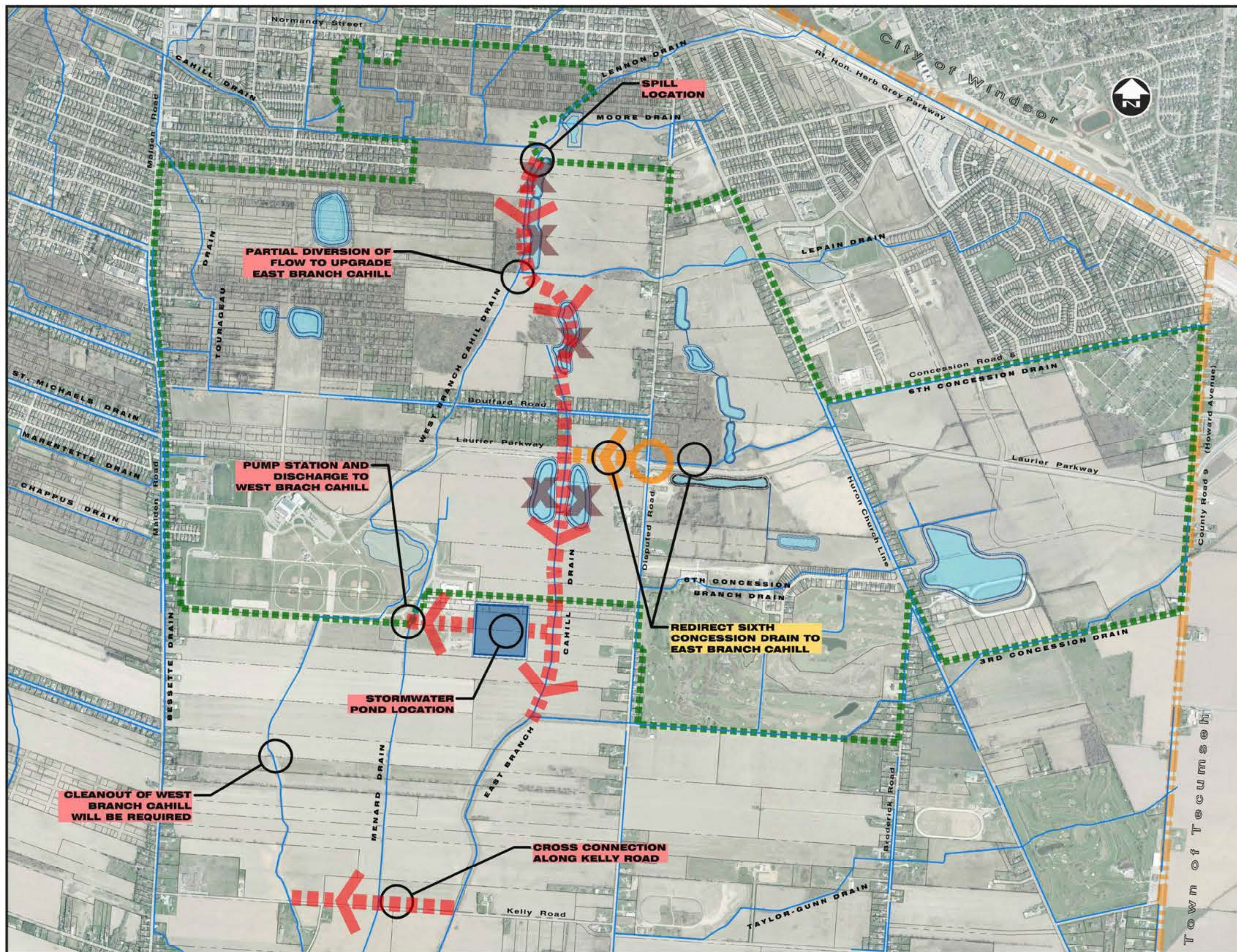


# Alternative 2A

## Redirect the Sixth Concession Drain



### HOWARD BOUFFARD PLANNING AREA

Master Drainage Study

#### LEGEND

- MUNICIPAL BOUNDARY
- HOWARD BOUFFARD STUDY AREA
- OPTION 1
- OPTION 2
- Pond Locations Identified in 2017 E.A. Addendum
- Existing Municipal Drains

#### Option 2A Description

- Same improvements as Option 1A
- Redirect Sixth Concession Drain to East Branch Cahill Drain to improve level of service

SCALE: N.T.S.

### PROPOSED CHANNELS

## OPTION 2A

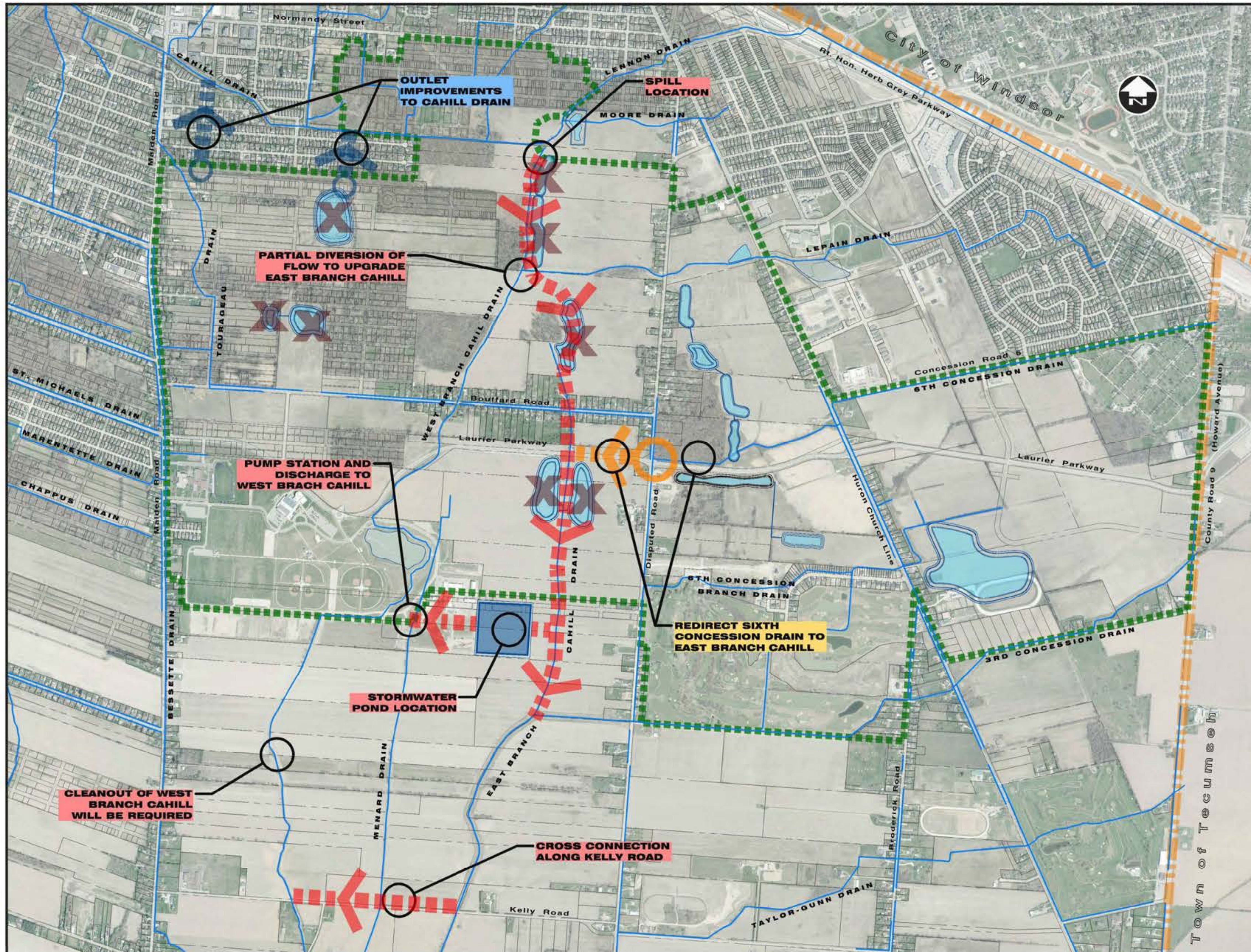
DATE: JUNE 2019  
Dillon Proj.No. 18-8169-1000

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 June 19, 2019 10:48 AM



# Alternative 2B

## 2A Plus Eliminate Ponds to Cahill Drain



**HOWARD BOUFFARD PLANNING AREA**  
Master Drainage Study

**LEGEND**

- MUNICIPAL BOUNDARY
- HOWARD BOUFFARD STUDY AREA
- OPTION 1
- OPTION 2
- DRAIN IMPROVEMENTS TO CAHILL DRAIN
- Pond Locations Identified In 2017 E.A. Addendum
- Existing Municipal Drains

**Option 2B Description**

- Same improvements as Option 2A
- Remove three ponds in northwest corner of planning area
- Improve storm sewer outlets to Cahill Drain
- Increase spill at Cahill drain to balance flows
- Increase regional stormwater pond

SCALE: N.T.S.

**PROPOSED CHANNELS**  
**OPTION 2B**

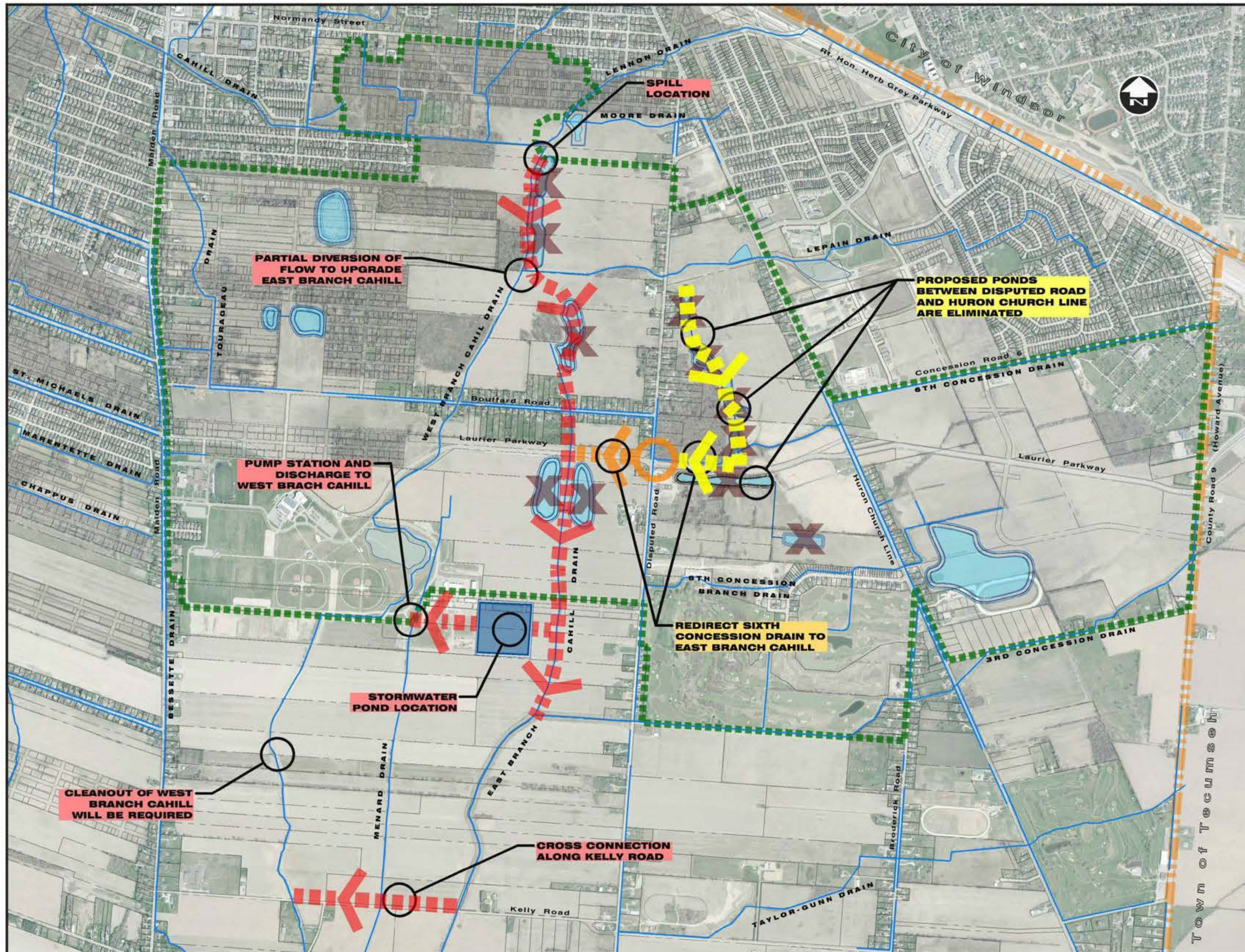
DATE: JUNE 2019  
Dillon Proj.No. 18-8169-1000

File Location: C:\projects\working\city\municipal\projects\2019\2019\municipal\18-8169-1000\18-8169-1000.dwg  
June 25, 2019 10:31 AM



# Alternative 3A

## Eliminate Ponds Between Disputed and Huron Church



### HOWARD BOUFFARD PLANNING AREA

Master Drainage Study

#### LEGEND

- MUNICIPAL BOUNDARY
- HOWARD BOUFFARD STUDY AREA
- OPTION 1
- OPTION 2
- OPTION 3
- Pond Locations Identified in 2017 E.A. Addendum
- Existing Municipal Drains

#### Option 3A Description

- Same improvements as Option 2A
- Eliminate proposed ponds between Huron Church Line and Disputed Road

SCALE: N.T.S.

### PROPOSED CHANNELS OPTION 3A

DATE: JUNE 2019  
Dillon Proj.No. 18-8169-1000

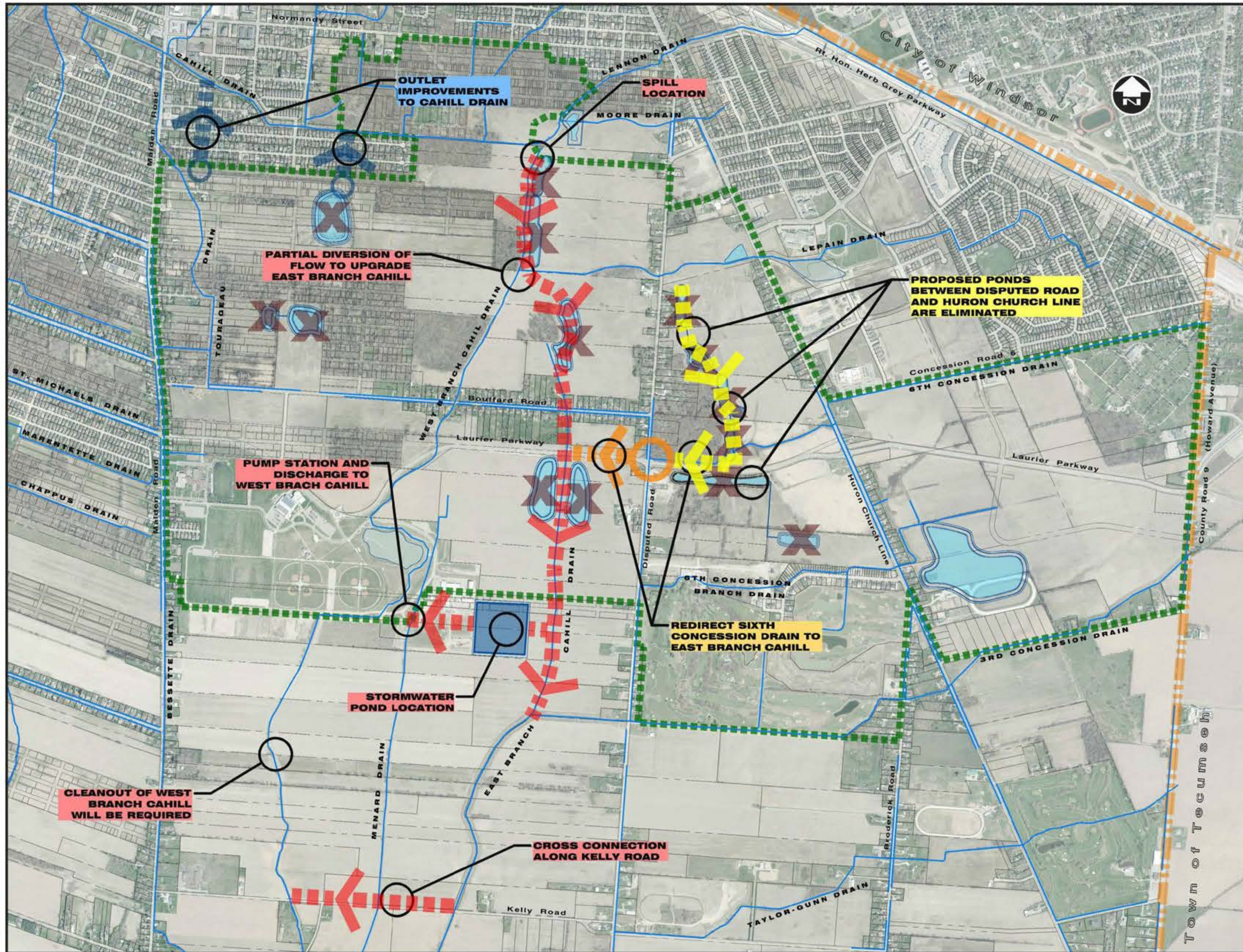


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June 20, 2019 10:59 AM



# Alternative 3B

## 3A Plus Eliminate Ponds to Cahill Drain



**HOWARD BOUFFARD PLANNING AREA**  
Master Drainage Study

**LEGEND**

- MUNICIPAL BOUNDARY
- HOWARD BOUFFARD STUDY AREA
- OPTION 1
- OPTION 2
- OPTION 3
- DRAIN IMPROVEMENTS TO CAHILL DRAIN
- Pond Locations Identified in 2017 E.A. Addendum
- Existing Municipal Drains

**Option 3B Description**

- Same improvements as Option 3A

SCALE: N.T.S.

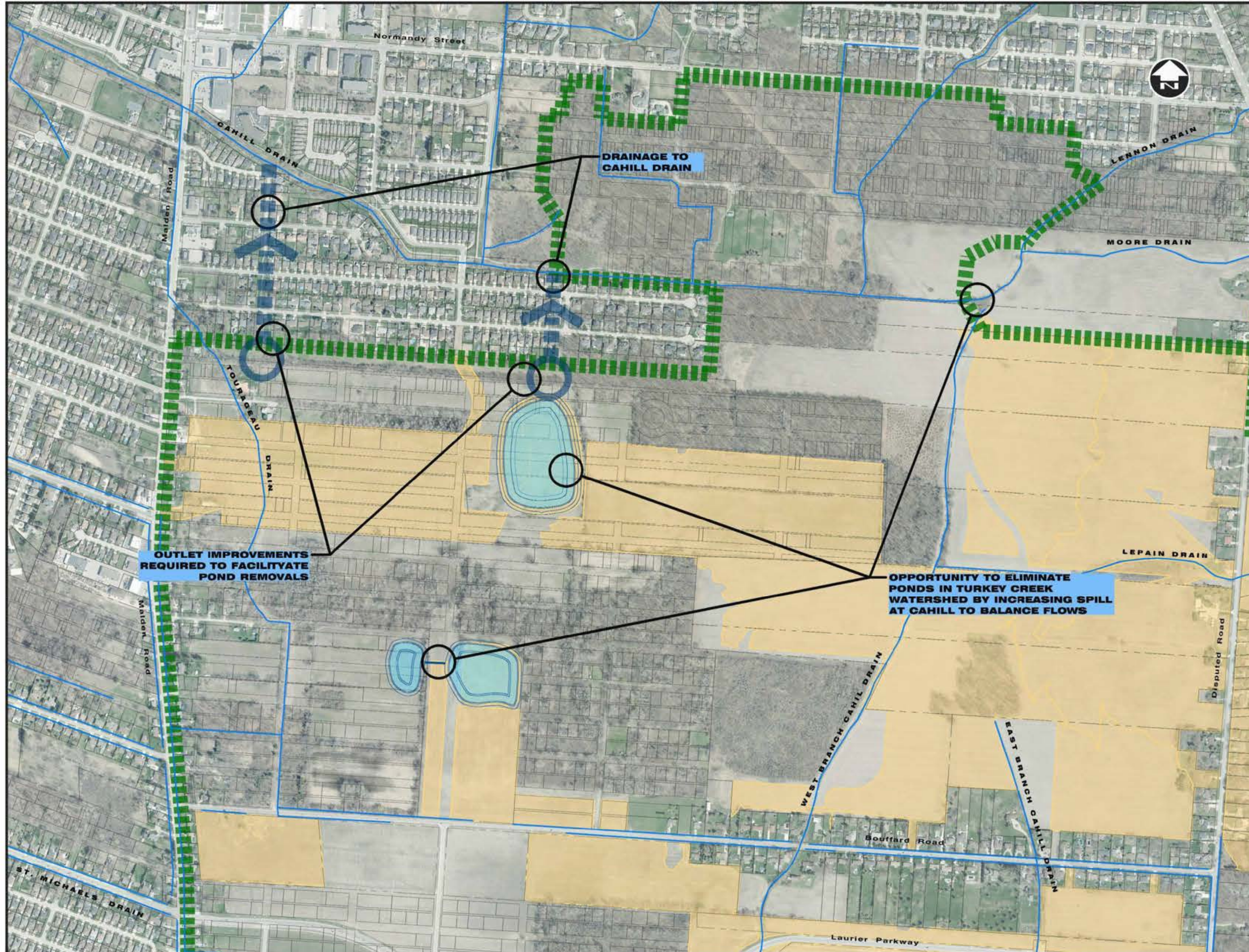
**PROPOSED CHANNELS**  
**OPTION 3B**

DATE: JUNE 2019  
Dillon Proj. No. 18-8169-1000

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JUNE 18, 2019 11:51 AM



# Alternative 1B, 2B and 3B Outlet Improvements to Cahill Drain



**HOWARD BOUFFARD PLANNING AREA**  
Master Drainage Study

**LEGEND**

- MUNICIPAL BOUNDARY
- HOWARD BOUFFARD STUDY AREA
- DRAINAGE TO CAHILL DRAIN
- Pond Locations Identified in 2017 E.A. Addendum
- Existing Municipal Drains

SCALE: N.T.S.

**PROPOSED OUTLET IMPROVEMENTS DRAINAGE TO CAHILL DRAIN**

DATE: JUNE 2019  
Dillon Proj.No. 18-8169-1000

File Location: C:\projects\working\drainage\projects\2019\20190601\mxd\18-8169-1000-1000-02-000-000.aprx  
June 25, 2019 11:29 AM



# Regional Pond Sizing



Proposed Option	Pond Footprint (m)	Storage Volume Required – 100yr24hr Chicago (m <sup>3</sup> )	Pond Depth (m) (Including 0.5m Freeboard)
Option #1A	222 x 222	110,000	3.17
Option #1B	230 x 230	149,000	3.95
Option #2A	224 x 224	119,000	3.35
Option #2B	232 x 232	157,000	4.12
Option #3A	228 x 228	139,000	3.75
Option #3B	277 x 277	212,000	3.72

§ 190m x 190m Pond Bottom For Options 1A to 3A

§ 240m x 240m Pond Bottom for Option 3B

§ 5:1 Side Slopes



Input received today will be used to finalize and evaluate the design options.

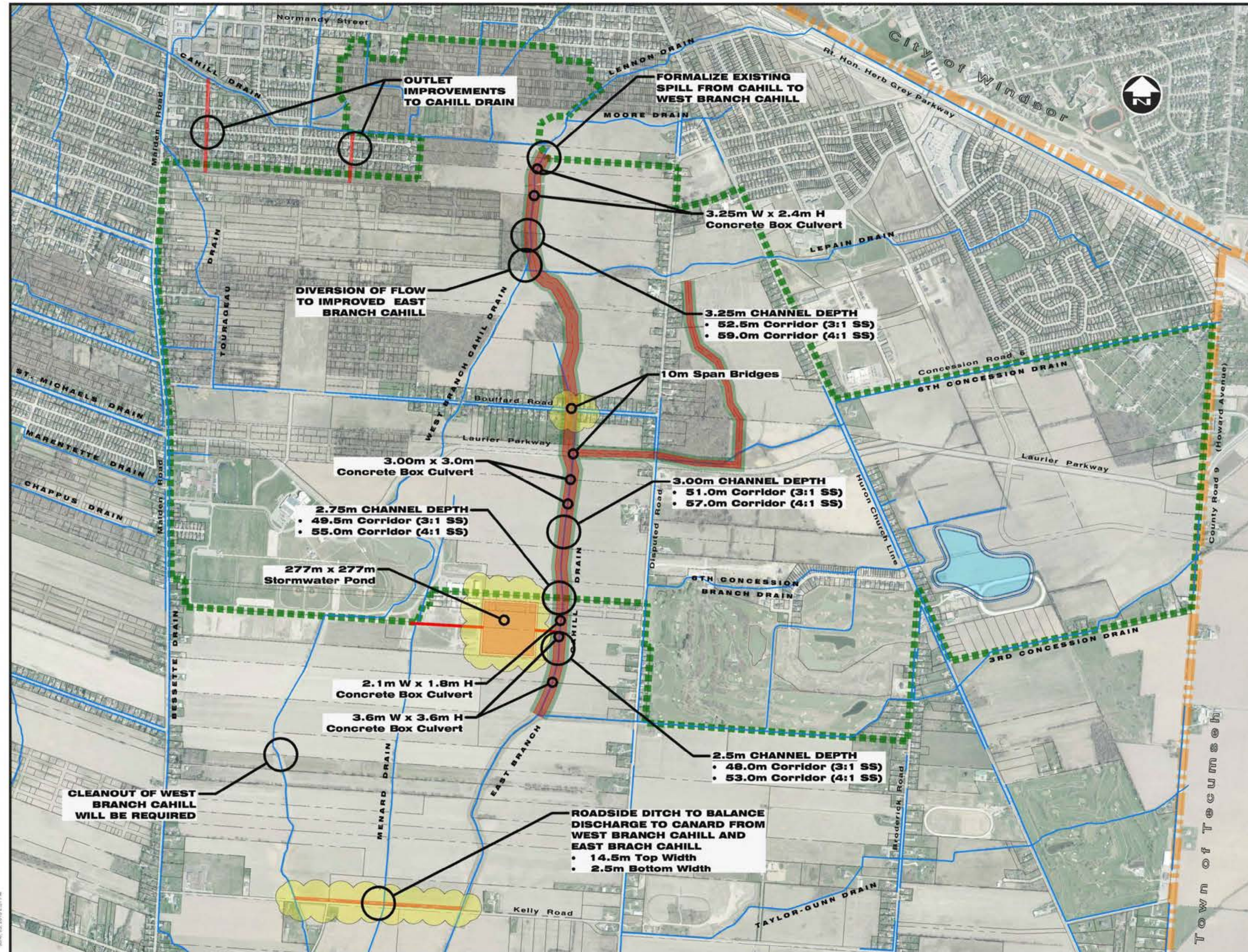
The EA process requires alternatives be developed and evaluated based on potential impacts to the environment, as well as engineering considerations and costs.

The following criteria were considered in the evaluation of alternatives.





# Recommended Alternative 3B



## HOWARD BOUFFARD PLANNING AREA

Master Drainage Study

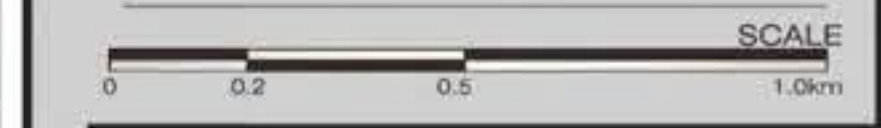
**LEGEND**

- MUNICIPAL BOUNDARY
- HOWARD BOUFFARD STUDY AREA
- PROPOSED CHANNEL ALIGNMENT
- Pond Locations Identified in 2017 E.A. Addendum
- Existing Municipal Drains
- Property required along corridors to facilitate solution.
- Highlighted areas requiring property acquisition.

- Drain Crossing Locations Identifier
- CHANNEL DESCRIPTION IDENTIFIER

**DRAINS**

3:1 Side Slopes (SS) Preferred.  
 4:1 Side Slopes (SS) may be required based on Geotechnical recommendations.



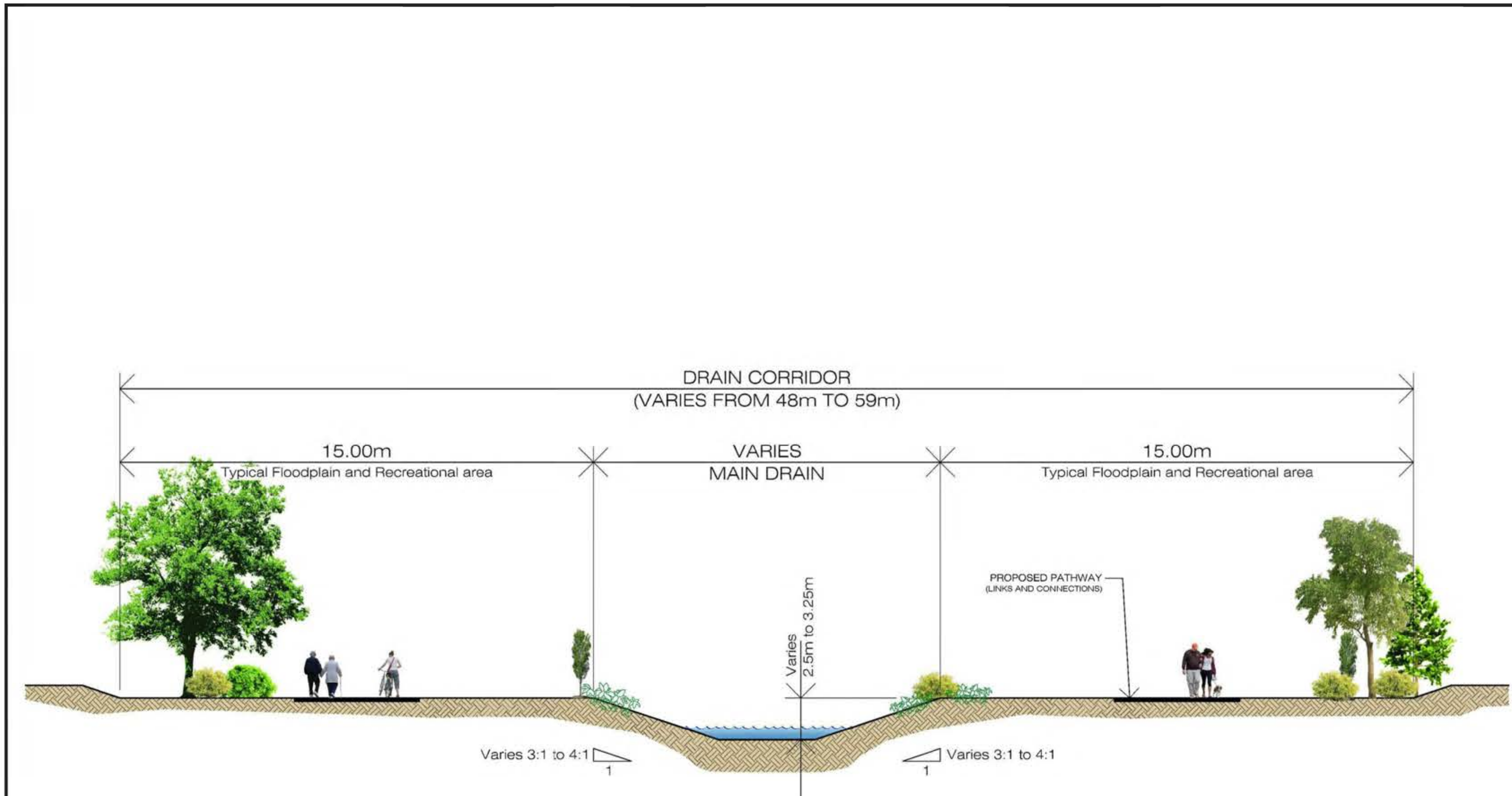
## PREFERRED OPTION 3B

DATE: JUNE 2019  
 Dillon Proj.No. 18-8169-1000

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# Recommended Alternative 3B



**TYPICAL CROSS SECTION**

**HOWARD BOUFFARD  
PLANNING AREA**  
Master Drainage Study

Maximum Ponding Depths in Floodplain  
is 0.3m.

SCALE: N.T.S.

**TYPICAL DRAIN  
CROSS  
SECTION**

DATE: JUNE 2019  
Dillon Proj.No. 18-8169-1000



File Location: C:\projects\howard\working\_directory\projects\2018\2019\mud\2018\_180100\_002.pdf-fig1.rvt  
JUN 25 2019 11:44 AM



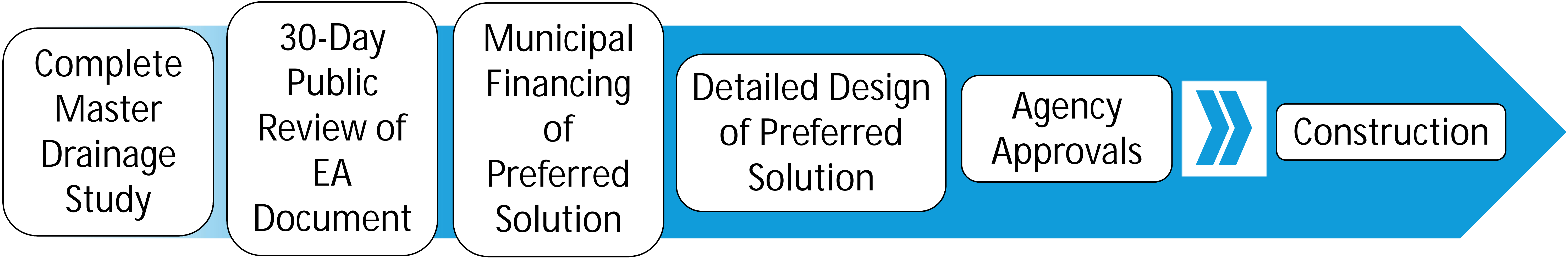
- Alternatives were subject to an Urban Stress Test
  - Additional 42mm of rain over 24hrs
- Results in approximately 50% increase to storage requirements
  - Additional volume ranges from 51,000m<sup>3</sup> for Option 1A to 112,000m<sup>3</sup> for option 3B
  - Can be addressed through depressing park lands and other green space
    - Ideal to locate parks along the drainage corridor
    - Stormwater benefits and connectivity to recreational areas along the corridor
  - Does not necessarily have to increase size of Stormwater Pond



# Anticipated Project Timeline



Summer 2019    October 2019    6 to 12 months    1 year    1 year    1 to 2 years



Could be concurrent

\* Steps beyond completion of the Master Drainage Study requires Council approval.



# Estimated Construction Costs

	CAPITAL COSTS				BENEFITS		
	Construction	Engineering (15%)	Contingency (25%)	Total	# Ponds Eliminated	# Pump Stations Eliminated	Land Area Gained (Ha)*
<b>Option 1A</b>	\$23.0	\$3.5	\$6.6	\$33.1	5	3	10.8
<b>Option 1B</b>	\$24.0	\$3.6	\$6.9	\$34.5	8	5	17.1
<b>Option 2A</b>	\$23.3	\$3.5	\$6.6	\$33.4	5	3	10.8
<b>Option 2B</b>	\$24.2	\$3.6	\$7.0	\$34.8	8	5	17.1
<b>Option 3A</b>	\$23.7	\$3.6	\$6.8	\$34.1	11	6	17.0
<b>Option 3B</b>	\$25.4	\$3.8	\$7.3	\$36.5	14	8	23.2

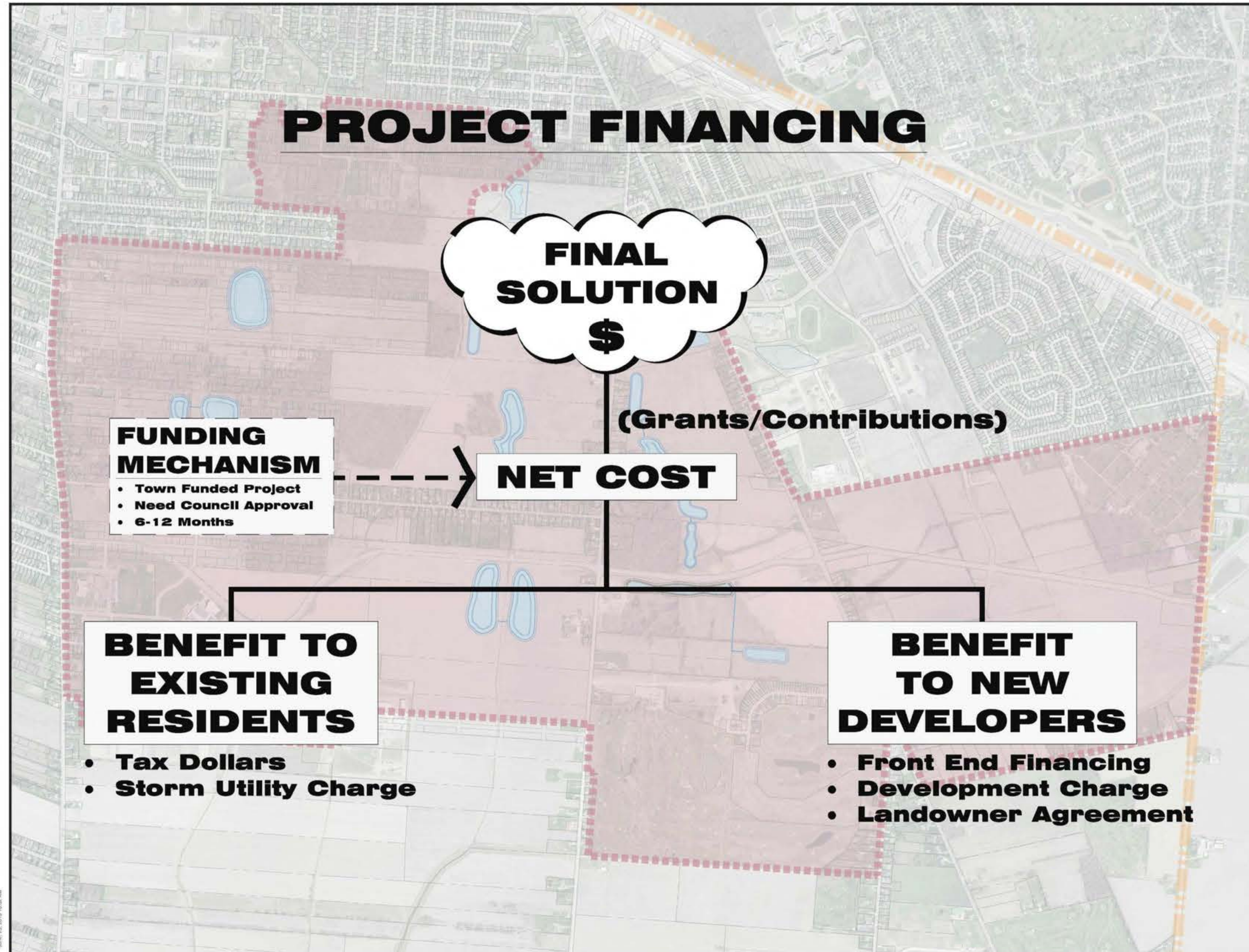
\* Approximate Land Area based on 2017 Environmental Assessment Addendum

- Excludes land acquisition costs
- Excludes areas for climate change resiliency

Estimated Construction Cost for Proposed Improvements reduced by:

- ➔ **MORE** Revenue Resulting from more Developable Land
- ➔ **LESS** Costs for Construction of Local Stormwater Ponds
- ➔ **LESS** Costs for Local Pump Stations





**HOWARD BOUFFARD  
PLANNING AREA**  
Master Drainage Study

**PROJECT  
FINANCING**

DATE: JUNE 2019  
Dillon Proj.No. 18-8169-1000

File Location: C:\projects\working\drainage\projects\2019\2019\mxd\2019\_11\_15\_10\_02\_00.aprx  
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# We Need Your Participation



Feedback from the public and the development community is vital as it will directly influence development of the preferred solution.

- What do you like about the proposed solution?
- What do you dislike about the proposed solution?
- Feedback regarding eliminating local stormwater ponds and pump stations
- Do you require your existing farm crossing to be replaced?

\* Please provide us with your comments by July 15, 2019



	2019			2020		
	Summer	Fall	Winter	Spring	Summer	Fall
Review feedback from this meeting (PIC)		➔				
Complete impact assessment on preferred solution		➔				
Document Study in an EA Report and make available for public review		➔				
Council Consideration of Next Steps			➔			

Thank you for attending.

If you have any questions about this project, please fill out the comment sheets or contact either of the individuals listed below.

[Project Website](http://www.lasalle.ca/hbmds)

<http://www.lasalle.ca/hbmds>

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