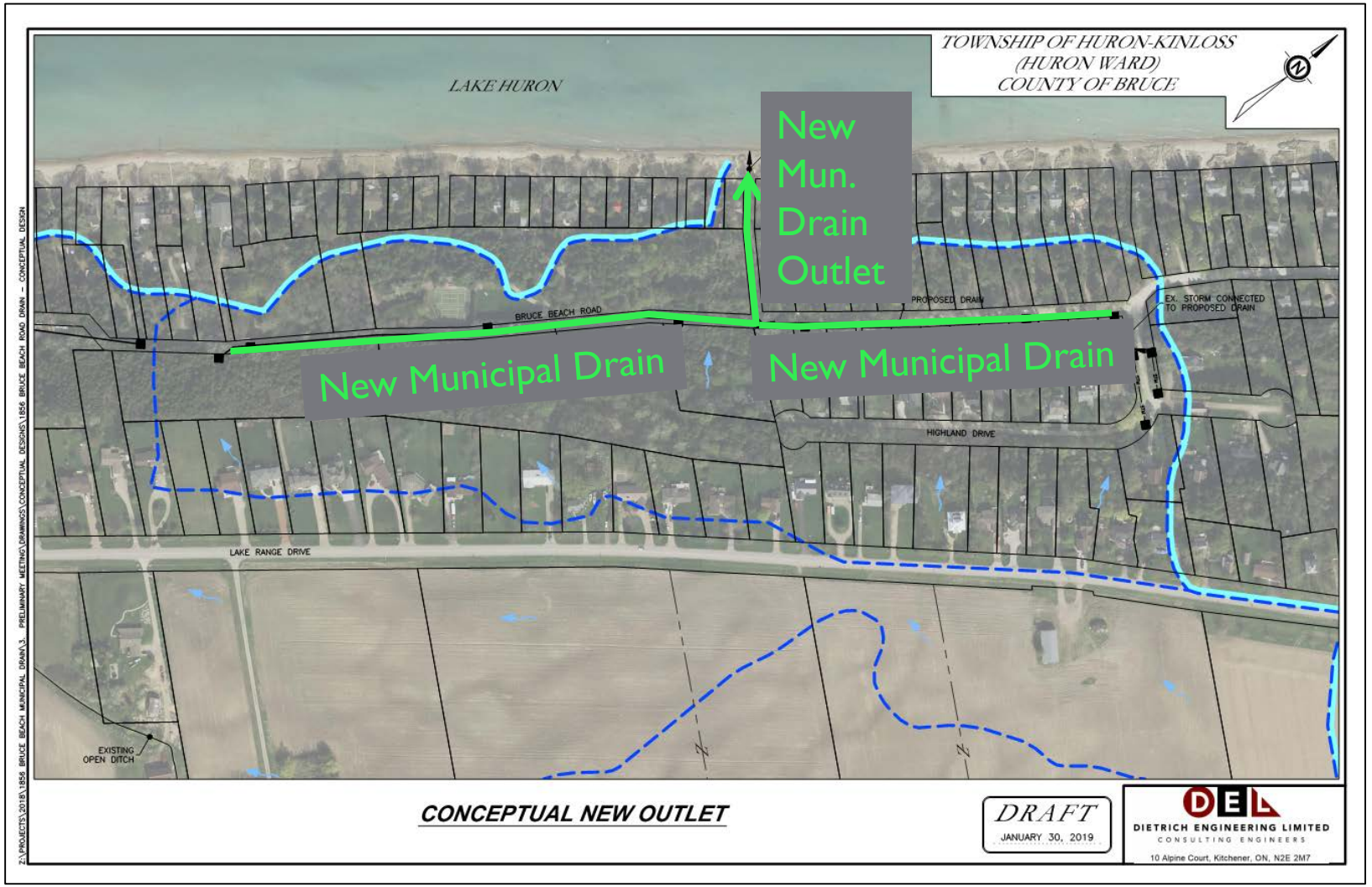
- Dietrich Engineering Limited presented five conceptual designs and a general project plan at the February 11, 2019 Council Meeting.



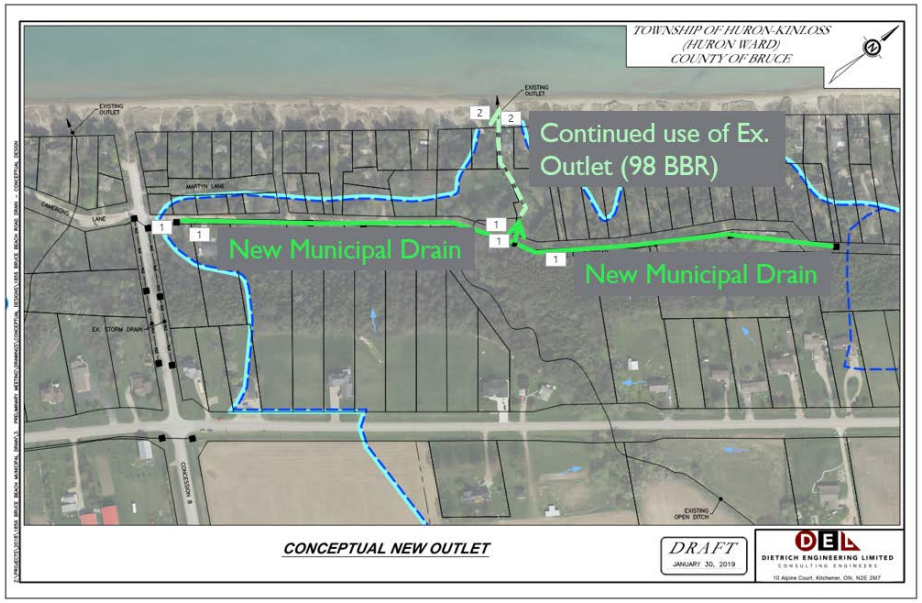
Concept No. 1a (98 BBR)

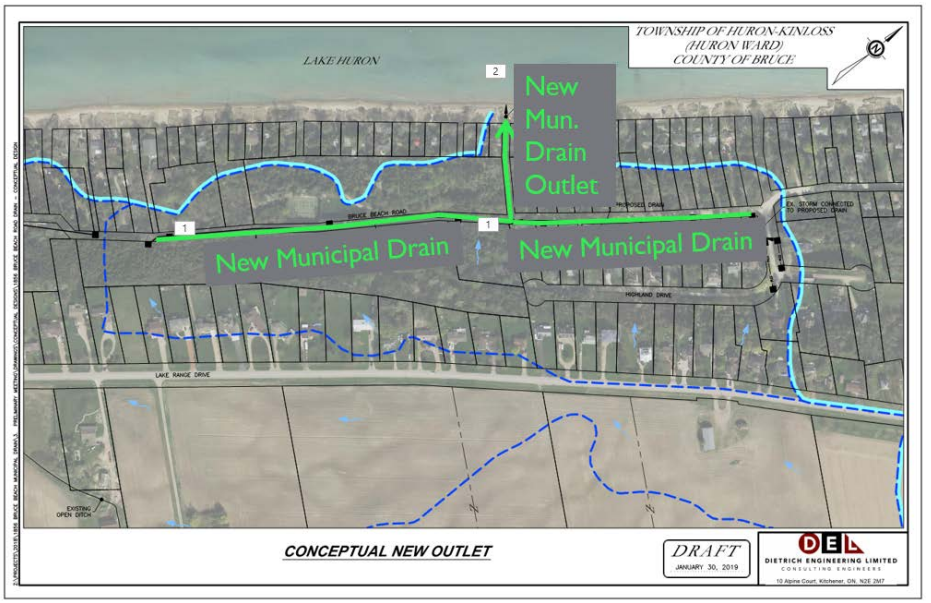


Concept No. 1b (Highland Drive)



Concept No. 1 (previously presented)





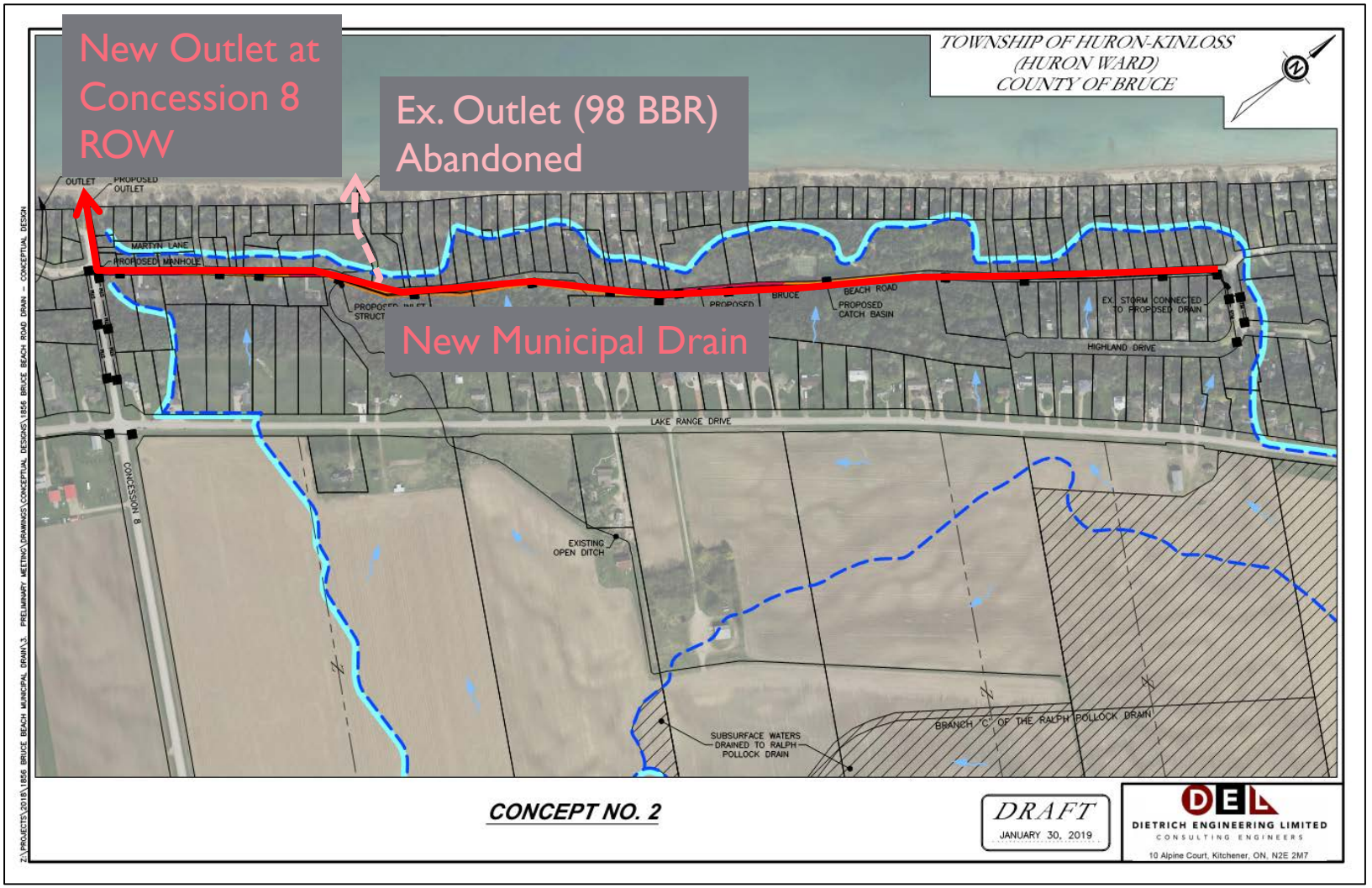
Guiding Principals (December 3rd Council Presentation)

- Do not increase the number of outlets to the beach
- Eliminate the outlet at 98 Bruce Beach Road
- Use Concession 8 Road Allowance as outlet
- Determine lands from Lake Range and Highland Drive and re-route
- Employ stormwater management principles to manage stormwater runoff

Municipal Drain Benefits

- Solve drainage issues along Bruce Beach Road (not quality)
- Offers cost sharing of total project costs
- Provides a provisions for future maintenance

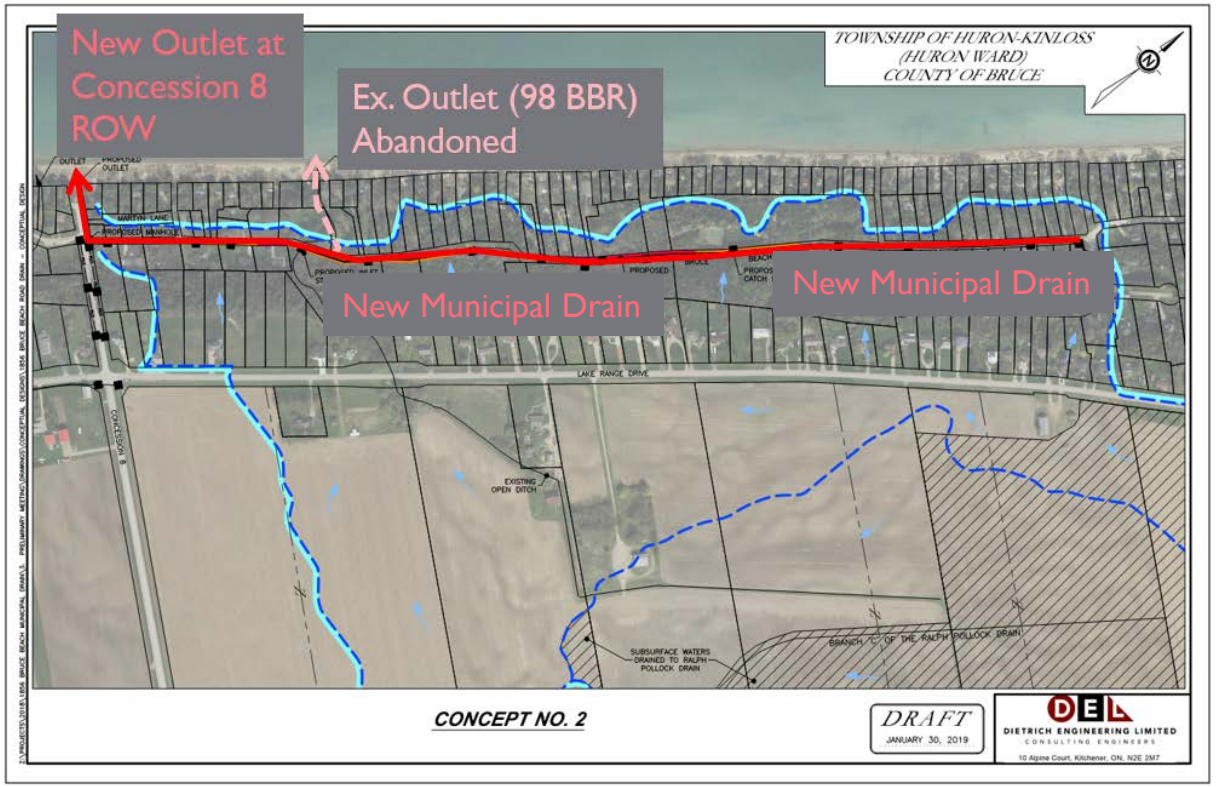
Concept No. 2


New Outlet at Concession 8 ROW
Ex. Outlet (98 BBR) Abandoned
New Municipal Drain
TOWNSHIP OF HURON-KINLOSS
(HURON WARD)
COUNTY OF BRUCE
OUTLET
PROPOSED OUTLET
MARTYN LANE
PROPOSED MANHOLE
BEACH ROAD
PROPOSED CATCH BASIN
EX. STORM CONNECTED TO PROPOSED DRAIN
HIGHLAND DRIVE
LAKE RANGE DRIVE
CONCESSION 8
EXISTING OPEN DITCH
SUBSURFACE WATERS DRAINED TO RALPH POLLOCK DRAIN
BRANCH 'C' OF THE RALPH POLLOCK DRAIN
CONCEPT NO. 2
DRAFT
JANUARY 30, 2019
DIETRICH ENGINEERING LIMITED
CONSULTING ENGINEERS
10 Alpine Court, Kitchener, ON, N2E 2M7

Concept No. 2 (previously presented)

Guiding Principals (December 3rd Council Presentation)

- Do not increase the number of outlets to the beach (Currently outlets at Cameron Street & 98 BBR)
- Eliminate the outlet at 98 Bruce Beach Road
- Use Concession 8 Road Allowance as outlet
- Determine lands from Lake Range and Highland Drive and re-route
- Employ stormwater management principles to manage stormwater runoff



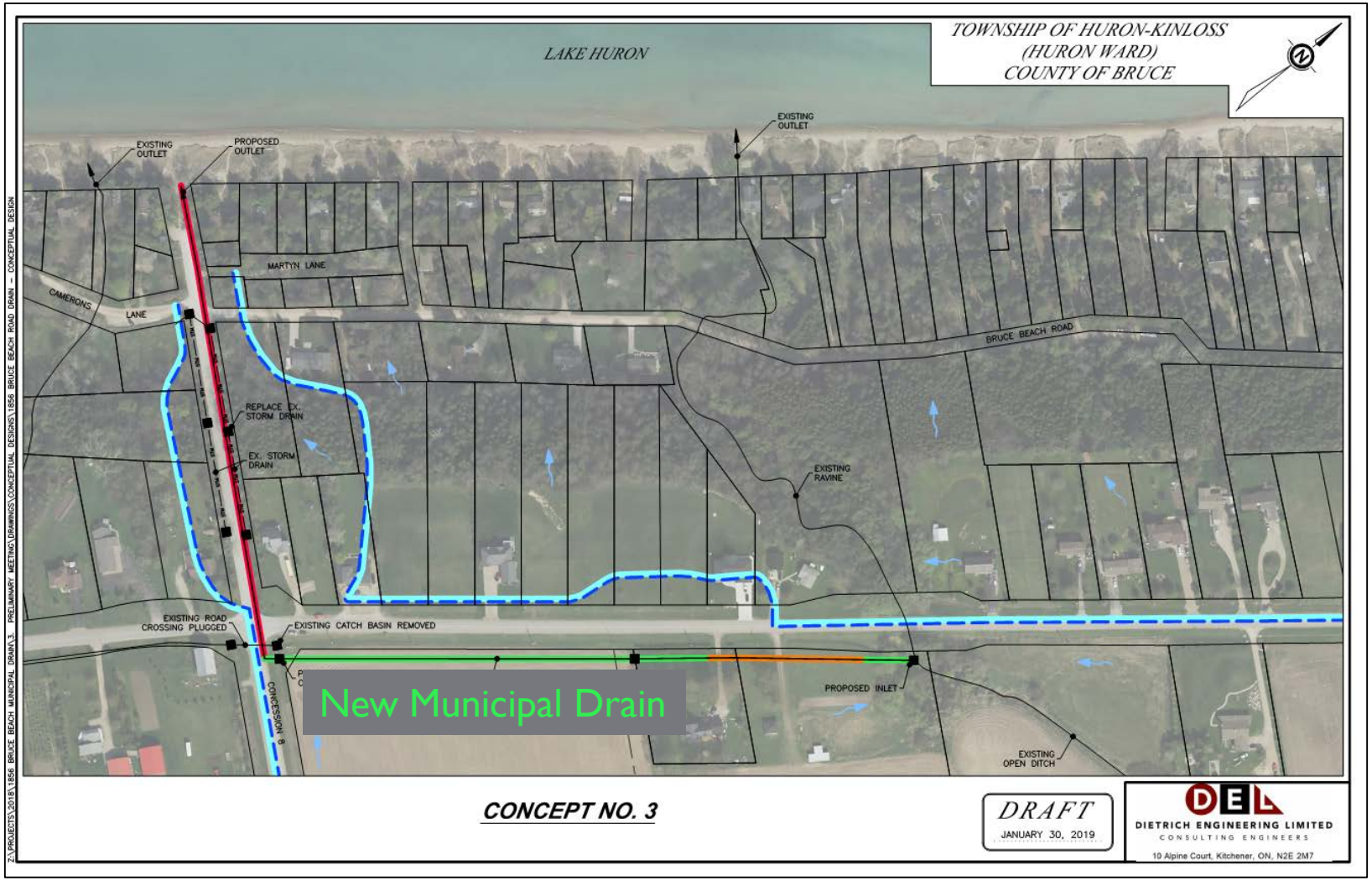
Municipal Drain Benefits

- Solve drainage issues along Bruce Beach Road
- Offers cost sharing of total project costs
- Provides a mechanism for future maintenance

Other Comments

- **Not feasible due to construction conditions**

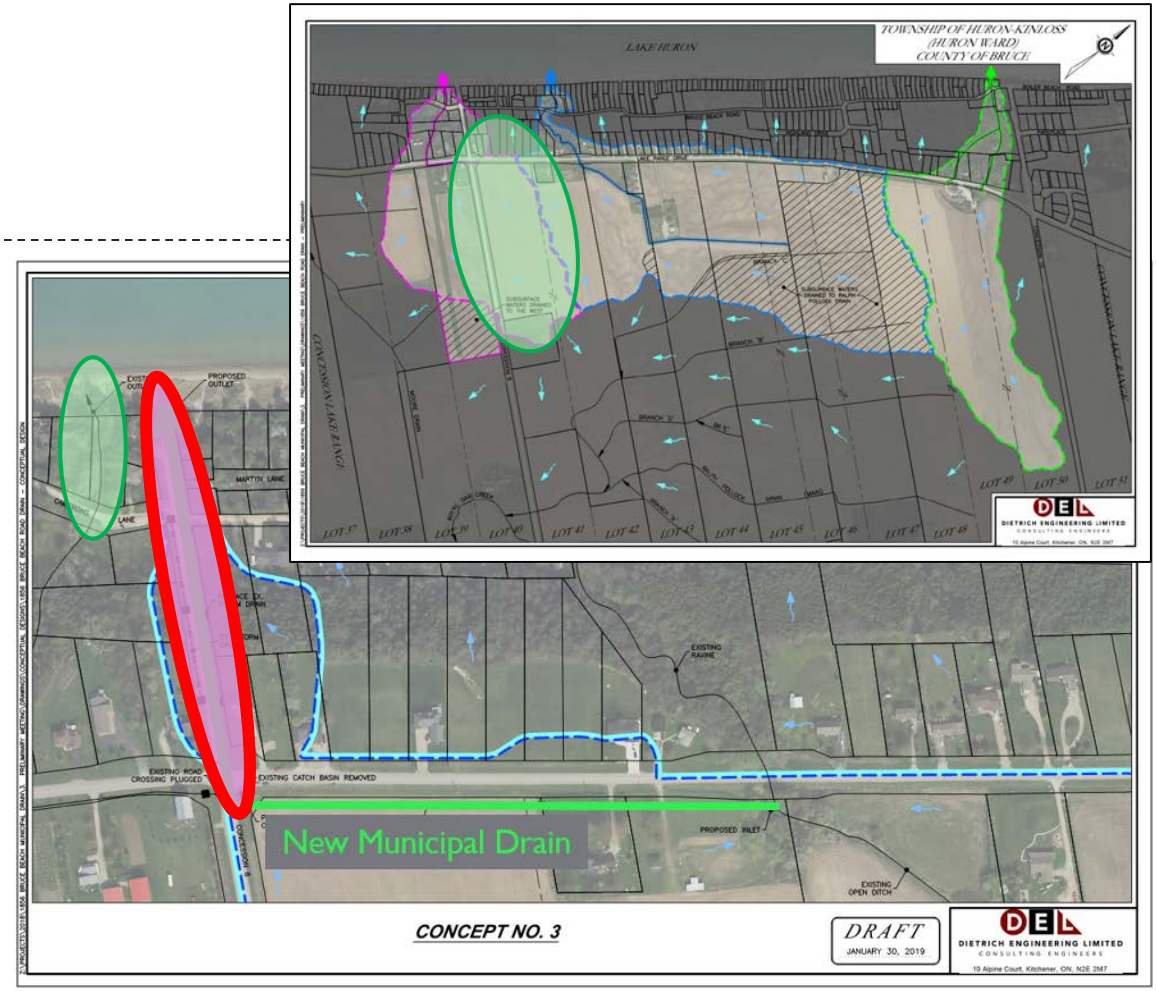
Concept No. 3


LAKE HURON
TOWNSHIP OF HURON-KINLOSS
(HURON WARD)
COUNTY OF BRUCE
EXISTING OUTLET
PROPOSED OUTLET
EXISTING OUTLET
MARTYN LANE
CAMERONS LANE
BRUCE BEACH ROAD
REPLACE EX. STORM DRAIN
EX. STORM DRAIN
EXISTING RAVINE
EXISTING ROAD CROSSING PLUGGED
EXISTING CATCH BASIN REMOVED
CONCESSION 8
New Municipal Drain
PROPOSED INLET
EXISTING OPEN DITCH
CONCEPT NO. 3
DRAFT
JANUARY 30, 2019
DIETRICH ENGINEERING LIMITED
CONSULTING ENGINEERS
10 Alpine Court, Kitchener, ON, N2E 2M7
Z:\PROJECTS\2018\1856 BRUCE BEACH MUNICIPAL DRAIN\3. PRELIMINARY MEETING\DRAWINGS\CONCEPTUAL DESIGNS\1856 BRUCE BEACH ROAD DRAIN - CONCEPTUAL DESIGN

Concept No. 3

Guiding Principals (December 3rd Council Presentation)

- Do not increase the number of outlets to the beach
  (Currently outlets at Cameron Street & 98 BBR)
- Eliminate the outlet at 98 Bruce Beach Road
- Use Concession 8 Road Allowance as outlet
- Determine lands from Lake Range and Highland Drive and re-route
- Employ stormwater management principles to manage stormwater runoff



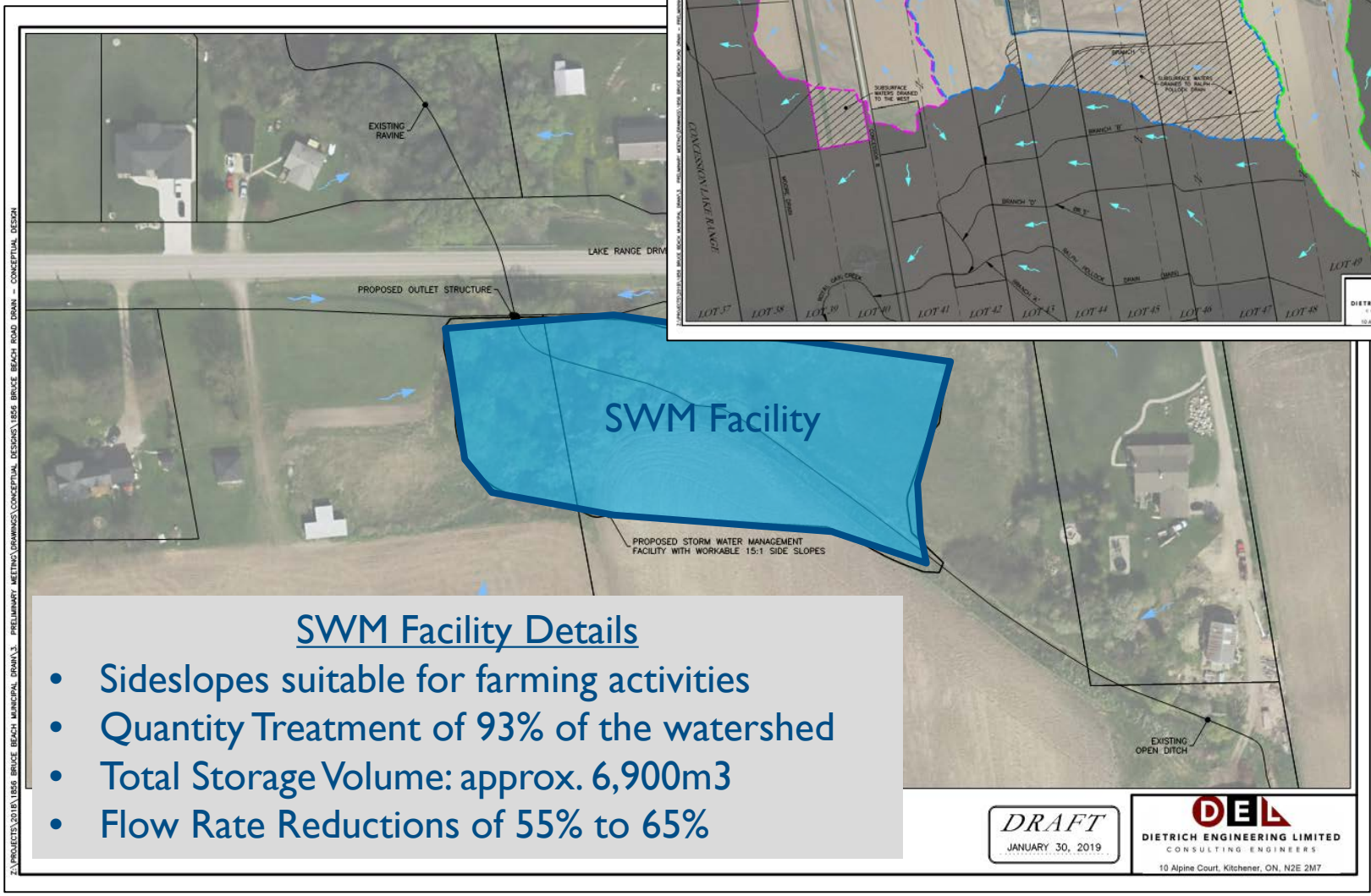
Other Comments

- Intense construction along Concession 8 Road
- Still requires use of 98 BBR Outlet
- Provides some relief to Cameron outlet

Municipal Drain Benefits

- Solve drainage issues along Bruce Beach Road
- Offers cost sharing of total project costs
- Provides a mechanism for future maintenance

Concept No. 4



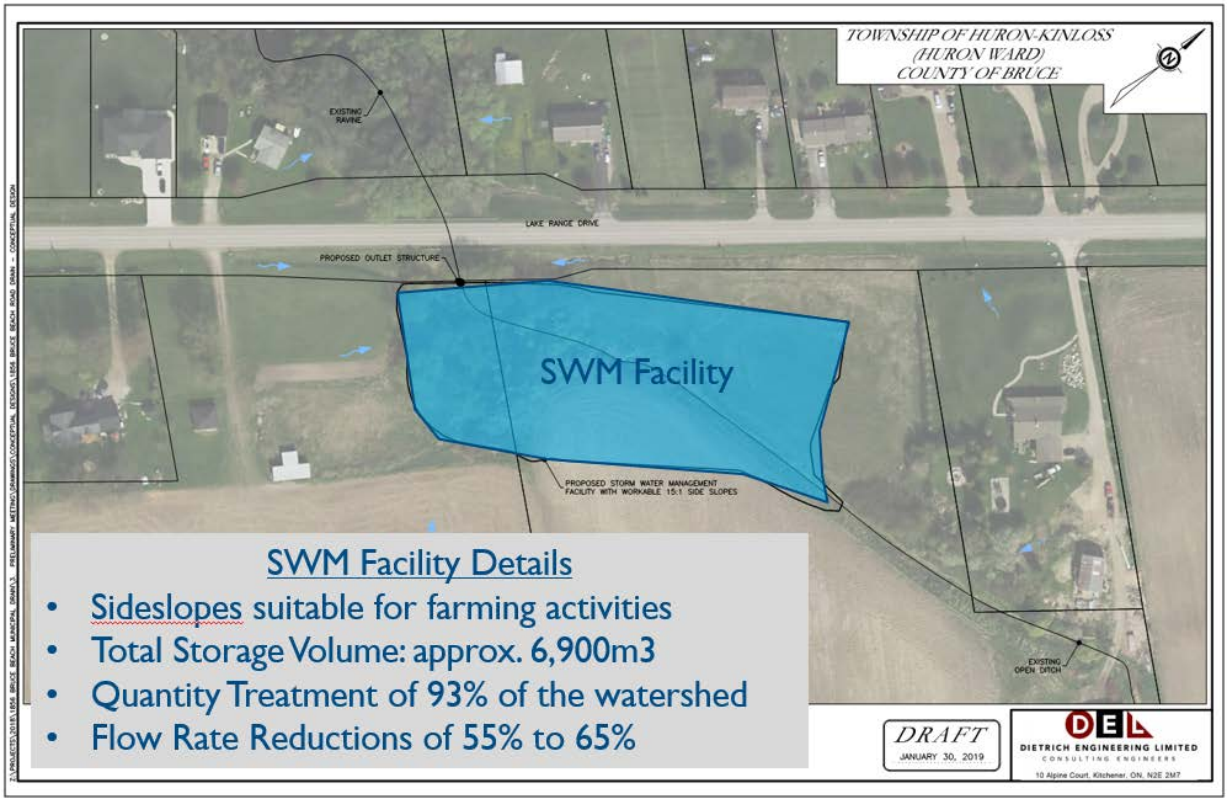
SWM Facility Details

- Sideslopes suitable for farming activities
- Quantity Treatment of 93% of the watershed
- Total Storage Volume: approx. 6,900m3
- Flow Rate Reductions of 55% to 65%

Concept No. 4

Guiding Principals (December 3rd Council Presentation)

- Do not increase the number of outlets to the beach (Currently outlets at Cameron Street & 98 BBR)
- Eliminate the outlet at 98 Bruce Beach Road
- Use Concession 8 Road Allowance as outlet
- Determine lands from Lake Range and Highland Drive and re-route
- Employ stormwater management principles to manage stormwater runoff



Municipal Drain Benefits

- Solve drainage issues along Bruce Beach Road
- Offers cost sharing of total project costs
- Provides a mechanism for future maintenance

Other Comments

- Greatly reduces peak flows at 98 Bruce Beach Road and the Ravine
- Provides improved use of the land upstream (east) of Lake Range Road

Concept No. 5

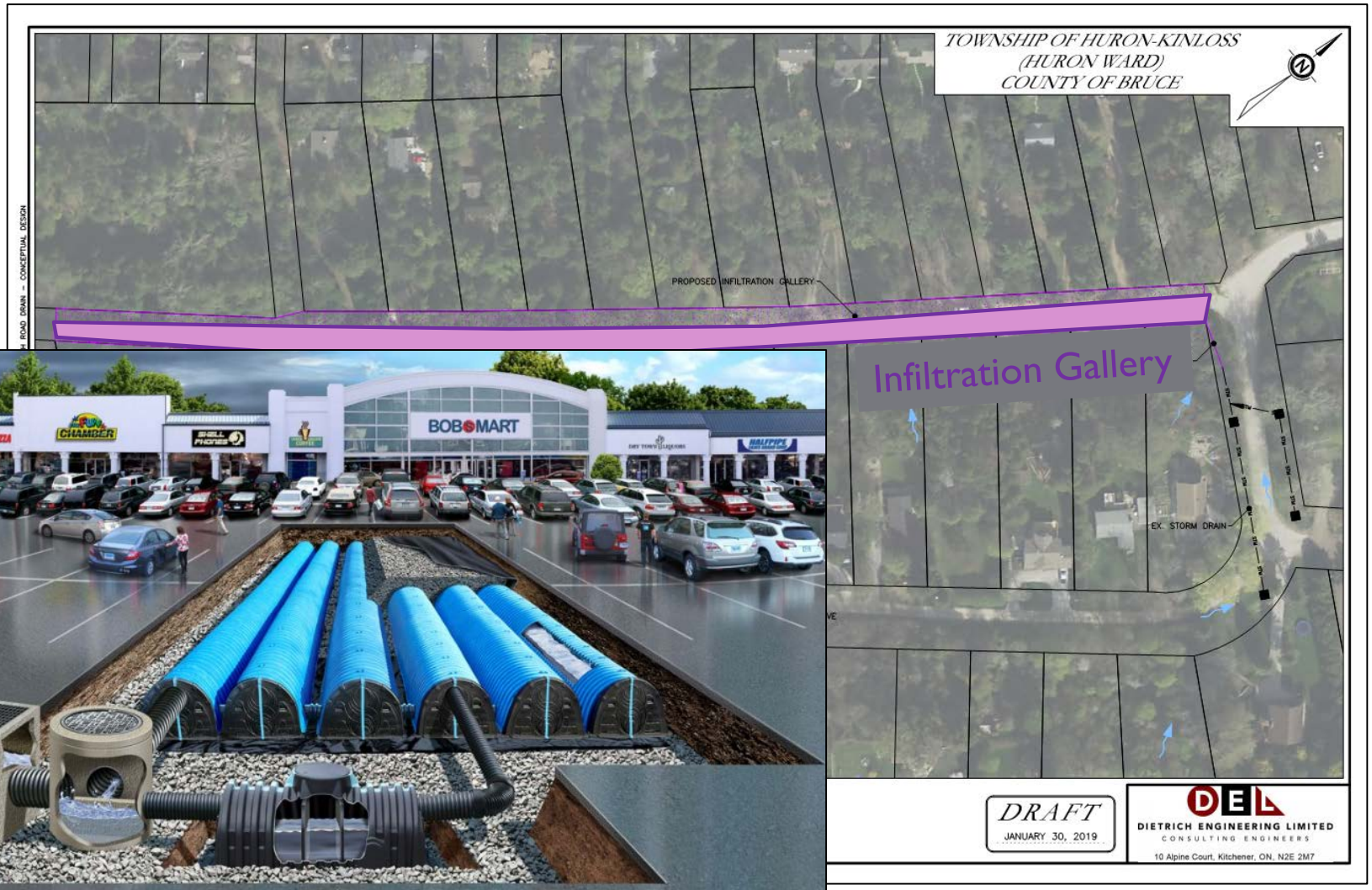
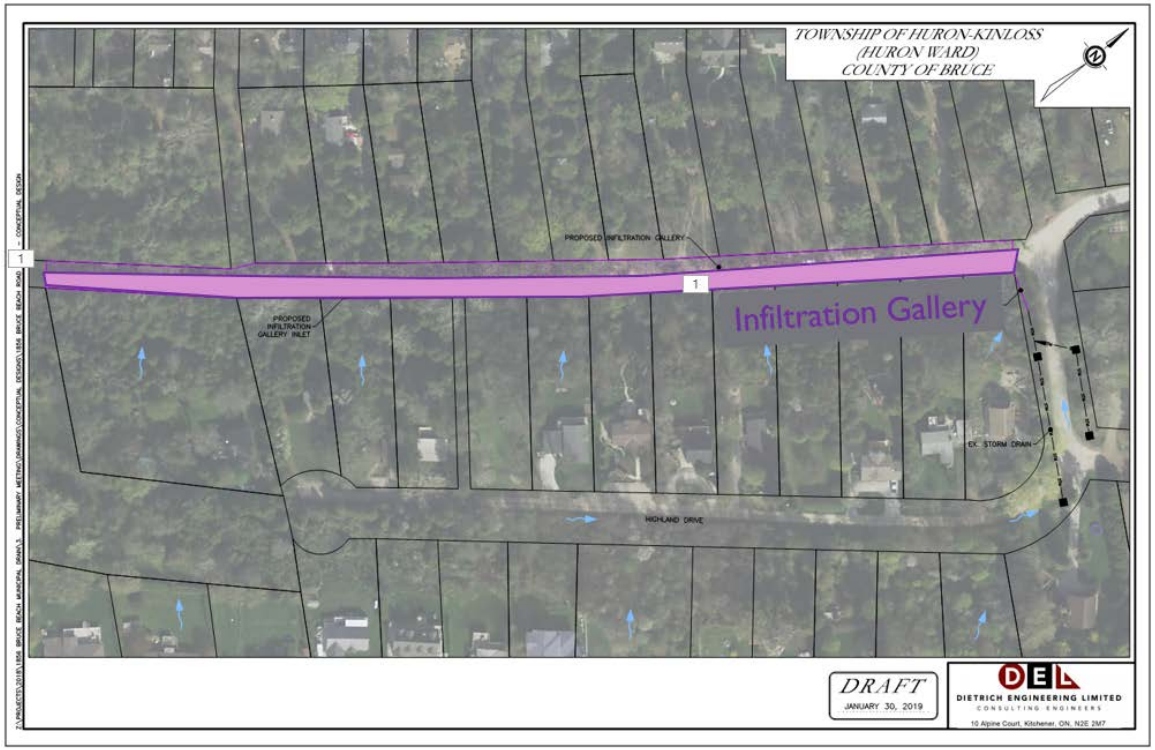


Photo Source: Aqua Q website

Concept No. 5 (previously presented)

Guiding Principals (December 3rd Council Presentation)

- Do not increase the number of outlets to the beach (Currently outlets at Cameron Street & 98 BBR)
- Eliminate the outlet at 98 Bruce Beach Road
- Use Concession 8 Road Allowance as outlet
- Determine lands from Lake Range and Highland Drive and re-route
- Employ stormwater management principles to manage stormwater runoff



Other Comments

- Requires real-estate within BBR Right-of-Way

Municipal Drain Benefits

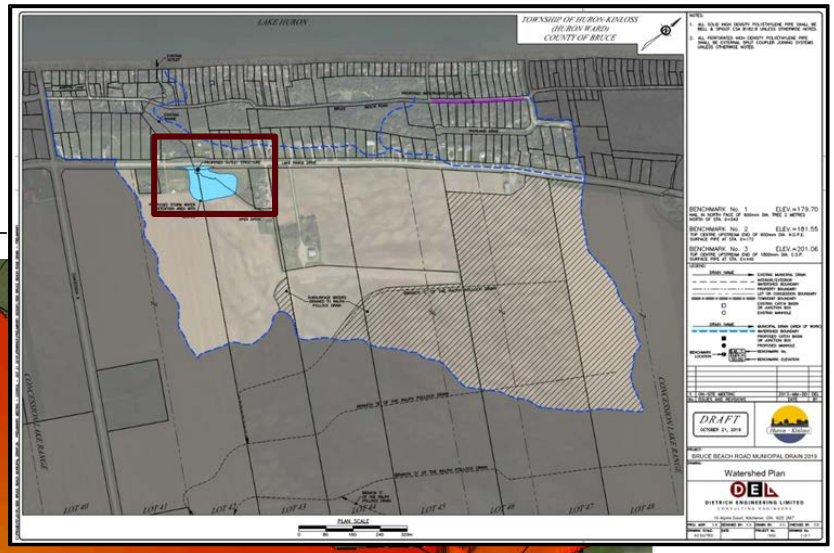
- Solve drainage issues along Bruce Beach Road
- Offers cost sharing of total project costs
- Provides a mechanism for future maintenance

Scenario Comparison (previously presented)

Concept No.	Description	Feasibility / Practicality	Additional Comments
1a	New drainage system along south part of BBR Continued use of 98 BBR	Fair	Fails to meet guiding principals. Low complexity
1b	New drainage system along north part of BBR New outlet to Lake Huron	Fair	Fails to meet guiding principals. Low complexity
2	New drainage system along BBR New outlet @ Con 8	Not feasible	Meets most guiding principal Poses significant construction challenges
3	New drainage system along Lake Range New outlet @ Con 8	Fair	Meets some guiding principals
4	Detention facility @ Lake Range Road	Positive	Meets most guiding principals Can be coupled with other concepts
5	Infiltration @ Highland Drive	Positive	Meets most guiding principals

Design Recommendations

South Bruce Beach Road SWM Facility

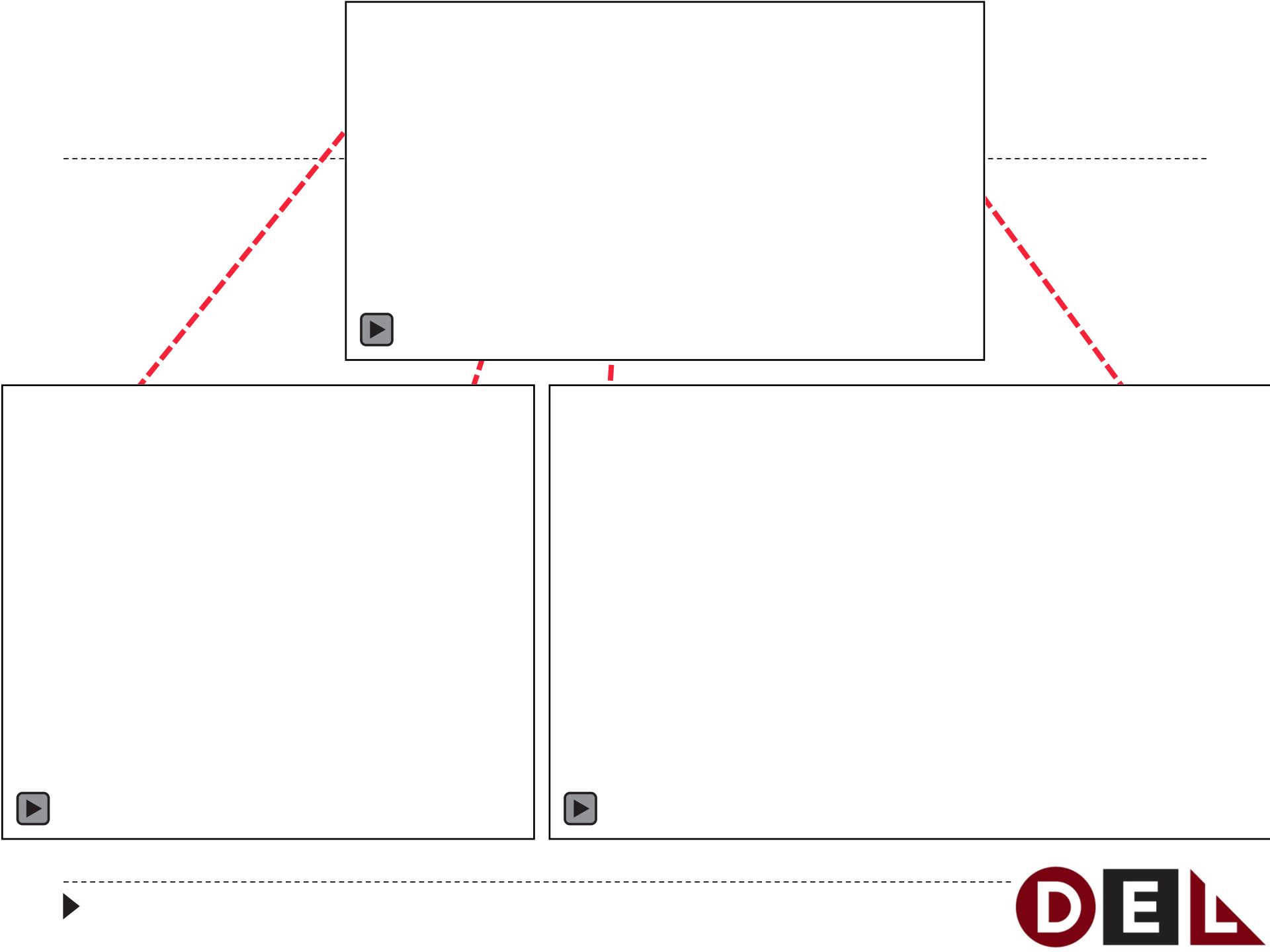


SWM Facility Details

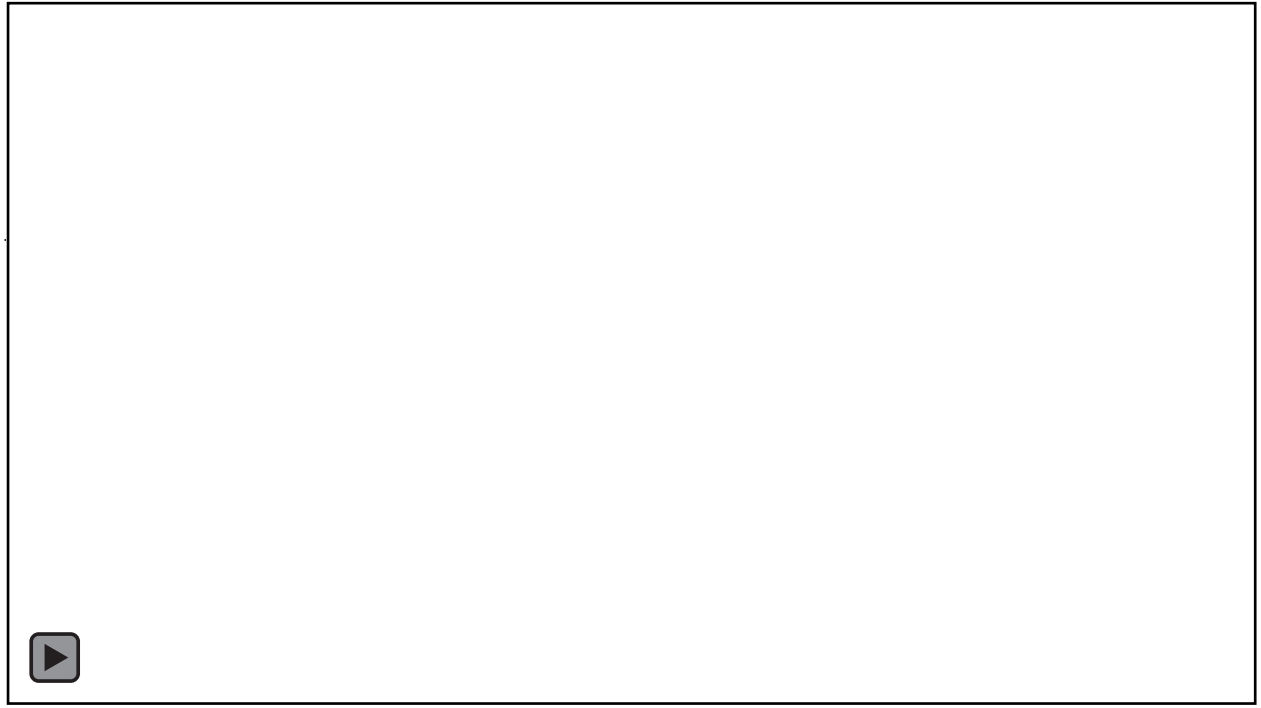
- Sideslopes suitable for farming activities
- Quantity Treatment of 93% of the watershed
- Total Storage Volume: approx. ~~6,900m3~~ **9,100m3**
- Flow Rate Reductions of ~~55% to 65%~~ **90% (approx)**

South Bruce Beach Road SWM Facility

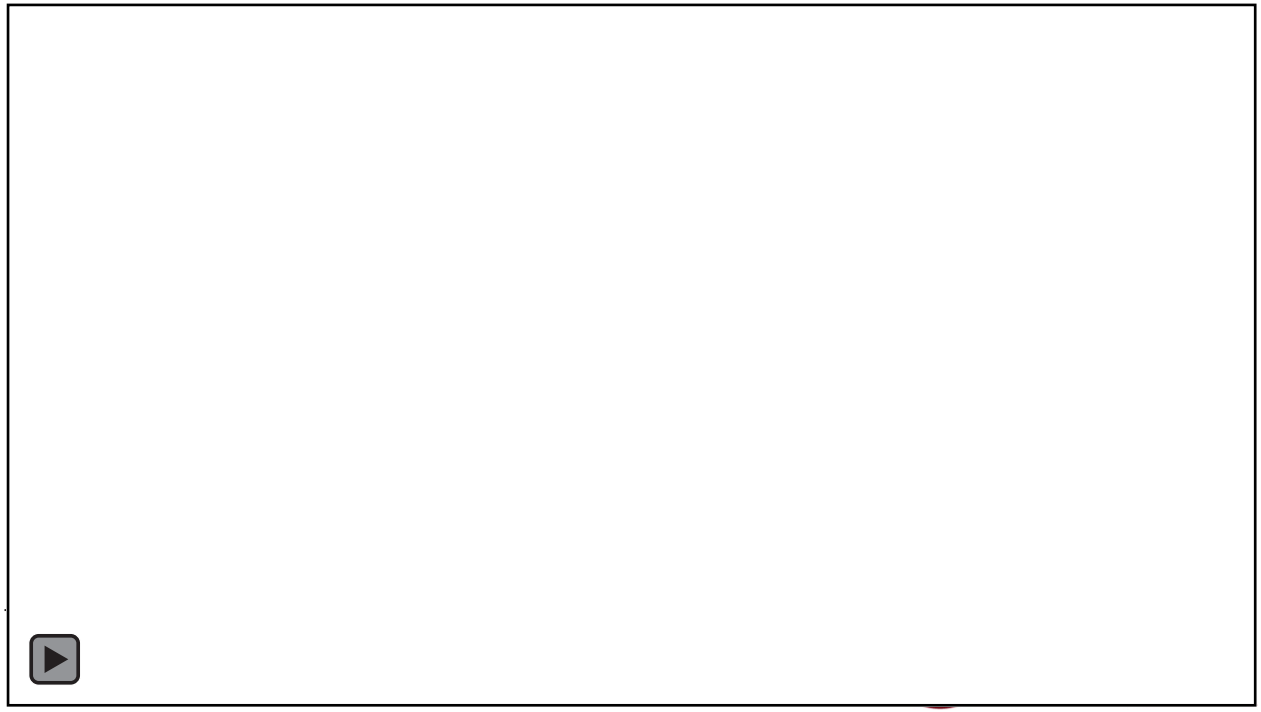




Existing



Proposed



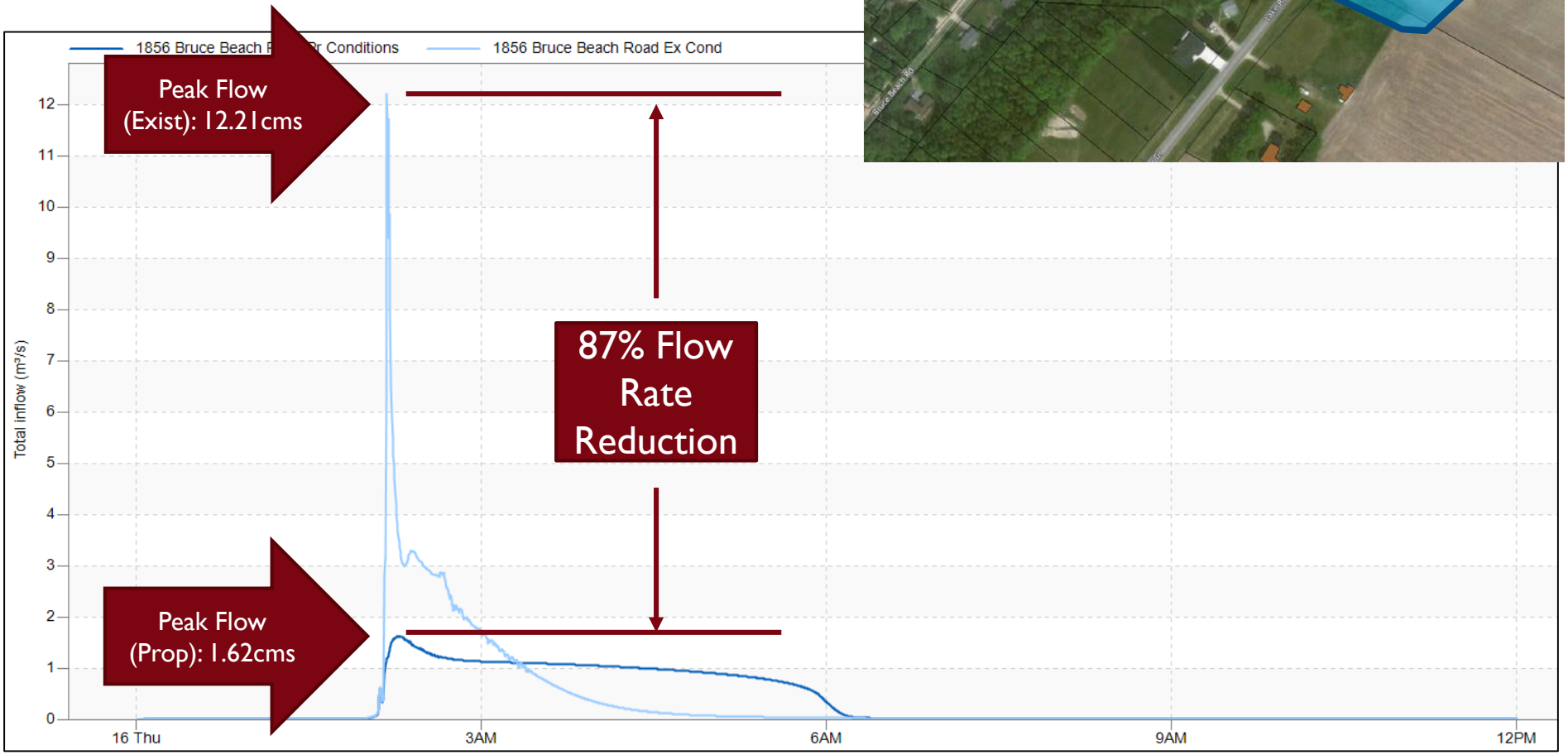
South Bruce Beach Road
SWM Facility (w\ Con. 8 Outlet)



South Bruce Beach Road Stormwater Attenuation Centre

- 5 Year Rainfall Event

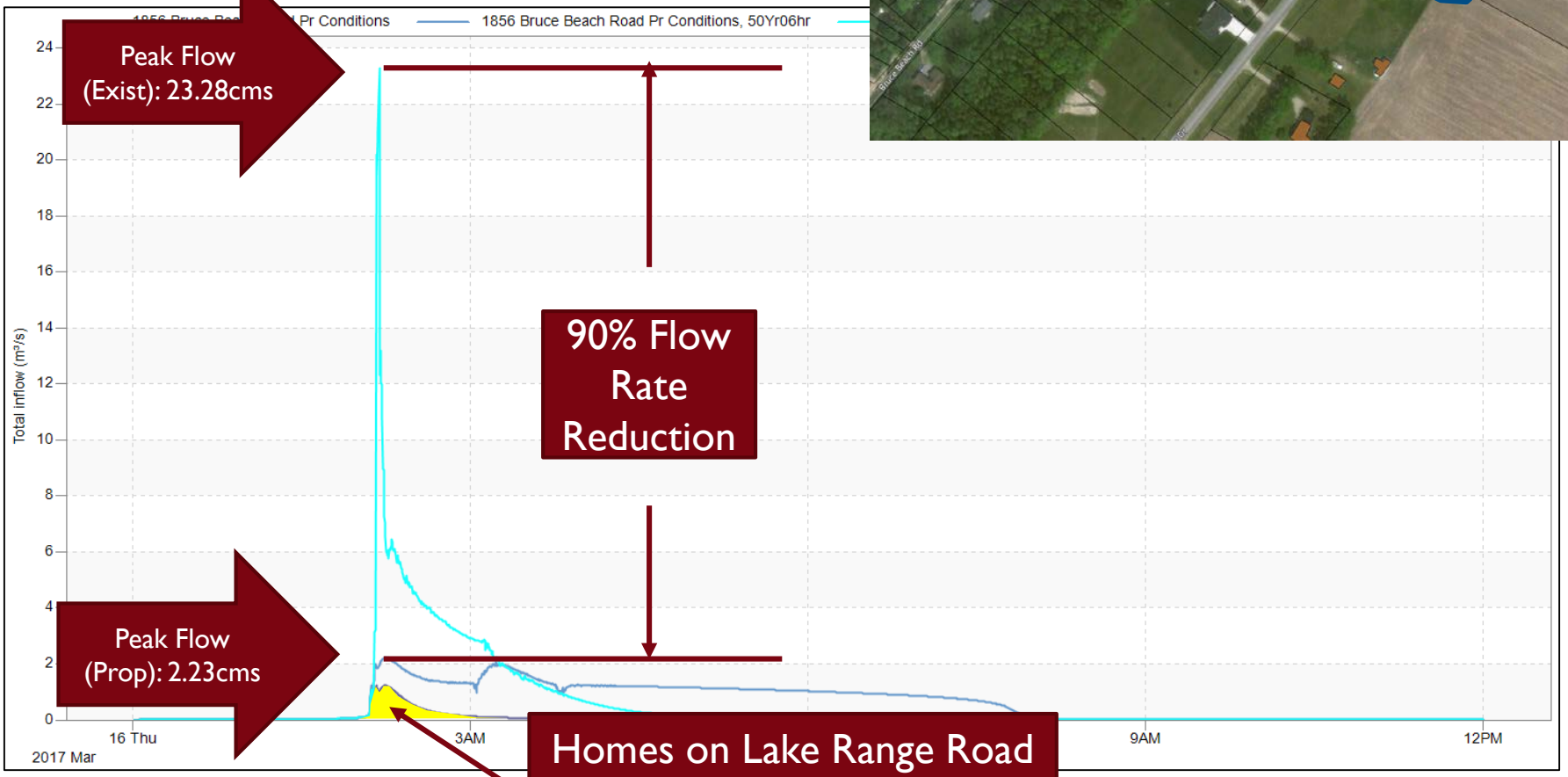




South Bruce Beach Road Stormwater Attenuation Centre

- 50 Year Rainfall Event





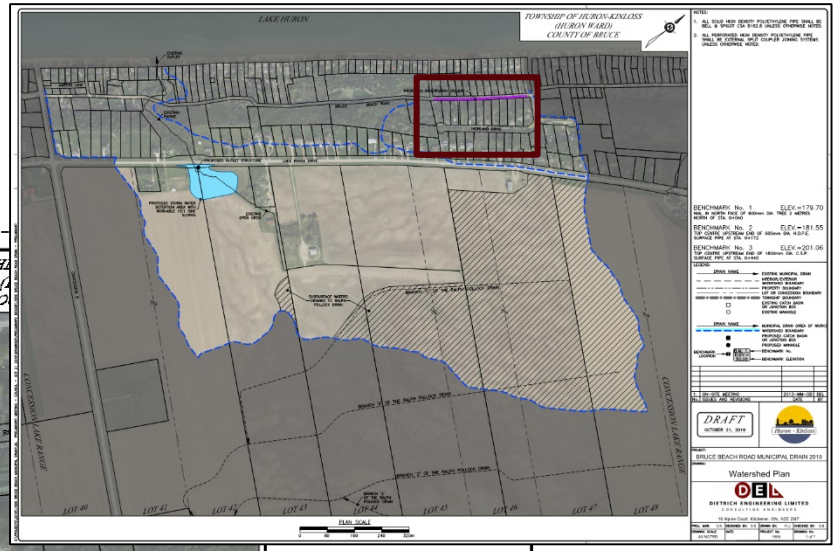
South Bruce Beach Road Stormwater Attenuation Centre

- Comparison of Flow Rates



Rainfall Event	Existing Peak Flow Rate	Proposed Peak Flow Rate	Percent Change
2 Year	5.71 m^3/s	1.35 m^3/s	76% Reduction
5 Year	12.21 m^3/s	1.62 m^3/s	86% Reduction
10 Year	16.40 m^3/s	1.81 m^3/s	89% Reduction
25 Year	18.51 m^3/s	2.04 m^3/s	89% Reduction
50 Year	23.28 m^3/s	2.23 m^3/s	90% Reduction
100 Year	25.30 m^3/s	2.87 m^3/s	89% Reduction

North Bruce Beach Road Infiltration Gallery

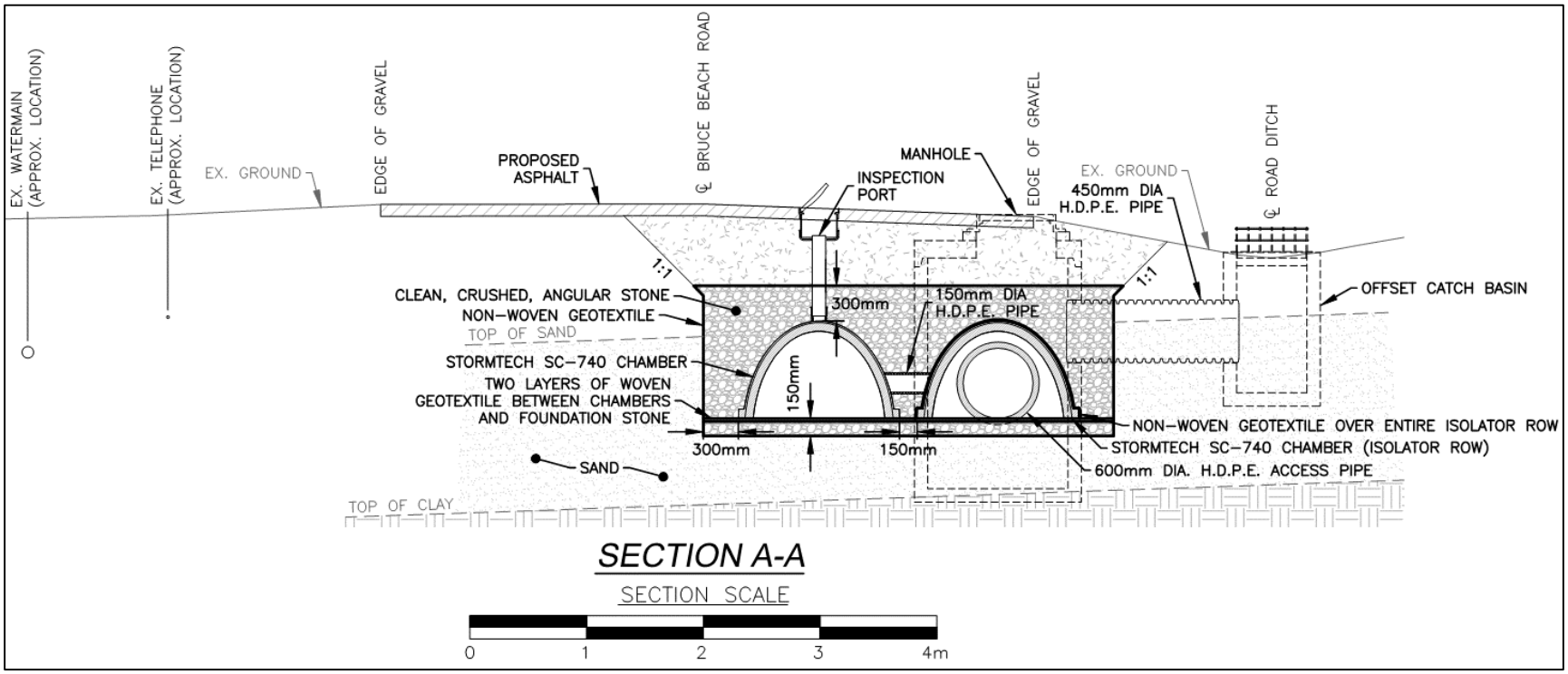




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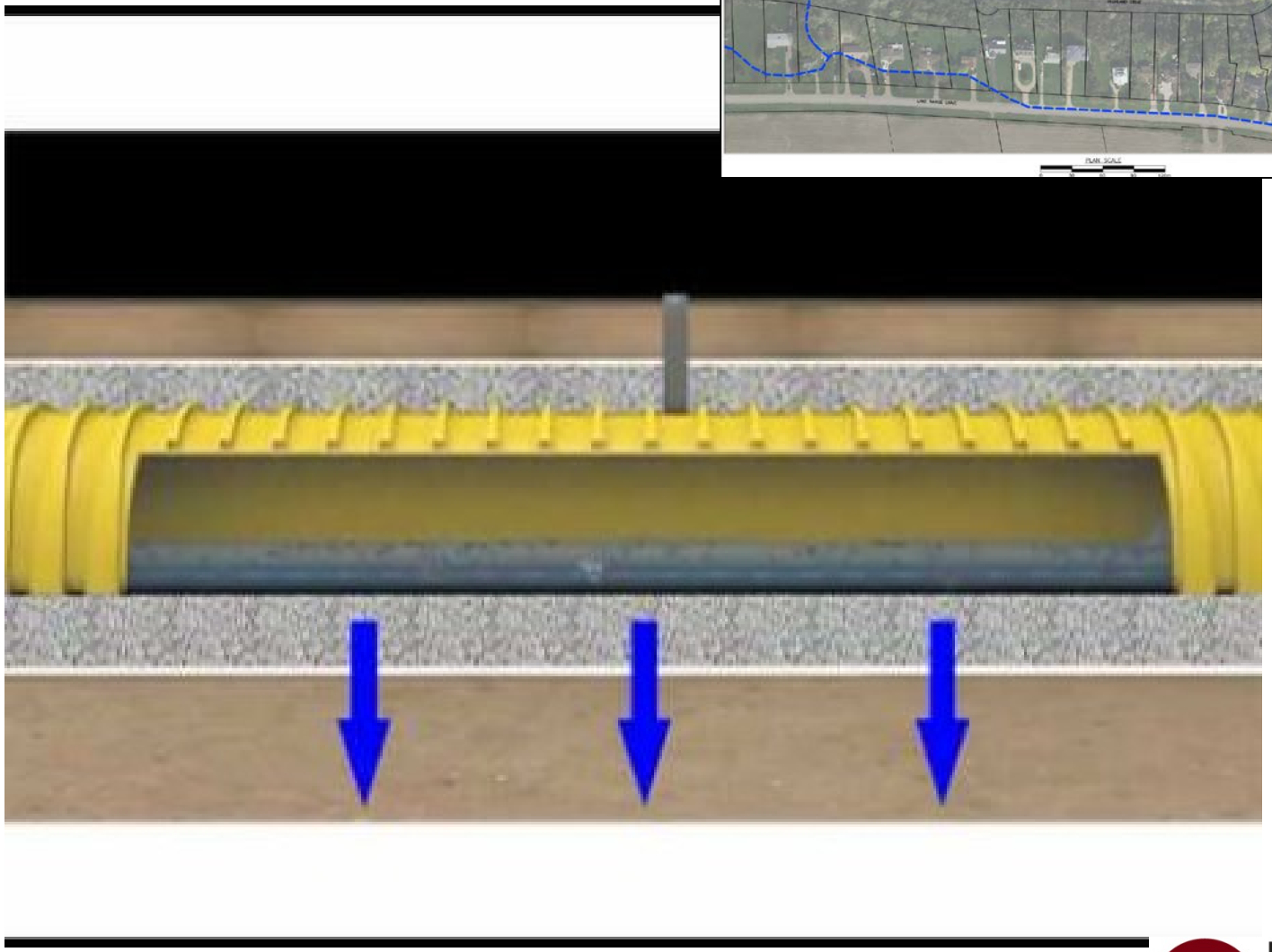
North Bruce Beach Road Infiltration Gallery





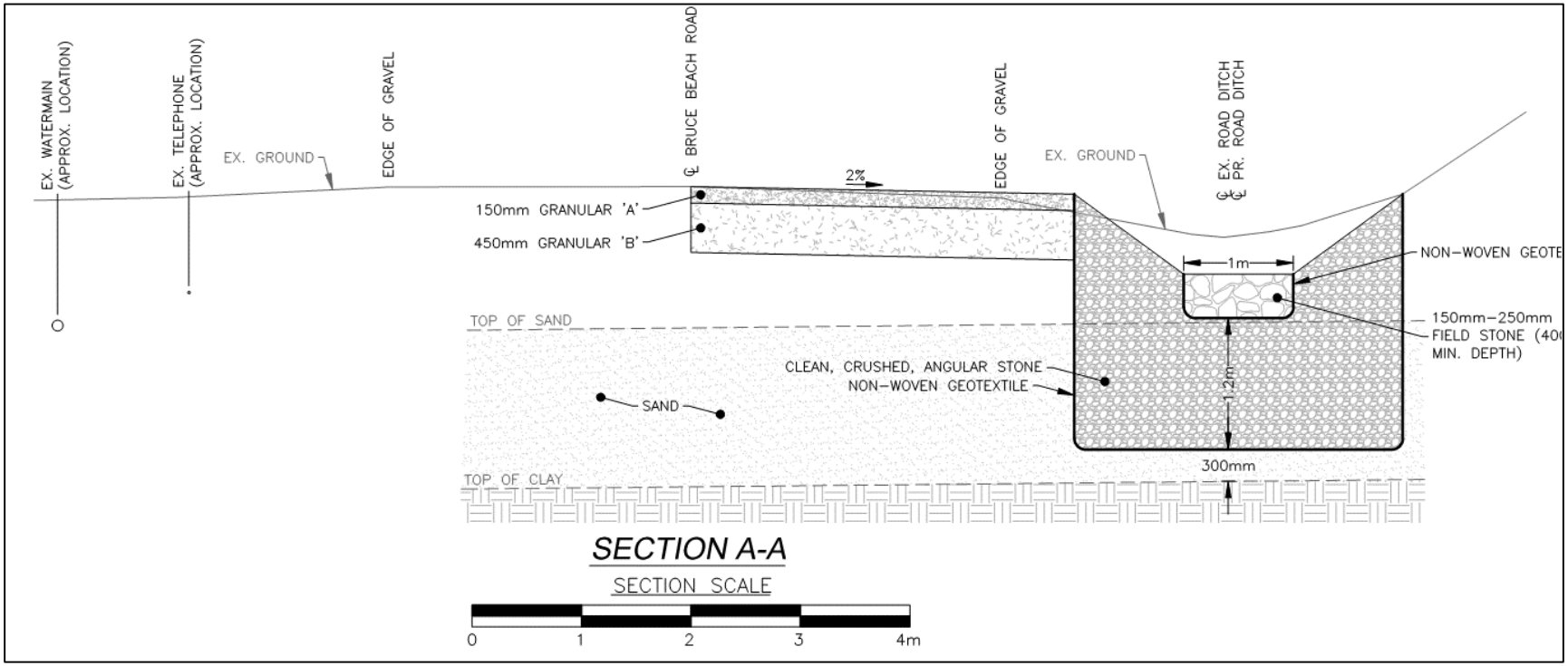
North Bruce Beach Road Infiltration Gallery





North Bruce Beach Road French Drain







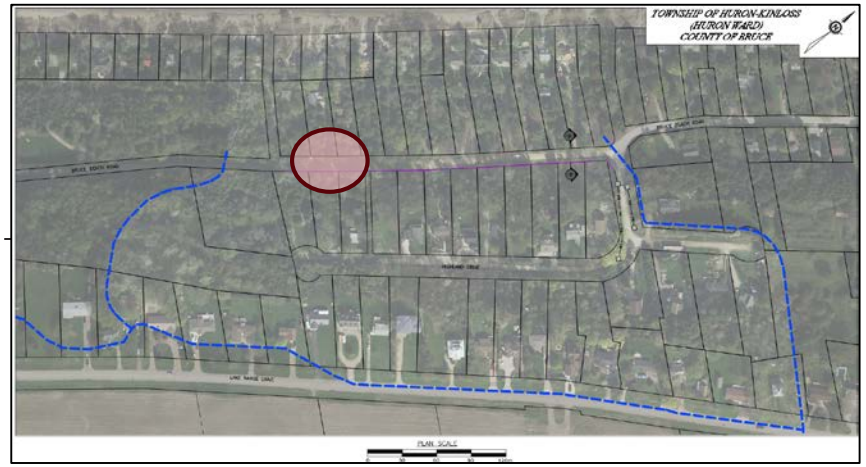


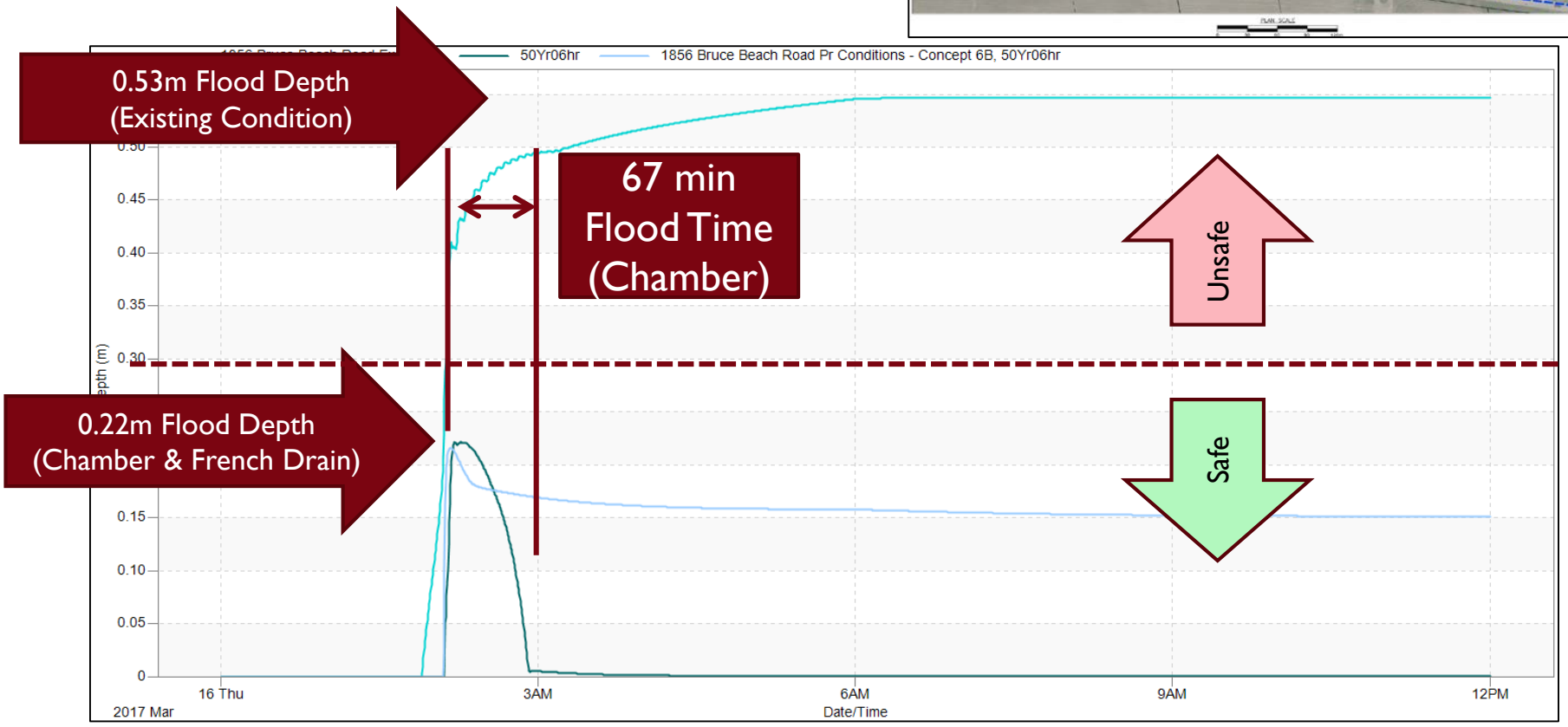




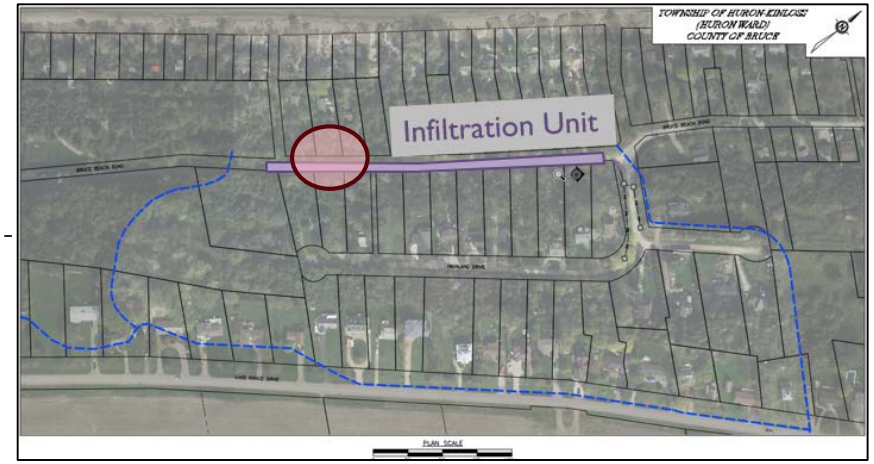
Bruce Beach Road South Infiltration Gallery

- 50 Year Rainfall Event





South Bruce Beach Road Infiltration Gallery



- Comparison of Flow Depths

	Existing Conditions		Proposed Conditions			
			2-Chamber Infiltration Gallery		French Drain	
Rainfall Event	**Flood Depth**	**Flood Time**	**Flood Depth**	**Flood Time**	**Flood Depth**	**Flood Time**
2 Year	0.33m	Days	**Zero**	**Zero**	**0.17m**	**Days**
5 Year	0.41m	Days	**0.04m**	**16 min**	**0.18m**	**Days**
10 Year	0.45m	Days	**0.12m**	**36 min**	**0.18m**	**Days**
25 Year	0.49m	Days	**0.19m**	**54 min**	**0.20m**	**Days**
50 Year	0.53m	Days	**0.22m**	**67 min**	**0.22m**	**Days**
100 Year	0.56m	Days	**0.25m**	**84 min**	**0.23m**	**Days**

Concept No. 5 (**Modified for French Drain**)

Guiding Principals (December 3rd Council Presentation)

- Do not increase the number of outlets to the beach (Currently outlets at Cameron Street & 98 BBR)
- Eliminate the outlet at 98 Bruce Beach Road
- Use Concession 8 Road Allowance as outlet
- Determine lands from Lake Range and Highland Drive and re-route
- Employ stormwater management principles to manage stormwater runoff



Municipal Drain Benefits

- Solve drainage issues along Bruce Beach Road
- Offers cost sharing of total project costs
- Provides a mechanism for future maintenance

Other Comments

- Requires real-estate within BBR Right-of-Way
- Requires flood water near Cottages 136 to 143 to travel via surface flow to the French Drain
- Does not address locally derived flows from west of BBR
- Higher Maintenance Requirements

Cost Estimates

Cost Estimate – South Bruce Beach Road

- SWM Facility with Ravine Outlet



	Cost Estimate
Allowances	$101,610
Construction Costs	$309,100
Administration	$141,230
Contingencies & Tax	$20,060
Sub-Total	**$572,000**

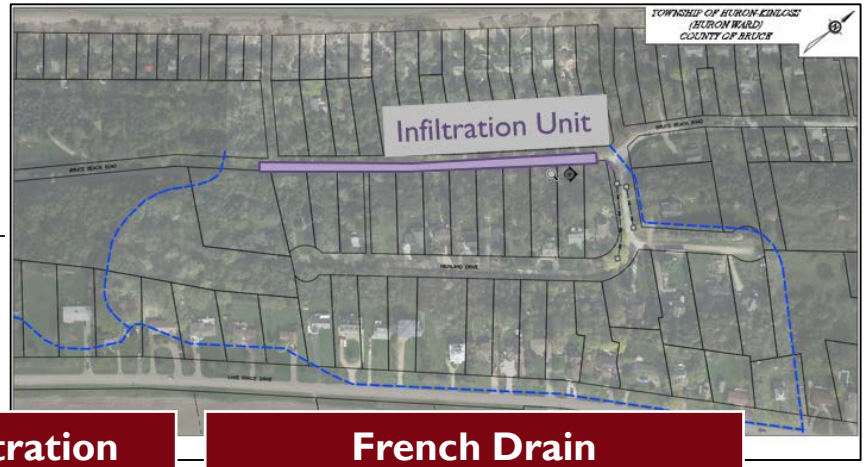
- SWM Facility with Concession 8 Road Outlet



	Cost Estimate
Allowances	$113,300
Construction Costs	$666,100
Administration	$247,570
Contingencies & Tax	$47,830
Sub-Total	**$1,074,800**

Cost Estimate

- North Bruce Beach Road



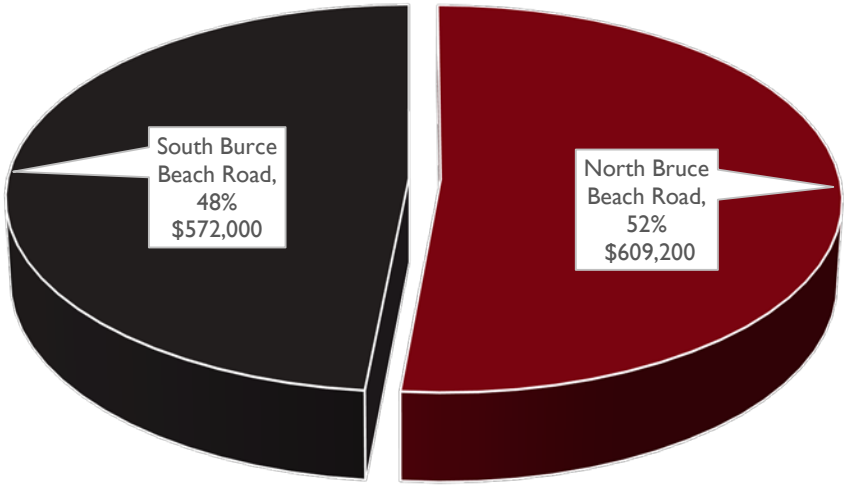
2-Chamber Infiltration Gallery	
	Cost Estimate
Allowances	$13,500
Construction Costs	$464,650
Administration	$99,880
Contingencies & Tax	$31,170
Sub-Total	**$609,200**

1-Chamber Infiltration Gallery	
	Cost Estimate
Allowances	$13,500
Construction Costs	$378,030
Administration	$99,880
Contingencies & Tax	$27,090
Sub-Total	**$518,500**

French Drain	
	Cost Estimate
Allowances	$2,250
Construction Costs	$67,000
Administration	$92,390
Contingencies & Tax	$18,660
Sub-Total	**$180,300**

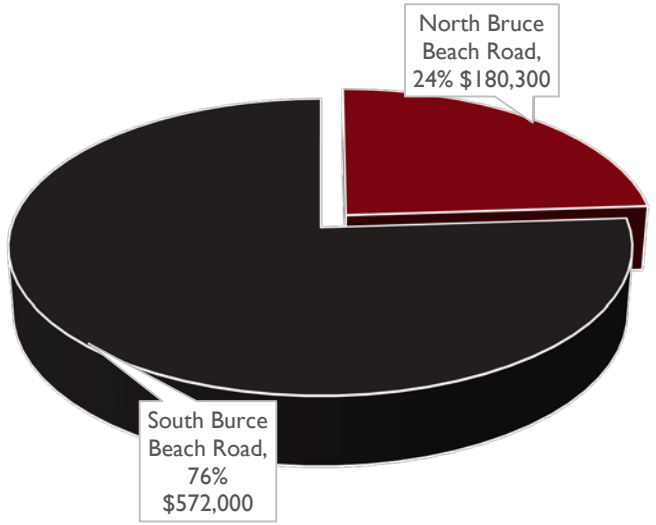
Cost Estimate Summary

- SWM Facility with Ravine Outlet & **2-Chamber Infiltration Gallery**



- Total Estimated Costs: $1,181,200

- SWM Facility with Ravine Outlet & **French Drain**



- Total Estimated Costs: $752,300

Assessment

Duty of the Engineer – (Section 11)

The **engineer** **shall**, to the best of the **engineer**'s skill, knowledge, judgment and ability, honestly and faithfully, and without fear of, favour to or prejudice against any person, perform the duty assigned to the **engineer** in connection with any drainage works and make a true report thereon.

Duty of the Engineer to Distinguish Assessments – (Section 21)

The **engineer** in the report **shall** assess for benefit, outlet liability and injuring liability, and **shall** insert in an assessment schedule, in separate columns, the sums assessed for each opposite **each parcel of land and road** liable therefor.

The Engineer does not assess people.

Engineer's Tools of Assessment

- Drainage Act Sections Applicable to the Bruce Beach Road Municipal Drain
  - Section 22 – Benefit
  - Section 23 – Outlet Liability
  - Section 25 – Block Assessment
  - Section 26 – Special Assessment

Assessment for Benefit
Section 22

- Lands, roads, buildings, utilities or other structures that are **increased in value** or are **more easily maintained** as a result of the construction, improvement, maintenance or repair of a drainage works may be assessed for **benefit**.

Definition of Benefit
Section 1

- "**benefit**" means the advantages to any lands, roads, buildings or other structures from the construction, improvement, repair or maintenance of drainage works such as will result in a **higher market value** or **increased crop production** or **improved appearance** or **better control of surface or subsurface water,** or **any other advantages** relating to the betterment of lands, roads, buildings or other structures.

Outlet Liability
Section 23(1)

- Lands and roads that use a drainage works as an outlet, or for which, when the drainage works is constructed or improved, an improved outlet is provided either directly or indirectly through the medium of any other drainage works or of swale, ravine, creek or watercourse, may be assessed for outlet liability.

Basis of Assessment for Outlet Liability Section 23(3)

- The assessment for outlet liability and injuring liability provided for in subsections (1) and (2) **shall** be **based upon the volume and rate of flow of the water artificially caused to flow** upon the injured land or road or into the drainage works from the lands and roads liable for such assessments.

Block Assessment
Section 25

- The council of the local municipality may direct the engineer to assess as a block, a built-up area designated by the council, and the sum assessed therefor may be levied against all the rateable properties in the designated area proportionately on the basis of the assessed value of the land and buildings.

Block Assessment
Section 25 (2)

- Where the engineer makes a block assessment under subsection (1), the engineer shall designate the proportion of the assessment to be charged against the public roads in the designated area.

Special Assessment
Section 26

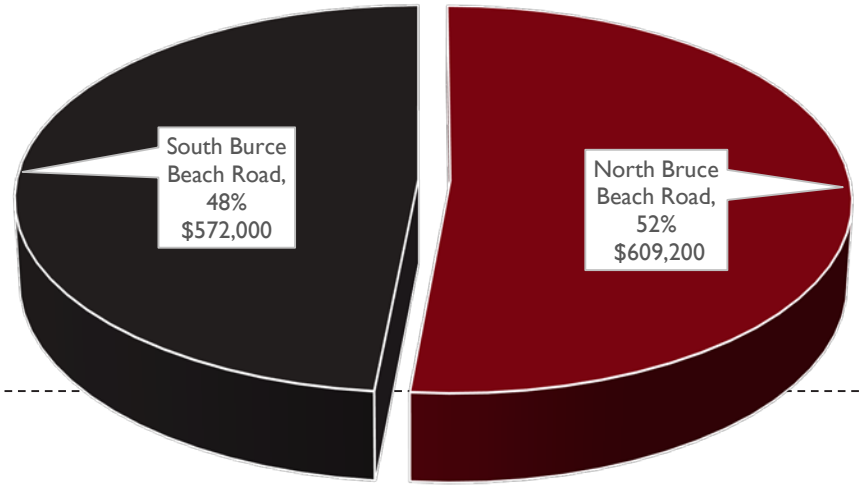
- In addition to all other sums lawfully assessed against the property of a public utility or road authority under this Act, and despite the fact that the public utility or road authority is not otherwise assessable under this act, the public utility or road authority **shall** be assessed for and **shall** pay all the increase of cost of such drainage works caused by the existence of the works of the public utility or road authority.

General Overview of Assessment

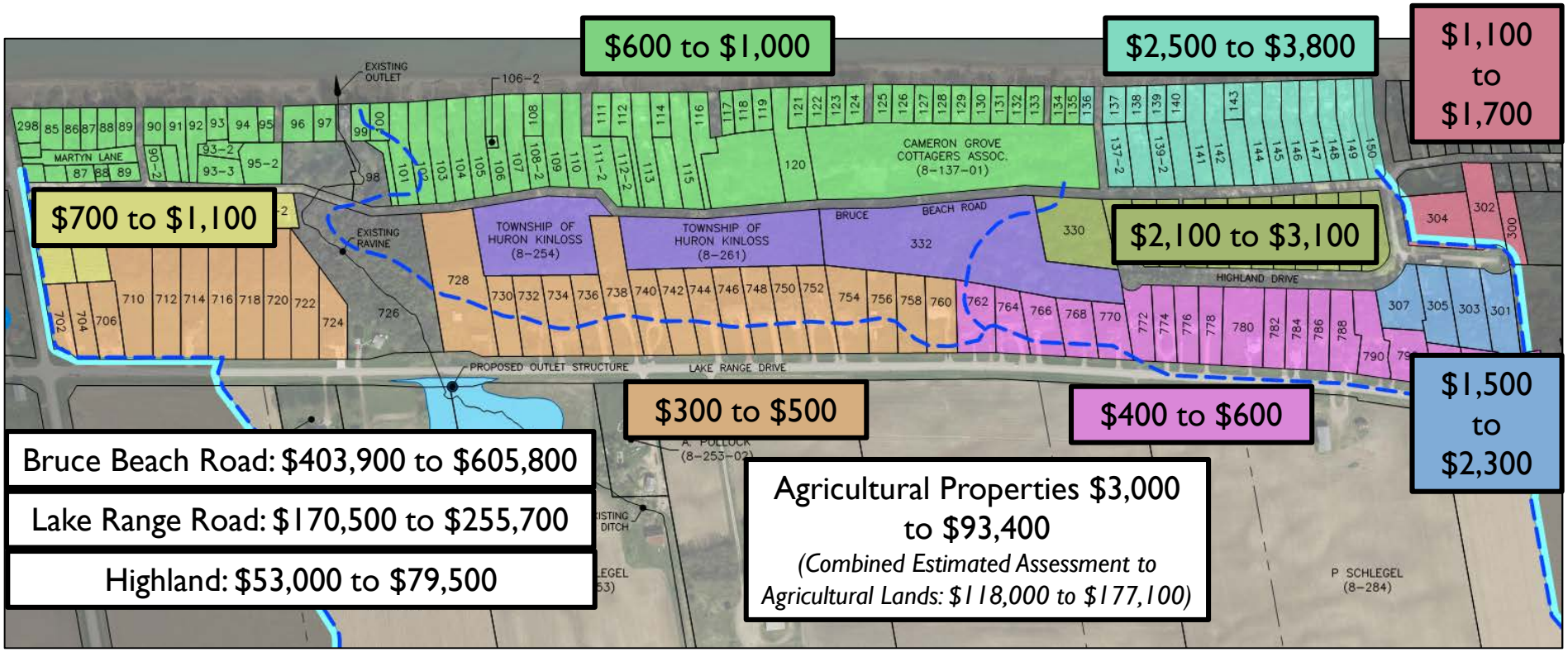
- Sequence of Activities for Determining Assessment
  - Step 1: Determine Estimated Costs of the Proposed Design.
    - Allowances
    - Construction
    - Administration
    - Contingencies, Tax, Interest, etc.
  - Step 2: Separate the Estimated Costs for North and South Portions
  - Step 3: Determine the Special Assessments.
  - Step 4: Separate the remaining costs (Total Costs less Specials) by interval.
  - Step 5: For each interval: Determine the benefits to be derived.
  - Step 6: Determine the Outlet Liability assessments by interval.
  - Step 7: Review all assessments considering various perspectives. (FAIRNESS TESTING)
    - Review field investigation notes
    - Compare benefit assessments to other benefiting properties
    - Consider the overall split between benefit and outlet liability
  - Step 8: Compare and discuss Assessment with colleagues. (FAIRNESS TESTING – EXPANDED)
    - DEL had three Engineers or Engineering Staff independently complete Steps 5 through 7.
    - DEL staff then compared and discussed with each other. Where there is agreement, the assessment interval is finalized; where there is differences, there is compromise.
  - Step 9: Present preliminary assessments to the public and receive feedback. Fine tune assessment as necessary.

General Overview of Assessment (with 2-Chamber Infiltration Gallery)

- South Bruce Beach Road
  - 98 Bruce Beach Road $52,600.00
  - Ravine $27,500.00
  - Detention Area $491,900.00
- TOTAL SOUTH BRUCE BEACH ROAD: $572,000.00
- TOTAL NORTH BRUCE BEACH ROAD: $609,200.00
- **TOTAL ESTIMATED COSTS: $1,181,200.00**

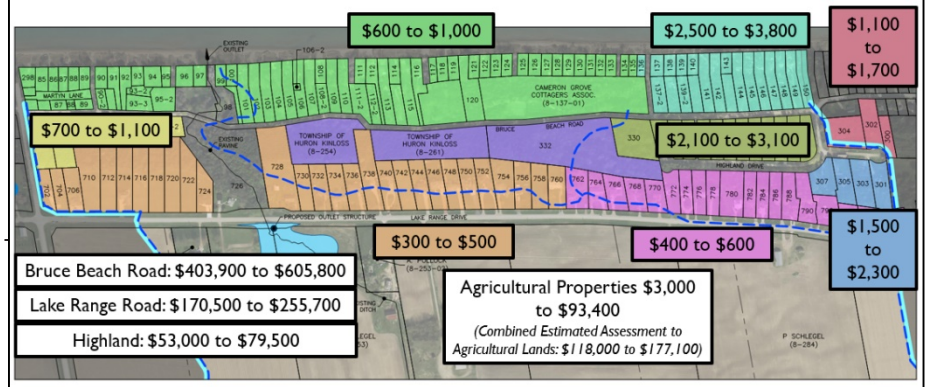


Preliminary Estimated Assessments (with 2-Chamber Infiltration Gallery)

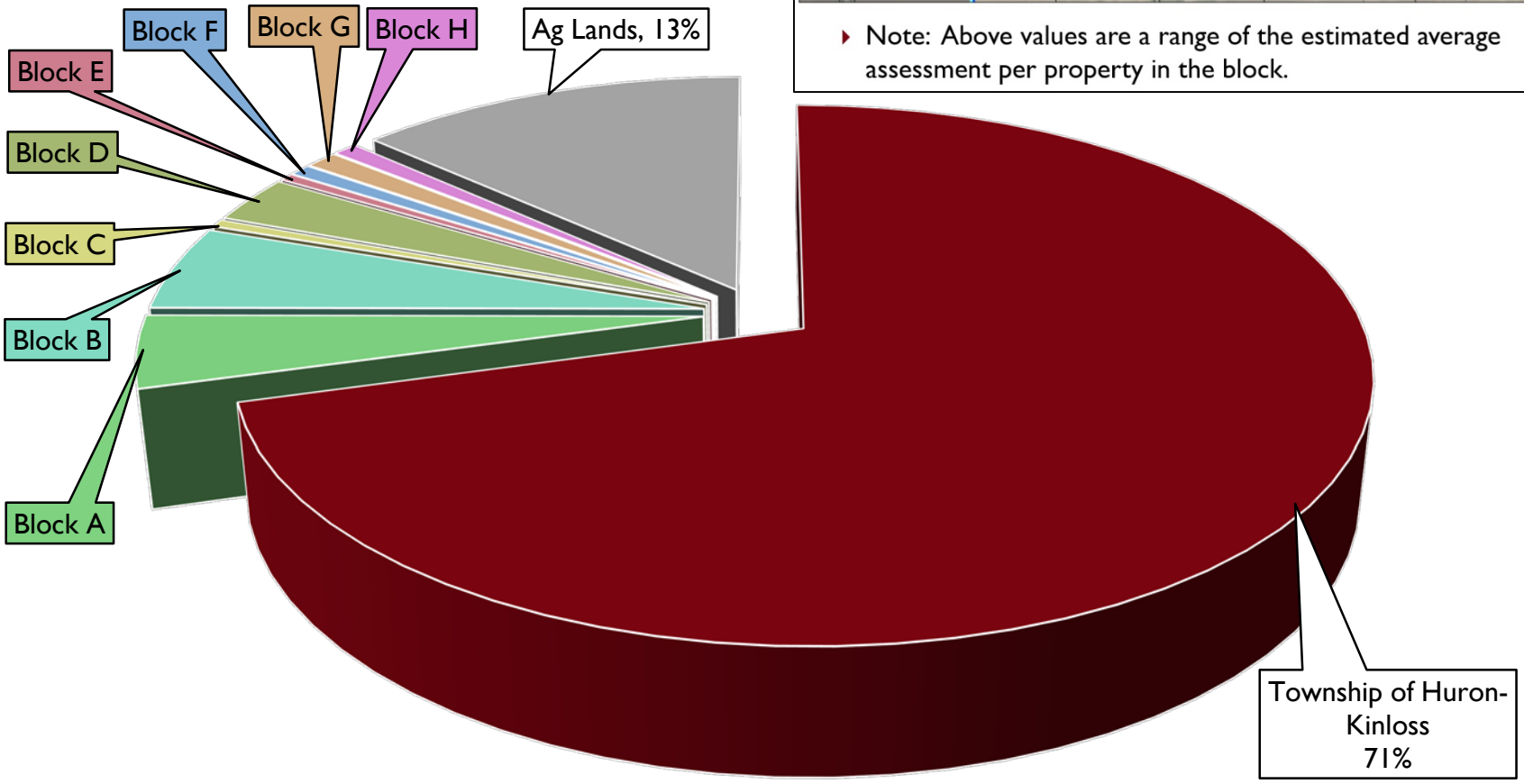


- Note: Above values are a range of the estimated average assessment per property in the block.

Preliminary Estimated Assessments (with 2-Chamber Infiltration Gallery)

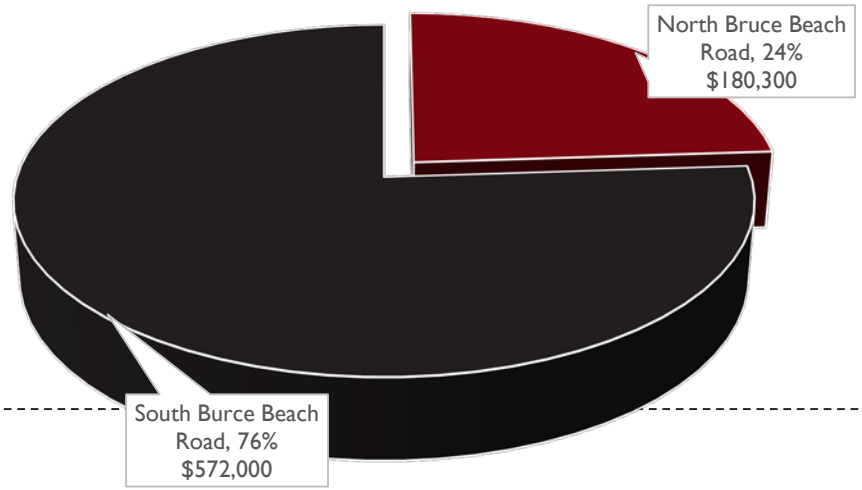


- Note: Above values are a range of the estimated average assessment per property in the block.

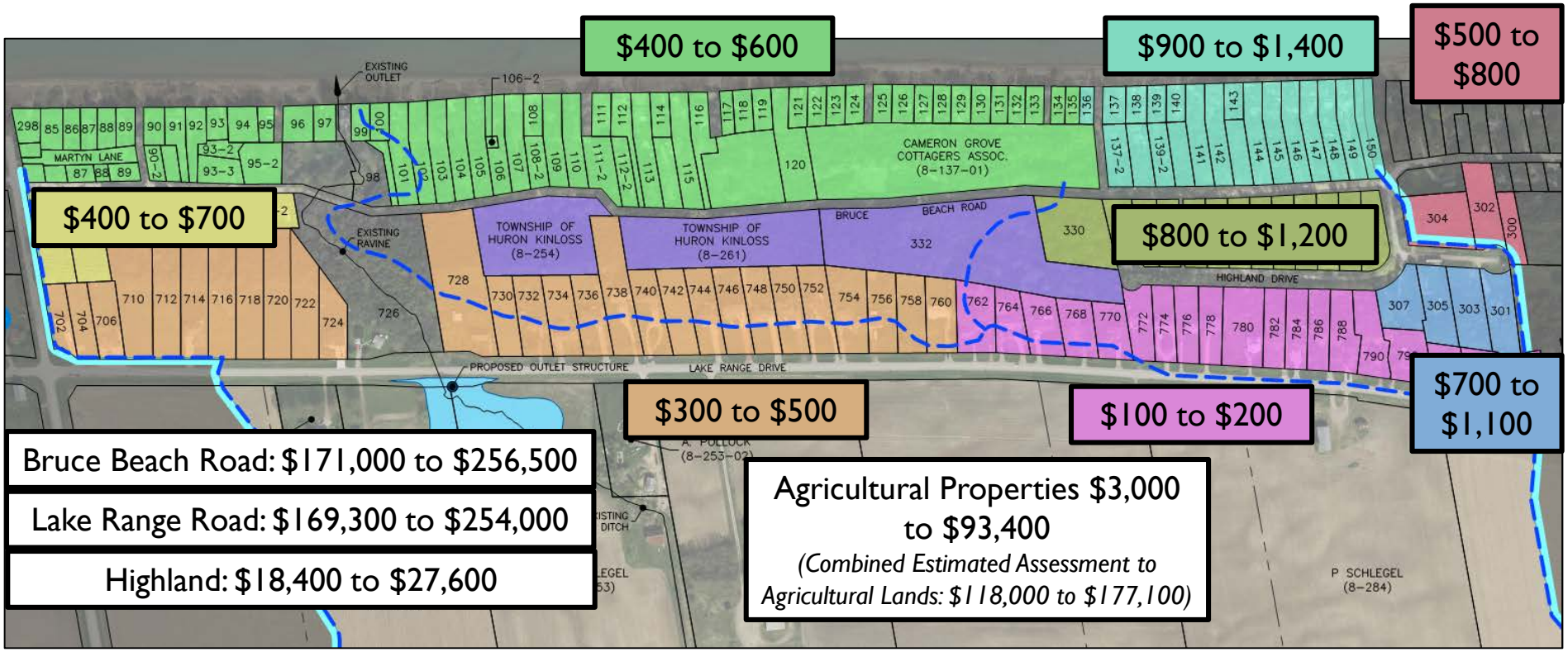


General Overview of Assessment (with French Drain)

- South Bruce Beach Road
  - 98 Bruce Beach Road $52,600.00
  - Ravine $27,500.00
  - Detention Area $491,900.00
- TOTAL SOUTH BRUCE BEACH ROAD: $572,000.00
- TOTAL NORTH BRUCE BEACH ROAD: $180,300.00
- **TOTAL ESTIMATED COSTS: $752,300.00**

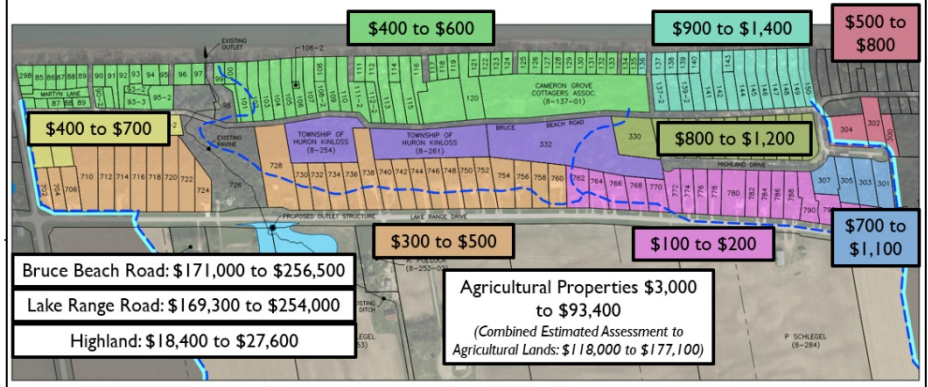


Preliminary Estimated Assessments (with French Drain)

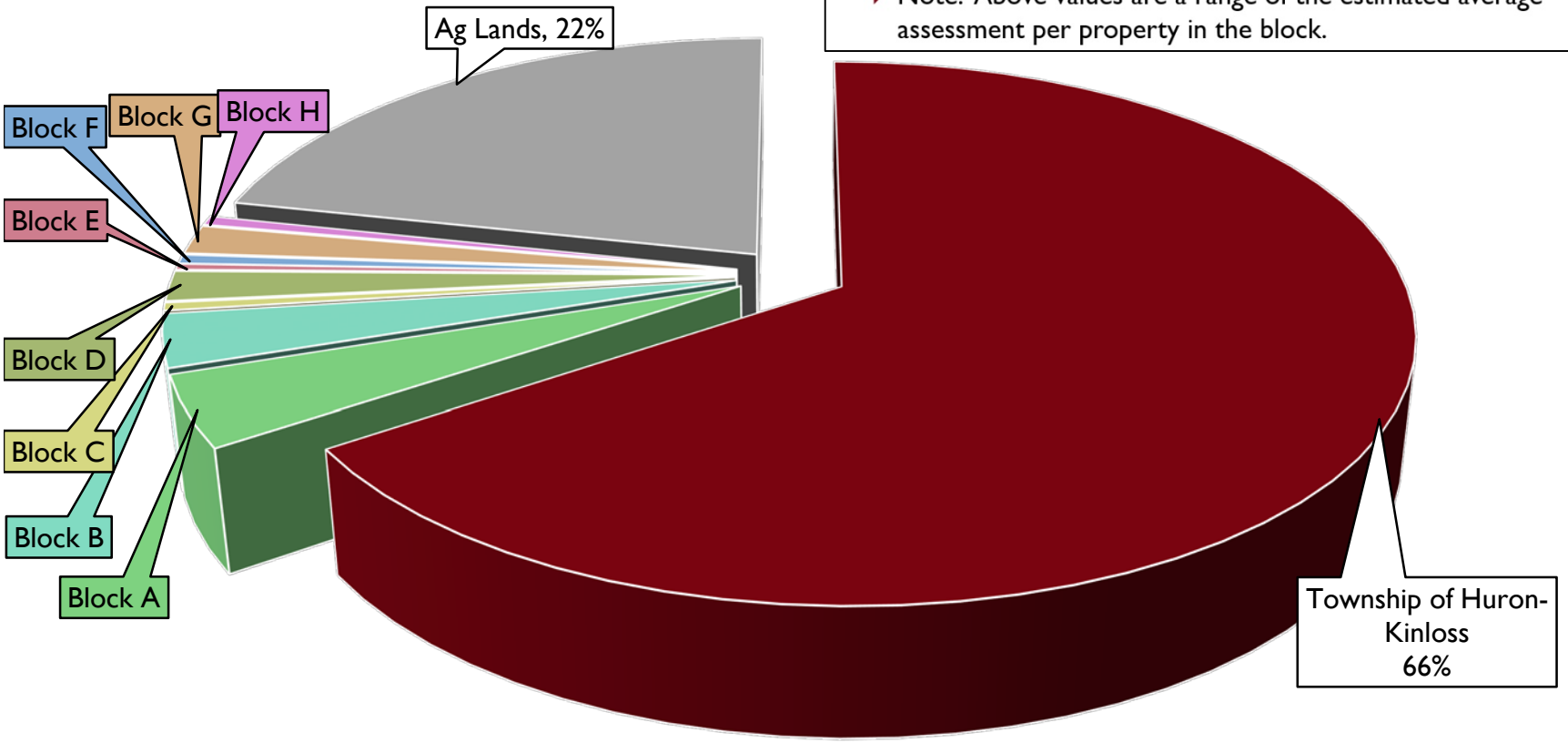


- Note: Above values are a range of the estimated average assessment per property in the block.

Preliminary Estimated Assessments (with French Drain)



- Note: Above values are a range of the estimated average assessment per property in the block.



Landowner Participation

Landowner Participation

