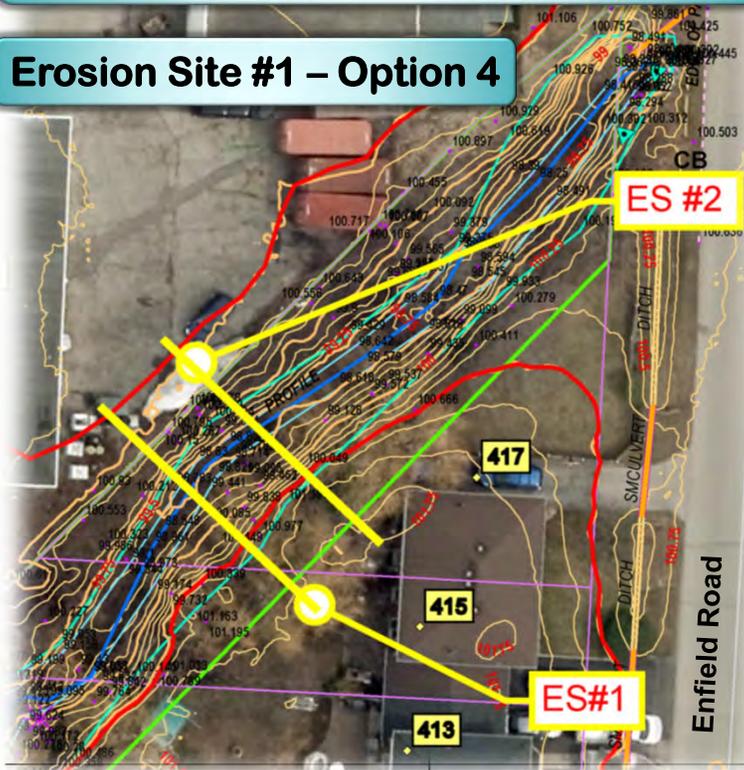
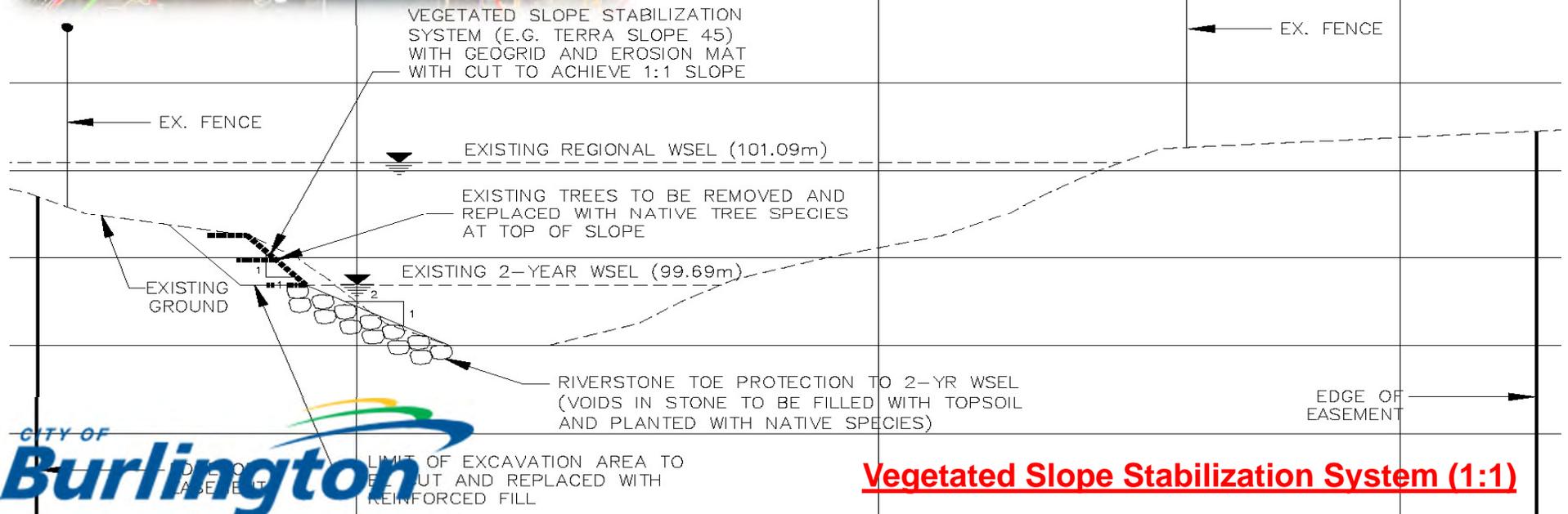


# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #1 – Option 4

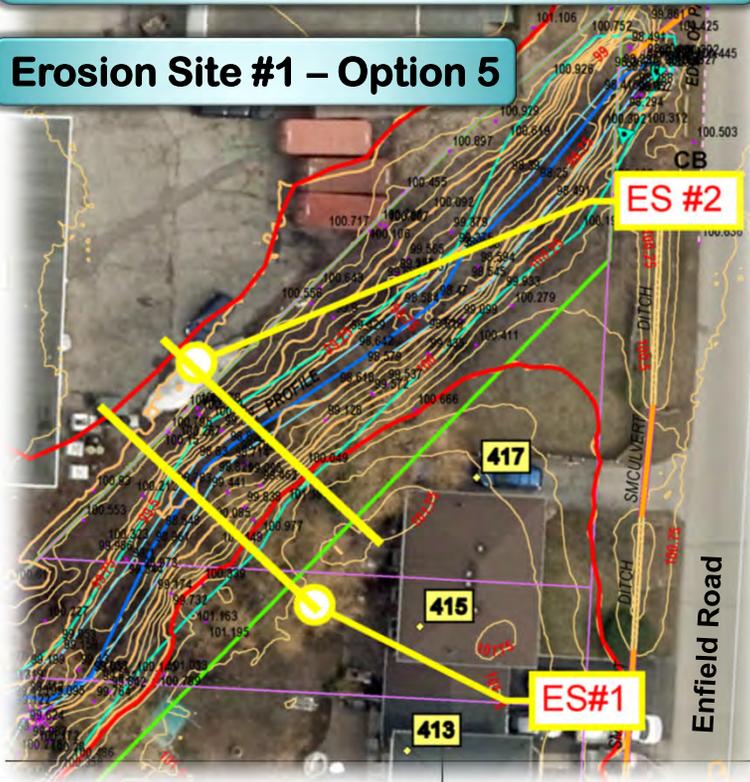


OPTION ④ EROSION SITE #1



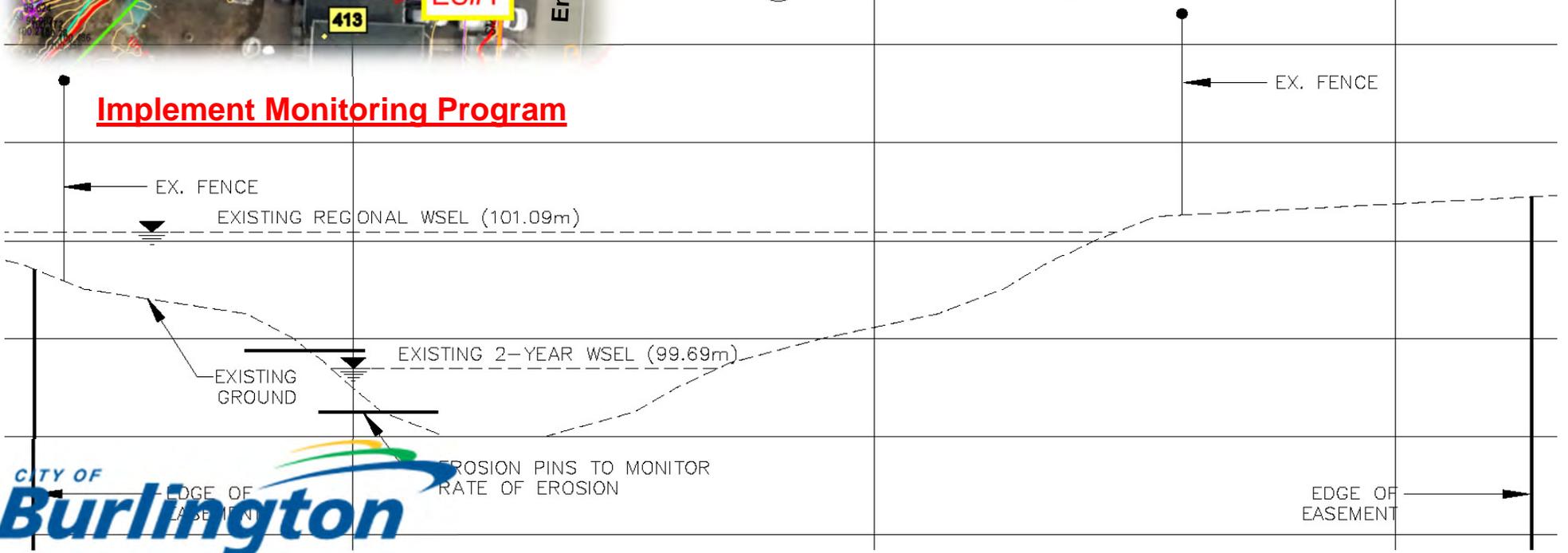
# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #1 – Option 5



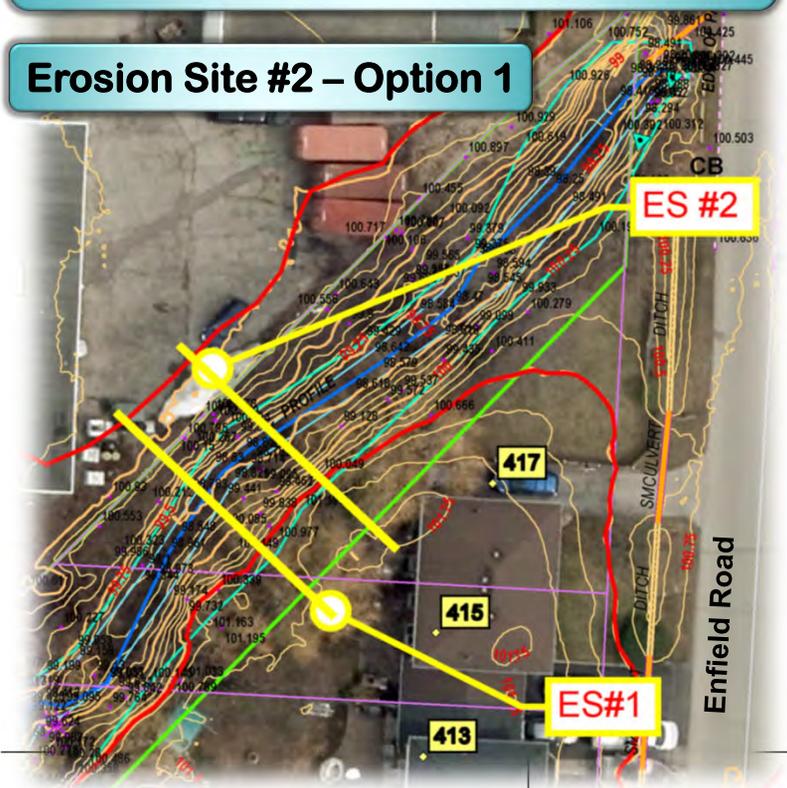
OPTION (5) EROSION SITE #1

### Implement Monitoring Program



# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #2 – Option 1



OPTION 1 EROSION SITE #2

**Do Nothing**

EX. FENCE

EX. FENCE

EXISTING GROUND

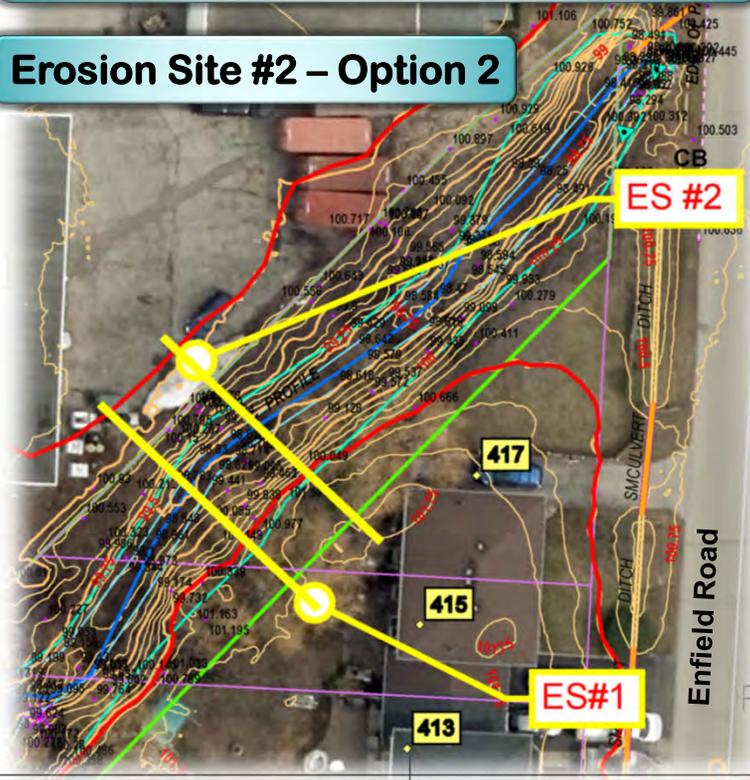
EXISTING REGIONAL WSEL (101.09m)

EXISTING 2-YEAR WSEL (99.69m)

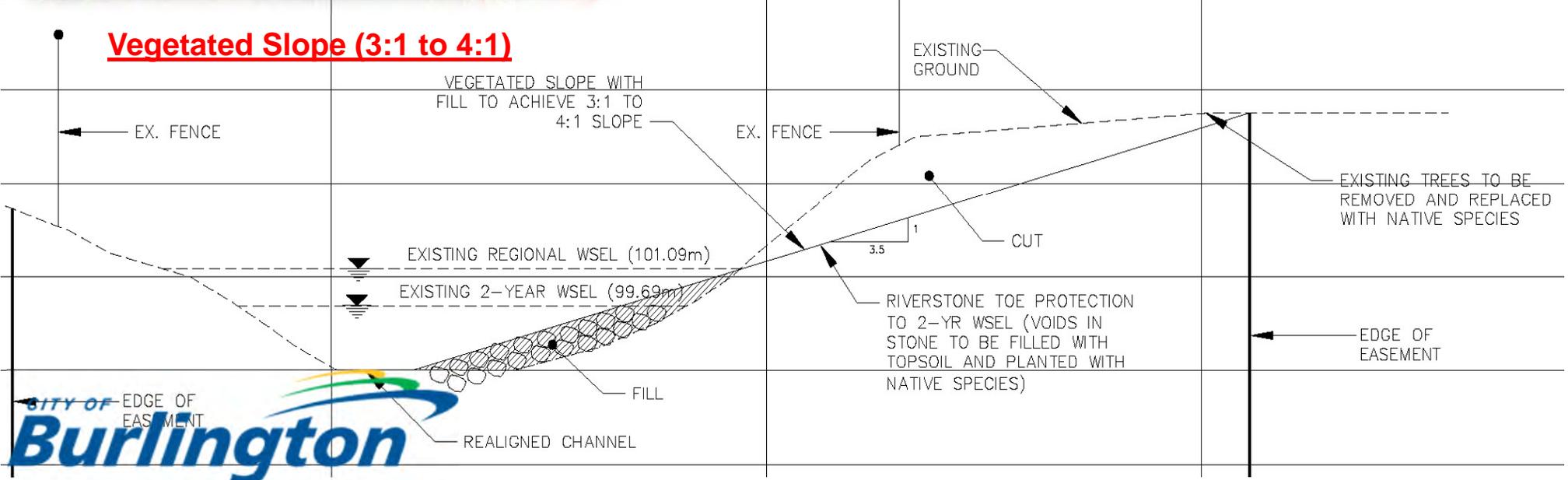
EDGE OF EASEMENT

# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #2 – Option 2

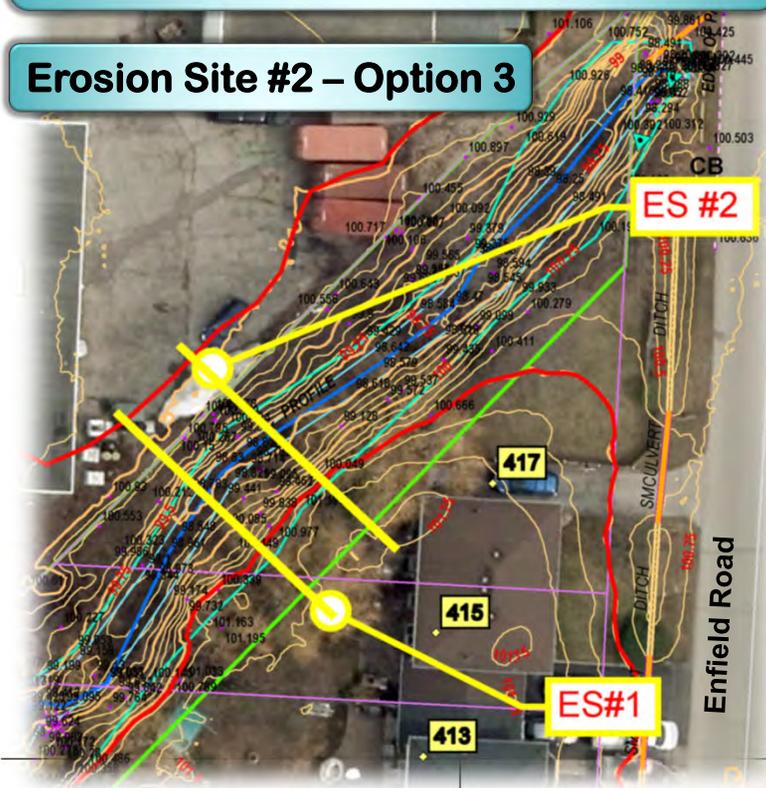


OPTION ② EROSION SITE #2



# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #2 – Option 3



OPTION ③ EROSION SITE #2

EXISTING TREES TO BE REMOVED AND REPLACED WITH NATIVE TREE SPECIES AT TOP OF SLOPE

EX. FENCE

VEGETATED EARTH-ANCHORING SYSTEM WITH CUT TO ACHIEVE 2:1 SLOPE (OPTIONAL: VEGETATED SUB-ANGULAR RIVERSTONE)

EXISTING GROUND

**Vegetated Sub-Angular Riverstone Slope (2:1)**  
**or Vegetated Earth-Anchoring System (2:1)**

EX. FENCE

EXISTING REGIONAL WSEL (101.09m)

EXISTING 2-YEAR WSEL (99.69m)

TERRAFIRM EARTH ANCHORING SYSTEM WITH GEOGRID AND TURF REINFORCEMENT MAT (TRM) SEEDING/PLANTED WITH LOW-LIGHT TOLERANT VEGETATION

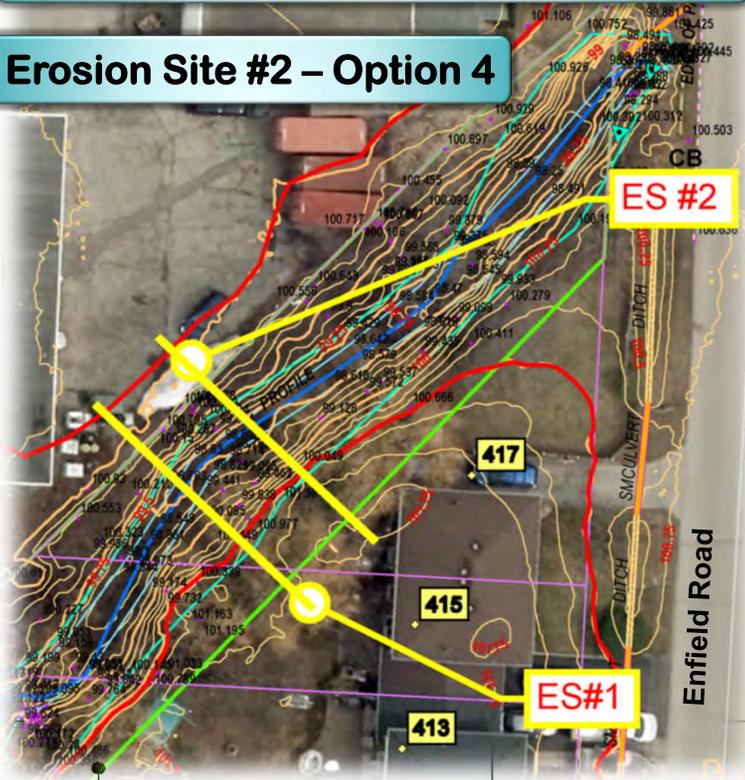
RIVERSTONE TOE PROTECTION TO 2-YR WSEL (VOIDS IN STONE TO BE FILLED WITH TOPSOIL AND PLANTED WITH NATIVE SPECIES)

EDGE OF EASEMENT

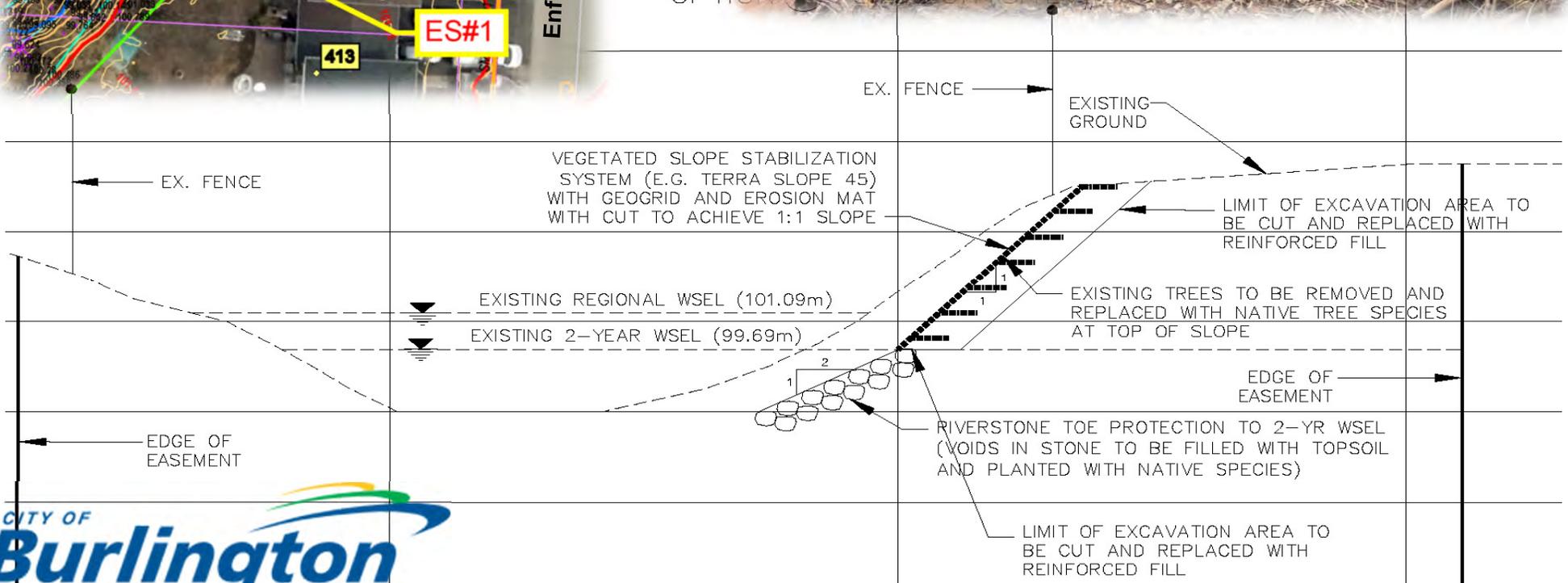


# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #2 – Option 4



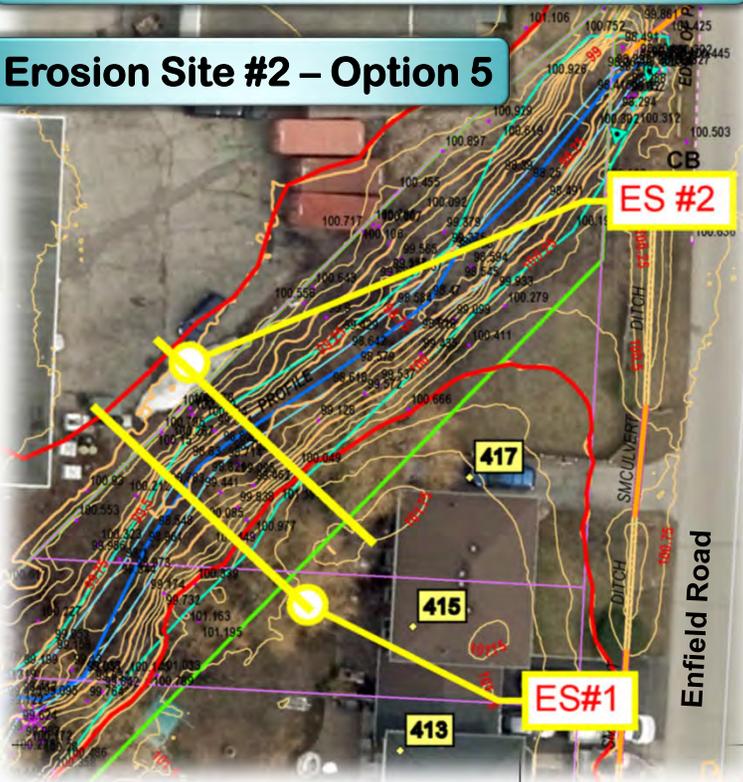
OPTIC



**Vegetated Slope Stabilization System (1:1)**

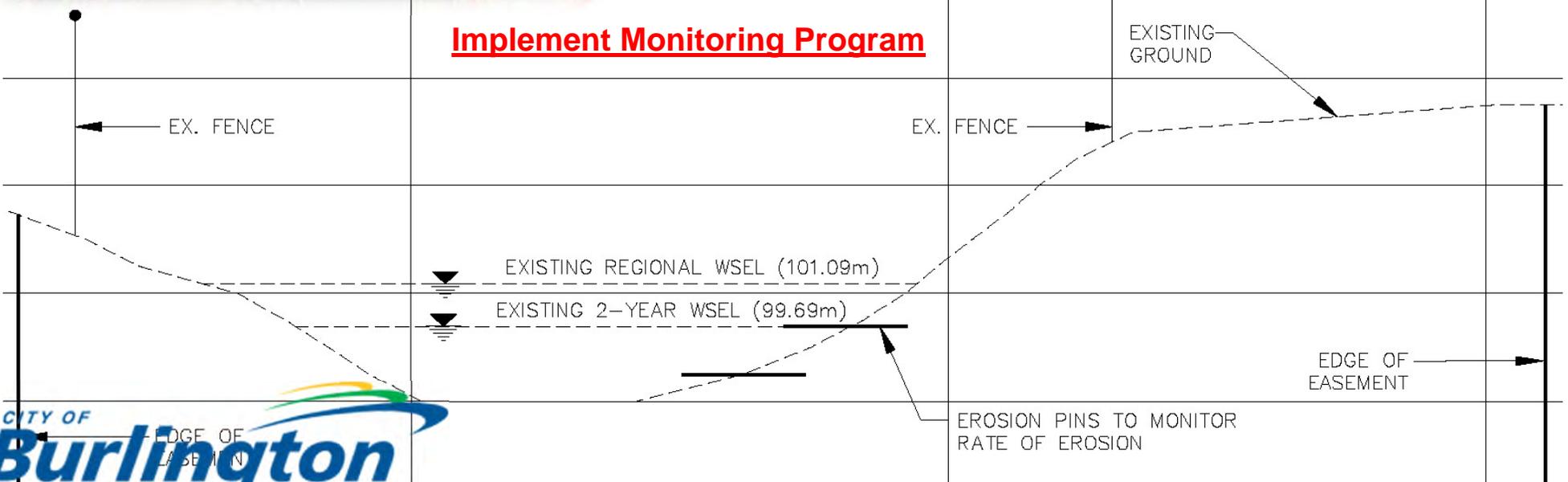
# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #2 – Option 5



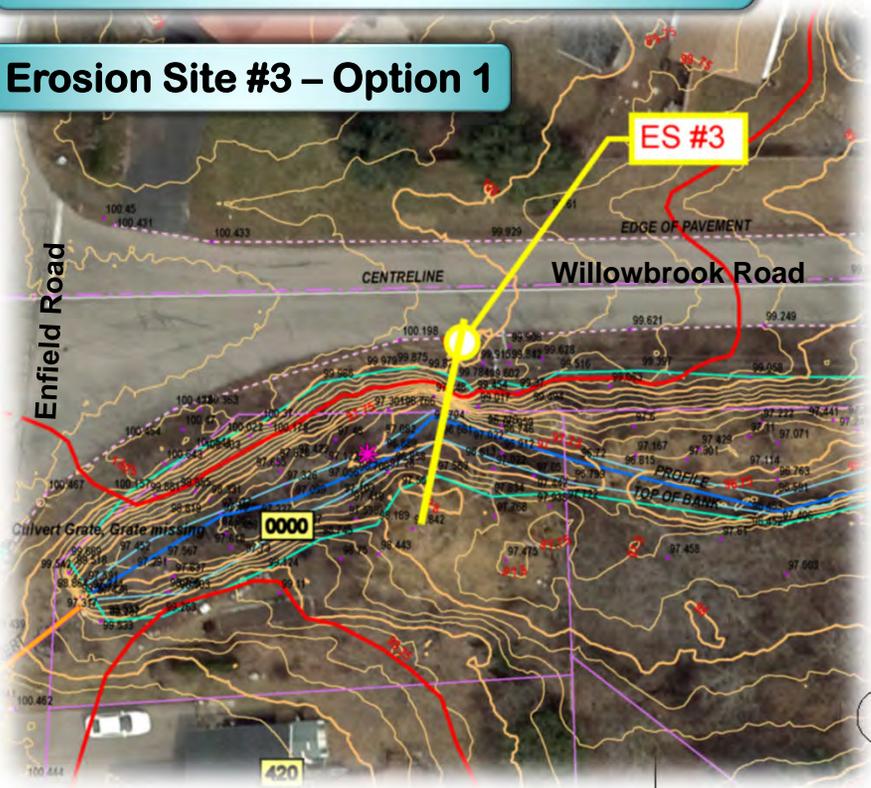
OPTION 5 EROSION SITE #2

### Implement Monitoring Program

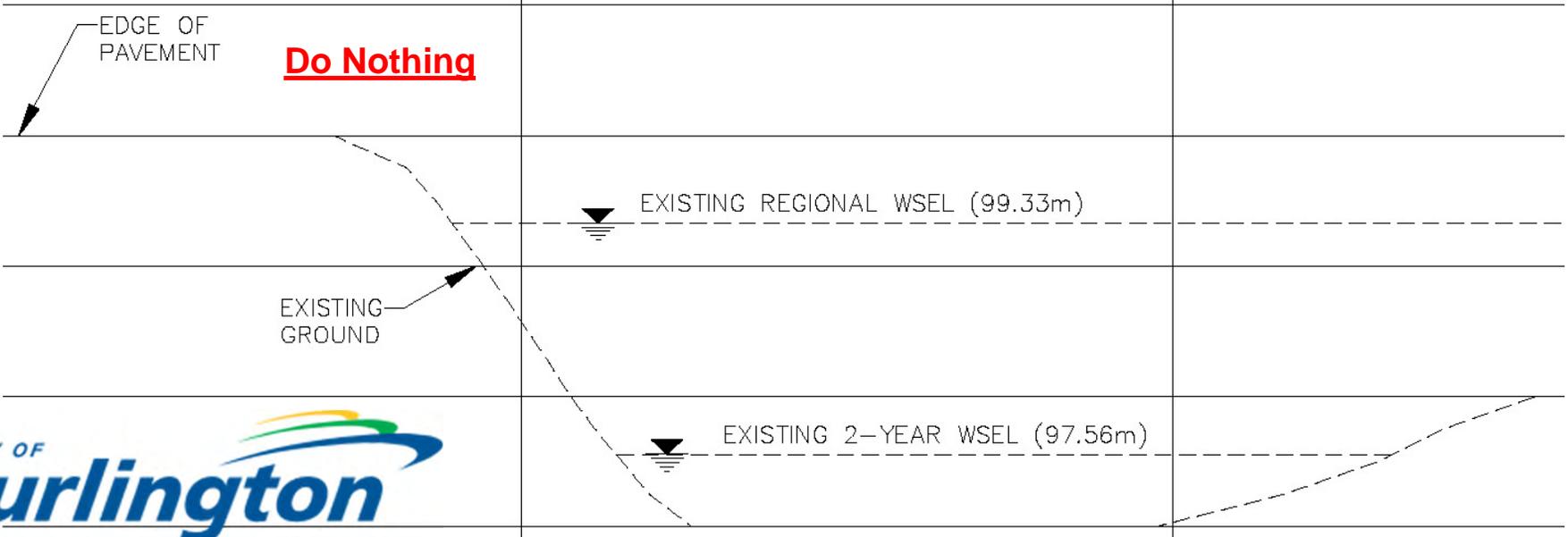


# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #3 – Option 1



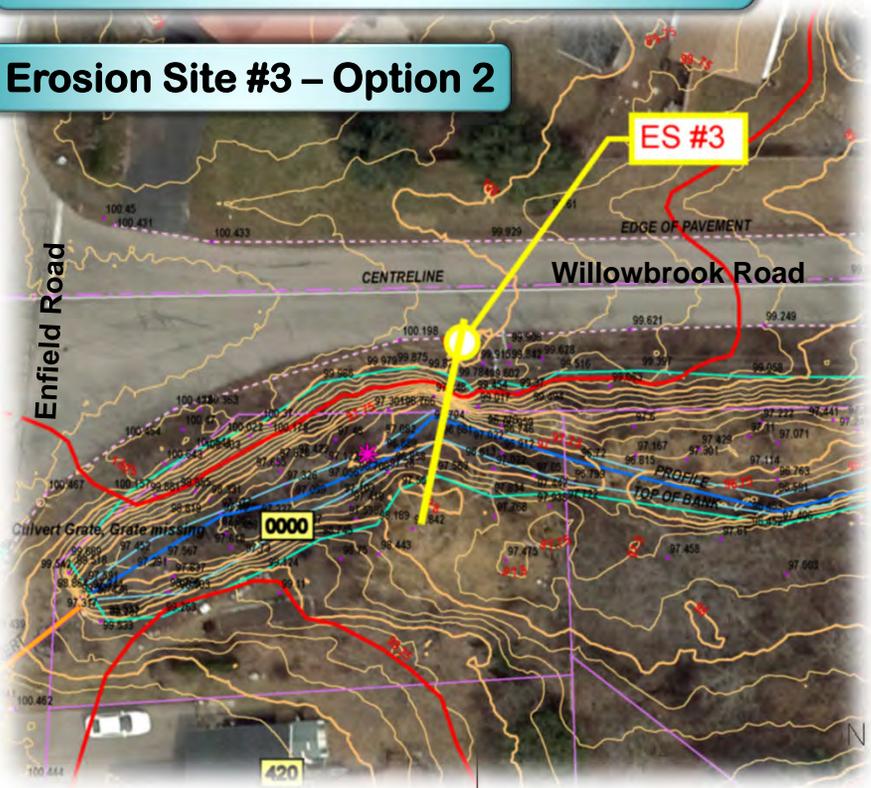
① EROSION SITE #3



**Do Nothing**

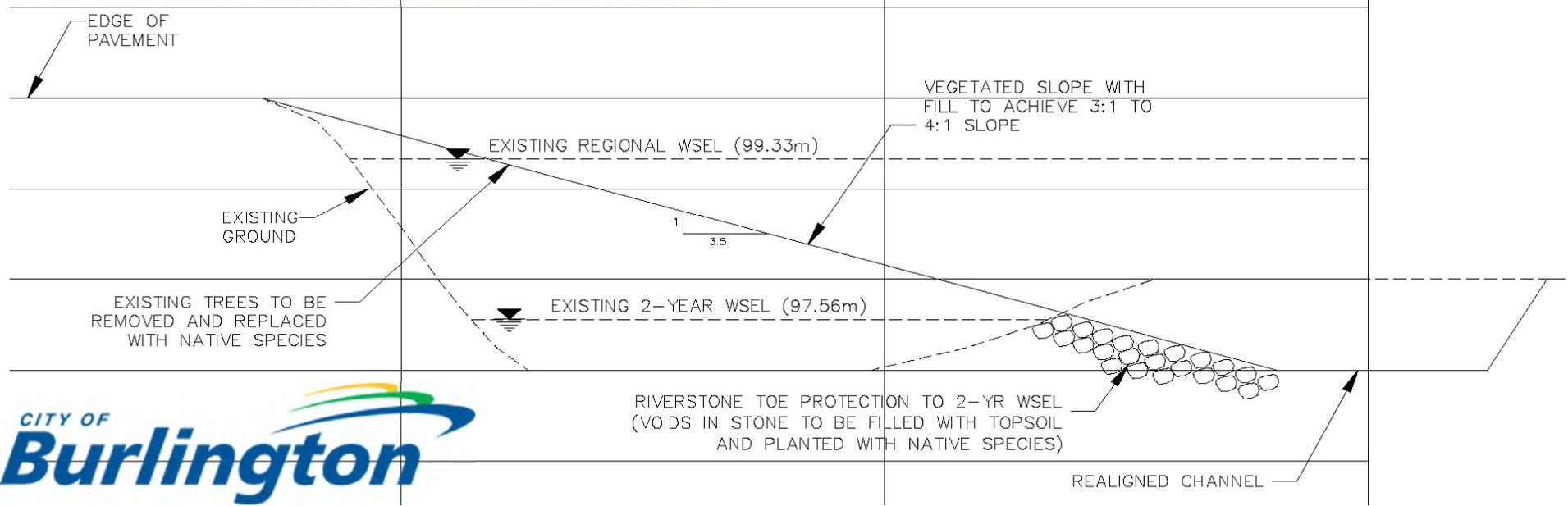
# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #3 – Option 2



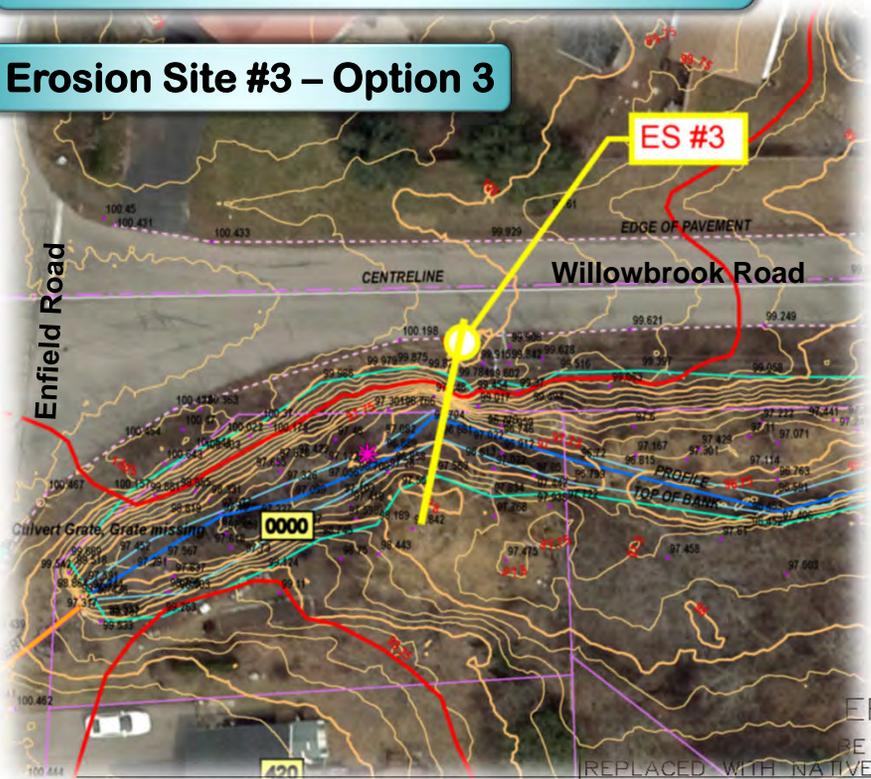
N SITE #3

### Vegetated Slope (3:1 to 4:1)

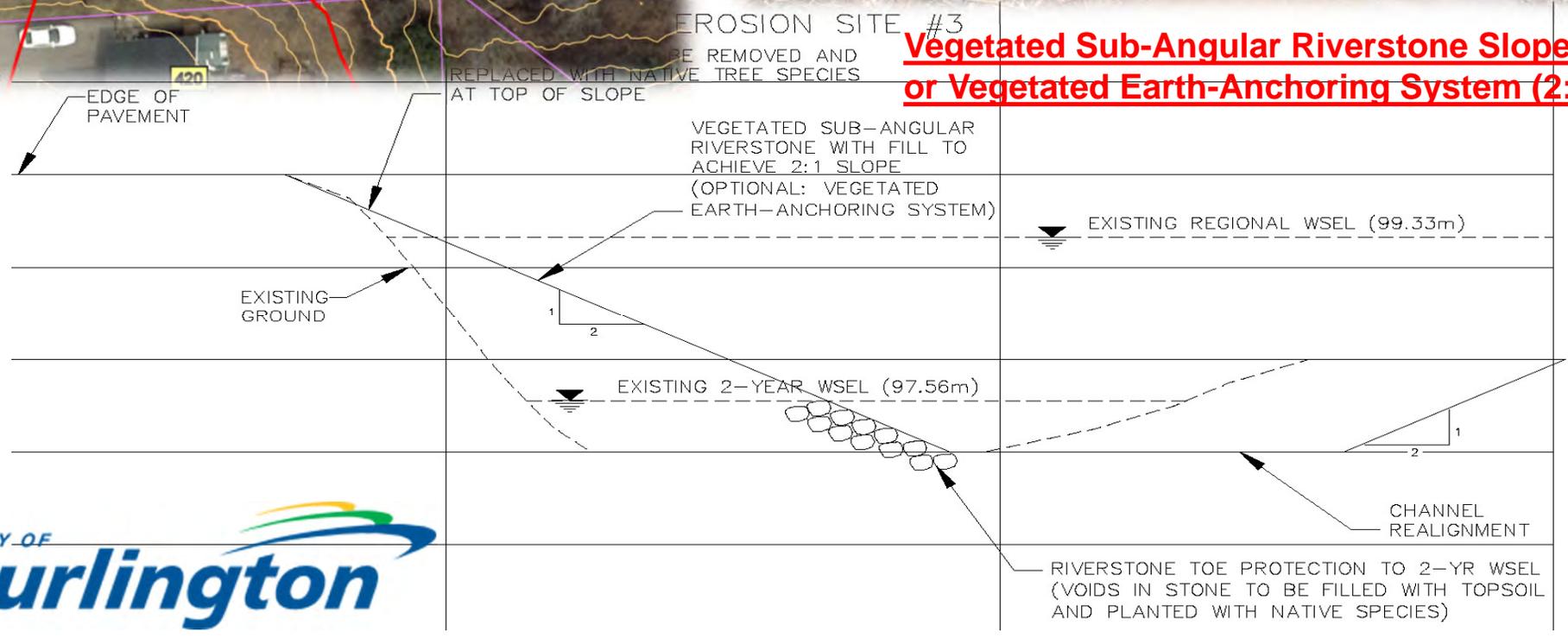


# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #3 – Option 3

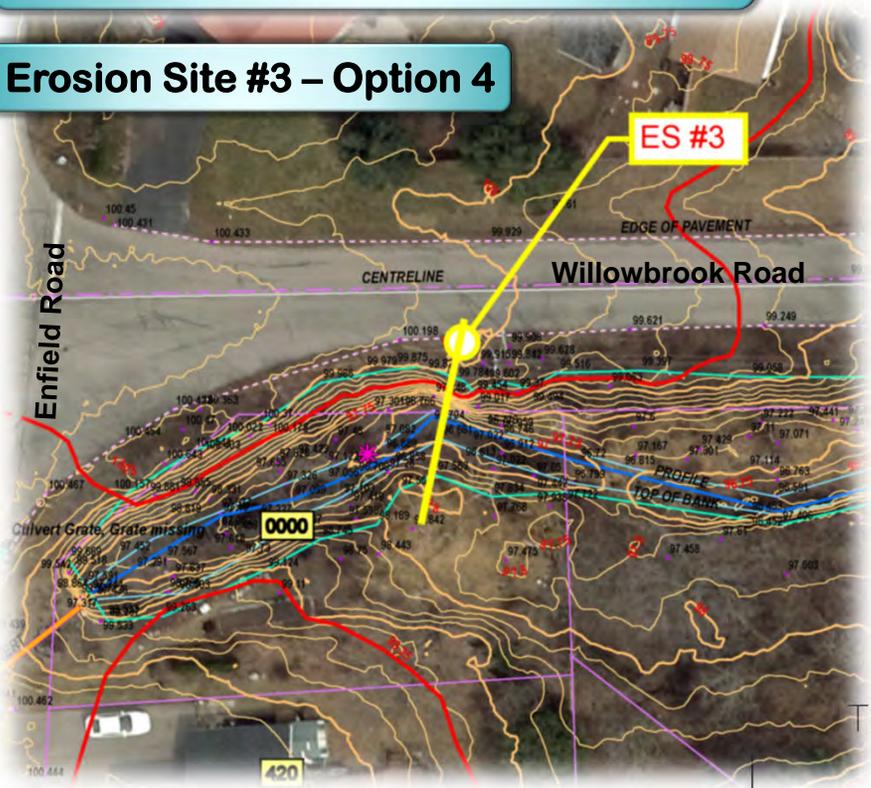


**Vegetated Sub-Angular Riverstone Slope (2:1)**  
**or Vegetated Earth-Anchoring System (2:1)**

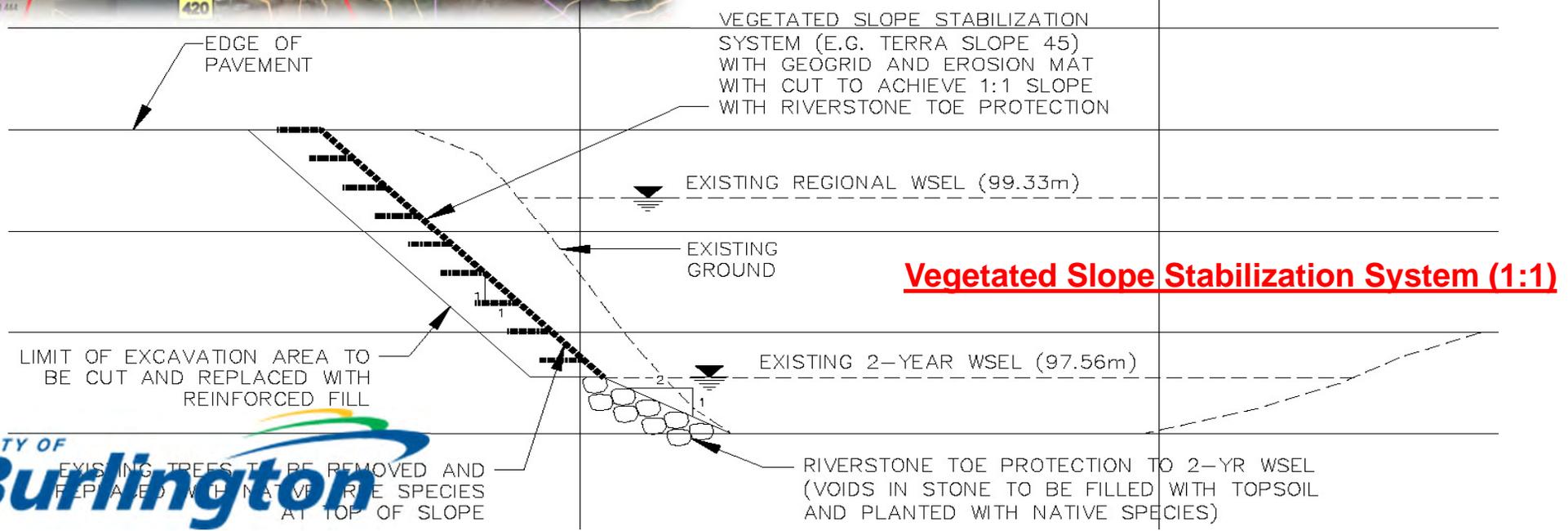


# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #3 – Option 4



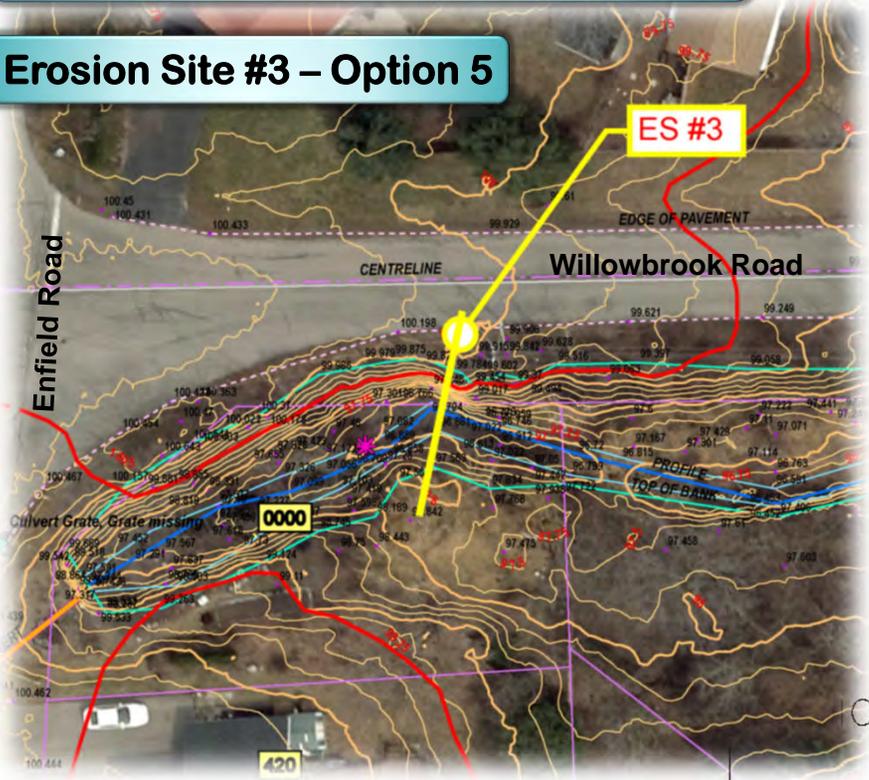
OPTION ④ EROSION SITE #3



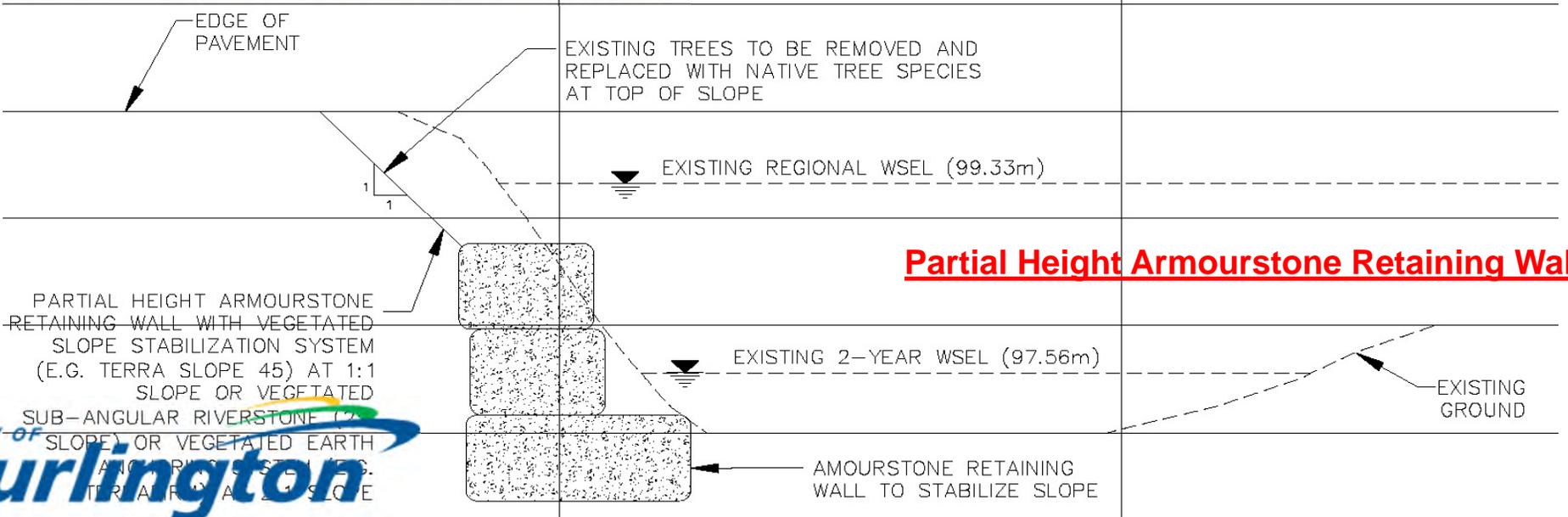
EXISTING TREES TO BE REMOVED AND REPLACED WITH NATIVE TREE SPECIES AT TOP OF SLOPE

# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #3 – Option 5

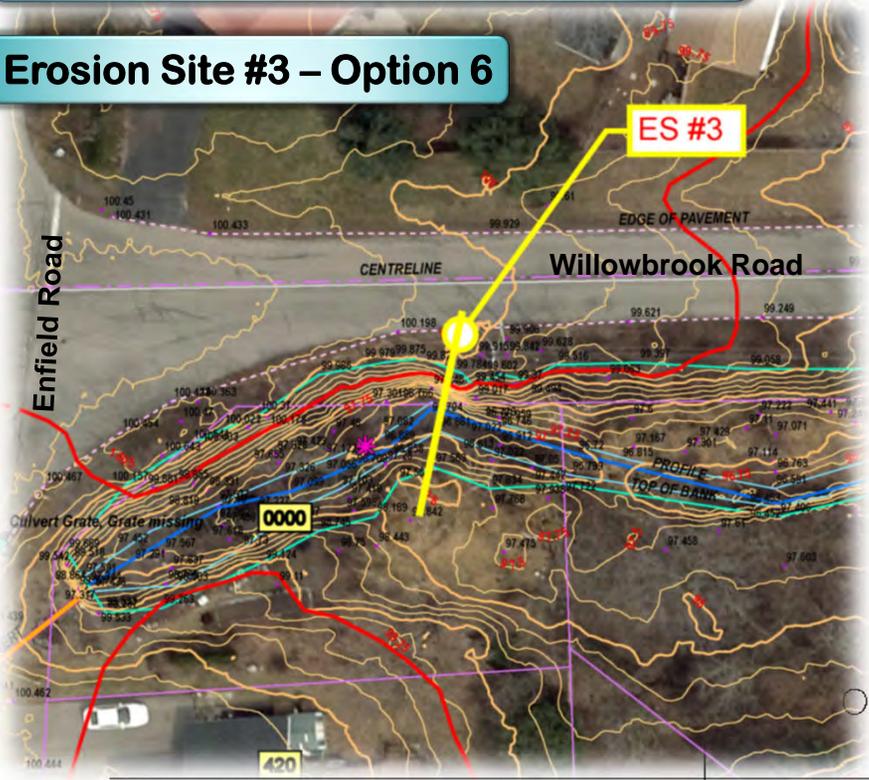


OPTION ⑤ EROSION SITE #3

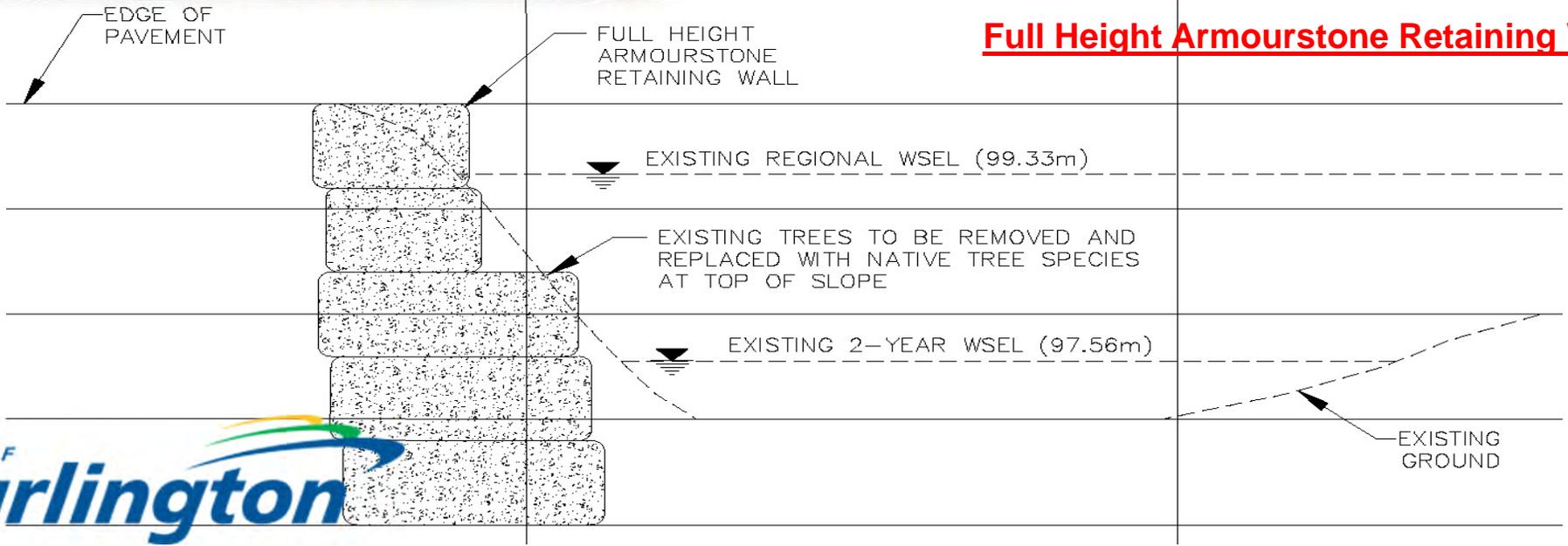


# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #3 – Option 6



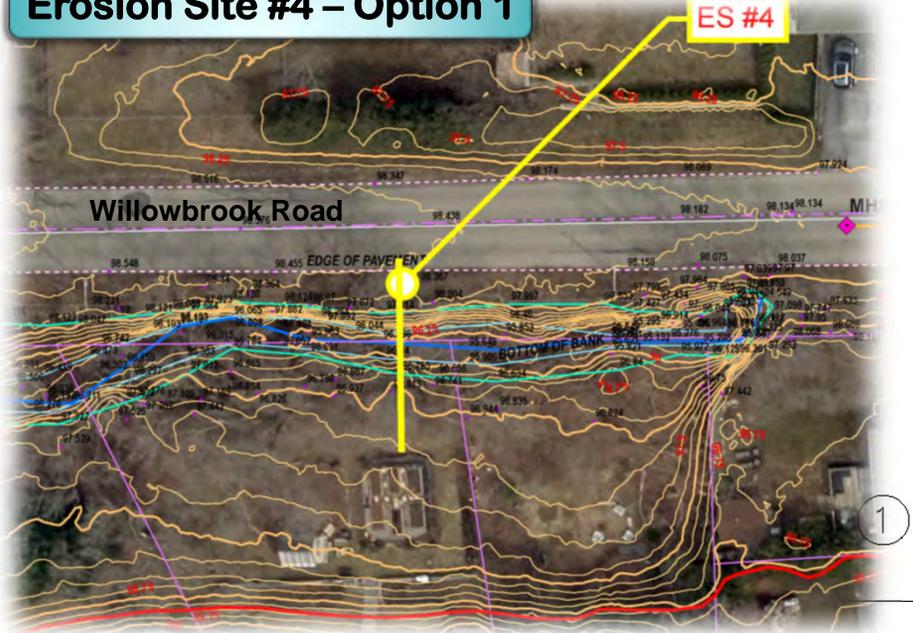
OPTION 6 EROSION SITE #3



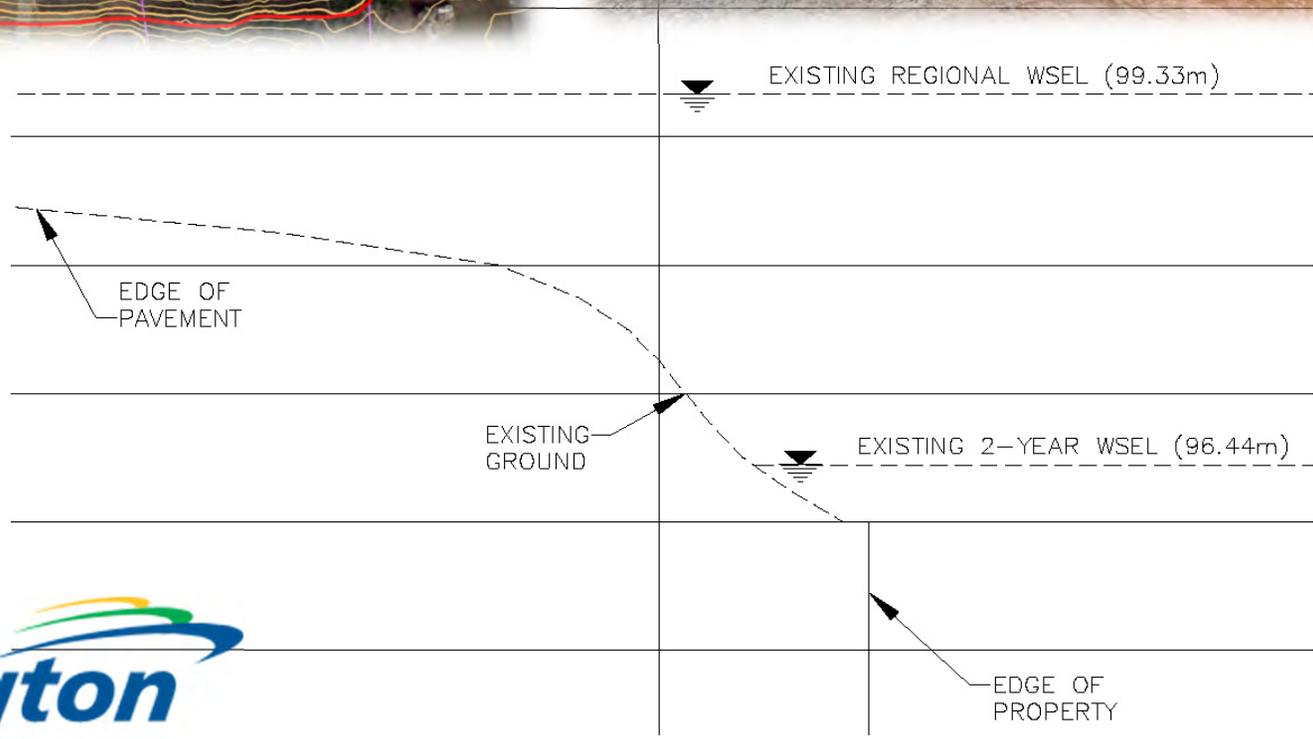
**Full Height Armourstone Retaining Wall**

# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #4 – Option 1

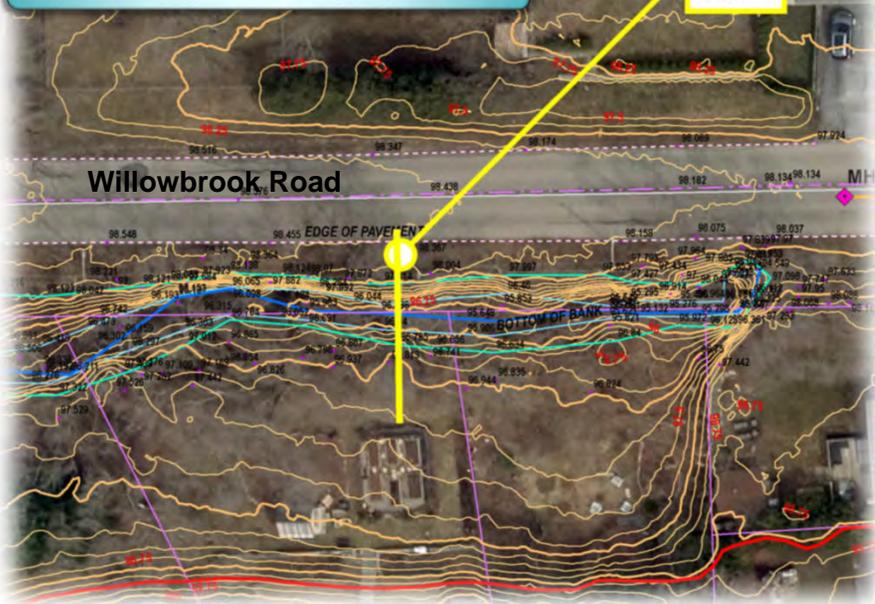


**Do Nothing**

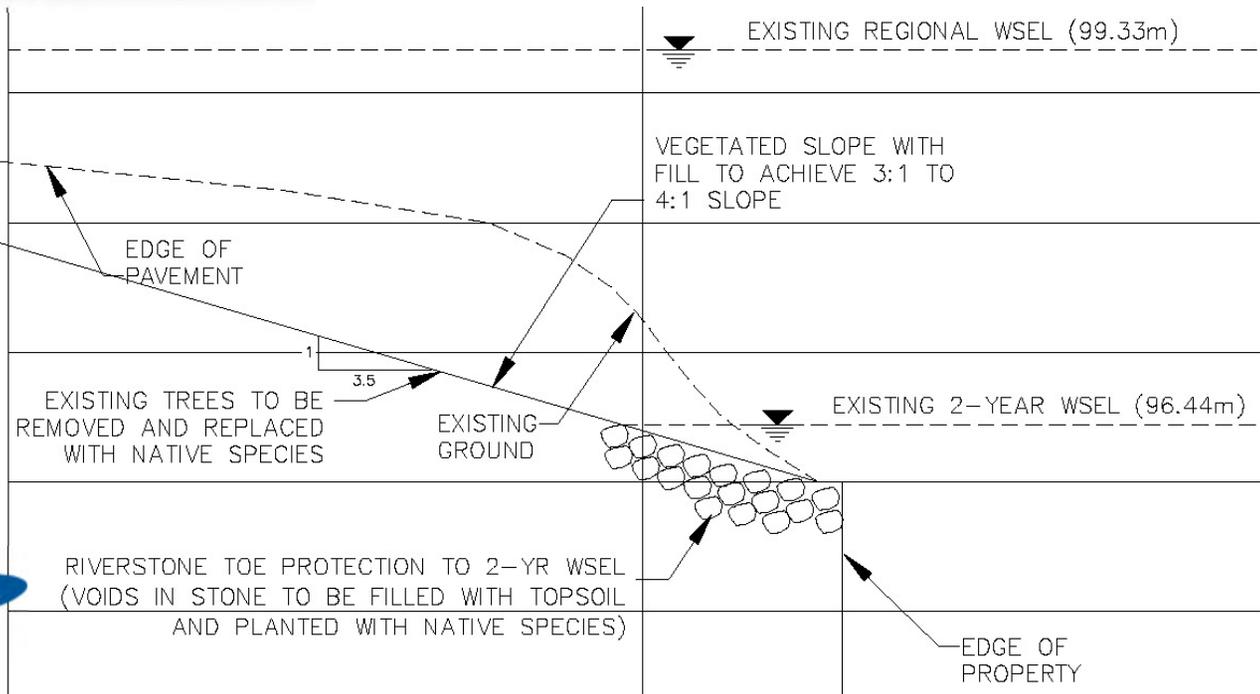


# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #4 – Option 2

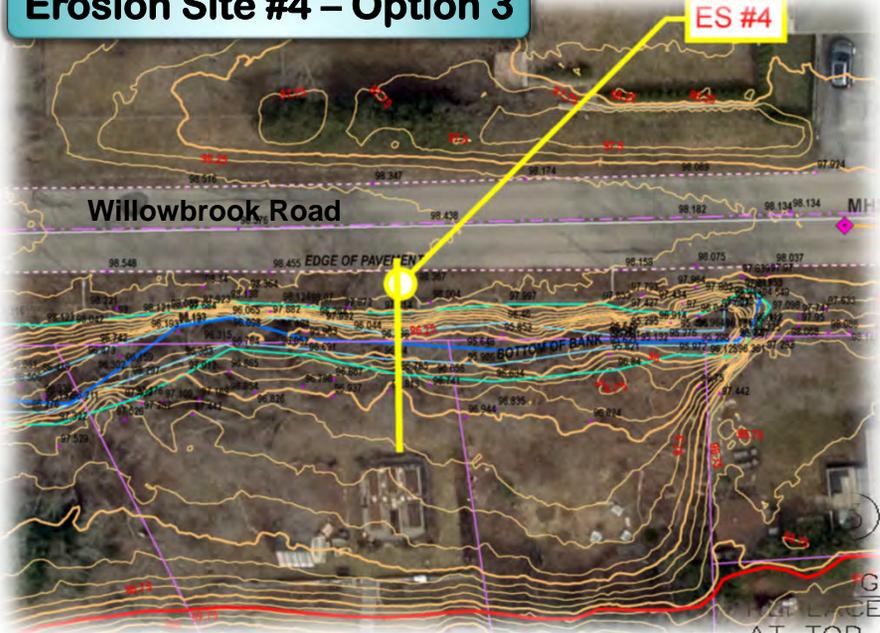


### Vegetated Slope (3:1 to 4:1)

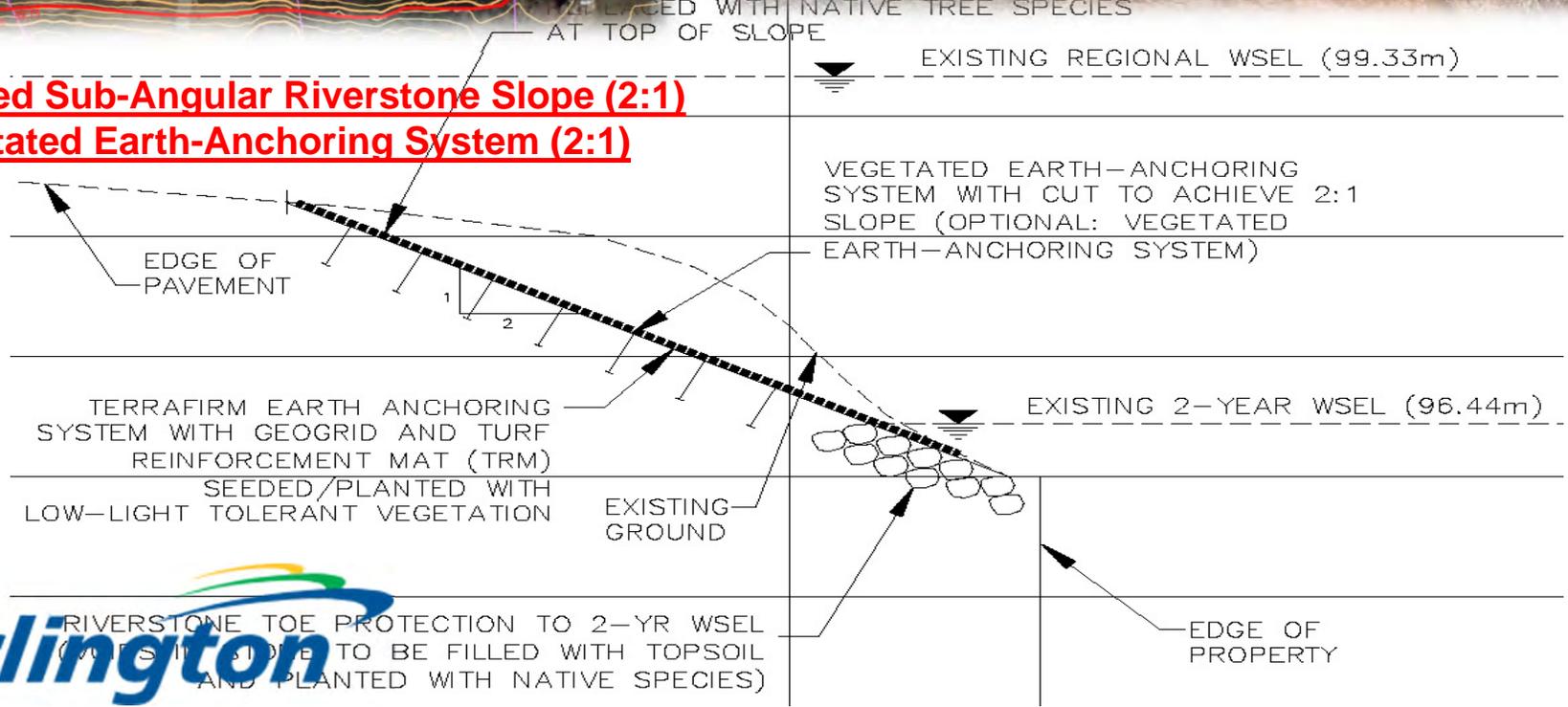


# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #4 – Option 3

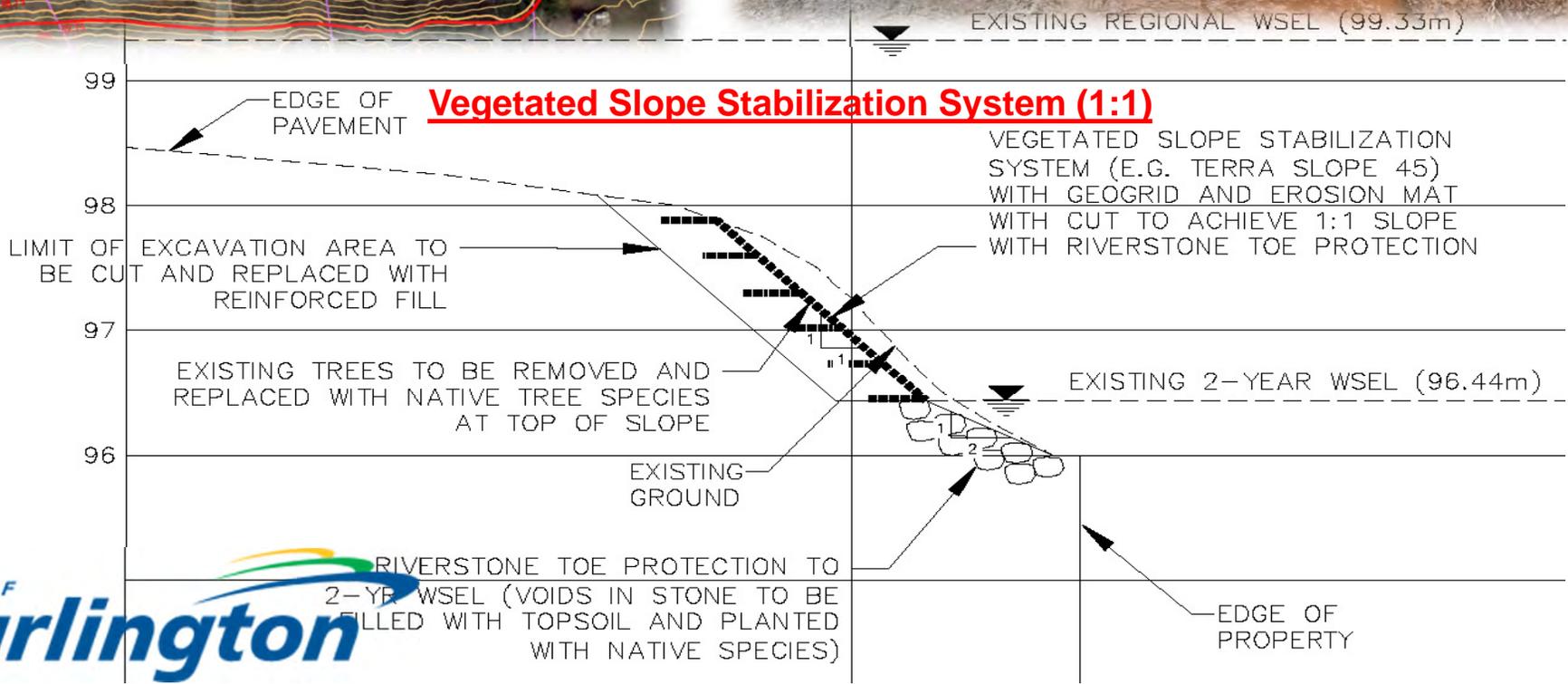
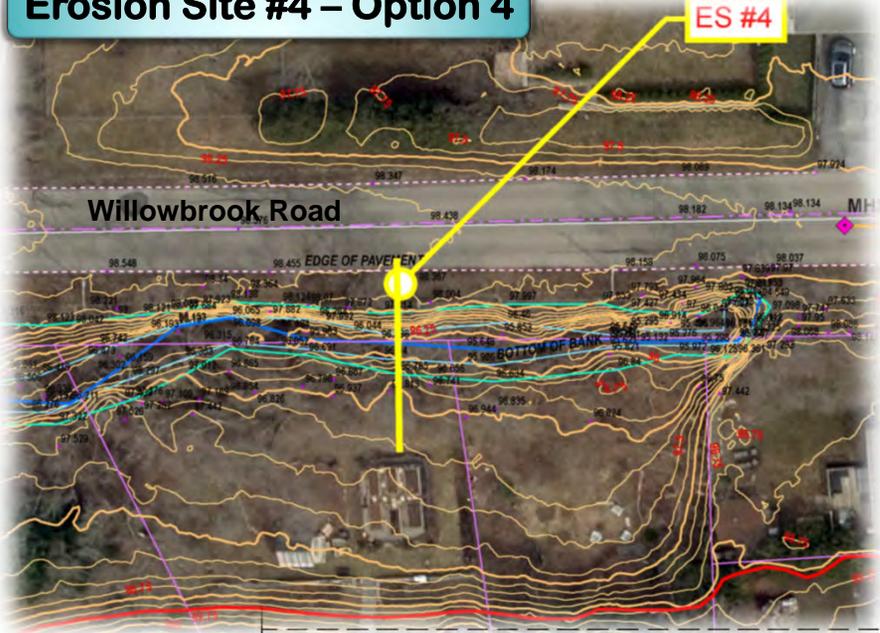


### Vegetated Sub-Angular Riverstone Slope (2:1) or Vegetated Earth-Anchoring System (2:1)



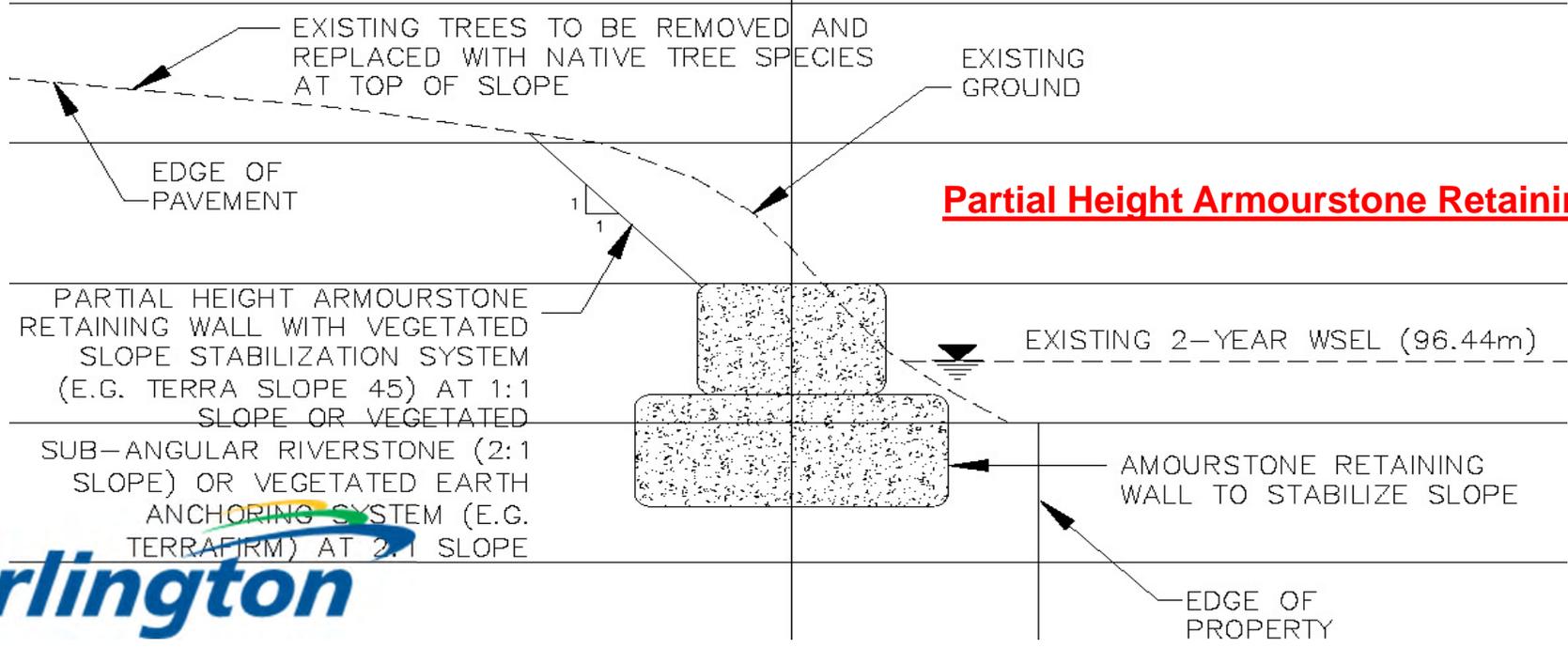
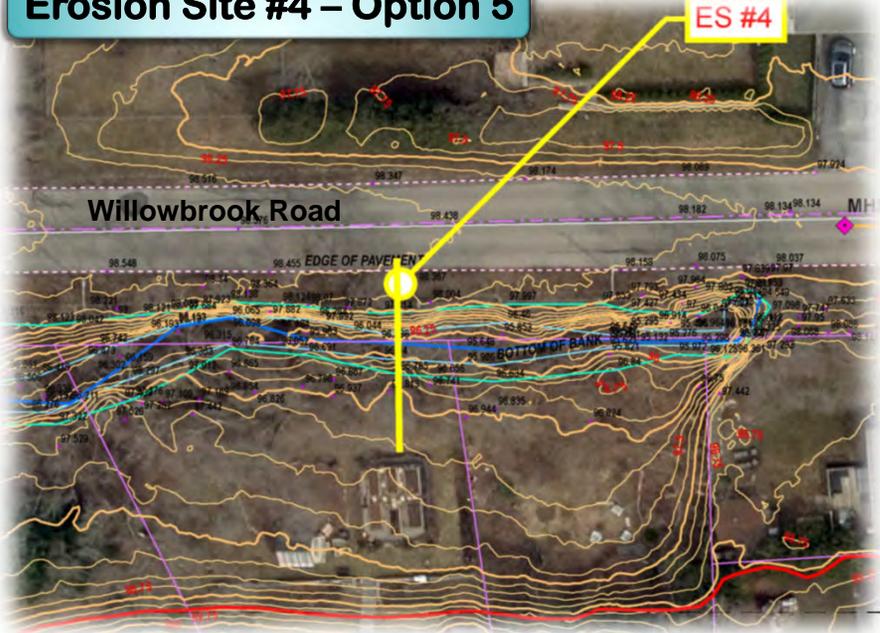
# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #4 – Option 4



# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

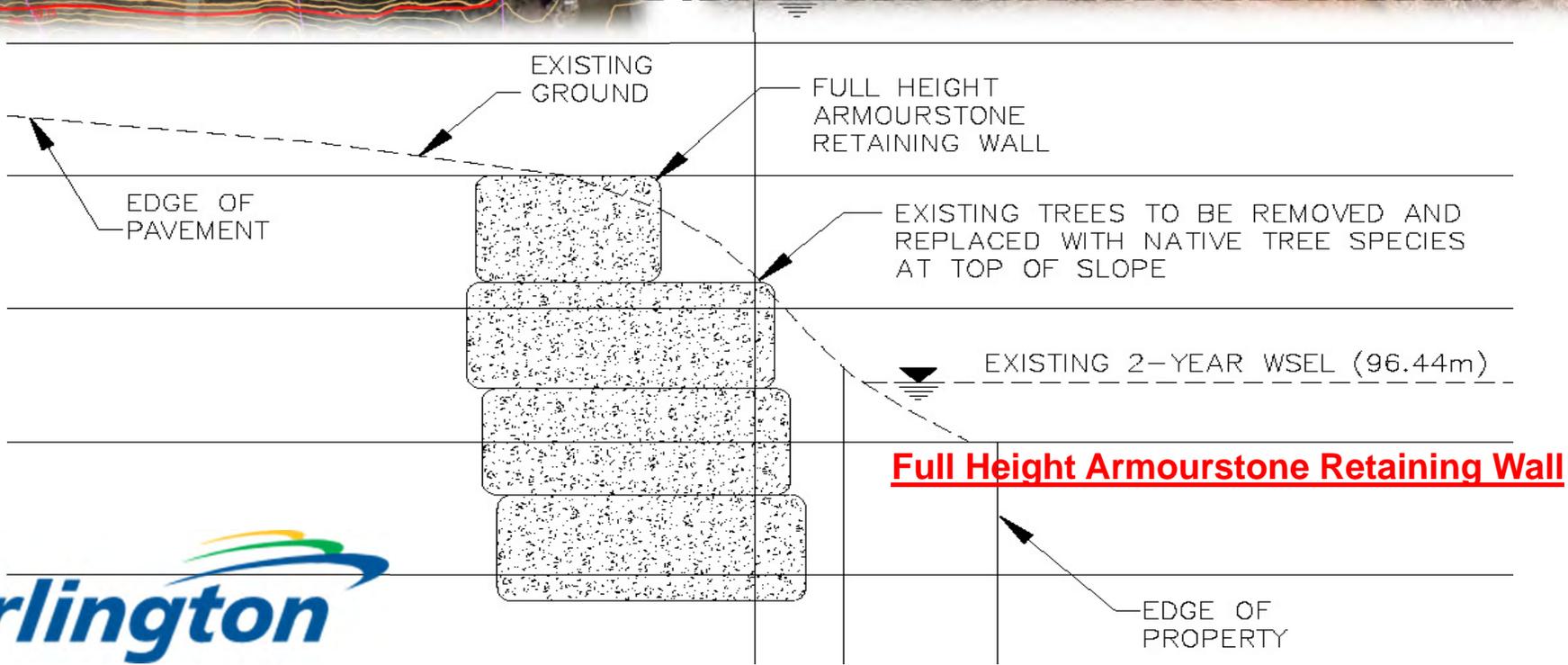
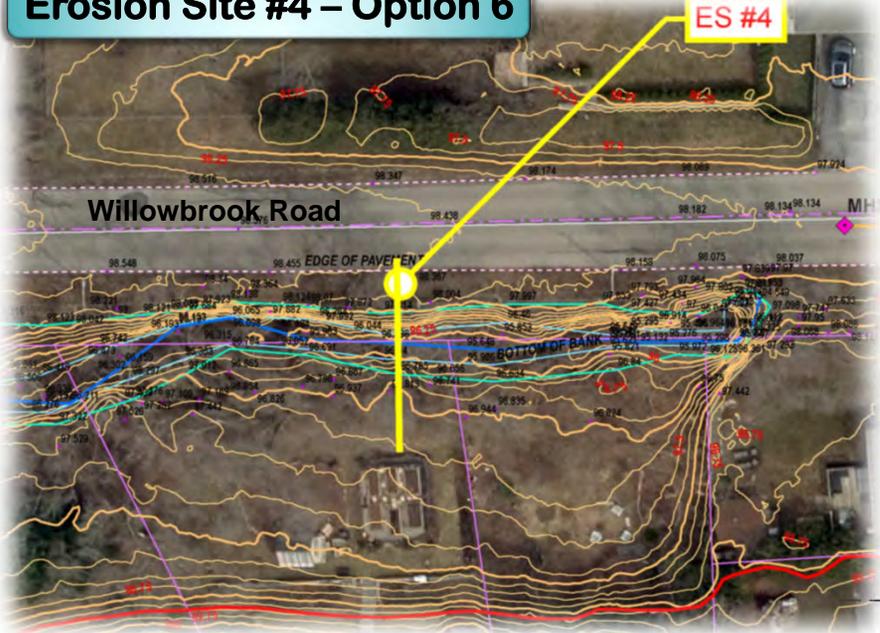
## Erosion Site #4 – Option 5



### Partial Height Armourstone Retaining Wall

# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Erosion Site #4 – Option 6



# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Summary of Mitigation Options – Falcon Creek - Erosion Site #1

Mitigation Option	Description	Advantages	Disadvantages
1	<u>Do Nothing (Existing Conditions)</u> – No mitigation work to be completed	<ul style="list-style-type: none"> <li>• Cost savings (if erosion risk is low and if mitigation is not required)</li> <li>• No tree removal required</li> </ul>	<ul style="list-style-type: none"> <li>• Erosion issues may become worse, including sedimentation downstream</li> <li>• Ultimate repair costs will be higher (if mitigation is required)</li> <li>• Potential liability issues (private property) (if erosion risk is high)</li> </ul>
2	<u>Vegetated slope (3:1 to 4:1)</u> with riverstone toe protection to the 2-yr water surface elevation with or without channel realignment and cut or fill to achieve the requisite slope	<ul style="list-style-type: none"> <li>• Very naturalized long-term solution</li> <li>• Low maintenance costs</li> <li>• No reduction in floodplain storage (if slope is achieved by cut)</li> <li>• May improve natural channel sinuosity</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Potential reduction in floodplain storage (if slope is achieved by fill) and channel realignment will be required</li> <li>• Tree removal required</li> <li>• Significant addition/removal of material required</li> <li>• Potential to shift long term stable slope west</li> <li>• Disturbance to private infrastructure (e.g. parking area, fencing) may occur (if slope is achieved by cut and maybe also with fill)</li> </ul>
3	<u>Vegetated sub-angular riverstone slope (2:1) or vegetated earth-anchoring system (e.g. Terraform)</u> at 2:1 slope with geogrid and turf reinforcement mat and including riverstone toe protection to the 2-yr water surface elevation with or without channel realignment and cut or fill to achieve the requisite slope	<ul style="list-style-type: none"> <li>• No reduction in floodplain storage (if slope is achieved by cut)</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> <li>• Tree removal requirements may be reduced compared to Options 2 or 4</li> </ul>	<ul style="list-style-type: none"> <li>• Potential long term maintenance costs</li> <li>• Potential to shift long term stable slope to east</li> <li>• Potential reduction in floodplain storage (if slope is achieved by fill) and not feasible without channel realignment</li> </ul>
4	<u>Vegetated slope stabilization system (e.g. Terra Slope 45)</u> with geogrid and erosion mat at 1:1 slope and including riverstone toe protection to the 2-yr water surface elevation	<ul style="list-style-type: none"> <li>• No reduction in floodplain storage</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Significant excavation and engineered fill required</li> <li>• Tree removal required</li> </ul>
5	<u>Implement monitoring program</u> (e.g. using erosion pins) to track and assess erosion risk and the requirement for mitigation	<ul style="list-style-type: none"> <li>• Cost savings (if erosion risk is low and if mitigation is not required)</li> <li>• Provides more certainty whether mitigation is required</li> </ul>	<ul style="list-style-type: none"> <li>• Ultimate repair costs will be higher (if mitigation is required) at a later time</li> </ul>

# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Summary of Mitigation Options – Falcon Creek - Erosion Site #2

Mitigation Option	Description	Advantages	Disadvantages
1	<u>Do Nothing (Existing Conditions)</u> – No mitigation work to be completed	<ul style="list-style-type: none"> <li>• Cost savings (if erosion risk is low and if mitigation is not required)</li> <li>• No tree removal required</li> </ul>	<ul style="list-style-type: none"> <li>• Erosion issues may become worse including sedimentation downstream</li> <li>• Ultimate repair costs will be higher (if mitigation is required)</li> <li>• Potential liability issues (private property) (if erosion risk is high)</li> </ul>
2	<u>Vegetated slope (3:1 to 4:1)</u> with riverstone toe protection to the 2-yr water surface elevation with or without channel realignment and cut or fill to achieve the requisite slope	<ul style="list-style-type: none"> <li>• Very naturalized long-term solution</li> <li>• Low maintenance costs</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> <li>• May improve natural channel sinuosity</li> </ul>	<ul style="list-style-type: none"> <li>• Potential reduction in floodplain storage (if slope is achieved by cut/fill)</li> <li>• Tree removal required</li> </ul>
3	<u>Vegetated sub-angular riverstone slope (2:1) or vegetated earth-anchoring system (e.g. Terrafirm) at 2:1 slope</u> with geogrid and turf reinforcement mat and including riverstone toe protection to the 2-yr water surface elevation with or without channel realignment and cut or fill to achieve the requisite slope	<ul style="list-style-type: none"> <li>• No reduction in floodplain storage (if slope is achieved by cut)</li> <li>• Tree removal may be avoided if slope achieved with fill</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Potential long term maintenance costs</li> <li>• Potential reduction in floodplain storage (if slope is achieved by fill) and may not be feasible without channel realignment</li> <li>• Disturbance to private infrastructure (e.g. fencing) (if slope achieved by cut)</li> <li>• Tree removal required if slope achieved by cut</li> </ul>
4	<u>Vegetated slope stabilization system (e.g. Terra Slope 45)</u> with geogrid and erosion mat at 1:1 slope and including riverstone toe protection to the 2-yr water surface elevation	<ul style="list-style-type: none"> <li>• No reduction in floodplain storage</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Significant excavation and engineered fill required</li> <li>• Disturbance to private infrastructure may occur (e.g. fencing)</li> <li>• Tree removal required</li> </ul>
5	<u>Implement monitoring program</u> (e.g. using erosion pins) to track and assess erosion risk and the requirement for mitigation	<ul style="list-style-type: none"> <li>• Cost savings (if erosion risk is low and if mitigation is not required)</li> <li>• Provides more certainty whether mitigation is required</li> </ul>	<ul style="list-style-type: none"> <li>• Ultimate repair costs will be higher (if mitigation is required) at a later time</li> </ul>

# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Summary of Mitigation Options – Falcon Creek - Erosion Site #3

Mitigation Option	Description	Advantages	Disadvantages
1	<u>Do Nothing (Existing Conditions)</u> – No mitigation work to be completed	<ul style="list-style-type: none"> <li>• Short term cost savings</li> <li>• No tree removal required</li> </ul>	<ul style="list-style-type: none"> <li>• Erosion issues will become worse including sedimentation downstream</li> <li>• Ultimate repair costs will be higher</li> <li>• High risk of damages to public infrastructure</li> </ul>
2	<u>Vegetated slope (3:1 to 4:1)</u> with riverstone toe protection to the 2-yr water surface elevation with or without channel realignment and cut or fill to achieve the requisite slope	<ul style="list-style-type: none"> <li>• Very naturalized long-term solution</li> <li>• Low maintenance costs</li> <li>• No reduction in floodplain storage (if slope is achieved by cut)</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> <li>• May improve natural channel sinuosity</li> </ul>	<ul style="list-style-type: none"> <li>• Potential reduction in floodplain storage (if slope is achieved by fill) and channel realignment is required</li> <li>• Trees will require removal and replacement on slope and at location of realigned channel</li> <li>• Potential to shift long term stable slope to west</li> <li>• Disturbance to public infrastructure (e.g. Willowbrook Rd) will occur (if slope is achieved by cut)</li> </ul>
3	<u>Vegetated sub-angular riverstone slope (2:1) or vegetated earth-anchoring system (e.g. Terrafirm) at 2:1 slope</u> with geogrid and turf reinforcement mat and including riverstone toe protection to the 2-yr water surface elevation with or without channel realignment and cut or fill to achieve the requisite slope	<ul style="list-style-type: none"> <li>• Tree removal requirements may be reduced compared to Option 2</li> <li>• No reduction in floodplain storage (if slope achieved by cut)</li> <li>• Provides more naturalized solution than armourstone (Options 5 or 6)</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> <li>• May improve natural channel sinuosity</li> </ul>	<ul style="list-style-type: none"> <li>• Potential long term maintenance costs</li> <li>• Potential reduction in floodplain storage and channel realignment required (if slope is achieved by fill)</li> <li>• Disturbance to public infrastructure (e.g. Willowbrook Rd) will occur (if slope is achieved by cut)</li> <li>• Potential to shift long term stable slope to west</li> <li>• Tree removal required</li> </ul>
4	<u>Vegetated slope stabilization system (e.g. Terra Slope 45)</u> with geogrid and erosion mat at 1:1 slope and including riverstone toe protection to the 2-yr water surface elevation	<ul style="list-style-type: none"> <li>• Disturbance to public infrastructure (e.g. Willowbrook Rd) may be avoided</li> <li>• No reduction in floodplain storage</li> <li>• Tree removal requirements may be reduced compared to Options 2 and 3</li> <li>• No channel realignment required</li> <li>• Provides more naturalized solution than armourstone (Options 5 or 6)</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Significant excavation and engineered fill required</li> <li>• Tree removal required</li> </ul>

# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

5	<p><u>Partial height armourstone retaining wall</u> for bottom portion of the slope including riverstone toe protection with the top portion of the slope either with vegetated sub-angular riverstone (2:1 slope) or vegetated earth anchoring system (e.g. Terrafirm) at 2:1 slope with geogrid and turf reinforcement mat or vegetated slope stabilization system (e.g. Terra Slope 45) with geogrid and erosion mat at 1:1 slope</p>	<ul style="list-style-type: none"> <li>• Less armourstone required than Mitigation Option 6</li> <li>• No reduction in floodplain storage</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> <li>• Disturbance to public infrastructure (e.g. Willowbrook Rd) may be avoided</li> </ul>	<ul style="list-style-type: none"> <li>• Less 'hard' armouring than Option 6 but still not well supported by Conservation Authority or First Nations (not naturalized)</li> <li>• Costly to build and maintain</li> <li>• Tree removal required</li> <li>• Significant excavation required but less than for Option 6</li> </ul>
6	<p><u>Full height armourstone retaining wall</u> with riverstone toe protection</p>	<ul style="list-style-type: none"> <li>• No reduction in floodplain storage</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Not well supported by Conservation Authority or First Nations (not naturalized)</li> <li>• Costly to build and maintain</li> <li>• Tree removal required</li> <li>• May not be feasible without disturbance to public infrastructure (e.g. Willowbrook Rd)</li> <li>• Significant excavation required</li> </ul>

# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

## Summary of Mitigation Options – Falcon Creek - Erosion Site #4

Mitigation Option	Description	Advantages	Disadvantages
1	<u>Do Nothing (Existing Conditions)</u> – No mitigation work to be completed	<ul style="list-style-type: none"> <li>• Short term cost savings</li> <li>• No tree removal required</li> </ul>	<ul style="list-style-type: none"> <li>• Erosion issues will become worse including sedimentation downstream</li> <li>• Ultimate repair costs will be higher</li> <li>• High risk of damages to public infrastructure</li> </ul>
2	<u>Vegetated slope (3:1 to 4:1)</u> with riverstone toe protection to the 2-yr water surface elevation with or without channel realignment and cut or fill to achieve the requisite slope	<ul style="list-style-type: none"> <li>• Very naturalized long-term solution</li> <li>• Low maintenance costs</li> <li>• No reduction in floodplain storage (if slope achieved by cut)</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Potential reduction in floodplain storage (if slope is achieved by fill)</li> <li>• Trees will require removal and replacement on slope and at location of realigned channel</li> <li>• Disturbance to public infrastructure (e.g. Willowbrook Rd) will occur (if slope is achieved by cut)</li> <li>• Works will encroach on private property (if slope achieved by fill) and channel realignment will be required</li> </ul>
3	<u>Vegetated sub-angular riverstone slope (2:1)</u> or <u>vegetated earth-anchoring system (e.g. Terrafirm)</u> at 2:1 slope with geogrid and turf reinforcement mat and including riverstone toe protection to the 2-yr water surface elevation	<ul style="list-style-type: none"> <li>• Tree removal requirements may be reduced compared to Option 2</li> <li>• No reduction in floodplain storage (if slope achieved by cut)</li> <li>• Provides more naturalized solution than armourstone (Options 5 or 6)</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Potential long term maintenance costs</li> <li>• Potential reduction in floodplain storage (if slope is achieved by fill)</li> <li>• Disturbance to public infrastructure may occur (if slope is achieved by cut)</li> <li>• Tree removal required</li> </ul>
4	<u>Vegetated slope stabilization system (e.g. Terra Slope 45)</u> with geogrid and erosion mat at 1:1 slope and including riverstone toe protection to the 2-yr water surface elevation	<ul style="list-style-type: none"> <li>• No reduction in floodplain storage</li> <li>• Provides more naturalized solution than armourstone (Options 5 or 6)</li> <li>• May avoid works encroaching on private property</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> <li>• May avoid works encroaching on private property</li> </ul>	<ul style="list-style-type: none"> <li>• Significant excavation and engineered fill required</li> <li>• Disturbance to public infrastructure (e.g. Willowbrook Rd) may occur (if slope achieved by cut)</li> <li>• Tree removal required</li> </ul>

# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY

5	<p><u>Partial height armourstone retaining wall</u> for bottom portion of the slope including riverstone toe protection with the top portion of the slope either with vegetated sub-angular riverstone (2:1 slope) <u>or</u> vegetated earth anchoring system (e.g. Terrafirm) at 2:1 slope with geogrid and turf reinforcement mat or vegetated slope stabilization system (e.g. Terra Slope 45) with geogrid and erosion mat at 1:1 slope</p>	<ul style="list-style-type: none"> <li>• Less armourstone required than option 6</li> <li>• No reduction in floodplain storage</li> <li>• May avoid works encroaching on private property</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Less 'hard' armouring than Option 6 but still not well supported by Conservation Authority or First Nations (not naturalized)</li> <li>• Costly to build and maintain</li> <li>• Significant excavation required but less than Option 6</li> <li>• Tree removal required</li> </ul>
6	<p><u>Full height armourstone retaining wall</u> with riverstone toe protection</p>	<ul style="list-style-type: none"> <li>• No reduction in floodplain storage</li> <li>• May avoid works encroaching on private property</li> <li>• Will improve bank stabilization and reduce sedimentation downstream</li> </ul>	<ul style="list-style-type: none"> <li>• Not well supported by Conservation Authority or First Nations (not naturalized)</li> <li>• Costly to build and maintain</li> <li>• Potential to shift long term stable slope to east (to be checked at detailed design)</li> <li>• Significant excavation required</li> <li>• Tree removal required</li> </ul>









# FALCON CREEK EROSION CONTROL MUNICIPAL CLASS EA STUDY



## Next Steps

1. Review comments received from the Public.
2. Finalize the EA Report.
3. Select the preferred solution(s).
4. Prepare and post the Notice of Study Completion for 30-day review period.
5. Complete the detailed design for the preferred solution(s).
6. Public Meeting #2 (Pre-Construction).
7. Prepare the construction tender.
8. Complete the construction of the preferred solution(s).



City of Burlington  
Engineering Department  
408 Brant Street, P.O. Box 5013  
Burlington, ON  
L7R 3Z6  
Telephone: (905) 335-7600 Ext. 7486  
Fax: (905) 335-7861

### Comment Sheet

Public Information Meeting – 08 March 2023  
Falcon Creek Erosion Control (between CNR and Willowbrook Road)  
Please provide us with your comments by March 31<sup>st</sup>, 2023

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Postal Code: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_  
Email: \_\_\_\_\_

Comments: \_\_\_\_\_  
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Thank you for your comments  
Your contributions are valuable to us

Please drop off, mail or fax to:  
City of Burlington  
Engineering Department  
426 Brant Street  
P.O. Box 5013  
Burlington, Ontario  
L7R 3Z6  
Attention: Mr. Arif Shahzad, M.Eng., P.Eng.  
(905) 335-7600 (fax) (905) 335-7861

## Comments from the Public

Please take a moment to complete the comment sheet provided and return via fax, mail, e-mail or by hand to either of the following individuals:

**Mr. Arif Shahzad, M.Eng., P.Eng.**  
**Senior Project Manager**  
City of Burlington  
426 Brant Street, P.O. Box 5013  
Burlington, Ontario  
L7R 3Z6  
Telephone: 905-335-7600 Ext. 7486  
E-mail: [arif.shahzad@burlington.ca](mailto:arif.shahzad@burlington.ca)

**Mr. Bill Coffey, M.Sc., P. Eng.**  
**Head of Water Resources**  
**Project Manager**  
Valdor Engineering Inc.  
571 Chrislea Road, Suite 4  
Woodbridge, Ontario  
L4L 8A2  
Telephone: (905) 264-0054 Ext. 232  
Fax: (905) 264-0069  
e-mail: [bcoffey@valdor-engineering.com](mailto:bcoffey@valdor-engineering.com)

**\*\*A copy of the PIC posters and Comment Sheet will be available on the City's website for further reference\*\***

Your feedback is important! **Thank you for attending the PIC.**

**From:** [Jean-Louis Gaudet](#)  
**To:** [arif.shahzad@burlington.ca](mailto:arif.shahzad@burlington.ca); [Bill Coffey](#)  
**Cc:** [Alana Kelcey](#)  
**Subject:** Falcon Creek EA - PIC questions  
**Date:** March 7, 2023 11:18:50 AM

---

Good morning,

I am writing about the PIC tomorrow evening for the Falcon Creek EA. The notice implied that the PIC materials would be provided on the project website in advance of the PIC (as step 2) - is that still the case? I do not see them posted.

Falcon Creek runs through the back of our property (411 Dorchester Cres), and as such we have a specific interest in what will be done to manage erosion along the creek between Enfield and where it enters the storm sewer at Willowbrook. In particular, we have put in considerable effort naturalizing the west side of the bank on our property. We have also worked with the Conservation Authority to remove Japanese Knotweed (an invasive species) and to plant native species, including species that would improve soil/bank retention.

It is our hope and preference that the preferred solution will include some form of erosion stabilization that aligns with or is compatible with stream naturalization and would allow for the movement of aquatic species and amphibians up and down the creek. We recognize that the configuration of entrance into the storm pipe is a barrier, but it would be nice if the long-term plan and design of the preferred solution could accommodate this for when the entrance or grate needs to be rebuilt. What we do NOT want to see is a hard channelization or covering of the creek. We do, however, recognize that some form of reinforcement of the east bank by the road may be required.

It would be greatly appreciated if our questions could be considered and answered during the course of tomorrow night's presentation:

1. Will the preferred solution ensure the watercourse continues to operate as a natural watercourse?
2. What considerations were given to the preservation and enhancement of the natural habitat within the study area?
3. Is there anything that could potentially be done at the grated entrance to the storm sewer to better allow the passage of aquatic species and amphibians up and down the creek?
4. We observe that a key contributor to erosion along the creek is blocking of the grate by debris. The debris blocks the grate, water levels rise, and then there is a prolonged and rapid flow of water once the debris is pulled from the grate (prolonged due to the time it takes for the dammed volume of water to drain). This prolonged and rapid flow then cuts into the bank. From our observations, much (most?) of this debris is brush/branches/yard waste that has been deposited along the creek's edge, either by property owners or by landscapers. Will the preferred solution include education and enforcement to discourage/prevent property owners and landscapers from putting their yard waste and such debris along the creek?

Regarding this last point, I would point out that this behaviour is even practiced by the City's contractors. For example, when the new guard rail was recently put in, some of the old guard rail posts - and even some of the painted stakes - were left behind on the creek bank. Not sure if they are still there, or if they have washed down into the front of the grate.

Thank you for your time,

Jean-Louis Gaudet

Alana Kelcey

411 Dorchester Crescent, Burlington

Virtual Falcon Creek PIC – Chat File

Meeting: Wednesday, March 8, 2023 from 6 – 8 pm (went past the 7:30pm time)

[This meeting chat is muted. Settings](#)

#### Message List

Giangregorio, Teresa joined the conversation.

Shahzad, Arif was invited to the meeting.

Clark, Cary was invited to the meeting.

Galbraith, Kelvin was invited to the meeting.

Gartside, Georgie was invited to the meeting.

Robinson, Steve was invited to the meeting.

McNicol, Derek was invited to the meeting.

Vanderbrug, Ingrid was invited to the meeting.

Rabeau, Marion was invited to the meeting.

Leanne Wallis (External) was invited to the meeting.

Benninks (Guest) was invited to the meeting.

Ed Gazendam (External) was invited to the meeting.

Bill Coffey was invited to the meeting.

LD (Guest) was invited to the meeting.

Nick Detmer was invited to the meeting.

Rick and Monica Coutts (Guest) was invited to the meeting.

Tim Antonio (External) was invited to the meeting.

Jean-Louis Gaudet was invited to the meeting.

Kate Borsi (Guest) was invited to the meeting.

Shawn Brisebois (Guest) was invited to the meeting.

Giangregorio, Teresa named the meeting Virtual Falcon Creek PIC.

Meeting started at Yesterday 5:55 PM

Questions can be submitted through TEAMS "Chat" by Giangregorio, Teresa Yesterday 6:07 PM

The presentation boards are located at the City's Website link: [burlington.ca/falconcreek](http://burlington.ca/falconcreek) by Giangregorio, Teresa Yesterday 6:15 PM

can you clarify what "in adjustment" means? by Jean-Louis Gaudet Yesterday 6:35 PM

For the boreholes - was the earth fill the fill from under the road? And has the erosion started to cut into the earth fill? by Jean-Louis Gaudet Yesterday 7:06 PM

Kate Borsi (Guest) left the chat.

Was an evaluation ever done in reference to debris and build up along the drainage area - at the southern part of the site - in reference to the causes of erosion? by Nick Detmer Yesterday 7:08 PM

My concern is regarding Erosion site 1. Approximately 20ft of land has disappeared. The City of Burlington has rerouted the culvert which accelerated erosion. Past storms has washed curb stops into the creek. Entire trees have toppled over into the creek roots & all. I think that the do nothing plan hasn't been working well ! by Shawn Brisebois (Guest) Yesterday 7:11 PM

Thank you - I'll note that I'll let the city know if I see excessive debris in the area1 Like reaction.1 by Nick Detmer Yesterday 7:13 PM

What type of personal input will the landowners have pertaining to the vegetation types being used on their property a what further personal involvement will they have before any final decisions are made? by Rick and Monica Coutts (Guest) Yesterday 7:14 PM

The drainage ditch on Enfield by Shawn Brisebois (Guest) Yesterday 7:14 PM

If there are other on sites in the area - I would be happy as a local resident to discuss any ongoing analysis of the area. I'm 423 Dorset - corner of willow broom and. dorset. by Nick Detmer Yesterday 7:23 PM

what is the timeline for the decision making process? when would remediation start? by Benninks (Guest) Yesterday 7:27 PM

thank you! by Jean-Louis Gaudet Yesterday 7:45 PM

left the chat.Shawn Brisebois (Guest) left the chat.

LD (Guest) left the chat.

Jean-Louis Gaudet left the chat.

Bill Coffey left the chat.

Benninks (Guest) left the chat.

Rick and Monica Coutts (Guest) left the chat.

Tim Antonio (External) left the chat.

Meeting ended: at Yesterday 7:46 PM after 2 hours 2 minutes 36 seconds

## Bill Coffey

---

**Subject:** FW: Falcon Creek EA - PIC Comments

---

**From:** Clark, Cary <Cary.Clark@burlington.ca>  
**Sent:** Friday, March 10, 2023 2:56 PM  
**To:** Bill Coffey <BCoffey@Valdor-Engineering.com>  
**Cc:** Shahzad, Arif <Arif.Shahzad@burlington.ca>; Alana Kelcey <alanakelcey@gmail.com>; Jean-Louis Gaudet <jeanlouisgaudet@gmail.com>  
**Subject:** RE: Falcon Creek EA - PIC Comments

Bill:

I have a site meeting arranged with our operations group early next week to review the safety concerns as was discussed in the PIC.

Following that meeting, I can provide some additional info on current actions that can be taken by the city.

**Cary Clark, P.Eng.**  
**Manager of Development & Stormwater Engineering**  
**Engineering Services**

P. 905-335-7600, ext 7672 | F. 905-335-7861 | E. [cary.clark@burlington.ca](mailto:cary.clark@burlington.ca)  
Address 426 Brant Street P.O. Box 5013, Burlington, Ontario, L7R 3Z6  
City of Burlington | [www.burlington.ca](http://www.burlington.ca)

 *Please consider the environment before printing this e-mail.*

---

**From:** Bill Coffey <[BCoffey@Valdor-Engineering.com](mailto:BCoffey@Valdor-Engineering.com)>  
**Sent:** Friday, March 10, 2023 2:48 PM  
**To:** Jean-Louis Gaudet <[jeanlouisgaudet@gmail.com](mailto:jeanlouisgaudet@gmail.com)>; Shahzad, Arif <[Arif.Shahzad@burlington.ca](mailto:Arif.Shahzad@burlington.ca)>  
**Cc:** Alana Kelcey <[alanakelcey@gmail.com](mailto:alanakelcey@gmail.com)>; Clark, Cary <[Cary.Clark@burlington.ca](mailto:Cary.Clark@burlington.ca)>  
**Subject:** RE: Falcon Creek EA - PIC Comments

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Jean-Louis,

Thank you for your input at the Falcon Creek Erosion Study PIC this week. Your comments below regarding the design will be reviewed and discussed with the City, including your noted safety issues related to the proposed design. We have, in the past, incorporated plantings to discourage access under similar conditions and so we will revisit this.

Regarding your safety concerns under existing conditions, the City (Cary Clark) indicated they would discuss this internally as this is an existing issue and not a direct component of the proposed design works. Please feel free to contact the City directly, should you have any further concerns regarding existing safety. Thank you.

Regards,

**Bill Coffey, M.Sc., P.Eng.**  
Head of Water Resources



## VALDOR ENGINEERING INC.

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URL: [www.valdor-engineering.com](http://www.valdor-engineering.com)

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---

**From:** Jean-Louis Gaudet <[jeanlouisgaudet@gmail.com](mailto:jeanlouisgaudet@gmail.com)>  
**Sent:** Wednesday, March 08, 2023 8:12 PM  
**To:** Shahzad, Arif <[Arif.Shahzad@burlington.ca](mailto:Arif.Shahzad@burlington.ca)>  
**Cc:** Alana Kelcey <[alanakelcey@gmail.com](mailto:alanakelcey@gmail.com)>; Bill Coffey <[BCoffey@Valdor-Engineering.com](mailto:BCoffey@Valdor-Engineering.com)>  
**Subject:** Re: Falcon Creek EA - PIC Comments

Hi Arif, Bill,

Thanks for the presentation tonight. It was well done.

For erosion site's 3 and 4, we agree with the results of the assessment and the preferred solutions identified.

As I noted during the PIC, myself, Rick and Nick are all neighbours whose backyards border Erosion Site 4. If desired, I'm sure a group meeting or site walk with all of us could be coordinated.

Regarding the discussion on safety, we can see that there are potential safety concerns above the stone wall by the road (on the east side of the creek at the grate). The area is accessible to the general public, and it is conceivable that a child could get curious during high flows, peer over and tumble over (my daughter has been curious as well, but I usually hold on to her when she looks over). A small, unobtrusive safety fence at that spot might not be a bad idea, and its design and installation could be done outside of this EA process (i.e., you could do it whenever you want). The stretch along Willowbrook above erosion site 4 is not as much of a concern, as the brambles and vegetation that is currently there seems to deter too much curiosity. That said, the installation of the guard rail does seem to have cleared out some of those brambles.

Regarding that eastern stone retaining wall at the grate, is that something that would be brought into the detailed design and construction for replacement? It does seem to be old. I understand that it would not fall under this EA, but thought it could potentially be brought in during detailed design.

I would suggest that safety needs be considered during the detailed design and construction of the works. Rather than using a fence along the road, perhaps the less-steep embankment combined with thick, woody native shrubbery may be adequate to deter accidental falls.

Regards,

Jean-Louis Gaudet  
Alana Kelcey  
411 Dorchester Crescent



12 May 2023  
File: **22118**

**Meeting #1 with Area Residents**  
Falcon Creek Erosion Control Project – CN Railroad to Willowbrook Road  
City of Burlington

**NOTES OF MEETING**

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Location:	On-Site - Enfield and Willowbrook Roads		
Date of Meeting:	11 May 2023 (13h00 – 15h00)		
Attendees:	Kelcey Alana	Resident	411 Dorchester Cr
	Nick Detmer	Resident	423 Dorset Ave
	Jean-Louis Gaudet	Resident	411 Dorchester Cr
	Shawn Brisebois	Owner	417/419/425 Enfield Rd
	Monica Coutts	Resident	409 Dorchester Cr
	Arif Shahzad	Project Manager	City of Burlington (CoB)
	Bill Coffey	Consultant Lead	Valdor Engineering (Valdor)
Regrets:	Teresa Giangregorio	SWM Technologist	City of Burlington (CoB)

---

**Introductions**

1. Introductions were made.
2. The purpose of the site meeting was to discuss questions and concerns raised at the PIC held 08 March 2023 and at the request of local residents.

**Project Discussions – Summary of Key Items**

3. Concerns for safety were expressed regarding site lines at the southwest corner of Enfield Road and Willowbrook Road. It was noted any concerns regarding this should be directed to the city's transportation department as this concern is unrelated to the erosion control project.
4. Concerns regarding children's safety were expressed for steep areas along Falcon Creek where erosion has occurred. It was noted that any new proposed mitigation solutions would be designed with appropriate safety measures included and as required. In addition, it was noted safety would be considered in preparing the planting plan by including "prickly" vegetation along the west side of Willowbrook Road at locations where steep slopes are present to discourage access.
5. Residents noted that plantings have been installed as part of a community planting undertaking along the west side of Falcon Creek at the downstream reach near the debris grate. This will be noted and considered regarding proposed mitigation designs in this area.
6. There were a number of questions regarding the approach being considered for erosion mitigation at each of the identified key erosion sites and these were reviewed and explained by Valdor. Residents also inquired

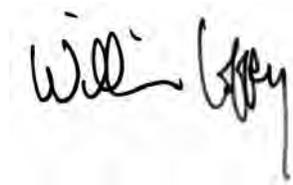


regarding the footprint required for the potential mitigation solutions. It was noted that the City's preference is to avoid any encroachment on private property unless absolutely necessary.

7. Mr. Brisebois (417/419/425) Enfield Rd expressed concerns regarding areas of erosion and settlement in the vicinity of the culvert immediately upstream of Enfield Road (near where the ditch empties to the creek) and along the east side of Falcon Creek extending up through his property from near the hydro pole and upstream adjacent the chain-link fence. The City and Valdor agreed to have the project geomorphologist review and comment further regarding the settlement and erosion in this area and respond to Mr. Brisebois as soon as possible.
  8. The meeting was adjourned.
- 

Notes Prepared By\*:

**VALDOR ENGINEERING INC.**



**Bill Coffey, M.Sc., P.Eng.**  
Head of Water Resources

c: Arif Shahzad, Teresa Giangregorio – City of Burlington

\*Any errors or omissions should be reported to the author in writing as soon as possible.

s:\projects\2022\22118\class ea\meetings\2023 05 11 - meeting with area residents\22118 - 11 may 2023 - meeting with area residents.doc

## Bill Coffey

---

**From:** Bill Coffey  
**Sent:** June 8, 2023 1:42 PM  
**To:** shawn brisebois  
**Cc:** Shahzad, Arif  
**Subject:** Response to Comments Received (Falcon Creek EA) - 417/419/425 Enfield Road

Dear Mr. Brisebois,

Thank you for attending the Falcon Creek Site Meeting with other residents on 11 May 2023. As discussed, we have reviewed the following comments and concerns provided by you at the site meeting:

***Mr. Brisebois (417/419/425) Enfield Rd expressed concerns regarding areas of erosion and settlement in the vicinity of the culvert immediately upstream of Enfield Road (near where the ditch empties to the creek) and along the east side of Falcon Creek extending up through his property from near the hydro pole and upstream adjacent the chain-link fence.***

We discussed the above-noted comments and concerns with the Project Geomorphologist (Water's Edge). The following is a summary of these discussions:

1. Water's Edge reviewed in further detail the available historical images/orthophotos and photos/notes from their field investigations related to the watercourse that runs through your neighbour's properties and adjacent your property.
2. Based on their review of the available information and field investigations, while erosion is occurring along the watercourse adjacent your property, the rate of bank erosion appears to be occurring at slow rate and there does not appear to be imminent risk to your property related to the bank erosion.
3. As a precaution, however, and to further assess and confirm the rate of bank erosion and potential risk to your property, the Project Geomorphologist has recommended that erosion pins be installed and monitored over time.
4. Based on the results of the erosion monitoring, the rate of erosion will be calculated more precisely such that the risk to your property resulting from bank erosion may be further evaluated and assessed.
5. Should it be determined that the monitored rate of erosion presents an imminent threat to your property, the City will then work with you to ensure that appropriate mitigation measures are implemented at that time.
6. Regarding the settlement you noted in the vicinity of the building and based upon further review, this does not appear to be related to bank erosion. Based on a review of historical orthophotos/images, there are indications of ground disturbance in the general area of the noted settlement (outlined in blue) in 2021 (see image below). It is not clear if the settlement may be related to activities associated with the noted ground disturbance.

Should you have any further questions or concerns, please reach out to Arif or me at your convenience. Thank you.



Regards,

**Bill Coffey, M.Sc., P.Eng.**  
Head of Water Resources



## **VALDOR ENGINEERING INC.**

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Planning & Regulations  
905.336.1158  
2596 Britannia Road West  
Burlington, Ontario L7P 0G3  
[conservationhalton.ca](http://conservationhalton.ca)

August 30, 2024

Bill Coffey, Head of Water Resources  
Valdor Engineering inc.  
571 Chrislea Road, Unit 4  
Vaughan, ON L4L 8A2

**BY E-MAIL ONLY ([bcoffey@valdor-engineering.com](mailto:bcoffey@valdor-engineering.com))**

To Bill Coffey:

**Re: Falcon Creek Erosion Control Study (CNR to Willowbrook Road)  
(draft final EA – June 2024)  
City of Burlington  
CH File Number(s): AMPR-78**

---

Conservation Halton (CH) staff has reviewed the above-noted application as per our regulatory responsibilities under the *Conservation Authorities Act* (CA Act) and Ontario Regulation 41/24 and our provincially delegated responsibilities under Ontario Regulation 686/21 (e.g., commenting on the risks related to natural hazards arising from the proposal where the authority considers it advisable).

Ch received the *Falcon Creek Erosion Control Study (CNR to Willowbrook Road)*, City of Burlington, Regional Municipality of Halton, prepared by Valdor Engineering Inc., dated June 2024, on June 21, 2024.

### **Study Objective**

The purpose of this study is to conduct an erosion control study for an approximately 275 metre stretch of Falcon Creek between the Canadian National Railroad (CNR) and Willowbrook Road, and to prepare multiple mitigation alternatives as well as conceptual and detailed designs for the preferred solution. The primary objectives are to assess the current erosion status and to identify a preferred set of alternatives to stabilize the existing creek erosion, including bank sections that have fallen into the creek resulting in a threat to public infrastructure within the Willowbrook Road right of way (ROW). The study was conducted as a Schedule B project in accordance with the Municipal Class EA process, as per the Environmental Assessment Act (2015). This study fulfills Phase 1 and Phase 2 of the Municipal Class EA process.

In this report, four sites of erosion are identified and mitigation solutions evaluated for each. For sites #1 and #2, both on private properties, the preferred alternative is identified to be Option #5 (implement monitoring program), and for sites #3 and #4, the preferred alternative is identified to be Option #3 (install a vegetated slope stabilization system at a 2:1 slope and bank stabilization system at 0.125:1 slope).

## **Background**

CH has participated in various stages of this EA, including:

- Providing an EA Checklist and commenting on the RFP text (March 2022)
- Participating in a kick-off meeting with the City (May 2022)
- Conducting a site walk (June 2022)
- Issued a formal comment letter on PIC #1 materials (February 2023)

## **Conservation Authorities Act and Ontario Regulation 41/24**

Effective April 1, 2024, CH's previous regulation, Ontario Regulation 162/06 ("Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses") under Section 28 of the *Conservation Authorities Act* (CA Act) was repealed and replaced by Ontario Regulation 41/24 ("Prohibited Activities, Exemptions and Permits"). Complementary provisions under Part VI ("Regulation of Areas Over Which Authorities Have Jurisdiction") and Part VII ("Enforcement and Offences") of the CA Act were proclaimed on the same date.

Under Part VI of the CA Act and Ontario Regulation 41/24, CH regulates all watercourses, valleylands, wetlands, Lake Ontario Shoreline and hazardous lands as well as lands adjacent to these features. The study area is regulated by CH as it contains Falcon Creek and its associated flood plain and erosion hazards. CH regulates 15 metres from the greater of the limit of the floodplain/stable top of bank/meander belt associated with the watercourse.

Permits are required from CH prior to undertaking development activities within CH's regulated area and applications for development are reviewed under the *Conservation Authorities Act* (CA Act), Ontario Regulation 41/24, and CH's Board-approved policies and requirements (<https://conservationhalton.ca/policies-and-guidelines>).

## **Ontario Regulation 686/21 – Natural Hazards**

In addition to CH's regulatory responsibilities (described above), CH also has provincially delegated responsibilities under Ontario Regulation 686/21: Mandatory Programs and Services, to review proposals made under the *Environmental Assessment Act* to comment on risks related to natural hazards arising from the proposal where the authority considers it advisable.

## **Key Comments**

Based on review of the materials submitted, there are no fundamental issues with the preferred alternatives for erosion control at the four sites within the study area. Please see Appendix A for one detailed comment that is to be addressed through CH permit requirements.

Please note that CH Permits will be required prior to initiation of erosion control works.

We trust the above is of assistance. Please contact the undersigned with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "L. Schreiner".

Laura Schreiner  
Environmental Planner  
905-336-1158 ext. 2230  
[lschreiner@hrca.on.ca](mailto:lschreiner@hrca.on.ca)

Cc: Arif Shahzad ([arif.shahzad@burlington.ca](mailto:arif.shahzad@burlington.ca))

Encl: **Appendix A: Detailed Comments**

**Appendix A: Detailed Comments**

CH provides the following detailed comments regarding Draft Final EA that are recommended to be addressed at the stage noted in the table.

#	Topic/Section/ Plan	CH – Draft Final Comments (August 30, 2024)	Recommended stage for comment to be addressed
1.	General	Staff request further exploration of the proposed Terraform method for stabilizing the bank above the proposed Scoulok during the detailed design phase to accommodate the planting of trees and shrubs. It is noted in the EA that existing trees will be replaced.	CH Permit

# **APPENDIX 'D'**

## **Stormsewer Outfall & Culvert Inventory and Assessment**

### **Falcon Creek Erosion Control Study (CNR to Willowbrook Road)**

**City of Burlington**

#### Appendix 'D' Contents:

- **Photos D.1 to D.10** – Stormsewer Outfall & Culvert Inventory and Assessment

**Photo D.1: CNR Culvert (Downstream Face)**



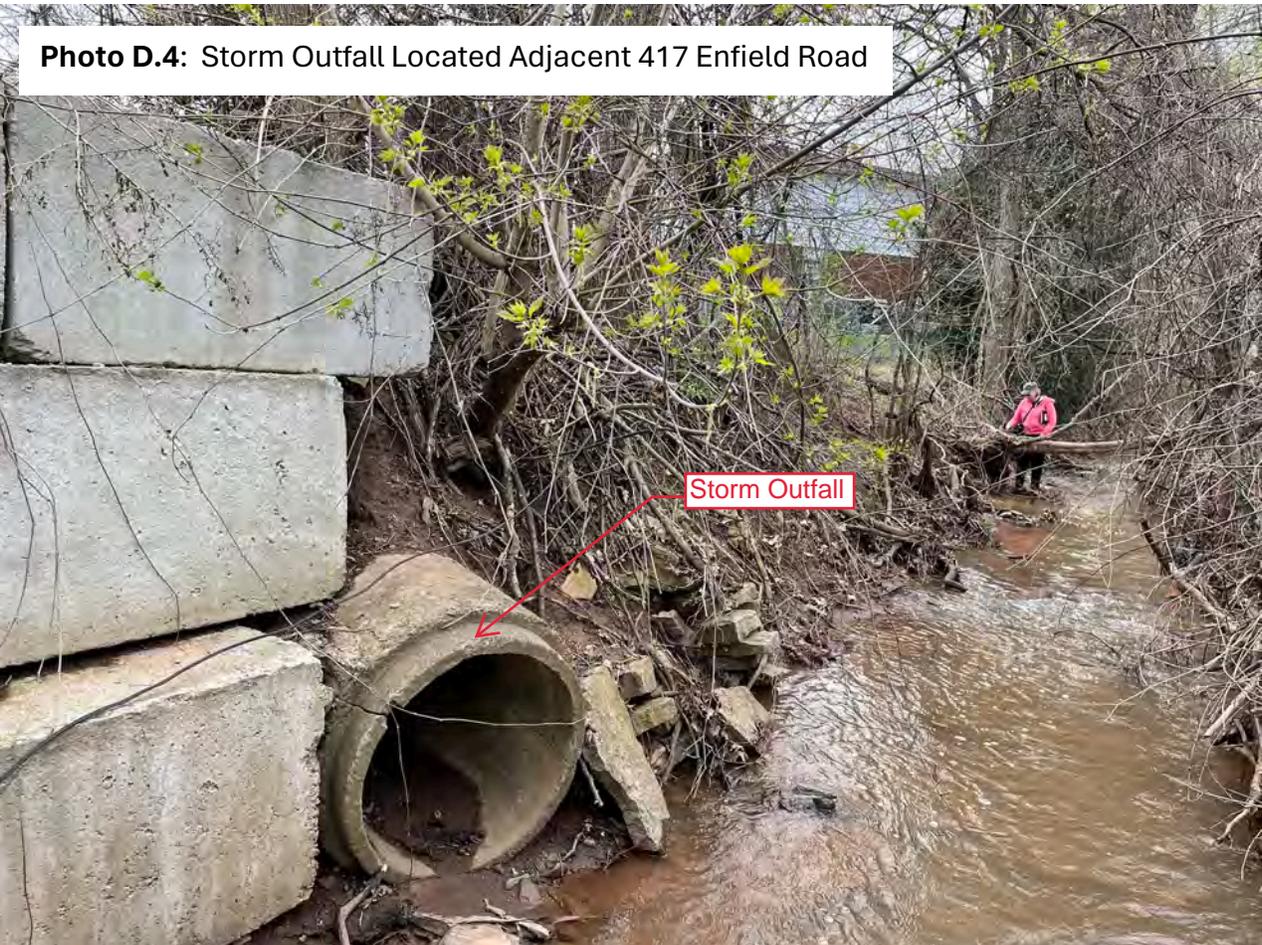
**Photo D.2: CNR Culvert (Inside)**



**Photo D.3:** Storm Outfall Located Adjacent 419 Enfield Road



**Photo D.4:** Storm Outfall Located Adjacent 417 Enfield Road



**Photo D.5: Enfield Road Culvert (Upstream Face)**



**Photo D.6: Enfield Road Culvert (Inside)**



**Photo D.7: Enfield Road Culvert (Downstream Face)**



**Photo D.8: Willowbrook Road Stormsewer Inlet with Grate**



**Failing Headwall and Wingwall**

**Photo D.9:** Willowbrook Road Stormsewer Inlet (Inside)



# APPENDIX 'E'

## Preliminary Construction Cost Estimate

### Falcon Creek Erosion Control Study (CNR to Willowbrook Road)

City of Burlington

#### Appendix 'E' Contents:

- **Table E.1** – Preliminary Construction Cost Estimate

**TABLE 1 - PRELIMINARY CONSTRUCTION COST ESTIMATE  
FALCON CREEK EROSION CONTROL  
CITY OF BURLINGTON**

<i>Item</i>	<i>Description</i>	<i>Approx. Quantity</i>	<i>Unit</i>	<i>Unit Price</i>	<i>Amount</i>
	<b>GENERAL WORKS - ALL EROSION SITES</b>				
1.01	Mobilization and demobilization for all stages of works including construction site access, signage, clearing and grubbing (excl. tree removal $\geq$ 15 cm DBH), temporary stockpile and staging areas, including maintenance. The limits of the temporary site access points are to be staked to minimize disturbance to naturalized areas and road infrastructure including guard rails and to avoid disturbance to private property. The temporary site access points are to be removed and restored to existing conditions or better.	1	L.S.	\$40,000.00	\$40,000.00
1.02	Complete pre-condition survey of construction areas and Willowbrook Road including road infrastructure and restore road pavement and infrastructure to existing or better condition upon completion of construction works	1	L.S.	\$10,000.00	\$10,000.00
1.03	Provide mud and dust control for the duration of the project on site and haul routes, complete (excl. mud mat).	1	L.S.	\$5,000.00	\$5,000.00
1.04	Supply and install mud mats	2	ea	\$6,500.00	\$13,000.00
1.05	Supply and install silt fence, including maintenance and removal as directed	150	m	\$20.00	\$3,000.00
1.06	Supply and install Modu-Loc construction fencing (or equivalent)	180	m	\$20.00	\$3,600.00
1.07	Supply, install and maintain tree protection fencing as detailed on drawings, complete.	100	m	\$35.00	\$3,500.00
1.08	Remove and dispose trees with DBH $\geq$ 15 cm within the identified construction limits for ES#3 and ES#4 offsite including removal of stumps and any chips. Removal and disposal of other trees with DBH $<$ 15 cm within the construction limits off site including removal of stumps and any chips included in Item 1.01.	1	LS	\$45,000.00	\$45,000.00

**TABLE 1 - PRELIMINARY CONSTRUCTION COST ESTIMATE  
FALCON CREEK EROSION CONTROL  
CITY OF BURLINGTON**

<i>Item</i>	<i>Description</i>	<i>Approx. Quantity</i>	<i>Unit</i>	<i>Unit Price</i>	<i>Amount</i>
1.09	Supply and install Nilex SedimentStop erosion control logs including removal and replacement as required during construction and maintenance and removal as directed	80	m	\$40.00	\$3,200.00
1.10	Remove and dispose of ex. debris piles, fallen trees, etc. within the creek using manual methods without large equipment	1	L.S.	\$10,000.00	\$10,000.00
1.11	Obtain all required utility, sewer and watermain locates including daylighting as necessary for all contract works to verify elevations prior to any work	1	L.S.	\$2,500.00	\$2,500.00
1.12	Coordinate with local hydro utility to secure any required permits and to ensure any safety issues and temporary pole stabilization regarding the overhead powerlines are addressed for the duration of construction works	1	L.S.	\$25,000.00	\$25,000.00
1.13	Secure necessary permits from the City for any required lane reductions and provide traffic control including notification and detour signage for the duration of construction, as required.	1	L.S.	\$65,000.00	\$65,000.00
1.14	Miscellaneous geotechnical and/or structural inspections during construction	1	L.S.	\$10,000.00	\$10,000.00
1.15	Complete all topographic surveys required for site layout prior to construction and including as-constructed surveys upon completion of construction works	1	L.S.	\$7,500.00	\$7,500.00
1.16	Miscellaneous geomorphic inspections during construction	1	L.S.	\$5,000.00	\$5,000.00
	<b>EROSION SITES #1 AND #2 WORKS</b>				
1.17	Supply and install eight (8) erosion pins	1	L.S.	\$2,100.00	\$2,100.00
1.18	Complete erosion recession measurements at 6 month intervals	6	ea	\$1,200.00	\$7,200.00

**TABLE 1 - PRELIMINARY CONSTRUCTION COST ESTIMATE  
FALCON CREEK EROSION CONTROL  
CITY OF BURLINGTON**

<i>Item</i>	<i>Description</i>	<i>Approx. Quantity</i>	<i>Unit</i>	<i>Unit Price</i>	<i>Amount</i>
1.19	Prepare a summary report including erosion recession rates and recommendations regarding the need for mitigation requirements	1	L.S.	\$4,500.00	\$4,500.00
1.20	Remove and safely dispose of eight (8) erosion pins	1	L.S.	\$1,500.00	\$1,500.00
	<b>EROSION SITE #3 WORKS</b>				
1.21	Supply and install pea gravel cofferdams, silt bags surrounding cofferdams and impervious membranes as specified including maintenance as required for the full duration of Erosion Site 3 works.	1	L.S.	\$7,500.00	\$7,500.00
1.22	Supply and install by-pass pump and piping for diversion of existing flows along with dewatering pump and piping as necessary to provide a dry work area. Note back-up pumps to be available on site at all times. Item to include all works for Erosion Site 3.	1	L.S.	\$40,000.00	\$40,000.00
1.23	(PROVISIONAL ITEM) If required, complete electrofishing process under permit from MNR for area between coffer dams, documenting fish captured, completing MNR fish collection record and relocating fish downstream of the work area	1	L.S.	\$3,500.00	\$3,500.00
1.24	Excavate and dispose of existing material off site	160	m <sup>3</sup>	\$60.00	\$9,600.00
1.25	Cut existing material, stockpile on-site and re-use	20	m <sup>3</sup>	\$20.00	\$400.00
1.26	Supply and install Terrafirm Armormax earth anchoring system and Scourlok bank stabilization system including granular 'B' backfill and earth anchors	1	L.S.	\$95,000.00	\$95,000.00
1.27	Supply and install 600mm depth of D50=300mm sub-angular riverstone toe and bank protection for transition areas upstream and downstream of the construction works.	50	m <sup>3</sup>	\$100.00	\$5,000.00
1.28	Supply and install Terrafix Coir Mat 400 (or equivalent) on disturbed channel slopes (transition areas upstream and downstream of the construction works)	80	m <sup>2</sup>	\$65.00	\$5,200.00

**TABLE 1 - PRELIMINARY CONSTRUCTION COST ESTIMATE  
FALCON CREEK EROSION CONTROL  
CITY OF BURLINGTON**

<i>Item</i>	<i>Description</i>	<i>Approx. Quantity</i>	<i>Unit</i>	<i>Unit Price</i>	<i>Amount</i>
1.29	Supply and install 1.5 m high black chainlink safety fencing.	22	m	\$170.00	\$3,740.00
1.30	Supply and install topsoil to cover all disturbed areas (150mm)	100	m <sup>2</sup>	\$7.00	\$700.00
	<b>EROSION SITE #4 WORKS</b>				
1.31	Supply and install pea gravel cofferdams, silt bags surrounding cofferdams and impervious membranes as specified including maintenance as required for the full duration of Erosion Site 4 works.	1	L.S.	\$7,500.00	\$7,500.00
1.32	Supply and install by-pass pump and piping for diversion of existing flows along with dewatering pump and piping as necessary to provide a dry work area. Note back-up pumps to be available on site at all times. Item to include all works for Erosion Site 4.	1	L.S.	\$80,000.00	\$80,000.00
1.33	(PROVISIONAL ITEM) If required, complete electrofishing process under permit from MNR for area between coffer dams, documenting fish captured, completing MNR fish collection record and relocating fish downstream of the work area	1	L.S.	\$3,500.00	\$3,500.00
1.34	Excavate and dispose of existing material off site	450	m <sup>3</sup>	\$60.00	\$27,000.00
1.35	Cut existing material, stockpile on-site and re-use	40	m <sup>3</sup>	\$20.00	\$800.00
1.36	Supply and install Terrafirm Armormax earth anchoring system and Scourlok bank stabilization system including granular 'B' backfill and earth anchors	1	L.S.	\$220,000.00	\$220,000.00
1.37	Supply and install 600mm depth of D50=300mm sub-angular riverstone toe and bank protection for transition areas upstream and downstream of the construction works.	50	m <sup>3</sup>	\$100.00	\$5,000.00

**TABLE 1 - PRELIMINARY CONSTRUCTION COST ESTIMATE  
FALCON CREEK EROSION CONTROL  
CITY OF BURLINGTON**

<i>Item</i>	<i>Description</i>	<i>Approx. Quantity</i>	<i>Unit</i>	<i>Unit Price</i>	<i>Amount</i>
1.38	Supply and install Terrafix Coir Mat 400 (or equivalent) on disturbed channel slopes (transition areas upstream and downstream of the construction works)	80	m <sup>2</sup>	\$65.00	\$5,200.00
1.39	Supply and install 1.5 m high black chainlink safety fencing.	60	m	\$170.00	\$10,200.00
1.40	Supply and install armourstone headwall and wingwalls at Willowbrook Rd stormsewer inlet consisting of 1.8x1.2x0.8m blocks including backfill but excl. excavation	25	m <sup>2</sup>	\$900.00	\$22,500.00
1.41	Supply and install topsoil to cover all disturbed areas (150mm)	325	m <sup>2</sup>	\$7.00	\$2,275.00
	<b>PLANTINGS AND RESTORATION</b>				
1.42	Supply and install plantings as per the Planting Plan.	1	L.S.	\$100,000.00	\$100,000.00
	<b>SUB-TOTAL</b>				<b>\$921,215.00</b>
	<b>20% CONTINGENCIES</b>				\$184,243.00
	<b>SUB-TOTAL</b>				<b>\$1,105,458.00</b>
	<b>13% HST</b>				\$143,709.54
	<b>TOTAL</b>				<b>\$1,249,167.54</b>