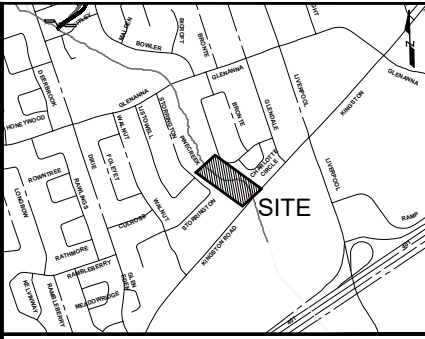
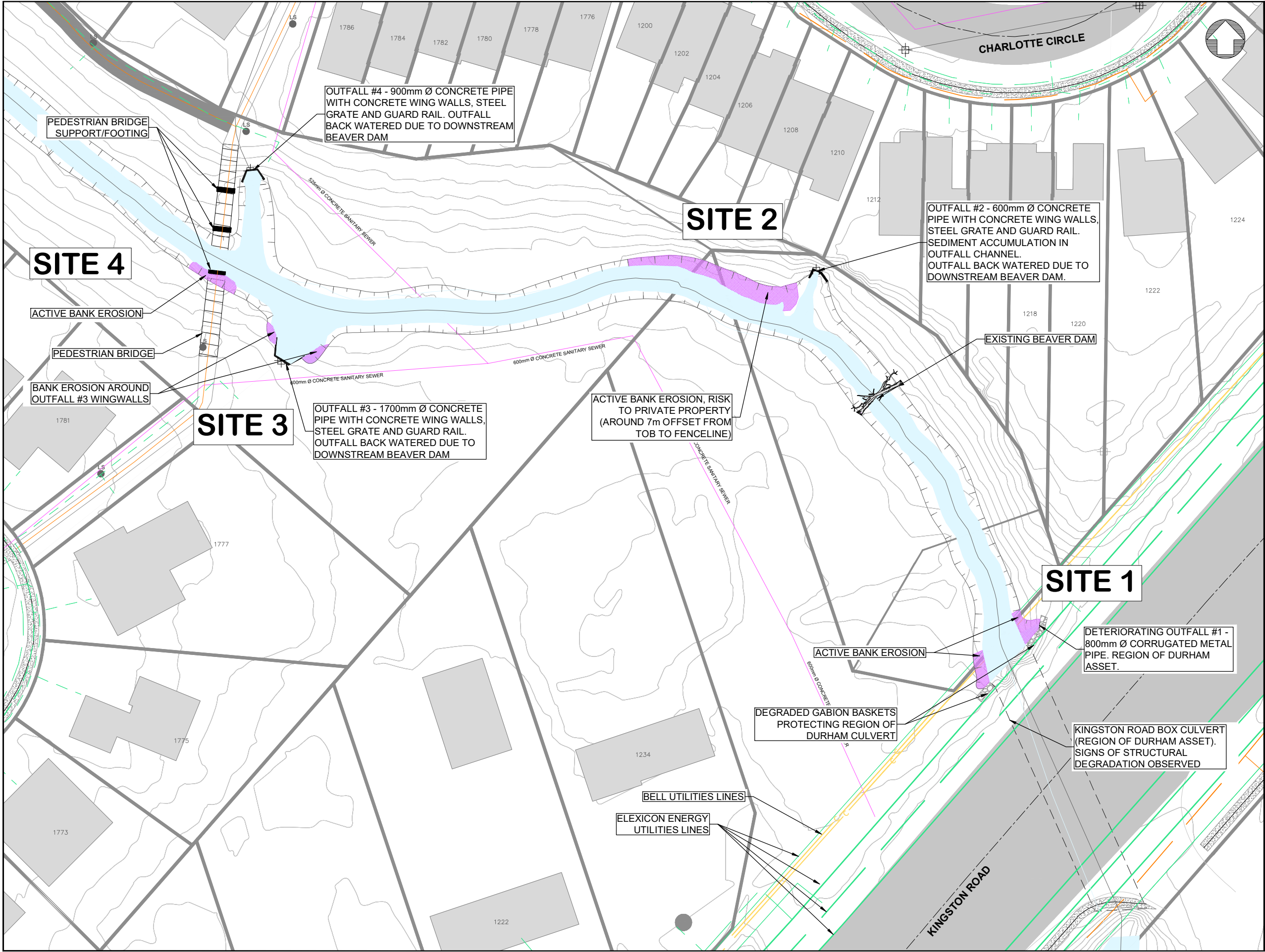

Appendix A –
Existing Conditions Drawings



KEY PLAN N.T.S.

3	ISSUED FOR REGION REVIEW	2023-07-12
2	ISSUED FOR PIC	2023-05-18
1	ISSUED FOR REVIEW	2022-11-21
No.	REVISION	By DATE

LEGEND:	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENBRIDGE UTILITIES
	ERODING/UNSTABLE BANK

THE POSITION OF THE POLE LINES, CONDUITS, WATERMANS, SEWERS, AND OTHER UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK
THE CONTRACTOR SHALL CONFIRM THE POSITION AND EXACT LOCATION OF ALL SUCH UTILITIES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO THEM DURING THE COURSE OF THE CONTRACT WORK.

JOB TITLE
**PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO**

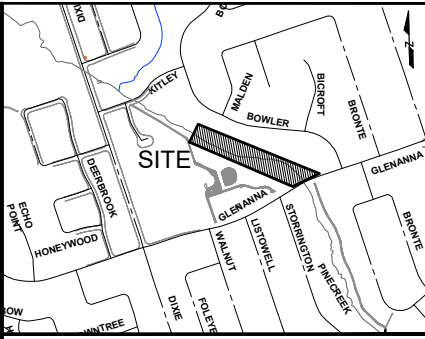
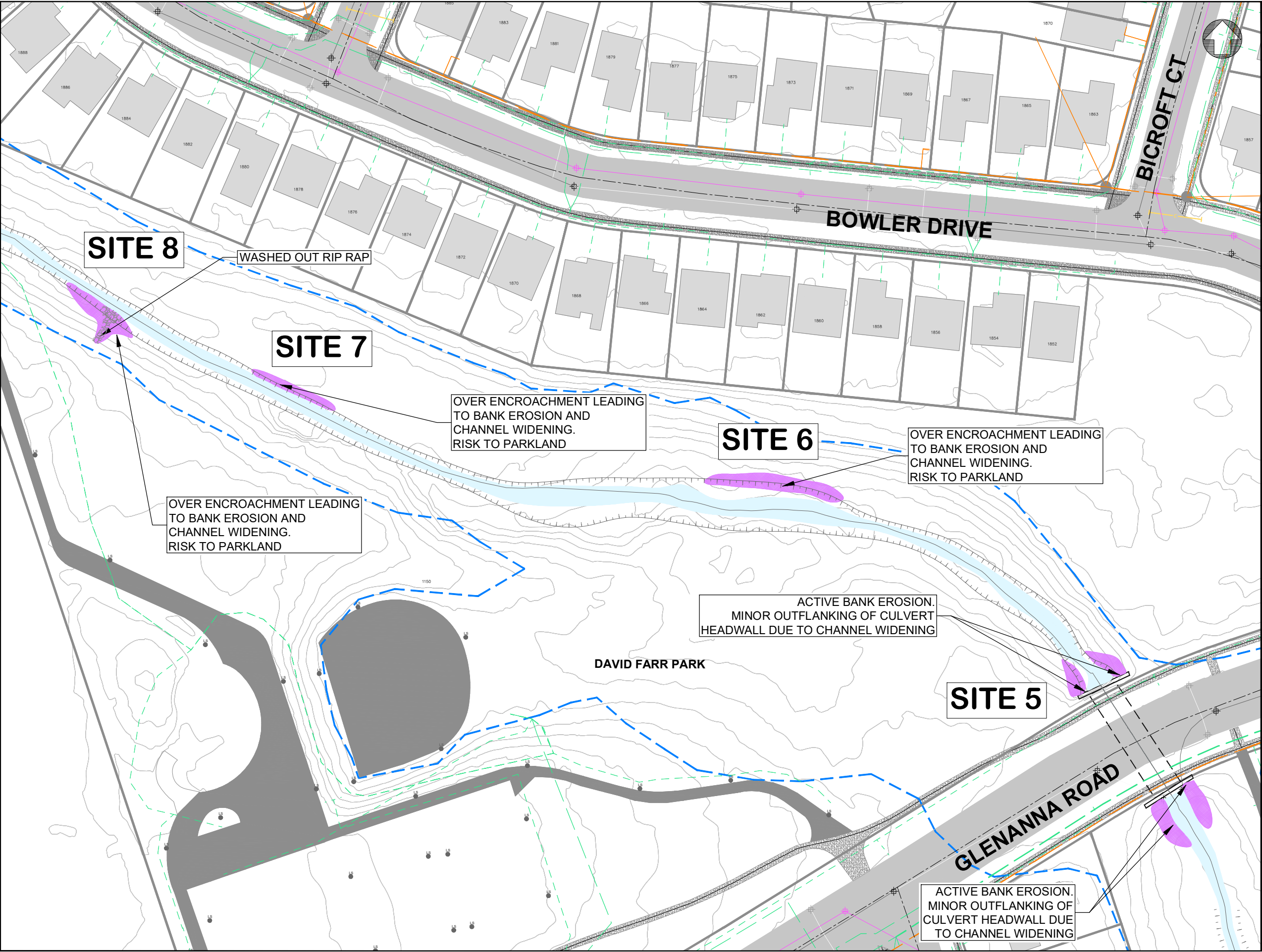
SHEET TITLE
**EROSION SITE 1,2,3 & 4
ALTERNATIVE 1 - DO NOTHING**

DESIGNED BY:	APPROVED BY:

**City of
PICKERING**

**Aquafor Beech
Limited**
#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:250	REVIEWED BY:	CONTRACT No.
DRAWN BY: M.Z.	DESIGNED BY:	FILE No.
DATE: 12, JULY 2023	SHEET NO: 1 OF 3	DRAWING No.



KEY PLAN N.T.S.

No.	REVISION	By	DATE
2	ISSUED FOR PIC		2023-05-18
1	ISSUED FOR REVIEW		2022-11-21

LEGEND:	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENBRIDGE UTILITIES
	ERODING/UNSTABLE BANK

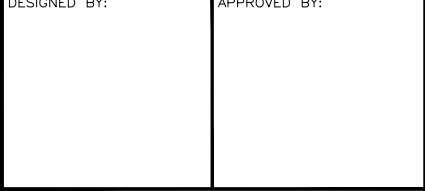
THE POSITION OF THE POLE LINES, CONDUITS, WATERMANS, SEWERS, AND OTHER UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

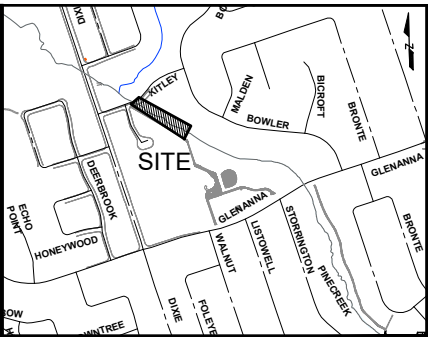
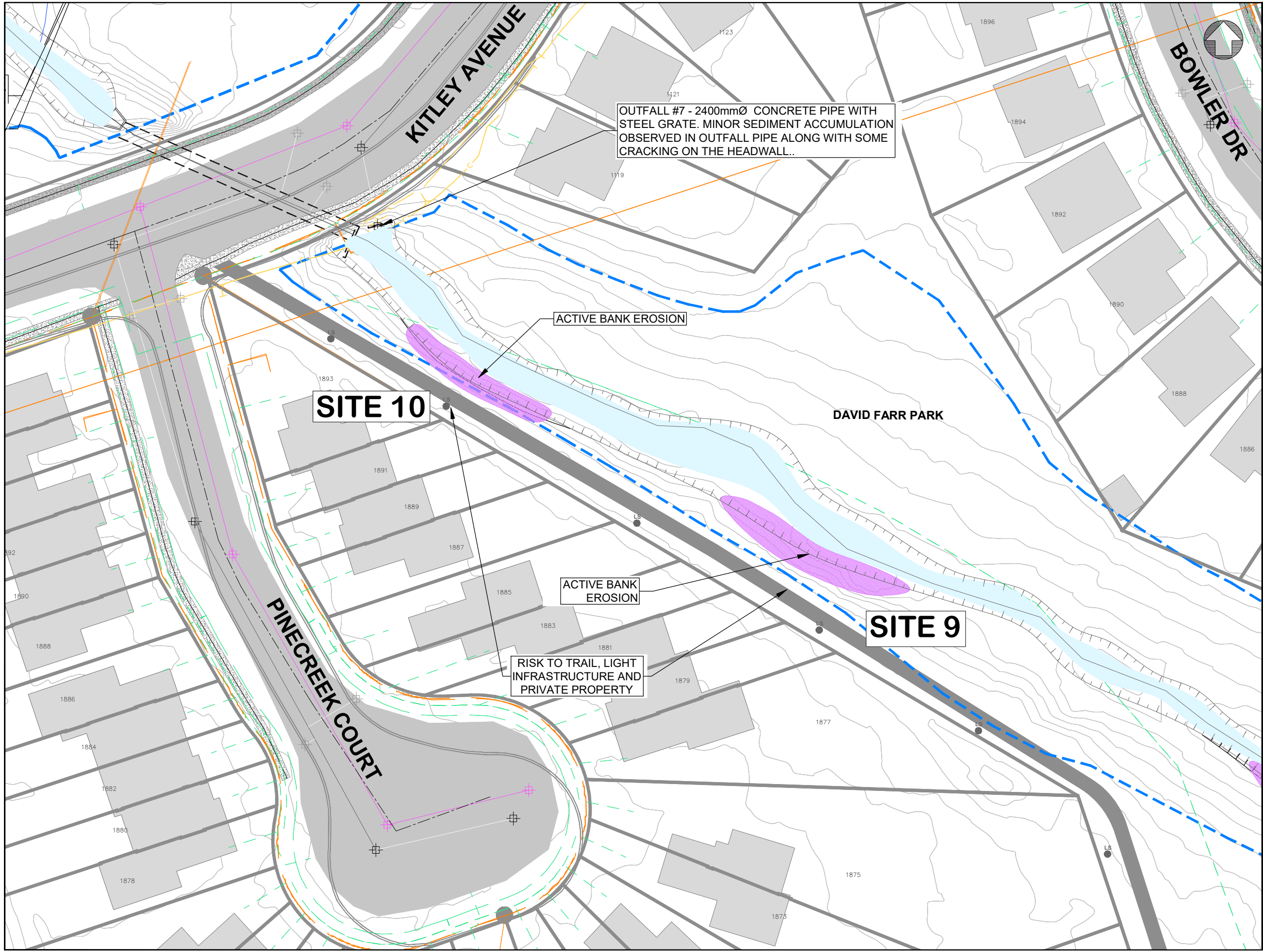
SHEET TITLE
EROSION SITE 5,6,7 & 8
ALTERNATIVE 1 - EXISTING WITH RISKS

DESIGNED BY:
APPROVED BY:



Aquafor Beech Limited
#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:400	REVIEWED BY:	CONTRACT No.
DRAWN BY: P.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 1 OF 3	DRAWING No.



KEY PLAN N.T.S.

2	ISSUED FOR PIC	2023-05-18
1	ISSUED FOR REVIEW	2022-11-21
No.	REVISION	By DATE

LEGEND:	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENGBRIDGE UTILITIES
	ERODING/UNSTABLE BANK

THE POSITION OF THE POLE LINES, CONDUITS, WATERMANS, SEWERS, AND OTHER UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL CONFIRM THE POSITION AND EXACT LOCATION OF ALL SUCH UTILITIES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO THEM MADE DURING THE COURSE OF THE CONTRACT WORK.

JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

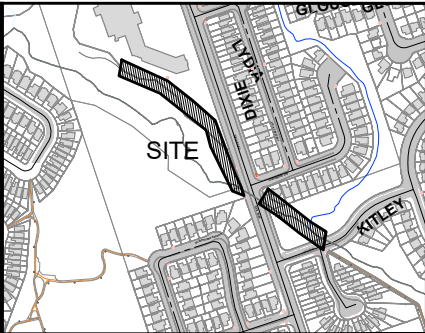
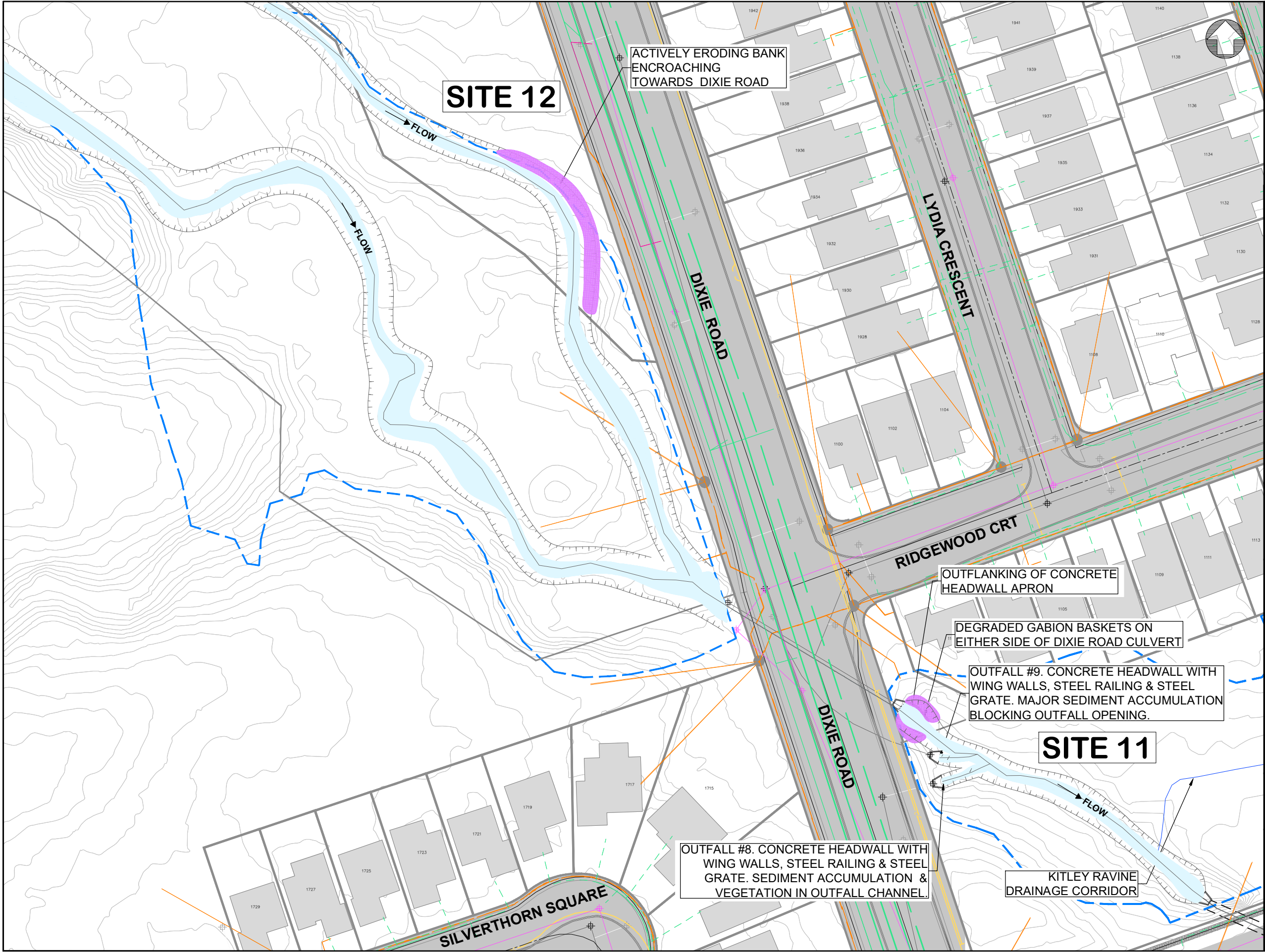
SHEET TITLE
EROSION SITE 9 & 10
ALTERNATIVE 1 - EXISTING WITH RISKS

DESIGNED BY:	APPROVED BY:
--------------	--------------

City of
PICKERING

Aquafor Beech
Limited
#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:250	REVIEWED BY:	CONTRACT No.
DRAWN BY: P.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 1 OF 3	DRAWING No.



2	ISSUED FOR PIC		2023-05-18
1	ISSUED FOR REVIEW		2022-11-21
No.	REVISION	By	DATE

LEGEND	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENGBRIDGE UTILITIES
	ERODING/UNSTABLE BANK
	KITLEY RAVINE DRAINAGE CORRIDOR

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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 11 - 12
ALTERNATIVE 1 - EXISTING WITH RISKS

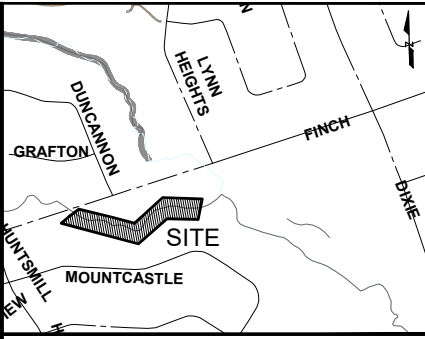
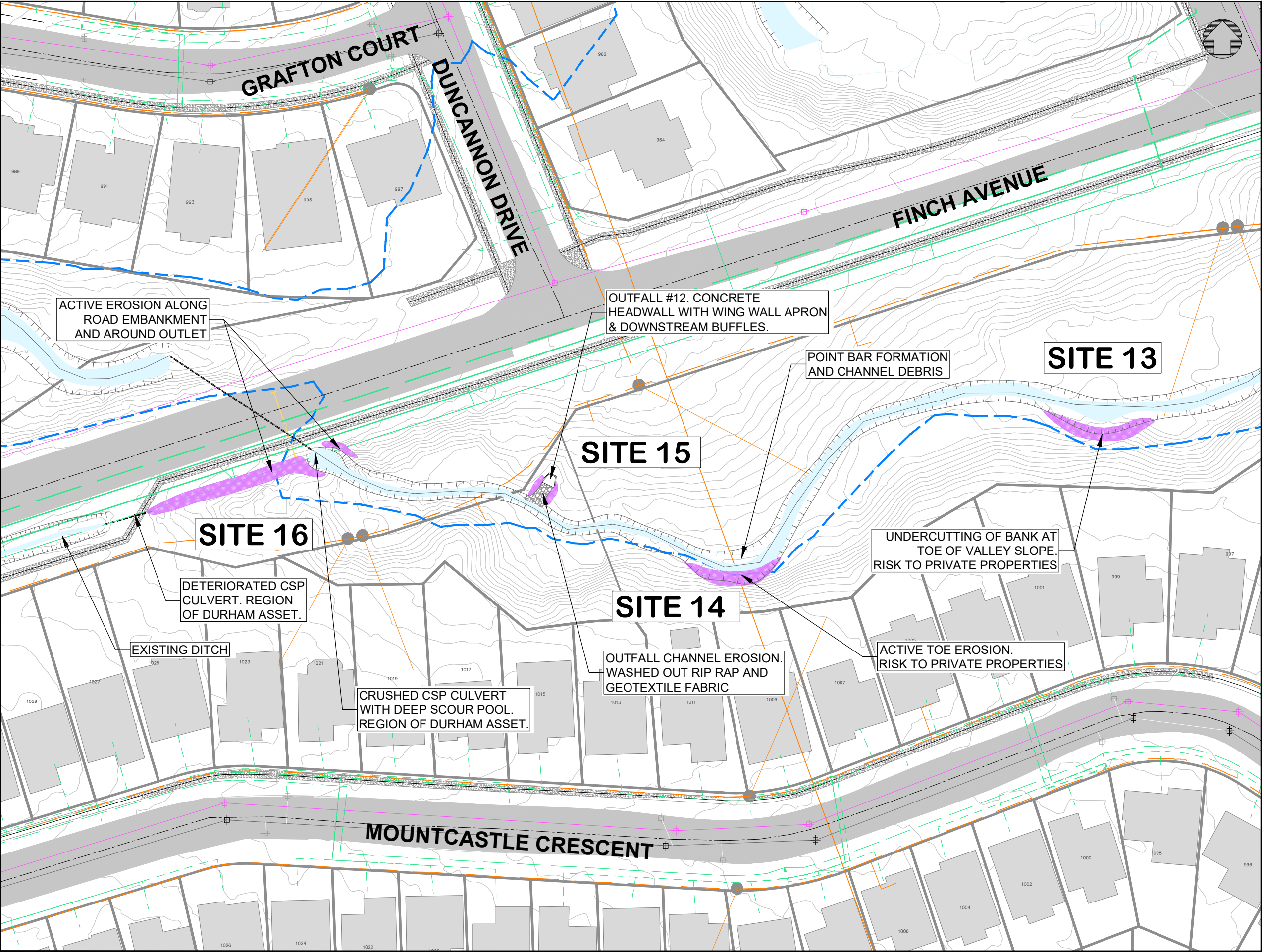
DESIGNED BY:	APPROVED BY:
--------------	--------------

City of
PICKERING

Aquafor Beech
Limited

#4-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:400	REVIEWED BY:	CONTRACT NO.
DRAWN BY: A.S.	DESIGNED BY:	FILE NO.
DATE: 18 MAY, 2023	SHEET NO: 1 OF 3	DRAWING NO.



KEY PLAN N.T.S.

3	ISSUED FOR REGION REVIEW	2023-07-12
2	ISSUED FOR PIC	2023-05-18
1	ISSUED FOR REVIEW	2022-11-21
No.	REVISION	By DATE

LEGEND	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENGBRIDGE UTILITIES
	ERODING/UNSTABLE BANK

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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

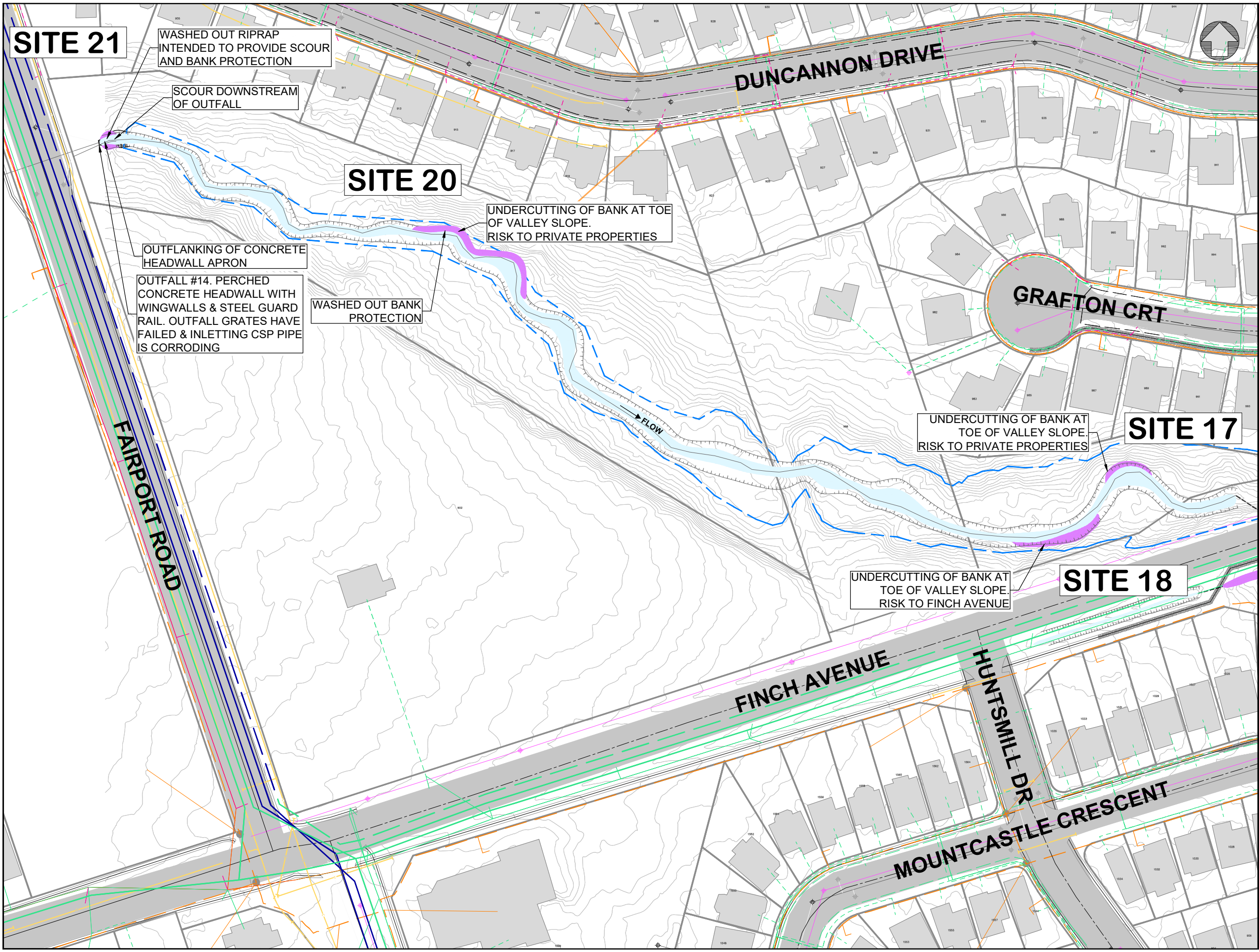
SHEET TITLE
EROSION SITE 13,14,15 & 16
ALTERNATIVE 1 - EXISTING WITH RISKS

DESIGNED BY: APPROVED BY:

City of PICKERING

Aquafor Beech Limited
#4-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:350	REVIEWED BY:	CONTRACT No.
DRAWN BY: P.S.	DESIGNED BY:	FILE No.
DATE: 12, JULY 2023	SHEET NO: 1 OF 3	DRAWING No.



KEY PLAN

N.T.S.

2	ISSUED FOR PIC	2023-05-18	
1	ISSUED FOR REVIEW	2022-11-21	
No.	REVISION	By	DATE

LEGEND

- PROPERTY LINE
- STORMLINE
- SANITARY
- REGIONAL FLOODLINE
- HYDRO UTILITIES
- BELL UTILITIES
- ELEXICON ENERGY UTILITIES
- ENGBRIDGE UTILITIES
- ERODING/UNSTABLE BANK

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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 17 - 18 & 20 - 21
ALTERNATIVE 1 - EXISTING WITH RISKS

DESIGNED BY:

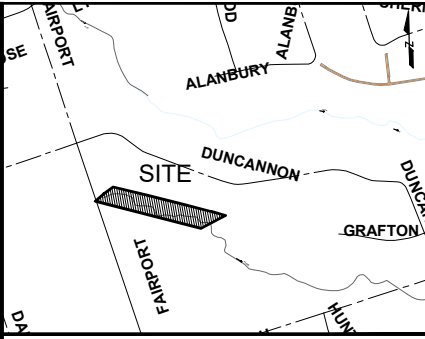
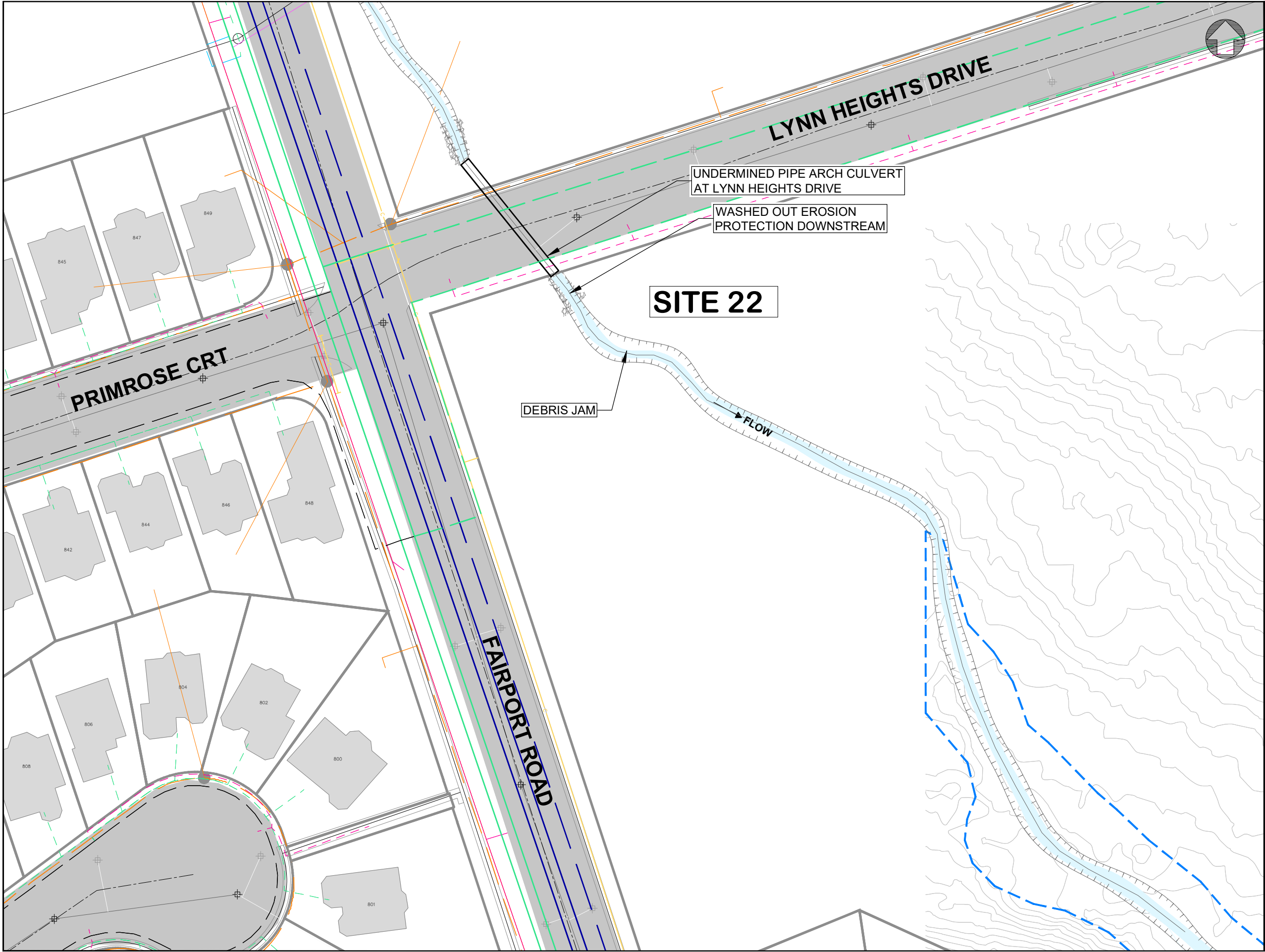
APPROVED BY:

City of PICKERING

Aquafor Beech Limited

6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1/600	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 1 OF 3	DRAWING No.



KEY PLAN N.T.S.

2	ISSUED FOR PIC		2023-05-18
1	ISSUED FOR REVIEW		2022-11-21
No.	REVISION	By	DATE

LEGEND			
	PROPERTY LINE		
	STORMLINE		
	SANITARY		
	REGIONAL FLOODLINE		
	HYDRO UTILITIES		
	BELL UTILITIES		
	ELEXICON ENERGY UTILITIES		
	ENGBRIDGE UTILITIES		

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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

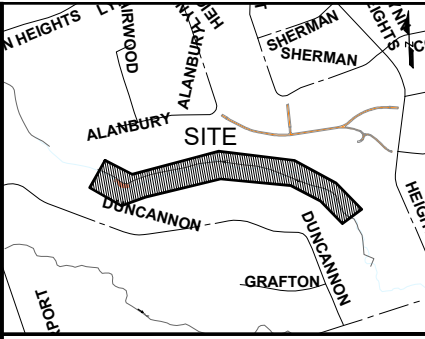
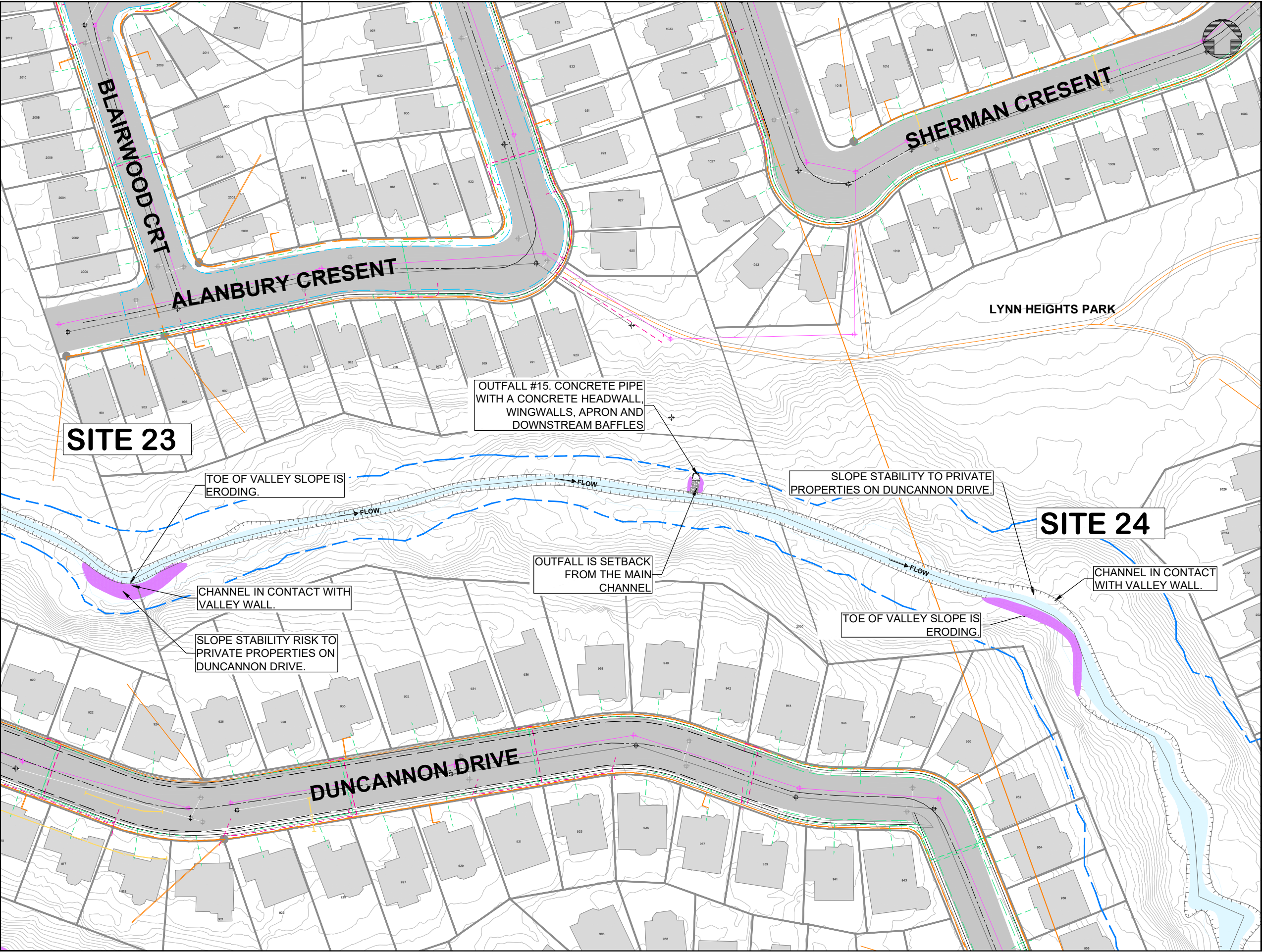
SHEET TITLE
EROSION SITE 22
ALTERNATIVE 1 - EXISTING WITH RISKS

DESIGNED BY:	APPROVED BY:

City of
PICKERING

Aquafor Beech
Limited
#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:350	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO:1 OF 3	DRAWING No.



KEY PLAN N.T.S

2	ISSUED FOR PIC	2023-05-18
1	ISSUED FOR REVIEW	2022-11-21
No.	REVISION	By DATE

LEGEND	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENGBRIDGE UTILITIES
	ERODING/UNSTABLE BANK

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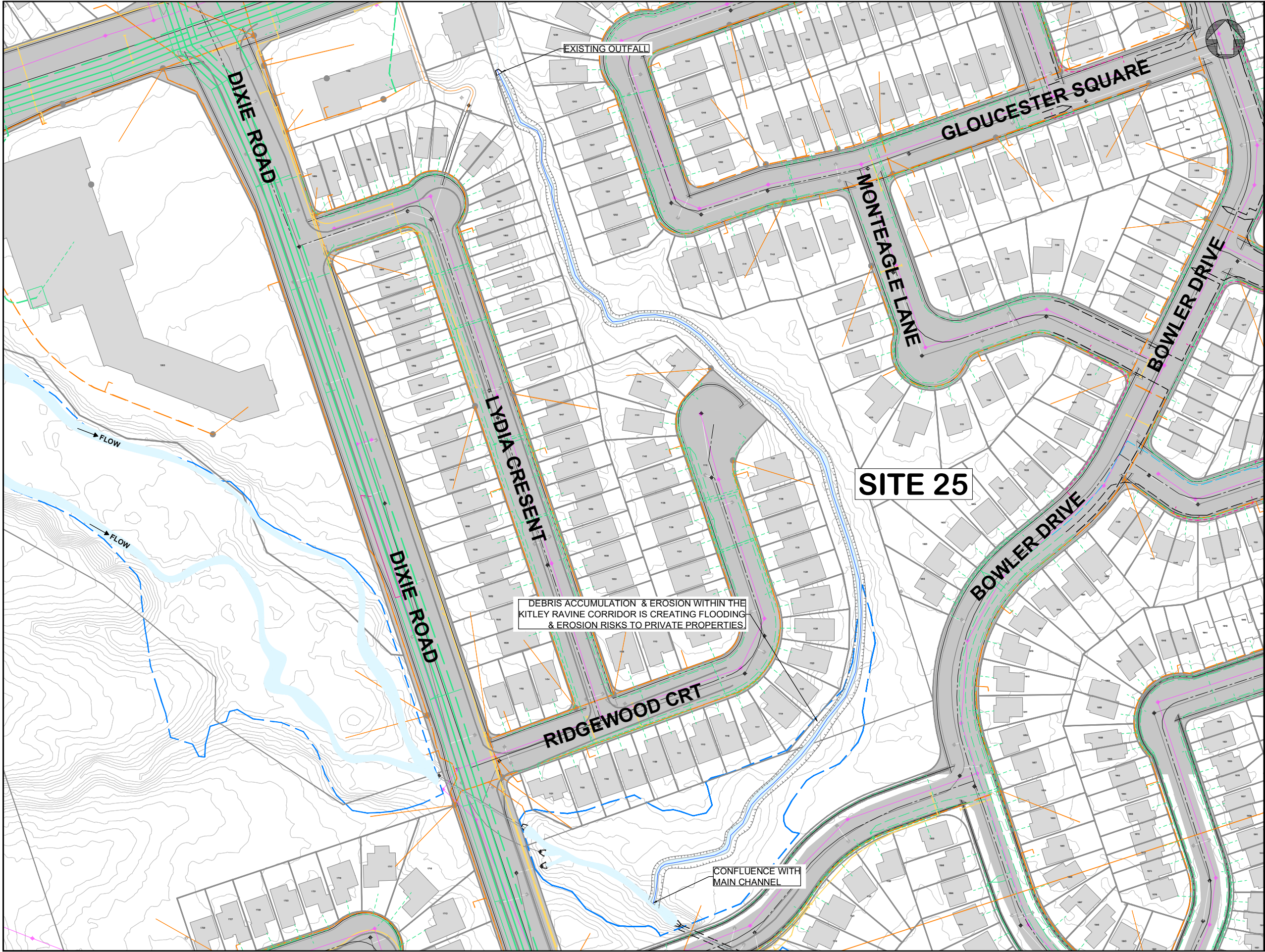
JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 23 & 24
ALTERNATIVE 1 - EXISTING WITH RISKS

DESIGNED BY:	APPROVED BY:
--------------	--------------

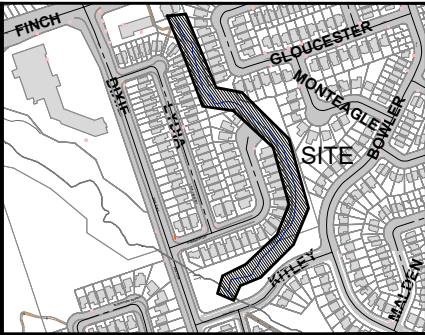
6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:550	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 1 OF 3	DRAWING No.



DEBRIS ACCUMULATION & EROSION WITHIN THE KITLEY RAVINE CORRIDOR IS CREATING FLOODING & EROSION RISKS TO PRIVATE PROPERTIES.

CONFLUENCE WITH MAIN CHANNEL



2	ISSUED FOR PIC		2023-05-18
1	ISSUED FOR REVIEW		2022-11-21
No.	REVISION	By	DATE

LEGEND	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENGBRIDGE UTILITIES
	KITLEY RAVINE DRAINAGE CORRIDOR

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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 25
ALTERNATIVE 1 - EXISTING WITH RISKS

DESIGNED BY:	APPROVED BY:

#4-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1/800	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO:1 OF 2	DRAWING No.

Appendix B –
RGA Sheets

Date Oct 4, 2022

Reach
PC3-a

RAPID GEOMORPHIC ASSESSMENT

Watercourse: Pine Creek

Staff: DK, Tas, J.V., GD

Reach boundaries: Downstream: Kingston Rd

Upstream: Glenanna Rd

Form/ Process	Geomorphic Indicator		Present		FactorValue
	no.	Description	No	Yes	
Evidence of Aggradation (AI)	1	Lobate bar		✓	0.714
	2	Coarse material in riffle embedded	✓		
	3	Siltation in pools		✓	
	4	Medial bars	✓		
	5	Accretion on point bars		✓	
	6	Poor longitudinal sorting of bed materials		✓	
	7	Deposition in overbank zone		✓	
Evidence of Degradation (DI)	1	Exposed bridge footings	✓		0.200
	2	Exposed sanitary/storm sewer/pipeline etc	✓		
	3	Elevated stormsewer outfall	✓		
	4	undermined gabion basket/concrete apron/etc	✓		
	5	Scour pools d/s of culverts/stormsewers	✓		
	6	Cut face on bar forms		✓	
	7	Head cutting due to knick point migration	✓		
	8	Terrace cut through older bar material	✓		
	9	Suspended armor layer visible in bank	✓		
	10	Channel worn into undisturbed overburden/bedrock		✓	
Evidence of Widening (WI)	1	Fallen/leaning trees/fence posts/etc		✓	0.890
	2	Occurrence of large organic debris		✓	
	3	Exposed tree roots		✓	
	4	Basal scour on inside meander bends		✓	
	5	Basal scour on both sides of channel through riffle		✓	
	6	Gabion baskets/concrete walls/armour stone etc. out flanked		✓	
	7	Length of basal scour > 50% through subject reach		✓	
	8	Exposed length of previously buried pipe/cable etc.	✓		
	9	Fracture lines along top of bank		✓	
	10	Exposed building foundation			
Evidence of Planimetric Form Adjustment (PI)	1	Formation of chute(s)	✓		0.143
	2	Evolution of single thread channel to multiple channel	✓		
	3	Evolution of pool-riffle form to low bed relief form	✓		
	4	Cutoff channel(s)	✓		
	5	Formation of island(s)	✓		
	6	Thalweg alignment out of phase with meander geometry	✓		
	7	Bar forms poorly formed/reworked/removed		✓	
Stability Index (SI) = (AI+DI+WI+PI)/m			SI = 0.49		

Where m=4, AI, DI, WI and PI are the normalized values of the aggradation, degradation, width enlargement and planimetric indices, respectively. The normalized value of each of the four FORM/PROCESS categories is computed as the sum of the GEOMORPHIC INDICATORS for which a Yes Determination is reported in the PRESENT column divided by n=the number of GEOMORPHIC INDICATORS used for each index. If a GEOMORPHIC INDICATOR is not applicable note n/a opposite this INDICATOR in the PRESENT column and reduce n by 1. For example, if there are no bridges in the reach then GEOMORPHIC INDICATOR No.1 "exposed bridge footing(s)" under EVIDENCE OF DEGRADATION (DI) is not applicable and the observer should record as n/a opposite this INDICATOR, reduce n to 9 and move on to the next INDICATOR.

Date Oct 4, 2022

Reach
PC3-b

RAPID GEOMORPHIC ASSESSMENT

Watercourse: Pine Creek

Staff: DK, Tas, JU, GD

Reach boundaries: Downstream: Glenanna Rd
Upstream: Kitley Ave

Form/ Process	Geomorphic Indicator		Present		FactorValue
	no.	Description	No	Yes	
Evidence of Aggradation (AI)	1	Lobate bar		✓	0.429
	2	Coarse material in riffle embedded	✓		
	3	Siltation in pools		✓	
	4	Medial bars	✓		
	5	Accretion on point bars	✓		
	6	Poor longitudinal sorting of bed materials	✓		
	7	Deposition in overbank zone		✓	
Evidence of Degradation (DI)	1	Exposed bridge footings	✓		0.200
	2	Exposed sanitary/storm sewer/pipeline etc	✓		
	3	Elevated stormsewer outfall	✓		
	4	undermined gabion basket/concrete apron/etc	✓		
	5	Scour pools d/s of culverts/stormsewers	✓		
	6	Cut face on bar forms		✓	
	7	Head cutting due to knick point migration	✓		
	8	Terrace cut through older bar material	✓		
	9	Suspended armor layer visible in bank	✓		
	10	Channel worn into undisturbed overburden/bedrock		✓	
Evidence of Widening (WI)	1	Fallen/leaning trees/fence posts/etc		✓	0.667
	2	Occurrence of large organic debris		✓	
	3	Exposed tree roots		✓	
	4	Basal scour on inside meander bends	✓		
	5	Basal scour on both sides of channel through riffle		✓	
	6	Gabion baskets/concrete walls/armour stone etc. out flanked	✓		
	7	Length of basal scour > 50% through subject reach		✓	
	8	Exposed length of previously buried pipe/cable etc.	✓		
	9	Fracture lines along top of bank		✓	
	10	Exposed building foundation			
Evidence of Planimetric Form Adjustment (PI)	1	Formation of chute(s)		✓	0.43
	2	Evolution of single thread channel to multiple channel	✓		
	3	Evolution of pool-riffle form to low bed relief form	✓		
	4	Cutoff channel(s)	✓		
	5	Formation of island(s)	✓		
	6	Thalweg alignment out of phase with meander geometry	✓		
	7	Bar forms poorly formed/reworked/removed	✓		
Stability Index (SI) = (AI+DI+WI+PI)/m			SI = 0.36		

Where m=4, AI, DI, WI and PI are the normalized values of the aggradation, degradation, width enlargement and planimetric indices, respectively. The normalized value of each of the four FORM/PROCESS categories is computed as the sum of the GEOMORPHIC INDICATORS for which a Yes Determination is reported in the PRESENT column divided by n=the number of GEOMORPHIC INDICATORS used for each index. If a GEOMORPHIC INDICATOR is not applicable note n/a opposite this INDICATOR in the PRESENT column and reduce n by 1. For example, if there are no bridges in the reach then GEOMORPHIC INDICATOR No.1 "exposed bridge footing(s)" under EVIDENCE OF DEGRADATION (DI) is not applicable and the observer should record as n/a opposite this INDICATOR, reduce n to 9 and move on to the next INDICATOR.

RAPID GEOMORPHIC ASSESSMENT

Watercourse: Pine Creek

Staff: DK, TS, JU, GD

Reach boundaries: Downstream = Confluence after Kitley Ave
Upstream = Confluence before Finch Ave

Form/ Process	Geomorphic Indicator		Present		FactorValue
	no.	Description	No	Yes	
Evidence of Aggradation (AI)	1	Lobate bar		✓	0.714
	2	Coarse material in riffle embedded	✗		
	3	Siltation in pools		✓	
	4	Medial bars	✗		
	5	Accretion on point bars		✓	
	6	Poor longitudinal sorting of bed materials		✓	
	7	Deposition in overbank zone		✓	
Evidence of Degradation (DI)	1	Exposed bridge footings	✗		0.100
	2	Exposed sanitary/storm sewer/pipeline etc	✗		
	3	Elevated stormsewer outfall	✗		
	4	undermined gabion basket/concrete apron/etc outflanking	✗		
	5	Scour pools d/s of culverts/stormsewers	✗		
	6	Cut face on bar forms	✗		
	7	Head cutting due to knick point migration	✗		
	8	Terrace cut through older bar material	✗		
	9	Suspended armor layer visible in bank	✗		
	10	Channel worn into undisturbed overburden/bedrock		✓	
Evidence of Widening (WI)	1	Fallen/leaning trees/fence posts/etc		✓	0.556
	2	Occurrence of large organic debris		✓	
	3	Exposed tree roots		✓	
	4	Basal scour on inside meander bends		✓	
	5	Basal scour on both sides of channel through riffle	✗		
	6	Gabion baskets/concrete walls/armour stone etc. out flanked		✓	
	7	Length of basal scour > 50% through subject reach	✗		
	8	Exposed length of previously buried pipe/cable etc.	✗		
	9	Fracture lines along top of bank	✗		
	10	Exposed building foundation			
Evidence of Planimetric Form Adjustment (PI)	1	Formation of chute(s)	✗		0
	2	Evolution of single thread channel to multiple channel next reach	✗		
	3	Evolution of pool-riffle form to low bed relief form	✗		
	4	Cutoff channel(s)	✗		
	5	Formation of island(s)	✗		
	6	Thalweg alignment out of phase with meander geometry	✗		
	7	Bar forms poorly formed/reworked/removed	✗		
Stability Index (SI) = (AI+DI+WI+PI)/m			SI = 0.34		

Where m=4, AI, DI, WI and PI are the normalized values of the aggradation, degradation, width enlargement and planimetric indices, respectively. The normalized value of each of the four FORM/PROCESS categories is computed as the sum of the GEOMORPHIC INDICATORS for which a Yes Determination is reported in the PRESENT column divided by n=the number of GEOMORPHIC INDICATORS used for each index. If a GEOMORPHIC INDICATOR is not applicable note n/a opposite this INDICATOR in the PRESENT column and reduce n by 1. For example, if there are no bridges in the reach then GEOMORPHIC INDICATOR No.1 "exposed bridge footing(s)" under EVIDENCE OF DEGRADATION (DI) is not applicable and the observer should record as n/a opposite this INDICATOR, reduce n to 9 and move on to the next INDICATOR.

RAPID GEOMORPHIC ASSESSMENT

Watercourse: Pine Creek

Staff: DK, TS, JV, GD

Reach boundaries: Downstream = Confluence before Finch Ave
Upstream = Fairport Road

Form/ Process	Geomorphic Indicator		Present		FactorValue
	no.	Description	No	Yes	
Evidence of Aggradation (AI)	1	Lobate bar	✓		0.286
	2	Coarse material in riffle embedded	✓		
	3	Siltation in pools <i>muddy</i>		✓	
	4	Medial bars	✓		
	5	Accretion on point bars		✓	
	6	Poor longitudinal sorting of bed materials	✓		
	7	Deposition in overbank zone	✓		
Evidence of Degradation (DI)	1	Exposed bridge footings	✓		0.300
	2	Exposed sanitary/storm sewer/pipeline etc	✓		
	3	Elevated stormsewer outfall		✓	
	4	undermined gabion basket/concrete apron/etc	✓		
	5	Scour pools d/s of culverts/stormsewers		✓	
	6	Cut face on bar forms	✓		
	7	Head cutting due to knick point migration	✓		
	8	Terrace cut through older bar material	✓		
	9	Suspended armor layer visible in bank	✓		
	10	Channel worn into undisturbed overburden/bedrock		✓	
Evidence of Widening (WI)	1	Fallen/leaning trees/fence posts/etc		✓	0.556
	2	Occurrence of large organic debris		✓	
	3	Exposed tree roots		✓	
	4	Basal scour on inside meander bends		✓	
	5	Basal scour on both sides of channel through riffle	✓		
	6	Gabion baskets/concrete walls/armour stone etc. out flanked		✓	
	7	Length of basal scour > 50% through subject reach	✓		
	8	Exposed length of previously buried pipe/cable etc.	✓		
	9	Fracture lines along top of bank	✓		
	10	Exposed building foundation			
Evidence of Planimetric Form Adjustment (PI)	1	Formation of chute(s)	✓		0.286
	2	Evolution of single thread channel to multiple channel		✓ <i>debris</i>	
	3	Evolution of pool-riffle form to low bed relief form.	✓		
	4	Cutoff channel(s)	✓		
	5	Formation of island(s)		✓	
	6	Thalweg alignment out of phase with meander geometry	✓		
	7	Bar forms poorly formed/reworked/removed	✓		
Stability Index (SI) = (AI+DI+WI+PI)/m			SI = 0.36		

Where m=4, AI, DI, WI and PI are the normalized values of the aggradation, degradation, width enlargement and planimetric indices, respectively. The normalized value of each of the four FORM/PROCESS categories is computed as the sum of the GEOMORPHIC INDICATORS for which a Yes Determination is reported in the PRESENT column divided by n=the number of GEOMORPHIC INDICATORS used for each index. If a GEOMORPHIC INDICATOR is not applicable note n/a opposite this INDICATOR in the PRESENT column and reduce n by 1. For example, if there are no bridges in the reach then GEOMORPHIC INDICATOR No.1 "exposed bridge footing(s)" under EVIDENCE OF DEGRADATION (DI) is not applicable and the observer should record as n/a opposite this INDICATOR, reduce n to 9 and move on to the next INDICATOR.

Date Friday, Oct 28, 2022

Reach

PC4-10

RAPID GEOMORPHIC ASSESSMENT

Watercourse: Pine Creek

Staff: DK, TS, JU, GD

Reach boundaries: Upstream to Downstream*
Upstream = Lynn Heights Dr
Downstream = Finch Ave

Form/ Process	Geomorphic Indicator		Present		FactorValue
	no.	Description	No	Yes	
Evidence of Aggradation (AI)	1	Lobate bar	✓		0.571
	2	Coarse material in riffle embedded		✓	
	3	Siltation in pools		✓	
	4	Medial bars	✓		
	5	Accretion on point bars		✓	
	6	Poor longitudinal sorting of bed materials	✓		
	7	Deposition in overbank zone		✓	
Evidence of Degradation (DI)	1	Exposed bridge footings	✓		0.500
	2	Exposed sanitary/storm sewer/pipeline etc	✓		
	3	Elevated stormsewer outfall		✓	
	4	undermined gabion basket/concrete apron/etc	✓		
	5	Scour pools d/s of culverts/stormsewers		✓	
	6	Cut face on bar forms		✓	
	7	Head cutting due to knick point migration	✓		
	8	Terrace cut through older bar material		✓	
	9	Suspended armor layer visible in bank	✓		
	10	Channel worn into undisturbed overburden/bedrock		✓	
Evidence of Widening (WI)	1	Fallen/leaning trees/fence posts/etc		✓	0.556
	2	Occurrence of large organic debris		✓	
	3	Exposed tree roots		✓	
	4	Basal scour on inside meander bends	✓		
	5	Basal scour on both sides of channel through riffle	✓		
	6	Gabion baskets/concrete walls/armour stone etc. out flanked		✓	
	7	Length of basal scour > 50% through subject reach		✓	
	8	Exposed length of previously buried pipe/cable etc.	✓		
	9	Fracture lines along top of bank	✓		
	10	Exposed building foundation			
Evidence of Planimetric Form Adjustment (PI)	1	Formation of chute(s)		✓	0.429
	2	Evolution of single thread channel to multiple channel	✓		
	3	Evolution of pool-riffle form to low bed relief form	✓		
	4	Cutoff channel(s)		✓	
	5	Formation of island(s)		✓	
	6	Thalweg alignment out of phase with meander geometry	✓		
	7	Bar forms poorly formed/reworked/removed	✓		
Stability Index (SI) = (AI+DI+WI+PI)/m					SI = 0.51

Where m=4, AI, DI, WI and PI are the normalized values of the aggradation, degradation, width enlargement and planimetric indices, respectively. The normalized value of each of the four FORM/PROCESS categories is computed as the sum of the GEOMORPHIC INDICATORS for which a Yes Determination is reported in the PRESENT column divided by n=the number of GEOMORPHIC INDICATORS used for each index. If a GEOMORPHIC INDICATOR is not applicable note n/a opposite this INDICATOR in the PRESENT column and reduce n by 1. For example, if there are no bridges in the reach then GEOMORPHIC INDICATOR No.1 "exposed bridge footing(s)" under EVIDENCE OF DEGRADATION (DI) is not applicable and the observer should record as n/a opposite this INDICATOR, reduce n to 9 and move on to the next INDICATOR.

Appendix C –
Storm Sewer Outfall Inventory Sheets

Watercourse and Crossing Location ID Number Date
 Pine Cr 1 Oct 4, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter cm
Box ☐	Concrete ☐	Two ☐	Mitered ☐	Mitered ☐	80 cm
Pipe-Arch ☐	CMP ☒	Three ☐	Headwall ☒	Headwall ☒	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☐	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: _____	

Performance Problems	Location	Overall Rating
Debris/Veg. Blockage > 1/3 of Rise		Good ☐
Sediment Blockage 1/3 to 3/4 of Rise		
Buoyancy or Crushing-Related Failure <i>Yes</i>		Fair ☒
Poor Channel Alignment		
Previous and/or Frequent Overtopping		
Local Scour		Poor ☒ <i>Fair - poor</i>
Embankment Piping		
Channel Degradation		Critical ☐
Headcut		
Embankment Slope Instability		Unknown ☐
Sediment Blockage > 3/4 Rise		
Sediment Blockage > 1/3 Rise Throughout		
Barrel		Performance Problems ☐
Submerged / Ends Totally Buried		
Aggressive Abrasion / Corrosion / Chemical		
Exposed Footing (Open Bottom Culvert Only)		
Category	Rating	
Invert Deterioration	<i>Poor</i>	
Joint and Seams		
Corrosion / Chemical	<i>Poor</i>	
Cross-Section Deformation		
Cracking		
Headwall / Wingwall	<i>Good</i>	
Apron		
Flared End Section		
Scour Protection		

Summary: 20.9 m long invert rusted through in 2 locations
 Gabion ~~near~~ headwall, good condition
 Not well defined outfall channel

Watercourse and Crossing Location
Pine Cr

ID Number
2

Date
Oct 4, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter 60 cm
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☒	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☒	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: <u>Grate</u> <u>Railway</u>	

Performance Problems	Location	Overall Rating
Debris/Veg. Blockage > 1/3 of Rise		Good ☒
Sediment Blockage 1/3 to 3/4 of Rise		
Buoyancy or Crushing-Related Failure		Fair ☐
Poor Channel Alignment		
Previous and/or Frequent Overtopping		Poor ☐
Local Scour		
Embankment Piping		Critical ☐
Channel Degradation		
Headcut		Unknown ☐
Embankment Slope Instability		
Sediment Blockage > 3/4 Rise		
Sediment Blockage > 1/3 Rise Throughout		Performance Problems ☐
Barrel		
Submerged / Ends Totally Buried <u>10cm backwatering</u>		
Aggressive Abrasion / Corrosion / Chemical		
Exposed Footing (Open Bottom Culvert Only)		

Category	Rating
Invert Deterioration	<u>Fair - Good</u>
Joint and Seams	
Corrosion / Chemical	
Cross-Section Deformation	
Cracking	
Headwall / Wingwall	
Apron	
Flared End Section	
Scour Protection	

Summary: 10cm backwatering under baseflow conditions
Bottom of headwall / pipe invert has cracking, deterioration

Watercourse and Crossing Location

ID Number

Date

Pine Cr

3

Oct 4, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter 170 cm
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☒	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☒	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: Grate	

Performance Problems

Location

Overall Rating

Debris/Veg. Blockage > 1/3 of Rise

Good



Sediment Blockage 1/3 to 3/4 of Rise

Buoyancy or Crushing-Related Failure

Fair



Poor Channel Alignment

Previous and/or Frequent Overtopping

Poor



Local Scour

Embankment Piping

Channel Degradation

Critical



Headcut

Embankment Slope Instability

Unknown



Sediment Blockage > 3/4 Rise

Sediment Blockage > 1/3 Rise Throughout

Performance Problems



Barrel

Submerged / Ends Totally Buried

56 cm backwatering

Aggressive Abrasion / Corrosion / Chemical

Exposed Footing (Open Bottom Culvert Only)

Category

Rating

Invert Deterioration

Joint and Seams

Corrosion / Chemical

Cross-Section Deformation

Cracking

Headwall / Wingwall

Apron

Flared End Section

Scour Protection

Summary:

56 cm backwatering

Some erosion around wing walls / headwall from overland flow
wingwalls becoming outflanked by scour from creek flows

Watercourse and Crossing Location

ID Number

Date

Pine Cr

4

Oct 4, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	90 cm
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☒	Span
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☒	cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: <u>Gate</u>	Rise
					cm

Performance Problems

Location

Overall Rating

Debris/Veg. Blockage > 1/3 of Rise
 Sediment Blockage 1/3 to 3/4 of Rise
 Buoyancy or Crushing-Related Failure
 Poor Channel Alignment
 Previous and/or Frequent Overtopping
 Local Scour
 Embankment Piping
 Channel Degradation
 Headcut
 Embankment Slope Instability
 Sediment Blockage > 3/4 Rise
 Sediment Blockage > 1/3 Rise Throughout
 Barrel
 Submerged / Ends Totally Buried 35cm backwatering
 Aggressive Abrasion / Corrosion / Chemical
 Exposed Footing (Open Bottom Culvert Only)

Good ☒ Fair - Good
 Fair ☒
 Poor ☐
 Critical ☐
 Unknown ☐
 Performance Problems ☐

Category

Rating

Invert Deterioration
 Joint and Seams
 Corrosion / Chemical
 Cross-Section Deformation
 Cracking
 Headwall / Wingwall
 Apron
 Flared End Section
 Scour Protection

Summary

wing wall partially buried
 outfall channel : heavy sedimentation
 35cm backwatering

Watercourse and Crossing Location

Pike Cr

ID Number

5

Date

Oct 4, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter 120 cm
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☐	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☐	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: <u>Bridge abut. Grate</u>	

Performance Problems

Location

Overall Rating

Debris/Veg. Blockage > 1/3 of Rise
 Sediment Blockage 1/3 to 3/4 of Rise
 Buoyancy or Crushing-Related Failure
 Poor Channel Alignment
 Previous and/or Frequent Overtopping
 Local Scour
 Embankment Piping
 Channel Degradation
 Headcut
 Embankment Slope Instability
 Sediment Blockage > 3/4 Rise
 Sediment Blockage > 1/3 Rise Throughout
 Barrel
 Submerged / Ends Totally Buried
 Aggressive Abrasion / Corrosion / Chemical
 Exposed Footing (Open Bottom Culvert Only)

Good ☒
 Fair ☐
 Poor ☐
 Critical ☐
 Unknown ☐
 Performance Problems ☐

Category

Rating

Invert Deterioration
 Joint and Seams
 Corrosion / Chemical
 Cross-Section Deformation
 Cracking
 Headwall / Wingwall
 Apron
 Flared End Section
 Scour Protection

10cm backwater

100

Watercourse and Crossing Location

Pine Cr

ID Number

6

Date

Oct 4, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter 137 cm
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☐	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☐	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: <u>Bridge Abut. Grate</u>	

Performance Problems

Location

Overall Rating

Debris/Veg. Blockage > 1/3 of Rise
 Sediment Blockage 1/3 to 3/4 of Rise
 Buoyancy or Crushing-Related Failure
 Poor Channel Alignment
 Previous and/or Frequent Overtopping
 Local Scour
 Embankment Piping
 Channel Degradation
 Headcut
 Embankment Slope Instability
 Sediment Blockage > 3/4 Rise
 Sediment Blockage > 1/3 Rise Throughout
 Barrel
 Submerged / Ends Totally Buried
 Aggressive Abrasion / Corrosion / Chemical
 Exposed Footing (Open Bottom Culvert Only)

Good ☒
 Fair ☐
 Poor ☐
 Critical ☐
 Unknown ☐
 Performance Problems ☐

Category

Rating

Invert Deterioration
 Joint and Seams
 Corrosion / Chemical
 Cross-Section Deformation
 Cracking
 Headwall / Wingwall
 Apron
 Flared End Section
 Scour Protection

10 cm Gackwater

Watercourse and Crossing Location

ID Number

Date

7

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter 240 cm
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☒	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☐	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: Grate	

Performance Problems

Location

Overall Rating

Debris/Veg. Blockage > 1/3 of Rise
 Sediment Blockage 1/3 to 3/4 of Rise
 Buoyancy or Crushing-Related Failure
 Poor Channel Alignment
 Previous and/or Frequent Overtopping
 Local Scour
 Embankment Piping
 Channel Degradation
 Headcut
 Embankment Slope Instability
 Sediment Blockage > 3/4 Rise
 Sediment Blockage > 1/3 Rise Throughout
 Barrel
 Submerged / Ends Totally Buried
 Aggressive Abrasion / Corrosion / Chemical
 Exposed Footing (Open Bottom Culvert Only)

10m backwatering

Good ☒
 Fair ☐
 Poor ☐
 Critical ☐
 Unknown ☐
 Performance Problems ☐

Category

Rating

Invert Deterioration
 Joint and Seams
 Corrosion / Chemical
 Cross-Section Deformation
 Cracking
 Headwall / Wingwall
 Apron
 Flared End Section
 Scour Protection

Some cracking around invert/headwall
 10cm backwatering
 Small scour pool

Watercourse and Crossing Location

Pine Creek

ID Number

8 ~~44~~

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter 60 cm
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☒	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☒	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: Grate	

Performance Problems

Location

Overall Rating

Debris/Veg. Blockage > 1/3 of Rise
 Sediment Blockage 1/3 to 3/4 of Rise
 Buoyancy or Crushing-Related Failure
 Poor Channel Alignment
 Previous and/or Frequent Overtopping
 Local Scour
 Embankment Piping
 Channel Degradation
 Headcut
 Embankment Slope Instability
 Sediment Blockage > 3/4 Rise
 Sediment Blockage > 1/3 Rise Throughout
 Barrel
 Submerged / Ends Totally Buried
 Aggressive Abrasion / Corrosion / Chemical
 Exposed Footing (Open Bottom Culvert Only)

Good ☒
 Fair ☐
 Poor ☐
 Critical ☐
 Unknown ☐
 Performance Problems ☐

Category

Rating

Invert Deterioration
 Joint and Seams
 Corrosion / Chemical
 Cross-Section Deformation
 Cracking
 Headwall / Wingwall
 Apron
 Flared End Section
 Scour Protection

outfall channel is Confined due to siltation.
 Possible siltation

Watercourse and Crossing Location

Pine Creek

ID Number

409

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter 7200 cm
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☒	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☒	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: Grate	

Performance Problems	Location	Overall Rating
Debris/Veg. Blockage > 1/3 of Rise		Good ☐
Sediment Blockage 1/3 to 3/4 of Rise		
Buoyancy or Crushing-Related Failure		Fair ☐
Poor Channel Alignment		
Previous and/or Frequent Overtopping		Poor ☐
Local Scour		
Embankment Piping		
Channel Degradation		Critical ☒
Headcut		
Embankment Slope Instability		Unknown ☐
Sediment Blockage > 3/4 Rise	Yes	
Sediment Blockage > 1/3 Rise Throughout Barrel	Y	Performance Problems ☐
Submerged / Ends Totally Buried		
Aggressive Abrasion / Corrosion / Chemical		
Exposed Footing (Open Bottom Culvert Only)		

Category	Rating
Invert Deterioration	
Joint and Seams	
Corrosion / Chemical	
Cross-Section Deformation	
Cracking	
Headwall / Wingwall	
Apron	
Flared End Section	
Scour Protection	

outfall > 80% filled with sediment

Watercourse and Crossing Location

ID Number

10

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☐	Timber ☐	One ☐	Projecting ☐	Projecting ☐	Diameter cm
Box ☐	Concrete ☐	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☒	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☒	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: _____	

Performance Problems	Location	Overall Rating
Debris/Veg. Blockage > 1/3 of Rise		Good ☒
Sediment Blockage 1/3 to 3/4 of Rise		
Buoyancy or Crushing-Related Failure		Fair ☐
Poor Channel Alignment		
Previous and/or Frequent Overtopping		Poor ☐
Local Scour		
Embankment Piping		
Channel Degradation		Critical ☐
Headcut		
Embankment Slope Instability		Unknown ☐
Sediment Blockage > 3/4 Rise		
Sediment Blockage > 1/3 Rise Throughout		
Barrel		Performance Problems ☐
Submerged / Ends Totally Buried		
Aggressive Abrasion / Corrosion / Chemical		
Exposed Footing (Open Bottom Culvert Only)		

Category	Rating
Invert Deterioration	
Joint and Seams	
Corrosion / Chemical	
Cross-Section Deformation	
Cracking	
Headwall / Wingwall	
Apron	
Flared End Section	
Scour Protection	

Small amount of Overland erosion around wing walls
1 cracked 1 broken baffle

Watercourse and Crossing Location

Rne Creek

ID Number

11

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☒	Diameter 90 cm
Box ☐	Concrete ☐	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☒	Three ☐	Headwall ☐	Headwall ☐	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☐	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: _____	

Performance Problems	Location	Overall Rating
Debris/Veg. Blockage > 1/3 of Rise		Good ☒
Sediment Blockage 1/3 to 3/4 of Rise		
Buoyancy or Crushing-Related Failure		Fair ☒
Poor Channel Alignment		
Previous and/or Frequent Overtopping		
Local Scour		Poor ☐
Embankment Piping		
Channel Degradation		Critical ☐
Headcut		
Embankment Slope Instability		Unknown ☐
Sediment Blockage > 3/4 Rise		
Sediment Blockage > 1/3 Rise Throughout		
Barrel		Performance Problems ☐
Submerged / Ends Totally Buried		
Aggressive Abrasion / Corrosion / Chemical		
Exposed Footing (Open Bottom Culvert Only)		

Category	Rating
Invert Deterioration	
Joint and Seams	
Corrosion / Chemical	Fair
Cross-Section Deformation	
Cracking	
Headwall / Wingwall	
Apron	
Flared End Section	
Scour Protection	

Some Corrosion on bottom

20cm filled with sediment throughout

Watercourse and Crossing Location

Pine Creek

ID Number

12

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter 45 cm
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☒	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☒	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: <u>Gate</u>	

Performance Problems

Location

Overall Rating

Debris/Veg. Blockage > 1/3 of Rise
 Sediment Blockage 1/3 to 3/4 of Rise
 Buoyancy or Crushing-Related Failure
 Poor Channel Alignment
 Previous and/or Frequent Overtopping
 Local Scour
 Embankment Piping
 Channel Degradation
 Headcut
 Embankment Slope Instability
 Sediment Blockage > 3/4 Rise
 Sediment Blockage > 1/3 Rise Throughout
 Barrel
 Submerged / Ends Totally Buried
 Aggressive Abrasion / Corrosion / Chemical
 Exposed Footing (Open Bottom Culvert Only)

Good ☒
 Fair ☐
 Poor ☐
 Critical ☐
 Unknown ☐
 Performance Problems ☐

Category

Rating

Invert Deterioration
 Joint and Seams
 Corrosion / Chemical
 Cross-Section Deformation
 Cracking
 Headwall / Wingwall
 Apron
 Flared End Section
 Scour Protection

Watercourse and Crossing Location

Pine Creek

ID Number

8113

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☒	Diameter 125 140 cm
Box ☐	Concrete ☐	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☒	Three ☐	Headwall ☐	Headwall ☐	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☐	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: _____	

Performance Problems	Location	Overall Rating
Debris/Veg. Blockage > 1/3 of Rise		Good ☐
Sediment Blockage 1/3 to 3/4 of Rise		
Buoyancy or Crushing-Related Failure	Crushed from side	Fair ☐
Poor Channel Alignment		
Previous and/or Frequent Overtopping		
Local Scour		Poor ☒
Embankment Piping		
Channel Degradation		Critical ☐
Headcut		
Embankment Slope Instability		Unknown ☐
Sediment Blockage > 3/4 Rise		
Sediment Blockage > 1/3 Rise Throughout		
Barrel		Performance Problems ☐

Submerged / Ends Totally Buried
 Aggressive Abrasion / Corrosion / Chemical
 Exposed Footing (Open Bottom Culvert Only)

Category Rating
 Invert Deterioration Poor

Joint and Seams

Corrosion / Chemical

Cross-Section Deformation Poor

Cracking

Headwall / Wingwall

Apron

Flared End Section

Scour Protection

Culvert is undermined at outlet

Invert corroded,
 water flowing through
 bottom

Watercourse and Crossing Location

Pipe Cr

ID Number

14

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☒	Diameter 60 cm
Box ☐	Concrete ☐	Two ☐	Mitered ☐	Mitered ☐	
Pipe-Arch ☐	CMP ☒	Three ☐	Headwall ☐	Headwall ☐	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☐	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: _____	

Performance Problems	Location	Overall Rating
Debris/Veg. Blockage > 1/3 of Rise		Good ☐
Sediment Blockage 1/3 to 3/4 of Rise		
Buoyancy or Crushing-Related Failure		Fair ☐
Poor Channel Alignment		
Previous and/or Frequent Overtopping		Poor ☐
Local Scour		
Embankment Piping		
Channel Degradation		Critical ☒
Headcut		
Embankment Slope Instability		Unknown ☐
Sediment Blockage > 3/4 Rise		
Sediment Blockage > 1/3 Rise Throughout Barrel		Performance Problems ☐
Submerged / Ends Totally Buried		
Aggressive Abrasion / Corrosion / Chemical	Yes	
Exposed Footing (Open Bottom Culvert Only)		

Category	Rating
Invert Deterioration	Critical
Joint and Seams	
Corrosion / Chemical	Critical
Cross-Section Deformation	
Cracking	
Headwall / Wingwall	
Apron	
Flared End Section	
Scour Protection	

End section had failed

~~Remaining pipe displays high amounts of invert corrosion~~

Watercourse and Crossing Location

Pine Creek

ID Number

15

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☐	Projecting ☐	Projecting ☐	Diameter cm
Box ☐	Concrete ☒	Two ☒	Mitered ☐	Mitered ☐	cm
Pipe-Arch ☐	CMP ☒	Three ☐	Headwall ☐	Headwall ☒	Span cm
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☒	Rise cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: _____	cm

125 : CSP
90 : Conc.

Performance Problems	Location	Overall Rating
Debris/Veg. Blockage > 1/3 of Rise		Good ☐
Sediment Blockage 1/3 to 3/4 of Rise		
Buoyancy or Crushing-Related Failure		
Poor Channel Alignment		Fair ☒ Fair-poor
Previous and/or Frequent Overtopping		
Local Scour	outflanked wing walls	Poor ☒
Embankment Piping		
Channel Degradation		Critical ☐
Headcut		
Embankment Slope Instability		Unknown ☐
Sediment Blockage > 3/4 Rise		
Sediment Blockage > 1/3 Rise Throughout		
Barrel		Performance Problems ☐

Submerged / Ends Totally Buried
Aggressive Abrasion / Corrosion / Chemical
Exposed Footing (Open Bottom Culvert Only)

Category	Rating
Invert Deterioration	Poor (CSP)
Joint and Seams	
Corrosion / Chemical	Poor (CSP)
Cross-Section Deformation	
Cracking	
Headwall / Wingwall	Elevated
Apron	
Flared End Section	
Scour Protection	

CSP inv. deteriorated

Elevated apron

Outflanked wing walls

CSP invert corroded/deteriorated, large hole at bottom

Watercourse and Crossing Location

Pine Cr

ID Number

16

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☐	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter cm
Box ☐	Concrete ☐	Two ☐	Mitered ☐	Mitered ☒	
Pipe-Arch ☒	CMP ☒	Three ☐	Headwall ☐	Headwall ☐	Span
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☐	230 cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: _____	Rise 160 cm

Performance Problems	Location	Overall Rating
Debris/Veg. Blockage > 1/3 of Rise		Good ☐
Sediment Blockage 1/3 to 3/4 of Rise		
Buoyancy or Crushing-Related Failure		Fair ☐
Poor Channel Alignment		
Previous and/or Frequent Overtopping		Poor ☐
Local Scour		
Embankment Piping		
Channel Degradation		Critical ☒
Headcut		
Embankment Slope Instability		Unknown ☐
Sediment Blockage > 3/4 Rise		
Sediment Blockage > 1/3 Rise Throughout Barrel		Performance Problems ☐
Submerged / Ends Totally Buried		
Aggressive Abrasion / Corrosion / Chemical		
Exposed Footing (Open Bottom Culvert Only)		

Category	Rating
Invert Deterioration	Poor Fair
Joint and Seams	
Corrosion / Chemical	Poor Fair
Cross-Section Deformation	
Cracking	
Headwall / Wingwall	
Apron	
Flared End Section	
Scour Protection	

Vertical rotting wooden support beams

Perched invert

Storm sewer enters into culvert wall

Invert at end of pipe is deteriorated/corroded

Watercourse and Crossing Location

Pine Creek

ID Number

2017

Date

Oct 28, 2022

Barrel Shape	Material	No. of Barrels	End Treatments		Dimension
			Upstream	Downstream	
Circular ☒	Timber ☐	One ☒	Projecting ☐	Projecting ☐	Diameter
Box ☐	Concrete ☒	Two ☐	Mitered ☐	Mitered ☐	50 cm
Pipe-Arch ☐	CMP ☐	Three ☐	Headwall ☐	Headwall ☒	Span
Elliptical ☐	PVC ☐	Four ☐	Wingwalls ☐	Wingwalls ☒	cm
Other: _____	Other: _____	Other: _____	Other: _____	Other: _____	Rise
					cm

Performance Problems

Location

Overall Rating

Debris/Veg. Blockage > 1/3 of Rise
 Sediment Blockage 1/3 to 3/4 of Rise
 Buoyancy or Crushing-Related Failure
 Poor Channel Alignment
 Previous and/or Frequent Overtopping
 Local Scour
 Embankment Piping
 Channel Degradation
 Headcut
 Embankment Slope Instability
 Sediment Blockage > 3/4 Rise
 Sediment Blockage > 1/3 Rise Throughout
 Barrel
 Submerged / Ends Totally Buried
 Aggressive Abrasion / Corrosion / Chemical
 Exposed Footing (Open Bottom Culvert Only)

Good ☒
 Fair ☐
 Poor ☐
 Critical ☐
 Unknown ☐
 Performance Problems ☐

Category

Rating

Invert Deterioration
 Joint and Seams
 Corrosion / Chemical
 Cross-Section Deformation
 Cracking
 Headwall / Wingwall
 Apron
 Flared End Section
 Scour Protection

Fair

Apron elevated ~ 20 cm
 Wingwalls slightly outflanked

Appendix D –
HEC-RAS Model Results

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
PC4-a	2	697.127	2 year	0.31	0.1	1.32	39.02	51.42
	2	697.127	5 year	0.63	0.13	1.58	53.31	84.1
	2	697.127	10 year	0.89	0.15	1.75	64.41	112.91
	2	697.127	25 year	1.26	0.17	1.95	78.03	152.1
	2	697.127	50 year	3.74	0.29	2.4	108.29	259.7
	2	697.127	100 year	4.51	0.32	2.45	111.27	273.04
	2	656.127	2 year	0.31	0.12	1.34	39.55	52.83
	2	656.127	5 year	0.63	0.15	1.63	55.67	90.58
	2	656.127	10 year	0.89	0.18	1.67	56.83	94.93
	2	656.127	25 year	1.26	0.21	1.75	60.26	105.26
	2	656.127	50 year	3.74	0.32	2.08	77.52	161.26
	2	656.127	100 year	4.51	0.34	2.17	83.17	180.67
	2	585.947	2 year	0.31	0.07	1.1	28.21	30.91
	2	585.947	5 year	0.63	0.09	1.36	42.35	57.66
	2	585.947	10 year	0.89	0.1	1.63	60.17	98.1
	2	585.947	25 year	1.26	0.12	1.75	68.32	119.76
	2	585.947	50 year	3.74	0.23	2.19	99.11	217.04
	2	585.947	100 year	4.51	0.26	2.25	102.45	230.05
	2	512.298	2 year	0.31	0.15	0.79	14.8	11.71
	2	512.298	5 year	0.63	0.22	1.06	23.48	24.87
	2	512.298	10 year	0.89	0.27	1.21	28.99	35.15
	2	512.298	25 year	1.26	0.34	1.38	35.51	49.08
	2	512.298	50 year	1.58	0.39	1.5	40.07	59.99
	2	512.298	100 year	1.9	0.44	1.59	43.98	70.06
	2	428.911	2 year	0.42	0.15	1.04	25.1	25.99
	2	428.911	5 year	0.75	0.22	1.26	33.23	41.88
	2	428.911	10 year	1.02	0.27	1.4	38.51	53.79
	2	428.911	25 year	1.39	0.33	1.55	45.02	69.91
	2	428.911	50 year	1.71	0.38	1.67	49.93	83.14
	2	428.911	100 year	2.08	0.43	1.77	54.79	97.2
	2	366.616	2 year	0.49	0.16	1.12	28.89	32.44
	2	366.616	5 year	0.83	0.22	1.39	40.38	56.14
	2	366.616	10 year	1.11	0.26	1.56	48.23	75.13
	2	366.616	25 year	1.48	0.32	1.74	57.16	99.32

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
	2	366.616	50 year	1.8	0.36	1.87	63.68	118.76
	2	366.616	100 year	2.21	0.41	2	70.42	140.59
	2	291.996	2 year	0.59	0.17	1.29	37.78	48.85
	2	291.996	5 year	0.94	0.23	1.51	47.17	71.28
	2	291.996	10 year	1.22	0.27	1.65	53.36	87.91
	2	291.996	25 year	1.59	0.33	1.8	60.73	109.32
	2	291.996	50 year	1.92	0.37	1.92	66.61	127.68
	2	291.996	100 year	2.37	0.43	2.06	74.07	152.42
	2	274.429	2 year	0.61	0.58	0.34	1.72	0.58
	2	274.429	5 year	0.96	0.68	0.41	2.36	0.97
	2	274.429	10 year	1.25	0.75	0.46	2.79	1.28
	2	274.429	25 year	1.62	0.88	0.51	3.23	1.63
	2	274.429	50 year	1.95	0.98	0.54	3.55	1.91
	2	274.429	100 year	2.4	1.12	0.58	3.89	2.25
	2	267.93		Culvert				
	2	216.29	2 year	0.69	0.23	1.1	24.9	27.38
	2	216.29	5 year	1.04	0.3	1.29	31.7	40.75
	2	216.29	10 year	1.34	0.35	1.42	36.85	52.14
	2	216.29	25 year	1.71	0.41	1.54	42.16	65.14
	2	216.29	50 year	2.04	0.46	1.65	46.52	76.62
	2	216.29	100 year	2.53	0.52	1.79	52.25	93.28
	2	181.119	2 year	0.73	0.19	1.39	41.72	57.89
	2	181.119	5 year	1.09	0.25	1.59	50.63	80.38
	2	181.119	10 year	1.39	0.3	1.72	56.76	97.61
	2	181.119	25 year	1.76	0.35	1.86	63.64	118.35
	2	181.119	50 year	2.09	0.39	1.97	69.09	135.91
	2	181.119	100 year	2.6	0.45	2.12	77.18	163.51
PC4-b	1	4344.636	2 year	0.53	0.22	1.49	47.45	70.49
	1	4344.636	5 year	1.1	0.25	1.87	65.81	122.75
	1	4344.636	10 year	1.58	0.16	1.66	46.55	77.43
	1	4344.636	25 year	2.26	0.19	1.74	48.45	84.48
	1	4344.636	50 year	2.83	0.22	1.86	53.57	99.46
	1	4344.636	100 year	3.43	0.24	1.96	58.45	114.5

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
	1	4331.712	2 year	0.53	0.4	0.52	4.69	2.46
	1	4331.712	5 year	1.11	0.5	0.73	7.91	5.76
	1	4331.712	10 year	1.59	0.56	0.84	9.85	8.25
	1	4331.712	25 year	2.27	0.65	0.95	11.81	11.21
	1	4331.712	50 year	2.84	0.72	1.01	12.87	13.04
	1	4331.712	100 year	3.44	0.82	1.06	13.62	14.45
	1	4314.677		Culvert				
	1	4277.638	2 year	0.54	0.21	1.2	31.08	37.37
	1	4277.638	5 year	1.13	0.35	1.51	42.94	64.93
	1	4277.638	10 year	1.62	0.43	1.75	53.57	93.75
	1	4277.638	25 year	2.31	0.52	2.06	69.3	142.44
	1	4277.638	50 year	2.89	0.58	2.3	83.83	193.04
	1	4277.638	100 year	3.5	0.64	2.51	96.45	242.4
	1	4198.748	2 year	0.56	0.34	1.03	20.5	21.1
	1	4198.748	5 year	1.16	0.1	1.34	30.86	41.38
	1	4198.748	10 year	1.66	0.13	1.49	36.71	54.71
	1	4198.748	25 year	2.37	0.17	1.64	42.9	70.29
	1	4198.748	50 year	2.97	0.19	1.73	46.68	80.66
	1	4198.748	100 year	3.59	0.2	1.84	51.9	95.31
	1	4103.222	2 year	0.58	0.23	1.52	49.12	74.74
	1	4103.222	5 year	1.2	0.24	1.86	63.85	118.75
	1	4103.222	10 year	1.71	0.23	1.88	59.33	111.47
	1	4103.222	25 year	2.44	0.26	1.98	61.83	122.62
	1	4103.222	50 year	3.05	0.28	2.09	66.09	137.88
	1	4103.222	100 year	3.7	0.31	2.19	70.6	154.4
	1	4021.68	2 year	0.59	0.28	1.33	36.18	48.23
	1	4021.68	5 year	1.23	0.23	1.82	60.12	109.36
	1	4021.68	10 year	1.76	0.26	1.94	63.28	122.78
	1	4021.68	25 year	2.5	0.31	2.1	69.51	146.01
	1	4021.68	50 year	3.13	0.34	2.22	75.06	166.95
	1	4021.68	100 year	3.79	0.37	2.33	80.02	186.64
	1	3886.665	2 year	0.62	0.25	1.57	51.35	80.43
	1	3886.665	5 year	1.28	0.19	1.81	58.46	105.64

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
	1	3886.665	10 year	1.83	0.2	1.78	52.26	93.21
	1	3886.665	25 year	2.61	0.23	1.9	56.14	106.61
	1	3886.665	50 year	3.25	0.25	2	60.67	121.46
	1	3886.665	100 year	3.93	0.27	2.09	64.47	134.66
	1	3787.876	2 year	0.64	0.25	1.58	52.16	82.55
	1	3787.876	5 year	1.32	0.16	1.7	50.54	85.82
	1	3787.876	10 year	1.89	0.18	1.72	48.11	82.52
	1	3787.876	25 year	2.68	0.21	1.84	52.73	96.91
	1	3787.876	50 year	3.35	0.24	1.86	52.19	96.94
	1	3787.876	100 year	4.04	0.28	1.96	57.39	112.75
	1	3676.396	2 year	0.66	0.26	1.6	52.93	84.62
	1	3676.396	5 year	1.37	0.26	1.93	66.31	127.86
	1	3676.396	10 year	1.95	0.26	1.98	64.36	127.72
	1	3676.396	25 year	2.76	0.3	2.11	67.97	143.23
	1	3676.396	50 year	3.45	0.32	2.22	72.5	160.65
	1	3676.396	100 year	4.17	0.36	2.26	72.97	164.94
	1	3579.411	2 year	0.68	0.26	1.61	53.44	86.08
	1	3579.411	5 year	1.4	0.2	1.81	57.45	104.15
	1	3579.411	10 year	2	0.21	1.84	55.04	101.5
	1	3579.411	25 year	2.84	0.25	1.97	59.66	117.62
	1	3579.411	50 year	3.54	0.27	2.09	64.88	135.3
	1	3579.411	100 year	4.27	0.3	2.17	68.38	148.23
	1	3533.928	2 year	0.69	0.35	1.24	29.53	36.57
	1	3533.928	5 year	1.42	0.18	1.77	54.52	96.66
	1	3533.928	10 year	2.03	0.2	1.81	53.02	96.06
	1	3533.928	25 year	2.87	0.24	1.94	57.61	111.55
	1	3533.928	50 year	3.58	0.26	2.06	63.29	130.18
	1	3533.928	100 year	4.32	0.28	2.16	68.35	147.71
	1	3484.703	2 year	0.7	0.27	1.63	54.23	88.21
	1	3484.703	5 year	1.44	0.17	1.73	51.31	88.59
	1	3484.703	10 year	2.05	0.19	1.82	53.79	98.01
	1	3484.703	25 year	2.91	0.24	1.45	31.23	45.41
	1	3484.703	50 year	3.63	0.37	0.94	12.1	11.42
	1	3484.703	100 year	4.38	0.55	0.67	5.69	3.81

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
	1	3439.853	2 year	0.71	0.37	0.88	13.37	11.82
	1	3439.853	5 year	1.46	0.47	1.08	17.03	18.33
	1	3439.853	10 year	2.08	0.57	1.12	17.1	19.21
	1	3439.853	25 year	2.94	0.79	1.11	15.45	17.2
	1	3439.853	50 year	3.67	1.03	1.09	13.91	15.12
	1	3439.853	100 year	4.43	1.28	1.07	12.72	13.56
	1	3438.153		Culvert				
	1	3381.462	2 year	0.72	1.05	0.43	2.45	1.05
	1	3381.462	5 year	1.48	1.26	0.74	6.79	5
	1	3381.462	10 year	2.11	1.36	0.97	11.42	11.04
	1	3381.462	25 year	2.99	1.46	1.28	19.72	25.32
	1	3381.462	50 year	3.72	1.52	1.53	27.74	42.53
	1	3381.462	100 year	4.49	1.56	1.79	37.54	67.3
	1	3363.989	2 year	0.72	0.21	0.91	14.31	13
	1	3363.989	5 year	1.49	0.25	1.13	19.72	22.23
	1	3363.989	10 year	2.12	0.29	1.19	20.69	24.55
	1	3363.989	25 year	3	0.27	1.93	56.04	108.09
	1	3363.989	50 year	3.74	0.3	2.04	60.97	124.43
	1	3363.989	100 year	4.51	0.32	2.18	68.31	149.06
PC3-c	3	3295.62	2 year	1.17	0.27	1.65	53.42	87.9
	3	3295.62	5 year	2.26	0.42	2.05	73.47	150.3
	3	3295.62	10 year	3.17	0.53	2.29	87.18	199.66
	3	3295.62	25 year	4.51	0.17	1.68	41.07	69.12
	3	3295.62	50 year	5.63	0.2	1.78	45.14	80.41
	3	3295.62	100 year	6.71	0.23	1.84	47.2	86.65
	3	3229.203	2 year	1.61	0.5	1.24	25.9	32.09
	3	3229.203	5 year	2.86	0.23	1.61	40.35	65.02
	3	3229.203	10 year	3.87	0.2	1.81	48.79	88.33
	3	3229.203	25 year	5.38	0.22	1.95	54.34	106.1
	3	3229.203	50 year	6.6	0.24	1.99	55.2	110.06
	3	3229.203	100 year	7.83	0.27	2.06	57.86	119.2
	3	3154.216	2 year	2.11	0.12	1.31	27.68	36.36
	3	3154.216	5 year	3.53	0.2	1.56	36.85	57.64

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
	3	3154.216	10 year	4.65	0.23	1.7	42.38	72.11
	3	3154.216	25 year	6.36	0.29	1.8	45.47	81.64
	3	3154.216	50 year	7.7	0.32	1.85	47.33	87.68
	3	3154.216	100 year	9.1	0.35	1.92	49.8	95.51
	3	3059.426	2 year	2.74	0.1	1.3	25.76	33.49
	3	3059.426	5 year	4.38	0.13	1.47	31.76	46.64
	3	3059.426	10 year	5.64	0.16	1.55	34.96	54.3
	3	3059.426	25 year	7.59	0.19	1.74	43.06	74.77
	3	3059.426	50 year	9.09	0.21	1.87	49.24	91.84
	3	3059.426	100 year	10.7	0.22	1.98	54.91	108.61
	3	2967.18	2 year	3.36	0.55	2.34	90.25	211.21
	3	2967.18	5 year	5.21	0.23	1.83	47.91	87.53
	3	2967.18	10 year	6.61	0.27	1.94	52.89	102.71
	3	2967.18	25 year	8.8	0.36	1.64	35.64	58.55
	3	2967.18	50 year	10.45	0.46	1.23	18.87	23.24
	3	2967.18	100 year	12.26	0.57	0.97	11.04	10.68
	3	2929.505	2 year	3.61	0.56	1.77	46.74	82.96
	3	2929.505	5 year	5.55	0.81	1.82	43.55	79.16
	3	2929.505	10 year	7	1.03	1.84	42.04	77.44
	3	2929.505	25 year	9.29	1.36	1.9	41.4	78.47
	3	2929.505	50 year	11	1.58	1.94	41.51	80.48
	3	2929.505	100 year	12.9	1.82	1.99	41.9	83.24
	3	2928.505		Culvert				
	3	2882.771	2 year	3.92	1.23	1.23	19.11	23.42
	3	2882.771	5 year	5.97	1.56	1.47	25.33	37.2
	3	2882.771	10 year	7.49	1.78	1.62	29.47	47.69
	3	2882.771	25 year	9.9	2.07	1.84	36.13	66.4
	3	2882.771	50 year	11.68	2.23	2.02	42.41	85.48
	3	2882.771	100 year	13.69	2.43	2.17	47.73	103.55
	3	2823.669	2 year	4.31	1.05	1.59	36.23	57.45
	3	2823.669	5 year	6.5	1.34	1.87	48.2	90.08
	3	2823.669	10 year	8.11	1.53	2.04	56.19	114.59
	3	2823.669	25 year	10.67	0.7	2.24	64.36	143.92

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
	3	2823.669	50 year	12.55	0.59	2.17	57.92	125.53
	3	2823.669	100 year	14.69	0.62	1.94	44.52	86.52
	3	2816.869	2 year	4.36	0.38	1.43	27.59	39.44
	3	2816.869	5 year	6.56	0.49	1.28	19.98	25.49
	3	2816.869	10 year	8.18	0.58	1.16	15.82	18.43
	3	2816.869	25 year	10.76	0.73	1.03	11.54	11.83
	3	2816.869	50 year	12.65	0.89	0.91	8.68	7.88
	3	2816.869	100 year	14.8	1.05	0.81	6.71	5.46
PC3-b	3	2793.314	2 year	8.21	0.85	1.16	16.69	19.35
	3	2793.314	5 year	12.83	1.14	1.39	22.01	30.51
	3	2793.314	10 year	16.03	1.34	1.5	24.54	36.69
	3	2793.314	25 year	21.1	1.63	1.64	27.82	45.55
	3	2793.314	50 year	24.89	1.86	1.7	28.79	48.89
	3	2793.314	100 year	28.9	2.12	1.73	28.86	50.03
	3	2791.854		Culvert				
	3	2755.393	2 year	8.47	1.59	0.84	7.75	6.53
	3	2755.393	5 year	13.17	1.86	1.12	13.06	14.67
	3	2755.393	10 year	16.45	2.01	1.3	16.95	21.97
	3	2755.393	25 year	21.64	2.21	1.55	23.62	36.72
	3	2755.393	50 year	25.61	2.34	1.74	28.86	50.08
	3	2755.393	100 year	29.76	2.47	1.92	34.56	66.18
	3	2688.864	2 year	8.91	0.77	1.15	15.59	17.95
	3	2688.864	5 year	13.76	0.94	1.34	19.94	26.72
	3	2688.864	10 year	17.2	1.04	1.45	22.81	33.17
	3	2688.864	25 year	22.58	1.15	1.62	27.49	44.65
	3	2688.864	50 year	26.87	1.22	1.74	31	54.05
	3	2688.864	100 year	31.27	1.29	1.85	34.26	63.38
	3	2581.167	2 year	9.64	0.46	2.63	89.43	235.3
	3	2581.167	5 year	14.71	0.54	2.94	104.78	307.89
	3	2581.167	10 year	18.4	0.6	3.11	113.97	354.82
	3	2581.167	25 year	24.11	0.67	3.32	124.97	415.13
	3	2581.167	50 year	28.92	0.73	3.43	129.79	445.28
	3	2581.167	100 year	33.71	0.77	3.6	140.23	504.7

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
	3	2497.769	2 year	10.2	0.59	1.85	41.18	76.33
	3	2497.769	5 year	15.46	0.61	2.65	82.9	219.3
	3	2497.769	10 year	19.33	0.62	3.19	119.46	380.69
	3	2497.769	25 year	25.3	0.7	3.44	134.61	463.54
	3	2497.769	50 year	30.5	0.75	3.65	147.46	537.82
	3	2497.769	100 year	35.6	0.81	3.76	152.9	574.38
	3	2470.847	2 year	10.38	1.01	0.7	4.96	3.46
	3	2470.847	5 year	15.69	0.96	1.01	10.14	10.2
	3	2470.847	10 year	19.63	0.98	1.2	14.22	17
	3	2470.847	25 year	25.68	1.01	1.46	21.04	30.77
	3	2470.847	50 year	31.01	1.04	1.67	27.04	45.06
	3	2470.847	100 year	36.21	1.08	1.79	30.66	54.78
	3	2468.187		Inl Struct				
	3	2465.53	2 year	10.42	0.96	0.83	7.47	6.17
	3	2465.53	5 year	15.74	1.18	0.94	9.26	8.75
	3	2465.53	10 year	19.69	1.26	1.03	10.7	11.02
	3	2465.53	25 year	25.75	1.3	1.12	12.23	13.73
	3	2465.53	50 year	31.11	1.36	1.19	13.49	16.11
	3	2465.53	100 year	36.33	1.42	1.26	14.62	18.36
	3	2388.073	2 year	10.94	0.68	1.21	16.38	19.84
	3	2388.073	5 year	16.43	0.76	1.31	18.02	23.57
	3	2388.073	10 year	20.56	0.83	1.34	18.39	24.67
	3	2388.073	25 year	26.85	0.94	1.32	17.09	22.58
	3	2388.073	50 year	32.58	1.03	1.33	16.82	22.33
	3	2388.073	100 year	38.09	1.11	1.34	16.67	22.28
	3	2347.593	2 year	11.21	0.6	2.93	107.92	316.56
	3	2347.593	5 year	16.79	0.71	3.28	126.06	413.23
	3	2347.593	10 year	21.01	0.86	3.01	99.06	297.77
	3	2347.593	25 year	27.43	0.99	2.97	90.82	269.33
	3	2347.593	50 year	33.35	1.02	3.23	105.25	340.18
	3	2347.593	100 year	39	0.97	3.61	129.81	468.92
	3	2334.025	2 year	11.3	1.79	0.88	8.06	7.11

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
	3	2334.025	5 year	16.91	2.08	1.14	12.74	14.47
	3	2334.025	10 year	21.16	2.32	1.28	15.56	19.87
	3	2334.025	25 year	27.62	0.89	1.5	20.64	30.95
	3	2334.025	50 year	33.61	1	1.68	25.45	42.8
	3	2334.025	100 year	39.31	1.02	1.86	30.82	57.38
	3	2333.35		Culvert				
PC3-a	3	2301.671	2 year	11.36	1.87	0.97	9.19	8.92
	3	2301.671	5 year	17.07	2.08	1.31	16.14	21.14
	3	2301.671	10 year	21.34	0.58	1.5	23.25	34.94
	3	2301.671	25 year	27.86	0.69	1.74	30.16	52.35
	3	2301.671	50 year	33.88	0.78	1.9	35.56	67.7
	3	2301.671	100 year	39.65	0.85	2.03	39.83	80.98
	3	2266.793	2 year	11.42	0.7	1.28	20.1	25.79
	3	2266.793	5 year	17.25	0.83	1.49	25.59	38.05
	3	2266.793	10 year	21.54	0.92	1.61	29.11	46.83
	3	2266.793	25 year	28.11	1.03	1.76	33.66	59.3
	3	2266.793	50 year	34.18	1.11	1.88	37.4	70.39
	3	2266.793	100 year	40.02	1.19	1.98	40.45	80.07
	3	2228.755	2 year	11.49	0.53	2.07	56.22	116.29
	3	2228.755	5 year	17.44	0.66	2.26	62.85	141.97
	3	2228.755	10 year	21.75	0.74	2.36	66.45	157.07
	3	2228.755	25 year	28.39	0.85	2.49	70.83	176.61
	3	2228.755	50 year	34.49	0.94	2.6	74.43	193.25
	3	2228.755	100 year	40.42	1.02	2.68	77.13	206.52
	3	2149.512	2 year	11.64	0.58	1.33	21.64	28.84
	3	2149.512	5 year	17.85	0.78	1.36	21.22	28.93
	3	2149.512	10 year	22.2	0.89	1.41	22.06	31.16
	3	2149.512	25 year	28.97	1.03	1.5	23.82	35.61
	3	2149.512	50 year	35.16	1.13	1.57	25.49	39.96
	3	2149.512	100 year	41.26	1.22	1.63	27.02	44.1
	3	2096.75	2 year	11.73	0.65	1.83	39.24	71.92
	3	2096.75	5 year	18.11	0.76	2.13	50.49	107.64
	3	2096.75	10 year	22.5	0.83	2.3	57.08	131.01

EA Reach	HEC-RAS Reach	River Station	Profile	Q Total	Hydr Depth	Vel Chnl	Shear Chan	Power Chan
				(m3/s)	(m)	(m/s)	(N/m2)	(N/m s)
	3	2096.75	25 year	29.36	0.91	2.52	66.68	167.86
	3	2096.75	50 year	35.6	0.98	2.67	73.57	196.74
	3	2096.75	100 year	41.82	1.05	2.8	79.11	221.53
	3	2025.418	2 year	11.86	0.64	1.51	26.8	40.35
	3	2025.418	5 year	18.48	0.79	1.71	33	56.55
	3	2025.418	10 year	22.9	0.87	1.82	36.47	66.53
	3	2025.418	25 year	29.89	0.97	2.01	43.12	86.76
	3	2025.418	50 year	36.2	1.05	2.14	47.49	101.39
	3	2025.418	100 year	42.57	1.13	2.24	51.22	114.7
	3	1968.571	2 year	11.97	0.48	2.64	93.28	246.06
	3	1968.571	5 year	18.76	0.6	3.08	120.37	370.43
	3	1968.571	10 year	23.22	0.66	3.33	137.49	457.91
	3	1968.571	25 year	30.3	0.79	3.32	129.62	429.99
	3	1968.571	50 year	36.68	0.88	3.47	138.2	480.04
	3	1968.571	100 year	43.17	0.98	3.43	130.12	446.16
	3	1819.77	2 year	12	0.64	0.49	2.67	1.31
	3	1819.77	5 year	18.84	0.85	0.48	2.37	1.13
	3	1819.77	10 year	23.31	0.96	0.47	2.24	1.05
	3	1819.77	25 year	30.42	1.13	0.46	2.02	0.92
	3	1819.77	50 year	36.82	1.13	0.51	2.46	1.25
	3	1819.77	100 year	43.34	1.27	0.51	2.41	1.23
	3	1770.174	2 year	12.33	1.56	0.87	7.23	6.28
	3	1770.174	5 year	19.77	1.86	1.19	13.05	15.58
	3	1770.174	10 year	24.34	2.04	1.36	16.47	22.37
	3	1770.174	25 year	31.76	2.31	1.59	21.74	34.52
	3	1770.174	50 year	38.35	2.39	1.86	29.48	54.76
	3	1770.174	100 year	45.27	0.26	2	33.68	67.45

Appendix E –

Plant List

City of Pickering, Ontario

[illegible]

Botanical Species List
Pine Creek Erosion Control
City of Pickering, Ontario

Scientific Name	Common Name	CC	CW	ESA Status	SARA Status	COSEWIC	G-Rank	S-Rank	Regional Rarity Oldham 7E-4 (2017)	Local Status TRCA Ranking (2017)	Native/Introduced
Epipactis helleborine	Eastern Helleborine		3				GNR	SNA	IC	L+	introduced
Eupatorium perfoliatum	Common Boneset	2	-3				G5	S5	C	L4	native
Euthamia graminifolia	Grass-leaved Goldenrod	2	0				G5	S5	C	L5	native
Eutrochium maculatum	Spotted Joe Pye Weed	3	-5				G5	S5	C	L5	
Fagus grandifolia	American Beech	6	3				G5	S4	C	L4	native
Fraxinus americana	White Ash	4	3				G5	S4	C	L5	native
Fraxinus pennsylvanica	Green Ash	3	-3				G5	S4	C	L5	native
Geranium robertianum	Herb-Robert	2	3				G5	S5	C	L+?	native
Geum sp.	Avens Species										
Glechoma hederacea	Ground Ivy		3				GNR	SNA	IC	L+	introduced
Hedera helix	English Ivy		3				GNR	SNA	IR	L+	introduced
Helianthus sp.	Sunflower Species										
Hesperis matronalis	Dame's Rocket		3				G4G5	SNA	IC	L+	introduced
Hibiscus syriacus	Rose-of-Sharon							SNA			
Impatiens capensis	Spotted Jewelweed	4	-3				G5	S5	C	L5	native
Inula helenium	Elecampane		3				GNR	SNA	IC	L+	introduced
Juglans cinerea	Butternut	6	3	END		END	G4	S2?	U	L3	native
Juglans nigra	Black Walnut	5	3				G5	S4?	C	L5	native
Laportea canadensis	Wood Nettle	6	-3				G5	S5	U	L5	native
Larix laricina	Tamarack	7	-3				G5	S5	R	L3	native
Leonurus cardiaca	Common Motherwort		5				GNR	SNA	IC	L+	introduced
Ligustrum vulgare	European Privet		3				GNR	SNA	IU	L+	introduced
Lobelia siphilitica	Great Blue Lobelia	6	-3				G5	S5	R	L3	native
Lonicera tatarica	Tatarian Honeysuckle		3				GNR	SNA	IC	L+	introduced
Lycopus americanus	American Water-horehound	4	-5				G5	S5	C	L4	native
Lycopus europaeus	European Water-horehound		-5				GNR	SNA	IU	L+	introduced
Lythrum salicaria	Purple Loosestrife		-5				G5	SNA	IC	L+	introduced
Maianthemum canadense	Wild Lily-of-the-valley	5	3				G5	S5	C	L4	native
Maianthemum racemosum	Large False Solomon's Seal	4	3				G5	S5	C	L5	native
Malus sp.	Crabapple Species										
Matteuccia struthiopteris	Ostrich Fern	5	0				G5	S5	C	L5	native
Mentha canadensis	Canada Mint	3	-3				G5	S5	C	L5	native
Morus alba	White Mulberry		0				GNR	SNA	IC	L+	introduced
Myosotis scorpioides	True Forget-me-not		-5				G5	SNA	IC	L+	introduced
Onoclea sensibilis	Sensitive Fern	4	-3				G5	S5	C	L5	native
Ostrya virginiana	Eastern Hop-hornbeam	4	3				G5	S5	C	L5	native
Oxalis stricta	Upright Yellow Wood-sorrel	0	3				G5	S5	C	L5	introduced
Parthenocissus vitacea	Thicket Creeper	4	3				G5	S5	C	L5	native
Persicaria maculosa	Spotted Lady's-thumb		-3				G3G5	SNA	IC	L+	introduced
Phalaris arundinacea	Reed Canary Grass	0	-3				G5	S5	C	L+?	native
Phlox paniculata	Fall Phlox		3				G5	SNA	IR	L+	introduced
Phragmites australis ssp. australis	European Reed		-3				G5T5	SNA	IC	L+	introduced

Botanical Species List
Pine Creek Erosion Control
City of Pickering, Ontario

Scientific Name	Common Name	CC	CW	ESA Status	SARA Status	COSEWIC	G-Rank	S-Rank	Regional Rarity Oldham 7E-4 (2017)	Local Status TRCA Ranking (2017)	Native/Introduced
Phryma leptostachya	Lopseed	6	3				G5	S4S5	R	L5	native
Picea glauca	White Spruce	6	3				G5	S5	U	L3	native
Picea pungens	Blue Spruce		3				G5	SNA		L+	introduced
Pilea pumila	Dwarf Clearweed	5	-3				G5	S5	U	L5	native
Pinus strobus	Eastern White Pine	4	3				G5	S5	C	L4	native
Pinus sylvestris	Scots Pine		3				GNR	SNA	IC	L+	introduced
Poa pratensis	Kentucky Bluegrass	0	3				G5	S5	C	L+	native
Populus alba	White Poplar		5				G5	SNA	IU	L+	introduced
Populus balsamifera	Balsam Poplar	4	-3				G5	S5	C	L5	native
Populus deltoides	Eastern Cottonwood	4	0				G5	S5	C	L5	native
Populus tremuloides	Trembling Aspen	2	0				G5	S5	C	L5	native
Prunus avium	Sweet Cherry		5				GNR	SNA	IX	L+	introduced
Prunus serotina	Black Cherry	3	3				G5	S5	C	L5	native
Prunus virginiana	Choke Cherry	2	3				G5	S5	C	L5	native
Quercus alba	White Oak	6	3				G5	S5	C	L3	native
Quercus rubra	Northern Red Oak	6	3				G5	S5	C	L4	native
Ranunculus acris	Tall Buttercup		0				G5	SNA	IC	L+	introduced
Rhamnus cathartica	Common Buckthorn		0				GNR	SNA	IC	L+	introduced
Rhus typhina	Staghorn Sumac	1	3				G5	S5	C	L5	native
Ribes americanum	Wild Black Currant	4	-3				G5	S5	C	L5	native
Rosa multiflora	Multiflora Rose		3				GNR	SNA	IC	L+	introduced
Rubus idaeus	Common Red Raspberry	2	3				G5	S5	C	L5	native
Rubus odoratus	Purple-flowering Raspberry	3	5				G5	S5	C	L5	native
Rumex crispus	Curly Dock		0				GNR	SNA	IC	L+	introduced
Salix eriocephala	Heart-leaved Willow	4	-3				G5	S5	C	L5	native
Salix interior	Sandbar Willow	1	-3				GNR	S5	C	L5	native
Salix x fragilis	(Salix alba X Salix euxina)						GNA	SNA	hyb	L+	introduced
Salix x pendulina	(Salix babylonica X Salix euxina)						GNA	SNA	hyb	L+	introduced
Salix x sepulcralis	(Salix alba X Salix babylonica)						GNA	SNA	hyb	L+	introduced
Sambucus canadensis	Common Elderberry	5	-3				G5	S5	C	L5	native
Sambucus racemosa	Red Elderberry	5	3				G5	S5	C	L5	native
Silphium perfoliatum	Cup Plant	9	-3				G5	S2	IR	L5	native
Solanum dulcamara	Bittersweet Nightshade		0				GNR	SNA	IC	L+	introduced
Solidago caesia	Blue-stemmed Goldenrod	5	3				G5	S5	C	L5	native
Solidago canadensis	Canada Goldenrod	1	3				G5	S5		L5	native
Solidago flexicaulis	Zigzag Goldenrod	6	3				G5	S5	C	L5	native
Solidago sp.	Goldenrod Species										
Sorbus aucuparia	European Mountain-ash		5				G5	SNA	IC	L+	introduced
Symphyotrichum lanceolatum	Panicled Aster	3	-3				G5	S5	C	L5	native
Symphyotrichum lateriflorum	Calico Aster	3	0				G5	S5	C	L4	native
Symphyotrichum novae-angliae	New England Aster	2	-3				G5	S5	C	L5	native
Symphyotrichum puniceum	Swamp Aster	6	-5				G5	S5	C	L5	native

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Scientific Name	Common Name	CC	CW	ESA Status	SARA Status	COSEWIC	G-Rank	S-Rank	Regional Rarity Oldham 7E-4 (2017)	Local Status TRCA Ranking (2017)	Native/Introduced
Thuja occidentalis	Eastern White Cedar	4	-3				G5	S5	C	L4	native
Tilia americana	American Basswood	4	3				G5	S5	C	L5	native
Tilia cordata	Little-leaf Linden		5				GNR	SNA	IR	L+	introduced
Torilis japonica	Erect Hedge-parsley		3				GNR	SNA	IR	L+	introduced
Toxicodendron radicans var. radicans	Eastern Poison Ivy	2	0				G5T5	S5	C	L5	native
Toxicodendron radicans var. rydbergii	Western Poison Ivy	2	0				G--T5	S5	C	L5	native
Tsuga canadensis	Eastern Hemlock	7	3				G5	S5	C	L4	native
Tussilago farfara	Colt's-foot		3				GNR	SNA	IC	L+	introduced
Typha latifolia	Broad-leaved Cattail	1	-5				G5	S5	C	L4	native
Ulmus americana	American Elm	3	-3				G5	S5	C	L5	native
Verbena urticifolia	White Vervain	4	0				G5	S5	C	L5	native
Veronica officinalis	Common Speedwell		5				G5	SNA	IC	L+	introduced
Viburnum acerifolium	Maple-leaved Viburnum	6	5				G5	S5	C	L3	native
Viburnum lentago	Nannyberry	4	0				G5	S5	C	L5	native
Viburnum opulus ssp. opulus	Cranberry Viburnum		-3				G5TNR	SNA	IC	L+	introduced
Vinca minor	Periwinkle		5				GNR	SNA	IC	L+	introduced
Vincetoxicum rossicum	European Swallow-wort		5				GNR	SNA	IC	L+	introduced
Viola sp.	Violet Species										
Vitis riparia	Riverbank Grape	0	0				G5	S5	C	L5	native

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LEGEND

Scientific Name and Common Name (NHIC, 2020)

Based on NHIC’s species list for Ontario downloaded on May 29, 2019.

COSEWIC (NHIC, 2020)

Federal Rarity List (does not provide protection under any Act)

- EXT Extinct - A species that no longer exists.
- EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
- END Endangered - A species facing imminent extirpation or extinction.
- THR Threatened - A species likely to become endangered if limiting factors are not reversed.
- SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
- NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
- DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

Species on Schedule 1 of Species At Risk Act (SARA) (NHIC, 2020)

Federal Rarity List

- EXP Extirpated - a species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
- END Endangered - a species that is facing imminent extirpation or extinction.
- THR Threatened - a species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.
- SC Species of Special Concern - a species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

S-Ranks (NHIC, 2020)

Provincial Rarity List (does not provide protection under any Act)

- S1 Critically Imperiled—Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
- S2 Imperiled—Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
- S3 Vulnerable—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
- S4 Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- S5 Secure—Common, widespread, and abundant in the nation or state/province.
- S#S# Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
- SX Apparently extirpated from Ontario, with little likelihood of rediscovery. Typically not seen in the province for many decades, despite searches at known historic sites.
- SE Exotic; not believed to be a native component of Ontario's flora.

Species At Risk Ontario (SARO) (NHIC, 2020)

Provincial Rarity List (Species protected under ESA 2007 and listed in O reg. 230/08)

- EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
- END Endangered - A species facing imminent extirpation or extinction.
- THR Threatened - A species likely to become endangered if limiting factors are not reversed.
- SC Special Concern - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Exotic Status (NHIC, 2020)

If an element is known to occur as an exotic in Ontario, the status value assigned to the element is SE. A ? qualifier added to that value indicates uncertainty about whether it is exotic or native. Numeric ranks of 1 through 5 added to the exotic status indicate the element’s abundance in Ontario, with 1 indicating the least abundance and 5 the most.

Coefficient of Conservatism and Coefficient of Wetness (NHIC, 2020)

CC = Coefficient of Conservatism. Rank of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.
CW = Coefficient of Wetness. -Value between 5 and –5. A value of –5 is assigned to Obligate Wetland (OBL) and 5 to Obligate Upland (UPL), with intermediate values assigned to the remaining categories (Oldham et al., 1995).

Regional Rarity

Status in Carolinian Zone 7E-4 (Oldham, 2017)

I - Introduced; thought to have been present in the Carolinian Zone or individual CZ area prior to European settlement; believed to be deliberately or inadvertently introduced to the CZ by humans (followed by a status, below)

C - Common

U - uncommon

R - rare

H - Historic records only (generally >30 years)

X - present; status unknown or not specified in source lists

? - unconfirmed report

hyb - hybrid

Combined Status (Status overall in CZ) from Oldham 2017

H - Historic native in all CZ and no known records for at least 30 years in all areas where native and ranked (i.e. not X). Occasionally used for a native species known to be extirpated from its only known CZ location(s)

R - Rare native to the CZ and (a) rar (as defined in source lists; sometimes including "very uncommon") or historic (no records in > 30 years) in more than half of the CZ area (>6) in which it is native and ranked; or (b) if rare or historic in <6 areas it must be uncommon or common in no more than one

U - Uncommon native in the CZ and (a) listed as common in no more than one CZ area; and (b) not rare or historic in more than half of the CZ areas (>6) in which is it native and ranked

C - Common native in the CZ and (a) common in at least two CZ areas; and (b) not rare or historic in more than half of the CZ areas (>6) in which it is native and ranked

X - No status. Present and native in the CZ but no status assigned because of lack or information, often due to confusion with similar species **Native Status**

VASCAN database (Brouillet et al. 2010)

N = Native to Ontario

I = Introduced to Ontario

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TRCA Rankings (April 2017):

TRCA, 2017. List provided by the Toronto Region Conservation, based on April 2017 rankings.

L5: able to withstand high levels of disturbance; generally secure throughout the jurisdiction, including the urban matrix. May be of very localized concern in highly degraded areas

L4: able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix

L3: able to withstand minor disturbance; generally secure in natural matrix; considered to be of regional concern.

L2: unable to withstand disturbance; some criteria are very limiting factors; generally occur in high-quality natural areas, in natural matrix; probably rare in the TRCA jurisdiction; of concern regionally

L1: unable to withstand disturbance; many criteria are limiting factors; generally occur in high-quality natural areas in natural matrix; almost certainly rare in the TRCA jurisdiction; of concern regionally

LX: extirpated from our region with remote chance of rediscovery. Presumably highly sensitive

LH: hybrid between two native species. Usually not scored unless highly stable and behaves like a species (e.g. Equisetum x nelsonii)

L+: exotic. Not native to TRCA jurisdiction. Includes hybrids between a native species and an exotic

L+?: origin uncertain or disputed, i.e. may or may not be native

pL : found in natural cover, but only as planted, not regenerating

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**Appendix F –
SAR Screening**

Species		SARA Status	ESA Status	COSEWIC Status	G-Rank	S-Rank	Data Source	Habitat Requirements (MNRF, 2000 unless otherwise sourced)	Assessment of Species Occurrence in Study Area
Scientific Name	Common Name								
BIRDS									
<i>Empidonax virescens</i>	Acadian Flycatcher	END	END	END	G5	S1B	OBBA	In Ontario, the Acadian flycatcher breeds in the understory of large, mature, closed-canopy forests, swamps and forested ravines – often containing Beech and Maple. This is a southern species typically only found along the shore of Lake Erie in southwestern Ontario. It prefers forests greater than 40 ha in size, and exhibits edge sensitivity preferring the deep interior of the forest. Its nest is loosely woven and placed near the tip of branch in a small tree or shrub often, but not always, near water.	Unlikely Present: No interior forest habitat is present in the study area that would support this species.
<i>Haliaeetus leucocephalus</i>	Bald Eagle	-	SC	-	G5	S4	eBird (2020)	Prefers deciduous and mixed deciduous forest; and habitat close to water bodies such as lakes and rivers. Typically nests in large, super-canopy trees.	Not Present: Smaller creeks such as Pine Creek that are not associated with mature forest are not likely to significantly contribute to Bald Eagle habitat. There was one record of this species in the study area via eBird (dated 2020), but it was noted as a flyover. Smaller creeks such as Pine Creek that are not associated with mature forest are not likely to significantly contribute
<i>Riparia riparia</i>	Bank Swallow	SC	SC	SC	G5	S4B	OBBA	Sand, clay or gravel riverbanks or steep riverbank cliffs; lakeshore bluffs or easily crumbled sand or gravel; gravel pits, road cuts, grassland or cultivated fields that are close to water. Nesting sites are limiting factor for species presence.	Not Present: Steep vertical banks or cliffs are not present in the study area.
<i>Hirundo rustica</i>	Barn Swallow	THR	THR	THR	G5	S4B	eBird, OBBA	Prefers farmland, lake/river shorelines, wooded clearings, urban populated areas, rocky cliffs and wetlands. They nest inside or outside buildings, under bridges and in road culverts, or on rock faces and caves.	Potentially Present: Species was not observed during field investigations, although suitable structures for nesting (e.g., box culverts) are present in the study area.
<i>Chlidonias niger</i>	Black Tern	-	SC	-	G4G5	S3B,S4M	NHIC, eBird	Prefers marshes where they build floating nests in colonies in shallow water. Cattails are often used as nest material.	Not Present: All nearby eBird records of this species are associated with Frenchman’s Bay to the south - there is no suitable habitat in the study area.
<i>Dolichonyx oryzivorus</i>	Bobolink	THR	THR	THR	G5	S4B	OBBA	Forage crops fields, grassland habitats including wet prairie, graminoid peatlands and abandoned fields dominated by tall grasses, remnants of uncultivated virgin prairie (tall-grass prairie), no-till cropland, small-grain fields, restored surface mining sites and irrigated fields in arid regions (COSEWIC, 2010). Requires large tracts of grassland habitat (>50 ha).	Not Present: Preferred habitat (i.e., large tracts of grassland) is not present in the study area. Species was not observed in the study area during breeding bird surveys.

Species		SARA Status	ESA Status	COSEWIC Status	G-Rank	S-Rank	Data Source	Habitat Requirements (MNR, 2000 unless otherwise sourced)	Assessment of Species Occurrence in Study Area
Scientific Name	Common Name								
<i>Cardellina canadensis</i>	Canada Warbler	THR	SC	SC	G5	S5B	MNR Midhurst	An interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat; usually requires at least 30 ha.	Not Present: The small patches of remnant forest in the study area are not expected to provide suitable habitat for this species.
<i>Chaetura pelagica</i>	Chimney Swift	THR	THR	THR	G4G5	S3B	NHIC, eBird, OBBA	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer. Now, most are found in urban areas in large, uncapped chimneys.	Not Present: Species was not observed in the study area during field investigations, and the study area contains no buildings with chimneys that may be used for nesting.
<i>Chordeiles minor</i>	Common Nighthawk	THR	SC	SC	G5	S4B	OBBA	Nesting habitat consists of open areas with little to no ground vegetation; such as clearings in dense forests, open woodlands, ploughed fields, gravel beaches or barren areas with rocky soils. Prefers natural sites but has been known to use anthropogenic sites such as roadsides and railways.	Not Present: Species was not observed in the study area during field investigations. Open ground and clearings suitable for nesting were not found in the study area.
<i>Sturnella magna</i>	Eastern Meadowlark	THR	THR	THR	G5	S4B,S3N	NHIC, OBBA	Open grasslands with dense ground cover, hay fields, meadows, fallow fields. Generally requires large tracts of grassland (>50 ha) but has been observed to use mosaics of smaller grassland areas, pastures, and similar. The MNR defines general habitat as the nest and suitable habitat within 300 metres of a nest or centre of defended territory.	Not Present: The study area does not provide sufficient area of suitable habitat; there is a concentration of eBird records associated with open habitat in a wide hydro corridor a distance to the north, which could be the source of the record.
<i>Contopus virens</i>	Eastern Wood-Pewee	SC	SC	SC	G5	S4B	NHIC, OBBA	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges.	Potentially Present: Woodland habitat in the study area is closely restricted to the immediate stream corridor, and the surrounding area is entirely developed, but some habitat potential is present in deciduous sections in particular where large Oak and Maple dominate.
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	THR	THR	SC	G4	S3B	OBBA	Generally prefer early successional habitat; shrubby, grassy abandoned fields with small deciduous trees bordered by low woodland and wooded swamps; alder bogs; deciduous, damp woods; shrubby clearings in deciduous woods with saplings and grasses; brier-woodland edges; requires >10 ha of habitat. Adults will also use mature forest once young birds have fledged; areas with a mosaic of shrub/open habitat and mature forest are therefore important features.	Not Present: Overall the study area location is highly developed and lacks the necessary open habitat component.
<i>Ammodramus savannarum</i>	Grasshopper Sparrow	SC	SC	-	G5	S4B	OBBA	Generally prefers open grasslands with well-drained sandy soils. Will also use hayfields and pastures.	Not Present: Preferred habitat (i.e., well-drained grasslands) is not present within the study area. Species was not observed in the study area during field investigations.

Species		SARA Status	ESA Status	COSEWIC Status	G-Rank	S-Rank	Data Source	Habitat Requirements (MNRF, 2000 unless otherwise sourced)	Assessment of Species Occurrence in Study Area
Scientific Name	Common Name								
<i>Ixobrychus exilis</i>	Least Bittern	THR	THR	THR	G4G5	S4B	OBBA, eBird	Deep marshes, swamps, bogs; marshy borders of lakes, ponds, streams, ditches; dense emergent vegetation of cattail, bulrush, sedge; nests in cattails; generally intolerant of loss of habitat and human disturbance.	Not Present: Marshes and swamps with sufficient depth and density of vegetation and lack of human disturbance are not present in the study area. The only eBird records in area are associated with Frenchman’s Bay to the south and other waterfront wetlands.
<i>Hylocichla mustelina</i>	Wood Thrush	THR	SC	THR	G4	S4B	OBBA, NHIC	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments.	Potentially Present: Although species was not observed during breeding bird surveys, the study area corridor does contain woodlands that contain suitable habitat features capable of supporting this species.
<i>Icteria virens</i>	Yellow-breasted Chat	-	END	END	G5	S1B	OBBA	Breeds in early successional, shrub-thicket habitats including woodland edges, regenerating old fields, railway and hydro right-of-ways, young coniferous reforestations, and wet thickets bordering wetlands. Tangles of grape (<i>Vitis</i> spp.) and raspberry (<i>Rubus</i> spp.) vines are features of most breeding sites. There is some evidence that the yellow-breasted chat is an area sensitive species. Nests are located in dense shrubbery near to the ground.	Potentially Present: Species was not detected during field investigations, although potentially suitable habitat is present in regenerating woodland or woodland edges throughout the study area.
INSECTS									
<i>Danaus plexippus</i>	Monarch	END	SC	SC	G5	S2N,S4B	OBA	Exist primarily where milkweed (<i>Asclepias</i> spp.) – its obligate larval host plant, and other wildflowers exist. This includes abandoned farmland, roadsides and other open spaces.	Present: This species was directly observed in the study area. Notwithstanding, although Milkweed was present, it was not observed in quantities that would make this habitat significant in terms of breeding. The majority of the study area habitat was wooded, so foraging habitat was limited mostly to edges or clearings in the woodlands.
MAMMALS									
<i>Myotis leibii</i>	Eastern Small-footed Myotis	END	END	END	G4	S2S3	General Screening	<u>Overwintering habitat:</u> Caves and mines that remain above 0°C. <u>Maternal Roosts:</u> primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses, and under tree bark.	Unlikely Present: Rocky substrates or other structures suitable for this species were generally found to be absent from the study areas. Overwintering Habitat - Not Present: Caves and mines are not present within the study area.
<i>Myotis lucifugus</i>	Little Brown Myotis	END	END	END	G3G4	S3	General Screening	<u>Overwintering habitat:</u> Caves and mines that remain above freezing. <u>Maternal roosts:</u> Often associated with buildings (attics, barns, etc.). Occasionally found in trees (25-44 cm DBH).	Maternity Habitat - Likely Present: Numerous large DBH trees were present throughout the study area, with a high likelihood that cavities, peeling bark and other suitable sheltering features are present. Leaf-off surveys would be required to document the full extent of <i>Myotis</i> habitat throughout the study area.

Species		SARA Status	ESA Status	COSEWIC Status	G-Rank	S-Rank	Data Source	Habitat Requirements (MNRF, 2000 unless otherwise sourced)	Assessment of Species Occurrence in Study Area
Scientific Name	Common Name								
<i>Myotis septentrionalis</i>	Northern Myotis	END	END	END	G2G3	S3	General Screening	<u>Overwintering habitat</u>: Caves and mines that remain above 0°C. <u>Maternal Roosts</u>: Often associated with cavities of large diameter trees (25-44 cm DBH). Occasionally found in structures (attics, barns etc.)	Overwintering Habitat - Not Present: Caves and mines are not present within the study area.
<i>Perimyotis subflavus</i>	Tricoloured Bat	END	END	END	G3G4	S3?	General Screening	<u>Overwintering habitat</u>: Caves and mines that remain above 0°C. <u>Maternal Roosts</u>: Can be in trees or dead clusters of leaves or arboreal lichens on trees; oaks and maples preferred. May also use barns or similar structures.	Maternity Habitat - Likely Present: Large-diameter maples and oaks with potential for Tricolored Bat habitat were identified in wooded portions of the study area. Overwintering Habitat - Not Present: Caves and mines are not present within the study area.
PLANTS									
<i>Fraxinus nigra</i>	Black Ash	-	END	END	G5	S4	NHIC	Tree species common to swamps, experiencing declines due to Emerald Ash Borer. Wetlands and saturated lowlands serve as habitat to this species. Note: Note: Although the application of general prohibitions against adversely impacting this species and its habitat is currently suspended under provincial SAR legislation, it has been designated Endangered by under both the ESA and COSEWIC, and protection for this species could be subject to change in future.	Unlikely Present: Species was not identified on the site during field investigations.
<i>Juglans cinerea</i>	Butternut	END	END	END	G3	S2?	NHIC, ABL	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows.	Present: Two mature Butternuts were confirmed throughout the Pine Creek corridor. Both are in the northern half, associated with deciduous woodland. One of the two Butternut is in poor condition with heavy signs of cankering and die-back, while the other seems relatively healthy with minimal cankering.
<i>Silphium perfoliatum</i> <i>var. perfoliatum</i>	Cup Plant	-	-	-	G5	S2	ABL	This sunflower-like species in the Aster family typically grows in full or partial sun with moist/loamy soil habitats such as moist prairies, moist meadows near rivers, low-lying woodland edges/thickets, fens and seeps, lake borders, fence rows, and along railroad ditches.	Present: Documented by Aquafor within the study area corridor (Polygon 1 – CUW1a). A large number of this species were found clustered in one area that contained other species common to planting plans, suggesting it may have been included in a restoration mix previously.
<i>Euonymus atropurpureus</i>	Eastern Burning Bush	-	-	-	G5	S3	NHIC	Native habitat of this shrub is moist, open woods, stream banks/bottoms, and thickets, particularly where there is deep rich humus soils or limestone soils that are well drained, and with dappled shade.	Unlikely Present: This species was not identified n the site during field investigations. Records are likely historical.

Species		SARA Status	ESA Status	COSEWIC Status	G-Rank	S-Rank	Data Source	Habitat Requirements (MNRF, 2000 unless otherwise sourced)	Assessment of Species Occurrence in Study Area
Scientific Name	Common Name								
<i>Lupinus perennis</i>	Sundial Lupine	-	-	-		S2S3	NHIC	This is a nitrogen fixing herbaceous plant species that prefers dry, sandy soils with full sun to moderate shade. It is often associated with sandy hills, clearings and open woods (e.g. black oak sand savannahs) where bare sand is present. Fire suppression has contributed to reduced occurrences of this species.	Not Present: Dry, open sandy habitat most suitable to this species was not observed in the study area.
REPTILES AND AMPHIBIANS									
<i>Emydoidea blandingii</i>	Blanding's Turtle	-	THR	END	G4	S3	ORAA	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	Unlikely Present: Although some wetland features were observed in the study area (e.g. MAM2-10 – Polygon X), these are heavily vegetated marsh features that did not contain a sufficient depth of standing water to support this species. It is likely that records of this species are associated with larger lakefront wetlands to the south.
<i>Thamnophis sauritus</i>	Eastern Ribbonsnake	-	SC	SC	G5	S3	NHIC, ORAA	Eastern Ribbonsnake is semi-aquatic and most frequently found along wetland edges. Quiet, shallow water with low surrounding cover is preferred, although areas with good exposure to sunlight are also required. Gravid females may move away from water before nesting, as females and juveniles are occasionally found in upland areas (COSEWIC, 2002)	Unlikely Present: This species was not observed during field investigations and the majority of aquatic and wetland habitat did not feature good sun exposure due to heavy vegetation cover. There was only one record of this species in the atlas, dated 1968; therefore, it may be a historical observation.
<i>Chrysemys picta marginata</i>	Midland Painted Turtle	SC	-	SC	G5	S4	NHIC, ORAA	Quiet, warm, shallow water with abundant aquatic vegetation such as ponds, large pools, streams, ditches, swamps, marshy meadows; eggs are laid in sandy places, usually in a bank or hillside, or in fields; basks in groups; not territorial.	Unlikely Present: Although a tributary flows through the study area, its size, shallow depth and lack of connectivity to permanent ponded features likely limits occurrences of this species to transient individuals using the creek corridor for movement.
<i>Lampropeltis Triangulum</i>	Eastern Milksnake	SC	-	SC	G5	S4	ORAA	This habitat generalist may utilize a variety of different habitats including open or forested natural areas, but shows preference to sites that can provide hibernation opportunities (old foundations, mammal burrows, old logs, etc.) and are in close proximity to water.	Potentially Present: Not observed during field investigations but could feasibly occur in the study area based on present habitat features (e.g. generalist habitat along river corridor, high level of connectivity to other natural areas).
<i>Graptemys geographica</i>	Northern Map Turtle	SC	SC	SC	G5	S3	ORAA	Large bodies of water with soft bottoms and aquatic vegetation, basks on logs or rocks or on beaches and grassy edges. Uses soft soil or clean dry sand for nest sites, may nest some distance from water.	Unlikely Present: The study area lacks large, permanent bodies of water that would appeal to this species. Existing records are likely associated with Lake Ontario.

Species		SARA Status	ESA Status	COSEWIC Status	G-Rank	S-Rank	Data Source	Habitat Requirements (MNRF, 2000 unless otherwise sourced)	Assessment of Species Occurrence in Study Area
Scientific Name	Common Name								
<i>Chelydra serpentina</i>	Snapping Turtle	SC	SC	SC	G5	S4	NHIC, ORAA	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravelly or sandy areas along streams. Snapping turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Potentially Present: Although a tributary flows through the study area, its size, shallow depth and lack of connectivity to permanent ponded features likely limits occurrences of this species to transient individuals using the creek corridor for movement.
<i>Pseudacris triseriata</i>	Western Chorus Frog	THR	-	THR	G5TN RQ	S4	ORAA	Habitat for this species typically consists of marshes or wooded wetlands, particularly those with dense shrub layers and grasses. Prefers fishless ponds with at least 10 cm of standing water for breeding. This species hibernates in terrestrial habitats under rocks, dead trees or leaves, in loose soil or in animal burrows.	Potentially Present: This species was not observed during field investigations, although potential habitat is present in the shallow marsh centrally located in the study area (MAM2-10 – Polygon X). There are nine records of this species in the atlas (ranging 1987-2013) for the 10x10 km square containing the study area. The timing of field investigations carried out by Aquafor is not appropriate to determine anuran populations, and spring amphibian surveys would be require to determine if this species is present.
FISH									
<i>Anguilla rostrata</i>	American Eel		END	THR	G4	S1S2	NHIC	In Ontario, the American Eel is native to the Lake Ontario, St. Lawrence River and Ottawa River watersheds, with the Ottawa River population considered extirpated. Their current distribution also includes lakes Huron, Erie, and Superior and their tributaries. The preferred habitat of the American eel is cool water of lakes and streams with muddy or silty substrates in water temperatures between 16 and 19°C. The American eel is a catadromous fish that lives in fresh water until sexual maturity then migrates to the Sargasso Sea to spawn.	Unlikely Present: Although there are NHIC records of this species in the vicinity of the study area, the DFO does not recognize any aquatic SAR within Pine Creek. It is likely these records are associated with Frenchman’s Bay, where they are most likely to be located in deeper, cooler water in the center of the Bay or the Bay inlet, rather than the Bay’s associated tributaries. As American Eel spawn in the Sargasso Sea and migrate from freshwater to do so, there are no timing windows associated with this species in Ontario. Notwithstanding, any works within and directly surrounding Pine Creek will still require approval in consultation with the DFO, and a fish rescue within the impact area should be conducted prior to construction as mitigation for this species and any other creek spawning fish.

Appendix G –
OSAP Field Sheets

Site Identification

Stream Code	PC	Site Code	PC1	Sample	01	Date (yyyy-mm-dd)	2022-09-14
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Stream Name

PINE CREEK

Site Length (m)

~40.0

Record using NAD83 datum	Uncorr. UTM	Zone	17	Easting	653179.0	North	4855237.0
	Corr. UTM	Zone	1	Easting		North	

OR

Lat.	DD	MM	SS.sss
Long.			

Source of Uncorrected UTM Coordinates

GPS/DGPS ☐

GIS ☐

OBM ☐

Other

Source of Corrected UTM Coordinates

FWIS ☐

Ortho-photos ☐

GIS ☐

Other

Name of Layer Used for Correction

Access Route

NORTH ON 29 FROM 401, WEST ON KINGSTON RD, NORTH ON CLENDALE, WEST ON BRONTE, PARK @ PED PATH

Site Description

PARK ON BRONTE @ PED PATH, WALK WEST TO BRIDGE

☐

Site Was Unsampleable - add reason(s) on reverse

Sketches

Site/Access Route Sketch

Be sure to include enough detail in sketches to ensure that someone could find the site again; include a north arrow and the locations of all markers and noted features. The artist should also sign the sketches.

Comments

Crew Leader (init. & last name)

G-331

Crew

Recorder

Entered

Verified

Corrected

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Site Features

Mandatory Fields In Grey
Must be filled out for processing

Stream Code PC	Site Code PC1	Sample 01	Date (mm-dd) 2022 09-14
Stream Name PINE CREEK			

For each landuse, check box that applies. Be sure to include comments explaining the particulars, including names and numbers of contacts

Site Features	Ongoing & Active	Historical Evidence	No Evidence but Reported	No Evidence	Unknown	Comments
Potential Point or Non-point Source Contaminant Sources	☒	☐	☐	☐	☐	OUTFALLS, PED PATH, LAWN, HOUSES
Major Nutrient Sources Upstream	☒	☐	☐	☐	☐	ROADS, DEV
Channel Hardening or Straightening	☒	☐	☐	☐	☐	OUTFALLS, ABUTMENT
Adjacent Landuses that Destabilize Banks	☒	☐	☐	☐	☐	LAWN, PED PATH
Sediment Loading or Deprivation	☒	☐	☐	☐	☐	LOADING
Instream Habitat Modifications	☒	☐	☐	☐	☐	OUTFALLS, ABUTMENT
Barriers and/or Dams in the Vicinity of the Site	☒	☐	☐	☐	☐	BEAVER, ACTIVITY D/S
High Fishing Pressure	☐	☐	☐	☒	☐	
Log Jam Deflectors	☒	☐	☐	☐	☐	BEAVERS
Springs or Seeps at the Site	☐	☐	☐	☒	☐	
Impervious Substrate Limiting Burrowing Depth of Fish	☐	☐	☐	☒	☐	
Fish Stocked Near Sample Site	☐	☐	☐	☒	☐	
Other Activities that Could Influence Biota or Habitat	☒	☐	☐	☒	☐	BEAVERS

Sources of Information

Visual Immediate ☒ Visual Extended ☐ Interview ☒ Maps & Photos ☐

Riparian Vegetation Community

Only check one box for each bank and zone.

Temperatures

Time (24hr)

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Water Temp (°C)

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Max. Water Temp (°C)

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Air Temp (°C)

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Max Air Temp (°C)

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Source of Max. Air Temp

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Dominant Vegetation Type

Riparian Zone	Left Bank					Right Bank								
	None	Lawn	Crop-land	Mea-dow	Scrub-land	Forest	Wet-lands	None	Lawn	Crop-land	Mea-dow	Scrub-land	Forest	Wet-lands
1.5-10m	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐
10-30m	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐
30-100m	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐

Comments

Crew Leader (initial & last name)

G	S	B									
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Crew Initials

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Recorder

Ent/Scanned

Verified

Corrected

Mandatory Fields In Grey
Must be filled out for processing

Dste YY MM DD
26 22 09 14

Site Type
☐ Calibration ☒ Survey

Crew Leader (initial & last name)

Crew

Recorder

DINE CRJEX

Q EBY

	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
Depth (mm)	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm								
101 - 600 mm			X	18	08			
601 - 1000 mm								
> 1000 mm								
Total # Points			10	08				

Note:
Grey hatched
areas are for
tally marks.

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points						

pes	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)	gavia feces
Point Particle	16	02			
Maximum Particle	13	05			

Mean Stream Width (m) Mean Depth at Crossover (mm) Maximum Particle Size (mm)

Eroding Bank

Angle > 45°, erodible soil, undercut or bare soil

Vulnerable Bank

Angle > 45°, erodible soil, no sign of recent erosion

Protected Bank

Angle > 45°, non-erodible material/soil

Deposition Zone

Angle < 45°, (gradual slope from river), fine grained sediments

Comments

Rooted Mac, Heavy silt, Fish

Ent/Scanned	Verified	Corrected
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Site Identification

Stream Code	Site Code	Sample	Date (yyyy-mm-dd)
PC	PC2	01	2022-09-14

Stream Name	Site Length (m)
PINE CREEK	

Record using NAD83 datum	Uncorr. UTM	Zone	Easting	North	OR Lat	DD	MM	SS.sss	
		17	692988.0	4855642.0					
	Corr. UTM	Zone	Easting	North		Long.			
	1								

Source of Uncorrected UTM Coordinates

GPS/DGPS ☐ Other ☐

GIS ☐

OBM ☐

Source of Corrected UTM Coordinates

FWIS ☐ Other ☐

Ortho-photos ☐

GIS ☐

Name of Layer Used for Correction

Access Route

NORTH ON 29 FROM 401, WEST ON GLENANNA, DARK @ PED PATH

Site Description

WALK NORTH TO OPENING IN FOREST TO CREEK

☐ Site Was Unsampleable - add reason(s) on reverse

Sketches

Site/Access Route Sketch

Be sure to include enough detail in sketches to ensure that someone could find the site again; include a north arrow and the locations of all markers and noted features. The artist should also sign the sketches.

Comments

Crew Leader (init. & last name)

G. COOY

Crew

Recorder

Entered

Verified

Corrected

Site Features

Mandatory Fields In Grey
Must be filled out for processing

Stream Code PC	Site Code PCZ	Sample 01	Date (mm-dd) 2022 09-11
Stream Name PINE CREEK			

For each landuse, check box that applies. Be sure to include comments explaining the particulars, including names and numbers of contacts

Site Features	Ongoing & Active	Historical Evidence	No Evidence but Reported	No Evidence	Unknown	Comments
Potential Point or Non-point Source Contaminant Sources	☒	☐	☐	☐	☐	PARK
Major Nutrient Sources Upstream	☒	☐	☐	☐	☐	DEV, ROADS
Channel Hardening or Straightening	☒	☐	☐	☐	☐	HISTORIC RESTORATION?
Adjacent Landuses that Destabilize Banks	☒	☐	☐	☐	☐	PARK / PATH
Sediment Loading or Deprivation	☐	☐	☐	☒	☐	
Instream Habitat Modifications	☒	☐	☐	☐	☐	
Barriers and/or Dams in the Vicinity of the Site	☐	☐	☐	☒	☐	
High Fishing Pressure	☐	☐	☐	☒	☐	
Log Jam Deflectors	☒	☐	☐	☐	☐	
Springs or Seeps at the Site	☐	☐	☐	☒	☐	
Impervious Substrate Limiting Burrowing Depth of Fish	☐	☐	☐	☒	☐	
Fish Stocked Near Sample Site	☐	☐	☐	☒	☐	
Other Activities that Could Influence Biota or Habitat	☐	☐	☐	☒	☐	

Sources of Information
Visual Immediate ☐ Visual Extended ☐ Interview ☐ Maps & Photos ☐

Riparian Vegetation Community
Only check one box for each bank and zone.

Temperatures Time (24hr)		Air Temp (°C)	
☐	☐	☐	☐
Water Temp (°C)		Max Air Temp (°C)	
☐	☐	☐	☐
Max. Water Temp (°C)		Source of Max. Air Temp	
☐	☐	☐	☐

Riparian Zone	Left Bank					Right Bank						
	None	Lawn	Crop-land	Meadow	Scrub-land	Wet-lands	None	Lawn	Crop-land	Meadow	Scrub-land	Wet-lands
1.5-10m	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐
10-30m	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐
30-100m	☐	☒	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐

Comments

Crew Leader (initial & last name)

CE												
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Crew Initials

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Recorder

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Ent/Scanned Verified

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Corrected

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Mandatory Fields In Grey
Must be filled out for processing

Date YY MM DD
2022-09-14

Site Type

☐ Calibration ☐ Survey

Stream Name

Crew Leader (initial & last name)

Crew

Recorder

PINE CREEK

C E B T

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)		
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	
0 - 100 mm									
101 - 600 mm	04	02	04	02					
601 - 1000 mm									
> 1000 mm									
Total # Points	04	02	04	02	04	02			

Note:
Grey hatched
areas are for
tally marks.

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points						

pes	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)	gavia feces
Point Particle	☒ 14	☒ 05	☒ 05	☐	☐
Maximum Particle	☒ 11	☒ 04	☒ 09	☐	☐

Mean Stream Width (m) Mean Depth at Crossover (mm) Maximum Particle Size (mm)

Eroding Bank

Angle > 45°, erodible soil, undercut or bare soil

Vulnerable Bank

Angle > 45°, erodible soll. no sign of recent erosion

Protected Bank-

Angle > 45°, non-erodible material/soil

Deposition Zone

Angle < 45°, (gradual slope from river), fine grained sediments

Comments

FISH IN POOL, CONSOLIDATED CLAY AND BOULDERS THROUGHOUT, RESTORATION? ATTACHED ALGAE, FIL, SOME MAC

Ent/Scanned Verified Corrected

Site Identification

Stream Code		Site Code		Sample	Date (yyyy-mm-dd)	
KR		KR		01	2022-09-14	
Stream Name					Site Length (m)	
KITLEY RAVINE						
Record using NAD83 datum	Zone	Easting	Northing		OR Lat.	
	Uncorr. UTM	17	652947.0	4859826.0		
	Corr. UTM	1				
	DD	MM	SS.sss			
Source of Uncorrected UTM Coordinates		Source of Corrected UTM Coordinates		Name of Layer Used for Correction		
GPS/DGPS ☐ Other ☐		FWIS ☐ Other ☐				
GIS ☐		Ortho-photos ☐				
OBM ☐		GIS ☐				

Access Route

NORTH ON DIXIE FROM 401, EAST ON KITLEY, PARK

Site Description

WALK NORTH TO CREEK, OFF OF RAVINE @ END OF GABION



Site Was Unsampleable - add reason(s) on reverse

Sketches

Site/Access Route Sketch

Be sure to include enough detail in sketches to ensure that someone could find the site again; include a north arrow and the locations of all markers and noted features. The artist should also sign the sketches.

Comments

Crew Leader (init. & last name)

G 03

Crew

Recorder

Entered

Verified

Corrected

Site Identification

Stream Code	PC	Site Code	PC3	Sample	01	Date (yyyy-mm-dd)	2022-09-14
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Stream Name	PINE CREEK	Site Length (m)	540.0
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Record using NAD83 datum	Uncorr. UTM	Zone	17	Easting	692064.0	Northing	4896075.0	OR Lat.	DD	MM	SS.sss
	Corr. UTM	Zone	1	Easting		Northing			Long.		

Source of Uncorrected UTM Coordinates	Source of Corrected UTM Coordinates	Name of Layer Used for Correction
GPS/DGPS ☐ GIS ☐ OBM ☐	FWIS ☐ Ortho-photos ☐ GIS ☐	

Access Route

WALK WEST ON FINCH FROM DIXIE, NORTH ON BUNCANNON, PARK

Site Description

WALK SOUTH ACROSS FINCH, LOCATE CULVERT

☐ Site Was Unsampleable - add reason(s) on reverse

Sketches

Site/Access Route Sketch

Be sure to include enough detail in sketches to ensure that someone could find the site again; include a north arrow and the locations of all markers and noted features. The artist should also sign the sketches.

Comments

Crew Leader (init. & last name)	Crew	Recorder	Entered	Verified	Corrected
G. E. B.					

Site Features

Mandatory Fields In Grey
Must be filled out for processing

Stream Code PC	Site Code PC3	Sample 01	Date (mm-dd) 2012 09-14
Stream Name PINE CREEK			

For each landuse, check box that applies. Be sure to include comments explaining the particulars, including names and numbers of contacts

Site Features	Ongoing & Active	Historical Evidence	No Evidence but Reported	No Evidence	Unknown	Comments
Potential Point or Non-point Source Contaminant Sources	☒	☐	☐	☐	☐	FINCH
Major Nutrient Sources Upstream	☒	☐	☐	☐	☐	DEV, FINCH
Channel Hardening or Straightening	☐	☐	☐	☒	☐	
Adjacent Landuses that Destabilize Banks	☒	☐	☐	☐	☐	U/S RUNOFF
Sediment Loading or Deprivation	☐	☐	☐	☒	☐	
Instream Habitat Modifications	☒	☐	☐	☐	☐	CULVERT
Barriers and/or Dams in the Vicinity of the Site	☒	☐	☐	☐	☐	"
High Fishing Pressure	☐	☐	☐	☒	☐	
Log Jam Deflectors	☒	☐	☐	☐	☐	MAJOR
Springs or Seeps at the Site	☐	☐	☐	☒	☐	
Impervious Substrate Limiting Burrowing Depth of Fish	☐	☐	☐	☒	☐	
Fish Stocked Near Sample Site	☐	☐	☐	☒	☐	
Other Activities that Could Influence Biota or Habitat	☐	☐	☐	☒	☐	

Sources of Information

Visual Immediate ☒ Visual Extended ☐ Interview ☐ Maps & Photos ☐

Riparian Vegetation Community
Only check one box for each bank and zone

Temperatures

Time (24hr)

		:		
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Water Temp (°C)

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Max. Water Temp (°C)

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Air Temp (°C)

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Max Air Temp (°C)

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Source of Max. Air Temp

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Dominant Vegetation Type

Riparian Zone	Left Bank					Right Bank								
	None	Lawn	Crop-land	Mea-dow	Scrub-land	Forest	Wet-lands	None	Lawn	Crop-land	Mea-dow	Scrub-land	Forest	Wet-lands
1.5-10m	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐
10-30m	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐
30-100m	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐

Comments

Crew Leader (initial & last name)

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Crew Initials

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Recorder

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Ent/Scanned

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Verified

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Corrected

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Rapid Assessment Methodology Field Form

Mandatory Fields In Grey
Must be filled out for processing

Stream Code
Site Code
Sample

Date YY MM DD

Site Type
☐ Calibration ☐ Survey

Stream Name

PINE CREEK

Crew Leader (initial & last name)

CEBT

Crew

Recorder

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm	02	04	04	02	04	02	02	02
101 - 600 mm	02	04	02	02	02	02	02	02
601 - 1000 mm	02	02	02	02	02	02	02	02
> 1000 mm	02	02	02	02	02	02	02	02
Total # Points	02	04	04	02	04	02	02	02

Note:
Grey hatched
areas are for
tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points	01	02	02	01	01	01

Substrate Types

	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)	gavia feces
Point Particle	12	04	02	02	02
Maximum Particle	07	07	04	02	02

Bank Stability

Mean Stream Width (m) Mean Depth at Crossover (mm) Maximum Particle Size (mm)

Eroding Bank 06	Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank 02	Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank 02	Angle > 45°, non-erodible material/soil
Deposition Zone 02	Angle < 45°, (gradual slope from river), fine grained sediments

Comments

Ent/Scanned Verified Corrected

Site Identification

Stream Code	Site Code	Sample	Date (yyyy-mm-dd)
DR	DK1	01	2022-09-14

Stream Name	Site Length (m)
DUNCANNON RAVINE	~45.0

Record using NAD83 datum	Uncorr. UTM	Zone	Easting	Northing	OR Lat.	DD	MM	SS.sss
		17	651796.0	4856084.0				
	Corr. UTM	Zone	Easting	Northing		Long.		
	1							

Source of Uncorrected UTM Coordinates

GPS/DGPS ☐

GIS ☐

OBM ☐

Other

Source of Corrected UTM Coordinates

FWIS ☐

Ortho-photos ☐

GIS ☐

Other

Name of Layer Used for Correction

Access Route

FROM SAME PARK AS PB3

Site Description

NORTH OF FINCH AVE

☐

Site Was Unsampleable - add reason(s) on reverse

Sketches

Site/Access Route Sketch

Be sure to include enough detail in sketches to ensure that someone could find the site again: include a north arrow and the locations of all markers and noted features. The artist should also sign the sketches.

Comments

WOOD PEENEE

Crew Leader (init. & last name)

G EBY

Crew

--	--	--	--	--

Recorder

Entered

Verified

Corrected

Site Features

Mandatory Fields In Grey
Must be filled out for processing

Stream Code DR	Site Code DR1	Sample 01	Date (mm-dd) 2022 09-14
Stream Name DUNCANNOON RAVINE			

For each landuse, check box that applies. Be sure to include comments explaining the particulars, including names and numbers of contacts

Site Features	Ongoing & Active	Historical Evidence	No Evidence but Reported	No Evidence	Unknown	Comments
Potential Point or Non-point Source Contaminant Sources	☒	☐	☐	☐	☐	DUMPING, FINCH, RES
Major Nutrient Sources Upstream	☒	☐	☐	☐	☐	" , CEMETERY, OCV
Channel Hardening or Straightening	☐	☐	☐	☒	☐	
Adjacent Landuses that Destabilize Banks	☒	☐	☐	☐	☐	DUMPING
Sediment Loading or Deprivation	☐	☐	☐	☒	☐	
Instream Habitat Modifications	☒	☐	☐	☐	☐	CULVERT @ FINCH
Barriers and/or Dams in the Vicinity of the Site	☒	☐	☐	☐	☐	
High Fishing Pressure	☐	☐	☐	☒	☐	
Log Jam Deflectors	☒	☐	☐	☐	☐	MATOR
Springs or Seeps at the Site	☐	☐	☐	☒	☐	
Impervious Substrate Limiting Burrowing Depth of Fish	☐	☐	☐	☒	☐	
Fish Stocked Near Sample Site	☐	☐	☐	☒	☐	
Other Activities that Could Influence Biota or Habitat	☒	☐	☐	☐	☐	DUMPING

Sources of Information

Visual Immediate ☒ Visual Extended ☐ Interview ☐ Maps & Photos ☒

Riparian Vegetation Community

Only check one box for each bank and zone.

Temperatures

Time (24hr)

--	--	--	--

Air Temp (°C)

--	--	--	--

Water Temp (°C)

--	--	--	--

Max Air Temp (°C)

--	--	--	--

Max. Water Temp (°C)

--	--	--	--

Source of Max. Air Temp

--	--	--	--	--	--	--	--	--	--

Dominant Vegetation Type

Riparian Zone	Left Bank						Right Bank							
	None	Lawn	Crop-land	Mea-dow	Scrub-land	Forest	Wet-lands	None	Lawn	Crop-land	Mea-dow	Scrub-land	Forest	Wet-lands
1.5-10m	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐
10-30m	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐
30-100m	☐	☐	☐	☐	☐	☒	☐	☐	☒	☐	☐	☐	☐	☐

Comments

Crew Leader (initial & last name)

--	--	--	--	--	--	--	--	--	--	--	--	--	--

Crew Initials

--	--

Recorder

--

Ent/Scanned

--

Verified

--

Corrected

--

Mandatory Fields In Grey
Must be filled out for processing

Date YY MM DD
2022-09-14

Site Type
☐ Calibration ☐ Survey

Crew Leader (initial & last name)

Crew

☐ Calibration ☐ Survey

Recorder

DUNCANNON RAVINE

6	EB
---	----

	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
Depth (mm)	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm					L 06 L	06		
101 - 600 mm	02	04						
601 - 1000 mm								
> 1000 mm								
Total # Points	02	04			06	06		

Note:
Grey hatched
areas are for
tally marks.

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points	0 1	06	-	04	0 1	0 1

pes		Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)	gavia feces
Point Particle		06	04	02		
Maximum Particle		02	06	04		

Mean Stream Width (m)	1.5	Mean Depth at Crossover (mm)	20	Maximum Particle Size (mm)	40
Eroding Bank	02	Angle > 45°, erodible soil, undercut or bare soil			
Vulnerable Bank	01	Angle > 45°, erodible soil, no sign of recent erosion			
Protected Bank		Angle > 45°, non-erodible material/soil			
Deposition Zone	03	Angle < 45°, (gradual slope from river), fine grained sediments			

Comments

Ent/Scanned Verified Corrected

Site Identification

Stream Code	Site Code	Sample	Date (yyyy-mm-dd)
PC	PC4	01	2022-09-14

Stream Name	Site Length (m)
PINE CREEK	45.0

*** Record using NAD83 datum	Uncorr. UTM	Zone	Easting	Northing	OR Lat.	DD	MM	SS.sss
		17	651600.0	4856332.0				
	Corr. UTM	Zone	Easting	Northing		Long		
	1							

Source of Uncorrected UTM Coordinates	Source of Corrected UTM Coordinates	Name of Layer Used for Correction
GPS/DGPS ☐ Other ☐	FWIS ☐ Other ☐	
GIS ☐	Ortho-photos ☐	
OBM ☐	GIS ☐	

Access Route

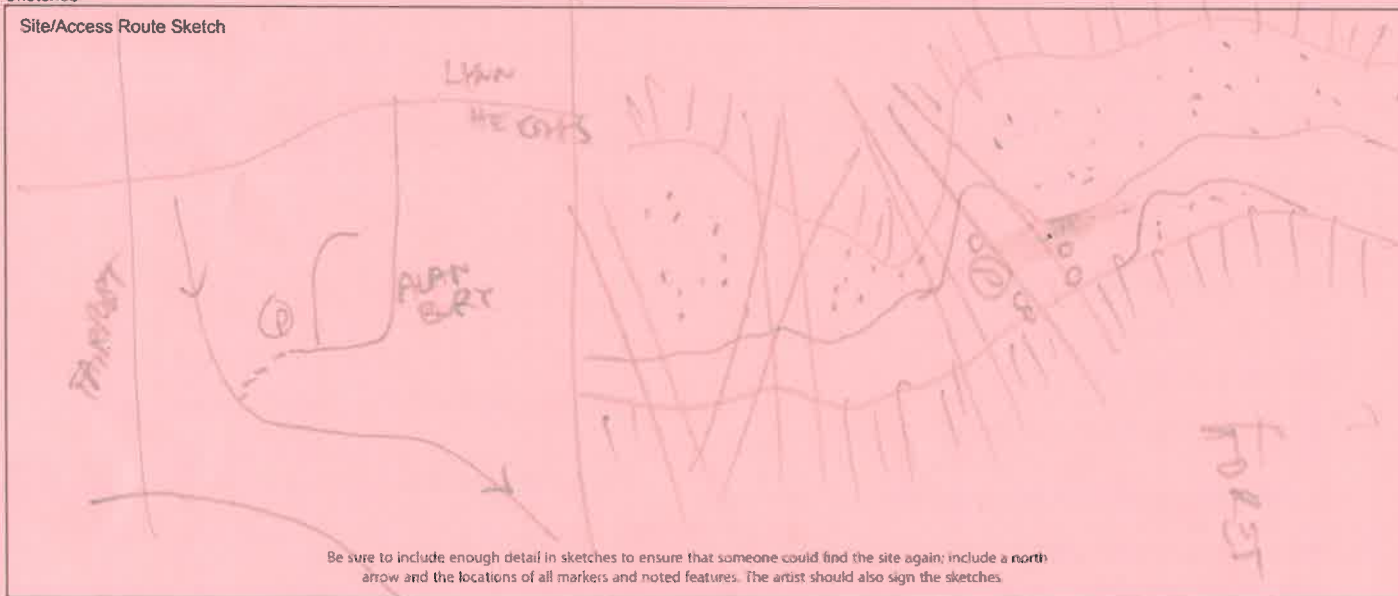
Site Description

PARK @ CUL-DE-SAC, WALK TRAIL @ HYDRANT TO CREEK

☐ Site Was Unsampleable - add reason(s) on reverse

Sketches

Site/Access Route Sketch



Be sure to include enough detail in sketches to ensure that someone could find the site again; include a north arrow and the locations of all markers and noted features. The artist should also sign the sketches

Comments

FISH IN POOLS

Crew Leader (init. & last name)

EBT

Crew

Recorder

Entered

Verified

Corrected

--	--	--	--	--

Site Features

Mandatory Fields In Grey
Must be filled out for processing

Stream Code
PC

Site Code
PC9

Sample
01

Date (mm-dd)
2022 09-14

Stream Name

PINE CREEK

For each landuse, check box that applies. Be sure to include comments explaining the particulars, including names and numbers of contacts

Site Features	Ongoing & Active	Historical Evidence	No Evidence but Reported	No Evidence	Unknown	Comments
Potential Point or Non-point Source Contaminant Sources	☐	☐	☐	☒	☐	
Major Nutrient Sources Upstream	☒	☐	☐	☐	☐	Dev, Roads, AO
Channel Hardening or Straightening	☐	☐	☐	☒	☐	
Adjacent Landuses that Destabilize Banks	☐	☐	☐	☒	☐	
Sediment Loading or Deprivation	☐	☐	☐	☒	☐	
Instream Habitat Modifications	☐	☐	☐	☒	☐	
Barriers and/or Dams in the Vicinity of the Site	☒	☐	☐	☐	☐	SAMS
High Fishing Pressure	☐	☐	☐	☒	☐	
Log Jam Deflectors	☒	☐	☐	☐	☐	
Springs or Seeps at the Site	☐	☐	☐	☒	☐	
Impervious Substrate Limiting Burrowing Depth of Fish	☐	☐	☐	☒	☐	
Fish Stocked Near Sample Site	☐	☐	☐	☒	☐	
Other Activities that Could Influence Biota or Habitat	☐	☐	☐	☒	☐	

Sources of Information

Visual Immediate ☐

Visual Extended ☐

Interview ☐

Maps & Photos ☐

Riparian Vegetation Community

Only check one box for each bank and zone.

Dominant Vegetation Type

Temperatures

Time (24hr)

Water Temp (°C)

Max. Water Temp (°C)

Air Temp (°C)

Max Air Temp (°C)

Source of Max. Air Temp

Riparian Zone	Left Bank					Right Bank								
	None	Lawn	Crop-land	Mea-dow	Scrub-land	Forest	Wet-lands	None	Lawn	Crop-land	Mea-dow	Scrub-land	Forest	Wet-lands
1.5-10m	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐
10-30m	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☒	☐
30-100m	☒	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐

Comments

Crew Leader (initial & last name)

CB

Crew Initials

Recorder

Ent/Scanned

Verified

Corrected

Mandatory Fields In Grey
Must be filled out for processing

Date YY MM DD
2022-09-14

Site Type
☐ Calibration ☐ Survey

Stream Name

Crew Leader (initial & last name)

Crew

Recorder

PINE CREEK

Channel Structure

Depth (mm)	Pools (Hydraulic Head = 0-3 mm)		Glides (Hydraulic Head = 4-7 mm)		Slow Riffles (Hydraulic Head = 8-17 mm)		Fast Riffles (Hydraulic Head > 17 mm)	
	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present	No Cover	Cover Present
0 - 100 mm	1	06	06	1	1	06	1	1
101 - 600 mm	1	06	1	1	1	1	1	1
601 - 1000 mm	1	1	1	1	1	1	1	1
> 1000 mm	1	1	1	1	1	1	1	1
Total # Points	1	06	06	1	1	06	1	1

Note:
Grey hatched
areas are for
tally marks.

Instream Cover

Cover Types	Flat Rock	Round Rock	Wood	Macrophytes	Bank	Other
Number of Points	00	01	09	:	03	00

Substrate Types

pes	Fines (<2 mm)	Gravel (2-100 mm)	Cobble (100-1000mm)	Bedrock (>1000mm)	gavia feces
Point Particle					
Maximum Particle					

Bank Stability

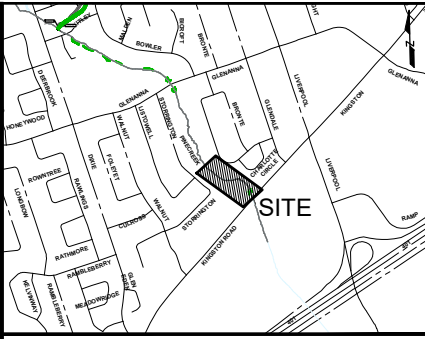
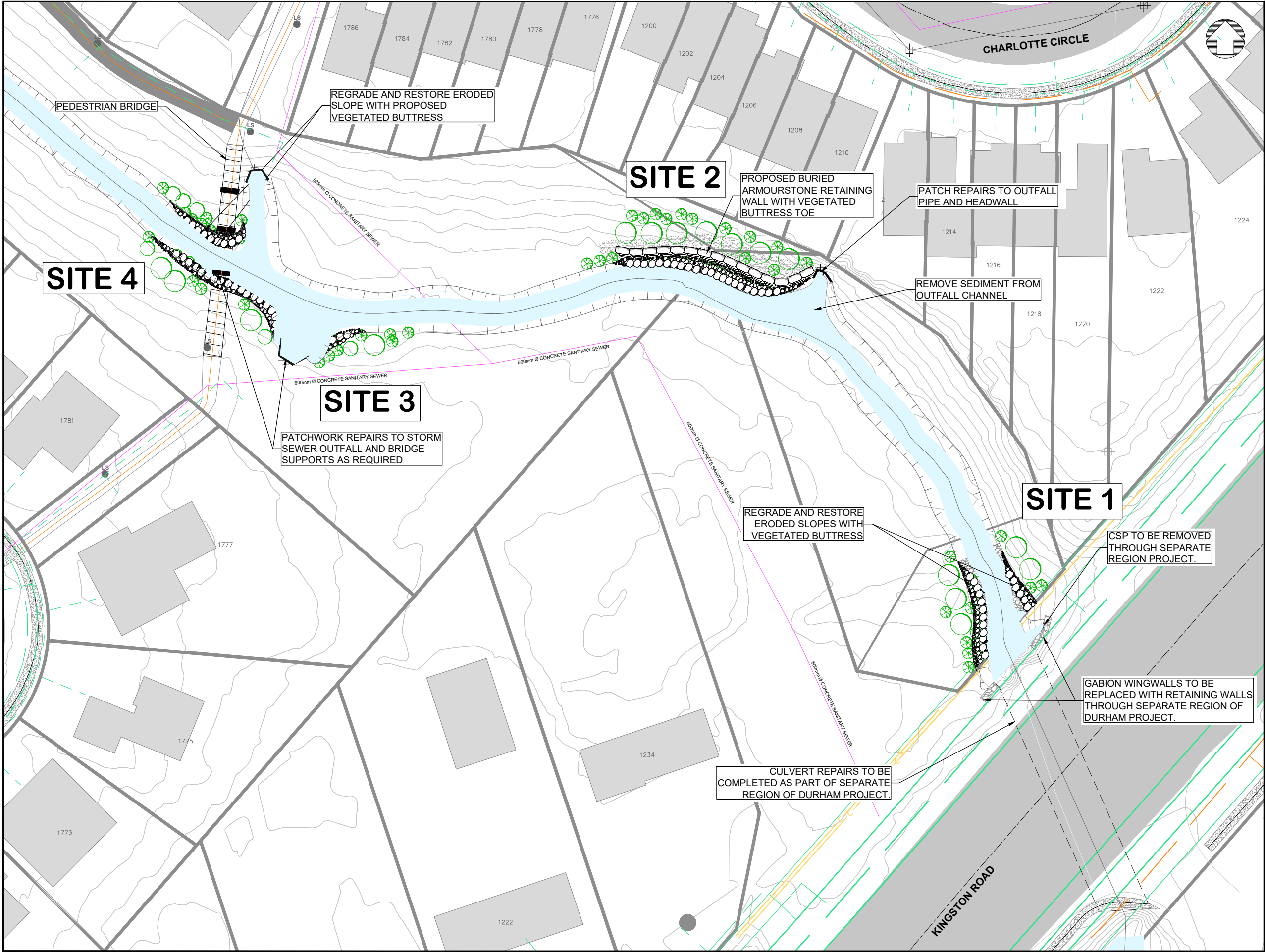
Mean Stream Width (m) Mean Depth at Crossover (mm) Maximum Particle Size (mm)

Eroding Bank		Angle > 45°, erodible soil, undercut or bare soil
Vulnerable Bank		Angle > 45°, erodible soil, no sign of recent erosion
Protected Bank		Angle > 45°, non-erodible material/soil
Deposition Zone		Angle < 45°, (gradual slope from river), fine grained sediments

Comments

Ent/Scanned	Verified	Corrected
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Appendix H –
Conceptual Design Drawings for the EA Alternatives



KEY PLAN N.T.S

3	ISSUED FOR REGION REVIEW	2023-07-12
2	ISSUED FOR PIC	2023-05-18
1	ISSUED FOR REVIEW	2022-11-21
No.	REVISION	By DATE

- LEGEND:
- PROPERTY LINE
 - STORMLINE
 - SANITARY
 - REGIONAL FLOODLINE
 - HYDRO UTILITIES
 - BELL UTILITIES
 - ELEXICON ENERGY UTILITIES
 - ENGBRIDGE UTILITIES
 - EASEMENT REQUIRED ON REGION OF DURHAM PROPERTY

THE POSITION OF THE POLE LINES, CONDUITS, WATERMANS, SEWERS, AND OTHER UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK
THE CONTRACTOR SHALL CONFIRM THE POSITION AND EXACT LOCATION OF ALL SUCH UTILITIES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO THEM MADE DURING THE COURSE OF THE CONTRACT WORK.

JOB TITLE
**PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO**

SHEET TITLE
**EROSION SITE 1,2,3 & 4
ALTERNATIVE 2 - LOCAL WORKS**

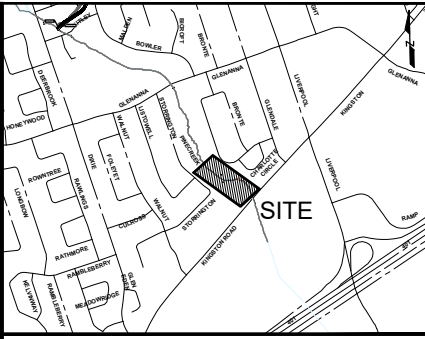
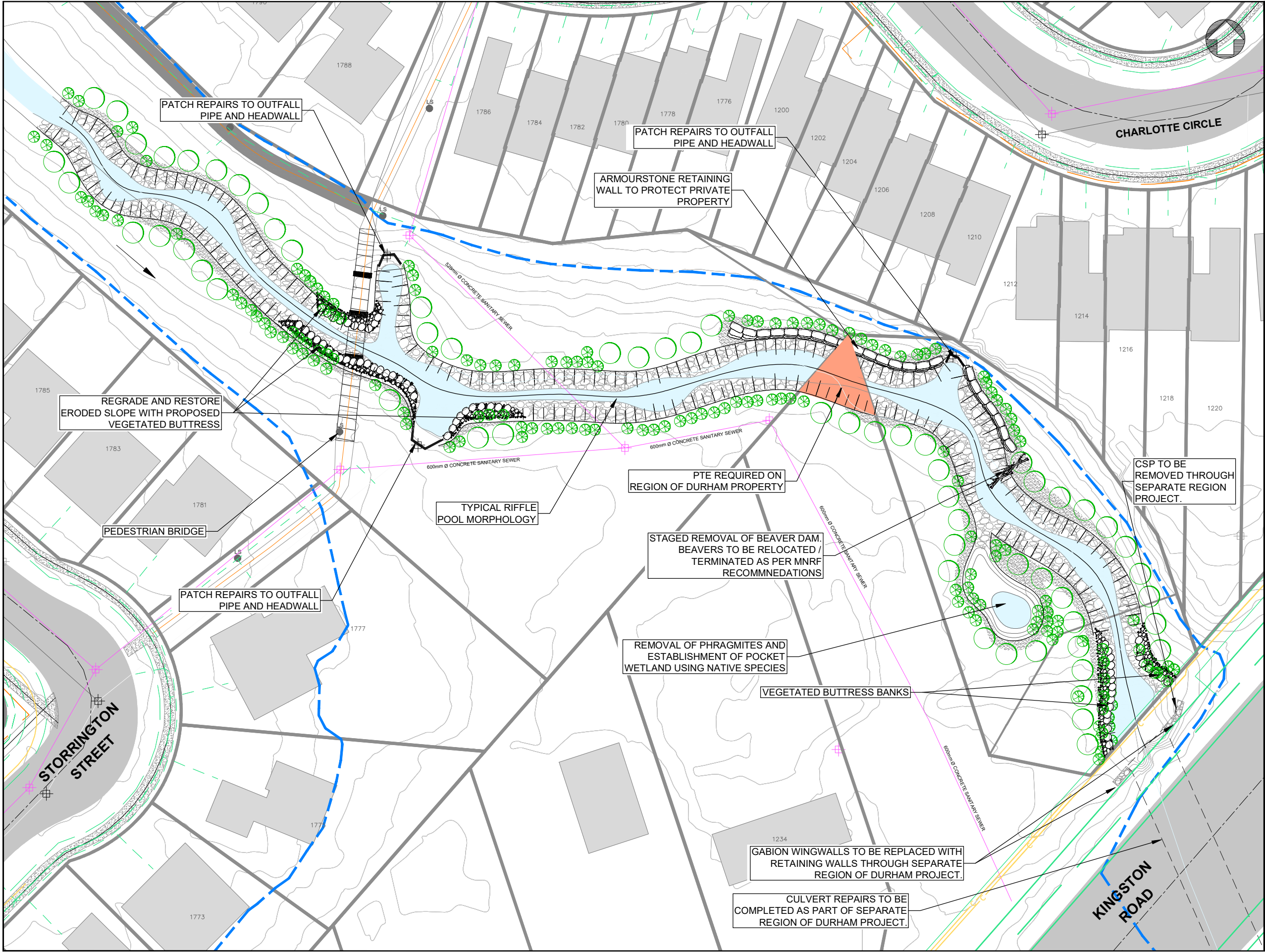
DESIGNED BY: APPROVED BY:

**City of
PICKERING**

**Aquafor Beech
Limited**

#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:250	REVIEWED BY:	CONTRACT No.
DRAWN BY: M.Z.	DESIGNED BY:	FILE No.
DATE: 12, JULY 2023	SHEET NO: 2 OF 3	DRAWING No.



KEY PLAN		N.T.S.	
3	ISSUED FOR REGION REVIEW	2023-07-12	
2	ISSUED FOR PIC	2023-05-18	
1	ISSUED FOR REVIEW	2022-11-21	
No.	REVISION	By	DATE

LEGEND:			
	PROPERTY LINE		
	STORMLINE		
	SANITARY		
	REGIONAL FLOODLINE		
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	ELEXICON ENERGY UTILITIES		
	ENGBRIDGE UTILITIES		
	EASEMENT REQUIRED ON REGION OF DURHAM PROPERTY		

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PICKERING, ONTARIO

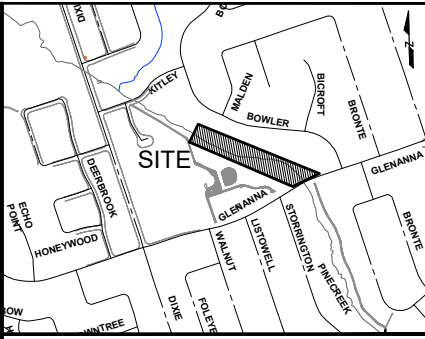
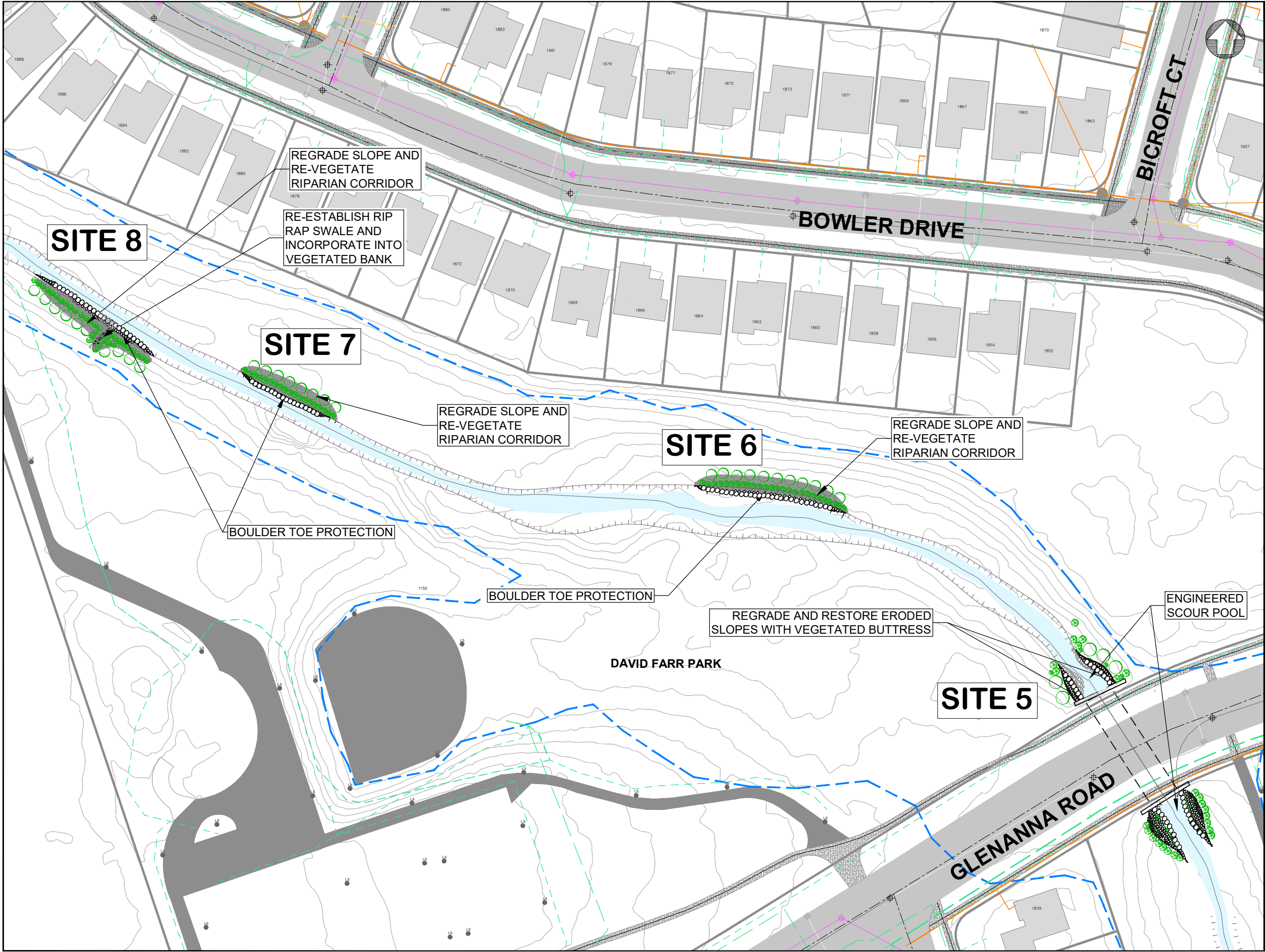
SHEET TITLE
EROSION SITE 1,2,3 & 4
ALTERNATIVE 3 - EXTENDED WORKS

DESIGNED BY:	APPROVED BY:

City of PICKERING

Aquafor Beech Limited
#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
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KEY PLAN N.T.S

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- PROPERTY LINE
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 - SANITARY
 - REGIONAL FLOODLINE
 - HYDRO UTILITIES
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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 5,6,7 & 8
ALTERNATIVE 2 - LOCAL WORKS

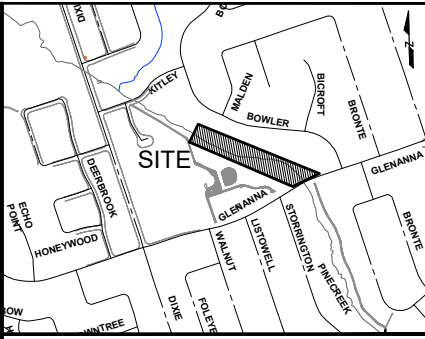
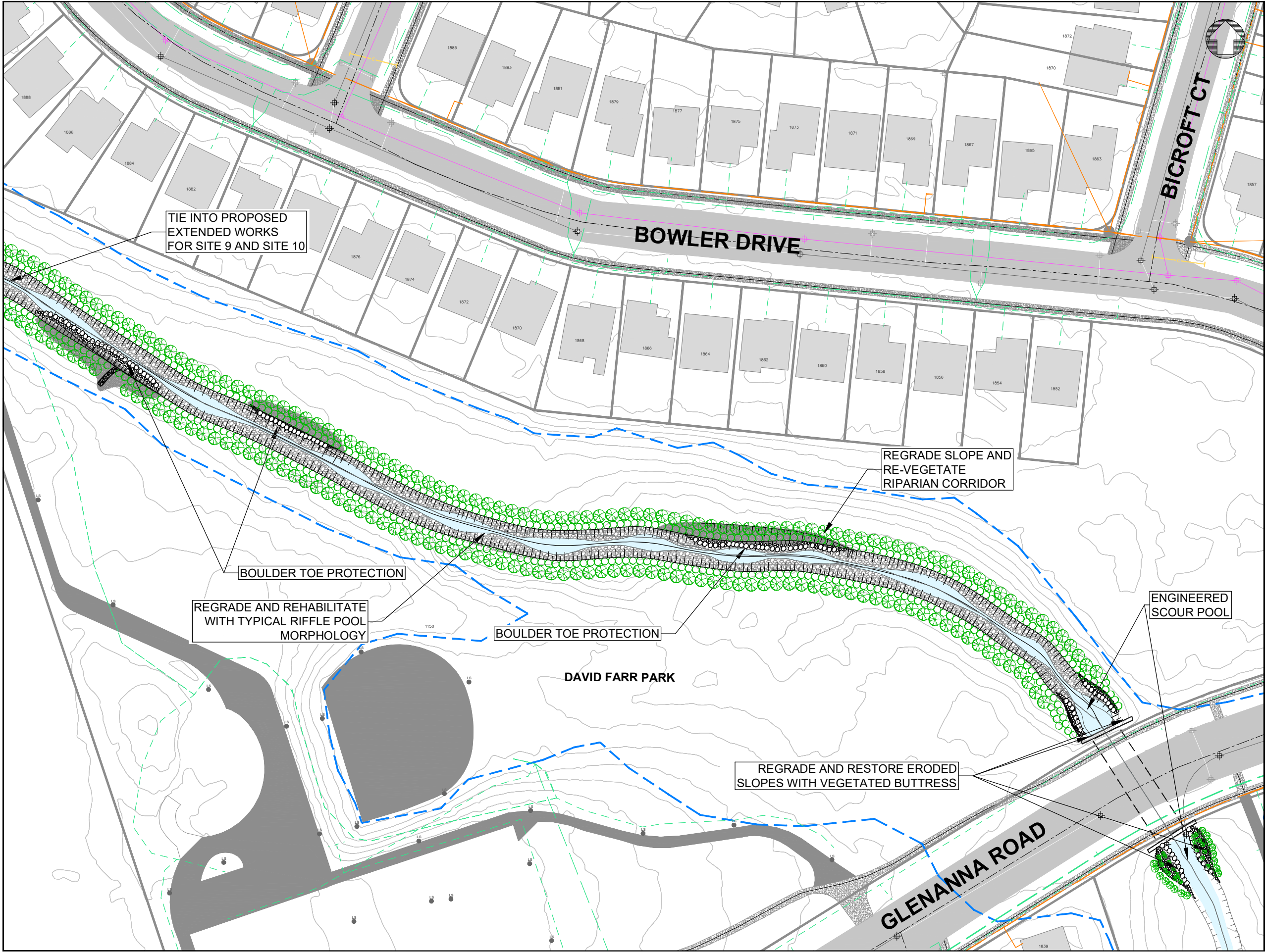
DESIGNED BY:	APPROVED BY:
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Aquafor Beech Limited

#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:400	REVIEWED BY:	CONTRACT No.
DRAWN BY: P.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 2 OF 3	DRAWING No.



KEY PLAN N.T.S.

No.	REVISION	By	DATE
2	ISSUED FOR PIC		2023-05-18
1	ISSUED FOR REVIEW		2022-11-21

LEGEND:	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENGBRIDGE UTILITIES

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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

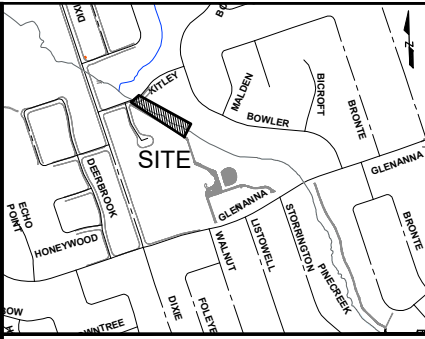
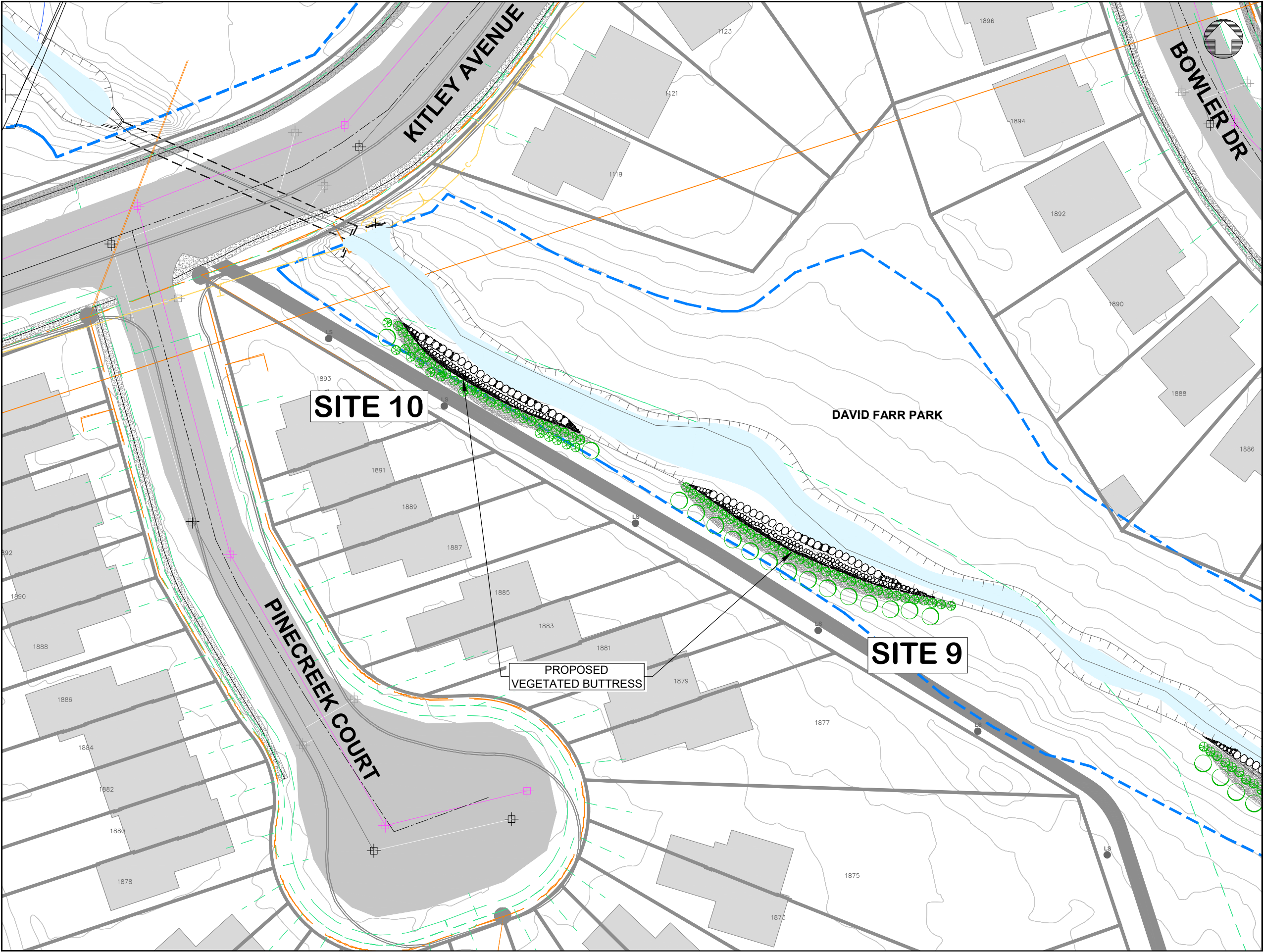
SHEET TITLE
EROSION SITE 5,6,7 & 8
ALTERNATIVE 3 - EXTENDED WORKS

DESIGNED BY: APPROVED BY:

City of PICKERING

Aquafor Beech Limited
#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

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KEY PLAN N.T.S.

No.	REVISION	By	DATE
2	ISSUED FOR PIC		2023-05-18
1	ISSUED FOR REVIEW		2022-11-21

LEGEND:	
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	STORMLINE
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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

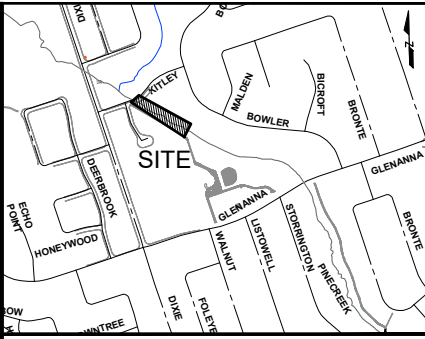
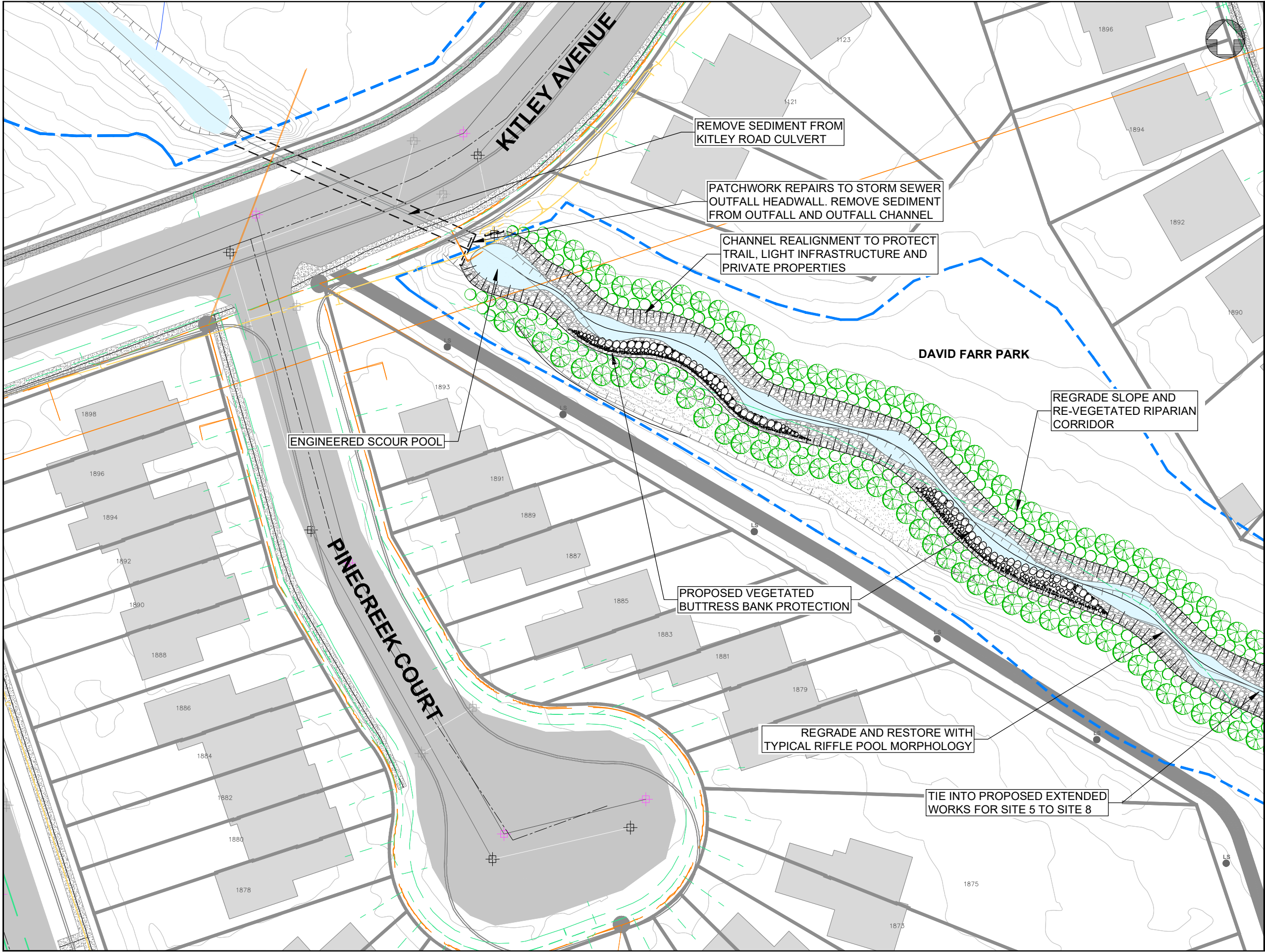
SHEET TITLE
EROSION SITE 9 & 10
ALTERNATIVE 2 - LOCAL WORKS

DESIGNED BY:	APPROVED BY:

City of
PICKERING

Aquafor Beech
Limited

SCALE: 1:250	REVIEWED BY:	CONTRACT No.
DRAWN BY: P.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 2 OF 3	DRAWING No.



KEY PLAN N.T.S.

2	ISSUED FOR PIC	2023-05-18
1	ISSUED FOR REVIEW	2022-11-21
No.	REVISION	By DATE

- LEGEND:
- PROPERTY LINE
 - STORMLINE
 - SANITARY
 - REGIONAL FLOODLINE
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JOB TITLE
**PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO**

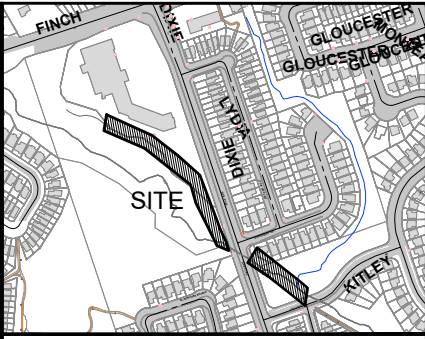
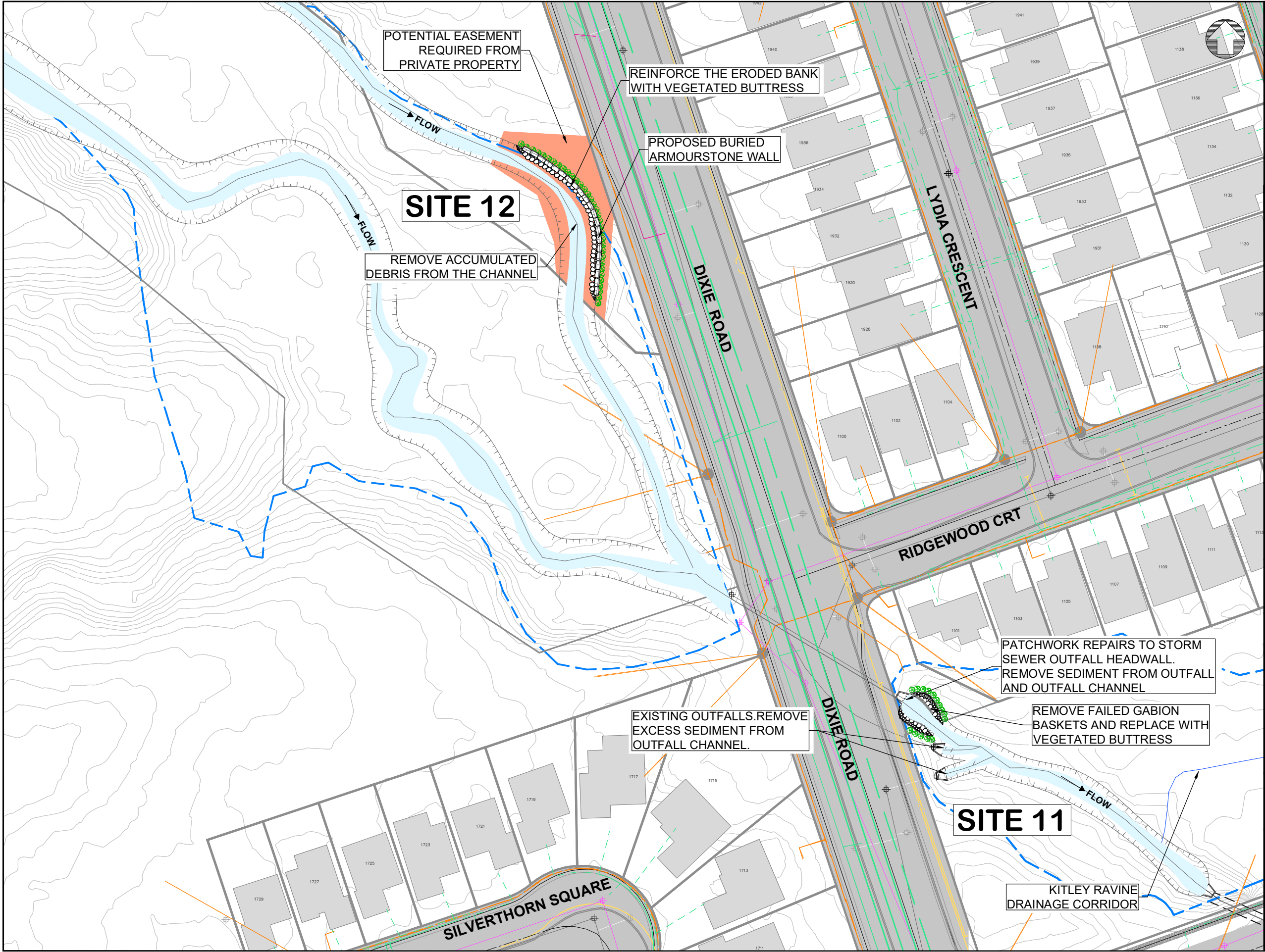
SHEET TITLE
**EROSION SITE 9 & 10
ALTERNATIVE 3 - EXTENDED WORKS**

DESIGNED BY:	APPROVED BY:
--------------	--------------

City of
PICKERING

Aquafor Beech Limited
#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:250	REVIEWED BY:	CONTRACT No.
DRAWN BY: P.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 3 OF 3	DRAWING No.



2	ISSUED FOR PIC	2023-05-18	
1	ISSUED FOR REVIEW	2022-11-21	
No.	REVISION	By	DATE

LEGEND	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENGBRIDGE UTILITIES
	EASEMENT REQUIRED FROM PRIVATE PROPERTY
	KITLEY RAVINE DRAINAGE CORRIDOR

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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 11 - 12
ALTERNATIVE 2 - LOCAL WORKS

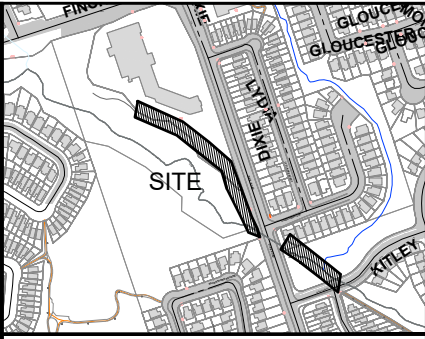
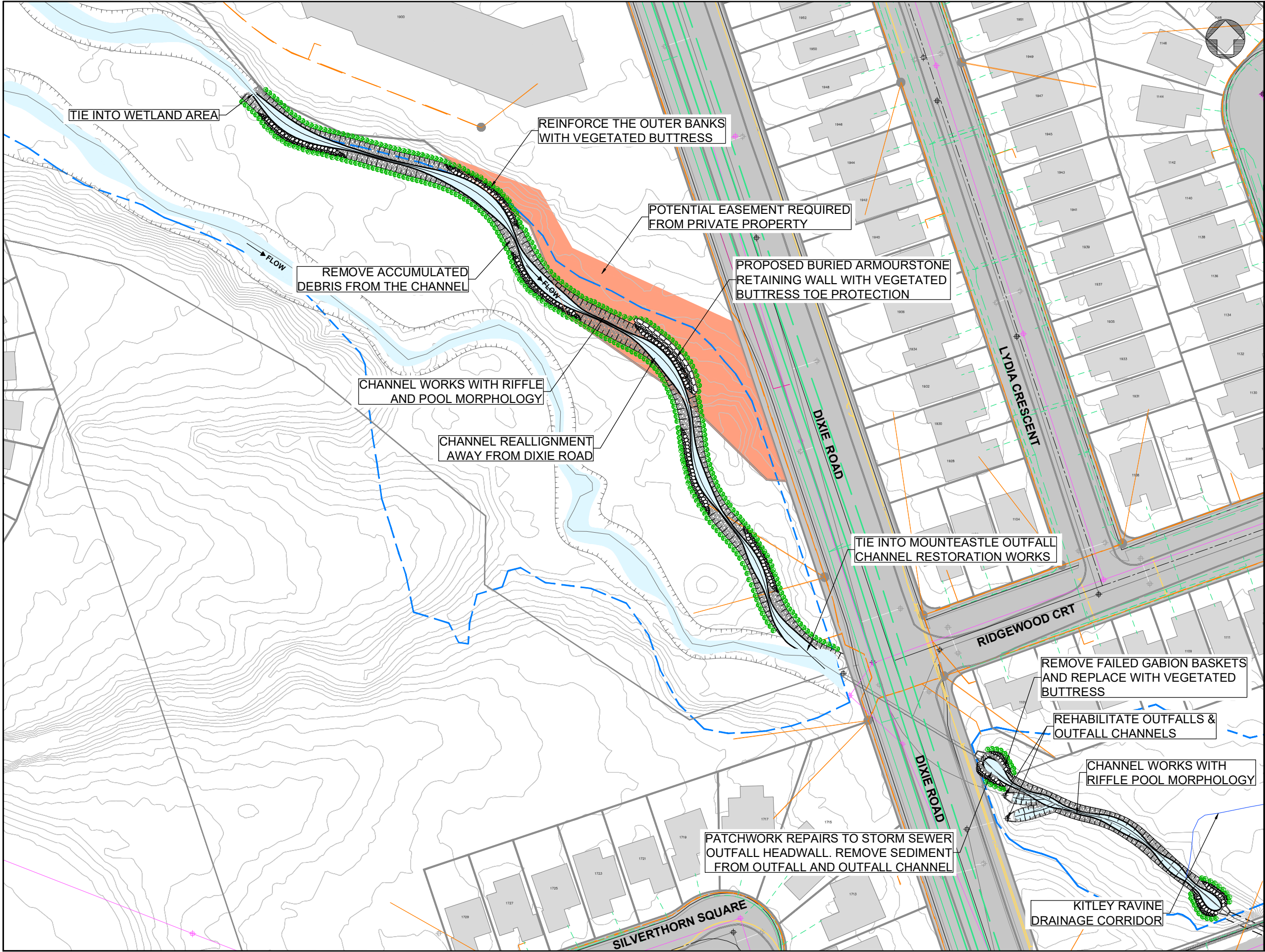
DESIGNED BY:	APPROVED BY:



Aquafor Beech Limited

#4-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:400	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 2 OF 3	DRAWING No.



2	ISSUED FOR PIC	2023-05-18	
1	ISSUED FOR REVIEW	2022-11-21	
No.	REVISION	By	DATE

LEGEND	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
	ENBRIDGE UTILITIES
	EASEMENT REQUIRED FROM PRIVATE PROPERTY
	KITLEY RAVINE DRAINAGE CORRIDOR

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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 11 - 12
ALTERNATIVE 3 - EXTENDED WORKS

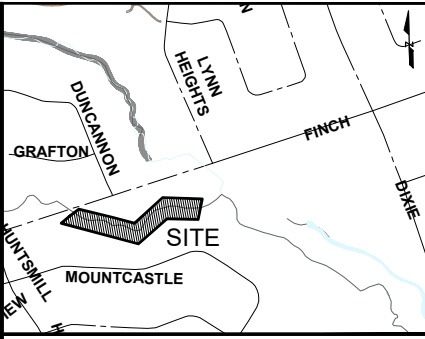
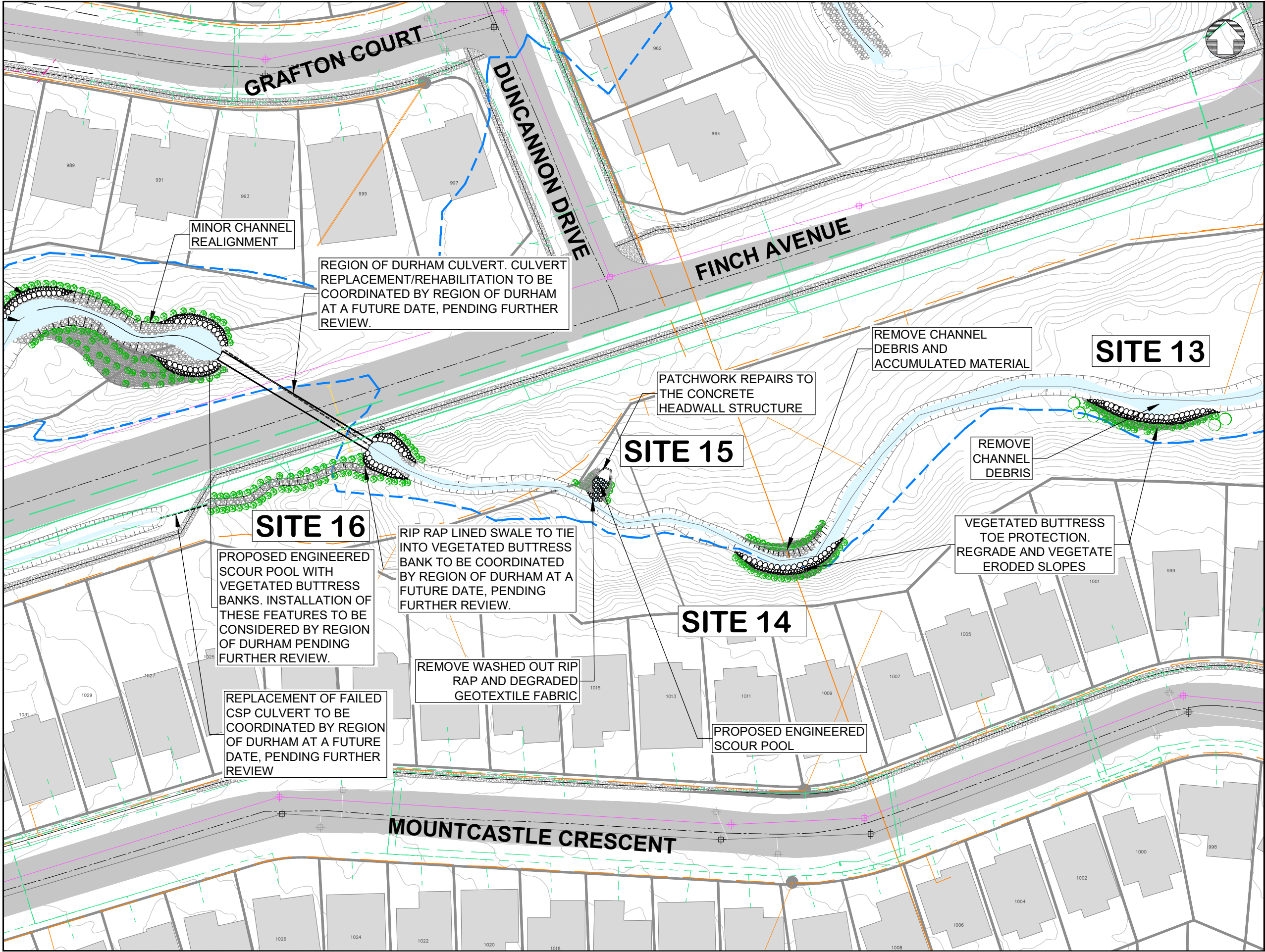
DESIGNED BY:	APPROVED BY:
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Limited

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SCALE: 1:500	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 3 OF 3	DRAWING No.



KEY PLAN		N.T.S	
No.	REVISION	By	DATE
3	ISSUED FOR REGION REVIEW		2023-07-12
2	ISSUED FOR PIC		2023-05-18
1	ISSUED FOR REVIEW		2022-11-21

LEGEND	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
	HYDRO UTILITIES
	BELL UTILITIES
	ELEXICON ENERGY UTILITIES
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PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 13,14,15 & 16
ALTERNATIVE 2 - LOCAL WORKS

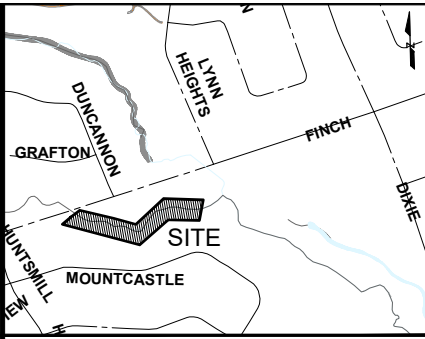
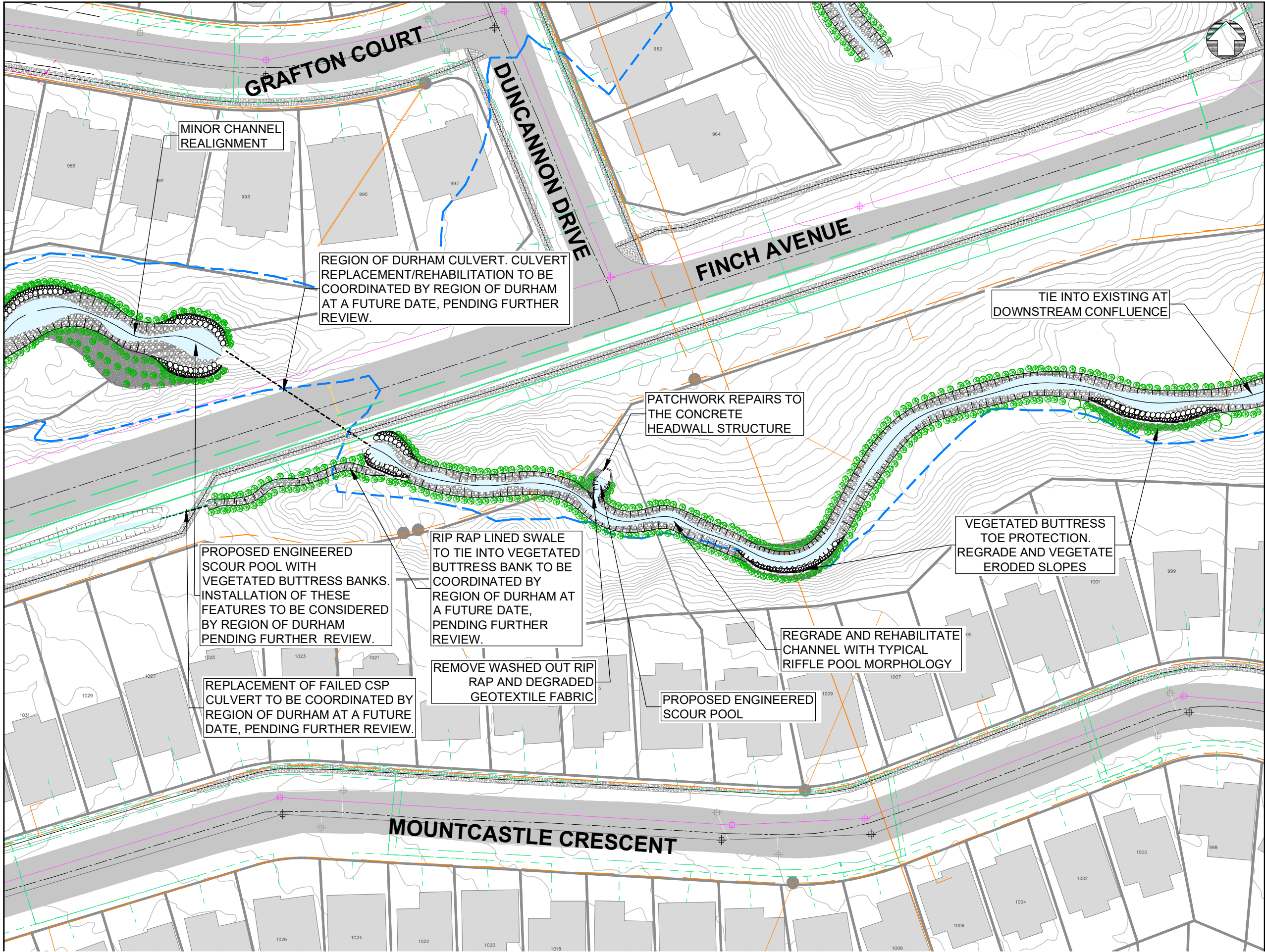
DESIGNED BY: _____ APPROVED BY: _____

**City of
PICKERING**

**Aquafor Beech
Limited**

#4-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:350	REVIEWED BY: _____	CONTRACT No. _____
DRAWN BY: P.S.	DESIGNED BY: _____	FILE No. _____
DATE: 12, JULY 2023	SHEET NO: 2 OF 3	DRAWING No. _____



KEY PLAN		N.T.S.	
3	ISSUED FOR REGION REVIEW	2023-07-12	
2	ISSUED FOR PIC	2023-05-18	
1	ISSUED FOR REVIEW	2022-11-21	
No.	REVISION	By	DATE

LEGEND	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
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PICKERING, ONTARIO

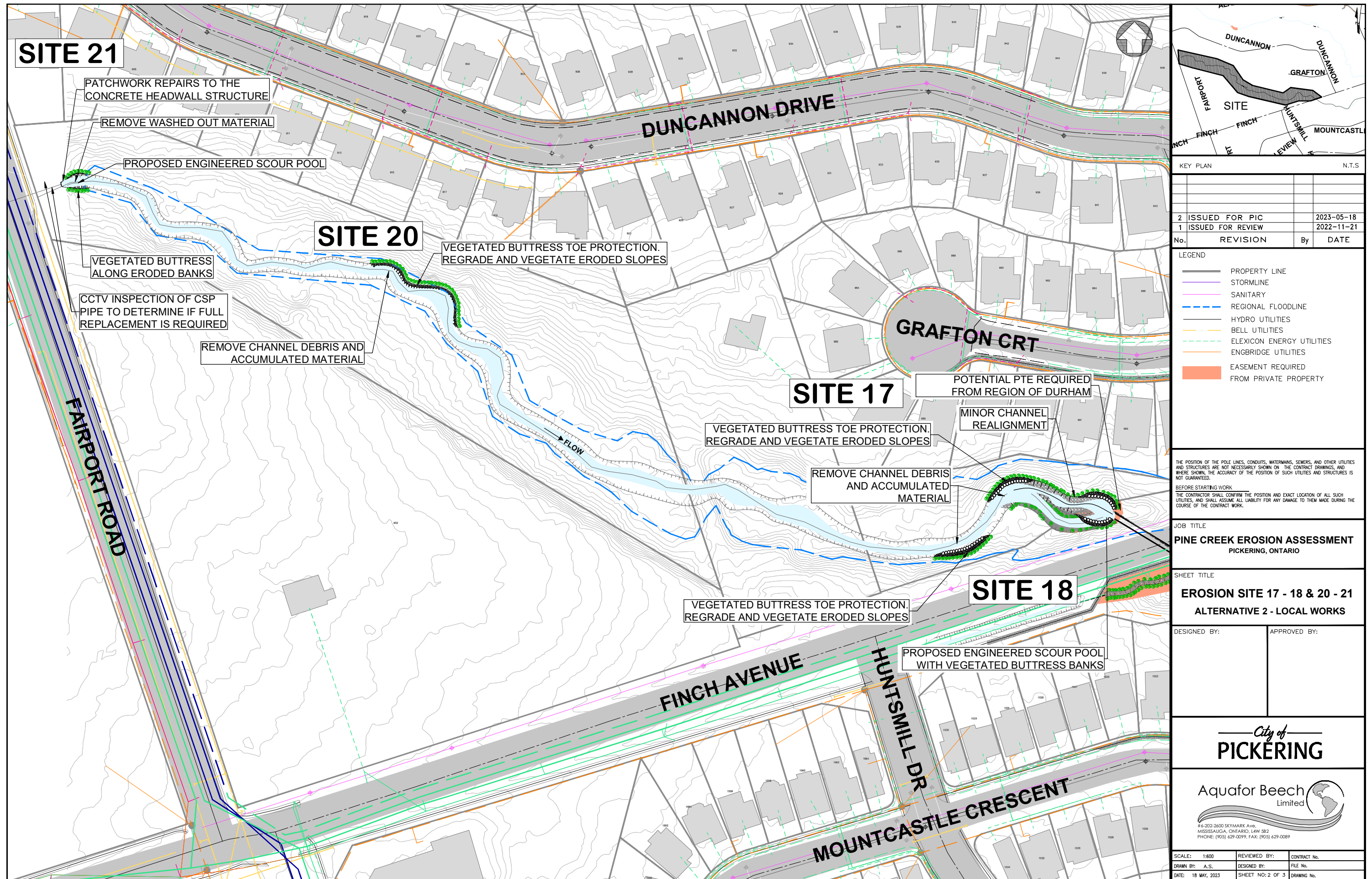
SHEET TITLE
EROSION SITE 13,14,15 & 16
ALTERNATIVE 3 - EXTENDED WORKS

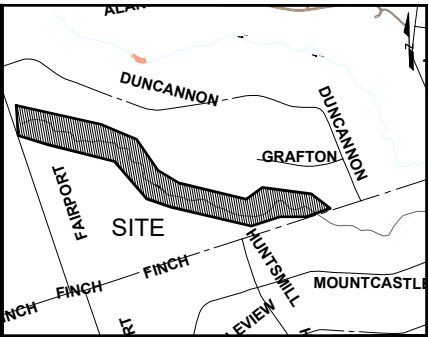
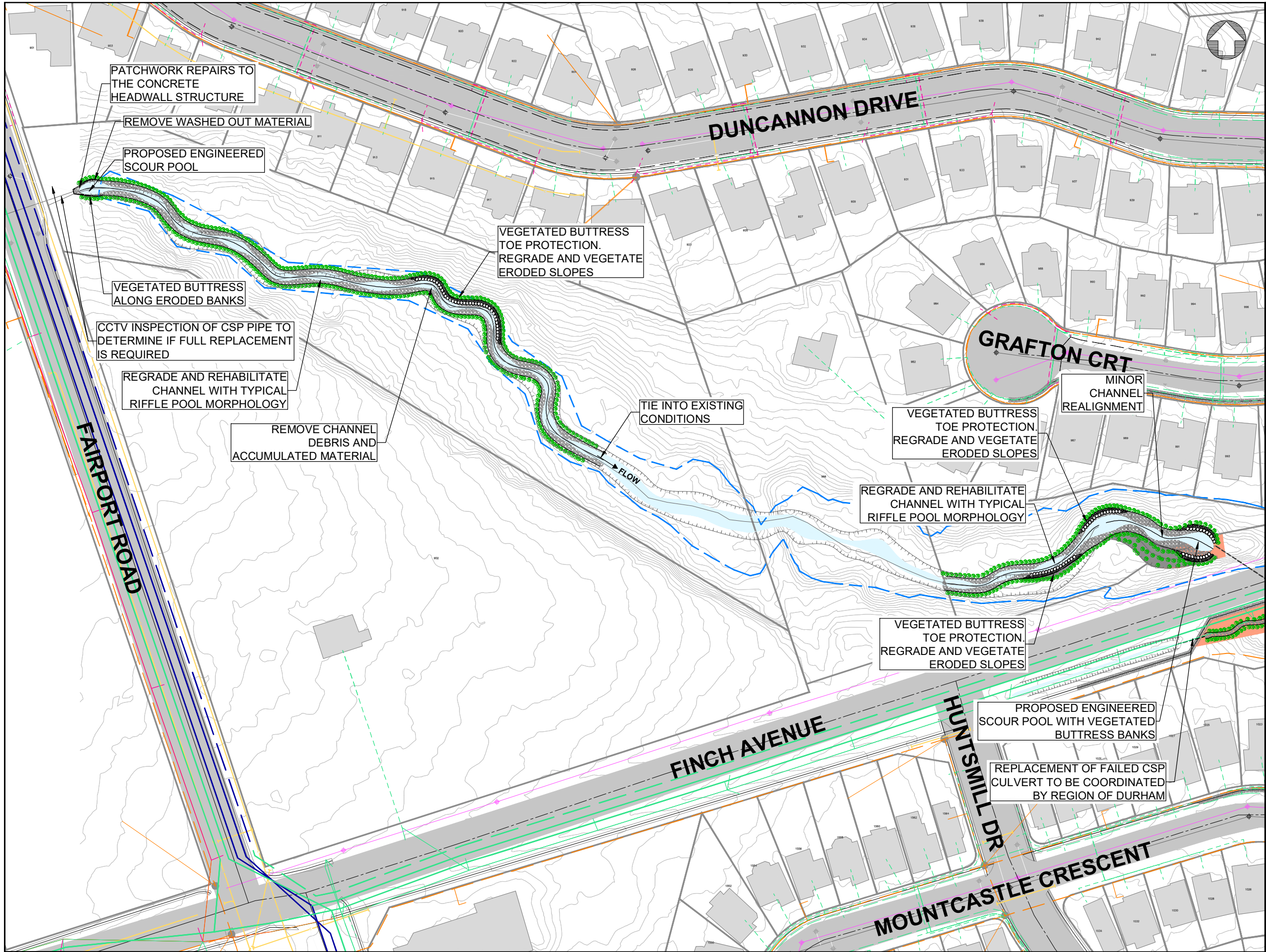
DESIGNED BY: _____ APPROVED BY: _____

City of PICKERING

Aquafor Beech Limited
#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 3B2
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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 17 - 18 & 20 - 21
ALTERNATIVE 3 - EXTENDED WORKS

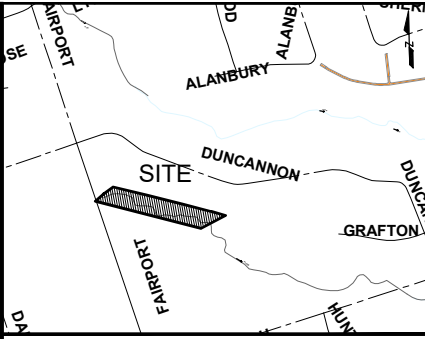
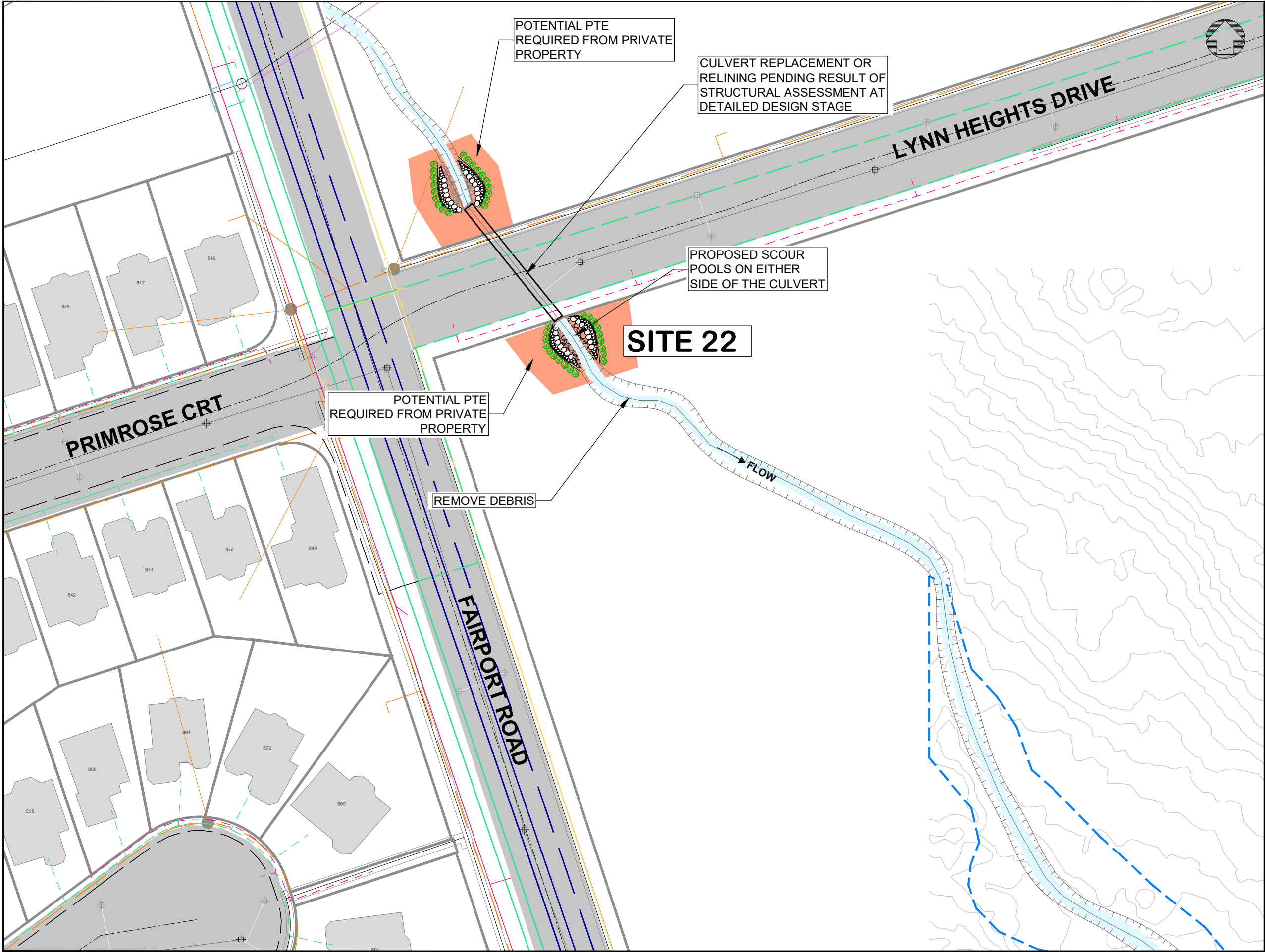
DESIGNED BY:	APPROVED BY:

CITY OF PICKERING

Aquafor Beech Limited

6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1/600	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 3 OF 3	DRAWING No.



KEY PLAN N.T.S.

2	ISSUED FOR PIC	2023-05-18
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No.	REVISION	By DATE

LEGEND

- PROPERTY LINE
- STORMLINE
- SANITARY
- REGIONAL FLOODLINE
- HYDRO UTILITIES
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JOB TITLE
**PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO**

SHEET TITLE
**EROSION SITE 22
ALTERNATIVE 2 - LOCAL WORKS**

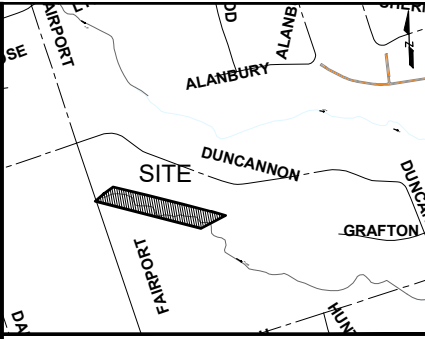
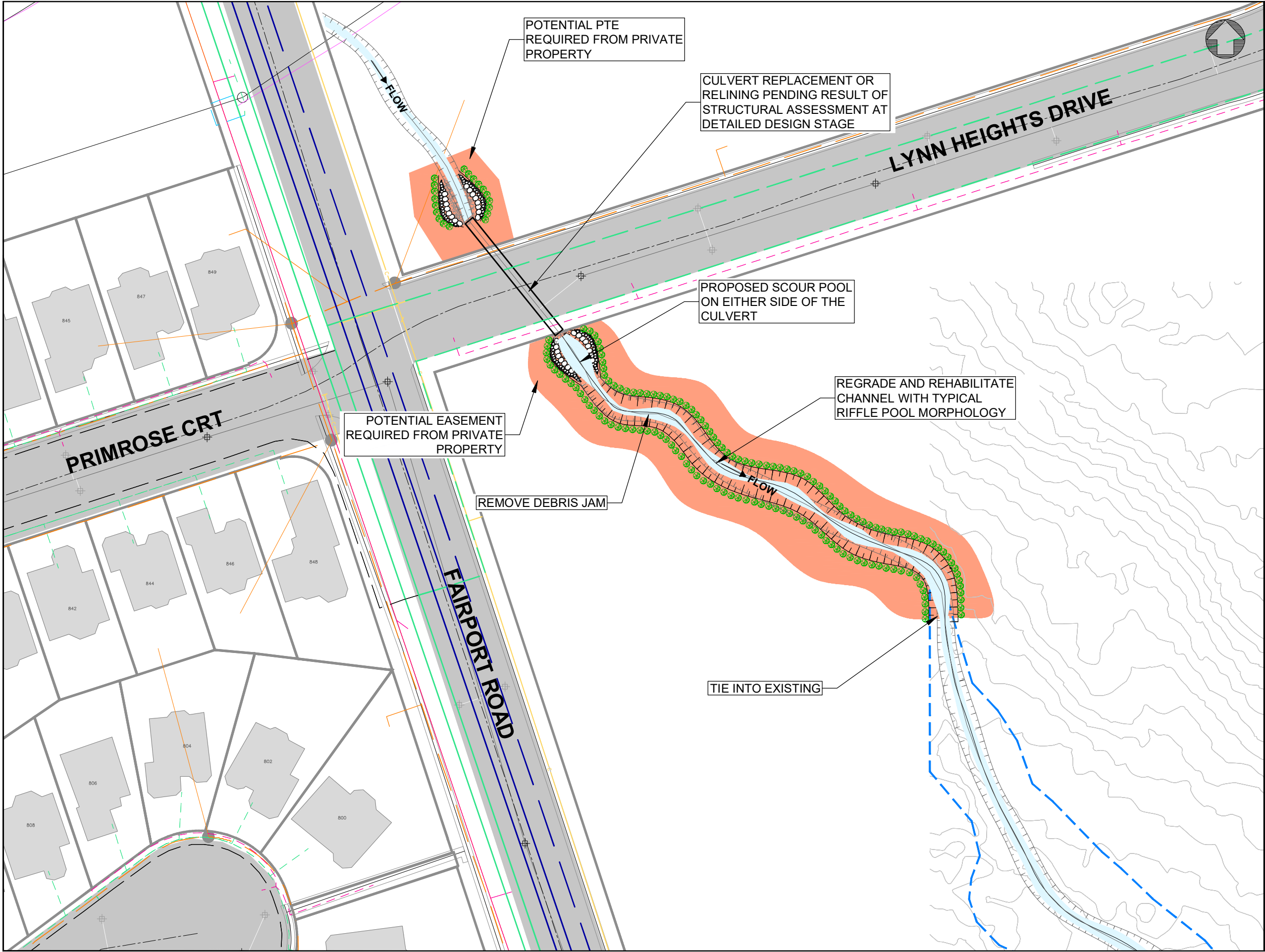
DESIGNED BY:	APPROVED BY:



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MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:350	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 2 OF 3	DRAWING No.



KEY PLAN N.T.S.

2	ISSUED FOR PIC	2023-05-18
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No.	REVISION	By DATE

- LEGEND
- PROPERTY LINE
 - STORMLINE
 - SANITARY
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PICKERING, ONTARIO

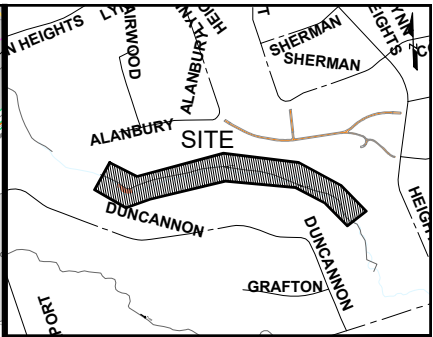
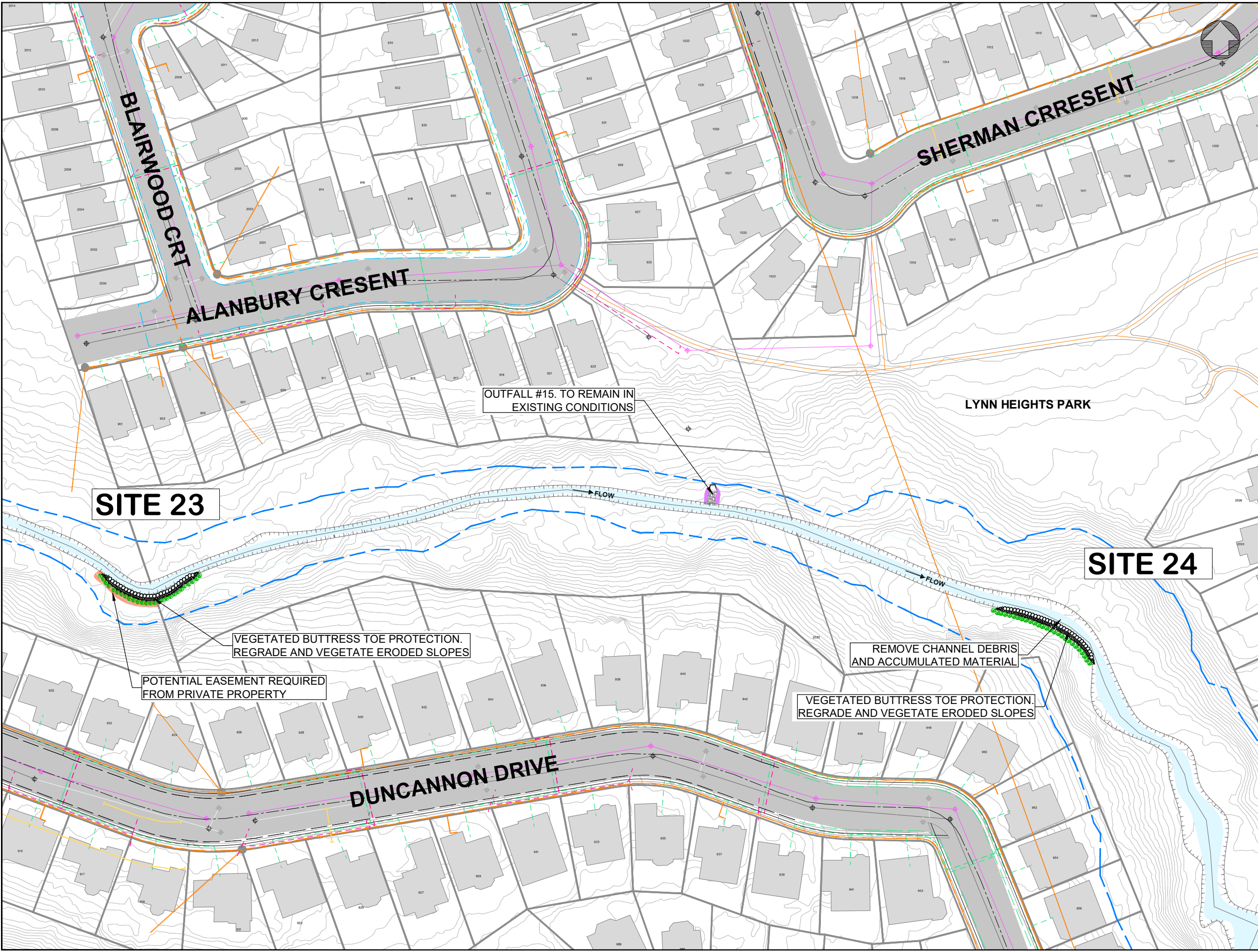
SHEET TITLE
EROSION SITE 22
ALTERNATIVE 3 - EXTENDED WORKS

DESIGNED BY: APPROVED BY:

City of PICKERING

Aquafor Beech Limited
#6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
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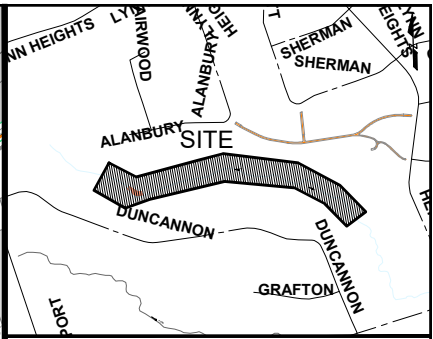
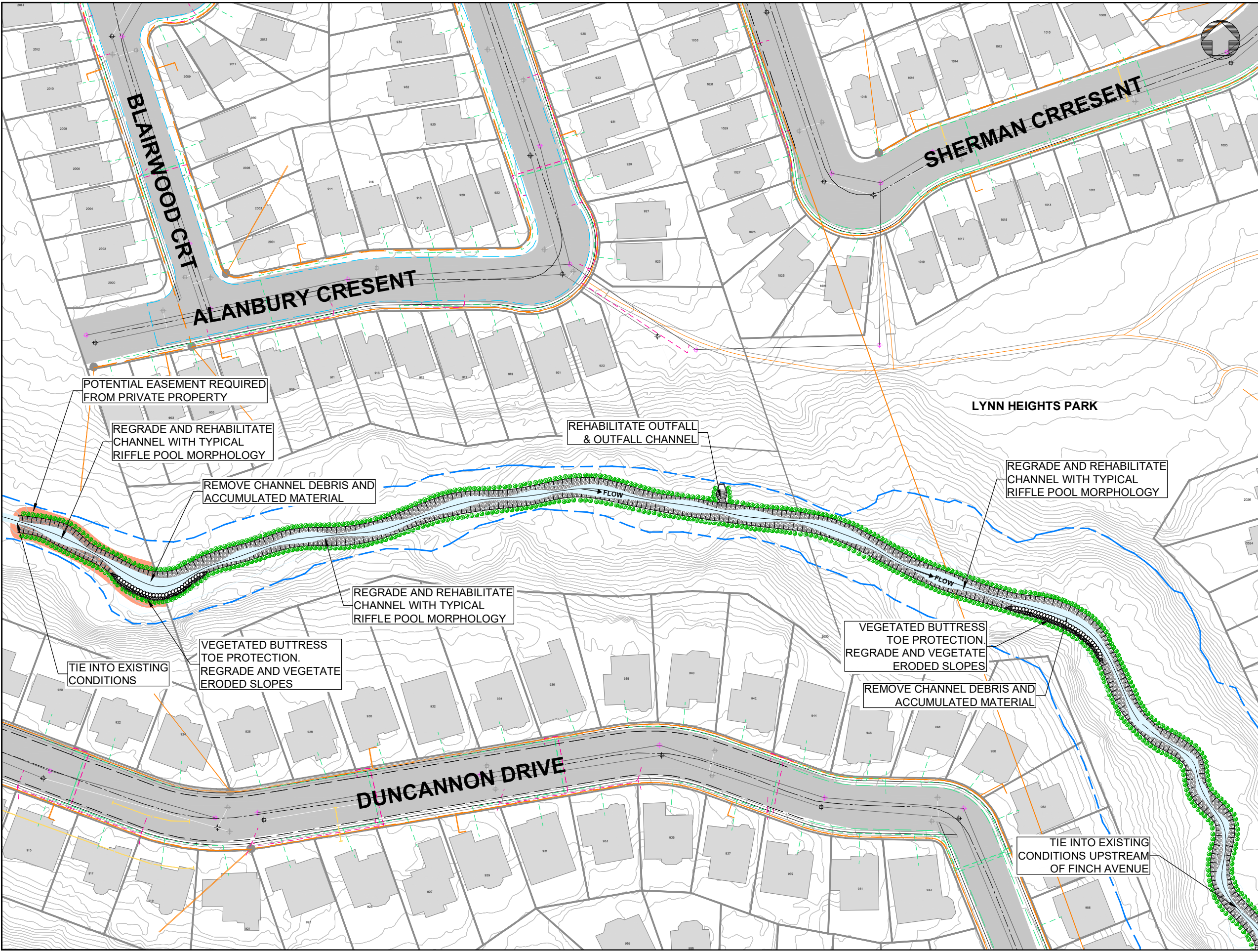
SHEET TITLE
EROSION SITE 23 & 24
ALTERNATIVE 2 - LOCAL WORKS

DESIGNED BY:
APPROVED BY:

City of PICKERING

Aquafor Beech Limited
6-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1:550	REVIEWED BY:	CONTRACT NO.
DRAWN BY: A.S.	DESIGNED BY:	FILE NO.
DATE: 18 MAY, 2023	SHEET NO: 2 OF 3	DRAWING No.



KEY PLAN N.T.S.

2	ISSUED FOR PIC	2023-05-18
1	ISSUED FOR REVIEW	2022-11-21
No.	REVISION	By DATE

LEGEND	
	PROPERTY LINE
	STORMLINE
	SANITARY
	REGIONAL FLOODLINE
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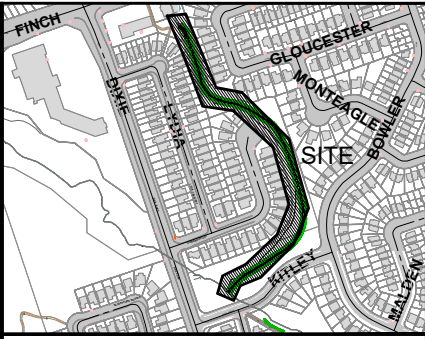
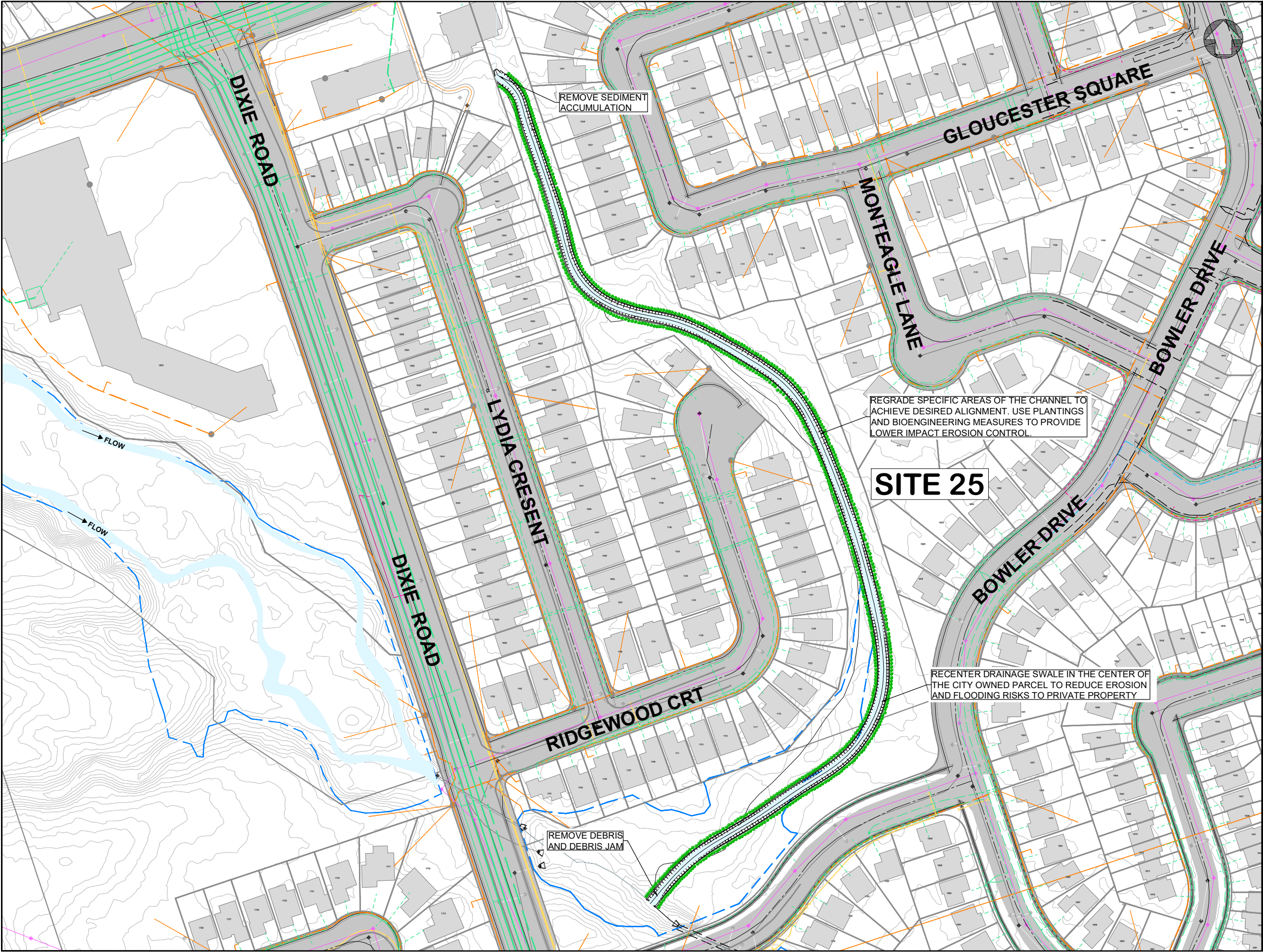
SHEET TITLE
EROSION SITE 23 & 24
ALTERNATIVE 2 - EXTENDED WORKS

DESIGNED BY:
APPROVED BY:

City of
PICKERING

Aquafor Beech
Limited
6-202-2600 SKYMARK AVE.
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1 ISSUED FOR REVIEW		2022-11-21	
No.	REVISION	By	DATE

LEGEND			
	PROPERTY LINE		STORMLINE
	SANITARY		REGIONAL FLOODLINE
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PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 25
ALTERNATIVE 2 - TARGETED
CORRIDOR REHABILITATION

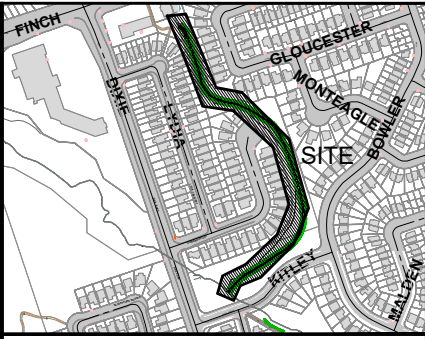
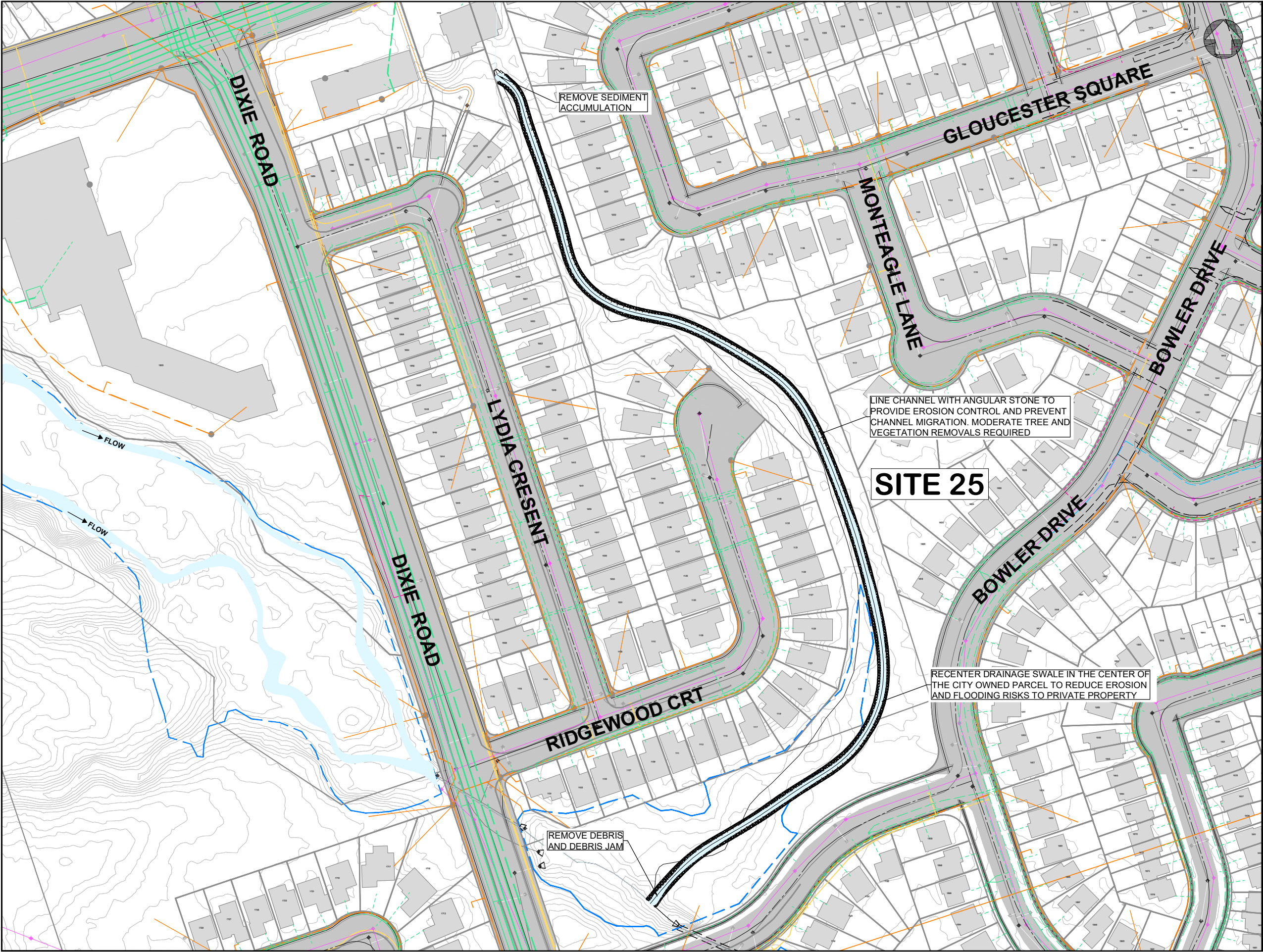
DESIGNED BY:	APPROVED BY:



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MISSISSAUGA, ONTARIO, L4W 5B2
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SCALE: 1/800	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
DATE: 18 MAY, 2023	SHEET NO: 2 OF 2	DRAWING No.



2	ISSUED FOR PIC	2023-05-18	
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No.	REVISION	By	DATE

LEGEND	
	PROPERTY LINE
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JOB TITLE
PINE CREEK EROSION ASSESSMENT
PICKERING, ONTARIO

SHEET TITLE
EROSION SITE 25
ALTERNATIVE 3 - FULL CORRIDOR REHABILITATION

DESIGNED BY:	APPROVED BY:



Aquafor Beech Limited
44-202-2600 SKYMARK AVE.
MISSISSAUGA, ONTARIO, L4W 5B2
PHONE: (905) 629-0099, FAX: (905) 629-0089

SCALE: 1/800	REVIEWED BY:	CONTRACT No.
DRAWN BY: A.S.	DESIGNED BY:	FILE No.
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Appendix I –
Detailed Evaluation Matrices

Erosion Sites #1 - #4					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	18	18
Weighted Score			12.50	18.75	18.75
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	3	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	2	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			13.00	16.00	14.00
Weighted Score			16.25	20.00	17.50
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
Subtotal			8.00	14.00	11.00
Weighted Score			12.50	21.88	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	3
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			10.00	18.00	18.00
Weighted Score			12.50	22.50	22.50
TOTAL SCORE (/100)			53.8	83.1	75.9

Erosion Sites #5 - #8					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	18	19
Weighted Score			12.50	18.75	19.79
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	2	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	2	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			13.00	15.00	14.00
Weighted Score			16.25	18.75	17.50
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
Subtotal			8.00	14.00	11.00
Weighted Score			12.50	21.88	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	3
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			11.00	18.00	18.00
Weighted Score			13.75	22.50	22.50
TOTAL SCORE (/100)			55.0	81.9	77.0

Erosion Sites #9 - #10					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	3	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	2	4
Subtotal			12	15	19
Weighted Score			12.50	15.63	19.79
Social / Cultural Environment	Public Safety	Impact on public safety	1	3	4
	Landowner Impacts / Community Disruption	Impact on private property	1	3	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
Subtotal			8.00	14.00	17.00
Weighted Score			10.00	17.50	21.25
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	2	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3	4
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	4
Subtotal			8.00	11.00	13.00
Weighted Score			12.50	17.19	20.31
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	2	4
Subtotal			11.00	16.00	18.00
Weighted Score			13.75	20.00	22.50
TOTAL SCORE (/100)			48.8	70.3	83.9

Erosion Site #11					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	3	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	16	18
Weighted Score			12.50	16.67	18.75
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	3	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			12.00	16.00	14.00
Weighted Score			15.00	20.00	17.50
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
Subtotal			8.00	14.00	11.00
Weighted Score			12.50	21.88	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			11.00	17.00	17.00
Weighted Score			13.75	21.25	21.25
TOTAL SCORE (/100)			53.8	79.8	74.7

Erosion Site #12					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	3	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	16	18
Weighted Score			12.50	16.67	18.75
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	2	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			12.00	15.00	14.00
Weighted Score			15.00	18.75	17.50
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
Subtotal			8.00	14.00	11.00
Weighted Score			12.50	21.88	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			11.00	18.00	17.00
Weighted Score			13.75	22.50	21.25
TOTAL SCORE (/100)			53.8	79.8	74.7

Erosion Sites #13-#16					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	2	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	2	4
Subtotal			12	14	19
Weighted Score			12.50	14.58	19.79
Social / Cultural Environment	Public Safety	Impact on public safety	1	2	4
	Landowner Impacts / Community Disruption	Impact on private property	1	2	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
Subtotal			8.00	12.00	17.00
Weighted Score			10.00	15.00	21.25
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	2	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	2	4
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	4
Subtotal			8.00	10.00	13.00
Weighted Score			12.50	15.63	20.31
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	3	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	3
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	2	4
Subtotal			10.00	14.00	17.00
Weighted Score			12.50	17.50	21.25
TOTAL SCORE (/100)			47.5	62.7	82.6

Erosion Sites #17-#18					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	3	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	2	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	18	19
Weighted Score			12.50	18.75	19.79
Social / Cultural Environment	Public Safety	Impact on public safety	1	4	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	4	3
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	2	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			8.00	17.00	16.00
Weighted Score			10.00	21.25	20.00
Economic Environment	Capital Costs	One time cost to City	4	2	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3	2
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	3
Subtotal			8.00	11.00	10.00
Weighted Score			12.50	17.19	15.63
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	3
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			10.00	17.00	16.00
Weighted Score			12.50	21.25	20.00
TOTAL SCORE (/100)			47.5	78.4	75.4

Erosion Sites #20-#21					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	3	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	2	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	18	19
Weighted Score			12.50	18.75	19.79
Social / Cultural Environment	Public Safety	Impact on public safety	1	4	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	4	2
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	2	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			8.00	17.00	15.00
Weighted Score			10.00	21.25	18.75
Economic Environment	Capital Costs	One time cost to City	4	2	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3	2
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	3
Subtotal			8.00	11.00	10.00
Weighted Score			12.50	17.19	15.63
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	3
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			10.00	17.00	16.00
Weighted Score			12.50	21.25	20.00
TOTAL SCORE (/100)			47.5	78.4	74.2

Erosion Site #22					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	4	4
Subtotal			12	18	18
Weighted Score			12.50	18.75	18.75
Social / Cultural Environment	Public Safety	Impact on public safety	1	4	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4	2
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	4	3
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
Subtotal			8.00	17.00	14.00
Weighted Score			10.00	21.25	17.50
Economic Environment	Capital Costs	One time cost to City	4	3	2
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	2
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	3
Subtotal			8.00	13.00	11.00
Weighted Score			12.50	20.31	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	1
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	4	4
Subtotal			10.00	18.00	16.00
Weighted Score			12.50	22.50	20.00
TOTAL SCORE (/100)			47.5	82.8	73.4

Erosion Sites #23, #24					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	2	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	2	4
Subtotal			12	14	18
Weighted Score			12.50	14.58	18.75
Social / Cultural Environment	Public Safety	Impact on public safety	1	3	4
	Landowner Impacts / Community Disruption	Impact on private property	1	2	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural hertiage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
Subtotal			8.00	13.00	17.00
Weighted Score			10.00	16.25	21.25
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3	4
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works seperately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	4
Subtotal			8.00	12.00	13.00
Weighted Score			12.50	18.75	20.31
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	3	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			10.00	15.00	18.00
Weighted Score			12.50	18.75	22.50
TOTAL SCORE (/100)			47.5	68.3	82.8

Erosion Site #25					
Evaluation Category	Evaluation Criteria	Comment	Do Nothing	Targeted Corridor Rehabilitation	Full Corridor Rehabilitation
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	3	5
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	2	4	3
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	4	2
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	2	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			13	19	16
Weighted Score			13.54	19.79	16.67
Social / Cultural Environment	Public Safety	Impact on public safety	1	3	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4	3
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	3	3	3
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	2	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	4	3
Subtotal			10.00	16.00	14.00
Weighted Score			12.50	20.00	17.50
Economic Environment	Capital Costs	One time cost to City	4	2	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	1	3	3
Subtotal			7.00	11.00	11.00
Weighted Score			10.94	17.19	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	3	4	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	3	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	4	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	5	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	2	4	4
Subtotal			15.00	19.00	18.00
Weighted Score			18.75	23.75	22.50
TOTAL SCORE (/100)			55.7	80.7	73.9

Appendix J –
Public Consultation Records

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: August 2, 2022 11:54 AM
To: 'Marouchko, Irina'
Cc: ursulak.j@aquaforbeech.com
Subject: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: Notice of Study Commencement - Pine Creek Erosion Assessment MCEA.PDF

Dear Stakeholder,

Please find attached a Notice of Study Commencement for the City of Pickering - Pine Creek Erosion Assessment Class EA.

The next point of contact will include a Public Information Centre to discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures. The PIC date and details will be advertised as the Study progresses.

Thanks very much for your interest and input, we look forward to hearing from you.

Best Regards,

Rob

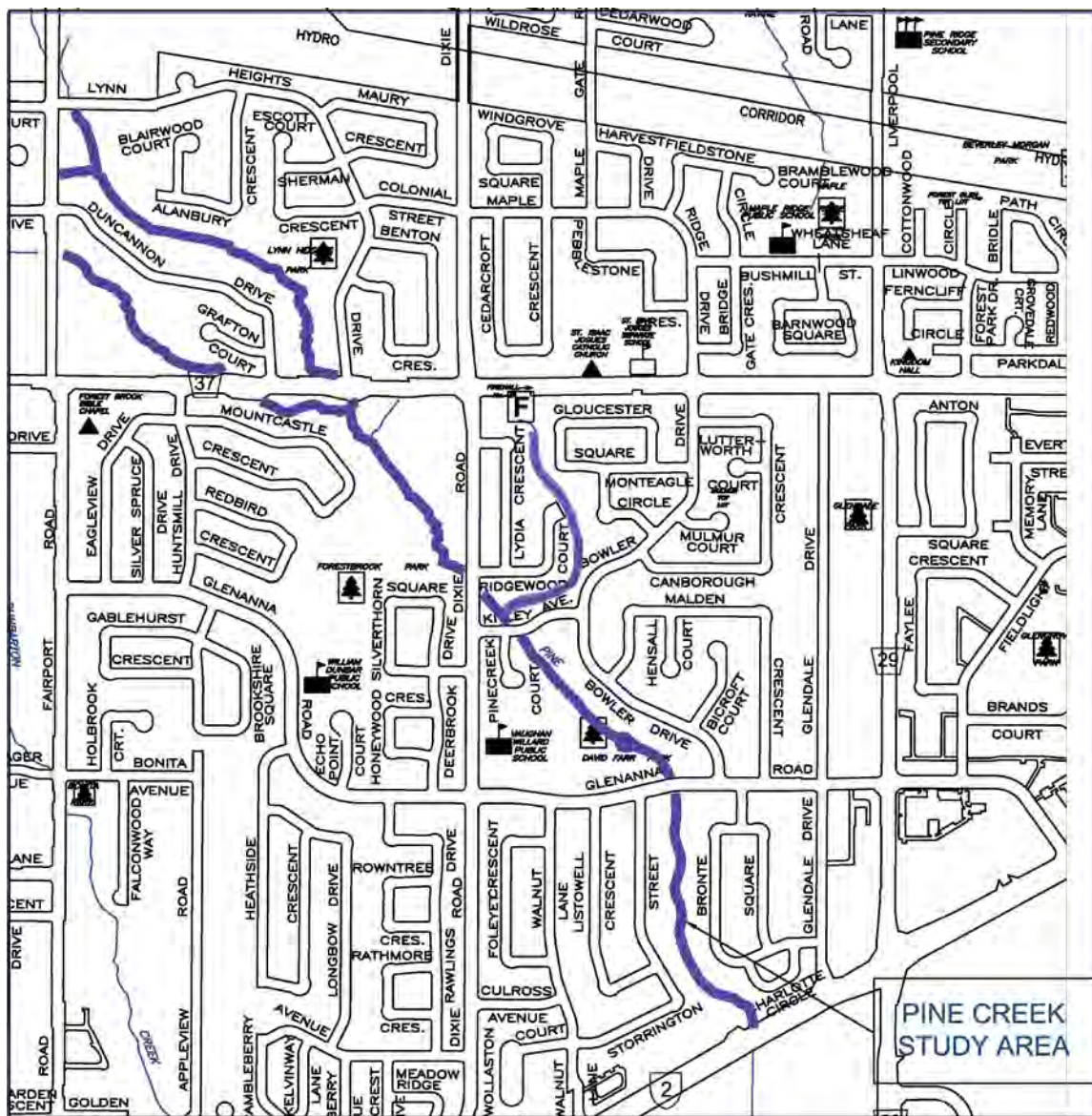
Robert Amos MAsC. P.Eng.
Project Manager, Aquafor Beech Ltd.
905.629.0099 x 284
amos.r@aquaforbeech.com

Engineering Services Department

July 28, 2022

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below. Aquafor Beech Limited has been retained by the City of Pickering to complete the Pine Creek Erosion Assessment.



Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

The study will be conducted in accordance with Schedule B projects, as outlined in the Municipal Engineers Association's, Municipal Class Environmental Assessment (October 2000, amended 2007, 2011 and 2015). The Study is intended to address the first two phases of the Municipal Class EA process, and consultation with stakeholders (public and agencies) will be a key component of the Study. A Public Information Centre (PIC) will be held to discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures. The PIC date and details will be advertised as the Study progresses.

Comments

This Notice of Study Commencement is being issued to notify the stakeholders of the project and invite comment. Comments and information regarding the Study will be maintained for reference throughout the project and will become part of public record. The information is collected under the authority of the *Environmental Assessment Act* and is collected and maintained for the purpose of creating a record that is available to the general public as described in s. 37 of the *Freedom of Information and Protection of Privacy Act*. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

For further information on this project please contact:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T: 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com

Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

ursulak.j@aquaforbeech.com

From: amos.r@aquaforbeech.com
Sent: August 4, 2022 6:07 AM
To: dube.g@aquaforbeech.com; ursulak.j@aquaforbeech.com
Subject: FW: Pine Creek Erosion Assessment - Notice of Study Commencement

Hi GD – can you please update the outlook group as per below.

From: Antony Manoharan <Antony.Manoharan@durham.ca>
Sent: August 2, 2022 1:22 PM
To: Rob Amos <amos.r@aquaforbeech.com>; Marouchko, Irina <imarouchko@pickering.ca>
Cc: Doug Robertson <Doug.Robertson@Durham.ca>
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement

Hi Rob/Irina,
Please remove Doug Robertson from the contact list and add myself to the list as requested below.

Thanks,
Antony



Antony Manoharan, P.Eng. | Project Manager-Stormwater Management
Works Department | Transportation Infrastructure
The Regional Municipality of Durham
Antony.Manoharan@durham.ca | 905-668-7711
Extension 3881 | durham.ca.



From: Doug Robertson <Doug.Robertson@Durham.ca>
Sent: August 2, 2022 12:06 PM
To: Antony Manoharan <Antony.Manoharan@durham.ca>
Subject: FW: Pine Creek Erosion Assessment - Notice of Study Commencement

Hi Antony,

I think it would make sense for you to be our main contact on this study instead of me. Is that OK? If so, please respond to the email below asking them to add you to the contact list and remove me.

Thanks.
Doug

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: August 2, 2022 11:54 AM
To: 'Marouchko, Irina' <imarouchko@pickering.ca>

Cc: ursulak.j@aquaforbeech.com

Subject: Pine Creek Erosion Assessment - Notice of Study Commencement

Dear Stakeholder,

Please find attached a Notice of Study Commencement for the City of Pickering - Pine Creek Erosion Assessment Class EA.

The next point of contact will include a Public Information Centre to discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures. The PIC date and details will be advertised as the Study progresses.

Thanks very much for your interest and input, we look forward to hearing from you.

Best Regards,

Rob

Robert Amos MASc. P.Eng.
Project Manager, Aquafor Beech Ltd.
905.629.0099 x 284
amos.r@aquaforbeech.com

THIS MESSAGE IS FOR THE USE OF THE INTENDED RECIPIENT(S) ONLY AND MAY CONTAIN INFORMATION THAT IS PRIVILEGED, PROPRIETARY, CONFIDENTIAL, AND/OR EXEMPT FROM DISCLOSURE UNDER ANY RELEVANT PRIVACY LEGISLATION. No rights to any privilege have been waived. If you are not the intended recipient, you are hereby notified that any review, re-transmission, dissemination, distribution, copying, conversion to hard copy, taking of action in reliance on or other use of this communication is strictly prohibited. If you are not the intended recipient and have received this message in error, please notify me by return e-mail and delete or destroy all copies of this message.

ursulak.j@aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: August 8, 2022 12:11 PM
To: ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: FW: MNRF Comment re Pine Creek Erosion Municipal EA
Attachments: Notice of Study Commencement - Pine Creek Erosion Assessment MCEA.PDF;
2022-08-08-PickeringErosionControlEA_MNRFcomment-NoticeOfCommencement.pdf

JU & GD,

Please find attached to be included in the Pine Creek EA consultation program.

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com

From: Kennedy, Adam (NDMNRF) [mailto:Adam.Kennedy@ontario.ca]
Sent: Monday, August 8, 2022 11:01 AM
To: imarouchko@pickering.ca; Amos.R@Aquaforbeech.com
Cc: Kennedy, Adam (NDMNRF)
Subject: MNRF Comment re Pine Creek Erosion Municipal EA

Hi Irina and Robert,

I have attached the Ministry of Natural Resources and Forestry (MNRF) comment re the Pine Creek Erosion Assessment EA circulation.

If you have any questions please let me know.

Regards,
Adam

Adam Kennedy (he/him)
Regional Planner | LUPSI | Southern Region
(705) 761-3374
Adam.Kennedy@Ontario.ca

August 8, 2022

Dear Irina and Robert,

SUBJECT: MNRF Comment Re Notice of Study Commencement – Pine Creek Erosion Assessment – Municipal Class EA – Pickering, Ontario

The Ministry of Natural Resources and Forestry (MNRF) received the Notice of Study Commencement on August 2, 2022. Thank you for circulating this to our office. Please note that we have not completed a screening of natural heritage or other resource values for the project at this time. This response, however, does provide information to guide you in identifying and assessing natural features and resources as required by applicable policies and legislation, as well as engaging with the Ministry for advice as needed.

Please also note that it is the proponent's responsibility to be aware of, and comply with, all relevant federal or provincial legislation, municipal by-laws or other agency approvals.

Natural Heritage

MNRF's natural heritage and natural resources GIS data layers can be obtained through the Ministry's [Land Information Ontario \(LIO\)](#) website. You may also view natural heritage information online (e.g., Provincially Significant Wetlands, ANSI's, woodlands, etc.) using the [Make a Map: Natural Heritage Areas](#) tool.

We recommend that you use the above-noted sources of information during the review of your project proposal.

Natural Hazards

A series of natural hazard technical guides developed by MNRF are available to support municipalities and conservation authorities implement the natural hazard policies in the Provincial Policy Statement (PPS). For example, standards to address flood risks and the potential impacts and costs from riverine flooding are addressed in the *Technical Guide River and Stream Systems: Flooding Hazard Limit (2002)*. We recommend that you consider these technical guides as you assess specific improvement projects that can be undertaken to reduce the risk of flooding.

Petroleum Wells & Oil, Gas and Salt Resources Act

Although unlikely given the project location, there may be petroleum wells within the proposed project area. Please consult the Ontario Oil, Gas and Salt Resources Library website (www.ogsrlibrary.com) for the best-known data on any wells recorded by NDMNRF. Please

"To serve you better, please call ahead to make an appointment with our staff"

reference the 'Definitions and Terminology Guide' listed in the publications on the library website to better understand the well information available. Any oil and gas wells in your project area are regulated by the *Oil, Gas and Salt Resource Act*, and the supporting regulations and operating standards. If any unanticipated wells are encountered during development of the project, or if the proponent has questions regarding petroleum operations, the proponent should contact the Petroleum Operations Section at POSRecords@ontario.ca or 519-873-4634.

Fish and Wildlife Conservation Act

Please note, that should the project require:

- The relocation of fish outside of the work area, a Licence to Collect Fish for Scientific Purposes under the *Fish and Wildlife Conservation Act* will be required.
- The relocation of wildlife outside of the work area (including amphibians, reptiles, and small mammals), a Wildlife Collector's Authorization under the *Fish and Wildlife Conservation Act* will be required.

Public Lands Act & Lakes and Rivers Improvement Act

Some projects may be subject to the provisions of the *Public Lands Act* or *Lakes and River Improvement Act*, especially when working around lakes/rivers/creeks/streams. Please review the information on MNRF's web pages provided below regarding when an approval is, or is not, required. Please note that many of the authorizations under the *Lakes and Rivers Improvement Act* are administered by the local Conservation Authority.

- For more information about the *Public Lands Act*: <https://www.ontario.ca/page/crown-land-work-permits>
 - For additional information on whether a work permit is required for this specific project, or if you deem that a work permit application is required, please forward a description of the proposed project along with mapping of the area to the Aurora MNRF District office at: scp.aurora@ontario.ca
- For more information about the *Lakes and Rivers Improvement Act*: <https://www.ontario.ca/page/lakes-and-rivers-improvement-act-administrative-guide>

After reviewing the information provided, if you have not identified any of MNRF's interests stated above, there is no need to circulate any subsequent notices to our office. If you have identified any of MNRF's interests and/or may require permit(s) or further technical advice, please direct your specific questions to myself or the Aurora District MNRF office at the contact info in the signature block below or email provided above as applicable.

If you have any questions or concerns, please feel free to contact me.

Best Regards,

Adam Kennedy
Regional Planner / Southern Region
Ministry Natural Resources and Forestry (MNR)
(705) 761-3374
Adam.Kennedy@Ontario.ca

From: Kennedy, Adam (NDMNRF) <Adam.Kennedy@ontario.ca>
Sent: August 9, 2022 11:20 AM
To: Rob Amos
Cc: imarouchko@pickering.ca; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: MNRF Comment re Pine Creek Erosion Municipal EA

Hi Rob,

I have reached out to my colleagues at the MNRF Aurora District office, and there are no ministry permitting requirements for trapping and relocating beavers or other problem wildlife.

Section 31 of the *Fish and Wildlife Conservation Act* (FWCA) allows for a property owner to protect their property from wildlife causing (or about to cause) damage. A landowner or their agent may harass, capture or kill wildlife that is causing damage to the property.

Relocation of wildlife is limited to 1km from point of capture, in similar habitat, and landowner permission must be obtained prior to relocating an animal onto private property. This being said, we generally do not promote the relocation of beavers. These animals are highly territorial and relocation is generally a more inhumane option than destruction.

If a licensed trapper is required, Aurora District staff can provide contact information by emailing scp.aurora@ontario.ca

Hope the above clarifies for you. If you have any questions please let me know.

Regards,

Adam

Adam Kennedy (he/him)
Regional Planner | LUPSI | Southern Region
(705) 761-3374
Adam.Kennedy@Ontario.ca

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: August 8, 2022 1:58 PM
To: Kennedy, Adam (NDMNRF) <Adam.Kennedy@ontario.ca>
Cc: imarouchko@pickering.ca; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: MNRF Comment re Pine Creek Erosion Municipal EA

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Adam,

Thanks very much for your response. We will add you to the stakeholders list, and ensure we follow your directions with regards to MNRF interests.

One initial question as we have significant beaver activity and impact downstream, is whether the MNRF has a specific protocol beyond the Preventing Conflicts with Beavers (<https://www.ontario.ca/page/preventing-conflicts-beavers>) webpage).

Thanks,

Rob

Robert Amos MAsc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com

From: Kennedy, Adam (NDMNRF) [<mailto:Adam.Kennedy@ontario.ca>]
Sent: Monday, August 8, 2022 11:01 AM
To: imarouchko@pickering.ca; Amos.R@Aquaforbeech.com
Cc: Kennedy, Adam (NDMNRF)
Subject: MNRF Comment re Pine Creek Erosion Municipal EA

Hi Irina and Robert,

I have attached the Ministry of Natural Resources and Forestry (MNRF) comment re the Pine Creek Erosion Assessment EA circulation.

If you have any questions please let me know.

Regards,
Adam

Adam Kennedy (he/him)
Regional Planner | LUPSI | Southern Region
(705) 761-3374
Adam.Kennedy@Ontario.ca

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: August 12, 2022 10:06 AM
To: dube.g@aquaforbeech.com; ursulak.j@aquaforbeech.com
Subject: FW: 1123 Ridgewood Court - RE: Pine Creek Erosion Assessment Municipal Class Environmental Assessment

GD – please add Mr. Anthony Pigaidoulis to the stakeholders list, and ensure we make reference to his wall when walking.

Thanks,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com

From: Anthony Pigaidoulis [REDACTED]
Sent: Friday, August 12, 2022 8:32 AM
To: imarouchko@pickering.ca; amos.r@aquaforbeech.com
Subject: [REDACTED] - RE: Pine Creek Erosion Assessment Municipal Class Environmental Assessment

Hello Ms. Marouchko and Mr. Amos,

My name is Anthony Pigaidoulis and I reside at [REDACTED] in Pickering.

I was pleased to read in my local paper that the Class EA for the Pine Creek Erosion Assessment has commenced. I wanted to bring to your attention the erosion that has occurred on my property, specifically at the back of my lot that is adjacent to the Kitley Ravine.

I am very concerned that the watercourse that feeds into the Pine Creek has encroached onto my property. Also erosion from the watercourse has caused the failure of my fence and the retaining wall begins at my neighbours yard which is downstream. This retaining wall was built by the developer 30+ years ago and as it has failed, it is clogging the flow of the watercourse..

I would be happy to meet with you and allow you access to my property to view my area of concern.

I look forward to hearing from you and the outcome of the study.

Sincerely,

Anthony Pigaidoulis
[REDACTED]

[REDACTED]

From: Caroline Mugo <Caroline.Mugo@trca.ca>

Sent: August 12, 2022 12:30 PM

To: Rob Amos <amos.r@aquaforbeech.com>

Cc: Marouchko, Irina <imarouchko@pickering.ca>; dube.g@aquaforbeech.com; ursulak.j@aquaforbeech.com; Nathan Jenkins <Nathan.Jenkins@trca.ca>

Subject: RE: Pine Creek - Erosion Assessment EA - Background Data Request

Hi Rob,

Please also include Nathan Jenkins (copied) on the project contact list. He will be the main TRCA point of contact.

Thanks,

Caroline Mugo, Ph.D

Senior Planner, Infrastructure Planning and Permits

Development and Engineering Services Division

T: [\(437\) 880-2390](tel:437-880-2390)

C: [\(416\) 471-4213](tel:416-471-4213)

E: caroline.mugo@trca.ca

A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](https://www.trca.ca) | [trca.ca](https://www.trca.ca)



From: Rob Amos <amos.r@aquaforbeech.com>
Sent: September 16, 2022 2:02 PM
To: ursulak.j@aquaforbeech.com; 'Gabriel Dubé'
Subject: FW: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment
Attachments: Supporting Attachment - Proponent's Intro to Delegation of Procedural Aspects of Consultation with Aboriginal Communities.pdf; Supporting Attachment - Species at Risk Proponents Guide to Preliminary Screening (Draft May 2019).pdf; MECP Comments - MEA Class EA Sch B - City of Pickering_Pine Creek Erosion Assessment.pdf

FYI – MECP Response for Pine Creek.

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com

From: Santano Carrasco, Mimi (MECP) [mailto:Mimi.SantanoCarrasco@ontario.ca]
Sent: Friday, September 16, 2022 10:48 AM
To: imarouchko@pickering.ca
Cc: Potter, Katy (MECP); Dugas, Celeste (MECP); amos.r@aquaforbeech.com; Wild, Loralyn (MECP)
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

Good morning,

Please find the attached letter and relevant documents for the above noted project. If your project team have any questions regarding the information provided, please let us know.

Cheers,

Mimi

Mimi Santano Carrasco, EPt (she/her)
Regional Environmental Planner | Ministry of the Environment, Conservation and Parks
Project Review Unit | Environmental Assessment Branch
135 St. Clair Ave. W, 7th Floor Toronto, ON M4V 1P5
T: 416-356-8583 | mimi.santanocarrasco@ontario.ca



From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>
Sent: August 2, 2022 3:06 PM
To: EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>
Cc: amos.r@aquaforbeech.com; 'Marouchko, Irina' <imarouchko@pickering.ca>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>
Subject: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

To Whom it May Concern,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Municipal Class Environmental Assessment to complete the **Pine Creek Erosion Assessment** in the City of Pickering. The intent of the study is to identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation.

In accordance with the streamlined class environmental assessment process, Aquafor would like to submit the Notice of Commencement and Project Information Form for this project, as attached.

Should you have any questions or comments please feel free to the contact the following:

Irina Marouchko, P.Eng.
Senior Water Resources Engineer
City of Pickering
One the Esplanade
Pickering, ON L1V 6K7
(905) 420-4660, ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
2600 Skymark Avenue, Unit 6-202
Mississauga, ON, L4W 5B2
(905) 629-0099, ext. 284
amos.r@aquaforbeech.com

Kind Regards,

Jacob Ursulak, MASc
Aquafor Beech Limited
226.606.2703
ursulak.j@aquaforbeech.com

**Ministry of the Environment,
Conservation and Parks**

**Ministère de l'Environnement,
de la Protection de la nature
et des Parcs**

Environmental Assessment
Branch

Direction des évaluations
environnementales

1st Floor
135 St. Clair Avenue W
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax.: 416 314-8452

Rez-de-chaussée
135, avenue St. Clair Ouest
Toronto ON M4V 1P5
Tél. : 416 314-8001
Télec. : 416 314-8452

September 16, 2022

Irina Marouchko, P. Eng.
Senior Water Resources Engineer
City of Pickering
imarouchko@pickering.ca

BY EMAIL ONLY

Re: **Pine Creek Erosion Assessment
City of Pickering
Municipal Class Environmental Assessment, Schedule B
Acknowledgement of Notice of Commencement**

Dear Irina Marouchko,

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment, Conservation and Parks (MECP) acknowledges that the City of Pickering (proponent) has indicated that the study is following the approved environmental planning process for a Schedule C project under the Municipal Class Environmental Assessment (Class EA).

The **updated (August 2022)** attached "Areas of Interest" document provides guidance regarding the ministry's interests with respect to the Class EA process. Please address all areas of interest in the EA documentation at an appropriate level for the EA study. Proponents who address all the applicable areas of interest can minimize potential delays to the project schedule. **Further information is provided at the end of the Areas of Interest document relating to recent changes to the Environmental Assessment Act through Bill 197, Covid-19 Economic Recovery Act 2020.**

The Crown has a legal duty to consult Aboriginal communities when it has knowledge, real or constructive, of the existence or potential existence of an Aboriginal or treaty right and contemplates conduct that may adversely impact that right. Before authorizing this project, the Crown must ensure that its duty to consult has been fulfilled, where such a duty is triggered. Although the duty to consult with Aboriginal peoples is a duty of the Crown, the Crown may delegate procedural aspects of this duty to project proponents while retaining oversight of the consultation process.

The proposed project may have the potential to affect Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. Where the Crown's duty to consult is triggered in relation to the proposed project, **the MECP is delegating the procedural aspects of rights-based consultation to the proponent through this letter.** The Crown intends to rely on the delegated consultation process in discharging its duty to consult and maintains the right to participate in the consultation process as it sees fit.

Based on information provided to date and the Crown's preliminary assessment the proponent is required to consult with the following communities who have been identified as potentially affected by the proposed project:

- Curve Lake First Nation
- Mississaugas of Scugog Island First Nation
- Alderville First Nation
- Hiawatha First Nation
- Rama First Nation
- Chippewas of Georgina Island
- Beausoleil

O A copy should be sent to Karry Sandy Mackenzie, WTFN process coordinator

Steps that the proponent may need to take in relation to Aboriginal consultation for the proposed project are outlined in the "[Code of Practice for Consultation in Ontario's Environmental Assessment Process](#)". Additional information related to Ontario's Environmental Assessment Act is available online at: www.ontario.ca/environmentalassessments.

Please also refer to the attached document "A Proponent's Introduction to the Delegation of Procedural Aspects of consultation with Aboriginal Communities" for further information, including the MECP's expectations for EA report documentation related to consultation with communities.

The proponent must contact the Director of Environmental Assessment Branch (EABDirector@ontario.ca) under the following circumstances after initial discussions with the communities identified by the MECP:

- Aboriginal or treaty rights impacts are identified to you by the communities;
- You have reason to believe that your proposed project may adversely affect an Aboriginal or treaty right;
- Consultation with Indigenous communities or other stakeholders has reached an impasse; or
- A Section 16 Order request is expected based on impacts to Aboriginal or treaty rights

The MECP will then assess the extent of any Crown duty to consult for the circumstances and will consider whether additional steps should be taken, including what role you will be asked to play should additional steps and activities be required.

A draft copy of the report should be sent directly to me prior to the filing of the final report, allowing a minimum of 30 days for the ministry's technical reviewers to provide comments.

Please also ensure a copy of the final notice is sent to the ministry's Central Region EA notification email account (eanotification.cregion@ontario.ca) after the draft report is reviewed and finalized.

Should you or any members of your project team have any questions regarding the material above, please contact me at mimi.santanocarrasco@ontario.ca.

Sincerely,



Mimi Santano Carrasco
Regional Environmental Planner – Central Region

Cc: Katy Potter, Supervisor, Environmental Assessment Branch, MECP
Celeste Dugas, Manager, York Durham District Office, MECP
Loralyn Wild, Water Compliance Supervisor, Program Services Unit, MECP
Robert Amos, MAsc., P. Eng., Aquafor Beech Ltd.

Enclosed: Areas of Interest

Attached: Client's Guide to Preliminary Screening for Species at Risk

A Proponent's Introduction to the Delegation of Procedural Aspects of Consultation with Aboriginal Communities

AREAS OF INTEREST (v. August 2022)

It is suggested that you check off each section after you have considered / addressed it.

☐ Planning and Policy

- Applicable plans and policies should be identified in the report, and the proponent should describe how the proposed project adheres to the relevant policies in these plans.
 - Projects located in MECP Central, Eastern or West Central Region may be subject to [A Place to Grow: Growth Plan for the Greater Golden Horseshoe \(2020\)](#).
 - Projects located in MECP Central or Eastern Region may be subject to the [Oak Ridges Moraine Conservation Plan \(2017\)](#) or the [Lake Simcoe Protection Plan \(2014\)](#).
 - Projects located in MECP Central, Southwest or West Central Region may be subject to the [Niagara Escarpment Plan \(2017\)](#).
 - Projects located in MECP Central, Eastern, Southwest or West Central Region may be subject to the [Greenbelt Plan \(2017\)](#).
 - Projects located in MECP Northern Region may be subject to the [Growth Plan for Northern Ontario \(2011\)](#).
- The [Provincial Policy Statement \(2020\)](#) contains policies that protect Ontario's natural heritage and water resources. Applicable policies should be referenced in the report, and the proponent should describe how the proposed project is consistent with these policies.
- In addition to the provincial planning and policy level, the report should also discuss the planning context at the municipal and federal levels, as appropriate.

☐ Source Water Protection

The *Clean Water Act*, 2006 (CWA) aims to protect existing and future sources of drinking water. To achieve this, several types of vulnerable areas have been delineated around surface water intakes and wellheads for every municipal residential drinking water system that is located in a source protection area. These vulnerable areas are known as a Wellhead Protection Areas (WHPAs) and surface water Intake Protection Zones (IPZs). Other vulnerable areas that have been delineated under the CWA include Highly Vulnerable Aquifers (HVAs), Significant Groundwater Recharge Areas (SGRAs), Event-based modelling areas (EBAs), and Issues Contributing Areas (ICAs). Source protection plans have been developed that include policies to address existing and future risks to sources of municipal drinking water within these vulnerable areas.

Projects that are subject to the Environmental Assessment Act that fall under a Class EA, or one of the Regulations, have the potential to impact sources of drinking water if they occur in designated vulnerable areas or in the vicinity of other at-risk drinking water systems (i.e.

systems that are not municipal residential systems). MEA Class EA projects may include activities that, if located in a vulnerable area, could be a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and the activity could therefore be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Class EA projects (where the project includes an activity that is a threat to drinking water) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

- In October 2015, the MEA Parent Class EA document was amended to include reference to the Clean Water Act (Section A.2.10.6) and indicates that proponents undertaking a Municipal Class EA project must identify early in their process whether a project is or could potentially be occurring with a vulnerable area. **Given this requirement, please include a section in the report on source water protection.**
 - The proponent should identify the source protection area and should clearly document how the proximity of the project to sources of drinking water (municipal or other) and any delineated vulnerable areas was considered and assessed. Specifically, the report should discuss whether or not the project is located in a vulnerable area and provide applicable details about the area.
 - If located in a vulnerable area, proponents should document whether any project activities are prescribed drinking water threats and thus pose a risk to drinking water (this should be consulted on with the appropriate Source Protection Authority). Where an activity poses a risk to drinking water, the proponent must document and discuss in the report how the project adheres to or has regard to applicable policies in the local source protection plan. This section should then be used to inform and be reflected in other sections of the report, such as the identification of net positive/negative effects of alternatives, mitigation measures, evaluation of alternatives etc.
- While most source protection plans focused on including policies for significant drinking water threats in the WHPAs and IPZs it should be noted that even though source protection plan policies may not apply in HVAs, these are areas where aquifers are sensitive and at risk to impacts and within these areas, activities may impact the quality of sources of drinking water for systems other than municipal residential systems.
- In order to determine if this project is occurring within a vulnerable area, proponents can use [Source Protection Information Atlas](#), which is an online mapping tool available to the public. Note that various layers (including WHPAs, WHPA-Q1 and WHPA-Q2, IPZs, HVAs, SGRAs, EBAs, ICAs) can be turned on through the “Map Legend” bar on the left. The

mapping tool will also provide a link to the appropriate source protection plan in order to identify what policies may be applicable in the vulnerable area.

- For further information on the maps or source protection plan policies which may relate to their project, proponents must contact the appropriate source protection authority. **Please consult with the local source protection authority to discuss potential impacts on drinking water. Please document the results of that consultation within the report and include all communication documents/correspondence.**

More Information

For more information on the *Clean Water Act*, source protection areas and plans, including specific information on the vulnerable areas and drinking water threats, please refer to [Conservation Ontario's website](#) where you will also find links to the local source protection plan/assessment report.

A list of the prescribed drinking water threats can be found in [section 1.1 of Ontario Regulation 287/07](#) made under the *Clean Water Act*. In addition to prescribed drinking water threats, some source protection plans may include policies to address additional "local" threat activities, as approved by the MECP.

☐ **Climate Change**

The document "[Considering Climate Change in the Environmental Assessment Process](#)" (Guide) is now a part of the Environmental Assessment program's Guides and Codes of Practice. The Guide sets out the MECP's expectation for considering climate change in the preparation, execution and documentation of environmental assessment studies and processes. The guide provides examples, approaches, resources, and references to assist proponents with consideration of climate change in EA. Proponents should review this Guide in detail.

- **The MECP expects proponents of Class EA projects to:**

1. Consider during the assessment of alternative solutions and alternative designs, the following:
 - a. the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation); and
 - b. resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).
2. Include a discrete section in the report detailing how climate change was considered in the EA.

How climate change is considered can be qualitative or quantitative in nature and should be scaled to the project's level of environmental effect. In all instances, both a project's impacts on climate change (mitigation) and impacts of climate change on a project (adaptation) should be considered.

- The MECP has also prepared another guide to support provincial land use planning direction related to the completion of energy and emission plans. The "[Community Emissions Reduction Planning: A Guide for Municipalities](#)" document is designed to educate stakeholders on the municipal opportunities to reduce energy and greenhouse gas emissions, and to provide guidance on methods and techniques to incorporate consideration of energy and greenhouse gas emissions into municipal activities of all types. We encourage you to review the Guide for information.

□ **Air Quality, Dust and Noise**

- If there are sensitive receptors in the surrounding area of this project, a quantitative air quality/odour impact assessment will be useful to evaluate alternatives, determine impacts and identify appropriate mitigation measures. The scope of the assessment can be determined based on the potential effects of the proposed alternatives, and typically includes source and receptor characterization and a quantification of local air quality impacts on the sensitive receptors and the environment in the study area. The assessment will compare to all applicable standards or guidelines for all contaminants of concern.
Please contact this office for further consultation on the level of Air Quality Impact Assessment required for this project if not already advised.
- If a quantitative Air Quality Impact Assessment is not required for the project, the MECP expects that the report contain a qualitative assessment which includes:
 - A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
 - A discussion of the nearby sensitive receptors and the project's potential air quality impacts on present and future sensitive receptors;
 - A discussion of local air quality impacts that could arise from this project during both construction and operation; and
 - A discussion of potential mitigation measures.
- As a common practice, "air quality" should be used as an evaluation criterion for all road projects.
- Dust and noise control measures should be addressed and included in the construction plans to ensure that nearby residential and other sensitive land uses within the study area are not adversely affected during construction activities.
- The MECP recommends that non-chloride dust-suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures that could be applied, refer to [Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from](#)

[Construction and Demolition Activities](#) report prepared for Environment Canada. March 2005.

- The report should consider the potential impacts of increased noise levels during the operation of the completed project. The proponent should explore all potential measures to mitigate significant noise impacts during the assessment of alternatives.

☐ **Ecosystem Protection and Restoration**

- Any impacts to ecosystem form and function must be avoided where possible. The report should describe any proposed mitigation measures and how project planning will protect and enhance the local ecosystem.
- Natural heritage and hydrologic features should be identified and described in detail to assess potential impacts and to develop appropriate mitigation measures. The following sensitive environmental features may be located within or adjacent to the study area:
 - Key Natural Heritage Features: Habitat of endangered species and threatened species, fish habitat, wetlands, areas of natural and scientific interest (ANSIs), significant valleylands, significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.
 - Key Hydrologic Features: Permanent streams, intermittent streams, inland lakes and their littoral zones, seepage areas and springs, and wetlands.
 - Other natural heritage features and areas such as: vegetation communities, rare species of flora or fauna, Environmentally Sensitive Areas, Environmentally Sensitive Policy Areas, federal and provincial parks and conservation reserves, Greenland systems etc.

We recommend consulting with the Ministry of Natural Resources and Forestry (MNRF), Fisheries and Oceans Canada (DFO) and your local conservation authority to determine if special measures or additional studies will be necessary to preserve and protect these sensitive features. In addition, for projects located in Central Region you may consider the provisions of the Rouge Park Management Plan if applicable.

☐ **Species at Risk**

- The Ministry of the Environment, Conservation and Parks has now assumed responsibility of Ontario's Species at Risk program. Information, standards, guidelines, reference materials and technical resources to assist you are found at <https://www.ontario.ca/page/species-risk>.
- The Client's Guide to Preliminary Screening for Species at Risk (Draft May 2019) has been attached to the covering email for your reference and use. Please review this document for next steps.

- For any questions related to subsequent permit requirements, please contact SAROntario@ontario.ca.

□ **Surface Water**

- The report must include enough information to demonstrate that there will be no negative impacts on the natural features or ecological functions of any watercourses within the study area. Measures should be included in the planning and design process to ensure that any impacts to watercourses from construction or operational activities (e.g. spills, erosion, pollution) are mitigated as part of the proposed undertaking.
- Additional stormwater runoff from new pavement can impact receiving watercourses and flood conditions. Quality and quantity control measures to treat stormwater runoff should be considered for all new impervious areas and, where possible, existing surfaces. The ministry's [Stormwater Management Planning and Design Manual \(2003\)](#) should be referenced in the report and utilized when designing stormwater control methods.
- **A Stormwater Management Plan prepared as part of the Class EA process** should include:
 - Strategies to address potential water quantity and erosion impacts related to stormwater draining into streams or other sensitive environmental features, and to ensure that adequate (enhanced) water quality is maintained
 - Watershed information, drainage conditions, and other relevant background information
 - Future drainage conditions, stormwater management options, information on erosion and sediment control during construction, and other details of the proposed works
 - Information on maintenance and monitoring commitments.
- Ontario Regulation 60/08 under the *Ontario Water Resources Act* (OWRA) applies to the Lake Simcoe Basin, which encompasses Lake Simcoe and the lands from which surface water drains into Lake Simcoe. If the proposed sewage treatment plant is listed in Table 1 of the regulation, the report should describe how the proposed project and its mitigation measures are consistent with the requirements of this regulation and the OWRA.
- Any potential approval requirements for surface water taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, except for certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please

review the [Water Taking User Guide for EASR](#) for more information. Additionally, an Environmental Compliance Approval under the OWRA is required for municipal stormwater management works.

☐ **Groundwater**

- The status of, and potential impacts to any well water supplies should be addressed. If the project involves groundwater takings or changes to drainage patterns, the quantity and quality of groundwater may be affected due to drawdown effects or the redirection of existing contamination flows. In addition, project activities may infringe on existing wells such that they must be reconstructed or sealed and abandoned. Appropriate information to define existing groundwater conditions should be included in the report.
- If the potential construction or decommissioning of water wells is identified as an issue, the report should refer to Ontario Regulation 903, Wells, under the OWRA.
- Potential impacts to groundwater-dependent natural features should be addressed. Any changes to groundwater flow or quality from groundwater taking may interfere with the ecological processes of streams, wetlands or other surficial features. In addition, discharging contaminated or high volumes of groundwater to these features may have direct impacts on their function. Any potential effects should be identified, and appropriate mitigation measures should be recommended. The level of detail required will be dependent on the significance of the potential impacts.
- Any potential approval requirements for groundwater taking or discharge should be identified in the report. A Permit to Take Water (PTTW) under the OWRA will be required for any water takings that exceed 50,000 L/day, with the exception of certain water taking activities that have been prescribed by the Water Taking EASR Regulation – *O. Reg. 63/16*. These prescribed water-taking activities require registration in the EASR instead of a PTTW. Please review the [Water Taking User Guide for EASR](#) for more information.
- Consultation with the railroad authorities is necessary wherever there is a plan to use construction dewatering in the vicinity of railroad lines or where the zone of influence of the construction dewatering potentially intercepts railroad lines.

☐ **Excess Materials Management**

- In December 2019, MECP released a new regulation under the Environmental Protection Act, titled “[On-Site and Excess Soil Management](#)” (O. Reg. 406/19) to support improved management of excess construction soil. This regulation is a key step to support proper management of excess soils, ensuring valuable resources don’t go to waste and to provide

clear rules on managing and reusing excess soil. New risk-based standards referenced by this regulation help to facilitate local beneficial reuse which in turn will reduce greenhouse gas emissions from soil transportation, while ensuring strong protection of human health and the environment. The new regulation is being phased in over time, with the first phase in effect on January 1, 2021. For more information, please visit <https://www.ontario.ca/page/handling-excess-soil>.

- The report should reference that activities involving the management of excess soil should be completed in accordance with O. Reg. 406/19 and the MECP's current guidance document titled "[Management of Excess Soil – A Guide for Best Management Practices](#)" (2014).
- All waste generated during construction must be disposed of in accordance with ministry requirements

☐ **Contaminated Sites**

- Any current or historical waste disposal sites should be identified in the report. The status of these sites should be determined to confirm whether approval pursuant to Section 46 of the EPA may be required for land uses on former disposal sites. We recommend referring to the [MECP's D-4 guideline](#) for land use considerations near landfills and dumps.
 - o Resources available may include regional/local municipal official plans and data; provincial data on [large landfill sites](#) and [small landfill sites](#); Environmental Compliance Approval information for waste disposal sites on [Access Environment](#).
- Other known contaminated sites (local, provincial, federal) in the study area should also be identified in the report (Note – information on federal contaminated sites is found on the Government of Canada's [website](#)).
- The location of any underground storage tanks should be investigated in the report. Measures should be identified to ensure the integrity of these tanks and to ensure an appropriate response in the event of a spill. The ministry's Spills Action Centre must be contacted in such an event.
- Since the removal or movement of soils may be required, appropriate tests to determine contaminant levels from previous land uses or dumping should be undertaken. If the soils are contaminated, you must determine how and where they are to be disposed of, consistent with *Part XV.1 of the Environmental Protection Act* (EPA) and Ontario Regulation 153/04, Records of Site Condition, which details the new requirements related to site assessment and clean up. Please contact the appropriate MECP District Office for further consultation if contaminated sites are present.

☐ **Servicing, Utilities and Facilities**

- The report should identify any above or underground utilities in the study area such as transmission lines, telephone/internet, oil/gas etc. The owners should be consulted to discuss impacts to this infrastructure, including potential spills.
- The report should identify any servicing infrastructure in the study area such as wastewater, water, stormwater that may potentially be impacted by the project.
- Any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste must have an Environmental Compliance Approval (ECA) before it can operate lawfully. Please consult with MECP's Environmental Permissions Branch to determine whether a new or amended ECA will be required for any proposed infrastructure.
- We recommend referring to the ministry's [environmental land use planning guides](#) to ensure that any potential land use conflicts are considered when planning for any infrastructure or facilities related to wastewater, pipelines, landfills or industrial uses.

☐ **Mitigation and Monitoring**

- Contractors must be made aware of all environmental considerations so that all environmental standards and commitments for both construction and operation are met. Mitigation measures should be clearly referenced in the report and regularly monitored during the construction stage of the project. In addition, we encourage proponents to conduct post-construction monitoring to ensure all mitigation measures have been effective and are functioning properly.
- Design and construction reports and plans should be based on a best management approach that centres on the prevention of impacts, protection of the existing environment, and opportunities for rehabilitation and enhancement of any impacted areas.
- The proponent's construction and post-construction monitoring plans must be documented in the report, as outlined in Section A.2.5 and A.4.1 of the MEA Class EA parent document.

☐ **Consultation**

- The report must demonstrate how the consultation provisions of the Class EA have been fulfilled, including documentation of all stakeholder consultation efforts undertaken during the planning process. This includes a discussion in the report that identifies concerns that were raised and **describes how they have been addressed by the proponent** throughout

the planning process. The report should also include copies of comments submitted on the project by interested stakeholders, and the proponent's responses to these comments (as directed by the Class EA to include full documentation).

- Please include the full stakeholder distribution/consultation list in the documentation.

☐ **Class EA Process**

- If this project is a Master Plan: there are several different approaches that can be used to conduct a Master Plan, examples of which are outlined in Appendix 4 of the Class EA. **The Master Plan should clearly indicate the selected approach for conducting the plan**, by identifying whether the levels of assessment, consultation and documentation are sufficient to fulfill the requirements for Schedule B or C projects. Please note that any Schedule B or C projects identified in the plan would be subject to Part II Order Requests under the Environmental Assessment Act, although the plan itself would not be. **Please include a description of the approach being undertaken (use Appendix 4 as a reference).**
- If this project is a Master Plan: Any identified projects should also include information on the MCEA schedule associated with the project.
- The report should provide clear and complete documentation of the planning process in order to allow for transparency in decision-making.
- The Class EA requires the consideration of the effects of each alternative on all aspects of the environment (including planning, natural, social, cultural, economic, technical). The report should include a level of detail (e.g. hydrogeological investigations, terrestrial and aquatic assessments, cultural heritage assessments) such that all potential impacts can be identified, and appropriate mitigation measures can be developed. Any supporting studies conducted during the Class EA process should be referenced and included as part of the report.
- Please include in the report a list of all subsequent permits or approvals that may be required for the implementation of the preferred alternative, including but not limited to, MECP's PTTW, EASR Registrations and ECAs, conservation authority permits, species at risk permits, MTO permits and approvals under the *Impact Assessment Act*, 2019.
- Ministry guidelines and other information related to the issues above are available at <http://www.ontario.ca/environment-and-energy/environment-and-energy>. We encourage you to review all the available guides and to reference any relevant information in the report.

Amendments to the EAA through the Covid-19 Economic Recovery Act, 2020

Once the EA Report is finalized, the proponent must issue a Notice of Completion providing a minimum 30-day period during which documentation may be reviewed and comment and input can be submitted to the proponent. The Notice of Completion must be sent to the appropriate MECP Regional Office email address.

The public can request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights. In addition, the Minister may issue an order on his or her own initiative within a specified time period. The Director (of the Environmental Assessment Branch) will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on your project.

Therefore, the proponent cannot proceed with the project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- a Section 16 Order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, or
- the Director has issued a Notice of Proposed order regarding the project.

Please ensure that the Notice of Completion advises that outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Section 16 Order requests on those matters should be addressed in writing to:

Minister David Piccini
Ministry of Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto ON M7A 2J3
minister.mecp@ontario.ca

and

Director, Environmental Assessment Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Ave. W, 1st Floor
Toronto ON, M4V 1P5
EABDirector@ontario.ca

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: September 16, 2022 3:14 PM
To: 'Gabriel Dubé'; ursulak.j@aquaforbeech.com
Subject: FW: CFN 67561 - Pine Creek - Erosion Assessment EA - TRCA Noc Response Letter
Attachments: TRCA CFN 67561_Pine Creek Erosion Assessment_NoC Letter.pdf

TRCA Response for Pine Creek.

Robert Amos MASC. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com

From: Nathan Jenkins [mailto:Nathan.Jenkins@trca.ca]
Sent: Friday, September 16, 2022 3:10 PM
To: Marouchko, Irina
Cc: amos.R@aquaforbeech.com; Nancy Gaffney; Greg Lymer; Sharon Lingertat; Caroline Mugo
Subject: CFN 67561 - Pine Creek - Erosion Assessment EA - TRCA Noc Response Letter

Good afternoon,

Thank you for the Notice of Commencement regarding the Pine Creek - Erosion Assessment EA. Please see the attached TRCA response letter outlining TRCA's interests in the study.

Please feel free to reach out with any questions.

Thank you,

Nathan Jenkins, H.B.Sc. (Env), M.Pl., RPP (he/him/his)
Planner
Infrastructure Planning and Permits | Development and Engineering Services

T: +1 437-880-2395
E: nathan.jenkins@trca.ca
A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](https://www.trca.ca/101-Exchange-Avenue-Vaughan-ON-L4K-5R6) | [trca.ca](https://www.trca.ca)



September 16, 2022

CFN 67561

BY E-MAIL ONLY (imarouchko@pickering.ca)

Ms. Irina Marouchko
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON
L1V 6K7

Dear Irina Marouchko:

**Re: Response to Notice of Study Commencement
Pine Creek Erosion Assessment
Municipal Class Environmental Assessment – Schedule B
Frenchman’s Bay Watershed; City of Pickering; Regional Municipality of Durham**

Toronto and Region Conservation Authority (TRCA) staff received the Notice of Commencement for the above noted Environmental Assessment (EA) on July 28, 2022. As a recognized commenting agency under the Ontario Environmental Assessment Act, TRCA has interests in this project.

PROJECT OVERVIEW

It is our understanding that the City of Pickering is proposing to study erosion related risks for a segment of Pine Creek watercourse in the City of Pickering. The study area encompasses all surface watercourse reaches from Fairport Road and Lynn Heights Drive in the north to Highway 2 in the south.

Furthermore, this undertaking involves identification and prioritization of erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. Aquafor Beech Limited has been retained by the City of Pickering to complete the Pine Creek Erosion Assessment. Please note that TRCA staff will need to be involved in the project’s Technical Agency Committee (TAC).

TRCA COMMENTING ROLES

As detailed in TRCA’s 2014 [The Living City Policies](#) (LCP), TRCA has a number of commenting roles relative to its review of this environmental assessment, including:

1. Regulatory Authority
2. Delegated Provincial Interests
3. Public Commenting Body
4. Resources Management Agency

5. Service Provider
6. Land Owner

These are further detailed in **Appendix A: TRCA Commenting Roles**.

TRCA AREAS OF INTEREST

TRCA staff request clarification on why the full extent of the Pine Creek watershed and the extent of its tributaries (both upstream tributaries and downstream outlets) are not included in the scope of this assessment.

In relation to this application, TRCA staff have identified a number of areas of interest within the study area related to these various commenting roles, including:

1. TRCA Program and Policy Areas
 - a. Natural System Programs and Policies
 - b. Sustainability Programs and Policies
2. Provincial Program Areas
3. Federal Program Areas

Further details are provided in **Appendix B: TRCA Areas of Interest**.

In relation to these areas of interest, please be advised that TRCA has select digital data available through an open data platform on the [TRCA website](#) that should be used to supplement the existing conditions analysis in the development of the environmental assessment. Upon request, TRCA can provide additional data for areas of interest not available on the web. Please contact the undersigned as needed. Please note that TRCA charges an administration fee for the compilation of this additional data.

ASSESSMENT OF ALTERNATIVES

In developing, evaluating and selecting alternatives, staff require the LCP policies be considered. TRCA staff recommends the preferred alternative meets the policies of Section 7. In particular, impacts to and opportunities for the following should be addressed:

1. Flooding, erosion or slope instability
2. Existing landforms, features and functions
3. Aquatic and terrestrial habitat and functions, including connectivity
4. TRCA property and heritage resources
5. Environmental best management practices that support climate change mitigation and adaptation
6. Community and public realm benefits

TRCA requires that the preferred alternative considers avoiding, minimizing, mitigating, and compensating impacts to the ecosystem, and avoid, mitigate or remediate hazards, in that order. In order to fulfil requirements of Ontario Regulation 166/06 at the detailed design stage, staff also requires that the preferred alternative meets LCP policies in Section 8.

In order to ensure TRCA concerns are addressed early in the review process, it is recommended that the TRCA planner be contacted when key project milestones are reached, as detailed in **Appendix C: Recommended Contact Points**. Please contact the planner to discuss the appropriate time for a site visit; please ensure the TRCA planner is included in the technical advisory committee; and please add Nancy Gaffney (nancy.gaffney@trca.ca), Government and Community Relations Specialist to the project mailing list to receive any public information updates.

SUBMISSION REQUIREMENTS

As this project proceeds through the various stages of the environmental assessment process, please ensure the following is provided to TRCA for review and comment at the appropriate time:

Digital Submissions

1. All technical advisory committee meeting agendas, as well as draft and final meeting minutes
2. All TRCA technical meeting agendas, as well as draft and final meeting minutes
3. Draft public information boards, prior to public review
4. Notices of public meetings, including final display material and handouts
5. Draft Phase 1 and 2 Report, if applicable
6. Draft technical reports and associated materials, including a covering letter that outlines the project purpose and lists the reports enclosed for review
7. Draft evaluation criteria and matrices, including a summary that details how the criteria and weighting (if applicable) were established
8. Draft EA document, including a covering letter that outlines how previous TRCA comments have been addressed
9. Final EA document, including a covering letter that outlines how previous TRCA comments have been addressed
10. Ensure all materials are submitted in PDF format, with drawings pre-scaled to print on 11"x17" pages.
11. Materials submitted through e-mail must be less than 25 MB.
12. Materials submitted through a file transfer protocol (FTP) site must be posted a minimum of two weeks.

Please note, prior to submitting the technical reports and materials, as well as appendices related to the draft and final EA documents, it is recommended that the project manager be contacted so that review requirements can be scoped to the TRCA areas of interest.

REVIEW FEES

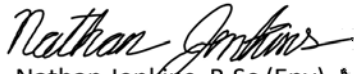
Please be advised that this application is subject to a Schedule B - Standard - \$9,260 application review fee as per our [**Fee Schedule**](#). Please note:

1. **To ensure accurate processing of your fee, please ensure your accounting department references CFN 67561 when making any payments.**
2. Payment method and timing must be noted in your covering letter response.

3. Additional fees are applied as per the fee schedule for reviews beyond two (2) three (3) submissions, including the final.
4. Payments can be made by:
 - a. Cheque: please attach the cheque to your resubmission. Alternatively, if sending separately through your accounting department, please request your accounting department submit the cheque to the attention of Oxana Stanislavskaya - Accounting Clerk, Finance Corporate Services, TRCA.
 - b. Credit Card: please contact Oxana Stanislavskaya at extension 6442 for payments made over the phone.
 - c. Electronic Fund Transfer: this option may be available through your accounting department.

Should you have any questions, please contact me at 437 880-2395 or at Nathan.jenkins@trca.ca.

Regards,



Nathan Jenkins, B.Sc (Env), M.Pl.
Planner, Infrastructure Planning and Permits
Development and Engineering Services

/NJ

Attached: Appendix A: TRCA Commenting Roles
 Appendix B: TRCA Areas of Interest
 Appendix C: Recommended TRCA Contact Points

BY E-MAIL

cc:

Aquafor Beech Ltd: Robert Amos (Amos.R@Aquaforbeech.com)
TRCA: Caroline Mugo, Senior Planner, Infrastructure Planning and Permits
 Sharon Lingertat, Senior Manager, Infrastructure Planning and Permits
 Nancy Gaffney, Government and Community Relations Specialist
CTC Source Protection Risk Management Official: Greg Lymer, Regional Municipality of Durham
(greg.lymer@durham.ca)

APPENDIX A: TRCA COMMENTING ROLES

TRCA COMMENTING ROLES	
Public Commenting Body	
Planning Act	Pursuant to the Planning Act , conservation authorities are a “public commenting body”, and therefore must be notified of municipal policy documents and planning and development applications under the Planning Act. TRCA comments according to its Board-approved policies as a local resource management agency to the municipality planning approval authority on these documents and applications.
Environmental Assessment Act	Pursuant to the federal and provincial Environmental Assessment (EA) Acts , conservation authorities are a commenting body. Conservation authorities are also responsible for comments made under environmental assessment (EA) exemption regulations, and the Ontario and National Energy boards. TRCA reviews and comments on environmental assessment that occur within TRCA’s jurisdiction under these various forms of legislation.
Delegated Provincial Interests	
Hazard Lands	As outlined in the Conservation Ontario/ Ministry of Natural Resources and Forestry/ Ministry of Municipal Affairs and Housing Memorandum of Understanding on CA Delegated Responsibilities, CAs have been delegated the responsibility of representing the provincial interest on natural hazards encompassed by Section 3.1 of the PPS 2014.
Conservation Authorities Act	
Regulatory Authority	
Ontario Regulation 166/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses	In accordance with Ontario Regulation 166/06 (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses), a permit is required from the TRCA prior to any development (e.g. construction) if, in the opinion of TRCA, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected. The Regulation Limit defines the greater of the natural hazards associated with Ontario Regulation 166/06 (listed below). NOTE: The Regulation Limit provides a geographical screening tool for determining if Ontario Regulation 166/06 will apply to a given proposal. Through site assessment or other investigation, it may be determined that areas outside of the defined Regulation Limit require permits under Ontario Regulation 166/06. In these instances, it is the text of the regulation that will prevail; modifications to the regulation line may be required. Any development within the Regulation Limit must comply with the applicable sections of The Living City Policies (2014).

Resources Management Agency	
TRCA Programs	In accordance with Section 20 and 21 of the Conservation Authorities Act, CAs are local watershed-based natural resource management agencies that develop programs that reflect local resource management needs within their jurisdiction. TRCA has developed programs and policies related to our role as a resource management agency that include, but are not limited to, watershed plans, fisheries management plans, land management plans, ecosystem restoration programs, and The Living City Policy (2014), which are approved by the TRCA Board. Please confirm that the preferred alternative design for this project addresses TRCA concerns related to its program areas. These will be further defined through the EA review process.
Service Provider	
Service Agreements and Memorandum of Understandings	Service Level Agreements: TRCA has service level agreements to provide EA Review services to various partners within specific service delivery timelines. Fees are charged as per agreement stipulations; review fees are not charged for individual files. Memorandum of Understandings: The provision of planning advisory services to municipalities is implemented through a Memorandum of Understandings (MOU) with participating municipalities or as part of a CA's approved program activity. In this respect, the CA is essentially acting as a technical advisor to municipalities. The agreements cover the CA's areas of technical expertise such as water management, natural hazards, and natural heritage.
Restoration Opportunities	TRCA requires that the preferred alternative considers avoiding, minimizing, mitigating, and compensating impacts to ecosystems in that order. In areas where impacts are unavoidable, mitigation or compensation will be required. It is recommended that the costs associated with these impacts be factored into decisions made during the EA. TRCA has identified opportunities for habitat restoration and enhancement on TRCA property and some privately owned lands, targeted to improve natural form and function based on goals in the watershed strategies. Should ecosystem restoration or compensation be required for this project, TRCA may be able to provide both restoration opportunities and restoration field services on a project specific basis. This will be further discussed through the EA review process.

Community and Public Realm Benefits	TRCA understands that the purpose of providing project-based community benefits is to provide measurable economic benefits to the local community, and that the purpose of providing public realm benefits is to support local opportunities for social and environmental improvements. As part of the 2013-2022 TRCA Strategic Plan (updated), TRCA has identified the need to achieve measurable positive impacts on the health of our watersheds and has developed a number of programs that actively engage with local communities to support a green, local economy. These programs include but are not limited to, Sustainable Neighbourhood Retrofit Action Plans, TRCA Conservation Land Care Program, TRCA Trails Program, TRCA Community Transformation Program and Partners in Project Green. It is recommended that commitment be made to work with TRCA and other partners to develop a Community and Public Realm Benefits Strategy for this project. This will be further discussed through the EA review process.
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APPENDIX B: TRCA AREAS OF INTEREST

TRCA PROGRAM AND POLICY AREAS	
<i>Note: Additional program and policy information may be available at www.trca.ca, or by request.</i>	
Natural System Programs and Policies	
Systems Approach	TRCA follows a systems approach in which the natural features and water resources are considered in relation to each other and the broader landscape in which they occur. The systems approach recognizes the role that linkages and connectivity within the natural system has in supporting ecological and hydrologic processes and functions that are vital to maintaining a healthy and robust natural system that is resilient against the impacts of urbanization and climate change. TRCA may require an assessment of the existing systems, together with an evaluation as to how the proposal may impact the systems.
Aquatic Systems, Species and Habitat	The aquatic system includes watercourses, wetlands, and flora and fauna species. Aquatic species and habitat should be assessed based on their conservation status according to sensitivity to disturbance and specialized ecological needs, as well as rarity. TRCA has prepared watershed plans or strategies, as well as fisheries management plans for some watersheds. The proposal must prevent negative impacts to the aquatic system, and as such, TRCA may require an assessment of the existing aquatic system, an evaluation as to how the proposal will meet the objectives articulated in the watershed plan or strategy, and/or an evaluation as to how the proposal will meet the objectives of the fisheries management plan.
Terrestrial System, Species and Habitat	The terrestrial system includes landscape features, vegetation communities, and flora and fauna species. Terrestrial species and habitat should be assessed based on their conservation status according to sensitivity to disturbance and specialized ecological needs, as well as rarity. TRCA has identified the need to improve both the quality and quantity of terrestrial habitat. TRCA's Terrestrial Natural Heritage System Strategy sets measurable targets for attaining a healthier natural system by creating an expanded and targeted land base. It includes strategic directions for stewardship and securement of the land base, a land use policy framework to help achieve the target system, and other implementation mechanisms. TRCA may require an assessment of the existing terrestrial species and habitat, together with an evaluation as to how the proposal will meet the objectives articulated in the watershed plan or terrestrial natural heritage strategy, as well as prevent negative impacts to the terrestrial system.

Groundwater Systems	
Aquifers and Hydrogeological Features and Functions	Groundwater systems include aquifers and their functional connections to surface water. The extraction and discharge of groundwater has the potential to negatively impact surrounding natural features and their functions. Even small amounts of groundwater extraction may reduce contributions to groundwater dependent features such as wetlands, springs, or fish spawning habitat. In addition, the discharge of groundwater must be controlled to avoid impacts to watercourses and fish habitat from temperature, erosion and sedimentation, as well other water quantity and quality issues. TRCA may require geotechnical or hydrogeological investigations to confirm dewatering and discharge requirements, and to identify appropriate mitigation measures with respect to potential impacts to natural features and functions.
Surface Water Systems	
Watercourses	Typically, watercourses are associated with aquatic species, and direct or indirect habitat. Any alteration or interference to a watercourse (e.g., straightening, diverting, realigning, altering baseflow) has the potential to impact fish communities, but may also affect the Regulatory Flood Plain, erosion or other natural channel processes. TRCA may require an environmental study or site confirmation of watercourse locations.
Meander Belt	Channel migration has a significant impact on infrastructure, structures and property located near river systems. Determining channel stability is important to ensure that damage from erosion, down-cutting or other natural channel processes is avoided. TRCA may require a meander belt delineation study or fluvial geomorphology analysis to confirm that any development does not conflict with natural channel processes.
Regulatory Flood Plain	The Regulatory Flood Plain is the approved standard used in a particular watershed to define the limit of the flood plain for regulatory purposes. Within TRCA's jurisdiction, the Regulatory Flood Plain is based on the greater of the regional storm, Hurricane Hazel, and the 100-year flood. TRCA's framework for Flood Plain Management is the LCP. TRCA may require a flood study or hydraulic update to confirm that there will be no impacts to the storage or conveyance of flood waters.
Wetlands	Wetlands are sensitive natural habitats that play an important role in numerous physical, chemical and biological processes, including storm water control, natural habitat and water quality improvement. Most wetlands are designated by the Ministry of Natural Resources and Forestry as Provincially Significant or Locally Significant. Other wetlands have also been identified on a site specific basis by TRCA.

	All wetlands are regulated under Ontario Regulation 166/06. TRCA may require an environmental study or site confirmation of wetland locations.
Storm Water Management, including Green Infrastructure	Stormwater management is integral to the health of streams, rivers, lakes, fisheries and terrestrial habitats, and source water protection is integral for managing the quality and quantity of drinking water at its source. TRCA requires all development, infrastructure and site alteration meet the criteria in the TRCA 2012 Stormwater Management Criteria document for water quantity, water quality, erosion control, discharge water temperature, and water balance for groundwater recharge and natural features. Green Infrastructure techniques, including Low Impact Development (LID) measures should be used to address issues related to stormwater management, as well as maximize ecosystem services and mitigate the impacts of urbanization and climate change. For further information, please refer to the TRCA Introduction to Green Infrastructure, the Sustainable Technologies Evaluation Program (STEP) -Urban Runoff Green Infrastructure and the STEP 2010 Low Impact Development Stormwater Management Planning and Design Guide.
Flood or Erosion Control Structures	There is an existing flood or erosion control structure (e.g., dam, weir, berm, channel) located in the project vicinity that must be considered as the project proceeds. A meeting with TRCA should be arranged as early as possible.
Valley Slopes	
Crest of Slope	Valley and stream corridors are dynamic systems that provide important natural functions and linkages for the physical, chemical and biological processes of wildlife, watercourses, and other natural features. The crest of slope identifies the physical limit of these corridors; however, due to ecological sensitivities, development restrictions typically extend beyond the actual crest of slope. TRCA may require the determination of the long term stable crest of slope (or toe of slope) through a staking with TRCA staff, as well as a geotechnical assessment.
Sustainability Programs and Policies	
Climate Change	In October 2017, MECP released a guideline under the Ontario environmental assessment legislation directing that all projects going through the EA process, including IEAs, Class EAs, and those governed by EA regulations, must consider impacts to and opportunities for climate change mitigation and adaptation, and consider the vulnerability of projects to climate change. It was further recommended that applicable policies in the 2014 Provincial Policy Statement be addressed, including but not limited to encouraging green infrastructure and strengthening stormwater management requirements; requiring consideration of energy conservation and efficiency, reduced greenhouse gas emissions and

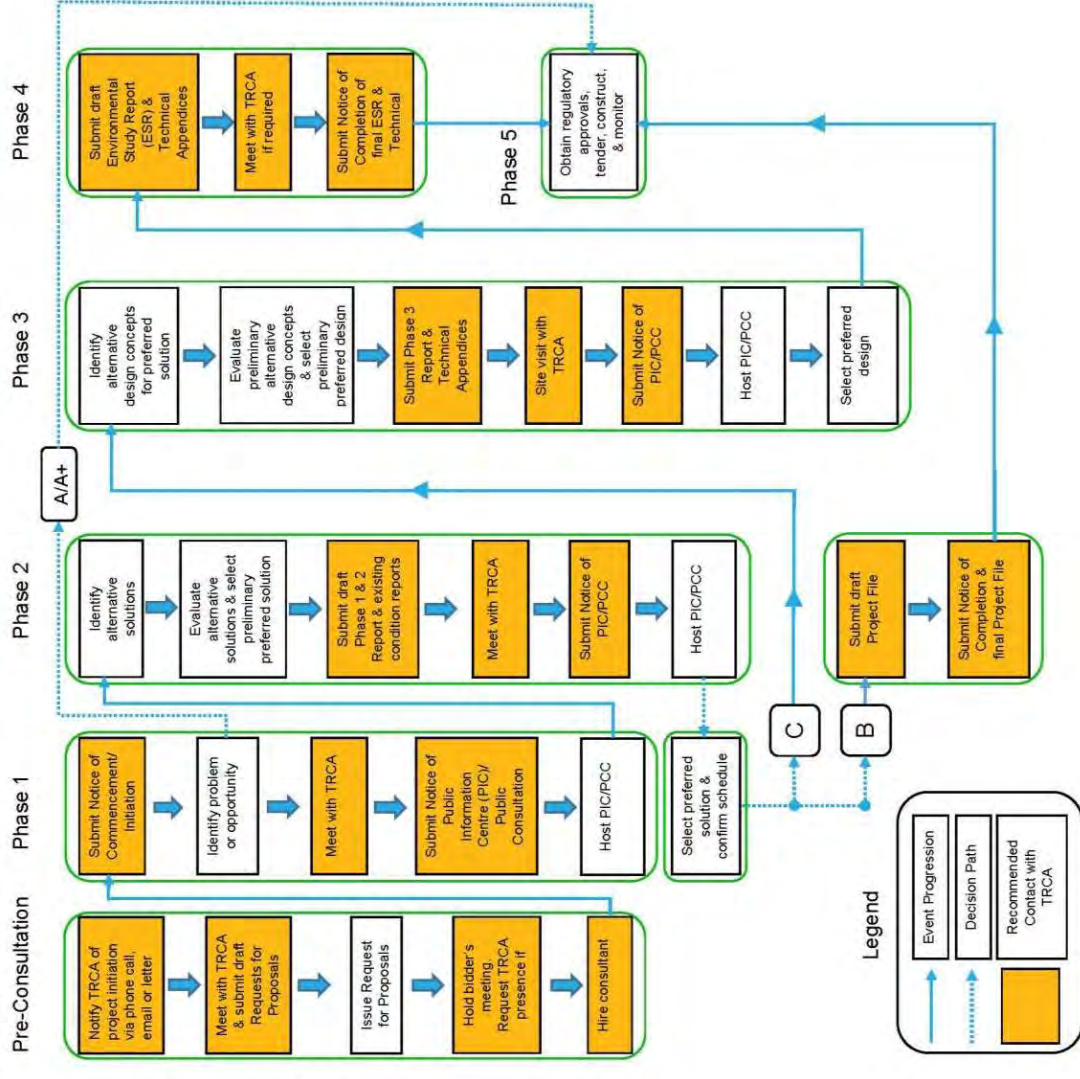
	climate change adaptation (e.g. tree cover); and consideration of the potential impacts of climate change that may increase the risk associated with natural hazards (e.g. flooding due to severe weather). The climate change section of the EA should include recommendations for Green Infrastructure, Sustainable Energy, Sustainable Buildings and Sustainable Construction Practices, as further described below. It is recommended that a completed Sustainable Technologies for Green Building, Green Infrastructure, and Sustainable Energy Design in Evaluation Matrix be included in the EA document.
Sustainable Infrastructure & Buildings	The sustainability of infrastructure and buildings determined through a variety of factors through planning, design, construction, operation, maintenance and decommissioning. Sustainability factors include the efficiency environmental impact of project inputs through all phases, including energy, water and natural resources/materials. The type and amount of energy used in construction and operation is one of the most significant factors affecting climate change, the ecological footprint of our communities, and ultimately our ability to create sustainable communities. As supported by the LCP, TRCA advocates that proponents consider the use of appropriate sustainable energy networking (e.g., community energy project), technologies (e.g., solar lights, etc.) and practices (e.g., selection of materials, transportation of materials, energy efficiency, passive solar energy) in their projects. Various sustainability best management practices include sustainable procurement, reusing resources, using recyclable/recycled resources, protecting natural systems, eliminating toxics, applying life-cycle costing and ensuring a high quality of construction. If designed appropriately, sustainable infrastructure or buildings generally cost less to operate, are more resilient and adaptable as compared to standard designs and are an aesthetic and environmental benefit to the community. TRCA recommends that a commitment to sustainable infrastructure or buildings through all project phases be made in the EA document. Please consider using a rating system such as Envision or LEED to guide the EA and detailed design.
Sustainable Communities	The TRCA Living City vision is based on a foundation that includes Sustainable Communities. Planning for community sustainability requires the identification of the complex and inter-related social, economic and ecological systems involved; TRCA supports a systems approach to developing integrative and adaptive solutions to improve community sustainability. Key socio-economic systems include: transportation facilities (including trails, sidewalks & multi-use pathways), community greenspaces (including parks), urban forests, cultural heritage resources, and the local economy. For transportation projects, a context sensitive design/solutions framework are encouraged.

Archaeological and Heritage Resources	TRCA watershed strategies include recommendations for the management of archaeological and heritage resources in accordance with Ministry of Culture and Municipal standards. The project should aim to preserve, protect and celebrate archaeological and heritage resources where possible.
PROVINCIAL PROGRAM AREAS	
Greenbelt Plan	The Greenbelt consists of more than 809,000 hectares of environmentally sensitive land, urban river valleys and agricultural land in the Golden Horseshoe. The Greenbelt Plan identifies limits to urbanization to provide permanent protection to the agricultural land base and the ecological features and functions occurring within this landscape. Contact the Ministry of Municipal Affairs and Housing for more details. Please confirm that the preferred alternative design for this project conforms with Section 4.2 Infrastructure Policies and Section 6 Urban River Valley Policies of the Greenbelt Plan.
Clean Water Act and Credit Valley - Toronto & Region - Central Lake Ontario (CTC) Source Protection Plan	The Clean Water Act ensures communities protect their drinking water supplies through prevention by developing collaborative, watershed-based source protection plans that are locally driven and based on science. Please be advised that the subject property appears to fall within the Highly Vulnerable Aquifers (HVA), vulnerable areas under the Credit Valley - Toronto and Region - Central Lake Ontario Source Protection Plan (CTC SPP). Please confirm that the preferred alternative design for this project conforms with the CTC SPP. Please also consult with the Risk Management Official as copied on this letter. Please note that in accordance with Ontario Regulation 166/06, permits from TRCA may be required for mitigation solutions that are designed to ensure conformity with the CTC SPP.
PROVINCIAL PROGRAM AREAS	
Please contact the Ministry of Natural Resources and Forestry to confirm if there are program interests related to this project for: • Areas of Natural and Scientific Interest (ANSI) • Provincially Significant Wetlands (PSW) • Provincially Endangered Species under the Species at Risk Act (SARA) Please be advised that this list is not inclusive and the onus is on the proponent and its consultants to consult with other provincial agencies, as required, to ensure that requirements of their respective legislation is met.	
FEDERAL PROGRAM AREAS	
Please contact the relevant federal agency to confirm if there are issues related to: • Asian Long-horned Beetle Regulated Area • Federally Endangered Species under the Endangered Species Act (ESA)	

- The **Fisheries Act**

Please be advised that this list is not inclusive and the onus is on the proponent and its consultants to consult with other provincial agencies, as required, to ensure that requirements of their respective legislation is met.

Appendix C: Recommended TRCA Contact Points in the Municipal Class EA Process



From: Minkin, Dan (MCM) <Dan.Minkin@ontario.ca>
Sent: October 18, 2022 5:35 PM
To: Rob Amos; 'Marouchko, Irina'
Cc: ursulak.j@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: 2022-10-18_PineCreekErosion_MCMcomments.pdf

Good afternoon,
Please see attached.

Dan Minkin | Heritage Planner
Ministry of Citizenship and Multiculturalism
Citizenship, Inclusion and Heritage Division | Heritage Branch | Heritage Planning Unit
T. 416. 786.7553 | Email: dan.minkin@ontario.ca

New : Effective October 17, 2022, units responsible for cultural heritage matters have been transferred from the Ministry of Tourism, Culture and Sport (MTCS) to the Ministry of Citizenship and Multiculturalism (MCM). Responsibility for the Ontario Heritage Act and associated matters is now held by MCM. Individual staff roles and contact information remain unchanged.

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: August 2, 2022 11:54 AM
To: 'Marouchko, Irina' <imarouchko@pickering.ca>
Cc: ursulak.j@aquaforbeech.com
Subject: Pine Creek Erosion Assessment - Notice of Study Commencement

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Dear Stakeholder,

Please find attached a Notice of Study Commencement for the City of Pickering - Pine Creek Erosion Assessment Class EA.

The next point of contact will include a Public Information Centre to discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures. The PIC date and details will be advertised as the Study progresses.

Thanks very much for your interest and input, we look forward to hearing from you.

Best Regards,

Rob

Robert Amos MASc. P.Eng.
Project Manager, Aquafor Beech Ltd.
905.629.0099 x 284
amos.r@aquaforbeech.com

From: Marouchko, Irina <imarouchko@pickering.ca>
Sent: May 4, 2023 8:52 AM
To: Marouchko, Irina
Cc: 'Rob Amos'
Subject: FW: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre
Attachments: Pine Creek Erosion Assessment EA_Notice of PIC.pdf

Please be advised that the City has issued a Notice of Public Information Centre for the Pine Creek Erosion Assessment Municipal Class Environmental Assessment (Class EA) Study. The Notice of Public Information Centre is attached to this email. The notice has also been sent out through a targeted mail-out to residents in the Study Area.

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of sites in need of rehabilitation. The Pine Creek Erosion Assessment will be completed in accordance with the planning principles of the Municipal Engineers Association Municipal Class Environmental Assessment, October 2000, as amended in 2007, 2011, 2015 and 2023, which is an approved process under the Environmental Assessment Act.

The PIC will introduce the project, outline the rationale behind it, identify existing conditions, and present the evaluation of alternative solutions. The website will include the information presented at the PIC, as well as a comment sheet and an email address to submit comments.

Should you have any questions regarding the project please contact myself (ext. 2072).

Regards,

Irina Marouchko, P.Eng.

Senior Water Resources Engineer | Water Resources & Development Services

905.420.4660 ext. 2072 | 1.866.683.2760 | TTY: 905.420.1739

imarouchko@pickering.ca



Engineering Services Department

Issued on: May 4, 2023

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of sites in need of rehabilitation. The Study Area is shown in the Key Map.

The Process

The study is being conducted in accordance with Schedule B projects, as outlined in the Municipal Engineers Association's, Municipal Class Environmental Assessment (October 2000, amended 2007, 2011, 2015 and 2023). The Study is intended to address the first two phases of the Municipal Class EA process.

Public Information Centre (PIC)

Public input is a key component of the study. The City wants anyone with an interest in the study to have an opportunity to provide input, which will help the Project Team in the decision making process. The PIC will be presented in a drop-in format and an on-line format with material available on the City's website at pickering.ca. The drop-in PIC will be held as follows:

Thursday, May 18, 2023 – 6:00 pm to 8:00 pm
Chestnut Hill Developments Recreation Complex
West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

The PIC will introduce the project, outline the rationale behind it, identify existing conditions, and present the evaluation of alternative solutions. The website will include the information presented at the PIC, as well as a comment sheet and an email address to submit comments.

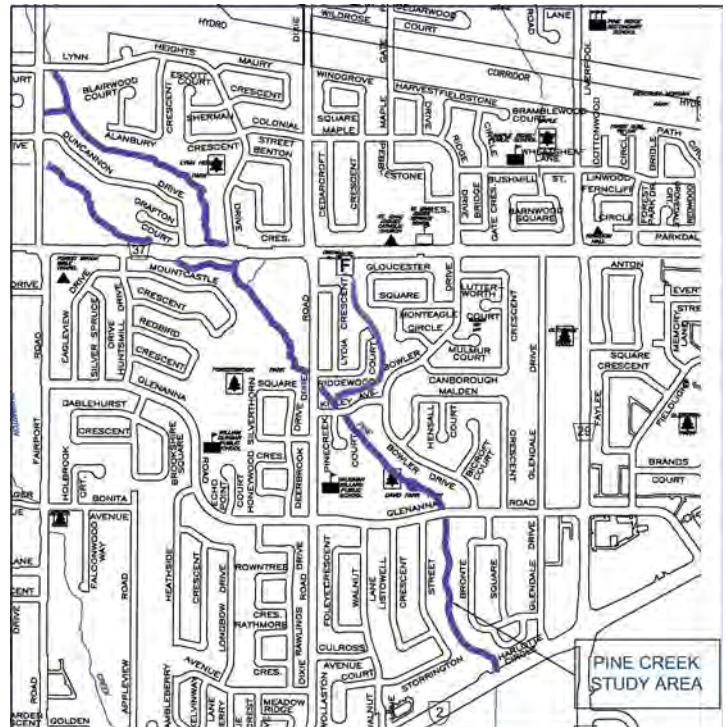
The Project Team wants to hear from you!

The deadline for the submission of on-line comments following the PIC will be **Friday, June 2, 2023**.

To provide comments and receive additional study information, please consider adding your name to the study mailing list by contacting either of the following Project Team members:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, M.A.Sc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T. 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com



Engineering Services Department

Issued on: May 4, 2023

The Study

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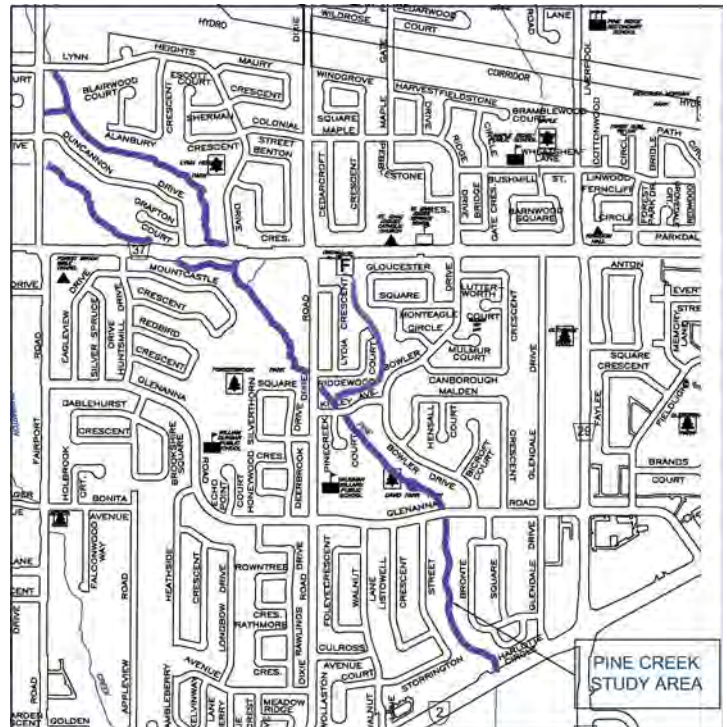
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To provide comments and receive additional study information, please consider adding your name to the study mailing list by contacting either of the following Project Team members:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, M.A.Sc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T. 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com



From: Antony Manoharan <Antony.Manoharan@durham.ca>
Sent: May 8, 2023 1:54 PM
To: amos.r@aquaforbeech.com
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hi Rob,
Thanks for sending the notice. Please let me know when the PIC slides are posted for review. We'll review and provide our comments to the project team. I'll be the Region lead for this study.

Thanks,
Antony



Antony Manoharan, P.Eng. | Project Manager-Stormwater Management
Works Department | Transportation Infrastructure
The Regional Municipality of Durham
Antony.Manoharan@durham.ca | 905-668-4113
Extension 3881 | durham.ca.



From: amos.r@aquaforbeech.com <amos.r@aquaforbeech.com>
Sent: May 5, 2023 7:43 AM
Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com
Subject: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Some people who received this message don't often get email from amos.r@aquaforbeech.com. [Learn why this is important](#)

Dear Stakeholder,

Please find attached a Notice of Public Information Centre (PIC) for the City of Pickering - Pine Creek Erosion Assessment Class EA.

The Public Information Centre will discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures.

The location and time for the PIC is below:

Thursday, May 18, 2023 – 6:00 pm to 8:00 pm
Chestnut Hill Developments Recreation Complex, West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

Thanks very much for your interest, we look forward to meeting you and receiving your input.

Best Regards,

Rob Amos, MAsC., P.Eng.
Aquafor Beech Ltd.
Mobile: 416.705.2367

THIS MESSAGE IS FOR THE USE OF THE INTENDED RECIPIENT(S) ONLY AND MAY CONTAIN INFORMATION THAT IS PRIVILEGED, PROPRIETARY, CONFIDENTIAL, AND/OR EXEMPT FROM DISCLOSURE UNDER ANY RELEVANT PRIVACY LEGISLATION. No rights to any privilege have been waived. If you are not the intended recipient, you are hereby notified that any review, re-transmission, dissemination, distribution, copying, conversion to hard copy, taking of action in reliance on or other use of this communication is strictly prohibited. If you are not the intended recipient and have received this message in error, please notify me by return e-mail and delete or destroy all copies of this message.

ursulak.j@aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: May 8, 2023 8:57 PM
To: ursulak.j@aquaforbeech.com; Gabriel Dubé
Cc: amos.r@aquaforbeech.com
Subject: FW: Pine Creek Erosion Assessment

JU and GD,

Please see below. Let's ensure we respond with a link to the PIC boards.

Thanks,

Rob Amos
Aquafor Beech Ltd
Mobile: 416.705.2367

----- Original message -----

From: Suzie Harding [REDACTED]
Date: 2023-05-08 8:31 p.m. (GMT-05:00)
To: imarouchko@pickering.ca, Amos.R@aquaforbeech.com
Subject: Pine Creek Erosion Assessment

I received a notice in my mail regarding Pine Creek Erosion Assessment. The notice does not give any detail to what action the project is taking and if this will physically affect the environment. Could I please have more details on what you intend to do to this creek?

best regards
Suzanne Harding

ursulak.j@aquaforbeech.com

From: Marouchko, Irina <imarouchko@pickering.ca>
Sent: May 9, 2023 10:01 AM
To: ursulak.j@aquaforbeech.com
Cc: Rob Amos
Subject: FW: Pine Creek study submission

Good morning Jacob,

Please see the email below.

Thanks,
Irina

From: paul darby [REDACTED]
Sent: Monday, May 8, 2023 7:10 PM
To: Marouchko, Irina <imarouchko@pickering.ca>
Subject: Pine Creek study submission

Dear Irina, I'm not sure I can make the May 18 Pine Creek meeting but I would like to take the time here to let you know some of the changes in the 48 years we've lived on [REDACTED], backing onto the creek, very near the bridge over to [REDACTED]. Runnymede, the original developers, created a straight run of the creek from Glenanna to Hwy 2 with baskets of stones creating a bank for a three-foot wide creek. As the river has widened (primarily because of three years of work by the beavers) it has caused two issues that must be dealt with by the town very soon. FIRST - the widening has now undercut and surrounded the two pillars of the bridge between Storrington and Bronte during the spring runoff or during rainstorms.. This year the walnut tree by the bridge will probably fall into the water not because of beavers (who do not like walnut bark) but because of the width of the river - a sign of what is to come of the bridge. SECOND - because the river has deepened its channel, when the water is low (all summer) the river cannot move under Hwy 2. The foundation (floor) of the tunnel under the highway is above the level of the water when the water is low (all summer). This means that the creek will become a pond at that point and the mosquitoes will propagate without the need of beavers to build a pond. There are other issues with our section of Pine Creek but these are the two that will require mitigation sooner than later. Regards, Paul Darby, [REDACTED] [REDACTED]

Pine Creek Erosion Assessment Municipal Class Environmental Assessment City of Pickering



May 18th, 2023



Sign-in Sheet

Name	Address	Phone Number	E-mail
Bob Purcell			
Ken Collins			
Martin Herzog			
Saïce Freund			
Maria Davis			
Walter Davis			
ANTHONY PIGAIDOWIS			
Paul Dalton			
Dale Baker			
Irene Moult			

COMMENT SHEET

Name (Optional)

JEANNETTE ANDERSON

THANK YOU.

Comments/Concerns/Questions

1) Do you have any information on the conditions of Pine Creek within the study area that would be useful for the study team to know (i.e. evidence of erosion you may have observed)? If so, please tell us what they are.

YES. EROSION CREATED DIRECTLY BY THE ROAD CULVERT THAT DIRECTS RUN-OFF FROM THE DITCH THAT STARTS AT FAIRPORT ROAD, SLOPES EASTWARD AND DUMPS WATER INTO

2) Do you agree with the preliminary preferred alternatives? Why or why not?

PINE CREEK.

OUR COMMENTS WILL BE SUBMITTED ON-LINE BEFORE JUNE 2, 2023. THANK YOU.

3) Do you have any concerns about the potential impacts the preliminary preferred alternatives may have on the creek or adjacent properties?

THERE IS A NATURAL SPRING LOCATED IN THE GROUND BELOW THE FINCH AVENUE CULVERT. THAT IS LOCATED AT WEST END OF STUDY AREA.

4) Additional questions/comments?

IS THE T. CONSERVATION AUTHORITY INVOLVED?

WHO IS RESP WILL TAKE RESPONSIBILITY FOR THE EROSION OF OUR PROPERTY LOTS THAT ARE IN THE CITY OF PICKERING; MOUNTCASTLE CRES FINCH ROAD WATER RUN OFF MIGHT BELONG TO REGION OF

Ms. Irina Marouchko P. Eng.
Senior Water Resources Engineer,
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
Phone: 905-420-4660 ext. 2072
Email: imarouchko@pickering.ca

Rob Amos, MAsc., P.Eng.
Project Manager, Aquafor Beech Limited
2600 Skymark Avenue,
Building 6, Unit 2,
Mississauga, ON L4W 5B2
Phone: 905-629-0099 x 284
Email: Amos.R@aquaforb企业.com

Return Comments By: June 2nd, 2023

Information will be collected in accordance with the Municipal Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

DURHAM, BUT IT EROSION IS NEGATIVE IMPACT ON PICKERING PROPERTIES.

COMMENT SHEET

**Pine Creek Erosion Assessment
Municipal Class Environmental
Assessment**

Name (Optional)

Comments/Concerns/Questions

1) Do you have any information on the conditions of Pine Creek within the study area that would be useful for the study team to know (i.e. evidence of erosion you may have observed)? If so, please tell us what they are.

The fact that when we first moved to [REDACTED]
[REDACTED], we could step over the creek and now that
is impossible. The beavers have caused a lot of
this problem.

2) Do you agree with the preliminary preferred alternatives? Why or why not?

Yes. I like the more natural look.

3) Do you have any concerns about the potential impacts the preliminary preferred alternatives may have on the creek or adjacent properties?

4) Additional questions/comments?

Ms. Irina Marouchko P. Eng.
Senior Water Resources Engineer,
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
Phone: 905-420-4660 ext. 2072
Email: imarouchko@pickering.ca

Rob Amos, MAsC., P.Eng.
Project Manager, Aquafor Beech Limited
2600 Skymark Avenue,
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Phone: 905-629-0099 x 284
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Return Comments By: June 2nd, 2023

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COMMENT SHEET

Name (Optional)

Harding

Comments/Concerns/Questions

- 1) Do you have any information on the conditions of Pine Creek within the study area that would be useful for the study team to know (i.e. evidence of erosion you may have observed)? If so, please tell us what they are.

Cleanup of garbage and wood cuttings would help with water flow.

- 2) Do you agree with the preliminary preferred alternatives? Why or why not?

Some preliminary alternatives look reasonable but not a complete stripping of the natural environment.

- 3) Do you have any concerns about the potential impacts the preliminary preferred alternatives may have on the creek or adjacent properties?

Yes, I'm concerned about Tree loss. Natural eco system living in the forest -

- 4) Additional questions/comments?

I'm concerned about natural wild life + plants -
It should be (natural) if possible -

Ms. Irina Marouchko P. Eng.
Senior Water Resources Engineer,
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
Phone: 905-420-4660 ext. 2072
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Email: Amos.R@aquaforbeech.com

Return Comments By: June 2nd, 2023

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ursulak.j@aquaforbeech.com

From: Marouchko, Irina <imarouchko@pickering.ca>
Sent: May 23, 2023 9:49 AM
To: Nadia and Adrian
Cc: amos.r@aquaforbeech.com; ursulak.j@aquaforbeech.com
Subject: RE: Erosion Assessment

Thank you for the contact information.

The suggested preferred alternative for this reach of Pine Creek includes local restoration works.

Please refer to the PIC presentation on the City's website <https://www.pickering.ca/en/city-hall/pine-creek-erosion-assessment-mcea-study.aspx>.

Slides 22 and 23 of the presentation show details of existing conditions and alternatives for the area of concern (sites 11 & 12).

Regards,

Irina Marouchko, P.Eng.

Senior Water Resources Engineer | Water Resources & Development Services

905.420.4660 ext. 2072 | 1.866.683.2760 | TTY. 905.420.1739

imarouchko@pickering.ca



From: Nadia and Adrian [REDACTED]
Sent: Tuesday, May 23, 2023 9:30 AM
To: Marouchko, Irina <imarouchko@pickering.ca>
Subject: Re: Erosion Assessment

Hi Irina,

Good morning.

As part of the assessment, what type of options are being considered?

As our backyard borders the creek we are concerned about potential solutions that may affect our property.

Please advise as soon you have the opportunity.

Thank You

Adrian Bhagwandin

On Tue, May 23, 2023, 9:08 a.m. Nadia and Adrian [REDACTED] wrote:

Adrian Bhagwandin

[REDACTED] Pickering, [REDACTED] Canada

Thank you,

Irina

On Tue, May 23, 2023, 8:35 a.m. Marouchko, Irina <imarouchko@pickering.ca> wrote:

Good day Nadia,

Your email has been added to the project contact list. Could you please provide your full name and address.

Thanks you,

Irina Marouchko, P.Eng.

Senior Water Resources Engineer | Water Resources & Development Services

905.420.4660 ext. 2072 | 1.866.683.2760 | TTY. 905.420.1739

imarouchko@pickering.ca

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From: Nadia and Adrian [REDACTED]
Sent: Monday, May 22, 2023 9:16 PM
To: Marouchko, Irina <imarouchko@pickering.ca>
Subject: Erosion Assessment

Hi,

We would like to be added to the erosion study list.

Thank You

ursulak.j@aquaforbeech.com

From: Marouchko, Irina <imarouchko@pickering.ca>
Sent: May 23, 2023 10:15 AM
To: [REDACTED]
Cc: ursulak.j@aquaforbeech.com
Subject: Pine Creek Erosion Assessment Municipal Class EA

Good day Dale,

It was nice to meet you at the Pine Creek Erosion Assessment Municipal Class EA Study PIC meeting last Thursday.

As we discussed, I have attached a few photos of the Mountcastle outfall restoration project.

Should you have any questions, please contact me.

Regards,
Irina

Pre-restoration





Post-restoration





Irina Marouchko, P.Eng.
Senior Water Resources Engineer | Water Resources & Development Services
905.420.4660 ext. 2072 | 1.866.683.2760 | TTY. 905.420.1739
imarouchko@pickering.ca

City of
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f t i e pingstreet

From: Christopher Coniam <[REDACTED]>
Sent: June 2, 2023 9:19 AM
To: Stephanie Dore
Cc: Marouchko, Irina; Margaret Schagen; amos.r@aquaforbeech.com; Megan Cranfield
Subject: Re: Pine Creek Erosion Assessment

Thanks again.

Left a message for Megan on her voicemail now.

Really just looking for some guidance on what I need a permit for, whether or not this is my project or the city would be involved as well, how and what to get permits for and whether or not I should just delay my deck and retaining wall until the city decides how they're going to pursue the erosion project.

My retaining wall will likely hold another year or two... not sure about my deck but I can probably reinforce it until then. But that'll probably be the end of my time window and I will have to act at that point.

I was thinking of ordering another 2/2.5 cubic yards of dirt as we haven't done that for about 3yrs now and I'm definitely bleeding out with noticeable drops in depth in areas of my backyard.

Talk soon!

Chris. [REDACTED]

On Thu, Jun 1, 2023 at 11:35 AM Stephanie Dore <Stephanie.Worron@trca.ca> wrote:

Good Morning Everyone,

[@Marouchko, Irina](#) thank you for providing Christopher with my information.

This inquiry has been delegated to my colleague Megan Cranfield who is copied on this email.

[@Christopher Coniam](#) please contact Megan directly to discuss the proposed deck and retaining wall project. Her phone number is 437-880-2162.

Kind Regards,

Stephanie Dore, RPP, MCIP
Senior Planner
Development Planning and Permits | Development and Engineering Services

T: [\(437\) 880-2469](tel:437-880-2469)
E: stephanie.dore@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca



From: Christopher Coniam <[REDACTED]>
Sent: Wednesday, May 31, 2023 3:09 PM
To: Marouchko, Irina <imarouchko@pickering.ca>
Cc: Margaret Schagen <margaret.schagen@yahoo.ca>; Stephanie Dore <Stephanie.Worron@trca.ca>; amos.r@aquaforbeech.com
Subject: Re: Pine Creek Erosion Assessment

Hi, Irina.

There are no emails before 1:51pm in my inbox.

Please provide Stephanie Dore's phone and email address for me to contact her.

On Wed, May 31, 2023 at 1:51 PM Marouchko, Irina <imarouchko@pickering.ca> wrote:

Good afternoon Chris,

Thank you for the information you provided regarding the Pine Creek conditions. As requested, your contact information has been added to the project contact list.

With respect to the retaining wall and deck construction, please note that your property is located within the area regulated by the Toronto Region Conservation Authority (TRCA). Construction works within the regulated area require the TRCA permit. Please contact Stephanie Dore Senior Planner, Development Planning and Permits for further information and requirements. I have copied Stephanie on this email.

Regards,

Irina Marouchko, P.Eng.

Senior Water Resources Engineer | Water Resources & Development Services

905.420.4660 ext. 2072 | 1.866.683.2760 | TTY. 905.420.1739

imarouchko@pickering.ca



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From: Christopher Coniam <[REDACTED]>

Sent: Monday, May 29, 2023 5:41 PM

To: Marouchko, Irina <imarouchko@pickering.ca>; amos.r@aquaforbeech.com

Cc: Margaret Schagen <margaret.schagen@yahoo.ca>

Subject: Pine Creek Erosion Assessment

Good afternoon, Irini and Robert.

My name is Chris. My wife and I live at [REDACTED] and were just told about this initiative.

Since the construction of the firehall on Finch we have seen MUCH change to the landscape behind our house. So much earth has been carried away in the water that near a third of the trees have fallen in several the windstorms. We see the cleanup and cutting crews but we don't think anything was planted to replace what fell - and so the movement of the earth and dropping of soil level has increased in the last few years. There are still some trees now that the erosion has continued to melt their foundations away and some that will likely fall on our fences and crush them in the foreseeable future.

The house south of me was sold to a new owner in December 2022 and they immediately constructed a 4/5ft retaining wall, lined with a mesh to prevent the dirt from sliding away as we told him since we've lived her we have

brought in near 10 cubic yards of dirt to fill what has slipped through the now bowing wooden retaining wall built when the house was built. They did this INSIDE their property line but we are looking for something bigger and likely concrete so we don't have to worry about further erosion behind us.

We spoke to a deck contractor as ours is also deteriorating and we were told we should fix the retaining wall issue before we do the deck.

So... can we please be added to the mailing list and see what the proposed action is and do you know if I am to get the retaining wall replaced whom I would speak to about either getting a permit/permission to be able to work over the fence on the town/crown land and whether or not I have to partner with or get approval from the city in order to remove the existing wall and put in a new stronger solution? Not sure which departments I'd have to speak to or what the correct procedure is.

Looking forward to the email and we can send back comments with pictures.

When we moved here about 17 years ago the forest behind us was thick enough that even when the trees lost their leaves in the winter we still couldn't really see the street behind us. Now its thin enough we can see their TV screens and sometimes tell what show they're watching. That's how much of the forest has fallen.

Thanks in advance. Look forward to hearing from you. `cc

Chris Coniam

[REDACTED]

[REDACTED]

[REDACTED]

Date: May 31, 2023

To: Ms. Irina Marouchko, Senior Water Resources Engineer, City of Pickering
imarouchko@pickering.ca

Rob Amos, Project Manager, Aquafor Beech Ltd.
amos.R@aquaforbeech.com

From: Martin Herzog

Re: Comments on Pine Creek Erosion Assessment,
Municipal Class Environmental Assessment (May 18, 2023)

1. Erosion Sites 9-10 - South of Kitley

1.1 Erosion Issue Pushed Down-Stream

Erosion along Pine Creek and its tributaries has been an issue since before 1990. Erosion accelerated in the 1990s and early 2000s, particularly along the Mountcastle outfall channel with year's of stormwater runoff and no mitigation efforts undertaken. Following the completion of the Mountcastle outfall channel restoration work in 2017-18, major erosion and creek bank failure occurred along Pine Creek - commencing immediately at the point where the Mountcastle buttress bank boulder protection work ended south of Kitley Avenue, most significantly an issue on the western bank. **The Mountcastle restoration project was insufficient and problematic as it ended prematurely and simply moved the erosion impacts directly down-stream.**

Pictures 1 & 2 (2018) show where the western bank failed next to the Mountcastle boulders ending, increasing the ledge at the water from 1-2 feet to 5+ feet. (Note: Site access is currently difficult given peak vegetation stage.) Picture 3 (2023) shows that the little vegetation still at creek edge in 2018 has since been eroded and some of the early boulder work has fallen into the creek as erosion has continued.

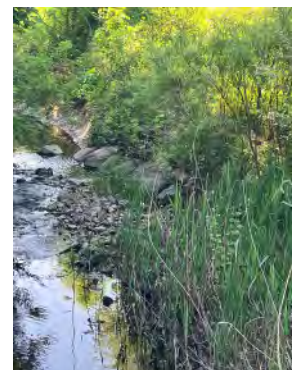
1



2



3



1.2 Proposed Restoration Alternative #1: Local Works

Alternative #1 Local Works is not an effective or cost-efficient solution for the magnitude of issues at Sites 9-10, as local experience shows that the erosion issues are being experienced along a continuous stretch of the creek and selective spot measures will simply move the erosion issue along to the gap areas. **The Local Works rating of “3” for Mitigation of Existing Erosion Risks is not justifiable and not supportable and should be reduced to “1”.**

1.3 Top of Bank Erosion Issue

The Hydrology & Existing Flooding Profile presents a Regional Floodline which is included in the mapping which is based on stormwater discharge of 73.8 cu. m/s. The MCEA report is unclear as to how the Regional Floodline informed the assessment. No analysis is provided of the relationship between the Regional Floodline and the top of bank. This is important as the top of bank in the vicinity of Sites 9-10 on the western bank is also being impacted by erosion. The top of bank in the area beside the paved trail in this vicinity appears to be the eastern edge of the paved trail (picture 4).

The re-paved trail replaced an old trail that was sinking towards Pine Creek. The re-paved trail is not lasting nearly as long as the former, and is already showing signs of instability (pic 5 & 6) caused by or accelerated by the slope failure of the western bank of Pine Creek which has the steepest slopes south of Kitley to Site 9. **The MCEA should explicitly indicate that the restoration work will address the erosion issue by bolstering and re-grading right to the top of the western bank along the section from where the Mountcastle effort ended south to the start of Site 9.**

This will entail several layers of boulders stepped back into the slope of the bank as part of the buttress bank protection. The “example of vegetated buttress detail” on page 21 of the MCEA report features a single row of large boulders which is not appropriate or adequate in this circumstance. **The MCEA should explicitly state that multiple layers of large boulders will be required in areas with greater slope failure from Kitley Avenue to Site 9, as required by the slope of the creek bank, and the diagram of the buttress detail on page 21 of the report should be modified to show that multiple layers of large boulders are to be used accordingly.**

4



5



6



1.4 Proposed Restoration Alternative #2/Preferred Alternative: Extended Works

Proposed Restoration Alternative #2: Extended Works, is superior to Alternative #1 Local Works. However, it has significant deficiencies and cannot be supported as presented. Picture 7 depicts the erosion and slope failure at Site 10. As Picture 1 showed, any new restoration work must be continuous from the where the Mountcastle boulders ended.

Picture 8 shows the area called Site 9 as well as Pine Creek, not only north to Site 10, but right back to the Mountcastle boulders. When the vegetation is seasonally fallow, it is evident that there is slope failure and erosion along the entire stretch of the steep sloped western bank of Pine Creek - there are no gaps. Accordingly, there should be no gaps in the erosion protective works.

The proposed buttress bank protection proposed in Alternative #2 is limited to 2 isolated and segmented components - Sites 9 & 10 - creating gaps in erosion protection that is inadequate to respond to the continuous stretch of slope erosion. **The MCEA should be amended to include a revised Alternative #2 as the Preferred Alternative which states explicitly that Site 10 will commence from where the Mountcastle restoration work ended and will be extended south to connect directly with Site 9 to ensure the buttress bank protection is continuous (no gaps) through this continuous erosion zone.**

See the modifications to the map of Revised Alternative #2/Preferred Alternative in picture 9:

A - approx. extent of existing Mountcastle restoration work

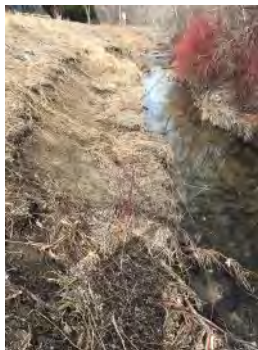
B - extension of new buttress boulders Site 10 north to connect directly to existing Mountcastle restoration boulders

C - extension of new buttress boulders Site 10 south to connect directly to Site 9

7



8



9



1.5 Stormwater Outfall & Swale

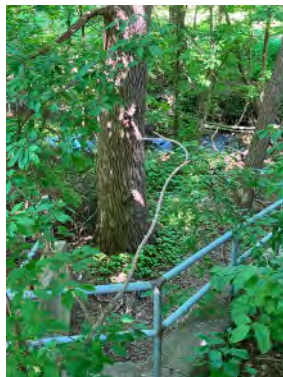
The mapping in the MCEA report fail to depict 2 stormwater runoff features. There is a stormwater outfall at location D1 (Picture 10; Map 9). There is a swale running along the school yard fence and the residential properties backing onto the school that directs runoff eastwards at location D2 (Map 9). Both features direct stormwater to approximately the same area of Pine Creek. Specific erosion protection on both east and west banks of Pine Creek at location D (Map 9) should be undertaken to handle peak storms as part of this restoration project. **The MCEA should be amended to explicitly include an increased level of erosion protection, such as a layer of larger buttress boulders, to protect both sides of Pine Creek in the immediate area where the outfall and the swale flow into the creek.**

1.6 Pine Creek - Now and Back Then

Currently, Pine Creek from Kitley Avenue to Site 9 is in poor condition, particularly on the western side which functions as a linear park and trail. In addition to erosion and slope failure that has widened the creek up to 3-4 times as wide as it once was at Site 10 and further south, erosion appearing at top of bank with signs the re-paved trail is starting to subside, this stretch of Pine Creek poses public safety risks (particularly to children accessing the school) and the vegetation is an unsightly sea of noxious weeds. Picture 11 is the current view of Sites 9 & 10 south from Kitley. Picture 12 is how wonderful, safe and well maintained this section of Pine Creek used to be.

Comments in 1.3 above called for bolstering and re-grading right to the top of the western bank. In doing so, erosion protection and restoration work in this section of Pine Creek should at least be guided by what Pine Creek once looked like and how it functioned. **The MCEA should include a specific goal to return Sites 9 & 10 back to a state that attempts to emulate what Pine Creek used to be and supports ongoing City maintenance of a linear park befitting a waterway in an urban neighbourhood.**

10



11



12

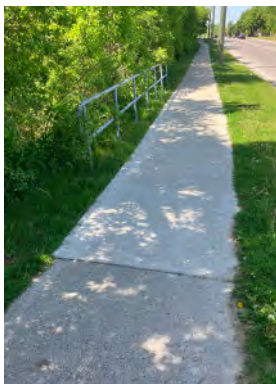


2. Erosion Site 12 - Dixie Road

2.1 Potential Preferred Alternative

Site 12 on the west side of Dixie Road is north of the Mountcastle outfall channel restoration work in 2017-18 (picture 14). This was not the first disturbance to the natural environment in this area due to restoration work. Erosion destabilized the eastern bank of Pine Creek north of the Mountcastle outfall channel south of Site 12. Picture 13 shows where the creek bank had to be stabilized to correct damage from erosion and the adjacent sidewalk that had sunk towards the creek had to be rebuilt.

13



14



The Potential Preferred Alternative/ Alternative #1: Local Works, a third effort to address erosion in this area, is basically another piecemeal instalment of protective works that leaves gaps in responding to erosion. It is also an area with a bend in the creek, the bend being fairly close to a collector road, which all makes future erosion in the gap areas more likely. A more comprehensive approach is warranted, as would result from Alternative #2: Extended Works. If the erosion protection work is not comprehensive and future erosion issues arise, further disturbance to the environment will occur and taxpayers will have to pay for more remedial work.

The rating on page 23 of the MCEA report Alternative #1: Local Works at “3” for Mitigation of Existing Erosion Risks is too high given the gaps in protective work, the proximity of the creek to Dixie Road near Site 12, and the likelihood of further remedial work required in future. Similarly, a piecemeal approach with gaps under Local Works has higher Life Cycle Costs with more investment for further restoration a greater potential, and a rating of “4” is not justifiable. **The Local Works rating of “3” for Mitigation of Existing Erosion Risks is not supportable and should be reduced to “1”. The Local Works rating of “4” for Mitigation of Existing Erosion Risks is not justifiable and should be reduced to “2”.**

The Preferred Alternative should be changed to Alternative #2: Extended Works.

3. Erosion Site 25 - Kitley Ravine

3.1 Proposed Restoration Alternatives

The Kitley Ravine has sufficient erosion issues that Alternative #1: Do Nothing is not an adequate response. **Alternative #2: Full Corridor Rehabilitation with channel clearing, re-centering and lining with round stone; bank restoration; and replanting, is the preferred option.**

3.2 Woodland Impacts

The Kitley Ravine flows through a wooded area. The ravine and woods, as with other Pine Creek tributaries and ravines, is a habitat and corridor for wildlife. The Kitley Ravine is home to a variety of birds, and so far in 2023 has had several sightings of wildlife including red foxes, coyotes, opossums and racoons. The tree canopy created by the woods is important to the integrity of this ecosystem, despite the condition of the Kitley Ravine channel.

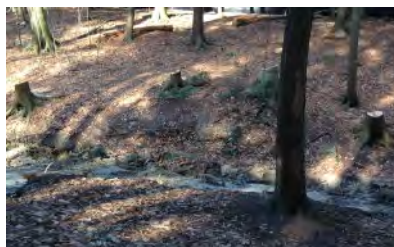
When the Mountcastle outfall channel was to be restored, on a site walk-through many of the mature trees at top of bank and part way down the bank were identified by the City and Aquafor Beech consultants as candidates for likely retention during channel restoration work. The reality, however, was that almost all of the mature trees discussed at the time were cut down and removed - in large part due to the over-sized construction equipment used in the restoration work (Pictures 15 & 16). While tree roots can be an issue for restoration, little effort was made to protect existing trees through more careful and detailed restoration design and use of smaller construction equipment. This was a serious failure in implementation. **The MCEA report must explicitly identify that a requirement for all Pine Creek erosion protection measures are required to use the smallest gauge of heavy equipment that can perform the work, with a goal of minimizing removal of existing trees, and that this criteria will be used in assessing the appropriateness of contracted services to undertake restoration work.** This applies equally to the woods in Kitley Ravine.

This criteria should also be applied to any future ravine and shoreline restoration work in the City of Pickering.

15



16



From: Marouchko, Irina <imarouchko@pickering.ca>
Sent: May 31, 2023 4:29 PM
To: [REDACTED]
Cc: amos.r@aquaforbeech.com
Subject: RE: Feedback & Questions RE: Pine Creek Erosion Assessment Municipal Class Environmental Assessment

Good afternoon Mr. Dalton,

Thank you for attending the PIC meeting and providing your comments/feedback.

The project team will respond to your questions within next several days.

Your contact information has been added to the stakeholders list.

Regards,

Irina Marouchko, P.Eng.

Senior Water Resources Engineer | Water Resources & Development Services

905.420.4660 ext. 2072 | 1.866.683.2760 | TTY. 905.420.1739

imarouchko@pickering.ca



From: [REDACTED]
Sent: Wednesday, May 31, 2023 4:05 PM
To: Marouchko, Irina <imarouchko@pickering.ca>; Amos.R@Aquaforbeech.com
Subject: Feedback & Questions RE: Pine Creek Erosion Assessment Municipal Class Environmental Assessment

Good afternoon Mrs. Marouchko and Mr. Amos,

We met in person at the PIC on May 18th regarding the Pine Creek Erosion Assessment Municipal Class Environmental Assessment.

I support the proposed preliminary preferred alternative – Full Corridor Restoration – for Erosion Site 25 and submit the following question/concerns as this is in our backyard:

1. Erosion Site 25 (PIC Slides 32 & 33) - Limits of work within the creek corridor – The entire width of the corridor along the creek is covered with fallen/rotting trees and underbrush and no apparent maintenance of the corridor has been carried out since we have lived at our residence (Feb. 2008). Many trees still standing are in poor health and are in danger of collapsing either across the existing creek alignment or into the adjacent back yards, causing damage to residential properties.

Will the intended work include Clearing/Close Cutting the entire width of the corridor between the back yard fences, or be limited to the limits of grading for the creek restoration shown on the cross-section shown on Slide 33?

Would it not be prudent financially to carry out this work as part of the creek restoration rather than the municipality having to come back at a later date, if at all, to remedy this situation under a separate contract?

2. Erosion Site 25 (PIC Slides 32 & 33) - Will there be a defined trail/pathway along the east side of the creek realignment throughout the length of Section 25? A defined pathway would encourage use of the corridor by the public and discourage adjacent land owners from dumping debris into the corridor.

Please add my name to the Stakeholder List.

Should you have any additional questions, please let me know.

Thank you in advance,

Paul Dalton

Resident at:

[REDACTED]

Pickering, ON

[REDACTED]

From: jay andy [REDACTED]
Sent: June 2, 2023 11:57 PM
To: Amos.R@aquaforbeech.com; imarouchko@pickering.ca
Subject: Pine Creek Erosion Assessment, Pickering

Hello Rob Amos and Irina Marouchko.

Video attached.

Firstly, thank you for the information and study that you have shared during to the Open House.

I would like to submit our concerns about:

- the erosion that is occurring as a direct result of the torrent run off that occurs from Finch Avenue into the ditch culvert which dumps directly into the ravine and into Pine Creek. I am attaching a video showing the Finch Ave culvert. This video also shows the Pine Creek culvert that the City of Pickering did some work on about 4 years ago. You'll see that there is no water run off happening there. All the run off water is coming from the road culvert.
- this road run off is dumping the silt and salt into Pine Creek from Finch Ave.
- the location of this culvert (and this video) is behind Mountcastle Crescent.
- the run off water starts up the hill where at Fairport and Finch meet (west of the culvert and Pine Creek) and all of that collection of water/silt/pollution is directly dumped into Pine Creek. Why is there no storm drains used to take all this run off away from Finch rather than have it dump directly into the natural Pine Creek and it's ecosystem?
- there is a natural spring located near the very area where that Finch Ave culvert dumps it's road runoff, silt, salt and oil.

I will be please to show you the location of the natural spring, I haven't looked for it for a few years. Also, I can show you where a conduit line/pipe has been exposed due to erosion near this ditch culvert.

We observed the Toronto Conservation Authority doing tree planting for the past 4 years, along the Pine Creek ravine on the north side of Finch Ave. You'll see hundreds of young trees have been planted there. But none have been planted on the south side of Finch Ave along same Pine Creek. Is there a reason for this different approach to helping the same ravine and same Creek but on different sides of Finch?

Thank you for your consideration to my comments.

The homes backing onto this area which is eroding due to the Finch culvert, are interested in hearing/seeing a remedy. The problem is not going to go away without intervention. The amount of runoff is getting worse.

Regards,

Jeannette Anderson

[REDACTED]

Pickering, Ontario

[REDACTED]



Thank you for your participation. Your views are important to us. Please share your experience and provide comments/feedback no later than June 2, 2023.

* Required field

Please provide your name and contact information below.

First Name *

Anthony

Last Name *

Pigaidoulis

How would you prefer to receive information about this study in the future? *

- ☒ Email (Please provide email below)
☐ I do not wish to receive further information

Street Address *

Unit

City *

Province *

Postal Code *

[REDACTED]

Pickering

ON

[REDACTED]

Phone Number

[REDACTED]

Email Address

[REDACTED]

1. Do you have any information on the conditions of Pine Creek within the study area that would be useful for the study team to know (i.e. evidence of erosion you may have observed)? If so, please tell us what they are.

I have already supplied the information about the drainage ditch in the Kitley Ravine and how it has impacted my property by the watercourse encroaching onto my property. My neighbours properties which are adjacent to the drainage ditch have a retaining wall which has fallen and caused all the fences which were installed by the builder to fail.

2. Do you agree with the preliminary preferred alternatives? Why or why not?

Yes, I agree with the preliminary preferred alternative for erosion site #25. I would strongly support this work to have a full corridor restoration with a rip-rap lining. The routing of the drainage ditch is currently causing large ponding directly behind my property and the drainage is blocked due to lack of maintenance to remove build up of fallen trees and the failed retaining wall downstream.

3. Do you have any concerns about the potential impacts the preliminary preferred alternatives may have on the creek or adjacent properties?

The only impact to consider is the routing of the new drainage ditch as there is currently a walking trail which follows the area east of the drainage ditch. The trail is from Gloucester to Kitley and is on the higher ground with the ditch to the west. Access over the drainage ditch should be consider from the cul-de-sac of Ridgewood Court into the Kitley ravine. The routing of the ditch should be routed to maintain the maximum distance from private property, but if space permits consideration for a walking path along the ditch would be useful for neighborhood use.

4. Additional questions/comments?

I appreciate the work thus far by the City and their consultant and look forward to reviewing the the final report recommendations.

Comments and information regarding this project are being collected to assist The City of Pickering in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the project and will be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Alternate formats available upon request at 905.683.7575.

ENG 2301-05/02

Submitted On

02-Jun-23

From: Antony Manoharan <Antony.Manoharan@durham.ca>
Sent: June 7, 2023 3:57 PM
To: amos.r@aquaforbeech.com
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; Janet Mosher
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Dear Project Team,

Thank you for the opportunity to provide comments on the PIC document for the above noted study that was downloaded from the project website.

We understand the study was carried out to assess the erosion related risks to private property and public infrastructure within the Pine Creek valley corridor, with the intent of providing recommendations to reduce erosion and protect the natural heritage of the area.

After examining the PIC document, we recognize that two of the twenty five erosion sites identified in the study, are on the Regional Right of Way. Under the preferred alternative, following works were proposed for the respective sites. We provide the following observations/comments for your considerations;

1. Site #1(board #17): Kingston Road Culvert (upstream):
Please note that this culvert will be rehabilitated under BRT project which is currently under detailed design and few items proposed under preferred alternative were already included in the detailed design.
 - a. Replace/Rehabilitate CSP – This CSP will be removed.
 - b. Replacement of Gabion wing walls with Armour stone – Gabion wing walls will removed and replaced with Retaining walls and not with Armour stone.
 - c. Patch work repairs to Kingston Culvert- Required repair works were already identified and included in the detailed design.
 - d. Vegetated butters upstream channel section- This work is not identified and cannot be included in the detailed design since EA will not be completed before the Tender which is in Q3.
 - e. Engineered scour pools- Same as above comment.
 - f. Easement requirement on Region's property- It is not clear why easement is required from Regional property. Please clarify
2. Site #16 (board #25): Finch Avenue Culvert (upstream and downstream)
Region's approach is to incorporate any erosion related works near the Region's infrastructure with the road program when the existing structure or the roadway are at risk from erosion. The section of Finch Avenue where the culvert is located is identified for widening in the 2027-2031 capital program. The alternatives provided in Pickering's PIC material for this site will be reviewed during the road widening project and would be incorporated if those works are required for flow conveyance and protect the culvert and the roadway.
 - a. Replacement/Rehabilitation of main culvert
 - b. Replacement of failed CSP culvert
 - c. Rip Rap lined swale

- d. Vegetated butters upstream/downstream channel section
- e. Engineering Scour pool
- f. Easement requirement on Region's property- It is not clear why easement is required from Regional property. Please clarify

3. As the projects move forward, be sure to identify all existing watermains and sanitary sewers in each individual work area on all of the design drawings and that all existing infrastructure is protected during construction

Should you or any member of your project team have any questions, please feel free to contact me.

Thanks.
Antony



Antony Manoharan, P.Eng. | Project Manager-Stormwater Management
Works Department | Transportation Infrastructure
The Regional Municipality of Durham
Antony.Manoharan@durham.ca | 905-668-4113
Extension 3881 | durham.ca.



From: amos.r@aquaforbeech.com <amos.r@aquaforbeech.com>

Sent: May 5, 2023 7:43 AM

Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com

Subject: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Some people who received this message don't often get email from amos.r@aquaforbeech.com. [Learn why this is important](#)

Dear Stakeholder,

Please find attached a Notice of Public Information Centre (PIC) for the City of Pickering - Pine Creek Erosion Assessment Class EA.

The Public Information Centre will discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures.

The location and time for the PIC is below:

Thursday, May 18, 2023 – 6:00 pm to 8:00 pm
Chestnut Hill Developments Recreation Complex, West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

Thanks very much for your interest, we look forward to meeting you and receiving your input.

Best Regards,

Rob Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
Mobile: 416.705.2367

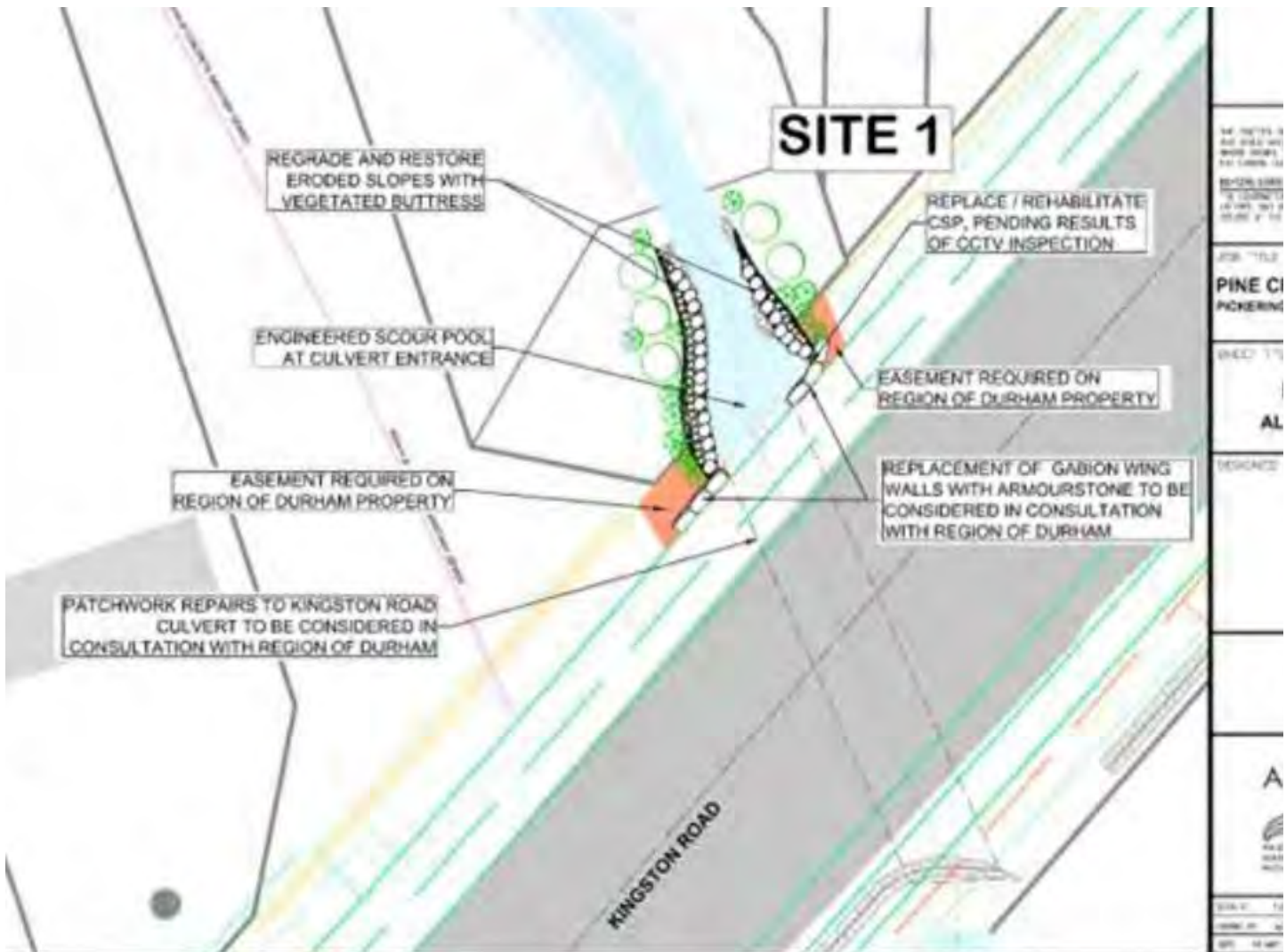
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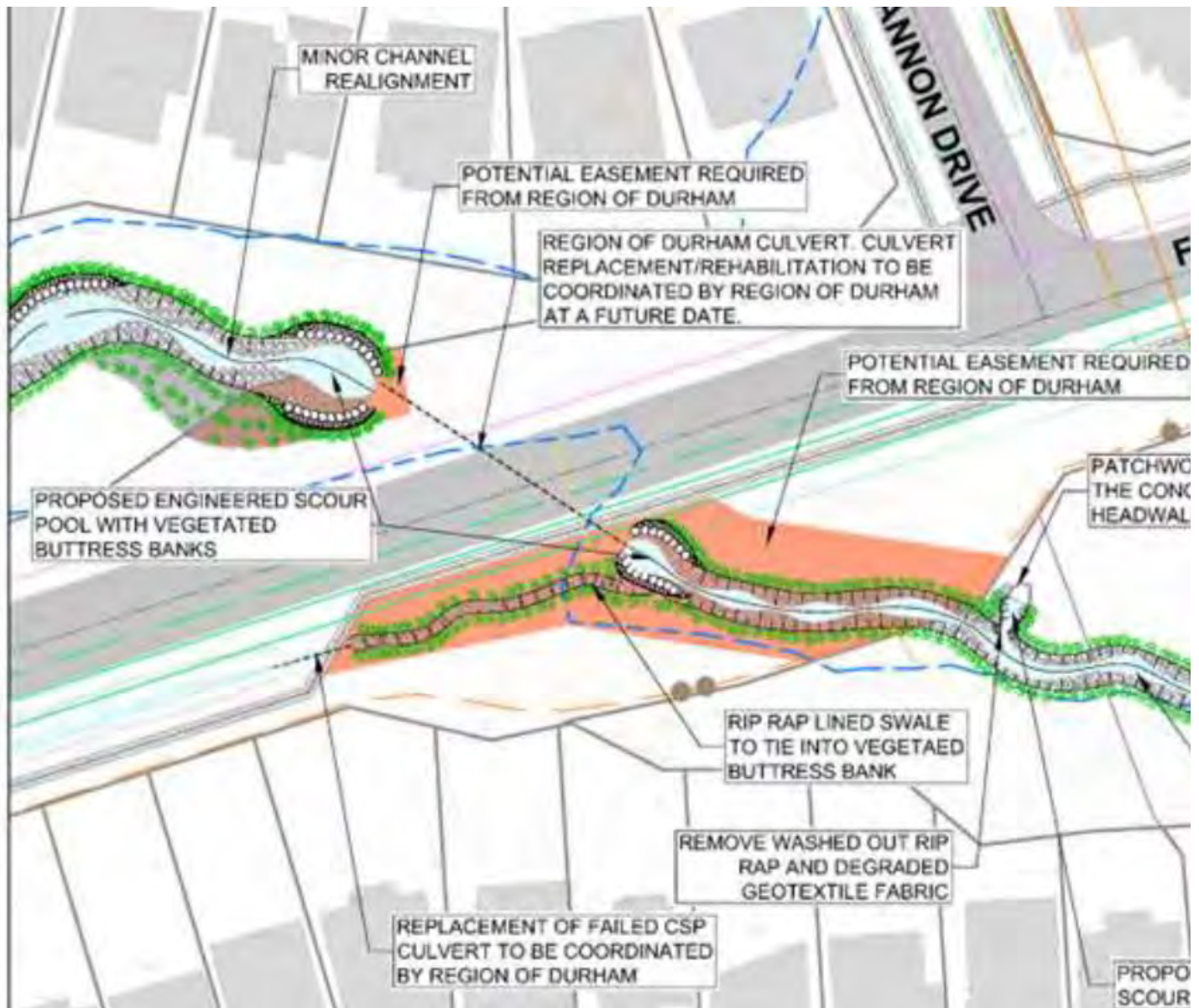
From: Janet Mosher <Janet.Mosher@Durham.ca>
Sent: June 15, 2023 10:02 AM
To: Marouchko, Irina
Cc: Antony Manoharan; Paul Gee; amos.r@aquaforbeech.com; ursulak.j@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hi Irina,

Thank you for the reply but I want to clarify that the PIC slides did show proposed alternatives and potential preferred alternatives on Durham assets and within the Region's ROW and road jurisdiction.

For example, slides 16-17 includes Kingston Rd and slide 24-27 include Finch Ave:





We are happy to work together where Pickering's study identifies Durham assets and ROW, but the Region needs to be consulted and coordinated with in advance.

Thank you.

Regards,
Janet



Janet Mosher, M.Eng., P.Eng. | Senior Project Manager
Works Department | Transportation Infrastructure
The Regional Municipality of Durham

Janet.Mosher@durham.ca | 905-668-4113 extension 3336 | durham.ca

My pronouns are she/her.



From: Marouchko, Irina <imarouchko@pickering.ca>

Sent: June 14, 2023 5:24 PM

To: Janet Mosher <Janet.Mosher@Durham.ca>

Cc: Antony Manoharan <Antony.Manoharan@durham.ca>; Paul Gee <Paul.Gee@Durham.ca>; amos.r@aquaforbeech.com; ursulak.j@aquaforbeech.com

Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

You don't often get email from imarouchko@pickering.ca. [Learn why this is important](#)

Hi Janet,

The City is undertaking the Municipal Class EA to complete the Pine Creek erosion assessment, identify and prioritize erosion related risks along the creek, and to develop a list of high priority sites in need of rehabilitation. The creek rehabilitation alternatives are proposed along the creek corridor/lands within the City's ownership. It should be noted that the scope of the study does not include an assessment of crossings, including crossing within the region's right-of-ways.

The project team has not met with the Region's staff prior the PIC.

Please note that Antony Manoharan has provided comments on the PIC materials. All received comments will be reviewed by the project team.

I hope the above alleviates your concerns.

Regards,

Irina Marouchko, P.Eng.

Senior Water Resources Engineer | Water Resources & Development Services

905.420.4660 ext. 2072 | 1.866.683.2760 | TTY. 905.420.1739

imarouchko@pickering.ca



From: Janet Mosher <Janet.Mosher@Durham.ca>

Sent: Monday, June 5, 2023 5:27 PM

To: Marouchko, Irina <imarouchko@pickering.ca>

Cc: Antony Manoharan <Antony.Manoharan@durham.ca>; Paul Gee <Paul.Gee@Durham.ca>; amos.r@aquaforbeech.com; ursulak.j@aquaforbeech.com

Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Importance: High

Hi Irina,

Can Pickering or your Consultant confirm if you had any meetings or discussions with Region of Durham staff prior to the PIC about the PIC materials please?

If so, please let us know who so we can discuss internally. If not, please note Durham needs to be consulted, and give it's OK prior, when presenting material to the public that includes infrastructure within the Region's right-of-way and Durham assets. Finch Ave (Reg. Rd. 37) and Kingston Rd (Reg. Hwy 2) are both Region of Durham regional roads within your study area.

However, Antony will be providing Pickering comments on the PIC material presented to the public on May 18.

Please feel free to call me if you wish to discuss further. I trust Pickering will coordinate with the Region moving forward before any further information is presented or released publicly.

Thank you.

Regards,
Janet



Janet Mosher, M.Eng., P.Eng. | Senior Project Manager
Works Department | Transportation Infrastructure
The Regional Municipality of Durham

Janet.Mosher@durham.ca | 905-668-4113 extension 3336 | durham.ca

My pronouns are she/her.



From: amos.r@aquaforbeech.com <amos.r@aquaforbeech.com>

Sent: May 5, 2023 7:43 AM

Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com

Subject: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

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Chestnut Hill Developments Recreation Complex, West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

Thanks very much for your interest, we look forward to meeting you and receiving your input.

Best Regards,

Rob Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
Mobile: 416.705.2367

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ursulak.j@aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: June 15, 2023 11:37 AM
To: ursulak.j@aquaforbeech.com
Subject: FW: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre
Attachments: CFN 67561 - PIC 1 Response.pdf; APPENDIX A - PIC 1.docx

JU – TRCA comments attached.

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com

From: Paul Leithwood [mailto:Paul.Leithwood@trca.ca]
Sent: Monday, June 12, 2023 8:30 AM
To: Marouchko, Irina
Cc: Caroline Mugo; Sharon Lingertat; amos.r@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hello Irina,

I apologize for the late submission.

TRCA staff have reviewed the materials made available for the Pine Creek Erosion Assessment – Public Information Centre on May 18, 2023. Please see our comments in the attached letter.

For your convenience, I have attached a Word version of Appendix A to assist with responses.

Thank you.

Paul Leithwood (he/him/his)
Planner I
Infrastructure Planning and Permits | Development and Engineering Services

T: [\(437\) 880-2146](tel:437-880-2146)
E: paul.leithwood@trca.ca
A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](https://www.trca.ca/101-Exchange-Avenue-Vaughan-ON-L4K-5R6) | [trca.ca](https://www.trca.ca)



From: Paul Leithwood
Sent: Friday, June 2, 2023 1:18 PM
To: Marouchko, Irina <imarouchko@pickering.ca>
Cc: Caroline Mugo <Caroline.Mugo@trca.ca>; amos.r@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hello Irina,

I am contacting you to let you know that TRCA comments in response to the PIC – Pine Creek Erosion Assessment are delayed. They will be provided early next week - we are aiming for Monday.

Please let me know if there are any questions or concerns.

Thank you.

Paul Leithwood (he/him/his)
Planner I
Infrastructure Planning and Permits | Development and Engineering Services

T: [\(437\) 880-2146](tel:(437)880-2146)
E: paul.leithwood@trca.ca
A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](https://www.trca.ca) | [trca.ca](https://www.trca.ca)



From: Paul Leithwood
Sent: Thursday, May 11, 2023 11:39 AM
To: Marouchko, Irina <imarouchko@pickering.ca>
Cc: Caroline Mugo <Caroline.Mugo@trca.ca>; amos.r@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hello Irina,

Please find attached TRCAs letter responding to the Public Information Centre to be conducted on May 18, 2023.

Please note the following two items below (can be found in the attached letter):

1. *Further to TRCA correspondence dated September 9, 2022, staff has expressed interest in this project, however staff will not be attending the meeting.*
2. *Staff will be accessing the information presented at the PIC on May 18th, 2023. Should this information become available earlier, please do notify us and we can begin our review.*

Thank you.

Paul Leithwood (he/him/his)
Planner I
Infrastructure Planning and Permits | Development and Engineering Services

T: [\(437\) 880-2146](tel:437-880-2146)
E: paul.leithwood@trca.ca
A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](https://www.trca.ca) | [trca.ca](https://www.trca.ca)



From: amos.r@aquaforbeech.com <amos.r@aquaforbeech.com>
Sent: May 5, 2023 7:42 AM
Cc: Marouchko, Irina <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>
Subject: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Dear Stakeholder,

Please find attached a Notice of Public Information Centre (PIC) for the City of Pickering - Pine Creek Erosion Assessment Class EA.

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Chestnut Hill Developments Recreation Complex, West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

Thanks very much for your interest, we look forward to meeting you and receiving your input.

Best Regards,

Rob Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
Mobile: 416.705.2367

June 12, 2023

CFN 6756

BY MAIL ONLY (imarouchko@pickering.ca)

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7

Dear Irina Marouchko,

**Re: Notice of Public Information Centre Board PIC 1)
Pine Creek Erosion Assessment
Municipal Class Environmental Assessment – Schedule**

These comments respond to the Municipal Class Environmental Assessment (MCEA) undertaken as a Schedule B project by the City of Pickering to complete the Pine Creek erosion assessment. The study will identify and prioritize erosion related risks to private property and public infrastructure within the Pine Creek Valley corridor and develop a list of sites in need of rehabilitation. PIC presentation materials were made available to the Toronto and Region Conservation Authority (TRCA) on May 18, 2023.

OVERVIEW

This study has identified twenty-five (25) erosion sites and prioritized those in need of rehabilitation regarding erosion related risks within the Pine Creek Study Area.

In summary, Preliminary Alternative Solutions for each site involve three proposed courses of action:

- Do Nothing: Leave the site as is with ongoing monitoring and potential for emergency works and maintenance;
- Local Restoration Works: Localized channel bank and/or bed work to address erosion issues with ongoing maintenance, occasional repairs, or eventual replacement – limits economic cost and environmental damage
- Extended Restoration Works: Reach-based approach to erosion issues utilizing natural channel design and “hard” engineered channel design. Minimal maintenance and typically applied to urban watercourses.

TRCA REVIEW

The preferred preliminary alternative solutions for sites 1 to 8, 11 to 12, and 17 to 22 includes Local Restoration Works. These works include but are not limited to replacing failed erosion control measures, restore eroded slopes, removal of accumulated sediment, repairs to degraded outfall structures, restoration plantings, and alterations to park management processes.

Extended Restoration Works is the preferred preliminary alternative solution for sites 9 to 10, 13 to 16, and 23 to 24. Work within these site areas include minor channel realignment with riffle-pool morphology, removal of debris and sediment from the channel, outfall repairs and restoration, regrading, stabilization of failing slopes, repair and rehabilitate scour pools downstream of outfalls and culverts.

The preferred solution for site 25 is also Extended Restoration Works however, the proposed work is greater in scope i that it includes full corridor rehabilitation through the recentering of the drainage ditch, installation of rip-rap lining, the removal of accumulated debris, and restoration plantings.

Staff have completed the review of this submission and have several comments which are enclosed as **Appendix A: TRCA Comments and Proponent Responses**. These should be addressed as the MCEA progresses.

RESUBMISSION REQUIREMENTS

1. Follow the [TRCA Digital Submission Requirements for Environmental Assessment Documents](#) to ensure all required information is provided in future submissions
2. This application is subject to a **\$10,015.00** application review fee as per our [Fee Schedule](#). For payment options, refer to [How to Pay TRCA Review Fees](#). Ensure your accounting department references **CFN 67561** when making payment.

Should you have any questions, please contact me at (437) 880 - 2146 or at paul.leithwood@trca.ca.

Regards,

Paul Leithwood

Paul Leithwood
Planner I, Infrastructure Planning and Permi
Development and Engineering Services

Attached: **Appendix** : TRCA Comments and Proponent Responses, WORD digital file for consultant/proponent response purposes

BY E-MAIL

cc:	Aquafor Beech Ltd:	Rob Amos, Project Manager (amos.r@aquaforbeech.com)
	TRCA:	Caroline Mugo, Senior Planner, Infrastructure Planning and Permits
		Sharon Lingertat, Senior Manager, Infrastructure Planning and Permits

APPENDIX A: TRCA COMMENTS AND PROPONENT RESPONSES

ITEM	DISCIPLINE	TRCA COMMENTS (June 12, 2023)	PROPONENT/CONSULTANT RESPONSE INSERT DATE)
1.	General – Fees	As per our NOC communication dated September 16, 2022. This EA review is subject to a Schedule B Standard \$10,015 review fee as per our Fee Schedule . For payment options, refer to How to Pay TRCA Review Fees . Ensure your accounting department references CFN 67561 when making payment.	
2.	General	Provide confirmation that the draft final EA will be made available to TRCA Staff prior to its release for public review.	
3.	Water Resources	Provide the following at the earliest preliminary assessment and/or design stages for TRCA water resources staff to confirm which alternative is preferred: a) Provide a hydraulic brief with an updated TRCA HEC-RAS model based on existing topographic and/or bathymetric surveys and proposed conditions. Please provide a comparison table showing the velocity, shear stress and stream power within the main channel and the overbanks (left/right) for both existing and proposed conditions for all HEC-RAS cross-sections for the 2-year to 100-year and Regional design storms at the early design stage Please ensure that the velocity, shear stress and stream power are reduced to the degree technically feasible with the proposed channel restoration design. Please incorporate floodplain connectivity to reduce channel velocities, stream power and erosion potential within the channel restoration design. Please update the design as required. In addition, please provide drawing cross-sections and documentation to validate the HEC-RAS model and drawings provided. A digital copy of the updated TRCA HEC-RAS model is required fo review. Please note that the latest TRCA HEC-RAS model is availab upon reques	
		b) Provide and/or improve the low flow channel sinuosity with fluvial geomorphology principles. Please ensure that design storms greater than the 2-year spill within the floodplain riparian zones to reduce erosive velocities and enhance floodplain connectivity. TRCA water resources staff are of the opinion that a highly conducive channels confines greater flow within the channel and as such increases channel velocity which leads to erosion over the long-term. As such, a channel that spills over after the 2-year design storm into adjacent areas effectively reduces erosive velocities.	

ITEM	DISCIPLINE	TRCA COMMENTS (June 12, 2023)	PROPONENT/CONSULTANT RESPONSE (INSERT DATE)
		c) Provide a detailed geomorphic assessment report with supporting field data to support the channel restoration designs, and ensure that the watercourse is designed with fluvial geomorphology principles and incorporates the findings of the detailed geomorphic assessment report.	
		d) Provide and/or improve floodplain connectivity for the low flow channel by ensuring that design storms greater than the 2-year spill over within the floodplain riparian zones to inundate flows and consequently reduce erosive velocities.	
		e) Incremental and cumulative riparian storage volumes are required every 0.3m incremental for existing and proposed conditions for the 2-year to 100-year and Regional design storms to ensure that there is no incremental and/or cumulative loss in riparian storage volumes. In addition, floodplain connectivity should be explored to enhance riparian storage volumes within the creek system, and reduce erosive velocities further.	
		f) Explore for each design alternative, whether wetland pockets are technically feasible to help attenuate flows, and reduce erosion.	
4.	Water Resources	As part of this EA, explore whether any upstream stormwater management measures, and/or wetland pockets at outfall locations are technically feasible to reduce erosive velocities and attenuate peak flows prior to entering the watercourse reaches.	
5.	Geotechnical Engineering	At the design stage, geotechnical and stability studies may be required depending on the scope, nature, and location of stabilization works being conducted.	
6.	Planning Ecology	All sites: Consider access routes during detailed design that have the least impact on the valley system.	
7.	Planning Ecology	Site 12: Detailed design should take into consideration wetland boundaries and impacts. If impacts cannot be avoided, this should be addressed in early consultation processes. Mitigation and restoration efforts should be applied. Please further note that the wetlands as mapped by ELC communities on Fig 1-2 are not consistent with TRCA wetland mapping.	
8.	Planning Ecology	TRCA requests a site visit is arranged to investigate and delineate/stake the boundaries of the wetland feature west of Dixie Road, as there appears to be a discrepancy in the ELC mapping provided and TRCA mapping.	

From: Antony Manoharan <Antony.Manoharan@durham.ca>
Sent: February 2, 2024 9:49 AM
To: ursulak.j@aquaforbeech.com
Cc: 'Marouchko, Irina'; Janet Mosher; amos.r@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Submission of Draft Project File Report for Region Review

Thanks Jacob. Will do.

Antony

From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>
Sent: Thursday, February 1, 2024 9:10 PM
To: Antony Manoharan <Antony.Manoharan@durham.ca>
Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; Janet Mosher <Janet.Mosher@Durham.ca>; amos.r@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Submission of Draft Project File Report for Region Review

Some people who received this message don't often get email from ursulak.j@aquaforbeech.com. [Learn why this is important](#)

Hi Antony,

To follow-up on the email thread below, the City of Pickering and Aquafor Beech Limited have recently completed the draft project file report for the Pine Creek Erosion Assessment Municipal Class EA. In preparing the draft project file report, comments and feedback received in response to the Public Information centre from the Region of Durham and other stakeholders have been taken into account.

Prior to filing the report with MECP for public review, we would like to consult with the Region to see if the Region has any comments on the draft project file report. The draft report can be downloaded from the dropbox link below in Word and PDF formats.

<https://www.dropbox.com/scl/fo/kccijgfa987x10m196pen/h?rlkey=kgstp1rj37votp6s9cwj6m735&dl=0>

Upon your review, please let us know if you have any comments, questions or would like to discuss any items in further detail. If you have any issues using dropbox as a file transfer method, please let us know and we can arrange to transfer the files using the file transfer mechanism of your choice.

Many thanks,

Jacob Ursulak (he/him), MAsc., EIT
Aquafor Beech Limited
2600 Skymark Avenue, Unit 6, Suite 202
Mississauga, ON
L4W 5B2

Tel: 226.606.2703
Email: ursulak.j@aquaforbeech.com
www.aquaforbeech.com

From: Antony Manoharan <Antony.Manoharan@durham.ca>
Sent: June 7, 2023 3:57 PM
To: amos.r@aquaforbeech.com
Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com; Janet Mosher
<Janet.Mosher@Durham.ca>
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Dear Project Team,

Thank you for the opportunity to provide comments on the PIC document for the above noted study that was downloaded from the project website.

We understand the study was carried out to assess the erosion related risks to private property and public infrastructure within the Pine Creek valley corridor, with the intent of providing recommendations to reduce erosion and protect the natural heritage of the area.

After examining the PIC document, we recognize that two of the twenty five erosion sites identified in the study, are on the Regional Right of Way. Under the preferred alternative, following works were proposed for the respective sites. We provide the following observations/comments for your considerations;

1. Site #1(board #17): Kingston Road Culvert (upstream):
Please note that this culvert will be rehabilitated under BRT project which is currently under detailed design and few items proposed under preferred alternative were already included in the detailed design.
 - a. Replace/Rehabilitate CSP – This CSP will be removed.
 - b. Replacement of Gabion wing walls with Armour stone – Gabion wing walls will removed and replaced with Retaining walls and not with Armour stone.
 - c. Patch work repairs to Kingston Culvert- Required repair works were already identified and included in the detailed design.
 - d. Vegetated butters upstream channel section- This work is not identified and cannot be included in the detailed design since EA will not be completed before the Tender which is in Q3.
 - e. Engineered scour pools- Same as above comment.
 - f. Easement requirement on Region's property- It is not clear why easement is required from Regional property. Please clarify
2. Site #16 (board #25): Finch Avenue Culvert (upstream and downstream)
Region's approach is to incorporate any erosion related works near the Region's infrastructure with the road program when the existing structure or the roadway are at risk from erosion. The section of Finch Avenue where the culvert is located is identified for widening in the 2027-2031 capital program. The alternatives provided in Pickering's PIC material for this site will be reviewed during the road widening project and would be incorporated if those works are required for flow conveyance and protect the culvert and the roadway.
 - a. Replacement/Rehabilitation of main culvert
 - b. Replacement of failed CSP culvert

- c. Rip Rap lined swale
- d. Vegetated butters upstream/downstream channel section
- e. Engineering Scour pool
- f. Easement requirement on Region's property- It is not clear why easement is required from Regional property. Please clarify

3. As the projects move forward, be sure to identify all existing watermain and sanitary sewers in each individual work area on all of the design drawings and that all existing infrastructure is protected during construction

Should you or any member of your project team have any questions, please feel free to contact me.

Thanks.
Antony



Antony Manoharan, P.Eng. | Project Manager-Stormwater Management
Works Department | Transportation Infrastructure
The Regional Municipality of Durham
Antony.Manoharan@durham.ca | 905-668-4113
Extension 3881 | durham.ca.



From: amos.r@aquaforbeech.com <amos.r@aquaforbeech.com>

Sent: May 5, 2023 7:43 AM

Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com

Subject: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

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1867 Valley Farm Rd, Pickering, ON L1V 6K7

Thanks very much for your interest, we look forward to meeting you and receiving your input.

Best Regards,

Rob Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
Mobile: 416.705.2367

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ursulak.j@aquaforbeech.com

From: Paul Leithwood <Paul.Leithwood@trca.ca>
Sent: February 12, 2024 3:48 PM
To: ursulak.j@aquaforbeech.com
Cc: amos.r@aquaforbeech.com; Marouchko, Irina; Caroline Mugo
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hello Jacob,

Thank you for providing the draft Project File Report. I can confirm I have downloaded the materials and have circulated them internally for comment. Please note that our service delivery timeline for review of Municipal Class EA draft reports is 45 business days in total from the day of submission (i.e. February 1, 2024).

Regarding payment, I will coordinate with our finance department to have an invoice provided once more, as I understand the original may have been sent some time ago.

In the meantime, please do not hesitate to let me know if there are any questions.

Thank you.

Paul

Paul Leithwood (he/him/his)
Planner
Infrastructure Planning and Permits | Development and Engineering Services

T: [\(437\) 880-2146](tel:4378802146)
E: paul.leithwood@trca.ca
A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](#) | trca.ca



From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>
Sent: Thursday, February 1, 2024 9:26 PM
To: Paul Leithwood <Paul.Leithwood@trca.ca>
Cc: amos.r@aquaforbeech.com; Marouchko, Irina <imarouchko@pickering.ca>; Dube.g@aquaforbeech.com; cota.c@aquaforbeech.com; Caroline Mugo <Caroline.Mugo@trca.ca>
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

EXTERNAL SENDER

Hi Paul,

To follow-up on the email thread below, the City of Pickering and Aquafor Beech Limited have recently completed the draft project file report for the Pine Creek Erosion Assessment Municipal Class EA. In preparing the draft project file

report, comments and feedback received in response to the Public Information centre from the TRCA and other stakeholders have been taken into account.

Prior to filing the report with MECP for public review, we would like to consult with the TRCA to see if the TRCA has any comments on the draft project file report. The draft report can be downloaded from the dropbox link below in Word and PDF formats.

<https://www.dropbox.com/scl/fo/kccijgfa987x10m196pen/h?rlkey=kgstp1rj37votp6s9cwj6m735&dl=0>

Upon your review, please let us know if you have any comments, questions or would like to discuss any items in further detail. If you have any issues using dropbox as a file transfer method, please let us know and we can arrange to transfer the files using the file transfer mechanism of your choice.

If there are any fees to be paid in order to facilitate TRCA's review, Irina Marouchko (cc'd) from the City of Pickering will coordinate payment.

Many thanks,

Jacob Ursulak (he/him), MAsC., EIT
Aquafor Beech Limited
2600 Skymark Avenue, Unit 6, Suite 202
Mississauga, ON
L4W 5B2

Tel: 226.606.2703
Email: ursulak.j@aquaforbeech.com
www.aquaforbeech.com



From: Paul Leithwood [<mailto:Paul.Leithwood@trca.ca>]
Sent: Monday, June 12, 2023 8:30 AM
To: Marouchko, Irina
Cc: Caroline Mugo; Sharon Lingertat; amos.r@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hello Irina,

I apologize for the late submission.

TRCA staff have reviewed the materials made available for the Pine Creek Erosion Assessment – Public Information Centre on May 18, 2023. Please see our comments in the attached letter.

For your convenience, I have attached a Word version of Appendix A to assist with responses.

Thank you.

Paul Leithwood (he/him/his)
Planner I
Infrastructure Planning and Permits | Development and Engineering Services

T: [\(437\) 880-2146](tel:437-880-2146)
E: paul.leithwood@trca.ca
A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](https://www.trca.ca) | [trca.ca](https://www.trca.ca)



From: Paul Leithwood
Sent: Friday, June 2, 2023 1:18 PM
To: Marouchko, Irina <imarouchko@pickering.ca>
Cc: Caroline Mugo <Caroline.Mugo@trca.ca>; amos.r@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hello Irina,

I am contacting you to let you know that TRCA comments in response to the PIC – Pine Creek Erosion Assessment are delayed. They will be provided early next week - we are aiming for Monday.

Please let me know if there are any questions or concerns.

Thank you.

Paul Leithwood (he/him/his)
Planner I
Infrastructure Planning and Permits | Development and Engineering Services

T: [\(437\) 880-2146](tel:437-880-2146)
E: paul.leithwood@trca.ca
A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](https://www.trca.ca) | [trca.ca](https://www.trca.ca)



From: Paul Leithwood
Sent: Thursday, May 11, 2023 11:39 AM
To: Marouchko, Irina <imarouchko@pickering.ca>
Cc: Caroline Mugo <Caroline.Mugo@trca.ca>; amos.r@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hello Irina,

Please find attached TRCAs letter responding to the Public Information Centre to be conducted on May 18, 2023.

Please note the following two items below (can be found in the attached letter):

1. *Further to TRCA correspondence dated September 9, 2022, staff has expressed interest in this project, however staff will not be attending the meeting.*

2. *Staff will be accessing the information presented at the PIC on May 18th, 2023. Should this information become available earlier, please do notify us and we can begin our review.*

Thank you.

Paul Leithwood (he/him/his)

Planner I

Infrastructure Planning and Permits | Development and Engineering Services

T: [\(437\) 880-2146](tel:4378802146)

E: paul.leithwood@trca.ca

A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](https://www.trca.ca/101-Exchange-Avenue-Vaughan-ON-L4K-5R6) | [trca.ca](https://www.trca.ca)



From: amos.r@aquaforbeech.com <amos.r@aquaforbeech.com>

Sent: May 5, 2023 7:42 AM

Cc: Marouchko, Irina <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>

Subject: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Dear Stakeholder,

Please find attached a Notice of Public Information Centre (PIC) for the City of Pickering - Pine Creek Erosion Assessment Class EA.

The Public Information Centre will discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures.

The location and time for the PIC is below:

Thursday, May 18, 2023 – 6:00 pm to 8:00 pm
Chestnut Hill Developments Recreation Complex, West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

Thanks very much for your interest, we look forward to meeting you and receiving your input.

Best Regards,

Rob Amos, MAsC., P.Eng.

Aquafor Beech Ltd.

Mobile: 416.705.2367

ursulak.j@aquaforbeech.com

From: Battarino, Gavin (MECP) <Gavin.Battarino@ontario.ca>
Sent: February 8, 2024 12:51 PM
To: ursulak.j@aquaforbeech.com
Cc: 'Rob Amos'; 'Gabriel Dubé'; 'Marouchko, Irina'; EA Notices to CRegion (MECP); Liu, Chunmei (MECP)
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

Jacob,

Thank you for your email. I have forwarded your request to Ms. Chunmei Lui, the lead Regional EA Coordinator for the area. I trust she will respond accordingly.

Thank you,

Gavin



Gavin Battarino, A/Supervisor
Project Review Unit, Environmental Assessment Services Section
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto ON M4V 1P5

If you have any accommodation needs or require communication supports or alternate formats, please let me know. Si vous avez des besoins en matière d'adaptation, ou si vous nécessitez des aides à la communication ou des médias substituts, veuillez me le faire savoir.

From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>
Sent: Thursday, February 8, 2024 12:48 PM
To: Battarino, Gavin (MECP) <Gavin.Battarino@ontario.ca>; Santano Carrasco, Mimi (MNRF) <Mimi.SantanoCarrasco@ontario.ca>
Cc: 'Rob Amos' <amos.r@aquaforbeech.com>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>; 'Marouchko, Irina' <imarouchko@pickering.ca>; EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi Mimi,

Thanks for looping in Gavin to this email thread. We will be sure to copy *eanotification.cregion@ontario.ca* on all correspondence moving forward.

Gavin,

Please see our request below for MECP's review of the draft project file report. We respectfully request to receive all comments on the draft report back by March 8th, 2024 as the City is looking to file the Notice of Completion shortly thereafter to allow an approximate 30 day public review period between March 29th and April 29th, 2024.

Upon your review, please let us know if you have any comments, questions or would like to discuss any items in further detail.

Thanks,

Jacob Ursulak (he/him), MAsc., EIT
Aquafor Beech Limited
2600 Skymark Avenue, Unit 6, Suite 202
Mississauga, ON
L4W 5B2

Tel: 226.606.2703
Email: ursulak.j@aquaforbeech.com
www.aquaforbeech.com



From: Santano Carrasco, Mimi (MNRF) <Mimi.SantanoCarrasco@ontario.ca>
Sent: February 8, 2024 9:52 AM
To: ursulak.j@aquaforbeech.com; Battarino, Gavin (MECP) <Gavin.Battarino@ontario.ca>
Cc: 'Rob Amos' <amos.r@aquaforbeech.com>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>; 'Marouchko, Irina' <imarouchko@pickering.ca>; EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

Good morning Jacob,

Congratulations on completing your draft PFR. I unfortunately no longer work at MECP, however I have included the Project Review manager, Gavin Battarino, to this email for his awareness. In future I'd recommend cc'ing eanotification.cregion@ontario.ca to correspondence, in case staff have moved or are away another staff can begin the review. Have a wonderful week and good luck with the rest of the project!

Cheers,

Mimi

Mimi Santano Carrasco (she/her)
Water Resources Policy Analyst | Ministry of Natural Resources and Forestry
Resources Planning and Development Policy Branch | Water Resources Section
6th Flr S, 300 Water St, Peterborough, ON K9J 3C7
T: (437) 655-2351 | mimi.santanocarrasco@ontario.ca



From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>
Sent: February 7, 2024 4:51 PM

To: Santano Carrasco, Mimi (MNRF) <Mimi.SantanoCarrasco@ontario.ca>
Cc: 'Rob Amos' <amos.r@aquaforbeech.com>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>; 'Marouchko, Irina' <imarouchko@pickering.ca>
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

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Hi Mimi,

To follow-up on the email below, the City of Pickering and Aquafor Beech Limited have completed our Draft Project File Report for the Pine Creek Erosion Assessment Municipal Class EA. In preparing the draft project file report, comments and feedback received from the Public, First Nations, Region of Durham, TRCA and other stakeholders have been taken into account.

Prior to filing the final report, we are submitting this draft to you to allow for a minimum of 30 days for the Ministry's technical review team to provide comments. This request is consistent with the requirement outlined in the attached letter received from MECP on September 16th, 2022 in response to the EA Notice of Commencement. The draft project file report can be downloaded from the dropbox link below in Word and PDF formats:

<https://www.dropbox.com/scl/fo/apmcctgmo2xw0w24bysqr/h?rlkey=e3zuggw1hxjc025xtedct9ztc&dl=0>

We respectfully request to receive all comments on the draft report back by March 8th, 2024 as the City is looking to file the Notice of Completion shortly thereafter to allow an approximate 30 day public review period between March 29th and April 29th, 2024.

Upon your review, please let us know if you have any comments, questions or would like to discuss any items in further detail. If you have any issues using dropbox as a file transfer method, please let us know and we can arrange to transfer the files using the file transfer mechanism of your choice.

Many thanks,

Jacob Ursulak (he/him), MAsc., EIT
Aquafor Beech Limited
2600 Skymark Avenue, Unit 6, Suite 202
Mississauga, ON
L4W 5B2

Tel: 226.606.2703
Email: ursulak.j@aquaforbeech.com
www.aquaforbeech.com



From: Santano Carrasco, Mimi (MECP) [<mailto:Mimi.SantanoCarrasco@ontario.ca>]
Sent: Friday, September 16, 2022 10:48 AM
To: imarouchko@pickering.ca
Cc: Potter, Katy (MECP); Dugas, Celeste (MECP); amos.r@aquaforbeech.com; Wild, Loralyn (MECP)
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

Good morning,

Please find the attached letter and relevant documents for the above noted project. If your project team have any questions regarding the information provided, please let us know.

Cheers,

Mimi

Mimi Santano Carrasco, EPT (she/her)

Regional Environmental Planner | Ministry of the Environment, Conservation and Parks
Project Review Unit | Environmental Assessment Branch
135 St. Clair Ave. W, 7th Floor Toronto, ON M4V 1P5
T: 416-356-8583 | mimi.santanocarrasco@ontario.ca



From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>

Sent: August 2, 2022 3:06 PM

To: EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>

Cc: amos.r@aquaforbeech.com; 'Marouchko, Irina' <imarouchko@pickering.ca>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>

Subject: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

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To Whom it May Concern,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Municipal Class Environmental Assessment to complete the **Pine Creek Erosion Assessment** in the City of Pickering. The intent of the study is to identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation.

In accordance with the streamlined class environmental assessment process, Aquafor would like to submit the Notice of Commencement and Project Information Form for this project, as attached.

Should you have any questions or comments please feel free to contact the following:

Irina Marouchko, P.Eng.
Senior Water Resources Engineer
City of Pickering
One the Esplanade
Pickering, ON L1V 6K7
(905) 420-4660, ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
2600 Skymark Avenue, Unit 6-202
Mississauga, ON, L4W 5B2
(905) 629-0099, ext. 284
amos.r@aquaforbeech.com

Kind Regards,

Jacob Ursulak, MASc
Aquafor Beech Limited
226.606.2703
ursulak.j@aquaforbeech.com

From: EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>
Sent: February 14, 2024 10:14 AM
To: ursulak.j@aquaforbeech.com; 'Rob Amos'; 'Gabriel Dubé'; 'Marouchko, Irina'
Cc: EA Notices to CRegion (MECP); Battarino, Gavin (MECP); Dugas, Celeste (MECP)
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

Dear Jacob Ursulak and Project Team, hope you're all doing well and Happy Valentine's Day 😊

Thank you for following up with us regarding this project. The ministry has no comments at this time and may not consider reviewing this project if your project team consider no significant concerns identified by the public and stakeholders, or those concerns can be addressed through further detailed design stage and permit and approval process(es).

If you have any questions regarding our approach for this project, please feel free to contact us for further discussion.

Many thanks,

Chunmei Liu (she/her) | Regional Environmental Planner

Environmental Assessments Branch, Ontario Ministry of the Environment, Conservation and Parks | 7th Flr, 135 St Clair Ave W, Toronto, ON M4V 1P5 | Chunmei.Liu@ontario.ca | 437-249-3102

From: Battarino, Gavin (MECP) <Gavin.Battarino@ontario.ca>
Sent: Thursday, February 8, 2024 12:51 PM
To: ursulak.j@aquaforbeech.com
Cc: 'Rob Amos' <amos.r@aquaforbeech.com>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>; 'Marouchko, Irina' <imarouchko@pickering.ca>; EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>; Liu, Chunmei (MECP) <Chunmei.Liu@ontario.ca>
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

Jacob,

Thank you for your email. I have forwarded your request to Ms. Chunmei Lui, the lead Regional EA Coordinator for the area. I trust she will respond accordingly.

Thank you,

Gavin



Gavin Battarino, A/Supervisor
Project Review Unit, Environmental Assessment Services Section
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto ON M4V 1P5

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From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>

Sent: Thursday, February 8, 2024 12:48 PM

To: Battarino, Gavin (MECP) <Gavin.Battarino@ontario.ca>; Santano Carrasco, Mimi (MNRF) <Mimi.SantanoCarrasco@ontario.ca>

Cc: 'Rob Amos' <amos.r@aquaforbeech.com>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>; 'Marouchko, Irina' <imarouchko@pickering.ca>; EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>

Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

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Hi Mimi,

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Gavin,

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Jacob Ursulak (he/him), MAsc., EIT

Aquafor Beech Limited

2600 Skymark Avenue, Unit 6, Suite 202

Mississauga, ON

L4W 5B2

Tel: 226.606.2703

Email: ursulak.j@aquaforbeech.com

www.aquaforbeech.com



From: Santano Carrasco, Mimi (MNRF) <Mimi.SantanoCarrasco@ontario.ca>

Sent: February 8, 2024 9:52 AM

To: ursulak.j@aquaforbeech.com; Battarino, Gavin (MECP) <Gavin.Battarino@ontario.ca>

Cc: 'Rob Amos' <amos.r@aquaforbeech.com>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>; 'Marouchko, Irina' <imarouchko@pickering.ca>; EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>

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Cheers,

Mimi

Mimi Santano Carrasco (she/her)
Water Resources Policy Analyst | Ministry of Natural Resources and Forestry
Resources Planning and Development Policy Branch | Water Resources Section
6th Flr S, 300 Water St, Peterborough, ON K9J 3C7
T: (437) 655-2351 | mimi.santanocarrasco@ontario.ca



From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>
Sent: February 7, 2024 4:51 PM
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Cc: 'Rob Amos' <amos.r@aquaforbeech.com>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>; 'Marouchko, Irina' <imarouchko@pickering.ca>
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

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Many thanks,

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L4W 5B2

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Email: ursulak.j@aquaforbeech.com
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Sent: Friday, September 16, 2022 10:48 AM
To: imarouchko@pickering.ca
Cc: Potter, Katy (MECP); Dugas, Celeste (MECP); amos.r@aquaforbeech.com; Wild, Loralyn (MECP)
Subject: RE: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

Good morning,

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Cheers,

Mimi

Mimi Santano Carrasco, EPT (she/her)
Regional Environmental Planner | Ministry of the Environment, Conservation and Parks
Project Review Unit | Environmental Assessment Branch
135 St. Clair Ave. W, 7th Floor Toronto, ON M4V 1P5
T: 416-356-8583 | mimi.santanocarrasco@ontario.ca



From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>
Sent: August 2, 2022 3:06 PM
To: EA Notices to CRegion (MECP) <eanotification.cregion@ontario.ca>
Cc: amos.r@aquaforbeech.com; 'Marouchko, Irina' <imarouchko@pickering.ca>; 'Gabriel Dubé' <dube.g@aquaforbeech.com>
Subject: City of Pickering, Schedule B Class EA, Pine Creek Erosion Assessment

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To Whom it May Concern,

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In accordance with the streamlined class environmental assessment process, Aquafor would like to submit the Notice of Commencement and Project Information Form for this project, as attached.

Should you have any questions or comments please feel free to the contact the following:

Irina Marouchko, P.Eng.
Senior Water Resources Engineer
City of Pickering
One the Esplanade
Pickering, ON L1V 6K7
(905) 420-4660, ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
2600 Skymark Avenue, Unit 6-202
Mississauga, ON, L4W 5B2
(905) 629-0099, ext. 284
amos.r@aquaforbeech.com

Kind Regards,

Jacob Ursulak, MASc
Aquafor Beech Limited
226.606.2703
ursulak.j@aquaforbeech.com

From: Antony Manoharan <Antony.Manoharan@durham.ca>
Sent: February 22, 2024 9:24 AM
To: ursulak.j@aquaforbeech.com; Marouchko, Irina
Cc: Janet Mosher
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Submission of Draft Project File Report for Region Review

Hi Jacob,

Thanks for providing a copy of the draft report for our review. Please find the following feedback/comments for your consideration;

1. Noted that Region's proposed works at the site #1 (Kingston Road) were reflected in the preferred alternative (2) that includes additional erosion works u/s of the Kingston Road culvert. Due to the timing of the EA completion, proposed erosion works will not be incorporated in the detailed design of Kingston Road which is currently underway.
2. Based on the Regional Mapping, Town owns the property at the site #2 that is designated for PTE from Region. Can you clarify and correct the drawing as required.
3. For site #16 (Finch Ave.), various recommendations were proposed under preferred alternative (3), those recommendations will be reviewed by the Region during the widening of Finch Ave.
4. It is noted that existing Regional stormlines were missing in the drawings at the sites #1 & #16. Please ensure the existing Regional/local stormlines are identified especially at the storm outfalls for clarity.
5. As the projects move forward, be sure to identify all existing watermains and sanitary sewers in each individual work area on all of the design drawings and that all existing infrastructure is protected during construction.
6. The assessment identifies key natural heritage feature policy considerations from the existing Regional Official Plan. It is recommended that the consultant also review regional natural heritage system, key natural heritage/hydrologic feature, and natural hazard policy considerations from the new [Regional Official Plan](#) (Chapter 7). They may not choose to include this information in the report because Region recognize the new Regional Official Plan has yet to be approved by the province, but it would be prudent to have it.

Let me know if you have any questions regarding the comments.

Thanks,
Antony



Antony Manoharan, P.Eng. | Project Manager-Stormwater Management
Works Department | Transportation Infrastructure
The Regional Municipality of Durham
Antony.Manoharan@durham.ca | 905-668-4113
Extension 3881 | durham.ca.



From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>

Sent: Friday, February 2, 2024 10:46 AM

To: Antony Manoharan <Antony.Manoharan@durham.ca>

Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; Janet Mosher <Janet.Mosher@Durham.ca>; amos.r@aquaforbeech.com

Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Submission of Draft Project File Report for Region Review

You don't often get email from ursulak.j@aquaforbeech.com. [Learn why this is important](#)

Thanks Antony,

We look forward to receiving the Region's comments on the draft EA report.

Best regards,

Jacob Ursulak (he/him), MAsc., EIT
Aquafor Beech Limited
2600 Skymark Avenue, Unit 6, Suite 202
Mississauga, ON
L4W 5B2

Tel: 226.606.2703

Email: ursulak.j@aquaforbeech.com
www.aquaforbeech.com



From: Antony Manoharan <Antony.Manoharan@durham.ca>

Sent: February 2, 2024 9:49 AM

To: ursulak.j@aquaforbeech.com

Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; Janet Mosher <Janet.Mosher@Durham.ca>; amos.r@aquaforbeech.com

Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Submission of Draft Project File Report for Region Review

Thanks Jacob. Will do.

Antony

From: ursulak.j@aquaforbeech.com <ursulak.j@aquaforbeech.com>

Sent: Thursday, February 1, 2024 9:10 PM

To: Antony Manoharan <Antony.Manoharan@durham.ca>

Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; Janet Mosher <Janet.Mosher@Durham.ca>; amos.r@aquaforbeech.com

Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Submission of Draft Project File Report for Region Review

Some people who received this message don't often get email from ursulak.j@aquaforbeech.com. [Learn why this is important](#)

Hi Antony,

To follow-up on the email thread below, the City of Pickering and Aquafor Beech Limited have recently completed the draft project file report for the Pine Creek Erosion Assessment Municipal Class EA. In preparing the draft project file report, comments and feedback received in response to the Public Information centre from the Region of Durham and other stakeholders have been taken into account.

Prior to filing the report with MECP for public review, we would like to consult with the Region to see if the Region has any comments on the draft project file report. The draft report can be downloaded from the dropbox link below in Word and PDF formats.

<https://www.dropbox.com/scl/fo/kccijgfa987x10m196pen/h?rlkey=kgstp1rj37votp6s9cwj6m735&dl=0>

Upon your review, please let us know if you have any comments, questions or would like to discuss any items in further detail. If you have any issues using dropbox as a file transfer method, please let us know and we can arrange to transfer the files using the file transfer mechanism of your choice.

Many thanks,

Jacob Ursulak (he/him), MAsc., EIT

Aquafor Beech Limited

2600 Skymark Avenue, Unit 6, Suite 202

Mississauga, ON

L4W 5B2

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From: Antony Manoharan <Antony.Manoharan@durham.ca>

Sent: June 7, 2023 3:57 PM

To: amos.r@aquaforbeech.com

Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com; Janet Mosher <Janet.Mosher@Durham.ca>

Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Dear Project Team,

Thank you for the opportunity to provide comments on the PIC document for the above noted study that was downloaded from the project website.

We understand the study was carried out to assess the erosion related risks to private property and public infrastructure within the Pine Creek valley corridor, with the intent of providing recommendations to reduce erosion and protect the natural heritage of the area.

After examining the PIC document, we recognize that two of the twenty five erosion sites identified in the study, are on the Regional Right of Way. Under the preferred alternative, following works were proposed for the respective sites. We provide the following observations/comments for your considerations;

1. Site #1(board #17): Kingston Road Culvert (upstream):
Please note that this culvert will be rehabilitated under BRT project which is currently under detailed design and few items proposed under preferred alternative were already included in the detailed design.
 - a. Replace/Rehabilitate CSP – This CSP will be removed.
 - b. Replacement of Gabion wing walls with Armour stone – Gabion wing walls will removed and replaced with Retaining walls and not with Armour stone.
 - c. Patch work repairs to Kingston Culvert- Required repair works were already identified and included in the detailed design.
 - d. Vegetated butters upstream channel section- This work is not identified and cannot be included in the detailed design since EA will not be completed before the Tender which is in Q3.
 - e. Engineered scour pools- Same as above comment.
 - f. Easement requirement on Region's property- It is not clear why easement is required from Regional property. Please clarify
2. Site #16 (board #25): Finch Avenue Culvert (upstream and downstream)
Region's approach is to incorporate any erosion related works near the Region's infrastructure with the road program when the existing structure or the roadway are at risk from erosion. The section of Finch Avenue where the culvert is located is identified for widening in the 2027-2031 capital program. The alternatives provided in Pickering's PIC material for this site will be reviewed during the road widening project and would be incorporated if those works are required for flow conveyance and protect the culvert and the roadway.
 - a. Replacement/Rehabilitation of main culvert
 - b. Replacement of failed CSP culvert
 - c. Rip Rap lined swale
 - d. Vegetated butters upstream/downstream channel section
 - e. Engineering Scour pool
 - f. Easement requirement on Region's property- It is not clear why easement is required from Regional property. Please clarify
3. As the projects move forward, be sure to identify all existing watermains and sanitary sewers in each individual work area on all of the design drawings and that all existing infrastructure is protected during construction

Should you or any member of your project team have any questions, please feel free to contact me.

Thanks.
Antony



Antony Manoharan, P.Eng. | Project Manager-Stormwater Management
Works Department | Transportation Infrastructure
The Regional Municipality of Durham
Antony.Manoharan@durham.ca | 905-668-4113
Extension 3881 | durham.ca.



From: amos.r@aquaforbeech.com <amos.r@aquaforbeech.com>

Sent: May 5, 2023 7:43 AM

Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com

Subject: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Some people who received this message don't often get email from amos.r@aquaforbeech.com. [Learn why this is important](#)

Dear Stakeholder,

Please find attached a Notice of Public Information Centre (PIC) for the City of Pickering - Pine Creek Erosion Assessment Class EA.

The Public Information Centre will discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures.

The location and time for the PIC is below:

Thursday, May 18, 2023 – 6:00 pm to 8:00 pm
Chestnut Hill Developments Recreation Complex, West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

Thanks very much for your interest, we look forward to meeting you and receiving your input.

Best Regards,

Rob Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
Mobile: 416.705.2367

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reliance on or other use of this communication is strictly prohibited. If you are not the intended recipient and have received this message in error, please notify me by return e-mail and delete or destroy all copies of this message. THIS MESSAGE IS FOR THE USE OF THE INTENDED RECIPIENT(S) ONLY AND MAY CONTAIN INFORMATION THAT IS PRIVILEGED, PROPRIETARY, CONFIDENTIAL, AND/OR EXEMPT FROM DISCLOSURE UNDER ANY RELEVANT PRIVACY LEGISLATION. No rights to any privilege have been waived. If you are not the intended recipient, you are hereby notified that any review, re-transmission, dissemination, distribution, copying, conversion to hard copy, taking of action in reliance on or other use of this communication is strictly prohibited. If you are not the intended recipient and have received this message in error, please notify me by return e-mail and delete or destroy all copies of this message.

From: Paul Leithwood <Paul.Leithwood@trca.ca>
Sent: April 19, 2024 8:32 AM
To: Marouchko, Irina
Cc: Caroline Mugo; ursulak.j@aquaforbeech.com; amos.r@aquaforbeech.com
Subject: CFN 67561 - Pine Creek Erosion Assessment EA Draft Project File Report
Attachments: CFN 67561 - Pine Creek EA - Draft Project File Report TRCA Response_20240419.pdf;
CFN 67561 - Appendix A_20240419.docx

Hello Irina,

Thank you for your patience.

TRCA staff have reviewed the materials made available for the *Pine Creek Erosion Assessment – Draft Project File Report* on February 1, 2024. Please see our comments in the attached letter. For your convenience, I have attached a Word version of Appendix A to assist with responses.

Please let me know if there are any questions once you have had a chance to review our comments, if a meeting is needed, I have preemptively held several meeting times with our technical staff and senior planning staff. Let me know if you would like those times provided.

Thank you.

Paul Leithwood (*he/him/his*)

Planner

Infrastructure Planning and Permits | Development and Engineering Services

T: [\(437\) 880-2146](tel:4378802146)

E: paul.leithwood@trca.ca

A: [101 Exchange Avenue, Vaughan, ON, L4K 5R6](https://www.trca.ca/101-Exchange-Avenue-Vaughan-ON-L4K-5R6) | [trca.ca](https://www.trca.ca)





May 8th, 2024

Attn: Antony Manoharan, P.Eng.
Project Manager – Stormwater Management,
Works Department | Transportation
Infrastructure
The Regional Municipality of Durham
Tel: 905.668.4113, Ext: 3881
Email: Anthony.Manoharan@durham.ca

Cc: Irina Marouchko, P. Eng.
Manager, Water Resources
City of Pickering
Tel: 905.420.4660, Ext: 2072
Email: imarouchko@pickering.ca

**RE: Pine Creek Erosion Assessment Municipal Class EA – Response to Region of
Durham Comments on Draft Project File Report**

Dear Mr. Manoharan,

Aquafor Beech is pleased to submit comment responses for the above noted project. Please find responses to the comments received from the Regional Municipality of Durham on February 22nd, 2024 below.

If you have any questions or require any further information, please contact Rob Amos at 416.705.2367 or by email at amos.r@aquaforbeech.com.

Sincerely,

AQUAFOR BEECH LIMITED

Rob Amos, MASc, P. Eng.
Project Manager

Jacob Ursulak, MASc, EIT
Water Resources Analyst

APPENDIX A: REGION OF DURHAM COMMENTS AND PROPONENT RESPONSES

ITEM	REGION OF DURHAM COMMENTS (February 22nd, 2024) – DRAFT PROJECT FILE REPORT	PROponent/CONSULTANT RESPONSE (May 8th, 2024)
1.	Noted that Region's proposed works at the site #1 (Kingston Road) were reflected in the preferred alternative (2) that includes additional erosion works u/s of the Kingston Road culvert. Due to the timing of the EA completion, proposed erosion works will not be incorporated in the detailed design of Kingston Road which is currently underway.	Noted. The description of the preferred alternative for Site #1 was updated accordingly, to specify that the Region's erosion control works at Site #1 will vary from the works shown within the EA.
2.	Based on the Regional Mapping, Town owns the property at the site #2 that is designated for PTE from Region. Can you clarify and correct the drawing as required.	Noted. The Site #2 alternative descriptions and drawings have been updated accordingly, to reflect City ownership on this property.
3.	For site #16 (Finch Ave.), various recommendations were proposed under preferred alternative (3), those recommendations will be reviewed by the Region during the widening of Finch Ave.	Noted. Region to provide any comments or recommendations to City/consultant team following their review at a future date.
4.	It is noted that existing Regional stormlines were missing in the drawings at the sites #1 & #16. Please ensure the existing Regional/local stormlines are identified especially at the storm outfalls for clarity.	As the base-mapping provided by the Region at the onset of the study does not show any regional storm sewer infrastructure in these areas, the drawings have not been updated. However, for the proposed works at both site #1 and site #16, a recommendation has been added to the report that a SUE investigation be completed at the detailed design stage to confirm the location of all infrastructure onsite, and that prior to any construction works, utility protection measures will need to be coordinated with the governing utility authority.
5.	As the projects move forward, be sure to identify all existing watermains and sanitary sewers in each individual work area on all of the design drawings and that all existing infrastructure is protected during construction.	Noted. This will be addressed as part of the detailed design phase of the project as per the recommendation listed under Section 8.1.4 of the Project File Report.
6.	The assessment identifies key natural heritage feature policy considerations from the existing Regional Official Plan. It is recommended that the consultant also review regional natural heritage system, key natural heritage/hydrologic feature, and	Noted. The project team has completed a cursory review of this additional information. As the report has not yet been approved by the



ITEM	REGION OF DURHAM COMMENTS (February 22nd, 2024) – DRAFT PROJECT FILE REPORT	PROPONENT/CONSULTANT RESPONSE (May 8th, 2024)
	natural hazard policy considerations from the new Regional Official Plan (Chapter 7). They may not choose to include this information in the report because Region recognize the new Regional Official Plan has yet to be approved by the province, but it would be prudent to have it.	province, a direct reference is not made in the EA report. However, the project team will keep this planned update in mind and will ensure this information is referenced at the detailed design stage for each proposed project.



May 8th, 2024

Attn: Paul Leithwood,
Planner,
Infrastructure Planning and Permits | Development and Engineering Services
Toronto and Region Conservation Authority (TRCA)
101 Exchange Avenue,
Vaughan, Ontario, L4K 5R6
Tel: 437.880.2146 | Email: paul.leithwood@trca.ca

Cc: Irina Marouchko, P. Eng.
Manager, Water Resources
City of Pickering
One The Esplanade,
Pickering, Ontario, L1V 6K7
Tel: 905.420.4660, Ext: 2072 | Email: imarouchko@pickering.ca

**RE: Pine Creek Erosion Assessment Municipal Class EA – Response to TRCA's
Comments on Draft Project File Report - CFN 67561**

Dear Mr. Leithwood,

Aquafor Beech is pleased to submit comment responses for the above noted project. Please find responses to the comments received from the Toronto and Region Conservation Authority (TRCA) on April 19th, 2024 below.

If you have any questions or require any further information, please contact Rob Amos at 416.705.2367 or by email at amos.r@aquaforbeech.com.

Sincerely,

AQUAFOR BEECH LIMITED

Rob Amos, MAsC, P. Eng.
Project Manager

Jacob Ursulak, MAsC, EIT
Water Resources Analyst

APPENDIX A: TRCA COMMENTS AND PROPONENT RESPONSES

ITEM	DISCIPLINE	TRCA COMMENTS (June 12, 2023) – PUBLIC INFORMATION CENTRE (PIC)	TRCA COMMENTS (APRIL 19, 2024) – DRAFT PROJECT FILE REPORT	PROponent/CONSULTANT RESPONSE (May 8th, 2024)
1.	General – Fees	As per our NOC communication dated September 16, 2022. This EA review is subject to a Schedule B Standard \$10,015 review fee as per our Fee Schedule . For payment options, refer to How to Pay TRCA Review Fees . Ensure your accounting department references CFN 67561 when making payment.		Noted. The City of Pickering will coordinate payment of TRCA review fees.
2.	General	Provide confirmation that the draft final EA will be made available to TRCA Staff prior to its release for public review.		The draft project file report was made available for TRCA review prior to its release for public review. TRCA subsequently provided comments on April 19 th , 2024 which are addressed below.
3.	Water Resources	Provide the following at the earliest preliminary assessment and/or design stages for TRCA water resources staff to confirm which alternative is preferred: a) Provide a hydraulic brief with an updated TRCA HEC-RAS model based on existing topographic and/or bathymetric surveys and proposed conditions. Please provide a comparison table showing the velocity, shear stress and stream power within the main channel and the overbanks (left/right) for both existing and proposed conditions for all HEC-RAS cross-sections for the 2-year to 100-year and Regional design storms at the early design stages. Please ensure that the velocity, shear stress and stream power are reduced to the degree technically feasible with the proposed channel restoration design. Please incorporate floodplain connectivity to reduce channel velocities, stream power and erosion potential within the channel restoration design. Please update the design as required. In addition, please provide drawing cross-sections and documentation to validate the HEC-RAS model and drawings provided. A digital copy of the updated TRCA HEC-RAS model is required for review. Please note that the latest TRCA HEC-RAS model is available upon request.		Noted. A high-level preliminary overview of the study area hydraulics is provided in Section 3.3 of the Project File Report. As per section 8.1.1. of the Project File Report, a detailed hydraulic modelling assessment will be completed for each proposed project coming out of this EA at the detailed design stage. This hydraulic modelling assessment will support both the detailed design process as well as the permit application process with TRCA.
		b) Provide and/or improve the low flow channel sinuosity with fluvial geomorphology principles. Please ensure that design storms greater than the 2-year spill within the floodplain riparian zones to reduce erosive velocities and enhance floodplain connectivity. TRCA water resources staff		Noted. As per section 8.1.1. & 8.1.2. of the Project File Report, a detailed hydraulic modelling assessment & geomorphic assessment will be completed for each proposed project coming out of this EA at the detailed design stage.

ITEM	DISCIPLINE	TRCA COMMENTS (June 12, 2023) – PUBLIC INFORMATION CENTRE (PIC)	TRCA COMMENTS (APRIL 19, 2024) – DRAFT PROJECT FILE REPORT	PROPONENT/CONSULTANT RESPONSE (May 8th, 2024)
		are of the opinion that highly conducive channels confines greater flow within the channel and as such increases channel velocity which leads to erosion over the long-term. As such, a channel that spills over after the 2-year design storm into adjacent areas effectively reduces erosive velocities.		These assessments will ensure that the detailed design is completed in accordance with geomorphic principles and that efforts are made to improve floodplain connectivity where feasible.
		c) Provide a detailed geomorphic assessment report with supporting field data to support the channel restoration designs and ensure that the watercourse is designed with fluvial geomorphology principles and incorporates the findings of the detailed geomorphic assessment report.		Noted. As per section 8.1.2. of the Project File Report, a detailed geomorphic assessment will be completed for each proposed project coming out of this EA at the detailed design stage. The completion of these assessments will ensure that the detailed design is completed in accordance with geomorphic principles and established methods of best practice.
		d) Provide and/or improve floodplain connectivity for the low flow channel by ensuring that design storms greater than the 2-year spill over within the floodplain riparian zones to inundate flows and consequently reduce erosive velocities.		Noted. As per section 8.1.1. & 8.1.2. of the Project File Report, a detailed hydraulic modelling assessment & geomorphic assessment will be completed for each proposed project coming out of this EA at the detailed design stage. These assessments will ensure that through the completion of the detailed design that efforts are made to improve floodplain connectivity where feasible. The target will be to ensure that design storms greater than the 2-year storm spill over within the floodplain riparian zones to inundate flows and reduce erosive velocities.
		e) Incremental and cumulative riparian storage volumes are required every 0.3m incremental for existing and proposed conditions for the 2-year to 100-year and Regional design storms to ensure that there is no incremental and/or cumulative loss in riparian storage volumes. In addition, floodplain connectivity should be explored to enhance riparian storage volumes within the creek system and reduce erosive velocities further.		Noted. As per section 8.1.1. of the Project File Report, a detailed hydraulic modelling assessment will be completed for each proposed project coming out of this EA at the detailed design stage. As part of these hydraulic assessments, incremental and cumulative riparian storage volumes will be assessed at 0.3 m increments for both existing and proposed model conditions. This will be done to ensure that implementation of the proposed

ITEM	DISCIPLINE	TRCA COMMENTS (June 12, 2023) – PUBLIC INFORMATION CENTRE (PIC)	TRCA COMMENTS (APRIL 19, 2024) – DRAFT PROJECT FILE REPORT	PROPONENT/CONSULTANT RESPONSE (May 8th, 2024)
				works will not result in a loss of riparian storage volume.
		f) Explore for each design alternative, whether wetland pockets are technically feasible to help attenuate flows and reduce erosion.		Noted. As per section 8.1.1 of the Project File report, consideration will be given on a project-by-project basis at the detailed design stage to explore opportunities for the installation of wetland pockets to help attenuate flows, create new habitat and reduce erosion.
4.	Water Resources	As part of this EA, explore whether any upstream stormwater management measures, and/or wetland pockets at outfall locations are technically feasible to reduce erosive velocities and attenuate peak flows prior to entering the watercourse reaches.		Noted. While consideration of upstream stormwater management measures (i.e., SWM ponds, OGS units, etc.). is outside the scope of this EA study, as per section 8.1.1 of the Project File report consideration will be given to installing pocket wetlands on a project-by-project basis at detailed design.
5.	Geotechnical Engineering	At the design stage, geotechnical and stability studies may be required depending on the scope, nature, and location of stabilization works being conducted.	For the design works, the geotechnical and stability studies may be needed depending on the type of work and the extent of the stabilization works. Further consultations with TRCA will be needed once further details are available during the design in-progress to include appropriate level of geotechnical studies and assessments	Acknowledged. As per Section 8.1.3. of the Project File Report, geotechnical investigations will be completed at detailed design to inform the design of bank protection works (i.e., armourstone retaining walls) and to confirm soil properties for the purposes of effective soil management during construction in accordance with O.Reg. 406/19.
6.	Planning Ecology	All sites: Consider access routes during detailed design that have the least impact on the valley system.	To be addressed at detail design.	Confirmed. As per section 8.1. of the Project File Report, access routes and staging areas will be finalized through the detailed design process. Efforts will be made to select access routes that minimize environmental disturbances.
7.	Planning Ecology	Site 12: Detailed design should take into consideration wetland boundaries and impacts. If impacts cannot be avoided, this should be addressed in early consultation processes. Mitigation and restoration efforts should be applied. Please further note that the wetlands as mapped by ELC communities on Fig 1-2 are not consistent with TRCA wetland mapping.	To be addressed at detail design.	Acknowledged. As per section 4.4 of the Project File Report, for Site #12, a site visit will be coordinated with TRCA at detailed design to clarify any discrepancies between the wetland areas defined in the Project File Report and TRCA wetland mapping. Through the site visit the wetland boundary will be staked onsite, and this boundary

ITEM	DISCIPLINE	TRCA COMMENTS (June 12, 2023) – PUBLIC INFORMATION CENTRE (PIC)	TRCA COMMENTS (APRIL 19, 2024) – DRAFT PROJECT FILE REPORT	PROPONENT/CONSULTANT RESPONSE (May 8th, 2024)
				used to guide the detailed design of the proposed local works solution.
8.	Planning Ecology	TRCA requests a site visit is arranged to investigate and delineate/stake the boundaries of the wetland feature west of Dixie Road, as there appears to be a discrepancy in the ELC mapping provided and TRCA mapping.	Not addressed.	As per section 4.4 of the Project File Report, for Site #12, a site visit will be coordinated with TRCA at detailed design to clarify any discrepancies between the wetland areas defined in the Project File Report and TRCA wetland mapping. Through the site visit the wetland boundary will be staked onsite, and this boundary used to guide the detailed design of the proposed local works solution.
9.	Planning Ecology		Section 3.7.3.3. Reference the latest version of the TRCA Compensation Guideline (2023). Ecosystem Compensation Protocol (trcaca.s3.ca-central-1.amazonaws.com)	Noted. Section 3.7.3.3 has been updated to reference the latest version of the TRCA Compensation Guidelines (2023).
10.	Planning Ecology		Section 3.7.3.3. Note that the TRCA expects the mitigation hierarchy (avoid, minimize, mitigate) to be applied before considering compensation for wetlands. Ecosystem compensation will be applicable for these works at a 1:1 ratio for marsh habitats. However, for swamp habitats, if present, the compensation ratio will be determined using basal area calculations. Consultation with TRCA is advised at early stages	Noted. Section 3.7.3.3 has been updated to specify that the mitigation hierarchy (avoid, minimize, mitigate) must be applied before considering compensation. Additionally, Section 3.7.3.3 was updated to differentiate between the 1:1 compensation ratio for marsh habitat, and the basal area method for the swamp habitat.
11.	Planning Ecology		Identify the impact areas (in ha) associated with the preferred options according to the Ecological Land Classification (ELC) to determine the extent of impact and assist in informing the restoration efforts	Noted. As per section 8.1 of the Project File report, impact areas based on the Ecological Land Classification system will be identified on a site-by-site basis as part of the detailed design process to guide the development of site restoration plans.
12.	Planning Ecology		All Sites: During the detailed design phase, plans should outline the extent of grading, label access routes and staging areas, and clearly display all disturbance areas, erosion and sediment controls (ESCs), and outline construction sequencing and phasing.	Acknowledged. As per section 8.1 of the Project File Report, the drawing packages prepared at detailed design will be comprehensive in nature and will define site grading, access routes, staging areas, disturbances areas, ESC plans and construction sequencing/phasing.
13.	Planning Ecology		All Sites: Consult the TRCA seed mix guidelines to assist in selecting appropriate seed mixes for riparian re-vegetation in the respective habitats. Additionally, if	Acknowledged. These materials will be consulted at the detailed design phase to guide the development of site restoration plans.

ITEM	DISCIPLINE	TRCA COMMENTS (June 12, 2023) – PUBLIC INFORMATION CENTRE (PIC)	TRCA COMMENTS (APRIL 19, 2024) – DRAFT PROJECT FILE REPORT	PROPONENT/CONSULTANT RESPONSE (May 8th, 2024)
			suitable, consider the use of erosion control blankets. Seed-Mix-Guidelines-Update January-19-2022.pdf (trcaca.s3.ca-central-1.amazonaws.com)	
14.	Planning Ecology		All Sites: Ensure the completion of a comprehensive erosion and sediment control (ESC) plan, including dewatering and watercourse bypass strategies for applicable sites. Microsoft Word - ESC Guide for Urban Construction.docx (sustainabletechnologies.ca)	Acknowledged. These materials will be consulted at the detailed design phase to guide the development of ESC plans as well as flow management plans.
15.	Planning Ecology		Site 9/23/24: Staff recommend employing a bypass flume to maintain water flows and fish passage.	Noted. This recommendation will be considered as part of the detailed design process.
16.	Planning Ecology		Site 12: Given proximity to the unevaluated wetland, please confirm the limits with TRCA. Please refer to comment # 7 and #8. Once the limits of the wetland have been confirmed, please advise if impact to the unevaluated wetland are anticipated, provide the relevant details, and proposed applicable restoration/compensation.	Acknowledged. As per section 4.4 of the Project File Report, for Site #12, a site visit will be coordinated with TRCA at detailed design to clarify any discrepancies between the wetland areas defined in the Project File Report and TRCA wetland mapping. Through the site visit the wetland boundary will be staked onsite, and this boundary used to guide the detailed design of the proposed local works solution.
17.	Planning Ecology		All sites: Provide a robust planting plan to restore disturbance areas associated with the works.	Noted. As per Section 8.1 of the Project File Report, the detailed design packages will provide comprehensive site restoration plans, developed in accordance with TRCA guidelines.
18.	Water Resources		Note that Erosion Site #1 includes road widening due to the future Kingston Road BRT. As the culvert is already showing signs of structural degradation and is likely undersized for a potential significant road widening, this culvert should be replaced. As such, given the risk to Kingston Road and future BRT, TRCA staff are of the opinion that this should likely be increased from low risk to medium or high risk in Table 2-1 and a higher risk rating in Table 5-1. Section 2.3 of the report acknowledges the role of the Region and the proposed BRT improvements;	Agreed. The Level of Risk for Site #1 in Table 2-1 was increased from “Low” to “Medium”, and the Risk Rating for Project 9 was increased from 3 to 4 in Table 5-1. Section 2.3 updated to specify that the BRT works will be coordinated between the City of Pickering and the Region to ensure that improvements effectively mitigate long-term erosion. Outfall #1 is the 800 mm diameter CSP located directly upstream of Kingston Road,

ITEM	DISCIPLINE	TRCA COMMENTS (June 12, 2023) – PUBLIC INFORMATION CENTRE (PIC)	TRCA COMMENTS (APRIL 19, 2024) – DRAFT PROJECT FILE REPORT	PROPONENT/CONSULTANT RESPONSE (May 8th, 2024)
			however, mitigation of embankment erosion and road improvements will need to be coordinated between the City of Pickering and the Region to ensure that improvements effectively mitigate long-term erosion and undermining of the adjacent embankments. In addition, outfall #1 appears to be in need to repair (is in poor condition/failing) and is also part of Site #1. It is noted that there is the Kingston Road box, please clarify whether the 800mm CSP pipe culvert is also under Kingston Road and show the configuration of the 800mm CSP pipe on Figure 2-6. In addition, under Table 3-3, please clarify where the Kingston Road culvert condition assessment is provided. Otherwise, please provide. Also note that the new Frenchman's Bay hydraulic model approved February 26th, 2024 shows approximately 84.55masl. As part of the Kingston Road BRT project, TRCA staff is also requesting the City of Pickering to explore whether culvert sizing at this location may reduce flooding impacts on Kingston Road.	with it's location identified in Figure 2.6. A photo of Outfall #1 is provided in the first row of Table 3-3. A condition assessment of the Kingston Road culvert was not part of the scope of work of this EA as the Kingston Road Culvert is not a City of Pickering asset. The condition of the culvert is instead being assessed through a separate study led by the Region of Durham. The Kingston Road BRT project is currently being undertaken by the Region, and is outside the scope of work of this environmental assessment.
19.	Water Resources		Given that there are three outfalls immediately upstream of or near major sediment accumulation within Site #11, this location is adjacent to Dixie Road, private properties and within the downstream reaches of the watercourse, there is a concern that if the major sediment accumulation is not addressed, the watercourse may be partially blocked which can be a hinderance to flow. In addition, outfall #9 appears to be failed and in need of repair as per Table 3-3 which appears to receive flows from the upstream reaches of Pine Creek north of Dixie Road. As such, TRCA staff are of the opinion that Site #11 should be increased from low risk to medium risk in Table 2-1 and a higher risk rating in Table 5-1.	Agreed. The Level of Risk for Site #11 in Table 2-1 was increased from "Low" to "Medium", and the Risk Rating for Project 10 was increased from 3 to 4 in Table 5-1.
20.	Water Resources		Provide one figure that shows all the outfall locations.	Figure 2-1 of the Project File Report shows the general locations of all outfalls within the project study area extents.

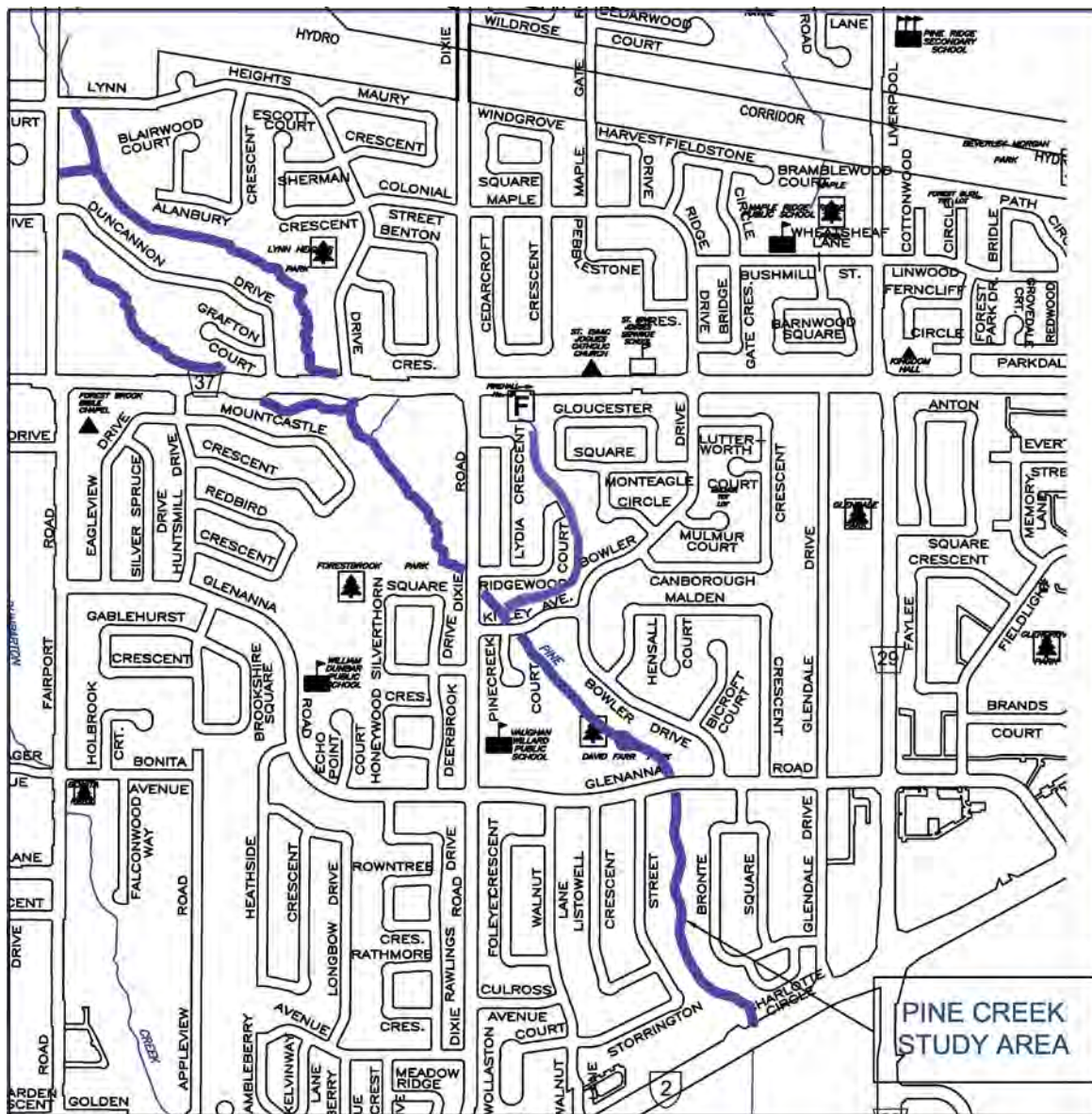
ITEM	DISCIPLINE	TRCA COMMENTS (June 12, 2023) – PUBLIC INFORMATION CENTRE (PIC)	TRCA COMMENTS (APRIL 19, 2024) – DRAFT PROJECT FILE REPORT	PROPONENT/CONSULTANT RESPONSE (May 8th, 2024)
				At the detailed design phase, additional figures will be provided, on a project-by-project basis, to show the specific locations of outfalls within each project site.
21.	Water Resources		Frenchman's Bay hydraulics and hydrology were simultaneously updated as of February 26th, 2024. As such, please update Section 3.3 of the report with the new hydrology and hydraulics information. Also reference comment #3 a). To request the latest TRCA modelling information, please contact Agamdeep Kang at Agamdeep.Kang@trca.ca.	Noted. The latest hydrologic and hydraulic modelling information will be leveraged at the detailed design phase to facilitate the hydraulic modelling assessments outlined in section 8.1.1 of the Project File Report. These assessments will be completed on a project-by-project basis to facilitate permitting with the TRCA and ensure the implementation of the proposed works will not have a negative impact on flooding or erosion.
22.	Water Resources		TRCA staff require updated HEC-RAS model for all solutions (inclusive of three scenarios; existing conditions, updated existing conditions, and proposed conditions). Please note that a hydraulic brief is required to compare the following parameters; 2year to 100year and Regional floodplain elevations, velocities, shear stress and stream power (which is equivalent to shear stress multiplied by velocity). In general, the proposed solutions should aim to reduce stream power via floodplain connectivity. This should be added to the evaluation criteria listed in Table 4-1.	Noted. As per section 8.1.1. of the Project File report, the required hydraulic modelling analysis will be provided as part of the detailed design phase for each of the proposed projects. It will be ensured that each of the alternatives will reduce overall stream power wherever feasible, though increasing floodplain connectivity. The Flooding Impacts criteria under Technical/Engineering Considerations in Table 4-1 takes into account the projected impacts of the proposed alternatives on flooding based on professional engineering judgement and experience.
23.	Planning		As a result of the new regulation, please update the report with the following: TRCA permits will be required at the detailed design stage under Section 28.1 of the Conservation Authorities Act (Please see Section 8.2 as an example where 166/06 will need to be updated).	Addressed. Section 8.2 and Section 3.7.3.3 updated to reflect the new regulation.

Engineering Services Department

May 10, 2024

The Study

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below.



Customer Care Centre
T.905.683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

The Class EA was conducted as a Schedule 'B' project in accordance with the "Municipal Class Environmental Assessment" document (Municipal Engineers Association, October 2000, as amended in 2007, 2011, 2015 and 2023), under the *Ontario Environmental Assessment Act*. The process included indigenous, public and review agency consultation, an evaluation of alternatives, an assessment of potential environmental impacts of the proposed improvements, and identification of reasonable measures to mitigate any adverse impacts. The Class EA identified preferred alternatives to be constructed at eleven (11) select locations. Further details are provided within the Class EA Project File.

How to Review the Project File Report

The Project File Report (PFR) is available for review on the City's website commencing Friday, May 10, 2024 at pickering.ca and at the following location:

Pickering Civic Complex
Clerks Department
One The Esplanade
Pickering, ON L1V 6K7

All comments and concerns should be sent in writing directly to the City's Project Manager, Irina Marouchko, Manager, Water Resources (contact information below) by **Monday, June 10, 2024**.

All personal information included in your request – such as name, address, telephone number and property location – is collected under the authority of Section 30 of the *Environmental Assessment Act* and is maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the *Municipal Freedom of Information and Protection of Privacy Act (MFIPPA)* (s.27) and the *Freedom of Information and Protection of Privacy Act (FIPPA)* (s.37) does not apply. Personal information you submit will become part of a public record that is available to the public unless you request in writing to the municipality and/or the Ministry that your personal information remain confidential.

For further information on this project please contact:

Irina Marouchko, P.Eng.
Manager, Water Resources
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, M.A.Sc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T. 416-705-2367
Amos.R@Aquaforbeech.com

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Alternate formats available upon request at 905.683.7575

Appendix K –
Public Information Centre Boards



WELCOME

Pine Creek Erosion Assessment
Municipal Class Environmental Assessment
PUBLIC INFORMATION CENTRE
May 18, 2023

Your comments are encouraged and appreciated, as this will provide us an opportunity to address project issues and concerns.



FIRST NATIONS LAND ACKNOWLEDGEMENT



Pine Creek Erosion Assessment
Municipal Class Environmental Assessment

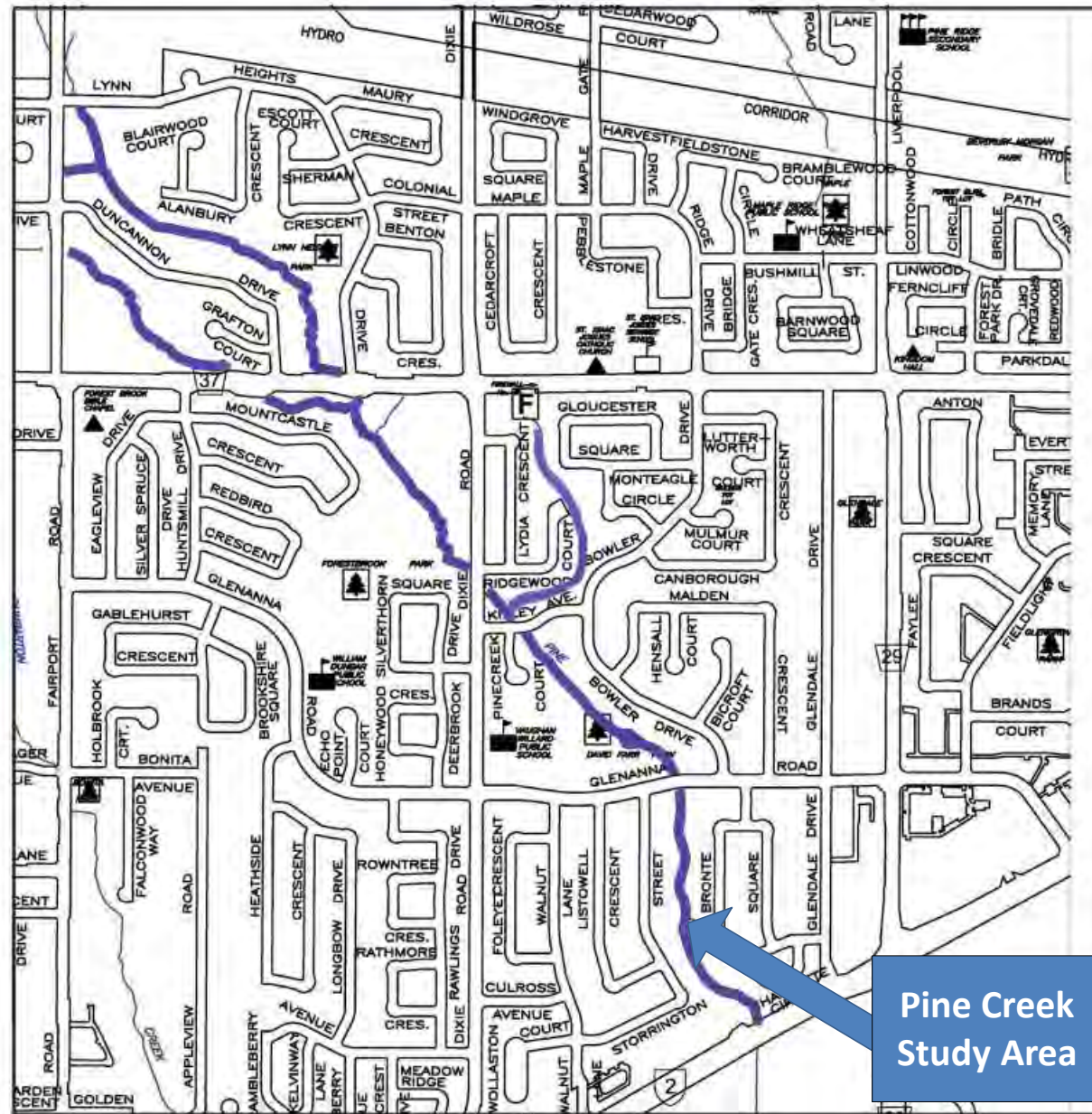
We acknowledge that the City of Pickering resides on land within the Treaty and traditional territory of the Mississaugas of Scugog Island First Nation and Williams Treaties signatories of the Mississauga and Chippewa Nations.

Pickering is also home to many Indigenous persons and communities who represent other diverse, distinct, and autonomous Indigenous nations.

This acknowledgement reminds us of our responsibilities to our relationships with the First Peoples of Canada, and to the ancestral lands on which we learn, share, work, and live.

STUDY AREA

The study area includes the Pine Creek corridor from Kingston Road to Kitley Avenue, Kitley Avenue to Finch Avenue, & Finch Avenue to Fairport Road as well as the Kitley Ravine.



STUDY PURPOSE / PROBLEM DEFINITION



This study is being carried out to assess the erosion related risks to private property and public infrastructure within the Pine Creek valley corridor, with the intent of providing recommendations to reduce erosion and protect the natural heritage of the area.

PUBLIC INFORMATION CENTRE PURPOSE



This Public Information Centre (PIC) is designed to:

- Present information on existing conditions
- Present alternative approaches to erosion protection
- Present study process and timelines



To gain community input on:

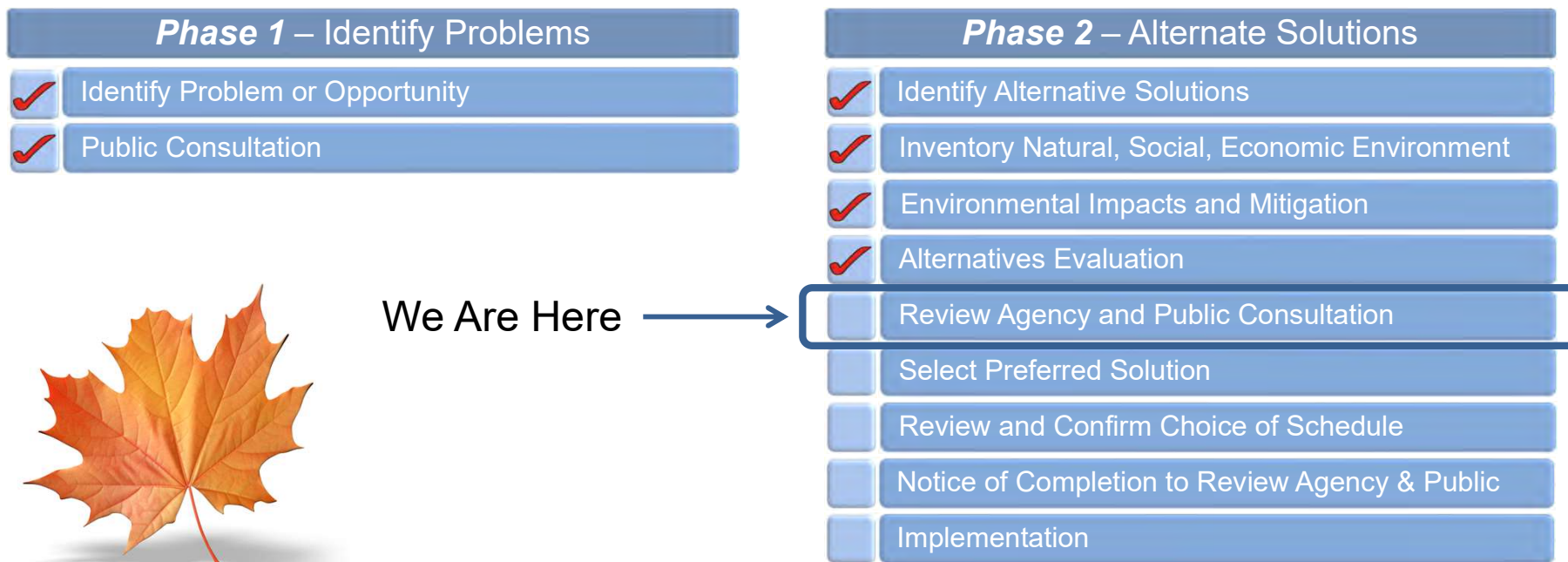
- Existing conditions information
- Identification of opportunities and mitigation preferences
- Prioritization of erosion sites
- Alternative evaluation criteria and scoring
- Selection of preferred solutions

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PROCESS

CLASS EA PROCESS - SCHEDULE B

Many projects related to municipal systems are similar in nature, are carried out routinely, and have predictable and mitigatable environmental effects which are investigated according to the Municipal Engineers Association “Municipal Class Environmental Assessment” process (October 2000, as amended in 2007, 2011, 2015 & 2023).

This study is being undertaken as a Schedule B project under the Municipal Class Environmental Assessment process. The flow chart illustrates the key steps to be undertaken as part of the EA process.



NATURAL HERITAGE ASSESSMENT

To assess the existing natural environment within the study area, the following studies were undertaken:

1. Vegetation community classification (Ecological Land Classification (ELC) protocol);
2. Terrestrial wildlife and habitat assessment;
3. Species at Risk (SAR) screening and habitat assessment;
4. Significant Wildlife Habitat (SWH) screening and assessment;
5. Natural heritage assessment;
6. Tree inventories;
7. Aquatic habitat assessment
8. Fish community assessment



SPECIES AT RISK

For the purpose of this study, Species at Risk (SAR) are defined as species listed as Endangered (END), Threatened (THR), or Special Concern (SC) under the Provincial Endangered Species Act (ESA) and/or the Federal Species at Risk Act (SARA). Other Species of Conservation Concern (SOCC) are those with Global ranks of G1-G3 and/or Subnational/Provincial ranks of S1-S3, and species considered rare within the Toronto Region Conservation Authority (TRCA) watershed (L-Ranks 2017) or in Eco-region 7E-4 (Oldham, 2017), where those species were not already considered under the SAR assessment noted above.

Species included in the screening assessment include those provided by secondary sources and those documented via direct observations by Aquafor Beech Limited. **A total of 13 SAR and SOCC were determined to be present or have some potential to be present in the study area.** These species include:

- | | |
|---|--------------------------------------|
| 1. Butternut – Endangered | 8. Snapping Turtle – Special Concern |
| 2. Barn Swallow – Threatened | 9. Western Chorus Frog – Threatened |
| 3. Eastern Wood-Pewee – Special Concern | 10. Monarch – Special Concern |
| 4. Wood Thrush – Special Concern | 11. Little Brown Myotis – Endangered |
| 5. Yellow-Breasted Chat – Endangered | 12. Northern Myotis – Endangered |
| 6. Eastern Milk snake – Special Concern | 13. Tricolored Bat – Endangered |
| 7. Midland Painted Turtle – Special Concern | |

VEGETATION COMMUNITY CLASSIFICATION



Pine Creek Erosion Assessment
Municipal Class Environmental Assessment

Vegetation communities within the study area were identified during field surveys completed in accordance with the *Ecological Land Classification (ELC) System for Southern Ontario: First Approximation and its Application* (Lee et al., 1998) protocol in 2022.

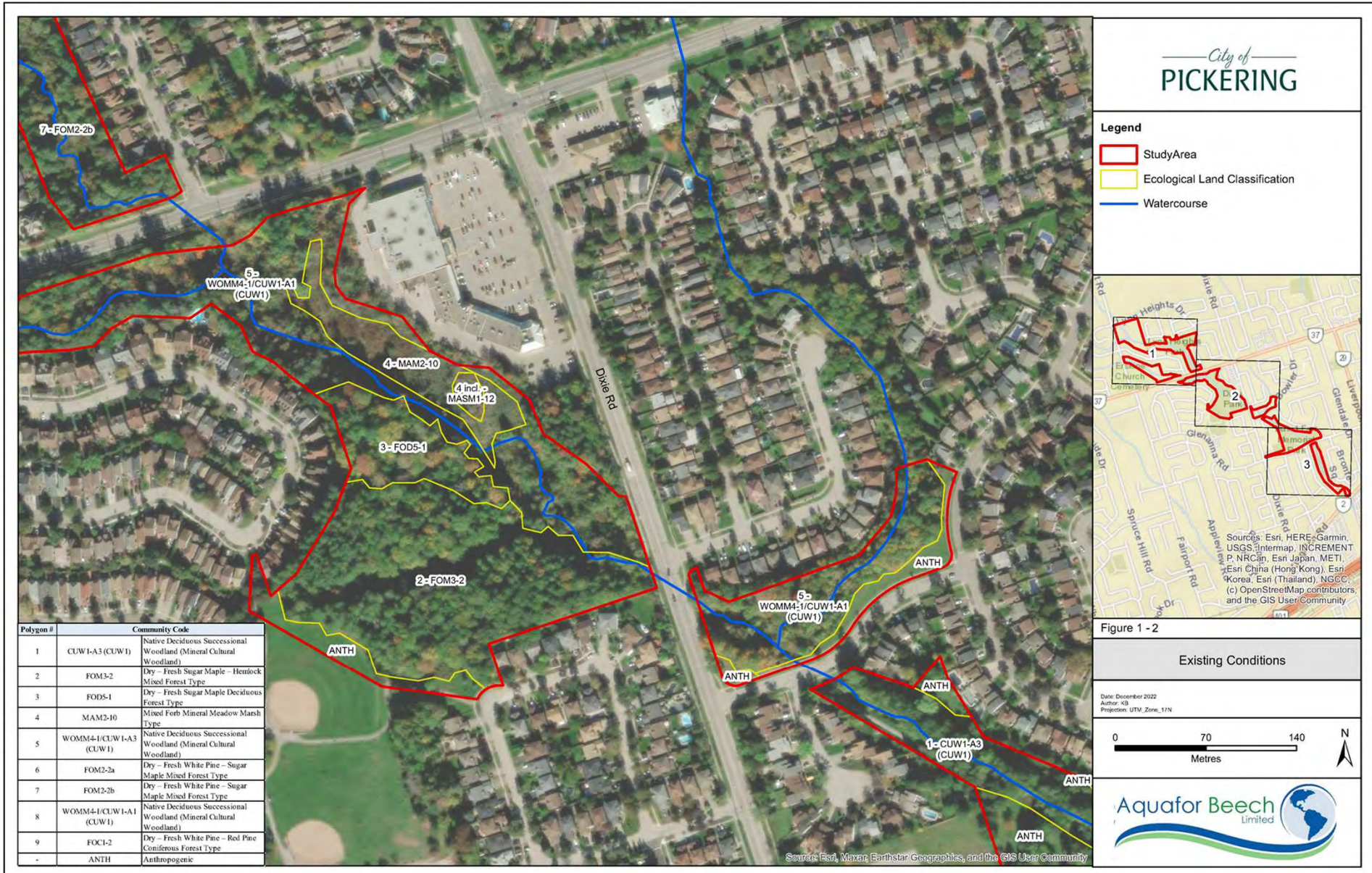
Determining the vegetation communities within the study area aids in identifying the presence of significant vegetation communities, Significant Wildlife Habitat (SWH), and the habitats of potential Species at Risk.

In total, 10 vegetation communities are present within the study area. Community types ranged from disturbed woodlands and open meadows, to deciduous forest habitats containing mature species and moderate to high quality habitat.



ELC mapping upstream of Finch Avenue

VEGETATION COMMUNITY CLASSIFICATION



ELC mapping between Dixie Road and Finch Avenue

VEGETATION COMMUNITY CLASSIFICATION



Pine Creek Erosion Assessment
Municipal Class Environmental Assessment



ELC mapping upstream of Kingston Road

To assess the existing fisheries and aquatic habitat within the study area the following studies were undertaken:

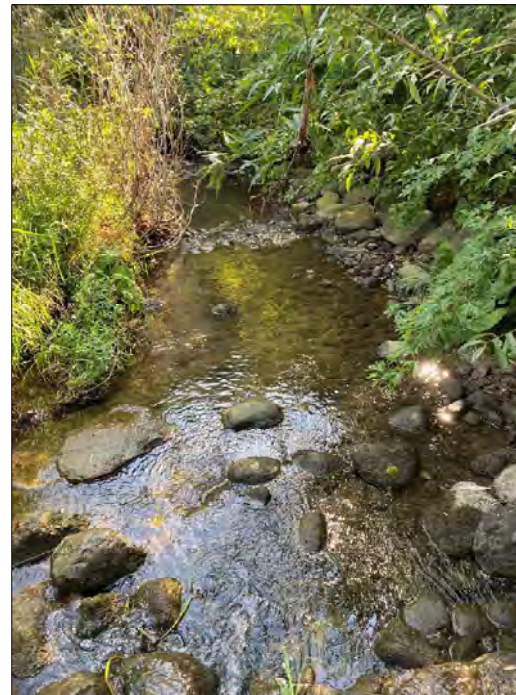
- Aquatic habitat assessments at six (6) locations throughout the study area, from Kingston Road upstream to Lynn Heights Drive
- Aquatic community assessments of historic data; and,
- SAR screening and potential habitat identification.

Summary of Fish Community Assessment

Scientific Name	Common Name
<i>Rhinichthys atratulus</i>	Blacknose dace
<i>Semotilus atromaculatus</i>	Creek chub
<i>Umbra limi</i>	Central Mudminnow
<i>Luxilus cornutus</i>	Common Shiner
<i>Percina caprodes</i>	Logperch
<i>Catostomus commersoni</i>	White sucker

Key Findings:

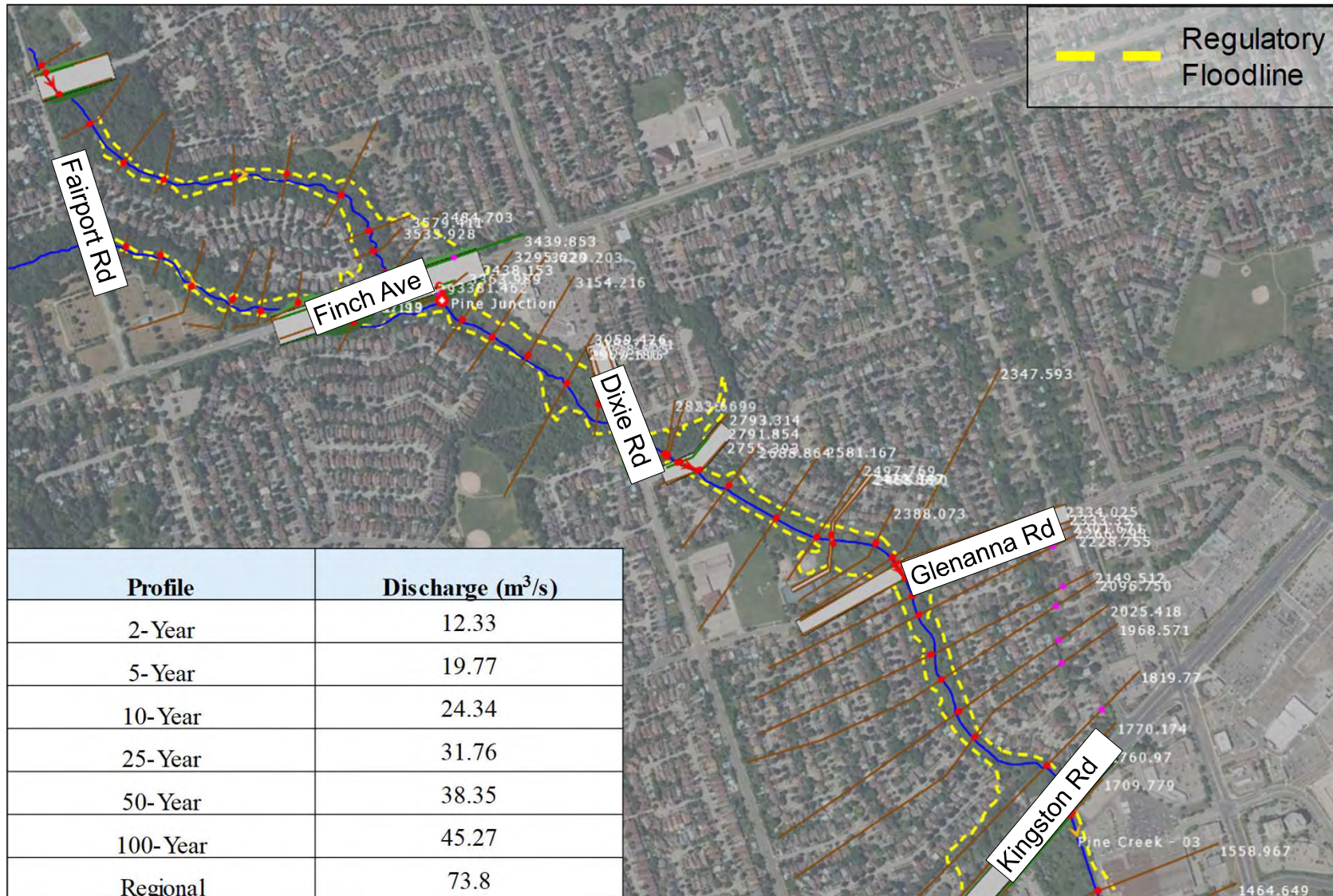
- No aquatic SAR were identified within the study area;
- The thermal classification of Pine Creek within the study area is that of a **Cool-Warmwater** thermal regime and is dominated by warmwater and coolwater species.
- Habitat quality and quantity vary throughout the study area and is largely dependent on surrounding land uses;
- A number of **fish barrier(s)** were observed throughout the study area, such as beaver dams and the Dixie Road culvert crossing.
- There are opportunities to improve fish habitat.



Representative aquatic habitat photos

HYDROLOGY & EXISTING FLOODING PROFILE

Flows under various rainfall events are presented in the figure below along with the regulatory floodline extents.



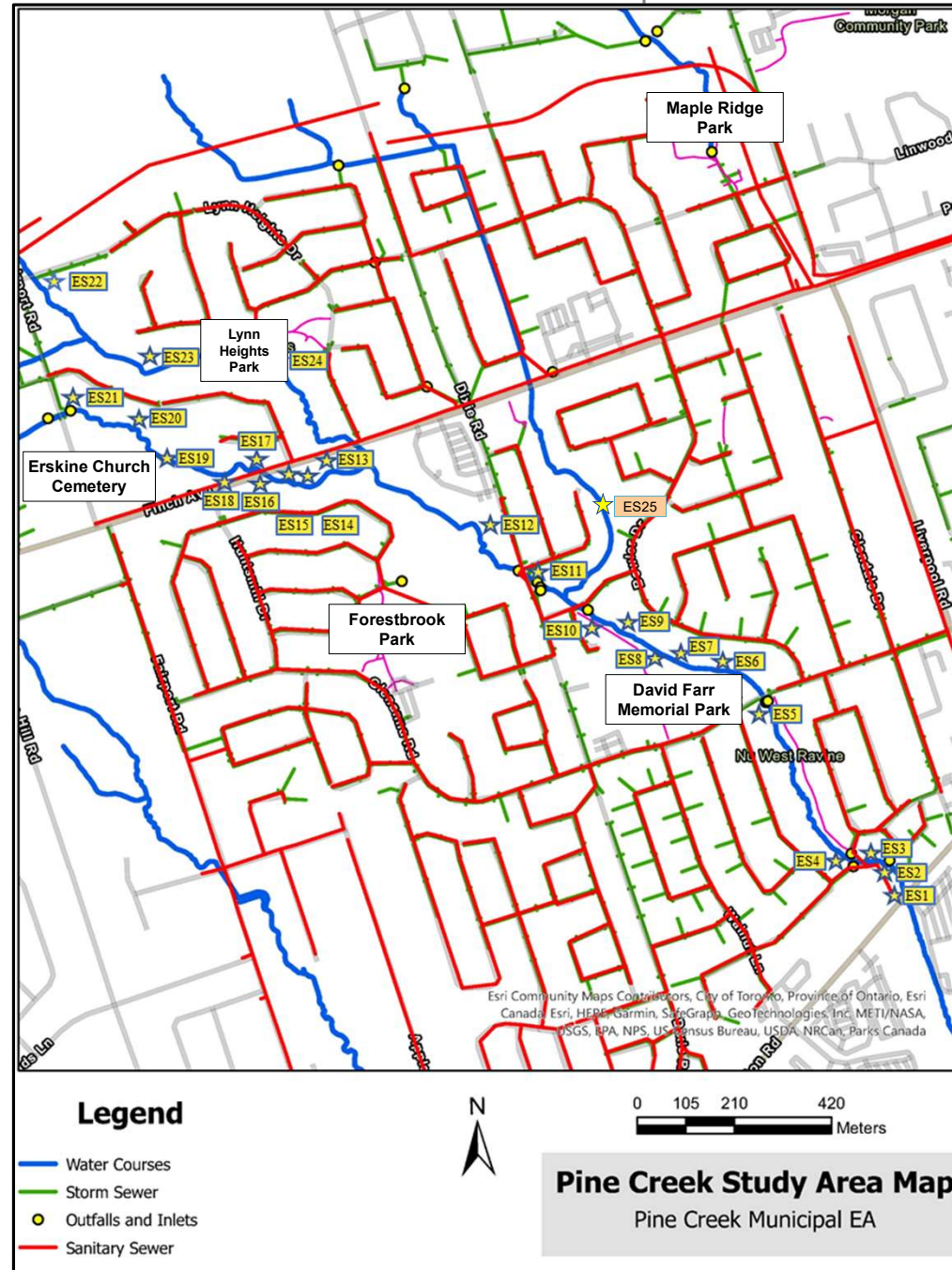
EROSION INVENTORY

Twenty five (x25) erosion sites were identified within the study area.

Risks observed at the erosion sites include:

- Risks to private properties;
- Risks to infrastructure;
- Negative impacts on water quality;
- Fish barriers;
- Woody debris and fallen trees within the creek – negative impact on flow conveyance;
- Deteriorating engineered structures requiring restoration / rehabilitation.

A series of alternatives have been developed to address the risks at each site.



EVALUATION CRITERIA



Pine Creek Erosion Assessment
Municipal Class Environmental Assessment

The following criteria are used to evaluate each alternative. It will help determine which alternative should be selected as the preliminary preferred alternative.

Comment sheets are provided to collect public feedback on the evaluation criteria and preliminary evaluation.

Physical / Natural Environment

Potential to Mitigate Existing Erosion Risks	Greater reduction of erosion risks scores higher
Potential to Improve Aquatic Habitat	Greater improvements to fish and aquatic habitat scores higher, including substrate, overhanging vegetation, turbidity, and passage/connectivity
Potential to Improve Terrestrial Habitat	Greater long-term benefit to terrestrial habitat conditions scores higher
Potential to Improve Terrestrial Vegetation	Smaller disturbance area scores higher as this minimizes vegetation removals
Potential to Reduce Impacts to Species at Risk	Minimal impact on terrestrial and aquatic habitat for Species at Risk scores higher
Potential to adapt to Climate Change	Higher ability to adapt to, and be resilient to, climate change scores higher

Social / Cultural Environment

Public Safety	Lower risks to public safety in the short and long-term scores higher
Landowner Impacts / Community Disruption	Smaller impact on private property, including short term and long term disturbances scores higher
Benefit to Community and Public Acceptance	Greater improvement of access to trails and enjoyment of surrounding lands scores higher
Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources scores higher
Aesthetic Value	Greater increase in the aesthetic value of the study area scores higher

Technical / Engineering Considerations

Regulatory Agency Acceptance	Greater ability to achieve regulatory agency acceptance scores higher
Impact on Existing Infrastructure	Greater protection of potential exposure of infrastructure scores higher
Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time scores higher
Technical Feasibility	Higher technical feasibility for implementing the project, including constructability and managing construction related disturbances to other infrastructure / property scores higher
Lifespan of Works	Greater expected lifespan scores higher

Economic Environment

Capital Costs	Lower capital cost with one time cost to City scores higher
Operation and Maintenance Costs	Lower operation and maintenance costs which ensure effectiveness of implemented measures scores higher
Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher
Cost Effectiveness	Greater ability to provide multiple improvements, at a cost less than the total of completing all the works separately with ability to partner and share costs with other agencies scores higher

EVALUATION APPROACH



Pine Creek Erosion Assessment Municipal Class Environmental Assessment

Each erosion site will be specifically evaluated to determine the preferred method for rehabilitation.

The evaluation uses a ranking scheme which accounts for Physical and Natural Environment, Social / Cultural Environment, Economic Environment and Technical / Engineering Considerations.

A preliminary ranking has been applied to each alternative for each reach. The alternative with the highest score will define which alternative is preferred for each erosion site.

The ranking score has been normalized to provide equal weighting for each category of evaluation criteria.

Comment sheets are provided to gain public input on the preliminary ranking. The ranking will be finalized once public input has been incorporated.

An example is illustrated in the adjacent table:

Ranking Scale					
No / Negative Impact	1	2	3	4	Ideal / Most Positive Impact

Erosion Site #1-4	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	18	18
Weighted Score			12.50	18.75	18.75
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	3	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	2	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			13.00	16.00	14.00
Weighted Score			16.25	20.00	17.50
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less than the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
Subtotal			8.00	14.00	11.00
Weighted Score			12.50	21.88	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	3
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			10.00	18.00	18.00
Weighted Score			12.50	22.50	22.50
TOTAL SCORE (/100)			53.8	83.1	75.9

Highest Score =
Preferred Alternative

PRELIMINARY ALTERNATIVE SOLUTIONS

1. Do Nothing

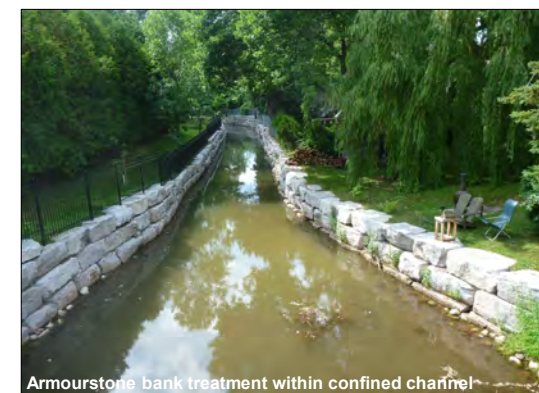
- Leave the site as it is and allow erosional processes to continue within the watercourse corridor;
- Ongoing monitoring of erosion areas to address increased risks;
- Maintenance or possible emergency works may be required in the future.

2. Local Restoration Works

- Localized channel bank and/or bed work to address erosion issues at the site;
- May require ongoing maintenance, occasional repairs, or eventual replacement;
- Often preferred to limit the economic cost and the environmental damage of large-scale channel engineering and stream restoration works.

3. Extended Restoration Works

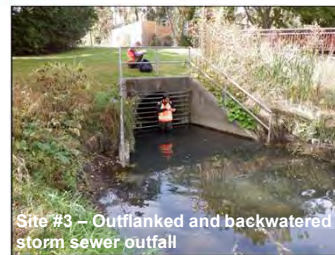
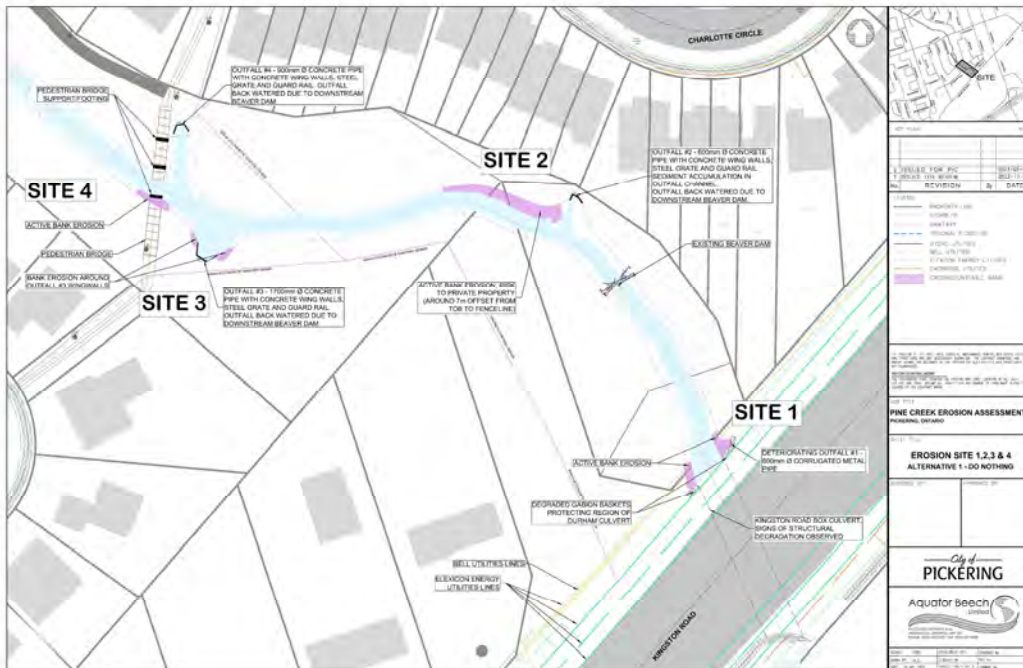
- A reach-based approach to address erosion issues at the site;
- Typically applied in highly constrained urban watercourses;
- Utilizes both “natural channel design” and “hard” channel engineering approaches;
- Higher capital cost, but requires minimal maintenance.



EROSION SITES 1 - 4

Pine Creek Erosion Assessment Municipal Class Environmental Assessment

Existing conditions & erosion risks

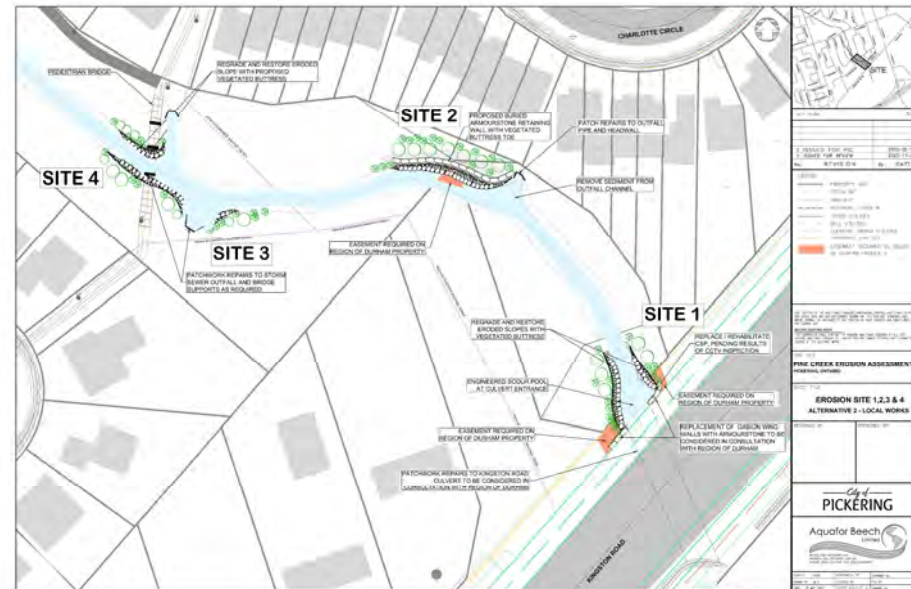


Risks to private property, municipal & regional infrastructure and aquatic habitat due to:

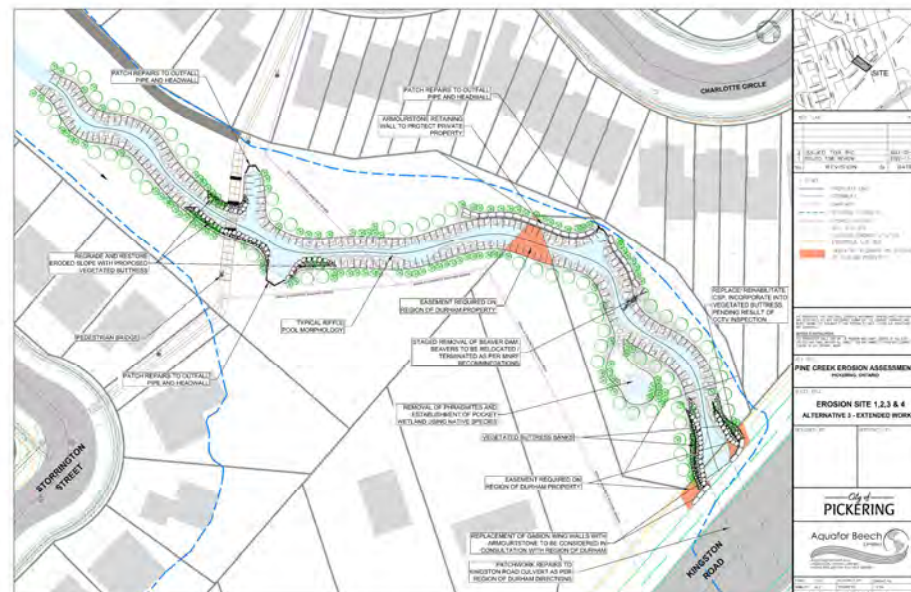
- Active bank erosion
- Beaver activity
- Aging infrastructure

Level of Risk: Low

Proposed restoration alternatives



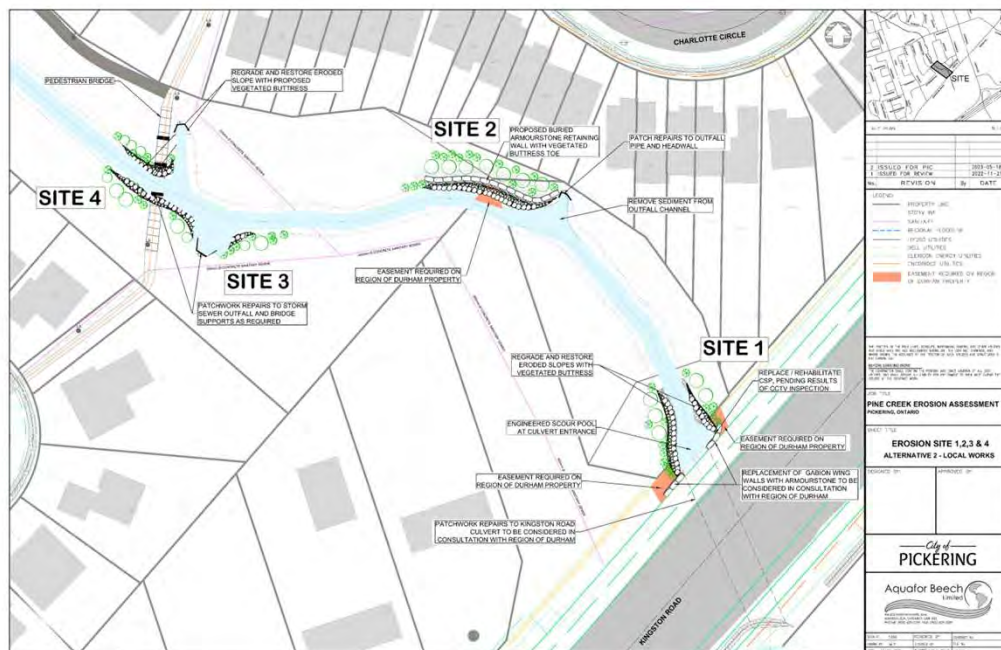
Alternative #1: Local Works



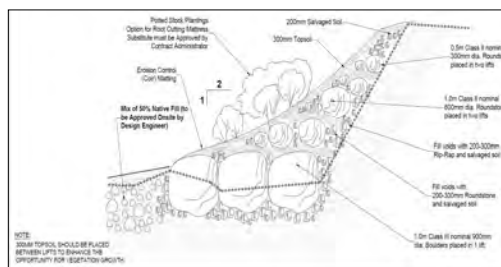
Alternative #2: Extended Works

EROSION SITES 1 - 4 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment Municipal Class Environmental Assessment



An example of natural channel design enhanced with vegetated buttress



An example of vegetated buttress detail

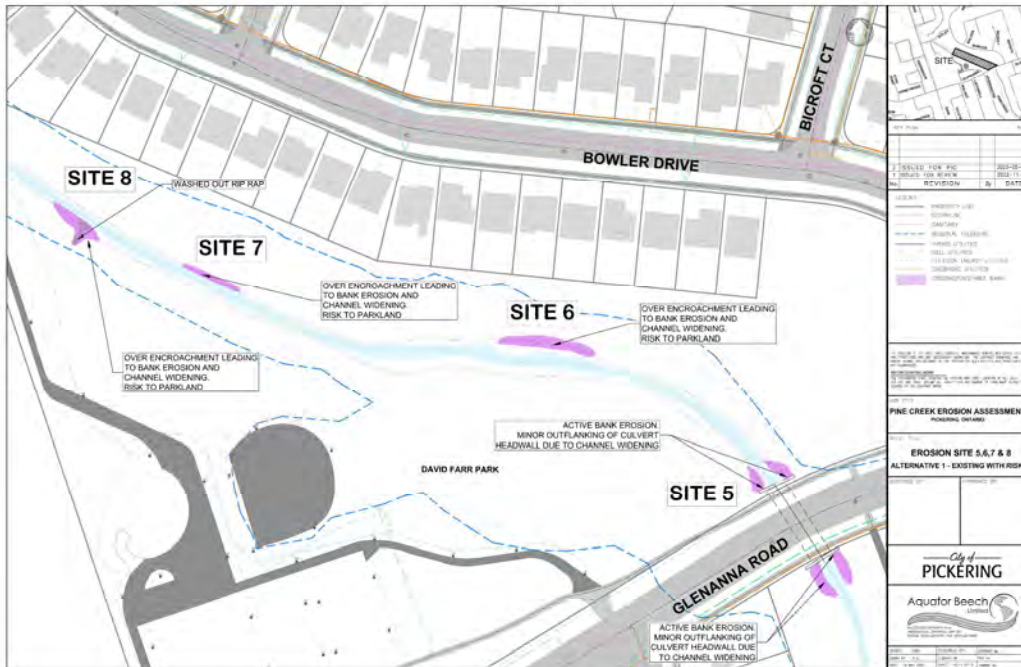
Erosion Site #1-4	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	18	18
Weighted Score			12.50	18.75	18.75
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	3	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	2	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			13.00	16.00	14.00
Weighted Score			16.25	20.00	17.50
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less than the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
Subtotal			8.00	14.00	11.00
Weighted Score			12.50	21.88	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	3
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			10.00	18.00	18.00
Weighted Score			12.50	22.50	22.50
TOTAL SCORE (/100)			53.8	83.1	75.9

Preliminary preferred alternative - Local Works

- Replace failed erosion control measures
- Restore eroded slopes and provide erosion protection through the construction of vegetated buttresses
- Removal of accumulated sediment and debris
- Repairs to degraded outfall structures
- Kingston Road culvert is a Region of Durham asset

EROSION SITES 5 - 8

Existing conditions & erosion risks

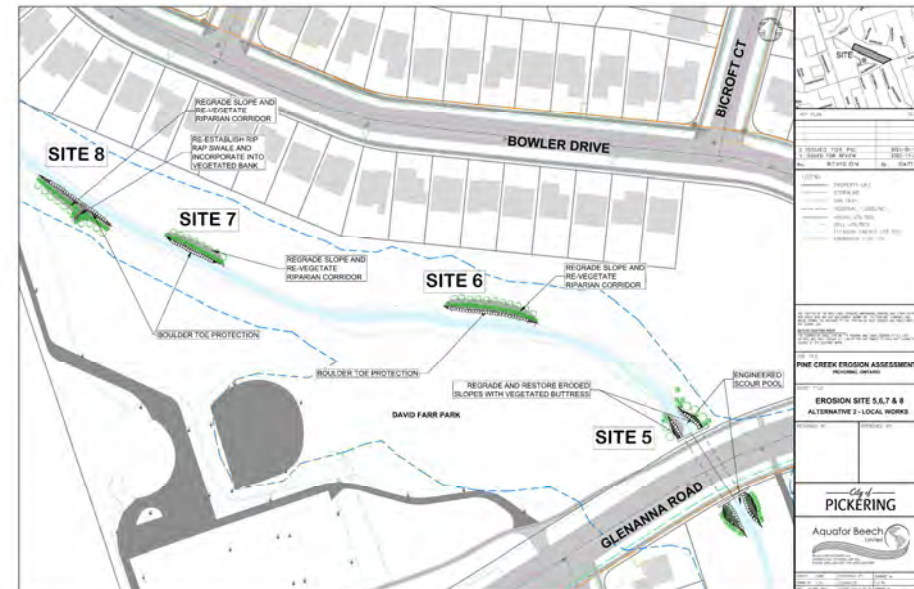


Risks to public parklands, municipal infrastructure and aquatic habitat due to:

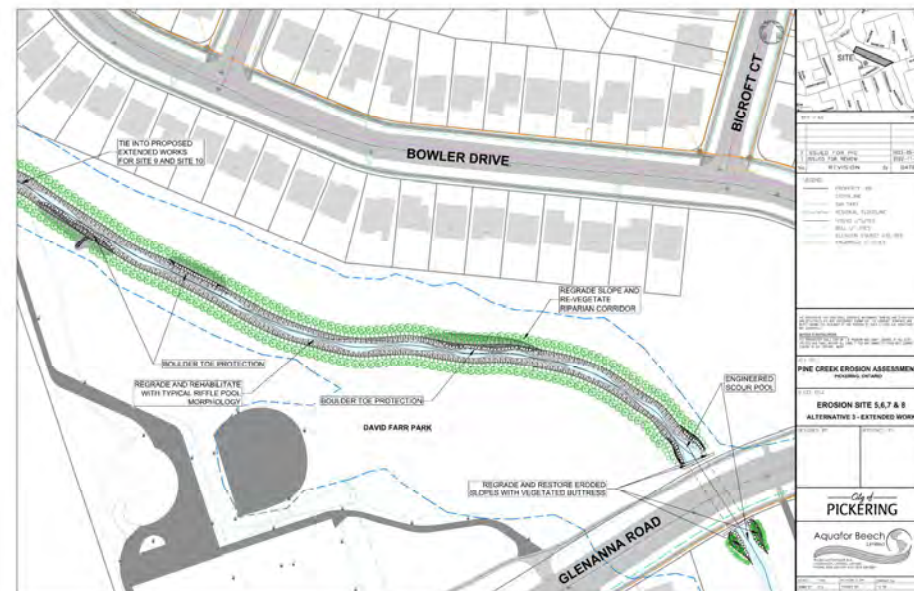
- Active bank erosion
- Over encroachment
- Debris accumulation

Level of Risk: Low

Proposed restoration alternatives



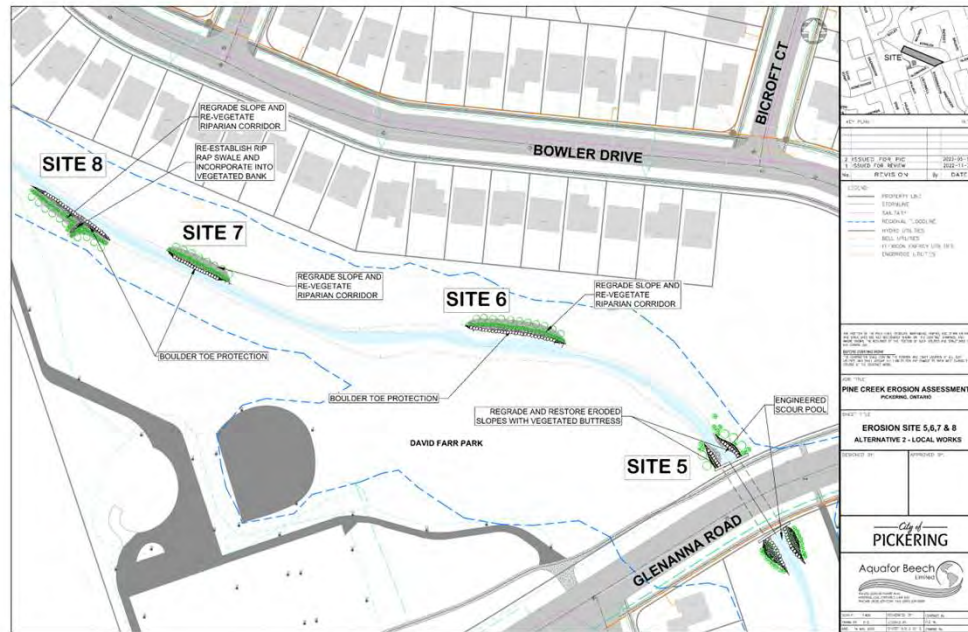
Alternative #1: Local Works



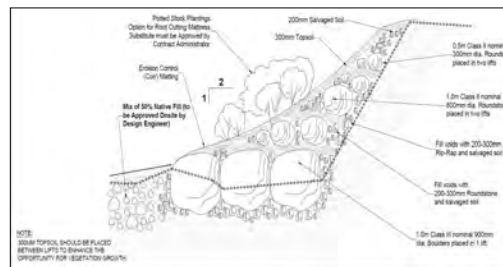
Alternative #2: Extended Works

EROSION SITES 5-8 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment Municipal Class Environmental Assessment



An example of natural channel design enhanced with vegetated buttress



An example of vegetated buttress detail

Erosion Site #5-8	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	18	19
Weighted Score			12.50	18.75	19.79
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	2	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	2	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			13.00	15.00	14.00
Weighted Score			16.25	18.75	17.50
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less than the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
Subtotal			8.00	14.00	11.00
Weighted Score			12.50	21.88	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	3
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			11.00	18.00	18.00
Weighted Score			13.75	22.50	22.50
TOTAL SCORE (/100)			55.0	81.9	77.0

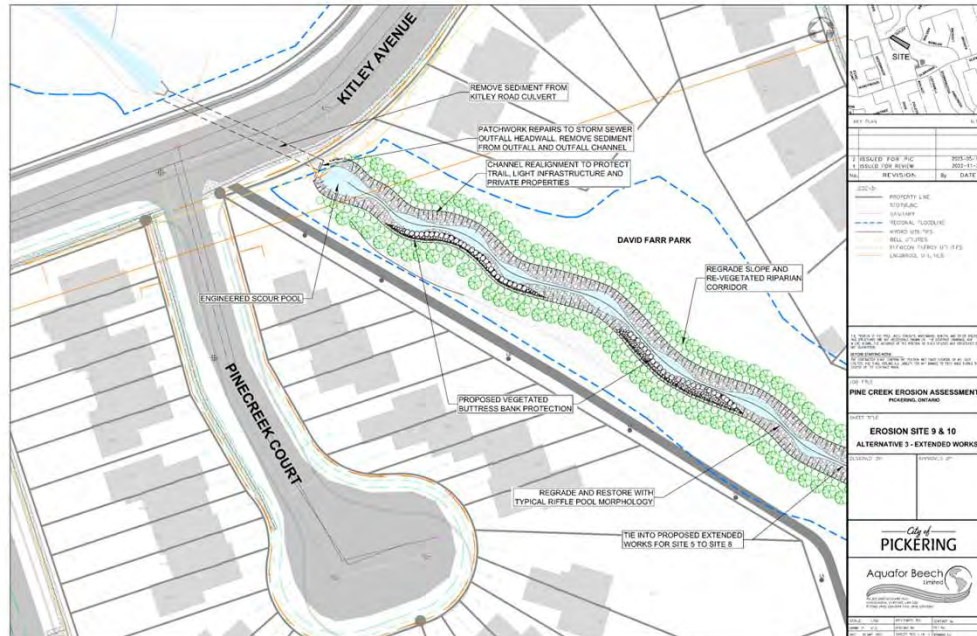
Preliminary preferred alternative - Local Works

- Restore eroded slopes and provide erosion protection through the construction of vegetated buttresses
- Removal of accumulated sediment and debris
- Replanting of the riparian zone to provide erosion protection and improve terrestrial and aquatic habitat conditions
- Recommend alterations to park management processes to prevent over encroachment within the riparian corridor

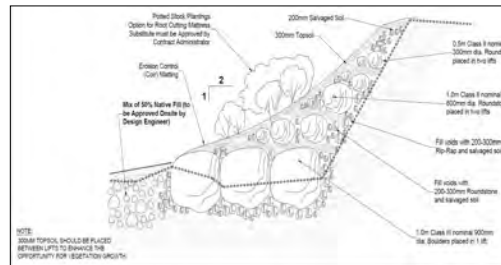
EROSION SITES 9 - 10 – POTENTIAL PREFERRED ALTERNATIVE



Pine Creek Erosion Assessment Municipal Class Environmental Assessment



An example of natural channel design with riffle-pool morphology



An example of vegetated buttress detail

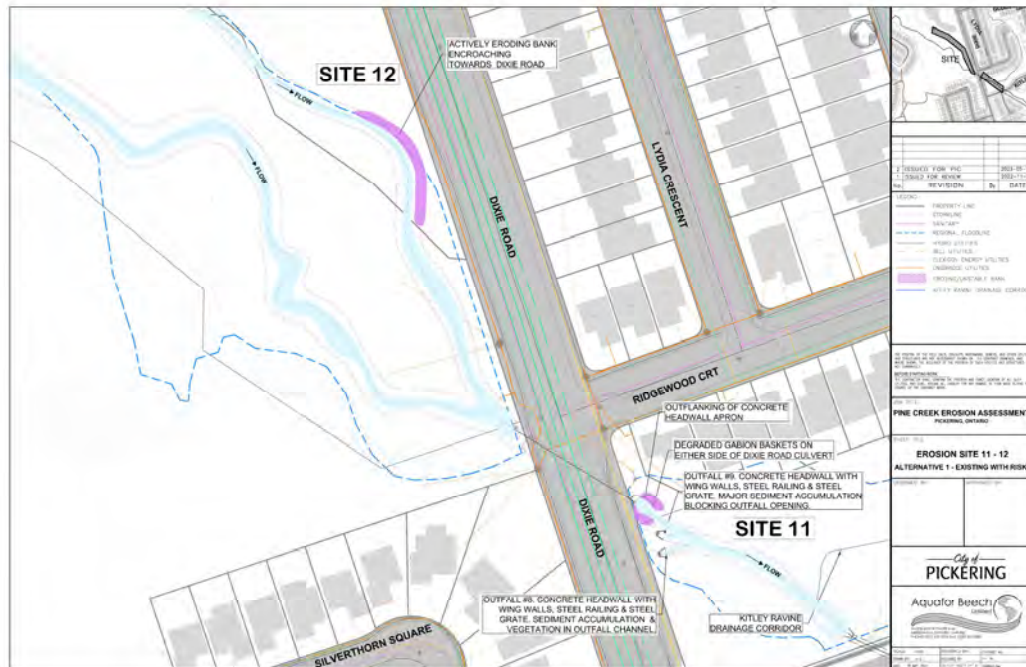
Erosion Site #9-10	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	3	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	2	4
Subtotal			12	15	19
Weighted Score			12.50	15.63	19.79
Social / Cultural Environment	Public Safety	Impact on public safety	1	3	4
	Landowner Impacts / Community Disruption	Impact on private property	1	3	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
Subtotal			8.00	14.00	17.00
Weighted Score			10.00	17.50	21.25
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	2	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3	4
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less than the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	4
Subtotal			8.00	11.00	13.00
Weighted Score			12.50	17.19	20.31
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	2	4
Subtotal			11.00	16.00	18.00
Weighted Score			13.75	20.00	22.50
TOTAL SCORE (/100)			48.8	70.3	83.9

Preliminary preferred alternative - Extended Works

- Minor channel realignment with riffle-pool morphology to improve ecological conditions and provide an offset from the park trail
- Removal of debris and sediment from the channel
- Outfall repairs / restoration

EROSION SITES 11 - 12

Existing conditions & erosion risks



Site 11 – Sediment accumulation downstream of Dixie Road



Site 11 – Failed gabion baskets creating a risk of headwall becoming outflanked



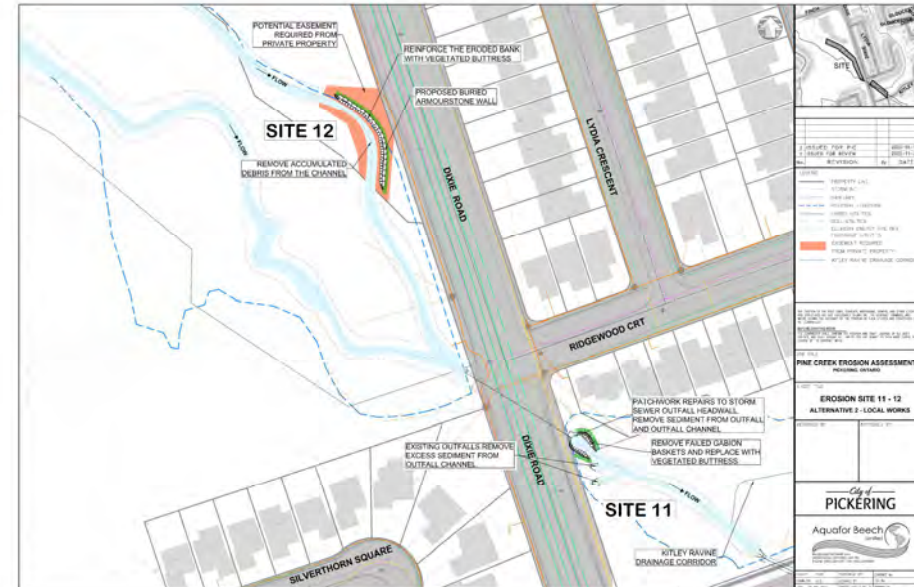
Site 12 – Slope failure creating risk to Dixie Road

Risks to municipal infrastructure, private property and aquatic habitat due to:

- Active channel erosion
- Sediment accumulated in front of storm sewer outfalls
- Aging / deteriorated infrastructure
- Debris jams

Level of Risk: Moderate

Proposed restoration alternatives



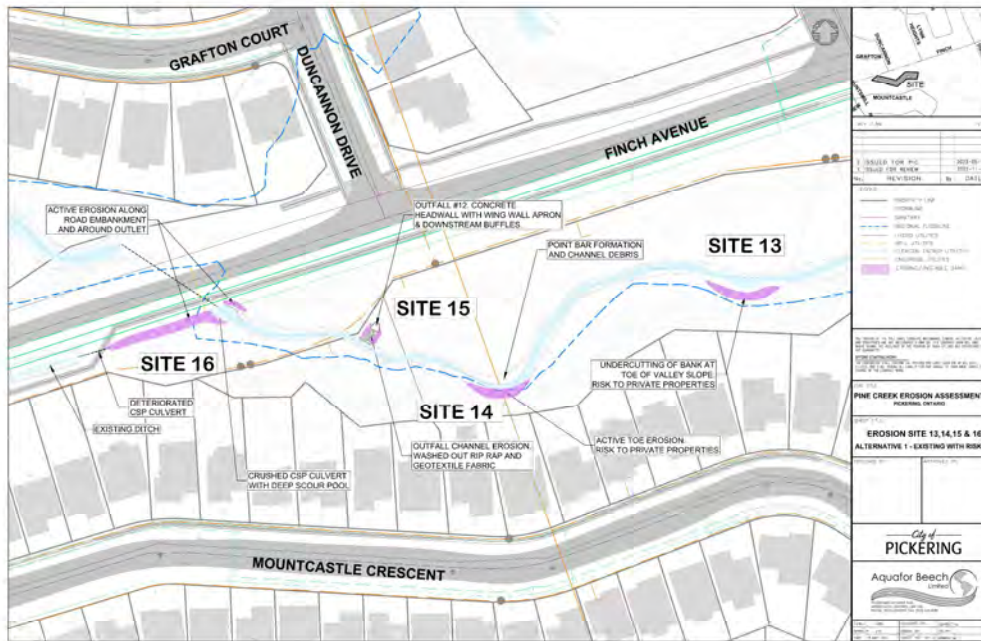
Alternative #1: Local Works



Alternative #2: Extended Works

EROSION SITES 13 - 16

Existing conditions & erosion risks



Site 13 – Slope instability risk to private property



Site 14 – Slope instability risk to private property



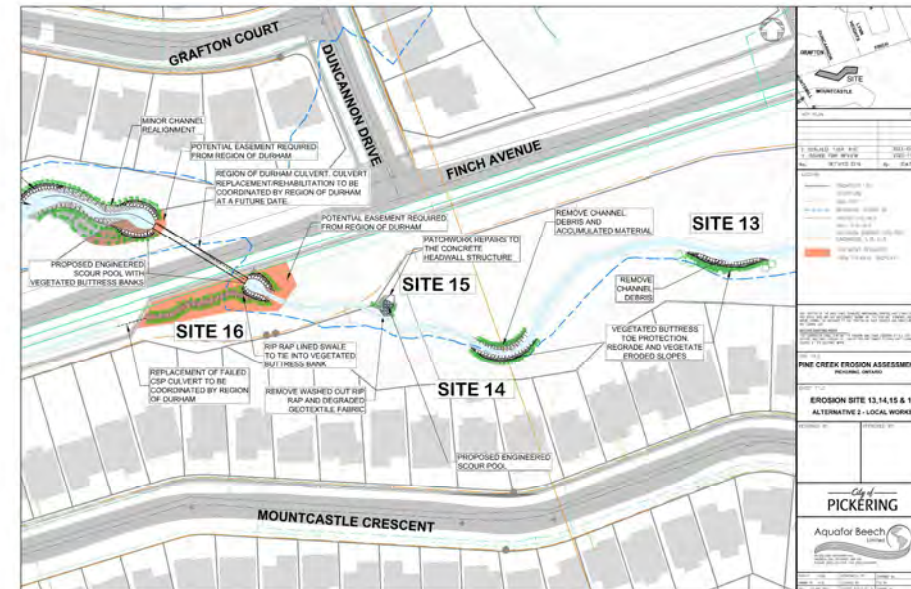
Site 16 – Scouring downstream of Finch Avenue culvert

Risks to private property, municipal & regional infrastructure and aquatic habitat due to:

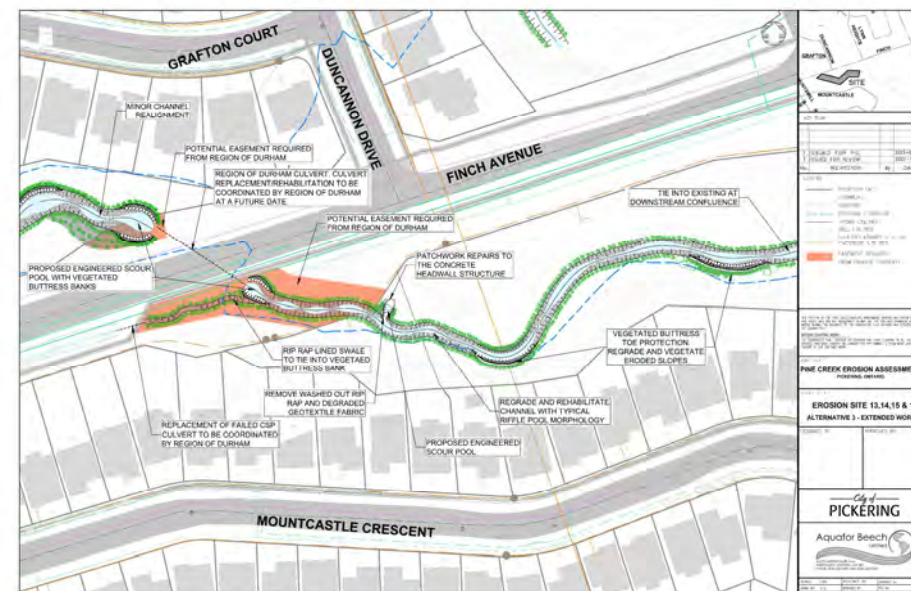
- Active bank erosion
- Woody debris jams in the channel
- Undercut and fallen trees

Level of Risk: High

Proposed restoration alternatives



Alternative #1: Local Works

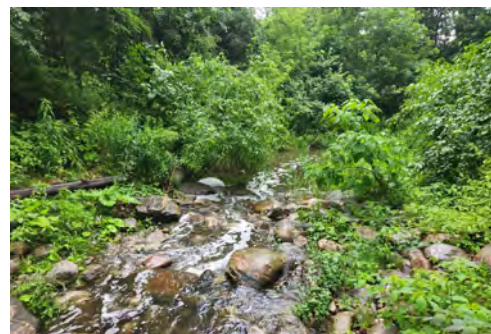
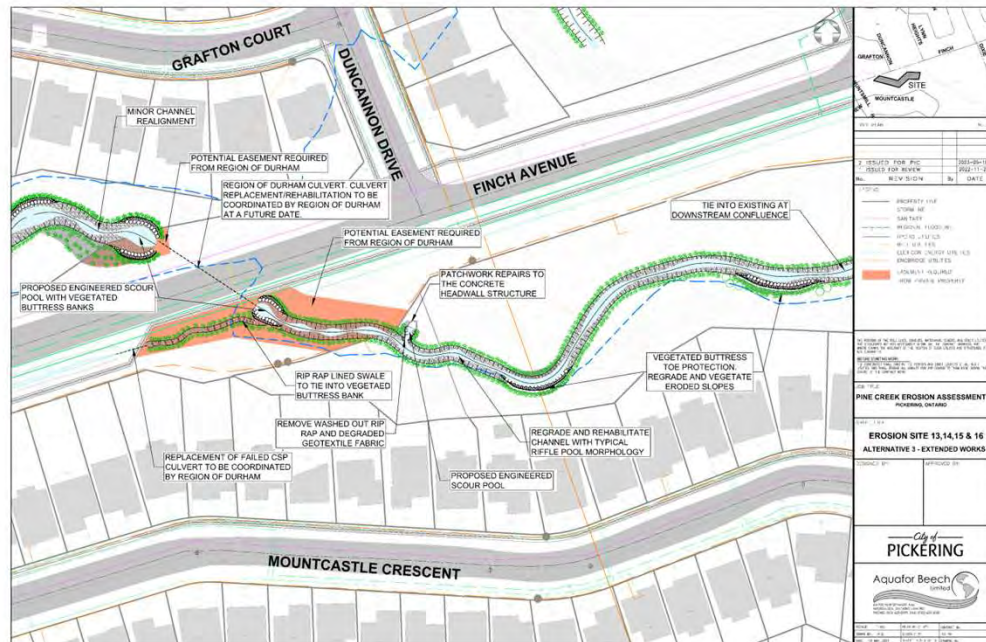


Alternative #2: Extended Works

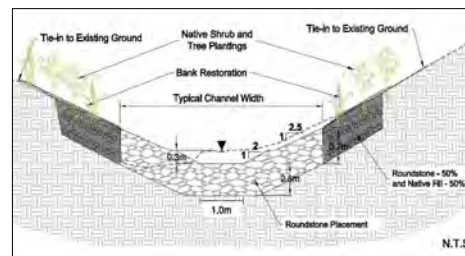
EROSION SITES 13 - 16 – POTENTIAL PREFERRED ALTERNATIVE



Pine Creek Erosion Assessment Municipal Class Environmental Assessment



An example of channel restoration design



An example of typical roundstone riffle – local gravel placement

Erosion Site #13-16	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	2	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	2	4
Subtotal			12	14	19
Weighted Score			12.50	14.58	19.79
Social / Cultural Environment	Public Safety	Impact on public safety	1	2	4
	Landowner Impacts / Community Disruption	Impact on private property	1	2	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
Subtotal			8.00	12.00	17.00
Weighted Score			10.00	15.00	21.25
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	2	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	2	4
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less than the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	4
Subtotal			8.00	10.00	13.00
Weighted Score			12.50	15.63	20.31
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	3	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	3
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	2	4
Subtotal			10.00	14.00	17.00
Weighted Score			12.50	17.50	21.25
TOTAL SCORE (/100)			47.5	62.7	82.6

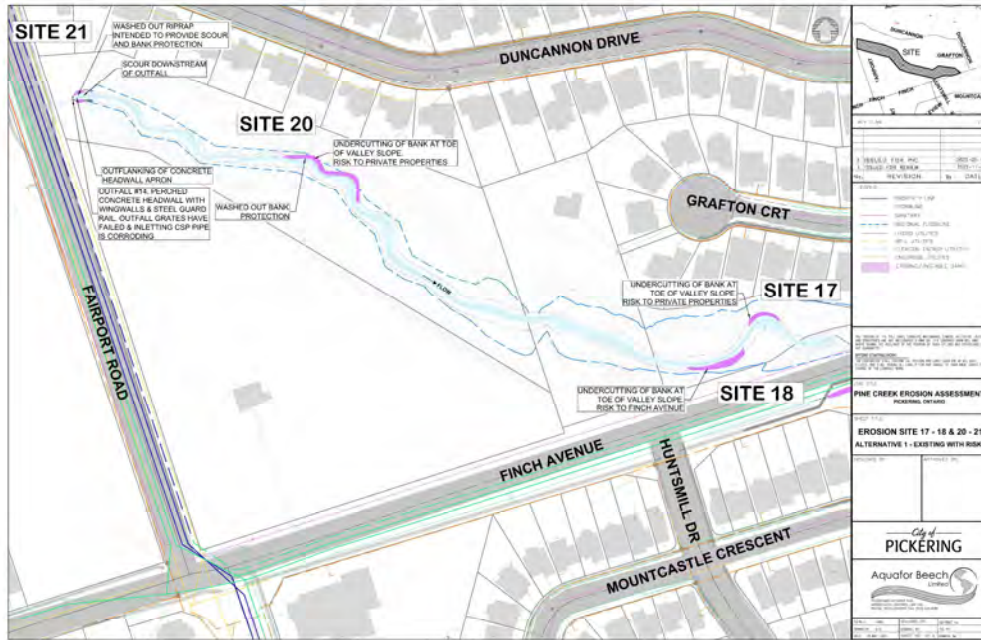
Preliminary preferred alternative – Extended Works

- Extended natural channel restoration works
- Regrade and stabilize failing slopes
- Repair/rehabilitate scour pools downstream of culverts and outfalls
- Finch Avenue culvert is a Region of Durham asset

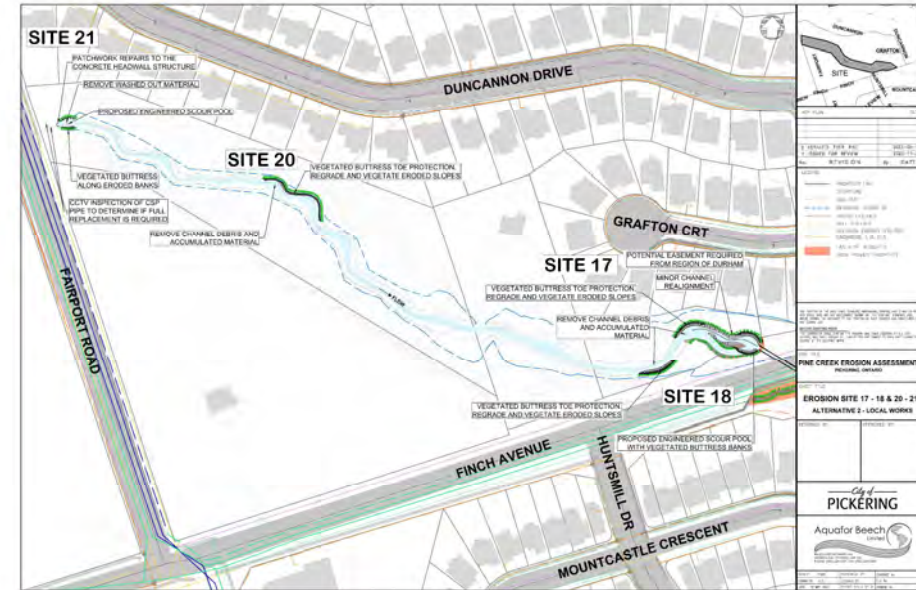
EROSION SITES 17 - 21

Pine Creek Erosion Assessment Municipal Class Environmental Assessment

Existing conditions & erosion risks



Proposed restoration alternatives



Alternative #1: Local Works



Site 17 – Slope stability risk to Private Property



Site 18 – Slope stability risk to Finch Avenue

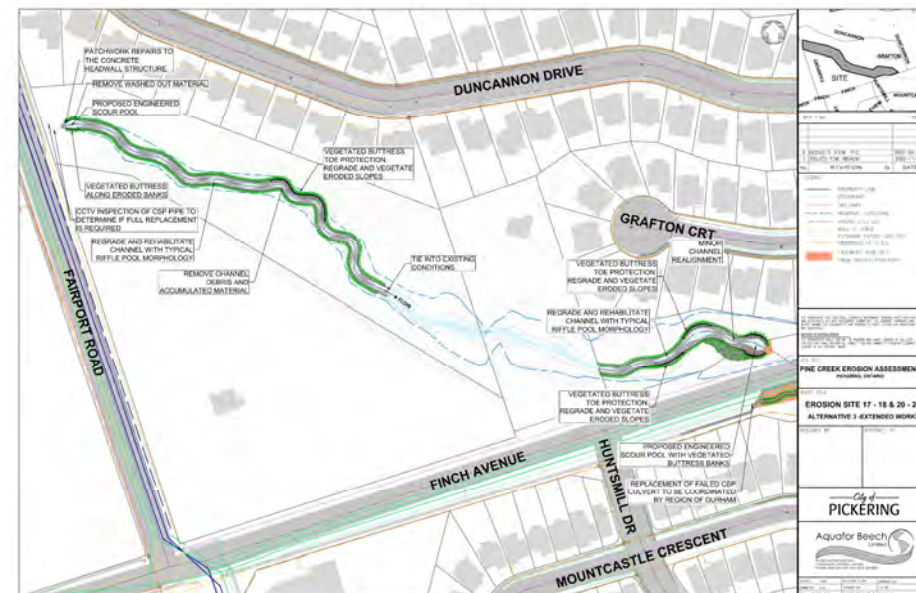


Site 21 – Degraded and perched outfall downstream of Fairport Road.

Risks to private property, Finch Avenue, municipal infrastructure and aquatic habitat due to:

- Active bank erosion
- Slope failures and fallen trees
- Woody debris jams

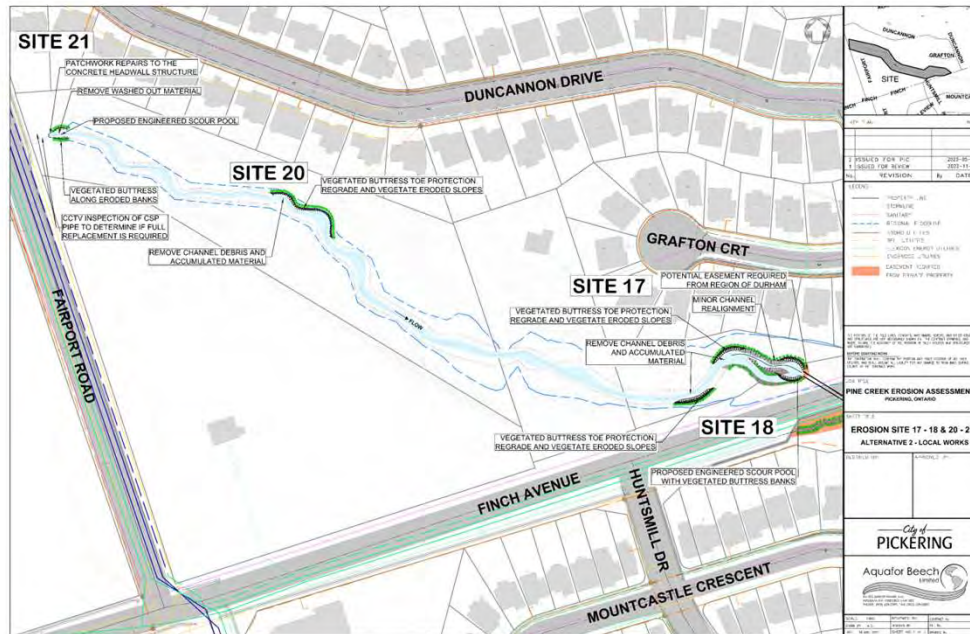
Level of Risk: Moderate



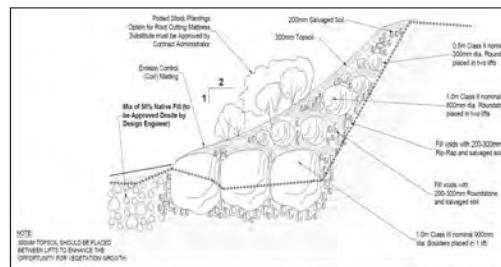
Alternative #2: Extended Works

EROSION SITES 17-21 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment Municipal Class Environmental Assessment



An example of natural channel design enhanced with vegetated buttress



An example of vegetated buttress detail

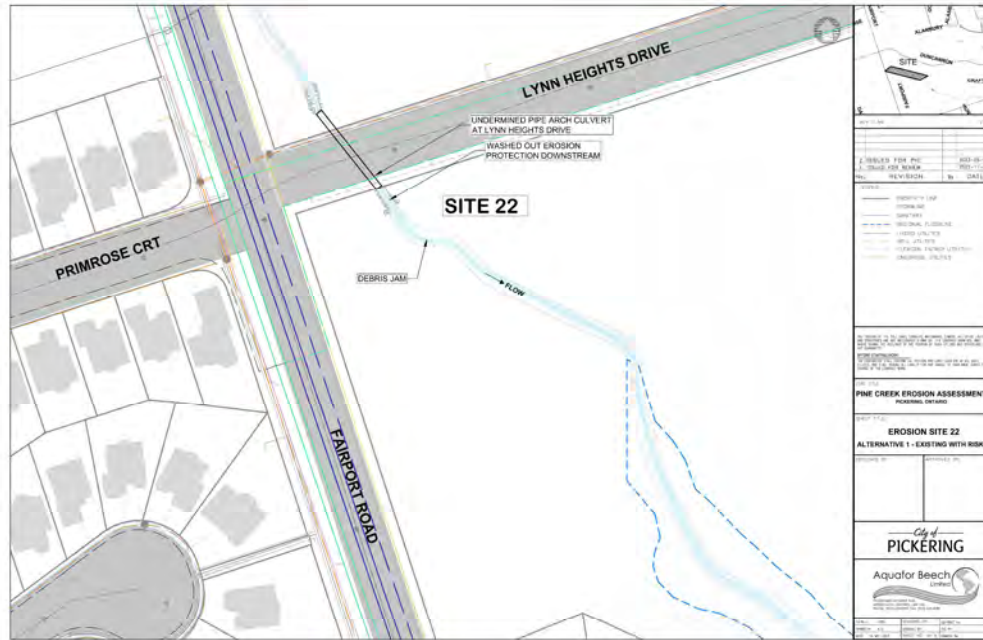
Erosion Site #17-21	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	3	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	2	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
Subtotal			12	18	19
Weighted Score			12.50	18.75	19.79
Social / Cultural Environment	Public Safety	Impact on public safety	1	4	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	4	3
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	2	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
Subtotal			8.00	17.00	16.00
Weighted Score			10.00	21.25	20.00
Economic Environment	Capital Costs	One time cost to City	4	2	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	2
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less than the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	3
Subtotal			8.00	12.00	10.00
Weighted Score			12.50	18.75	15.63
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	3
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
Subtotal			10.00	17.00	16.00
Weighted Score			12.50	21.25	20.00
TOTAL SCORE (/100)			47.5	80.0	75.4

Preliminary preferred alternative – Local Works

- Rehabilitate and restore eroded banks
- Minor channel realignment to establish a smoother transition into the downstream Finch Avenue culvert
- Construct vegetated buttresses at critical risk sites to provide erosion protection
- Outfall rehabilitation works and downstream scour protection (Site #21)

EROSION SITE 22

Existing conditions & erosion risks



Undermined pipe arch culvert at Lynn Heights Drive



Undermined toe of bank and debris jam downstream of Lynn Height Drive



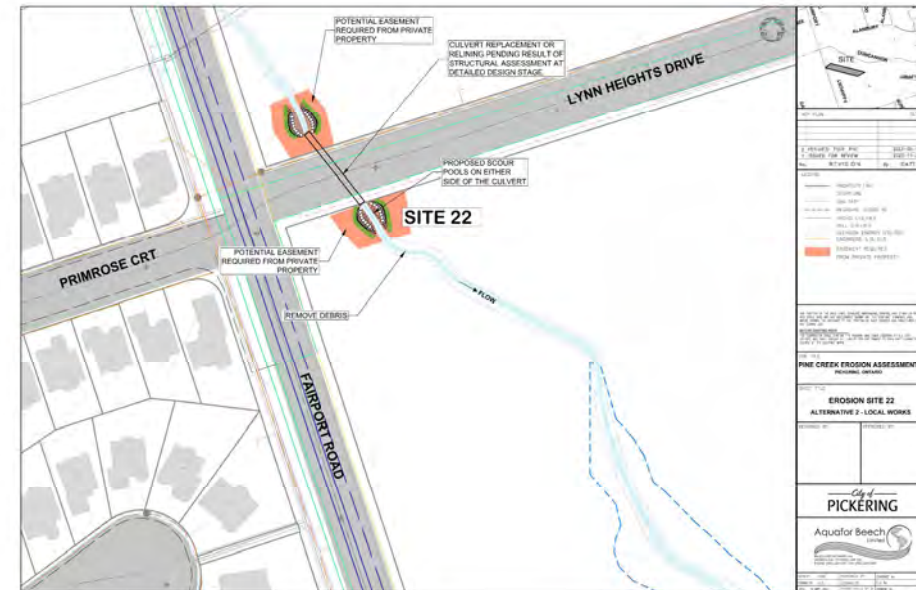
Washed out erosion protection downstream

Risks to municipal infrastructure and aquatic habitat due to:

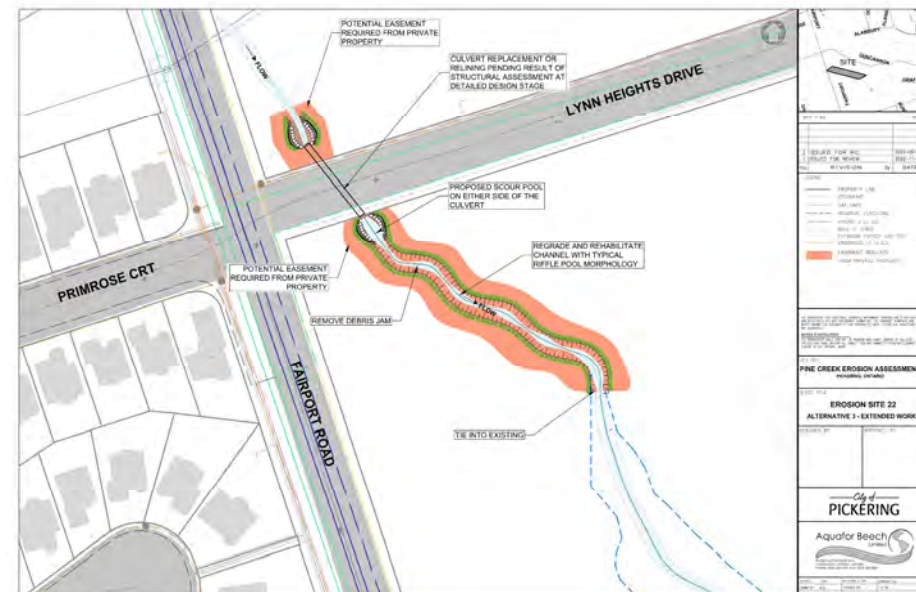
- Active scouring and erosion
- Infrastructure degradation and failure
- Debris accumulation

Level of Risk: High

Proposed restoration alternatives



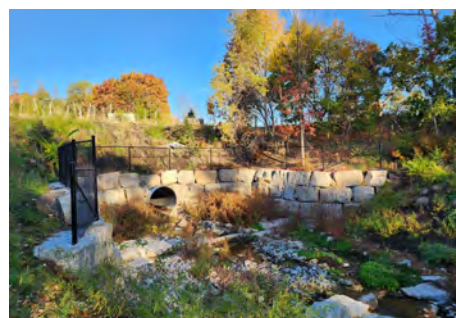
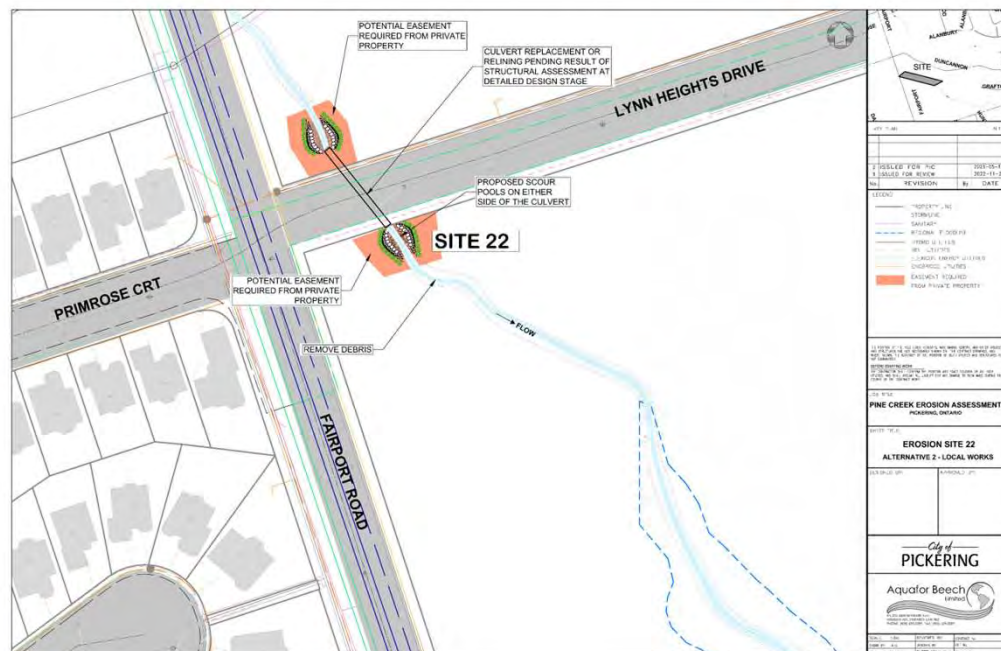
Alternative #1: Local Works



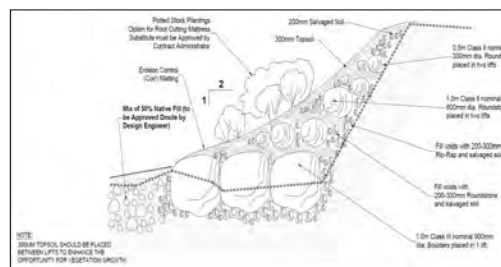
Alternative #2: Extended Works

EROSION SITE 22 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment Municipal Class Environmental Assessment



An example of culvert rehabilitation and downstream scour pool works



An example of vegetated buttress detail

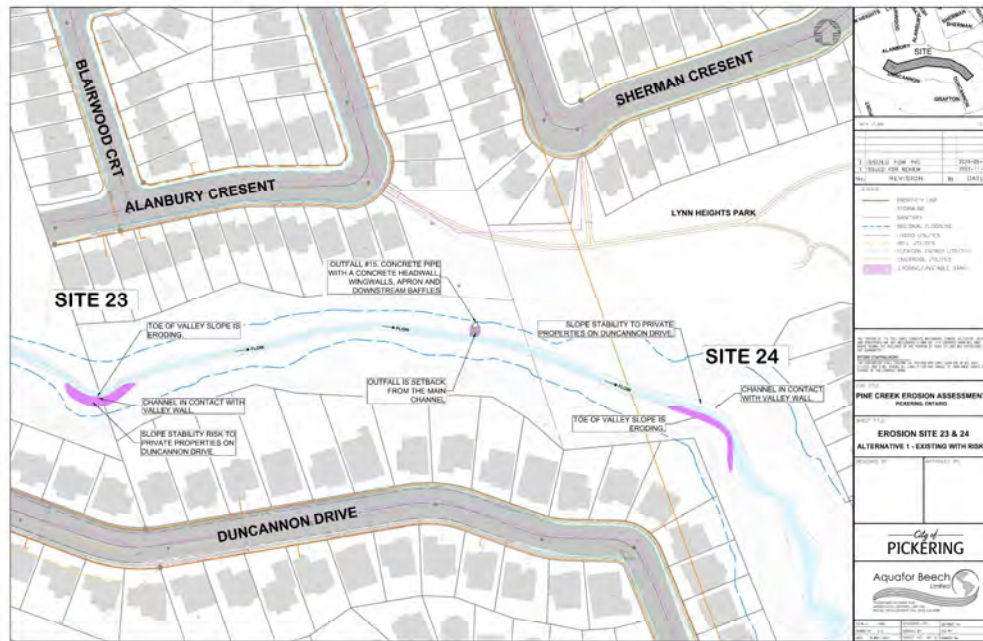
Erosion Site #22	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	4	4
Subtotal			12	18	18
Weighted Score			12.50	18.75	18.75
Social / Cultural Environment	Public Safety	Impact on public safety	1	4	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4	2
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	4	3
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
Subtotal			8.00	17.00	14.00
Weighted Score			10.00	21.25	17.50
Economic Environment	Capital Costs	One time cost to City	4	3	2
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	2
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less than the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	3
Subtotal			8.00	13.00	11.00
Weighted Score			12.50	20.31	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	1
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	4	4
Subtotal			10.00	18.00	16.00
Weighted Score			12.50	22.50	20.00
TOTAL SCORE (/100)			47.5	82.8	73.4

Preliminary preferred alternative – Local Works

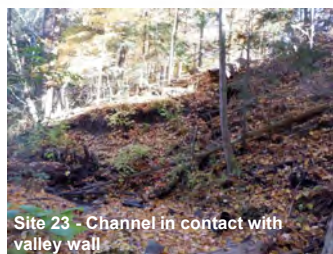
- Culvert replacement / rehabilitation
- Installation of bank erosion control and scour pools upstream and downstream of the culvert
- This alternative limits construction related impacts to private property

EROSION SITES 23 - 24

Existing conditions & erosion risks



Site 23 - Slope stability risk to private properties



Site 23 - Channel in contact with valley wall



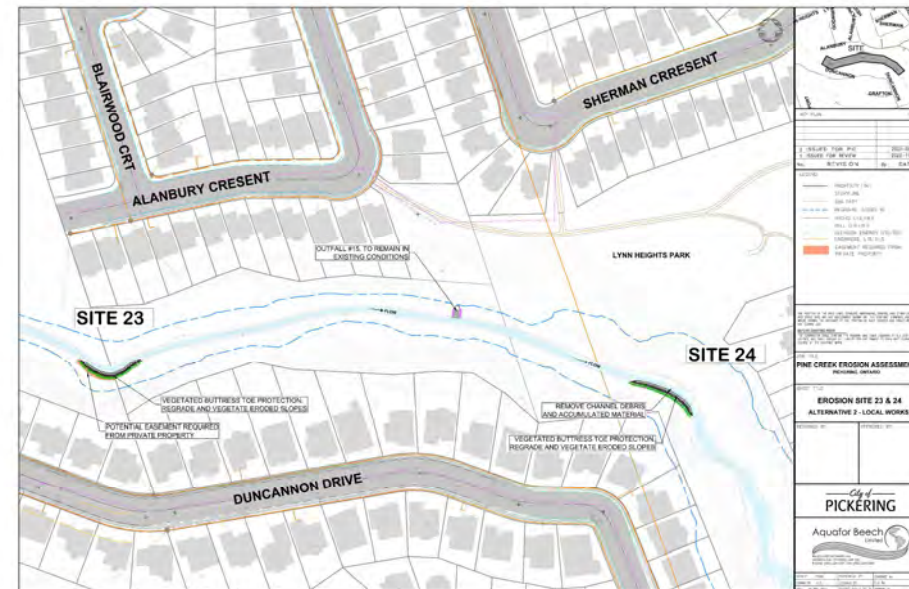
Site 24 - Erosion risk to private properties

Risks to private property and aquatic habitat due to:

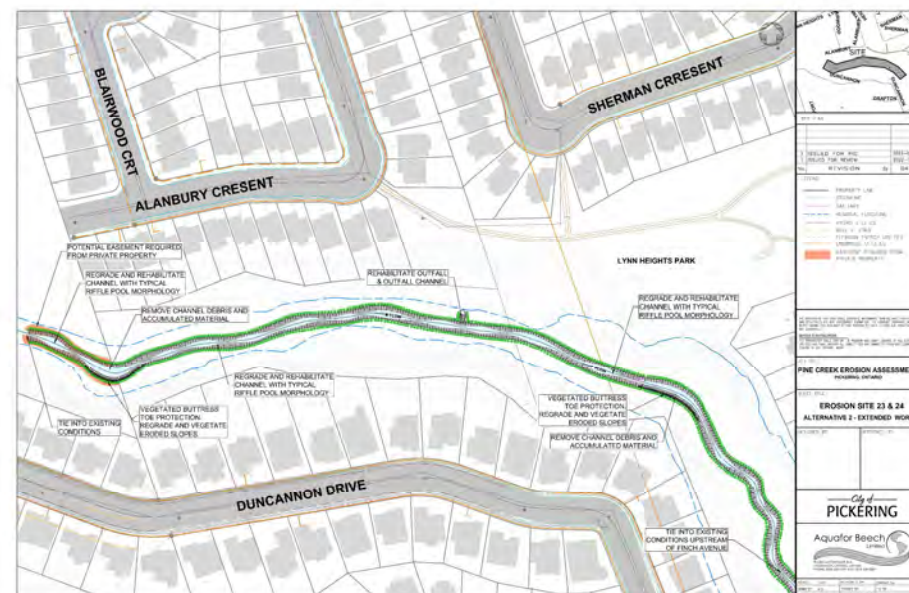
- Active bank erosion
- Slope failure and fallen trees

Level of Risk: Medium

Proposed restoration alternatives



Alternative #1: Local Works



Alternative #2: Extended Works

EROSION SITE 25 – Kitley Ravine

Existing conditions & erosion risks

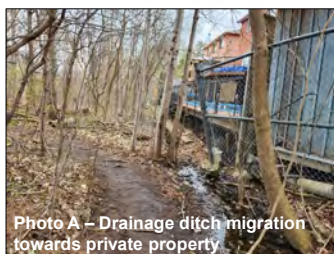
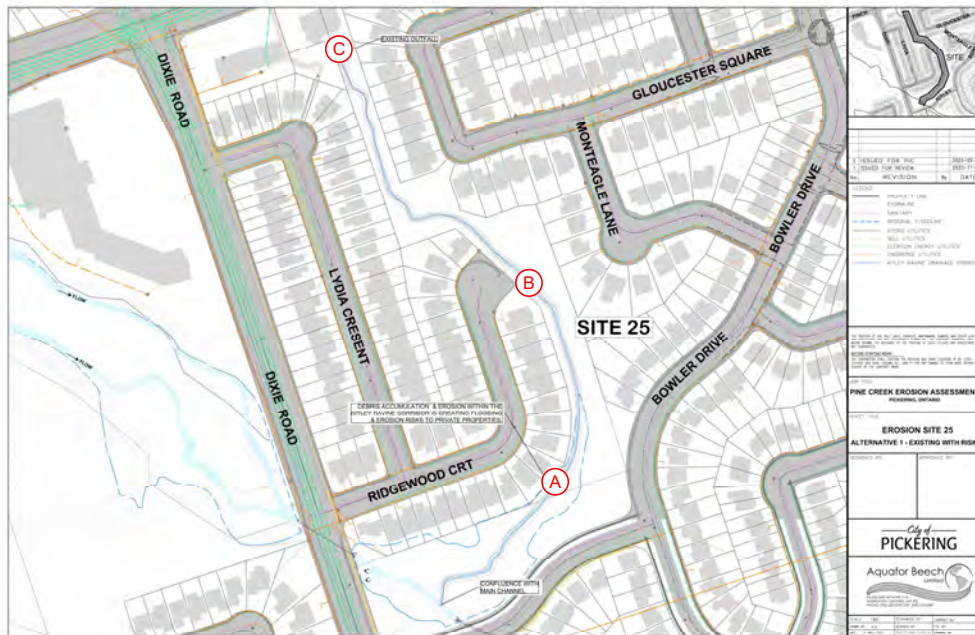


Photo A – Drainage ditch migration towards private property



Photo B – Debris accumulation within the Kitley Ravine corridor.



Photo C – Upstream outfall. Note significant blockage due to sediment.

Risks to private property and municipal infrastructure due to:

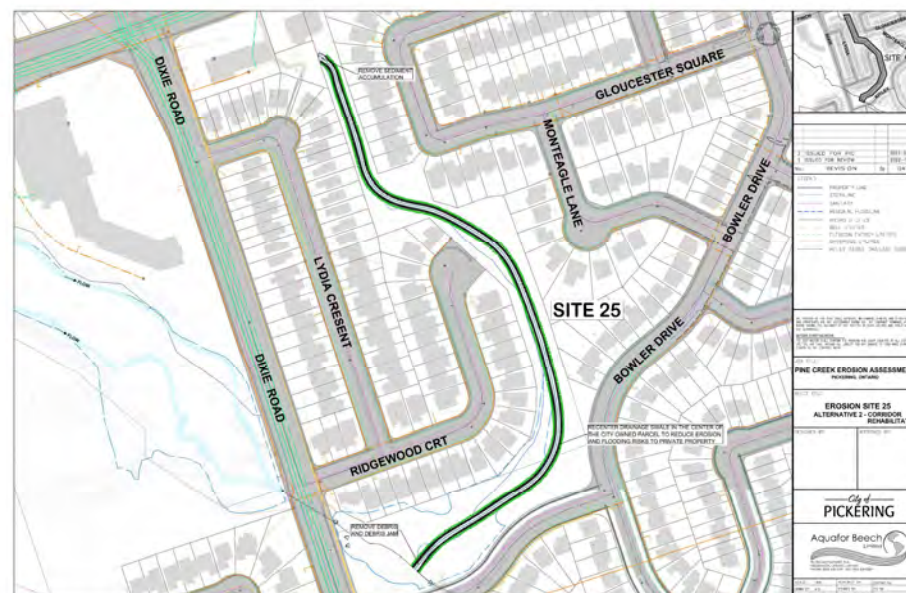
- Channel migration
- Fallen trees and debris jams
- Sediment accumulation

Level of Risk: Medium

Proposed restoration alternatives



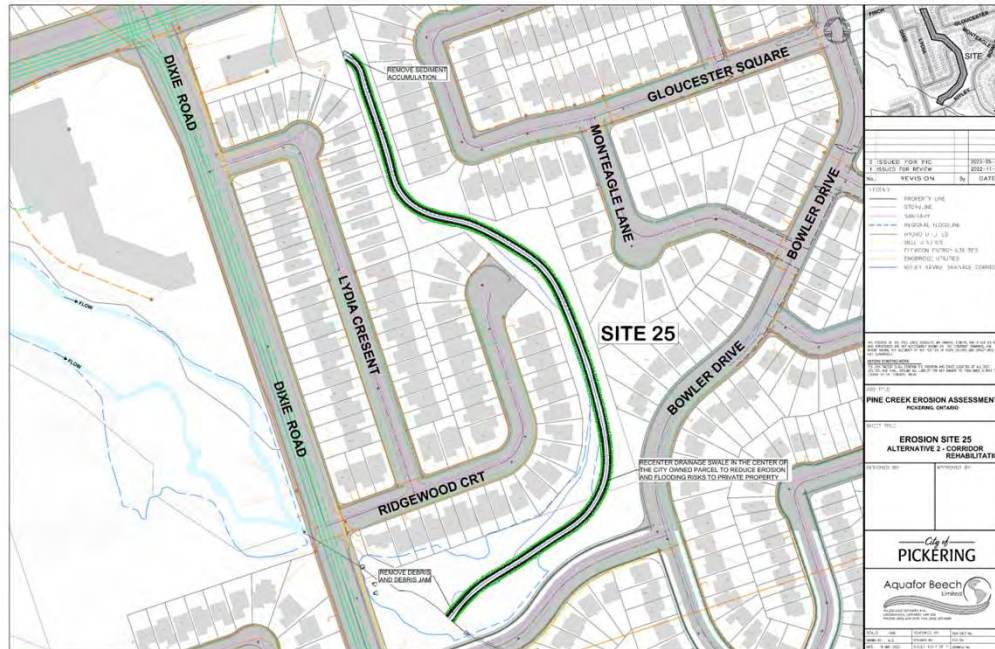
Alternative #1: Do Nothing



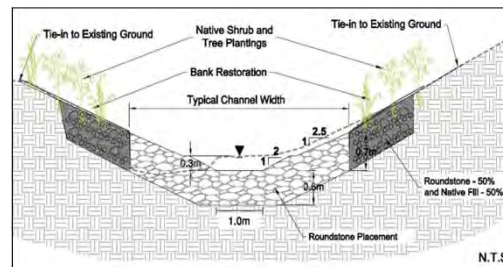
Alternative #2: Full Corridor Rehabilitation

EROSION SITE 25 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment Municipal Class Environmental Assessment



An example of a stone lined drainage channel



An example of a rip-rap lined ditch / channel

Erosion Site #25	Evaluation Criteria	Comment	Do Nothing	Corridor Rehabilitation
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	2	2
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	2
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	4
Subtotal			13	17
Weighted Score			13.54	17.71
Social / Cultural Environment	Public Safety	Impact on public safety	1	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3
Subtotal			8.00	15.00
Weighted Score			10.00	18.75
Economic Environment	Capital Costs	One time cost to City	4	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less than the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	1	4
Subtotal			7.00	11.00
Weighted Score			10.94	17.19
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	3	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	3	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	2	4
Subtotal			14.00	18.00
Weighted Score			17.50	22.50
TOTAL SCORE (/100)			52.0	76.1

Preliminary preferred alternative – Full Corridor Rehabilitation

- Recenter the drainage ditch in the middle of the City owned parcel, increasing the erosion and flooding buffer between the ditch and private properties
- Install a rip-rap lining to limit future ditch migration / erosion
- Removal of accumulated channel debris
- Application of restoration plantings

NEXT STEPS

PUBLIC CONSULTATION – MAY 2023

- Receive PIC feedback, incorporate input and update results
- Compile and review feedback. Confirm or adapt preliminary preferred alternatives.



SUBMIT EA PROJECT FILE – SUMMER/FALL 2023

- EA project file posted for 30 day review period.

DETAILED DESIGN & IMPLEMENTATION

- Construction timing dependant on City of Pickering Capital Planning.

TO PROVIDE COMMENT, OR TO BE ADDED TO THE STUDY STAKEHOLDER LIST, PLEASE CONTACT:

Ms. Irina Marouchko, P. Eng.
Senior Water Resources Engineer
City of Pickering
Pickering Civic Complex
One The Esplanade
Pickering, Ontario L1V 6K7
Phone: 905.420.4660 ext. 2072
E-mail: imarouchko@pickering.ca

Mr. Rob Amos, P. Eng.
Project Manager
Aquafor Beech Limited
2600 Skymark Ave., Suite 202,
Building 6, Mississauga, L4W 5B2
Phone: 905-629-0099 x 284
E-mail: amos.r@aquaforb企业.com

THANK YOU

**FOR PARTICIPATING IN THE PINE CREEK
EROSION ASSESSMENT MUNICIPAL CLASS
ENVIRONMENTAL ASSESSEMNT**

Appendix L –
Indigenous Consultation Records

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 9:59 AM
To: consultation@alderville.ca; dmowat@alderville.ca
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: Pine Creek EA Notification Letter - Alderville First Nation.pdf

Dear Alderville First Nation,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

Website

<https://www.pickering.ca/Modules/News/index.aspx?newsId=6891dabc-381d-48a6-9259-5a609debcf1c>

Should you have any questions or comments, please feel free to contact the following:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
2600 Skymark Avenue, Unit 6-201
Mississauga, Ontario
T. 416.705.2367
amos.r@aquaforbeech.com

We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com



November 14th, 2022

Alderville First Nation
PO BOX 46
Roseneath, ON K0K 2X0

Attn: Dave Simpson
Consultation Coordinator

RE: Notice of Study Commencement: Municipal Class EA Study

Dear Alderville First Nation,

The City of Pickering is undertaking a Schedule B Municipal Class Environmental Assessment Study to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks, and develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The study will investigate, analyze, and assess the creek and surrounding environment to identify potential risks and opportunities for environmental enhancement. As part of the study, priority areas will be identified, and alternatives for rehabilitation will be developed.

Public consultation, including consultation with Aboriginal communities, is a critical component of this study. In turn, the study team would like to inform you of this project, and will look forward to discussing any issues or concerns. The Notice of Study Commencement is attached to the end of this letter for your reference.

Your input is important. If you have any questions or comments, please contact the undersigned.

Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

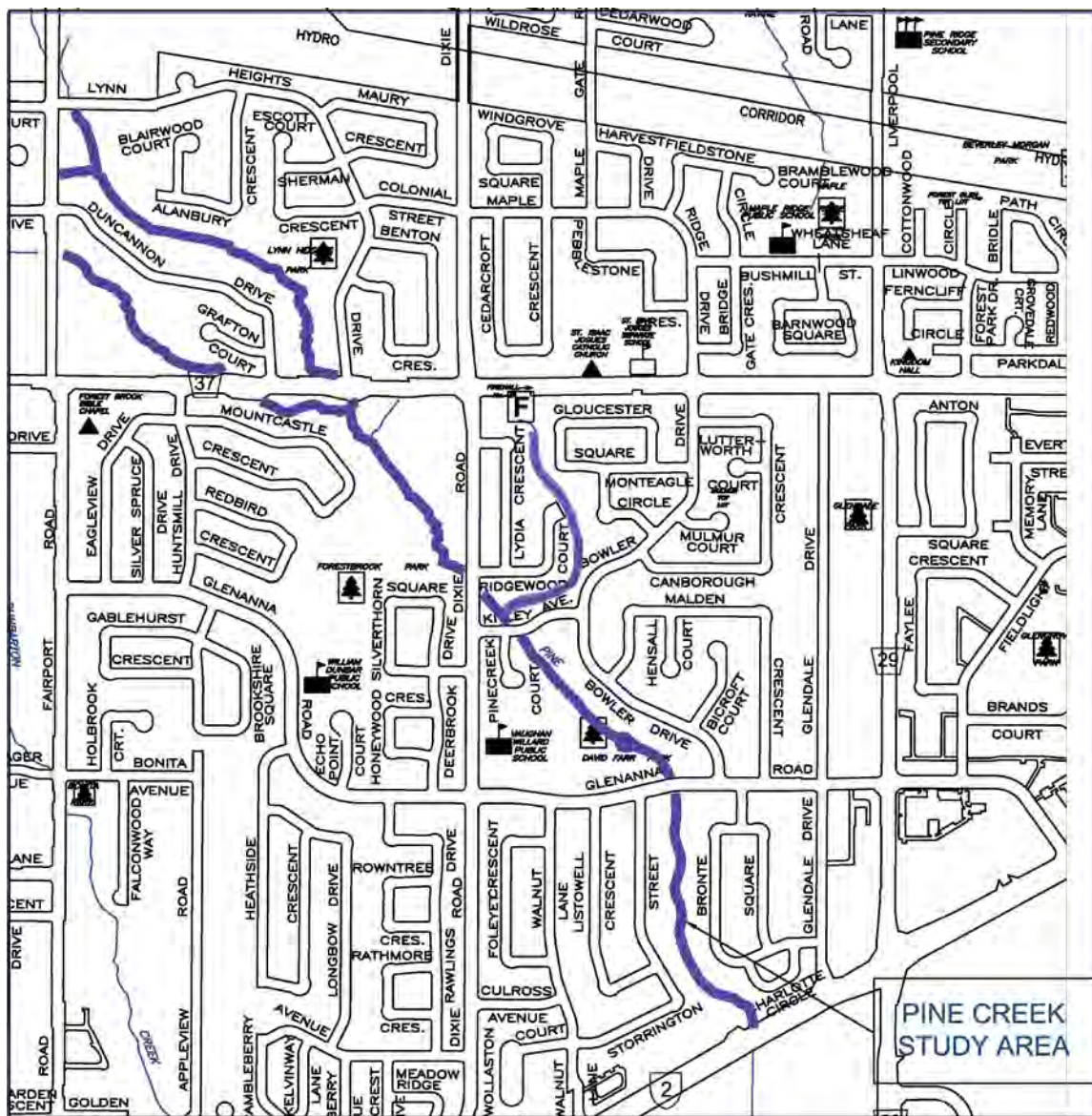
Robert Amos, MAsc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

July 28, 2022

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below. Aquafor Beech Limited has been retained by the City of Pickering to complete the Pine Creek Erosion Assessment.



Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

The study will be conducted in accordance with Schedule B projects, as outlined in the Municipal Engineers Association's, Municipal Class Environmental Assessment (October 2000, amended 2007, 2011 and 2015). The Study is intended to address the first two phases of the Municipal Class EA process, and consultation with stakeholders (public and agencies) will be a key component of the Study. A Public Information Centre (PIC) will be held to discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures. The PIC date and details will be advertised as the Study progresses.

Comments

This Notice of Study Commencement is being issued to notify the stakeholders of the project and invite comment. Comments and information regarding the Study will be maintained for reference throughout the project and will become part of public record. The information is collected under the authority of the *Environmental Assessment Act* and is collected and maintained for the purpose of creating a record that is available to the general public as described in s. 37 of the *Freedom of Information and Protection of Privacy Act*. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

For further information on this project please contact:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T: 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 10:00 AM
To: jcopegog@chimnissing.ca
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: Pine Creek EA Notification Letter - Beausoleil First Nation.pdf

Dear Beausoleil First Nation,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

Website

<https://www.pickering.ca/Modules/News/index.aspx?newsId=6891dabc-381d-48a6-9259-5a609debcf1c>

Should you have any questions or comments, please feel free to contact the following:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
2600 Skymark Avenue, Unit 6-201
Mississauga, Ontario
T. 416.705.2367
amos.r@aquaforbeech.com

We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com



November 14th, 2022

Beausoleil First Nation
11 O'Gema Miikaan
Christian Island, ON L9M 0A9

Attn: Jane Copegog

RE: Notice of Study Commencement: Municipal Class EA Study

Dear Beausoleil First Nation,

The City of Pickering is undertaking a Schedule B Municipal Class Environmental Assessment Study to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks, and develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The study will investigate, analyze, and assess the creek and surrounding environment to identify potential risks and opportunities for environmental enhancement. As part of the study, priority areas will be identified, and alternatives for rehabilitation will be developed.

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Your input is important. If you have any questions or comments, please contact the undersigned.

Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

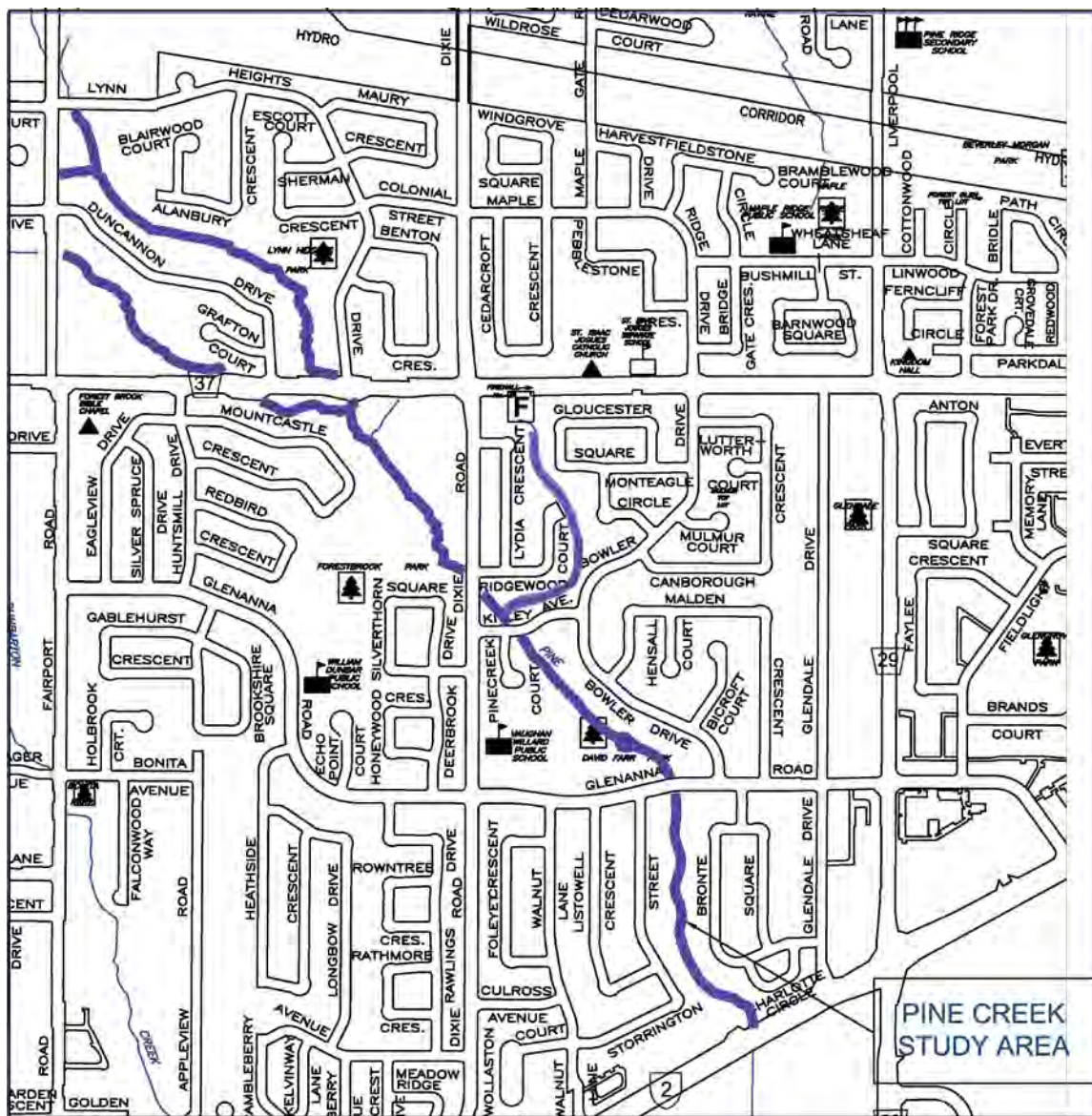
Robert Amos, MASc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

July 28, 2022

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below. Aquafor Beech Limited has been retained by the City of Pickering to complete the Pine Creek Erosion Assessment.



Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

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For further information on this project please contact:

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Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T: 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 10:01 AM
To: jl.porte@georginaisland.com
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: Pine Creek EA Notification Letter - Chippewas of Georgina Island.pdf

Dear Chippewas of Georgina Island,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

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Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
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We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com



November 14th, 2022

Chippewas of Georgina Island
R.R.#2 Box N-13
Sutton West, ON L0E 1R0

Attn: Chippewas of Georgina Island

RE: Notice of Study Commencement: Municipal Class EA Study

Dear Chippewas of Georgina Island,

The City of Pickering is undertaking a Schedule B Municipal Class Environmental Assessment Study to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks, and develop a list of high priority sites in need of rehabilitation.

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Sincerely,

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Project Manager
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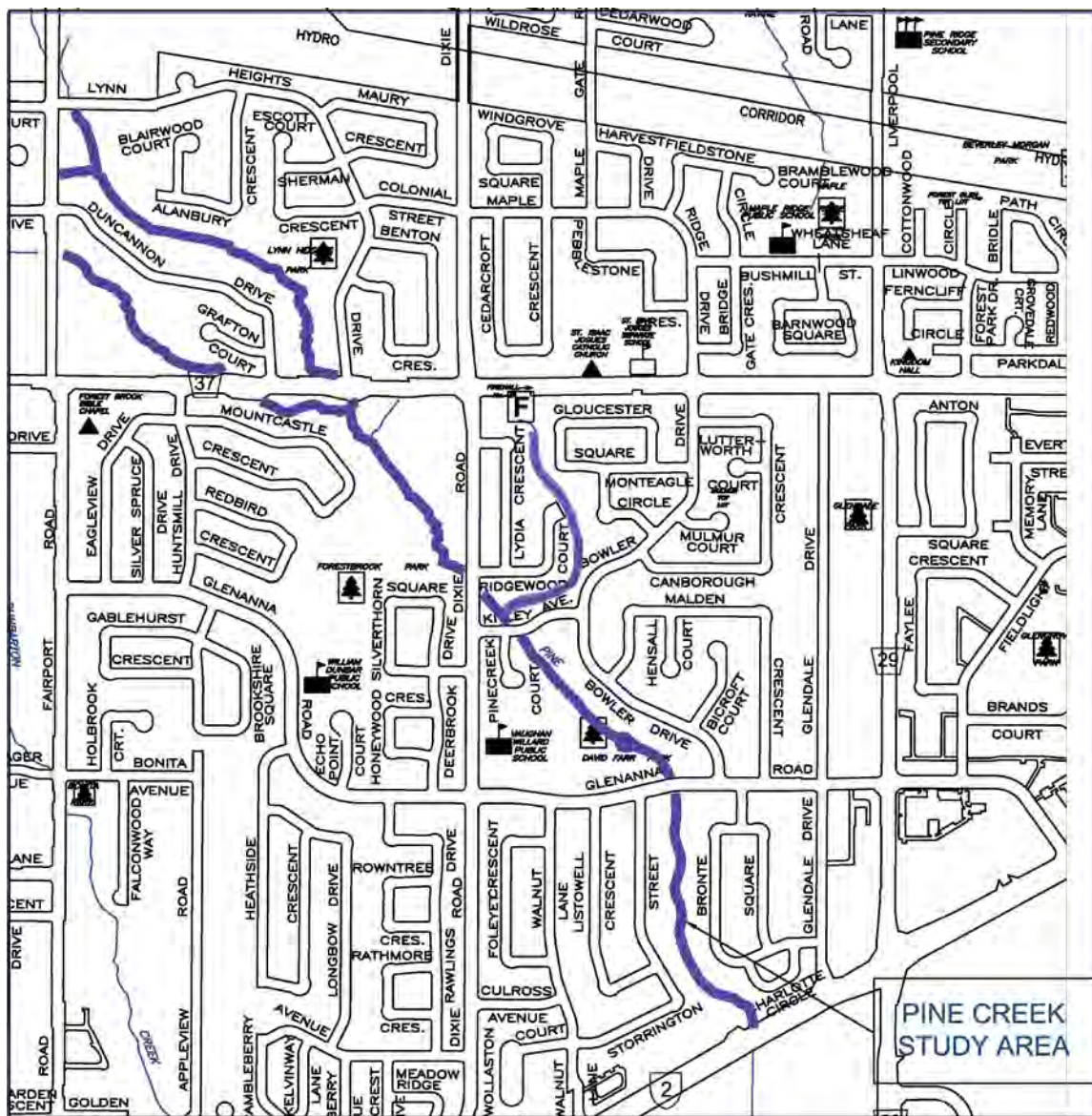
Robert Amos, MASc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

July 28, 2022

The Study

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T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

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For further information on this project please contact:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T: 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 10:02 AM
To: shardayj@ramafirstnation.ca
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: Pine Creek EA Notification Letter - Chippewas of Rama.pdf

Dear Chippewas of Rama,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

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<https://www.pickering.ca/Modules/News/index.aspx?newsId=6891dabc-381d-48a6-9259-5a609debcf1c>

Should you have any questions or comments, please feel free to contact the following:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
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T. 416.705.2367
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We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com



November 14th, 2022

Chippewas of Rama
200-5884 Rama Road
Rama, ON L3V 6H6

Attn: Sharday James
Community Consultation

RE: Notice of Study Commencement: Municipal Class EA Study

Dear Chippewas of Rama,

The City of Pickering is undertaking a Schedule B Municipal Class Environmental Assessment Study to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks, and develop a list of high priority sites in need of rehabilitation.

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Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

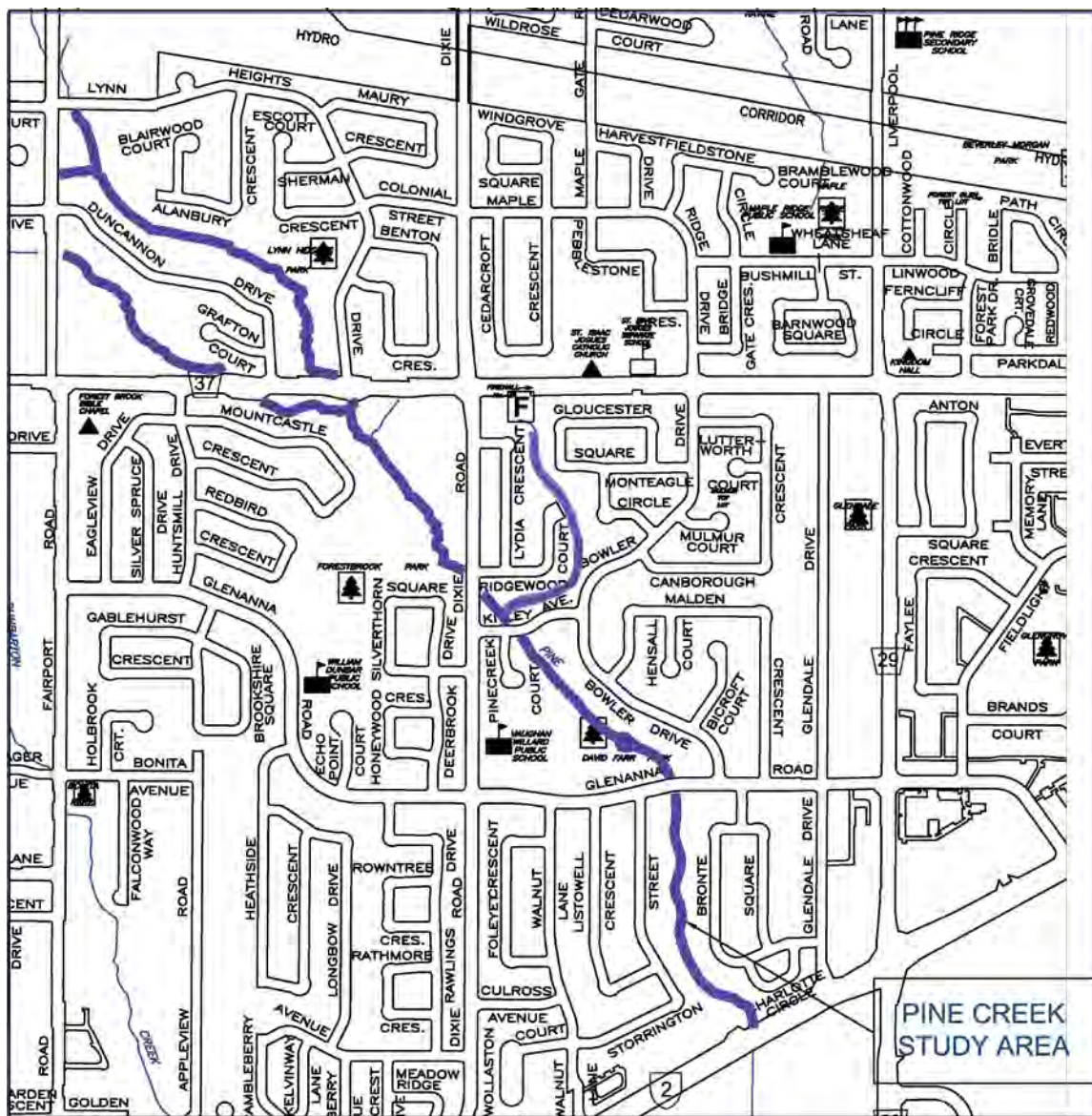
Robert Amos, MAsc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

July 28, 2022

The Study

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customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

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For further information on this project please contact:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T: 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 10:03 AM
To: Francis@francischua.com
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: Pine Creek EA Notification Letter - Curve Lake First Nation.pdf

Dear Curve Lake First Nation,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

Website

<https://www.pickering.ca/Modules/News/index.aspx?newsId=6891dabc-381d-48a6-9259-5a609debcf1c>

Should you have any questions or comments, please feel free to contact the following:

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Senior Water Resources Engineer
City of Pickering
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Robert Amos, P.Eng.
Consultant Project Manager
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T. 416.705.2367
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We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com



November 14th, 2022

Curve Lake First Nation
21 Public Works Rd.
Curve Lake, ON K0L 1R0

Attn: Francis Chua

RE: Notice of Study Commencement: Municipal Class EA Study

Dear Curve Lake First Nation,

The City of Pickering is undertaking a Schedule B Municipal Class Environmental Assessment Study to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks, and develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The study will investigate, analyze, and assess the creek and surrounding environment to identify potential risks and opportunities for environmental enhancement. As part of the study, priority areas will be identified, and alternatives for rehabilitation will be developed.

Public consultation, including consultation with Aboriginal communities, is a critical component of this study. In turn, the study team would like to inform you of this project, and will look forward to discussing any issues or concerns. The Notice of Study Commencement is attached to the end of this letter for your reference.

Your input is important. If you have any questions or comments, please contact the undersigned.

Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

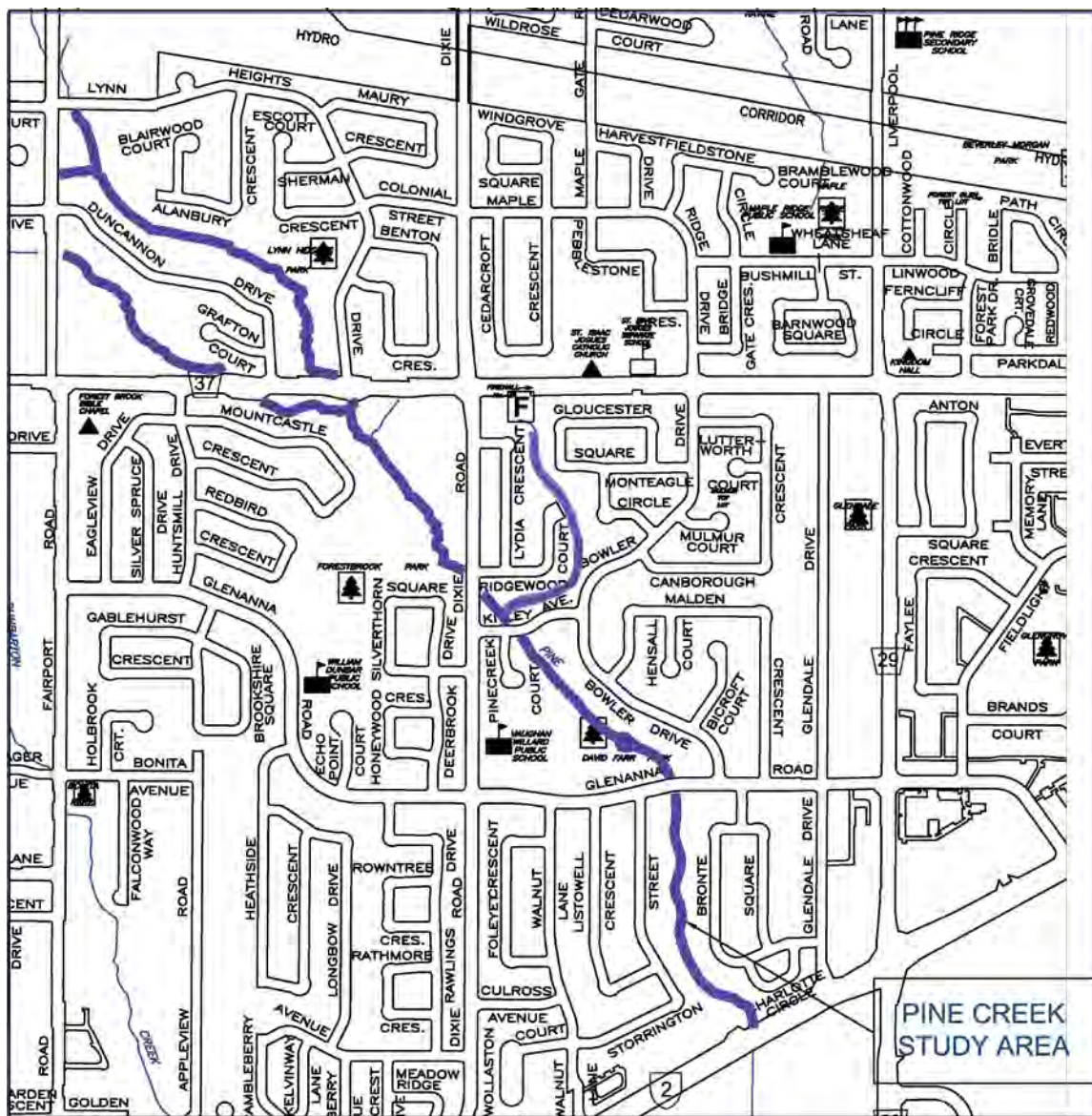
Robert Amos, MASc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

July 28, 2022

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below. Aquafor Beech Limited has been retained by the City of Pickering to complete the Pine Creek Erosion Assessment.



Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

The study will be conducted in accordance with Schedule B projects, as outlined in the Municipal Engineers Association's, Municipal Class Environmental Assessment (October 2000, amended 2007, 2011 and 2015). The Study is intended to address the first two phases of the Municipal Class EA process, and consultation with stakeholders (public and agencies) will be a key component of the Study. A Public Information Centre (PIC) will be held to discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures. The PIC date and details will be advertised as the Study progresses.

Comments

This Notice of Study Commencement is being issued to notify the stakeholders of the project and invite comment. Comments and information regarding the Study will be maintained for reference throughout the project and will become part of public record. The information is collected under the authority of the *Environmental Assessment Act* and is collected and maintained for the purpose of creating a record that is available to the general public as described in s. 37 of the *Freedom of Information and Protection of Privacy Act*. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

For further information on this project please contact:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, MAsC., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T: 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com

Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 10:04 AM
To: tcowie@hiawathafn.ca; sdavison@hiawathafn.ca
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: Pine Creek EA Notification Letter - Hiawatha First Nation.pdf

Dear Hiawatha First Nation,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

Website

<https://www.pickering.ca/Modules/News/index.aspx?newsId=6891dabc-381d-48a6-9259-5a609debcf1c>

Should you have any questions or comments, please feel free to contact the following:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
2600 Skymark Avenue, Unit 6-201
Mississauga, Ontario
T. 416.705.2367
amos.r@aquaforbeech.com

We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com



November 14th, 2022

Hiawatha First Nation
431 Hiawatha Line
Hiawatha, ON K9J 0E6

Attn: Tom Cowie and Sean Davison

RE: Notice of Study Commencement: Municipal Class EA Study

Dear Hiawatha First Nation,

The City of Pickering is undertaking a Schedule B Municipal Class Environmental Assessment Study to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks, and develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The study will investigate, analyze, and assess the creek and surrounding environment to identify potential risks and opportunities for environmental enhancement. As part of the study, priority areas will be identified, and alternatives for rehabilitation will be developed.

Public consultation, including consultation with Aboriginal communities, is a critical component of this study. In turn, the study team would like to inform you of this project, and will look forward to discussing any issues or concerns. The Notice of Study Commencement is attached to the end of this letter for your reference.

Your input is important. If you have any questions or comments, please contact the undersigned.

Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

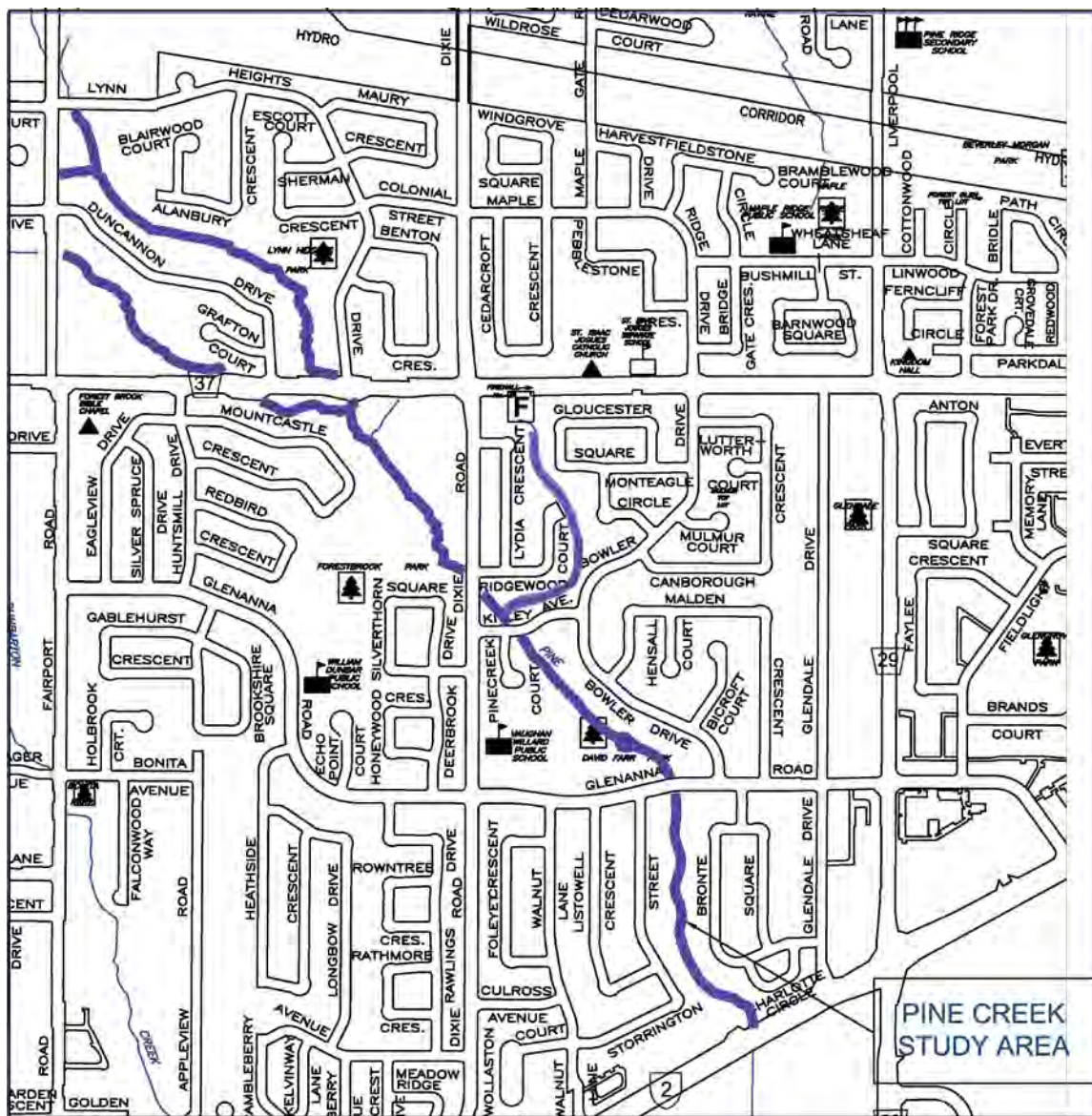
Robert Amos, MASc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

July 28, 2022

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below. Aquafor Beech Limited has been retained by the City of Pickering to complete the Pine Creek Erosion Assessment.



Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

The study will be conducted in accordance with Schedule B projects, as outlined in the Municipal Engineers Association's, Municipal Class Environmental Assessment (October 2000, amended 2007, 2011 and 2015). The Study is intended to address the first two phases of the Municipal Class EA process, and consultation with stakeholders (public and agencies) will be a key component of the Study. A Public Information Centre (PIC) will be held to discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures. The PIC date and details will be advertised as the Study progresses.

Comments

This Notice of Study Commencement is being issued to notify the stakeholders of the project and invite comment. Comments and information regarding the Study will be maintained for reference throughout the project and will become part of public record. The information is collected under the authority of the *Environmental Assessment Act* and is collected and maintained for the purpose of creating a record that is available to the general public as described in s. 37 of the *Freedom of Information and Protection of Privacy Act*. Personal information you submit will become part of a public record that is available to the general public unless you request that your personal information remain confidential.

For further information on this project please contact:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, MAsC., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T: 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com

Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 10:05 AM
To: maxime.picard@cnhw.gc.ca; melanievincent21@yahoo.ca
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: Pine Creek EA Notification Letter - Huron-Wendat Nation.pdf

Dear Huron-Wendat Nation,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

Website

<https://www.pickering.ca/Modules/News/index.aspx?newsId=6891dabc-381d-48a6-9259-5a609debcf1c>

Should you have any questions or comments, please feel free to contact the following:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
2600 Skymark Avenue, Unit 6-201
Mississauga, Ontario
T. 416.705.2367
amos.r@aquaforbeech.com

We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com



November 14th, 2022

Huron-Wendat Nation
255 Place Chef Michel Laveau
Wendake, QC G0A 4V0

Attn: Maxime Picard and Melanie Vincent

RE: Notice of Study Commencement: Municipal Class EA Study

Dear Huron-Wendat First Nation,

The City of Pickering is undertaking a Schedule B Municipal Class Environmental Assessment Study to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks, and develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The study will investigate, analyze, and assess the creek and surrounding environment to identify potential risks and opportunities for environmental enhancement. As part of the study, priority areas will be identified, and alternatives for rehabilitation will be developed.

Public consultation, including consultation with Aboriginal communities, is a critical component of this study. In turn, the study team would like to inform you of this project, and will look forward to discussing any issues or concerns. The Notice of Study Commencement is attached to the end of this letter for your reference.

Your input is important. If you have any questions or comments, please contact the undersigned.

Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

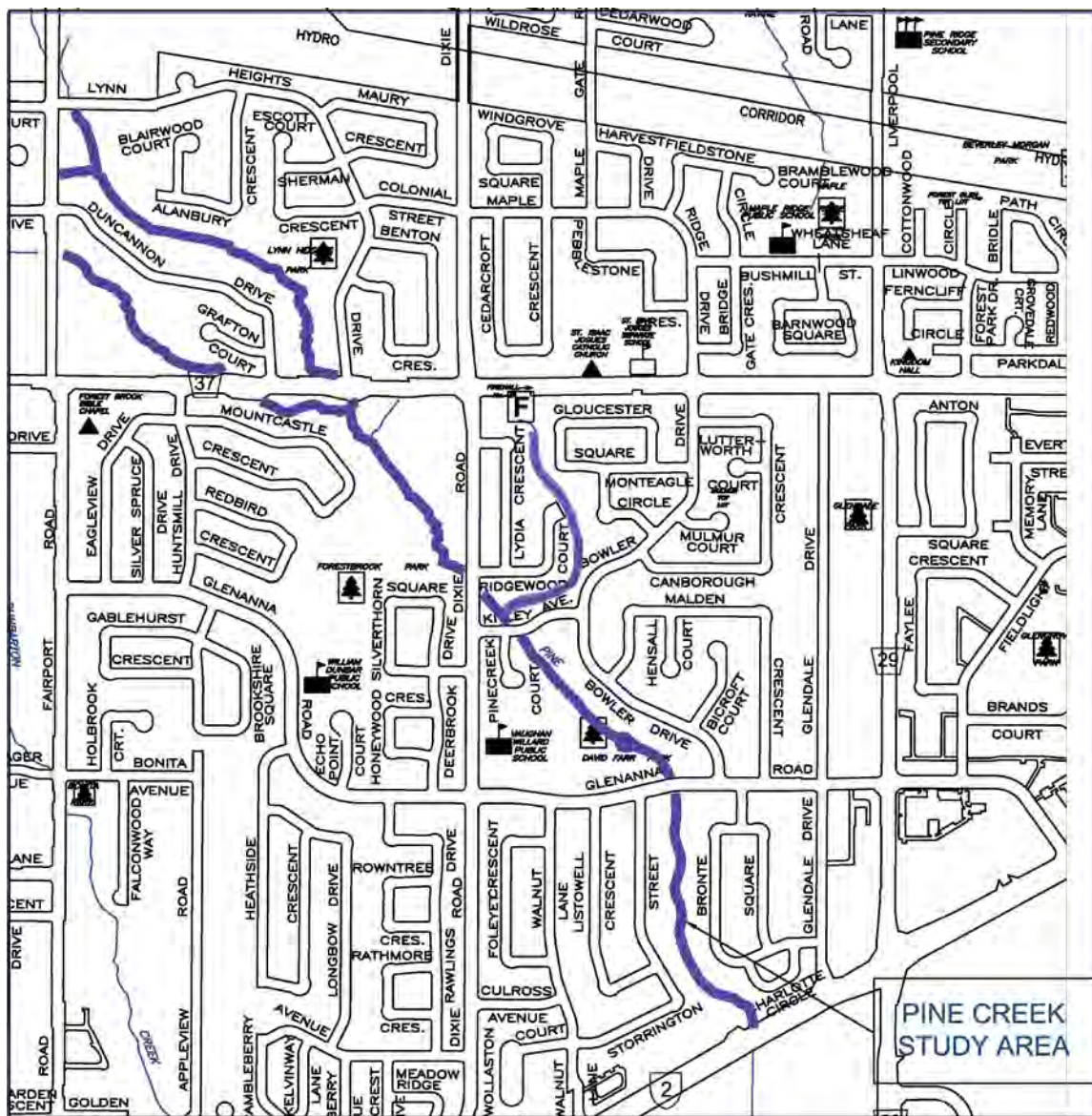
Robert Amos, MASc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

July 28, 2022

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below. Aquafor Beech Limited has been retained by the City of Pickering to complete the Pine Creek Erosion Assessment.



Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

The study will be conducted in accordance with Schedule B projects, as outlined in the Municipal Engineers Association's, Municipal Class Environmental Assessment (October 2000, amended 2007, 2011 and 2015). The Study is intended to address the first two phases of the Municipal Class EA process, and consultation with stakeholders (public and agencies) will be a key component of the Study. A Public Information Centre (PIC) will be held to discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures. The PIC date and details will be advertised as the Study progresses.

Comments

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For further information on this project please contact:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T: 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 10:06 AM
To: don@ibabraising.com; wbirch@ibabraising.com
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement
Attachments: Pine Creek EA Notification Letter - Mississaugas of Scugog Island.pdf

Dear Mississaugas of Scugog Island,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

Website

<https://www.pickering.ca/Modules/News/index.aspx?newsId=6891dabc-381d-48a6-9259-5a609debcf1c>

Should you have any questions or comments, please feel free to contact the following:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
2600 Skymark Avenue, Unit 6-201
Mississauga, Ontario
T. 416.705.2367
amos.r@aquaforbeech.com

We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com



November 14th, 2022

Mississaugas of Scugog Island
22521 Island Road
Port Perry, ON L9L 1B6

Attn: Don Richardson and Waverley Birch

RE: Notice of Study Commencement: Municipal Class EA Study

Dear Mississaugas of Scugog Island,

The City of Pickering is undertaking a Schedule B Municipal Class Environmental Assessment Study to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks, and develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The study will investigate, analyze, and assess the creek and surrounding environment to identify potential risks and opportunities for environmental enhancement. As part of the study, priority areas will be identified, and alternatives for rehabilitation will be developed.

Public consultation, including consultation with Aboriginal communities, is a critical component of this study. In turn, the study team would like to inform you of this project, and will look forward to discussing any issues or concerns. The Notice of Study Commencement is attached to the end of this letter for your reference.

Your input is important. If you have any questions or comments, please contact the undersigned.

Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

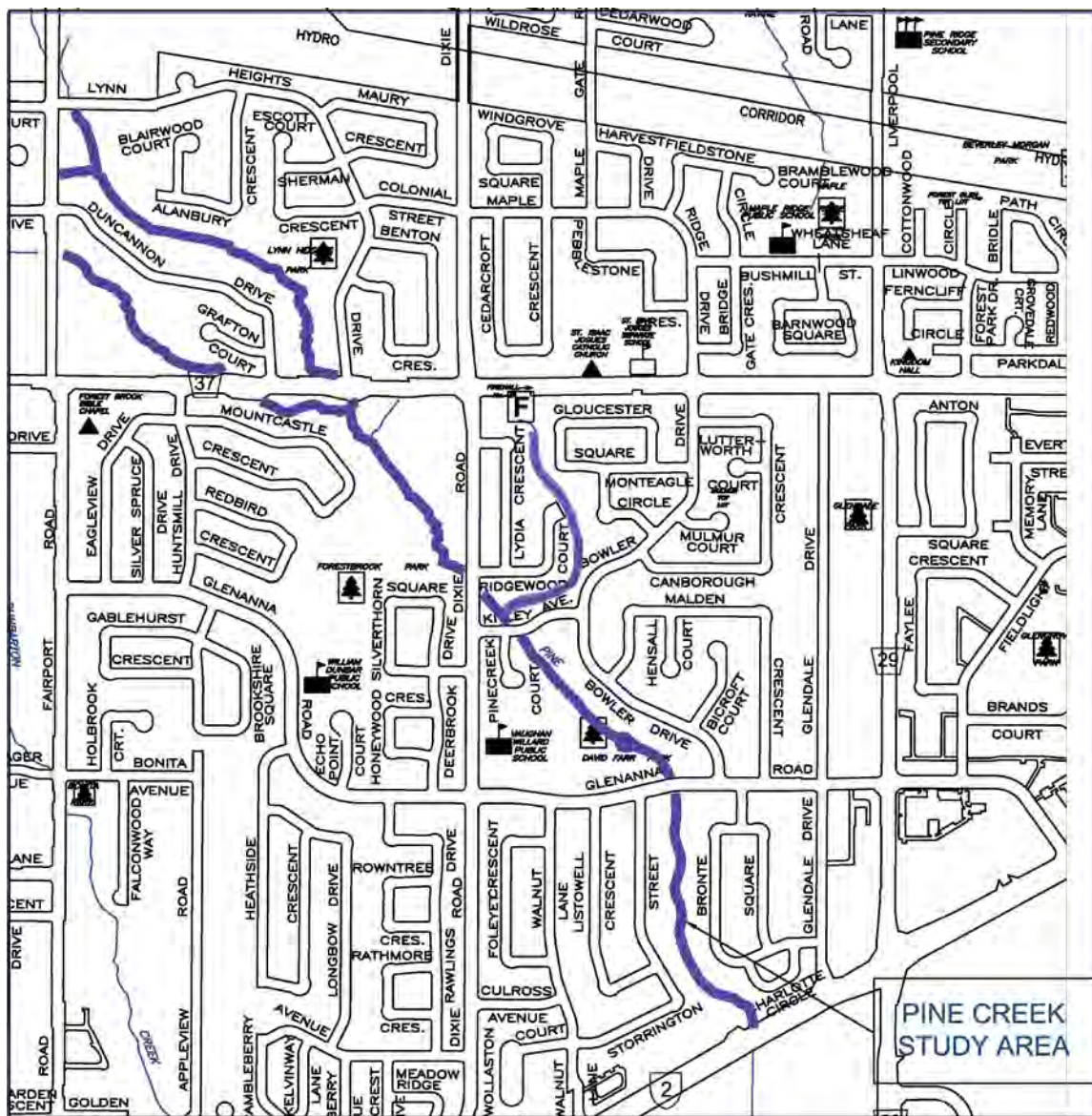
Robert Amos, MASc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

July 28, 2022

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below. Aquafor Beech Limited has been retained by the City of Pickering to complete the Pine Creek Erosion Assessment.



Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

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For further information on this project please contact:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, MAsc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T: 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com

Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

ursulak.j@aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 11:29 AM
To: Gabriel Dubé; ursulak.j@aquaforbeech.com
Cc: amos.r@aquaforbeech.com
Subject: FW: RE: Pine Creek Erosion Assessment - Notice of Study Commencement

Rob Amos
Aquafor Beech Ltd
Mobile: 416.705.2367

----- Original message -----

From: Dave Simpson <consultation@alderville.ca>
Date: 2022-12-08 11:14 a.m. (GMT-05:00)
To: Rob Amos <amos.r@aquaforbeech.com>
Cc: Dave Mowat <dmowat@alderville.ca>
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement

Thank you for the email regarding the study area of the Pine creek area. Please keep us posted as this project moves forward

Dave Simpson

Alderville First Nation

consultation@alderville.ca

905 375-5480

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 9:59 AM
To: Dave Simpson <consultation@alderville.ca>; Dave Mowat <dmowat@alderville.ca>
Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement

Dear Alderville First Nation,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

Website

<https://www.pickering.ca/Modules/News/index.aspx?newsId=6891dabc-381d-48a6-9259-5a609debcf1c>

Should you have any questions or comments, please feel free to contact the following:

Irina Marouchko, P.Eng

Senior Water Resources Engineer

City of Pickering

One The Esplanade

Pickering, ON L1V 6K7

T. 905.420.4660 ext. 2072

imarouchko@pickering.ca

Robert Amos, P.Eng.

Consultant Project Manager

Aquafor Beech Ltd.

2600 Skymark Avenue, Unit 6-201

Mississauga, Ontario

T. 416.705.2367

amos.r@aquaforbeech.com

We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MASc. P.Eng.

Fluvial Geomorphologist

905.629.0099 x 284

amos.r@aquaforbeech.com

From: Community Consultation <consultation@ramafirstnation.ca>
Sent: December 19, 2022 4:41 PM
To: Rob Amos
Cc: 'Marouchko, Irina'; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement

Note: please direct any future correspondence to consultation@ramafirstnation.ca. We are currently in a transitional period following the resignation of our Community Consultation Worker. As we undertake this process, we will do our best to keep lines of communication open and facilitate a warm transition to a new CCW when one becomes available to us. Please be sure to remove shardayj@ramafirstnation.ca from your contact list and add consultation@ramafirstnation.ca.

Samantha Craig-Curnow

Associate General Counsel, Legal

Chippewas of Rama First Nation

(ph) 705-325-3611, 1289

(cell) 705-818-3277

(fax) 705-325-0879

(url) www.ramafirstnation.ca

This email is intended only for the named recipient(s) and may contain information that is privileged, confidential and/or exempt from disclosure under applicable law. No waiver of privilege, confidence or otherwise is intended by virtue of communication via the internet. Any unauthorized or copying is strictly prohibited. If you have received this e-mail in error, or are not named as a recipient, please immediately notify the sender and destroy all copies of this e-mail.

By submitting your or another individual's personal information to Chippewas of Rama First Nation, its service providers and agents, you agree and confirm your authority from such other individual, to our collection, use and disclosure of such personal information in accordance with our privacy policy.

 Please consider the environment before printing this e-mail.

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: December 8, 2022 10:02 AM
To: Sharday James <shardayj@ramafirstnation.ca>
Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: RE: Pine Creek Erosion Assessment - Notice of Study Commencement

Dear Chippewas of Rama,

Aquafor Beech Limited has been retained by the City of Pickering to undertake a Schedule B Class Environmental Assessment Study for the Pine Creek area.

This project is being completed to address erosion issues associated with the watercourse.

In accordance with the environmental assessment process, Aquafor is pleased to share the attached letter and Notice of Commencement. Additional information is also available from the City website at:

Website

<https://www.pickering.ca/Modules/News/index.aspx?newsId=6891dabc-381d-48a6-9259-5a609debcf1c>

Should you have any questions or comments, please feel free to contact the following:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
2600 Skymark Avenue, Unit 6-201
Mississauga, Ontario
T. 416.705.2367
amos.r@aquaforbeech.com

We very much look forward to working with you throughout the project, and will ensure all documentation is available for your review and input.

Kind regards,

Rob

Robert Amos MAsc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com

Engineering Services Department

Issued on: May 4, 2023

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of sites in need of rehabilitation. The Study Area is shown in the Key Map.

The Process

The study is being conducted in accordance with Schedule B projects, as outlined in the Municipal Engineers Association's, Municipal Class Environmental Assessment (October 2000, amended 2007, 2011, 2015 and 2023). The Study is intended to address the first two phases of the Municipal Class EA process.

Public Information Centre (PIC)

Public input is a key component of the study. The City wants anyone with an interest in the study to have an opportunity to provide input, which will help the Project Team in the decision making process. The PIC will be presented in a drop-in format and an on-line format with material available on the City's website at pickering.ca. The drop-in PIC will be held as follows:

Thursday, May 18, 2023 – 6:00 pm to 8:00 pm
Chestnut Hill Developments Recreation Complex
West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

The PIC will introduce the project, outline the rationale behind it, identify existing conditions, and present the evaluation of alternative solutions. The website will include the information presented at the PIC, as well as a comment sheet and an email address to submit comments.

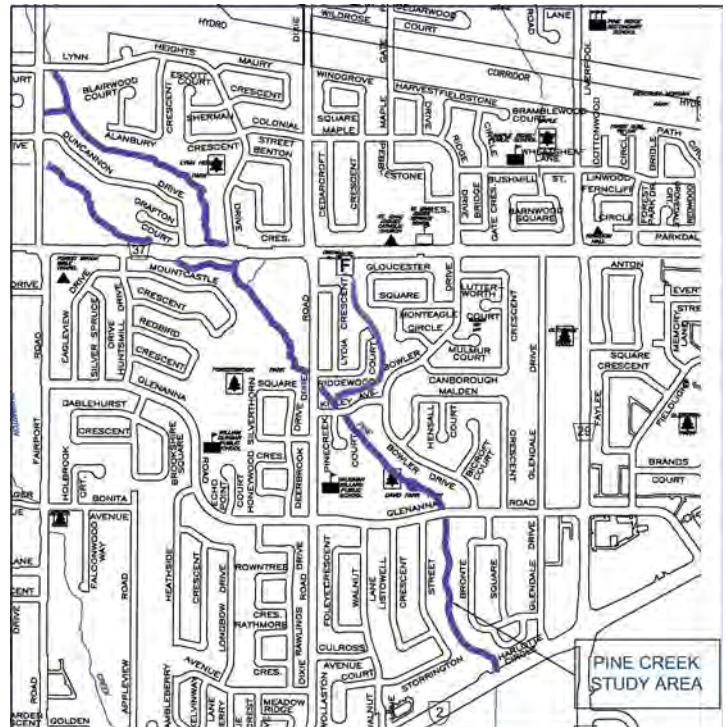
The Project Team wants to hear from you!

The deadline for the submission of on-line comments following the PIC will be **Friday, June 2, 2023**.

To provide comments and receive additional study information, please consider adding your name to the study mailing list by contacting either of the following Project Team members:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, M.A.Sc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T. 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com



Engineering Services Department

Issued on: May 4, 2023

The Study

The City of Pickering is undertaking a Municipal Class Environmental Assessment Study (Class EA) to complete the Pine Creek Erosion Assessment, identify and prioritize erosion related risks within the study area, and to develop a list of sites in need of rehabilitation. The Study Area is shown in the Key Map.

The Process

The study is being conducted in accordance with Schedule B projects, as outlined in the Municipal Engineers Association's, Municipal Class Environmental Assessment (October 2000, amended 2007, 2011, 2015 and 2023). The Study is intended to address the first two phases of the Municipal Class EA process.

Public Information Centre (PIC)

Public input is a key component of the study. The City wants anyone with an interest in the study to have an opportunity to provide input, which will help the Project Team in the decision making process. The PIC will be presented in a drop-in format and an on-line format with material available on the City's website at pickering.ca. The drop-in PIC will be held as follows:

Thursday, May 18, 2023 – 6:00 pm to 8:00 pm
Chestnut Hill Developments Recreation Complex
West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

The PIC will introduce the project, outline the rationale behind it, identify existing conditions, and present the evaluation of alternative solutions. The website will include the information presented at the PIC, as well as a comment sheet and an email address to submit comments.

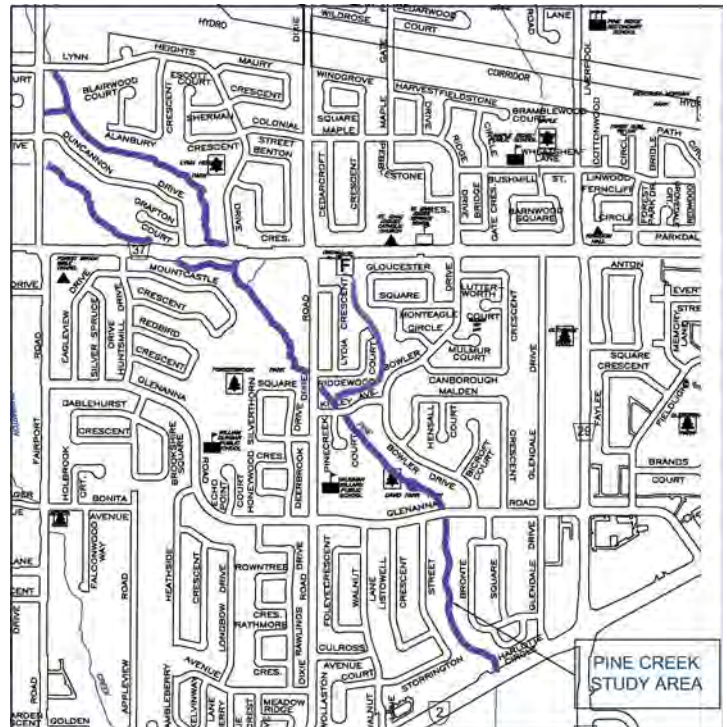
The Project Team wants to hear from you!

The deadline for the submission of on-line comments following the PIC will be **Friday, June 2, 2023**.

To provide comments and receive additional study information, please consider adding your name to the study mailing list by contacting either of the following Project Team members:

Irina Marouchko, P.Eng
Senior Water Resources Engineer
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, M.A.Sc., P.Eng.
Aquafor Beech Ltd.
2600 Skymark Avenue
Building 6, Unit 2
Mississauga, ON L4W 5B2
T. 905.629.0099 ext. 284
Amos.R@Aquaforbeech.com



ursulak.j@aquaforbeech.com

From: Rob Amos <amos.r@aquaforbeech.com>
Sent: May 8, 2023 1:41 PM
To: 'Marouchko, Irina'
Cc: ursulak.j@aquaforbeech.com; dube.g@aquaforbeech.com
Subject: FW: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hi Irina,

As a followup to our call, please find the email below with Mr. Tom Cowie from Hiawatha First Nation.

Thanks,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com

From: Rob Amos [mailto:amos.r@aquaforbeech.com]
Sent: Friday, May 5, 2023 10:39 AM
To: 'Tom Cowie'
Cc: 'Sean Davison'
Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Hi Tom,

Thanks very much for the response, and I appreciate the correction on the salutation.

We look forward to receiving and incorporating any input into the project from the Hiawatha First Nation.

Thanks again,

Rob

Robert Amos MASc. P.Eng.
Fluvial Geomorphologist
905.629.0099 x 284
amos.r@aquaforbeech.com

From: Tom Cowie [mailto:tcowie@hiawathafn.ca]
Sent: Friday, May 5, 2023 10:01 AM
To: amos.r@aquaforbeech.com

Cc: Sean Davison

Subject: RE: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

Aaniin Rob,

Chi miigwech for the update and information. To correct your salutation of email, we are not Stakeholders we are Inherent Rights and Treaty holders. We will finish reviewing and if we have any questions or concerns we will contact your office.

Gichi manaadendamowin

Tom Cowie

Tom Cowie
Lands/Resources Consultation
Hiawatha First Nation
431 Hiawatha Line,
Hiawatha, On
K9J 0E6
705 295-4421 Ext. 216
Email tcowie@hiawathan.ca



We, the Michi Saagiig of Hiawatha First Nation, are a vibrant, proud, independent and healthy people balanced in the richness of our culture and traditional way of life

From: amos.r@aquaforbeech.com <amos.r@aquaforbeech.com>

Sent: Friday, May 5, 2023 7:43 AM

Cc: 'Marouchko, Irina' <imarouchko@pickering.ca>; ursulak.j@aquaforbeech.com

Subject: Pine Creek Erosion Assessment Municipal Class EA - Notice of Public Information Centre

ALERT: This message originated outside of HFN's network. **BE CAUTIOUS** before clicking any link or attachment.

Dear Stakeholder,

Please find attached a Notice of Public Information Centre (PIC) for the City of Pickering - Pine Creek Erosion Assessment Class EA.

The Public Information Centre will discuss matters related to the study, including problems, opportunities, alternative solutions, evaluation criteria, environmental impacts and mitigation measures.

The location [Aaqniin Rob](#) and time for the PIC is below:

Thursday, May 18, 2023 – 6:00 pm to 8:00 pm
Chestnut Hill Developments Recreation Complex, West Salon
1867 Valley Farm Rd, Pickering, ON L1V 6K7

Thanks very much for your interest, we look forward to meeting you and receiving your input.

Best Regards,

Rob Amos, MAsC., P.Eng.
Aquafor Beech Ltd.
Mobile: 416.705.2367



May 10th, 2024

Alderville First Nation
PO BOX 46
Roseneath, ON K0K 2X0

Attn: Dave Simpson
Consultation Coordinator

RE: Notice of Study Completion: Municipal Class EA Study

Dear Alderville First Nation,

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the project study area and to develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The Class EA was conducted as a Schedule 'B' project in accordance with the "Municipal Class Environmental Assessment" document. The process included indigenous, public and review agency consultation, an evaluation of alternatives, an assessment of potential environmental impacts of the proposed improvements, and identification of reasonable measures to mitigate any adverse impacts. The Class EA identified preferred alternatives to be constructed at eleven (11) select locations. Further details are provided within the Class EA project file.

Public consultation, including consultation with Aboriginal communities, is a critical component of this study. In turn, the study team would like to inform you of the posting of the Project File Report for public review, and will look forward to discussing any issues or concerns. The Notice of Study Completion is attached to the end of this letter for your reference, outlining how to Review the Project File Report.

Your input is important. If you have any comments, please contact the undersigned.

Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

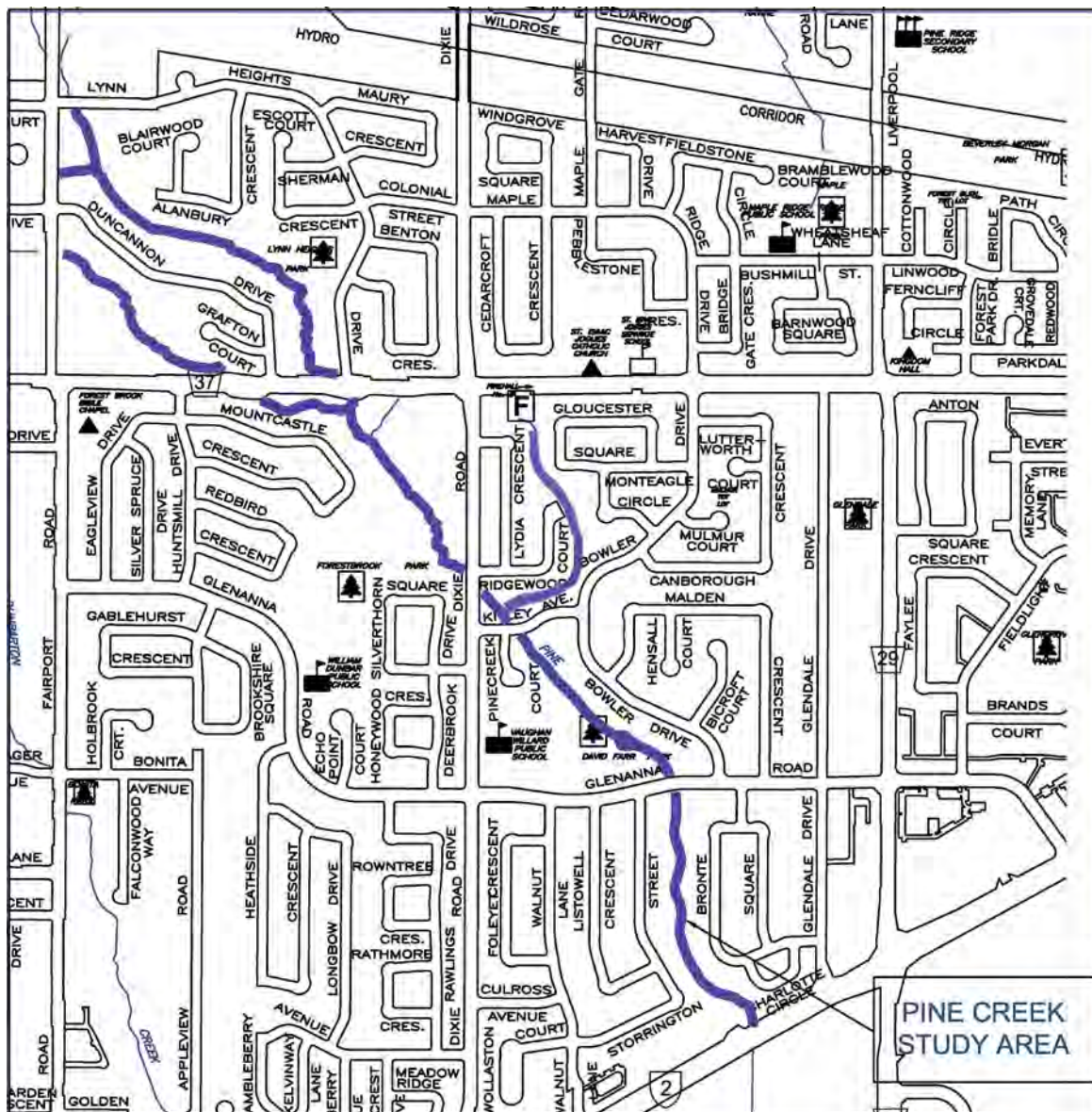
Robert Amos, MASc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

May 10, 2024

The Study

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below.



Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

The Class EA was conducted as a Schedule 'B' project in accordance with the "Municipal Class Environmental Assessment" document (Municipal Engineers Association, October 2000, as amended in 2007, 2011, 2015 and 2023), under the *Ontario Environmental Assessment Act*. The process included indigenous, public and review agency consultation, an evaluation of alternatives, an assessment of potential environmental impacts of the proposed improvements, and identification of reasonable measures to mitigate any adverse impacts. The Class EA identified preferred alternatives to be constructed at eleven (11) select locations. Further details are provided within the Class EA Project File.

How to Review the Project File Report

The Project File Report (PFR) is available for review on the City's website commencing Friday, May 10, 2024 at pickering.ca and at the following location:

Pickering Civic Complex
Clerks Department
One The Esplanade
Pickering, ON L1V 6K7

All comments and concerns should be sent in writing directly to the City's Project Manager, Irina Marouchko, Manager, Water Resources (contact information below) by **Monday, June 10, 2024**.

All personal information included in your request – such as name, address, telephone number and property location – is collected under the authority of Section 30 of the *Environmental Assessment Act* and is maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the *Municipal Freedom of Information and Protection of Privacy Act (MFIPPA)* (s.27) and the *Freedom of Information and Protection of Privacy Act (FIPPA)* (s.37) does not apply. Personal information you submit will become part of a public record that is available to the public unless you request in writing to the municipality and/or the Ministry that your personal information remain confidential.

For further information on this project please contact:

Irina Marouchko, P.Eng.
Manager, Water Resources
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, M.A.Sc., P.Eng.
Aquafor Beech Ltd.
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pickering.ca

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May 10th, 2024

Beausoleil First Nation
11 O'Gemaa Miikaan
Christian Island, ON L9M 0A9

Attn: Jane Copegog

RE: Notice of Study Completion: Municipal Class EA Study

Dear Beausoleil First Nation,

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the project study area and to develop a list of high priority sites in need of rehabilitation.

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Sincerely,

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Project Manager
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Email: imarouchko@pickering.ca

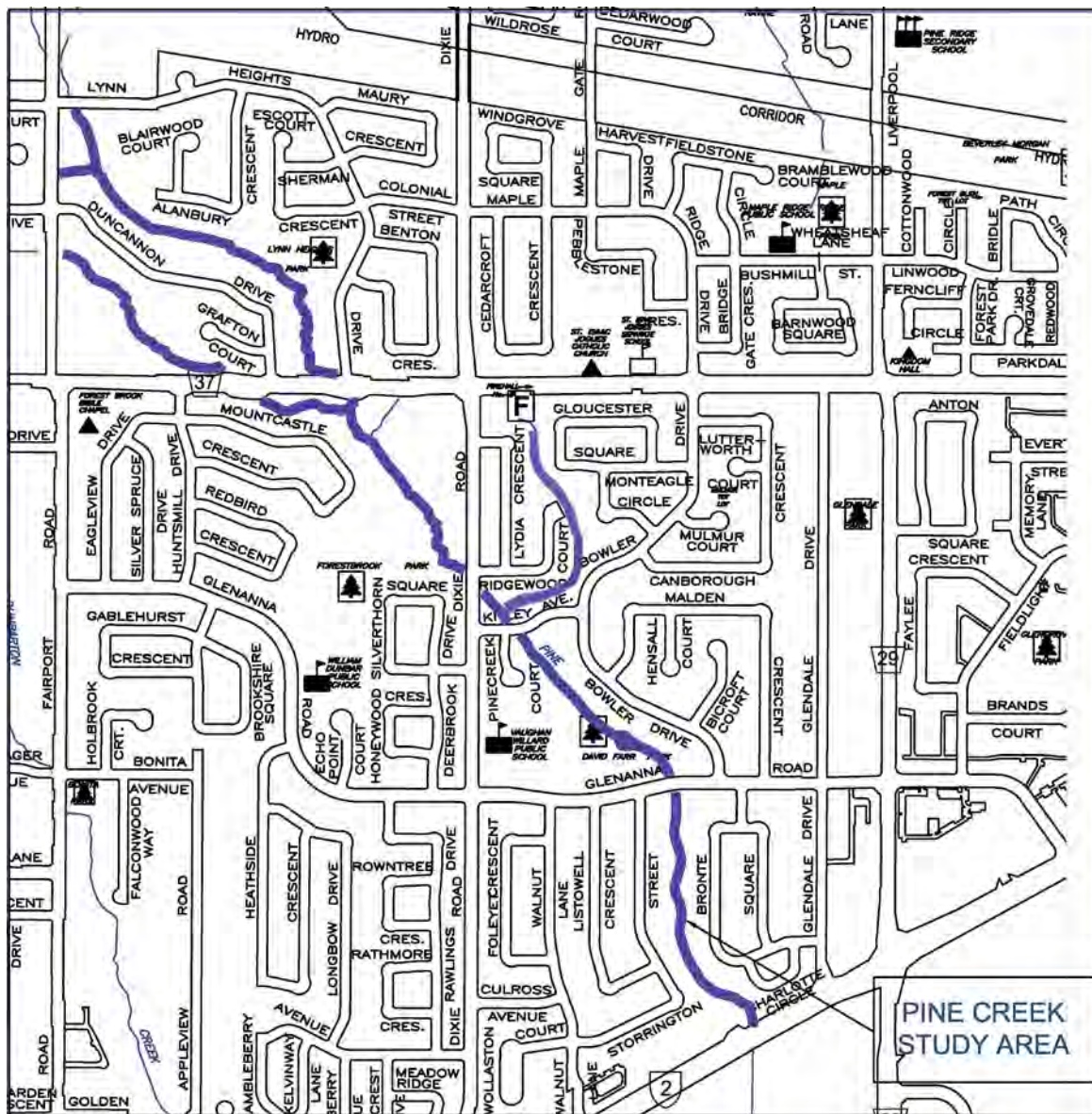
Robert Amos, MAsc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

May 10, 2024

The Study

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customercare@pickering.ca
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The Process

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For further information on this project please contact:

Irina Marouchko, P.Eng.
Manager, Water Resources
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
imarouchko@pickering.ca

Robert Amos, M.A.Sc., P.Eng.
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May 10th, 2024

Chippewas of Georgina Island
R.R.#2 Box N-13
Sutton West, ON L0E 1R0

Attn: Chippewas of Georgina Island

RE: Notice of Study Completion: Municipal Class EA Study

Dear Chippewas of Georgina Island,

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the project study area and to develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The Class EA was conducted as a Schedule 'B' project in accordance with the "Municipal Class Environmental Assessment" document. The process included indigenous, public and review agency consultation, an evaluation of alternatives, an assessment of potential environmental impacts of the proposed improvements, and identification of reasonable measures to mitigate any adverse impacts. The Class EA identified preferred alternatives to be constructed at eleven (11) select locations. Further details are provided within the Class EA project file.

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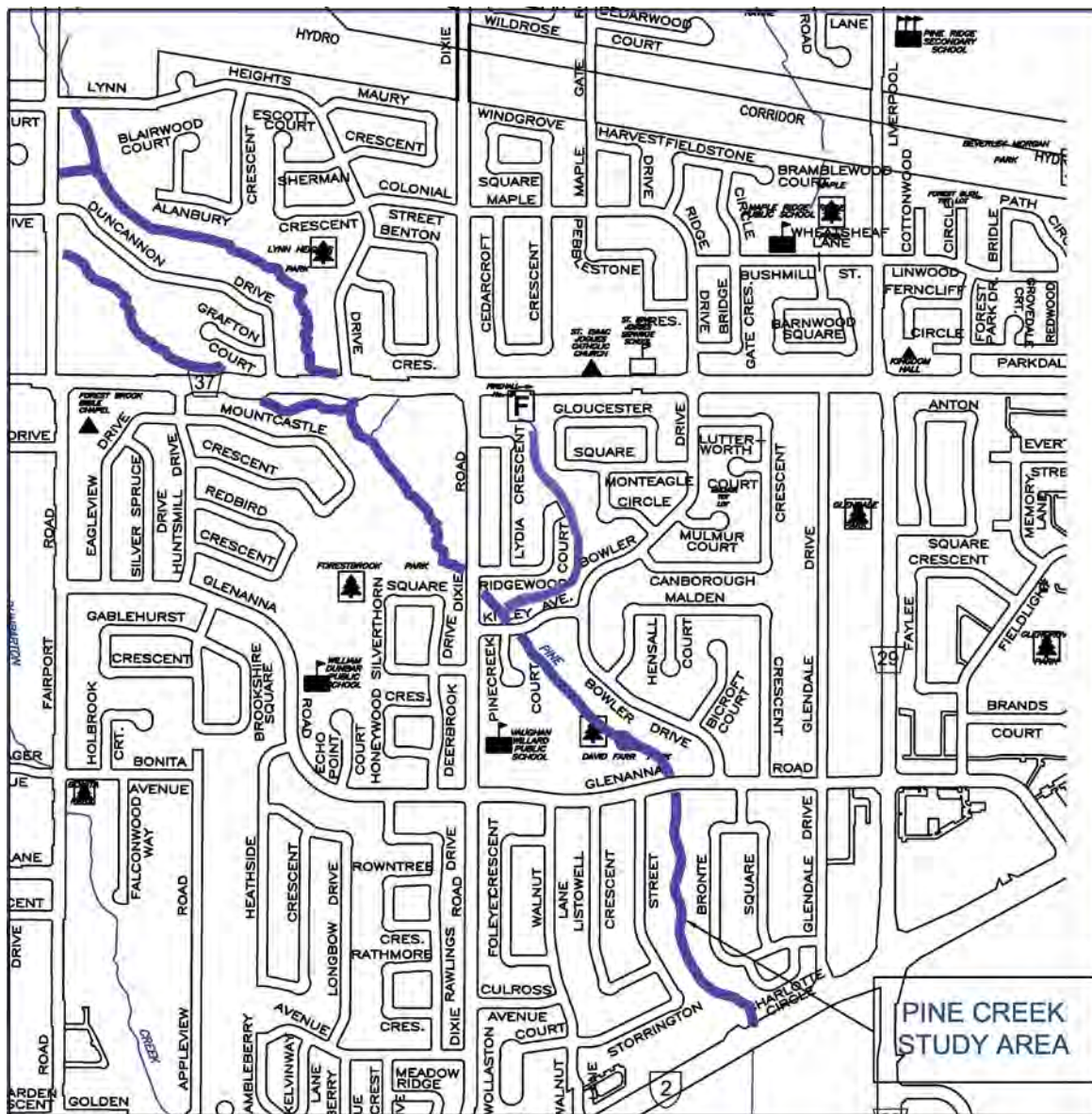
Robert Amos, MAsc., P.Eng.
Consultant Project Manager
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Engineering Services Department

May 10, 2024

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For further information on this project please contact:

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Manager, Water Resources
City of Pickering
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Pickering, ON L1V 6K7
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imarouchko@pickering.ca

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pickering.ca

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May 10th, 2024

Chippewas of Rama
200-5884 Rama Road
Rama, ON L3V 6H6

Attn: Sharday James
Community Consultation

RE: Notice of Study Completion: Municipal Class EA Study

Dear Chippewas of Rama,

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the project study area and to develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The Class EA was conducted as a Schedule 'B' project in accordance with the "Municipal Class Environmental Assessment" document. The process included indigenous, public and review agency consultation, an evaluation of alternatives, an assessment of potential environmental impacts of the proposed improvements, and identification of reasonable measures to mitigate any adverse impacts. The Class EA identified preferred alternatives to be constructed at eleven (11) select locations. Further details are provided within the Class EA project file.

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Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
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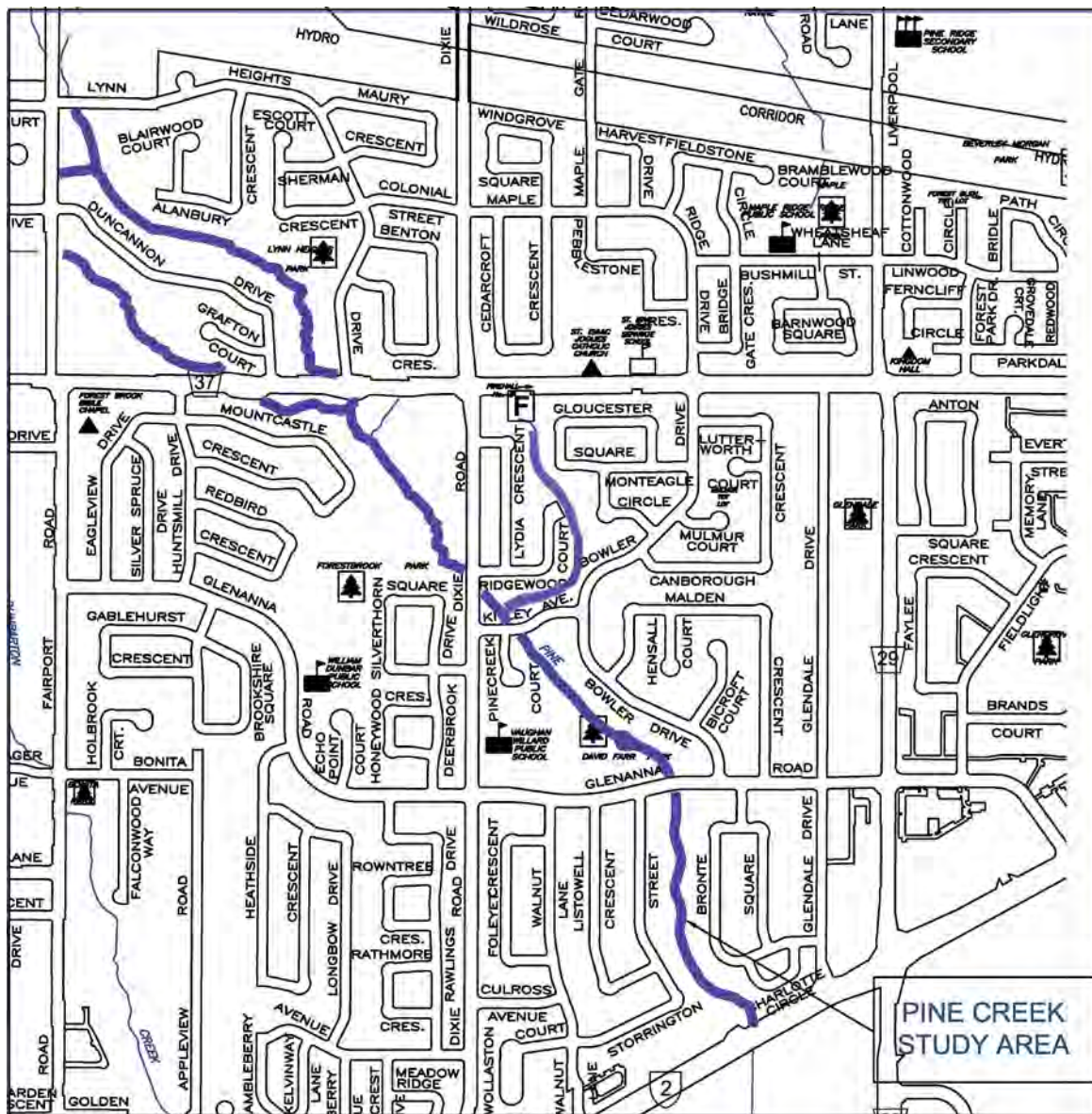
Robert Amos, MASc., P.Eng.
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Tel: 416-705-2367
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Engineering Services Department

May 10, 2024

The Study

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T.905.683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

The Class EA was conducted as a Schedule 'B' project in accordance with the "Municipal Class Environmental Assessment" document (Municipal Engineers Association, October 2000, as amended in 2007, 2011, 2015 and 2023), under the *Ontario Environmental Assessment Act*. The process included indigenous, public and review agency consultation, an evaluation of alternatives, an assessment of potential environmental impacts of the proposed improvements, and identification of reasonable measures to mitigate any adverse impacts. The Class EA identified preferred alternatives to be constructed at eleven (11) select locations. Further details are provided within the Class EA Project File.

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Clerks Department
One The Esplanade
Pickering, ON L1V 6K7

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For further information on this project please contact:

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Manager, Water Resources
City of Pickering
One The Esplanade
Pickering, ON L1V 6K7
T. 905.420.4660 ext. 2072
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Amos.R@Aquaforbeech.com

Customer Care Centre
T.905. 683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575



May 10th, 2024

Curve Lake First Nation
21 Public Works Rd.
Curve Lake, ON K0L 1R0

Attn: Francis Chua

RE: Notice of Study Completion: Municipal Class EA Study

Dear Curve Lake First Nation,

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the project study area and to develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The Class EA was conducted as a Schedule 'B' project in accordance with the "Municipal Class Environmental Assessment" document. The process included indigenous, public and review agency consultation, an evaluation of alternatives, an assessment of potential environmental impacts of the proposed improvements, and identification of reasonable measures to mitigate any adverse impacts. The Class EA identified preferred alternatives to be constructed at eleven (11) select locations. Further details are provided within the Class EA project file.

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Sincerely,

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Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

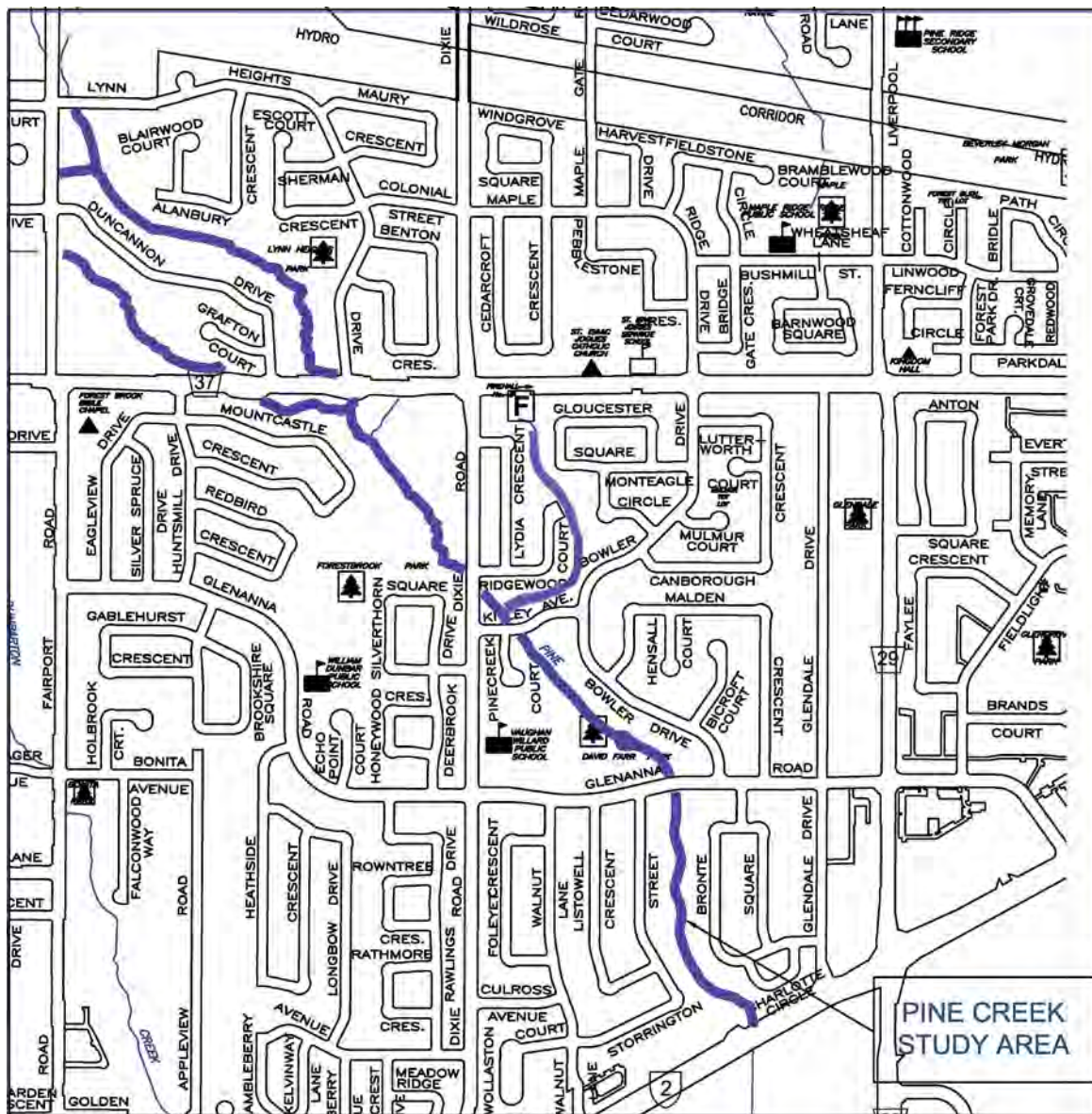
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Engineering Services Department

May 10, 2024

The Study

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customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575



May 10th, 2024

Hiawatha First Nation
431 Hiawatha Line
Hiawatha, ON K9J 0E6

Attn: Tom Cowie and Sean Davison

RE: Notice of Study Completion: Municipal Class EA Study

Dear Hiawatha First Nation,

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the project study area and to develop a list of high priority sites in need of rehabilitation.

The project area includes the Pine Creek corridor between Kingston Road and Fairport Road. The Class EA was conducted as a Schedule 'B' project in accordance with the "Municipal Class Environmental Assessment" document. The process included indigenous, public and review agency consultation, an evaluation of alternatives, an assessment of potential environmental impacts of the proposed improvements, and identification of reasonable measures to mitigate any adverse impacts. The Class EA identified preferred alternatives to be constructed at eleven (11) select locations. Further details are provided within the Class EA project file.

Public consultation, including consultation with Aboriginal communities, is a critical component of this study. In turn, the study team would like to inform you of the posting of the Project File Report for public review, and will look forward to discussing any issues or concerns. The Notice of Study Completion is attached to the end of this letter for your reference, outlining how to Review the Project File Report.

Your input is important. If you have any comments, please contact the undersigned.

Sincerely,

Irina Marouchko, P. Eng.
Project Manager
City of Pickering
Tel: (905) 420-4660 ext. 2072
Email: imarouchko@pickering.ca

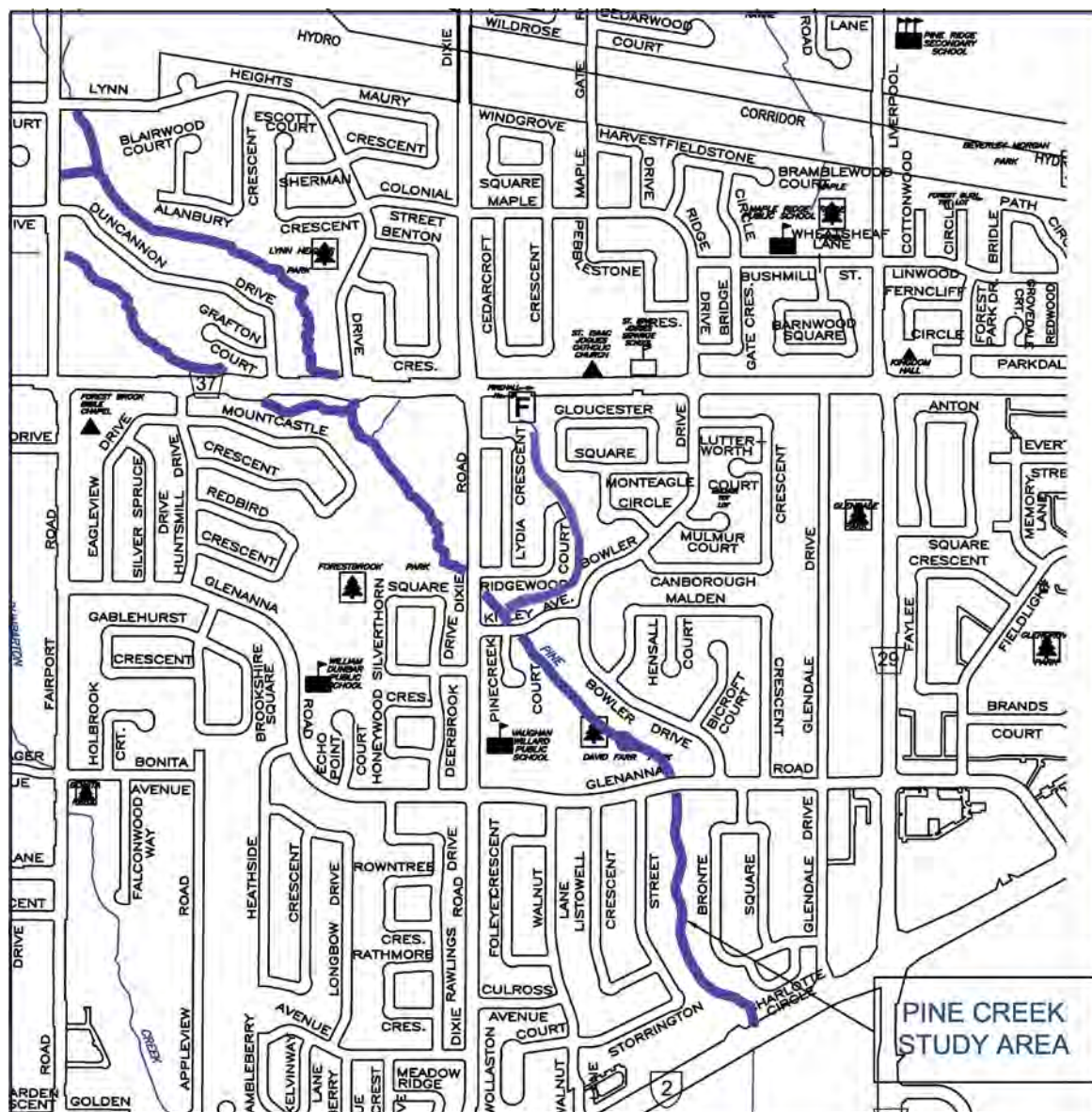
Robert Amos, MAsc., P.Eng.
Consultant Project Manager
Aquafor Beech Ltd.
Tel: 416-705-2367
Email: amos.r@aquaforbeech.com

Engineering Services Department

May 10, 2024

The Study

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the study area, and to develop a list of high priority sites in need of rehabilitation. The Study Area is shown in the Key Map below.



Customer Care Centre
T.905.683.7575

customercare@pickering.ca
pickering.ca

Alternate formats available upon request at 905.683.7575

The Process

The Class EA was conducted as a Schedule 'B' project in accordance with the "Municipal Class Environmental Assessment" document (Municipal Engineers Association, October 2000, as amended in 2007, 2011, 2015 and 2023), under the *Ontario Environmental Assessment Act*. The process included indigenous, public and review agency consultation, an evaluation of alternatives, an assessment of potential environmental impacts of the proposed improvements, and identification of reasonable measures to mitigate any adverse impacts. The Class EA identified preferred alternatives to be constructed at eleven (11) select locations. Further details are provided within the Class EA Project File.

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Pickering Civic Complex
Clerks Department
One The Esplanade
Pickering, ON L1V 6K7

All comments and concerns should be sent in writing directly to the City's Project Manager, Irina Marouchko, Manager, Water Resources (contact information below) by **Monday, June 10, 2024**.

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City of Pickering
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imarouchko@pickering.ca

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May 10th, 2024

Huron-Wendat Nation
255 Place Chef Michel Laveau
Wendake, QC G0A 4V0

Attn: Maxime Picard and Melanie Vincent

RE: Notice of Study Completion: Municipal Class EA Study

Dear Huron-Wendat First Nation,

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the project study area and to develop a list of high priority sites in need of rehabilitation.

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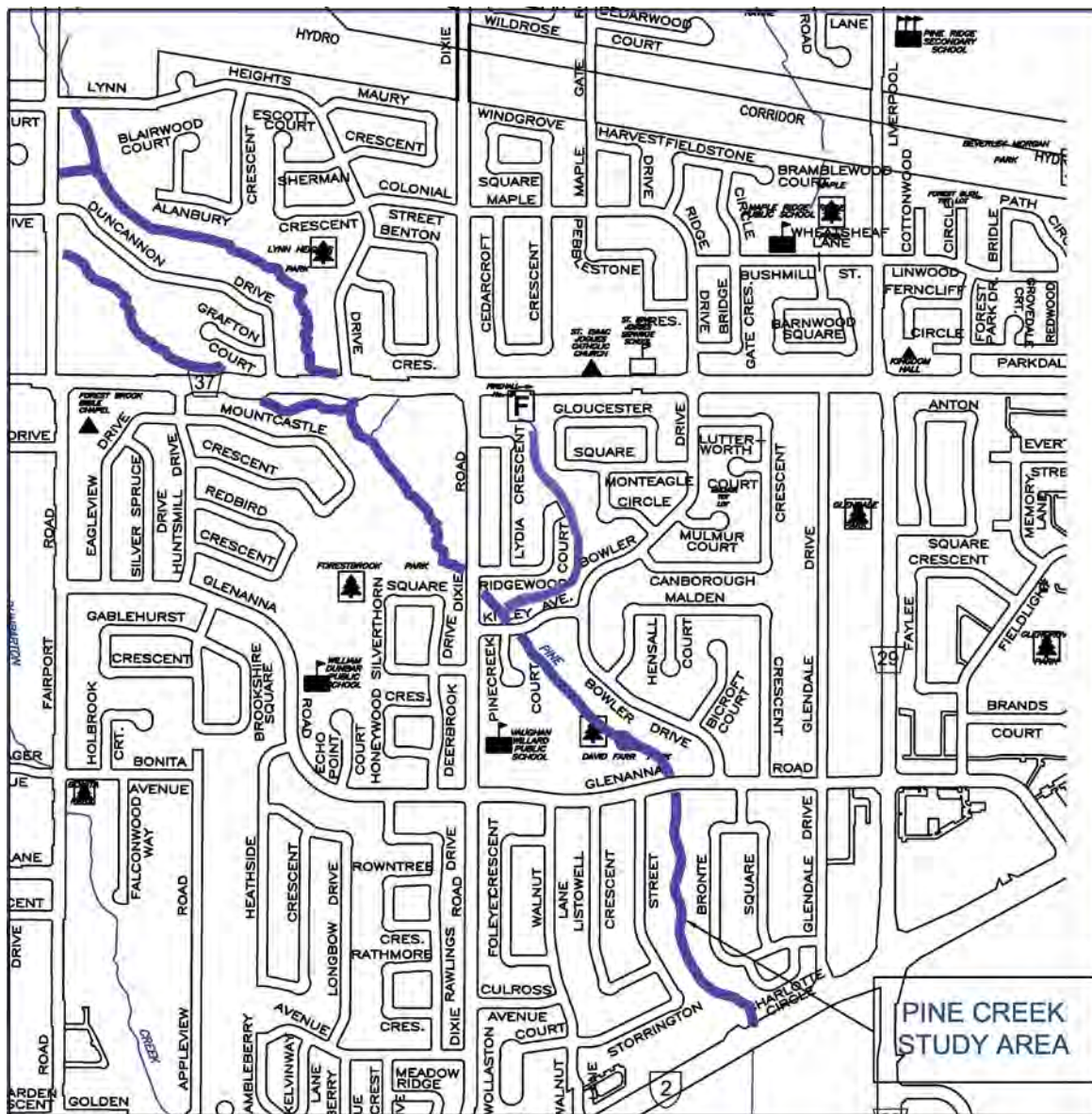
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May 10, 2024

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May 10th, 2024

Mississaugas of Scugog Island
22521 Island Road
Port Perry, ON L9L 1B6

Attn: Don Richardson and Waverley Birch

RE: Notice of Study Completion: Municipal Class EA Study

Dear Mississaugas of Scugog Island,

The City of Pickering has completed the Pine Creek Erosion Assessment Municipal Class Environmental Assessment Study (Class EA) to identify and prioritize erosion related risks within the project study area and to develop a list of high priority sites in need of rehabilitation.

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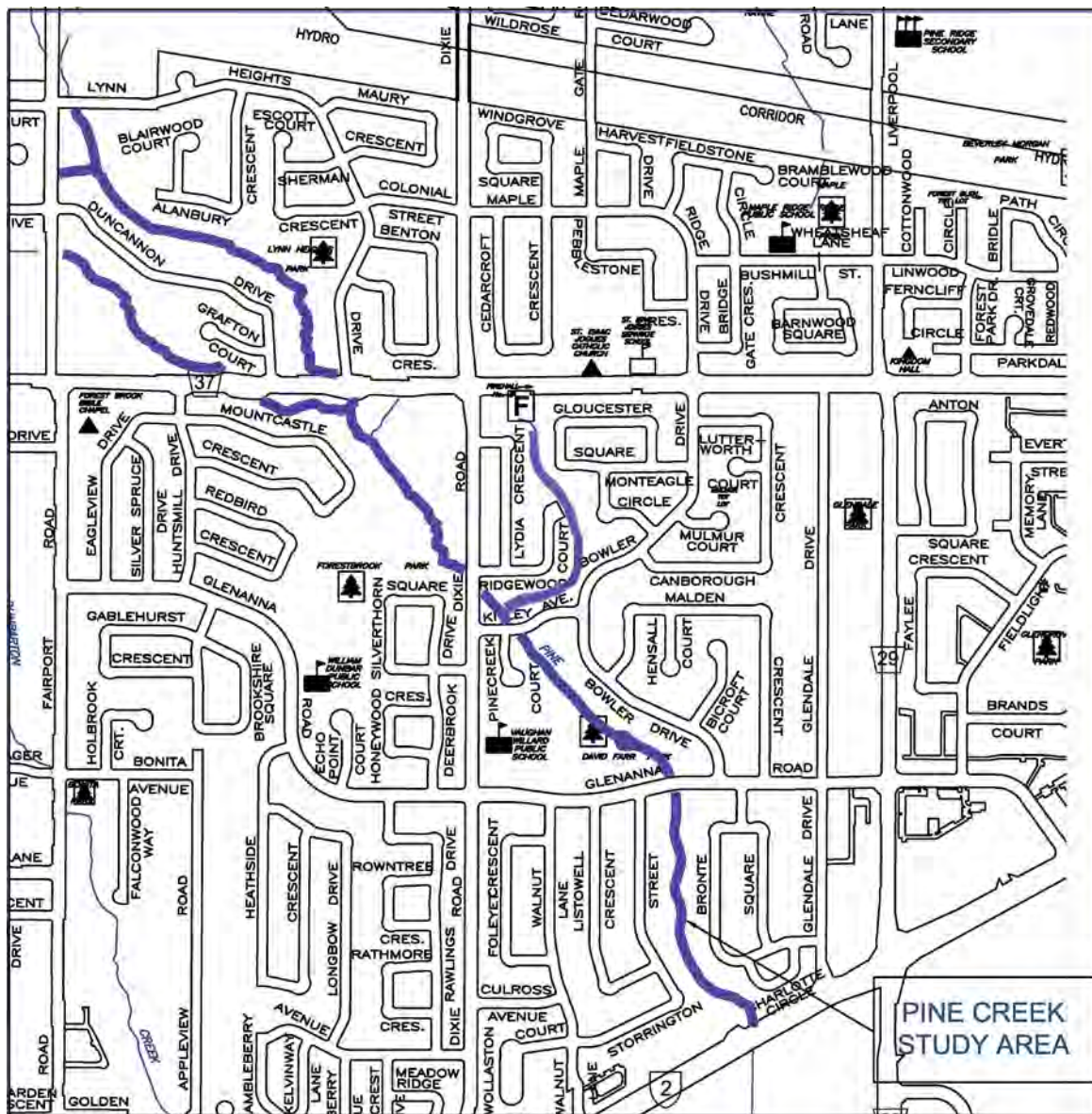
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Appendix M –
Stage 1 Archaeological Assessment Report



SECOND DRAFT: 04 JULY 2023

STAGE 1 ARCHAEOLOGICAL BACKGROUND STUDY

*Of the Erosion Assessment EA Along Pine Creek between Kingston Rd and Fairmount Rd, City of Pickering, Regional Municipality of Durham, Ontario.
(AMICK Corporate File #2022-047/MTCS File #P058-2259-2022)*

SUBMITTED TO:

Ontario Ministry of Citizenship and Multiculturalism
(MCM)

SUBMITTED BY:

AMICK Consultants Limited
Southwestern District Office
237 Sanders Street East
Exeter, ON N0M 1S1
Phone: (519) 432-4435
Email: mcornies@amick.ca
www.amick.ca

LICENSEE:

Michael Henry (#P058)

PIF NUMBER: P058-2259-2022

CORPORATE PROJECT NUMBER: 2022-047

04 JULY, 2023

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PROJECT PERSONNEL

AMICK CONSULTANTS LIMITED PARTNERS

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Marilyn Cornies (MTCS Professional Archaeologist Licence #P038)

AMICK CONSULTANTS LIMITED BUSINESS MANAGER

Melissa Maclean BBA email mmaclean@amick.ca

PROJECT COORDINATOR

Marilyn Cornies (MTCS Professional Archaeologist Licence #P038)

PROJECT LICENSEE ARCHAEOLOGIST

Michael Henry (MTCS Professional Archaeologist Licence #P058)

PROJECT FIELD DIRECTORS

Sean Berger (#R1261)

PROJECT REPORT PREPARATION & GRAPHICS

Sean Berger (#R1261)

PROJECT PHOTOGRAPHY

Sean Berger (#R1261)
Mike Martyniuk

EXECUTIVE SUMMARY

This report describes the results of the 2022 Stage 1 Archaeological Background Study of the Erosion Assessment EA Along Pine Creek between Kingston Rd and Fairmount Rd, City of Pickering, Regional Municipality of Durham, Ontario, conducted by AMICK Consultants Limited. This assessment was undertaken as a requirement under the Environmental Assessment Act (RSO 1990) and was conducted under Professional Archaeologist License #P058 issued to Michael Henry by the Minister Tourism, Culture and Sport (MTCS) for the Province of Ontario. All work was conducted in conformity with Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011) and the Ontario Heritage Act (RSO 1990a).

The entirety of the study area is approximately 31.1 hectares (ha) in area and includes within it forest, lawns, meadows parks, steep slope and bottom-lands such as swamp, marsh and seasonally flooded areas. The study area is bound on almost all sides by residential or commercial development, except for areas at the very northern edges of the study area, which are bound by roadways, with farmland on the opposite side. Some areas are also adjacent to park lands that are not included in this study. AMICK Consultants Limited was engaged by the proponent to undertake a Stage 1 Background Study of lands potentially affected by the proposed undertaking and was granted permission to carry out archaeological fieldwork. Following the criteria outlined by MTCS (2011) for determining archaeological potential, portions of the study area were determined as having archaeological potential for Pre-contact and/or Post-contact archaeological resources. Consequently, this report is being prepared in advance of the planning process for this property.

The entirety of the study area was subject to a desktop Stage 1 Archaeological Background Study on Nov 11, 2022. A property inspection and photographic documentation of the study area was completed on Dec 2, 2022. All records, documentation, field notes, photographs, and artifacts (as applicable) related to the conduct and findings of these investigations are held at the Lakelands District corporate offices of AMICK Consultants Limited until such time that they can be transferred to an agency or institution approved by the MTCS on behalf of the government and citizens of Ontario.

Some areas within the study area have been identified as exhibiting major landscape alterations and subsurface disturbances which include major grading to mitigate flooding, fill to facilitate road construction, pathways and underground electrical infrastructure and retaining walls to mitigate erosion. Additionally, some of the study area is made up of steep slopes in excess of 30 degrees, and seasonally flooded areas, limiting its archaeological potential. Consequently, in these areas there appears to be no potential to yield archaeological deposits of Cultural Heritage Value or Interest (CHVI) within the limits of the study area.

However, there are also some areas within the study area that do have high potential to yield archaeological deposits of Cultural Heritage Value or Interest (CHVI) based largely on their proximity to a primary water source, the Pine Creek, and the previous discovery of archaeological sites nearby. Therefore, the objectives of the Stage 1 Background Study have

been met and in accordance with the results of this investigation, the following recommendations are made.

1. *Due to previous extensive subsurface disturbances and landscape alterations in much of the study area, these areas no longer retain potential for archaeological resources and may be excluded from stage 2 survey..*
2. *However, the proposed undertaking has high potential for archaeological resources in areas that do not exhibit steep slope, extensive ground disturbance, or seasonally inundated lands. A Stage 2 archaeological assessment of these areas is recommended.*
3. *No soil disturbances or removal of vegetation shall take place within the study area prior to the MTCS acceptance of a report into the Provincial Registry of Archaeological Reports that recommends all archaeological concerns for the proposed undertaking have been addressed and no further archaeological investigations are required.*

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

This report describes the results of the 2022 Stage 1 Archaeological Background Study of, Erosion Assessment EA Along Pine Creek between Kingston Rd and Fairmount Rd, City of Pickering, Regional Municipality of Durham, Ontario conducted by AMICK Consultants Limited. This assessment was undertaken as a requirement under the Environmental Assessment Act (RSO 1990) and was conducted under Professional Archaeologist License #P058 issued to Michael Henry by the Ministry of Citizenship and Multiculturalism (MCM) for the Province of Ontario. All work was conducted in conformity with Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011) and the Ontario Heritage Act (RSO 1990a).

The entirety of the study area is approximately 31.1 hectares (ha) in area and includes within it forest, meadow, manicured lawns, steep slope and bottom-lands such as swamp, marsh and seasonally flooded areas. The study area is bound on almost all sides by residential or commercial development, except for areas at the very northern edges of the study area, which are bound by roadways, with farmland on the opposite side. Some areas are also adjacent to park lands that are not included in this study. AMICK Consultants Limited was engaged by the proponent to undertake a Stage 1 Background Study of lands potentially affected by the proposed undertaking and was granted permission to carry out archaeological fieldwork. Following the criteria outlined by MTCS (2011) for determining archaeological potential, portions of the study area were determined as having archaeological potential for Pre-contact and/or Post-contact archaeological resources. Consequently, this report is being prepared in advance of the planning process for this property.

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1.2 HISTORICAL CONTEXT

1.2.1 PRE-CONTACT LAND-USE OUTLINE

Table 1 illustrates the chronological development of cultures within southern Ontario prior to the arrival of European cultures to the area at the beginning of the 17th century. This general cultural outline is based on archaeological data and represents a synthesis and summary of research over a long period of time. It is necessarily generalizing and is not necessarily representative of the point of view of all researchers or stakeholders. It is offered here as a rough guideline and as a very broad outline to illustrate the relationships of broad cultural groups and time periods.

TABLE 1 PRE-CONTACT CULTURAL CHRONOLOGY FOR SOUTHERN ONTARIO		
Years ago	Period	Southern Ontario
250	Terminal Woodland	Ontario and St. Lawrence Iroquois Cultures
1000 2000	Initial Woodland	Princess Point, Saugeen, Point Peninsula, and Meadowood Cultures
3000 4000 5000 6000	Archaic	Laurentian Culture
7000 8000 9000 10000 11000	Paleo-Indian	Plano and Clovis Cultures

What follows is an outline of Aboriginal occupation in the area during the Pre-Contact Era from the earliest known period, about 9000 B.C. up to approximately 1650 AD.

1.2.1.1 PALEO-INDIAN PERIOD (APPROXIMATELY 9000-7500 B.C.)

North of Lake Ontario, evidence suggests that early occupation began around 9000 B.C. People probably began to move into this area as the glaciers retreated and glacial lake levels began to recede. The early occupation of the area probably occurred in conjunction with environmental conditions that would be comparable to modern Sub-Arctic conditions. Due to the great antiquity of these sites, and the relatively small populations likely involved, evidence of these early inhabitants is sparse and generally limited to tools produced from stone or to by-products of the manufacture of these implements.

1.2.1.2 ARCHAIC PERIOD (APPROXIMATELY 8000-1000 B.C.)

By about 8000 B.C. the gradual transition from a post glacial tundra-like environment to an essentially modern environment was largely complete. Prior to European clearance of the landscape for timber and cultivation, the area was characterized by forest. The Archaic Period is the longest and the most apparently stable of the cultural periods identified through

archaeology. The Archaic Period is divided into the Early, Middle and Late Sub-Periods, each represented by specific styles in projectile point manufacture. Many more sites of this period are found throughout Ontario, than of the Paleo-Indian Period. This is probably a reflection of two factors: the longer period of time reflected in these sites, and a greater population density. The greater population was likely the result of a more diversified subsistence strategy carried out in an environment offering a greater variety of abundant resources (Smith 2002:58-59).

Current interpretations suggest that the Archaic Period populations followed a seasonal cycle of resource exploitation. Although similar in concept to the practices speculated for the big game hunters of the Paleo-Indian Period, the Archaic populations utilized a much broader range of resources, particularly with respect to plants. It is suggested that in the spring and early summer, bands would gather at the mouths of rivers and at rapids to take advantage of fish spawning runs. Later in the summer and into the fall season, smaller groups would move to areas of wetlands to harvest nuts and wild rice. During the winter, they would break into yet smaller groups probably based on the nuclear family and perhaps some additional relatives to move into the interior for hunting. The result of such practices would be to create a distribution of sites across much of the landscape (Smith 2002: 59-60).

The material culture of this period is much more extensive than that of the Paleo-Indians. Stylistic changes between Sub-Periods and cultural groups are apparent, although the overall quality in production of chipped lithic tools seems to decline. This period sees the introduction of ground stone technology in the form of celts (axes and adzes), manos and metates for grinding nuts and fibres, and decorative items like gorgets, pendants, birdstones, and bannerstones. Bone tools are also evident from this time period. Their presence may be a result of better preservation from these more recent sites rather than a lack of such items in earlier occupations. In addition, copper and exotic chert types appear during the period and are indicative of extensive trading (Smith 2002: 58-59).

1.2.1.3 WOODLAND PERIOD (APPROXIMATELY 1000 B.C.-1650 A.D.)

The primary difference in archaeological assemblages that differentiates the beginning of the Woodland Period from the Archaic Period is the introduction of ceramics to Ontario populations. This division is probably not a reflection of any substantive cultural changes, as the earliest sites of this period seem to be in all other respects a continuation of the Archaic mode of life with ceramics added as a novel technology. The seasonally based system of resource exploitation and associated population mobility persists for at least 1500 years into the Woodland Period (Smith 2002: 61-62).

The Early Woodland Sub-Period dates from about 1000-400 B.C. Many of the artifacts from this time are similar to the late Archaic and suggest a direct cultural continuity between these two temporal divisions. The introduction of pottery represents an entirely new technology that was probably acquired through contact with more southerly populations from which it likely originates (Smith 2002:62).

The Middle Woodland Sub-Period dates from about 400 B.C.-800 A.D. Within the region including the study area, a complex emerged at this time termed “Point Peninsula.” Point Peninsula pottery reflects a greater sophistication in pottery manufacture compared with the earlier industry. The paste and temper of the new pottery is finer and new decorative techniques such as dentate and pseudo-scallop stamping appear. There is a noted Hopewellian influence in southern Ontario populations at this time. Hopewell influences from south of the Great Lakes include a widespread trade in exotic materials and the presence of distinct Hopewell style artifacts such as platform pipes, copper or silver panpipe covers and shark’s teeth. The populations of the Middle Woodland participated in a trade network that extended well beyond the Great Lakes Region.

The Late Woodland Sub-Period dates from about 500-1650 A.D. The Late Woodland includes four separate phases: Princess Point, Early Ontario Iroquoian, Middle Ontario Iroquoian and Late Ontario Iroquoian.

The Princess Point phase dates to approximately 500-1000 A.D. Pottery of this phase is distinguished from earlier technology in that it is produced by the paddle method instead of coil and the decoration is characterized by the cord wrapped stick technique. Ceramic smoking pipes appear at this time in noticeable quantities. Princess Point sites cluster along major stream valleys and wetland areas. Maize cultivation is introduced by these people to Ontario. These people were not fully committed to horticulture and seemed to be experimenting with maize production. They generally adhere to the seasonal pattern of occupation practiced by earlier occupations, perhaps staying at certain locales repeatedly and for a larger portion of each year (Smith 2002: 65-66).

The Early Ontario Iroquoian stage dates to approximately 950-1050 A.D. This stage marks the beginning of a cultural development that led to the historically documented Ontario Iroquoian groups that were first contacted by Europeans during the early 1600s (Petun, Neutral, and Huron). At this stage formal semi-sedentary villages emerge. The Early stage of this cultural development is divided into two cultural groups in southern Ontario. The areas occupied by each being roughly divided by the Niagara Escarpment. To the west were located the Glen Meyer populations, and to the east were situated the Pickering people (Smith 2002: 67).

The Middle Ontario Iroquoian stage dates to approximately 1300-1400 A.D. This stage is divided into two sub-stages. The first is the Uren sub-stage lasting from approximately 1300-1350 A.D. The second of the two sub-stages is known as the Middleport sub-stage lasting from roughly 1350-1400 A.D. Villages tend to be larger throughout this stage than formerly (Smith 2002: 67).

The Late Ontario Iroquoian stage dates to approximately 1400-1650 A.D. During this time the cultural divisions identified by early European explorers are under development and the geographic distribution of these groups within southern Ontario begins to be defined.

1.2.2 POST-CONTACT LAND USE OUTLINE

The first Europeans reported to have visited the Pickering area specifically are Francois Fenelon and Abbe d'Urfe, French Sulpicians who spent the winter of 1669-1670 at an Iroquois village called Gandatsetiagon, located at the first fork of the Rouge River.

An Irish fur trader named Duffin is rumored to have been the first European to settle in Pickering. He had a small home on Duffins Creek and is rumored to have been the victim of a grisly murder. A traveler passing by his home found the door ajar, evidence of a struggle, and blood on the floor, and Duffin was never seen again. A 2014 article by Tom Mohr suggests that the tale of his demise may, however, be slightly embellished. Mohr, through an analysis of various historical documents, shows that Duffin was engaged in trade at Fort Niagara during the late 1770s, and likely returned to his home in County Antrim, Ireland in 1779 (Personal Communication, Tom Mohr 2019). The first recorded settler in what is now Pickering was William Peak, a fur trader turned farmer, who built a home near the mouth of Duffins Creek (Greenwald 1973: 62) around 1874 (Mohr 2014: 4).

The land that is now Pickering township was included in the Toronto Purchase in 1788 between the British and Mississauga First Nations, however records of the exact boundaries of the purchase are still disputed (Greenwald, 1973). Pickering was originally included in the Township of Whitby, which was first surveyed by Europeans in 1791 and 1795 by a man named Augustus Jones. An oversight in the survey of the townships along the north shore of Lake Ontario, between Etobicoke Creek to the west and Trenton to the east, resulted in the 1783 Gunshot Treaty being improperly negotiated between the Crown and First Nations. This was not corrected until 1923 when the Crown obtained this land by-way-of the Williams Treaty (Johnson 1973:25). Many of the lots along the lake shore were granted to ex-soldiers and government officials who, rather than partition and sell portions of their lots to farmers, were content to leave the land largely undeveloped until property values had risen. This resulted in, aside from a small number of leases on land reserves, a general lack of settlement south of the fifth concession until after the war of 1812 (Greenwald, 1973).

The earliest record of township matters is from a township book dated June 4, 1801 in which marks are given for livestock "belonging to the inhabitants of Pickering and Whitby" (Beers & Co. 1877). Records for Pickering alone were kept beginning in 1811. Beginning around 1816 successive waves of European and American immigrants arrived in the area, and by the 1830's much of the land in Pickering had been settled.

Today the nearest First Nation reserves are Scugog Island, east of Port Perry and Hiawatha on Rice Lake.

Map 2 is a facsimile segment from Tremaine's Map of the County of Ontario (Tremaine 1859). Map 2 illustrates the location of the study area and environs as of 1859. The study area is shown to include portions of a number of lots. The lots included in the study area are Concession 1 lots 23, 24, 25 and Concession 2 lots 25 and 26. Concession 1, Lot 23 is shown

to belong to PF Whitney, while ownership of lot 24 is attributed to William Shortis. Concession 1 Lot 25 is noted as having been split into two lots, the western lot belonging to George White and the eastern half to William Dunbar. North of Finch Ave are Lots 25 and 26 on Concession 2. Lot 25 is recoded as having belonged to Thomas Purvis, while Lot 26 is divided into an eastern and western half belonging to Mrs A Brand and L Ferguson, respectively. A church, the Erskine Presbyterian Church built in 1854 (N.A. 1954), is present on the south-west corner of Lot 26 at the intersection of what is now Finch Ave and Fairport Rd. This demonstrates that the original property of which the study area is a part was settled by the time that the atlas data was compiled. Accordingly, it has been determined that there is potential for archaeological deposits related to early Post-contact settlement within the study area. Additionally, it shows that the Pine Creek's watercourse has been altered, likely due to residential construction

Map 3, a facsimile segment of Beers' Map Of Pickering Township, which gives insight into the environs as of 1877. There are some notable changes that occurred during the 18 years between the creation of these maps. First, Concession 1 Lot 23 had changed ownership to B. Bush and a northern part of the lot had been severed and sold to D. Lawson. Additionally, a structure is present on the western side of D Lawson's parcel. D Lawson also owned the Eastern half of Lot 24, while the western half was owned by W. Dunbar. Both of these lots are now shown to have structures on them, albeit well outside of the study area. Concession 2 Lot 25 is noted as changing possession to C Campbell, and shows a structure present near to the location of the Study Area. The eastern half of half of lot 26 is still in the possession of Mrs Brand and the map indicates a structure has been erected on the property while the western half is now in the hands of Mrs Ferguson and contains a church and another structure just to the north of the church.

The changes between Map 2, Tremaine's map from 1859 and Map 3, Beers' map from 1877, are notable in that they display that the construction of a number of structures related to the settlement of the area occurred between these dates. Also notable is the presence of the Erskine Presbyterian Church near the modern intersection of Finch and Fairport Road. The church was originally closer to the intersection of the modern roads but was moved 100 feet east in 1936 and put on a concrete slab foundation (N.A., 1954).

A plan of the study area is included within this report as Map 4. Current conditions encountered during the Stage 1-2 Property Assessment are illustrated on Map 4.

1.2.3 SUMMARY OF HISTORICAL CONTEXT

The brief overview of readily available documentary evidence indicates that the study area is situated within an area that was close to historic transportation routes and a historic church and was well populated during the nineteenth century and, therefore, has potential for sites relating to early Post-contact settlement in the region. Background research indicates the property also has potential for significant archaeological resources of Native origins based on proximity to a natural source of potable water, the Pine Creek, as well as the presence of known archaeological sites nearby.

1.3 ARCHAEOLOGICAL CONTEXT

The study area consists of a river valley located in the city of Pickering, Ontario. It is bound on almost all sides by residential or commercial development, except for areas at the very northern edges of the study area, which are bound by roadways with farmland on the opposite side. A cemetery is present along the edge of a small area at the northwest of the Study area. Some areas are also adjacent to park lands that are not included in this study.

Various areas within the study area have been identified as exhibiting major landscape alterations and subsurface disturbances which include major grading to mitigate flooding, fill to facilitate road construction, pathways and underground electrical infrastructure and retaining walls to mitigate erosion. Additionally, much of the study area is made up of steep slopes in excess of 30 degrees, and seasonally flooded areas, limiting its archaeological potential. Consequently, in these areas there appears to be no potential to yield archaeological deposits of Cultural Heritage Value or Interest (CHVI) within the limits of the study area.

However, there are also some areas within the study area that do have high potential to yield archaeological deposits of Cultural Heritage Value or Interest (CHVI) based largely on their proximity to a primary water source, the Pine Creek, and the previous discovery of archaeological sites nearby.

1.3.1 PHYSIOGRAPHIC REGION

The study area is situated within the West Great Lakes St Lawrence Lowlands physiographic region, more specifically the South Slope physiographic region. The South Slope is described by Chapman and Putnam (1984: 172-174) as “the southern slope of the oak ridges moraine...extending from the Niagara Escarpment to the Trent River”. More specifically, the study area falls in a region with soil made up of “stone free calcareous clay loam over heavy-till” (Olding, Wicklund and Richards 1950). The soil in the study area is mostly classified as bottomlands soil, which consists of alluvial deposits, as much of the study area is a valley associated with the Pine Creek. There are also, to a lesser extent, parts of the study area with Brighton Sandy Loam on the west side of the creek and Smithfield Clay Loam on the east side of the creek. Brighton sandy loam is described as a well-drained, grey-brown calcareous sandy loam, while Smithfield Clay Loam is described as a grey brown, imperfectly drained clay loam (Chapman and Putnam 1984).

1.3.2 SURFACE WATER & VEGETATION

The Pine Creek runs throughout the extent of the study area. Pine Creek flows southward into Frenchman’s Bay on Lake Ontario, approximately 1.2km south of the southern extent of the study area. Vegetation in the study area consists of plants and trees typical of the Great Lakes St Lawrence Forest Region such as white pine, oak, cedar and basswood. Much of the study area is wetlands with vegetation such as cattails, bulrush, ferns and Phragmites.

1.3.3 LITHIC SOURCES

The study area is not located near any known lithic material sources. The nearest sources of chert to the study area are those of Onondaga chert, located on the opposite shore of Lake Ontario in New York State; while technically a shorter distance (~55km), one would have to travel across lake Ontario to access them. Excluding these sources, the closest known chert outcrop is the Balsam Lake formation located approximately 85 kilometers north of the study area.

1.3.4 REGISTERED ARCHAEOLOGICAL SITES

The Archaeological Sites Database administered by the MTCS indicates that there are 31 previously documented sites within 1 kilometre of the study area. However, it must be noted that this assumes the accuracy of information compiled from numerous researchers using different methodologies over many years. AMICK Consultants Limited assumes no responsibility for the accuracy of site descriptions, interpretations such as cultural affiliation, or location information derived from the Archaeological Sites Database administered by MTCS. In addition, it must also be noted that a lack of formerly documented sites does not indicate that there are no sites present as the documentation of any archaeological site is contingent upon prior research having been conducted within the study area.

1.3.4.1 PRE-CONTACT REGISTERED SITES

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MTCS. As a result, it was determined that twenty (20) archaeological sites relating directly to Pre-contact habitation/activity had been formally registered within the immediate vicinity of the study area. Two (2) of these sites (AkGs-16, AlGs-449) are multi-component sites listed as both Pre-contact and Post-contact sites. All previously registered Pre-contact sites are briefly described below in Table 2:

TABLE 2 PRE-CONTACT SITES WITHIN 1KM

Borden #	Site Name	Time Period	Affinity	Site Type
AkGs-16	Highbush	Archaic/Post-Contact	Aboriginal/Euro Canadian	Other/Findspot/Homestead
AkGs-18		Archaic, Late	Aboriginal	Findspot
AkGs-26	Glenbrook	Pre-Contact	Aboriginal	Scatter
AkGs-51	Amberlea	Pre-Contact	Aboriginal	Unknown
AlGs-1	Miller	Woodland, Late	Aboriginal, Iroquoian	Burial, Village
AlGs-106	Camp Pidaca	Pre-Contact	Aboriginal	Findspot
AlGs-108	Ramage	Pre-Contact	Aboriginal	Findspot
AlGs-13	Garland Ossuary	Woodland, Late	Aboriginal, Iroquoian	Ossuary

AlGs-14	Deckers Hill	Woodland, Late	Aboriginal	Campsite
AlGs-15		Other	Aboriginal	Campsite
AlGs-159		Archaic, Early	Aboriginal	Findspot
AlGs-199	McLachlan	Woodland, Late	Aboriginal, Iroquoian	Hamlet
AlGs-201	Isolated Find #18	Archaic, Late	Aboriginal	Findspot
AlGs-232	Valley Ross	Woodland, Late	Aboriginal	Unknown
AlGs-3	A. Bunker	Archaic	Aboriginal	Campsite
AlGs-380	Duffins Creek	Woodland, Late	Aboriginal	Campsite
AlGs-449	Disciples Church	Post-Contact, Pre-Contact	Aboriginal/Euro Canadian	Church/ Scatter
AlGs-495	White Owl Lithic Scatter	Archaic	Aboriginal	Scatter/ Workshop
AlGs-496	White Owl Area D	Pre-Contact	Aboriginal	Scatter
AlGs-500	West Duffins Creek Loc. 1	Woodland	Aboriginal	Findspot

One of the above noted archaeological sites, AlGs-3, is situated within 50 metres of the study area. Therefore, it demonstrates archaeological potential for further archaeological resources related to Pre-contact activity and occupation with respect to the archaeological assessment of the proposed undertaking.

1.3.4.2 POST-CONTACT REGISTERED SITES

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MTCS. As a result, it was determined that eleven (11) archaeological sites relating directly to Post-contact habitation/activity had been formally registered within the immediate vicinity of the study area. Two (2) of these sites (AkGs-16, AlGs-449) are multi-component sites listed as both Pre-contact and Post-contact sites. All previously registered Post-contact sites are briefly described below in Table 3:

TABLE 3 POST-CONTACT SITES WITHIN 1KM

Borden #	Site Name	Time Period	Affinity	Site Type
AkGs-16	Highbush	Archaic/ Post-Contact	Aboriginal/ Euro-Canadian	Other/Findspot/ Homestead
AkGs-2	Ganadatsetiagon	Post-Contact	Seneca	Campsite

AkGs-20	William Dunbar Residence	Post-Contact	Euro-Canadian	Homestead
AkGs-50	South Dunbarton	Post-Contact	Euro-Canadian	Homestead
AlGs-152	Wise-Whaley	Post-Contact	Euro-Canadian	Homestead
AlGs-230	Altona Forest	Post-Contact	Euro-Canadian	Dump
AlGs-439	Clarks Hollow	Post-Contact	Euro-Canadian	Findspot/ Homestead
AlGs-442	Palmer	Post-Contact	Euro-Canadian	Unknown
AlGs-449	Disciples Church	Post-Contact/ Pre-Contact	Euro-Canadian/ Aboriginal	Church, Scatter
AlGs-501	West Duffins Creek Loc. 4	Post-Contact	Euro-Canadian	Sawmill
AlGs-502	Whites Road Loc. 1	Post-Contact	Euro-Canadian	Homestead

None of the above noted archaeological sites are situated within 300 metres of the study area. Therefore, they have no impact on determinations of archaeological potential for further archaeological resources related to Post-contact activity and occupation with respect to the archaeological assessment of the proposed undertaking.

1.3.4.3 REGISTERED SITES OF UNKNOWN CULTURAL AFFILIATION

There are no sites of unknown cultural affiliation within 300m of the study area.

1.3.5 PREVIOUS ARCHAEOLOGICAL ASSESSMENTS

Background research shows that one previous study has taken place within 50m of the study area. For further information see:

MacDonald, J. (1992). *An A. A. of High Site Potential Areas of Cherrywood TS x Finch Jct Corridor Realignment/Consolidation Plus Extension 1 Report*

SUMMARY:

In 1992, John MacDonald conducted shovel test pitting followed by pedestrian survey of ploughed lands amounting to approximately 1 acre in area. A large Onondaga chert flake was recovered. Three 1m x 1m test-units were excavated and no further artifacts recovered. It was assumed that the majority of the site to the east, west and south of the findspot had been destroyed/removed as a result of electrical infrastructure construction.

1.3.5.2 PREVIOUS REGIONAL ARCHAEOLOGICAL POTENTIAL MODELLING

The study area is situated in area for which there is no archaeological master plan.

1.3.6 HISTORIC PLAQUES

There are no relevant plaques associated with the study area, which would suggest an activity or occupation within, or near, the study area that may indicate potential for associated archaeological resources of significant CHVI.

1.3.7 SUMMARY OF ARCHAEOLOGICAL CONTEXT

The study area consists of the wetlands, valleys and parklands associated with the Pine Creek watershed. The study area includes the Pine Creek as well as two smaller tributaries in the north, one north of the Erskine Church Cemetery, the other east of Lidia Crescent. The main waterway runs from a bush lot at the southeast corner of Lynn Heights Drive and Fairport Road, southward toward lake Ontario, crossing underneath Finch Avenue and Glenanna Road. The westernmost tributary flows from north-west of the Erskine church cemetery, in a southeast direction, crossing underneath Finch Ave, where it joins the primary waterway. The eastern tributary flows southward between Lydia Crescent and Gloucester Square, joining the main waterway just to the north of Pinecreek Court. A cursory examination of historic mapping of the study area suggests that the watercourse has been diverted in some areas, likely due to residential construction, however the watercourse modification is not significant enough, or distant enough from the original watercourse, as to diminish archaeological potential

A significant portion of the study area is steeply-sloped valley and seasonal wetlands associated with the Pine Creek. There are also level areas of higher ground found intermittently throughout the study area. The parts of the study area north and west of the bridge at Dixie Rd remain mostly natural, with little to no significant land disturbance aside from a retaining wall behind the shopping complex at the intersection of Dixie Rd and Finch Ave, and culverts beneath road-crossings. The westernmost tributary borders on the Erskine Church Cemetery to the south, but does not appear to contain buried infrastructure. South and East of the Dixie bridge, however, there is much more soil disturbance associated with built infrastructure. The study area included around the eastern-most tributary contains a fire station at the northernmost limit, as well as a retaining wall on the west bank of the river, behind the homes on Ridgewood Ct. The area surrounding the main waterway south-east of Finch Ave includes an area with a baseball diamond, a large circular cement pad, walking paths, and lighting and buried electrical associated with these paths.

Current conditions indicate that some portions of the study area have no or low archaeological potential and should be excluded from Stage 2 Property Assessment. This includes the footprint of existing structures, areas under gravel or cement, areas exhibiting significant soil disturbance, areas of steep slope and low-lying wet areas. However, a significant proportion of the study area does exhibit significant archaeological potential and therefore a Stage 2 Property Assessment is required in these areas. Refer to Map 4 for information regarding which areas require Stage 2 Assessment and which areas may be excluded from Stage 2 assessment.

A total of 31 previously registered archaeological sites have been documented within 1km of the study area. Of these, 20 are Pre-contact and 11 are Post-contact. One of these sites, the A. Bunker site, is located within 50m of the study area, therefore, demonstrating high archaeological potential for further archaeological resources of Pre-contact/Post-contact activity and occupation with respect to the archaeological assessment of the current study area.

The study area is not situated in area for which there is an archaeological master plan and There are no relevant plaques associated with the study area

The study area has potential for archaeological resources of Native origins based on proximity to previously registered archaeological sites of Pre-contact origins and proximity to a source of potable water that was also used as a means of waterborne trade and communication. Background research also suggests potential for archaeological resources of Post-contact origins based on proximity to previously registered archaeological sites of Post-contact origins, proximity to a historic roadway, and proximity to areas of documented historic settlement.

2.0 PROPERTY INSPECTION

A property inspection was carried out in compliance with Standards and Guidelines for Consultant Archaeologists (MTC 2011) to document the existing conditions of the study area to facilitate the Stage 2 Property Assessment. All areas of the study area were visually inspected and select features were photographed as a representative sample of each area. Observations made of conditions within the study area at the time of the inspection were used to inform the requirement for Stage 2 Property Assessment for portions of the study area as well as to aid in the determination of appropriate Stage 2 Property Assessment strategies. The locations from which photographs were taken and the directions toward which the camera was aimed for each photograph are illustrated in Map 5 of this report.

The documentation produced during the field investigation conducted in support of this report includes: one sketch map, one page of photo log, one page of field notes, and 28 digital photographs.

3.0 ANALYSIS AND CONCLUSIONS

3.1 STAGE 1 ANALYSIS AND CONCLUSIONS

3.1.1 CHARACTERISTICS INDICATING ARCHAEOLOGICAL POTENTIAL

Section 1.3.1 of the Standards and Guidelines for Consultant Archaeologists specifies the property characteristics that indicate archaeological potential (MTC 2011). Factors that indicate archaeological potential are features of the local landscape and environment that may have attracted people to either occupy the land or to conduct activities within the study area. One or more of these characteristics found to apply to a study area would necessitate a Stage 2 Property Assessment to determine if archaeological resources are present. These characteristics include:

- 1) Within 300m of Previously Identified Archaeological Sites
- 2) Within 300m of Primary Water Sources (e.g., lakes, rivers, streams, and creeks)
- 3) Within 300m of Secondary Water Sources (e.g., intermittent streams and creeks, springs, marshes, and swamps)
- 4) Within 300 m of Features Indicating Past Water Sources (e.g., glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, and cobble beaches)
- 5) Within 300m of an Accessible or Inaccessible Shoreline (e.g., high bluffs, swamp, or marsh fields by the edge of a lake, sandbars stretching into marsh)
- 6) Elevated Topography (e.g., eskers, drumlins, large knolls, and plateaux)
- 7) Pockets of Well-drained Sandy Soil, especially near areas of heavy soil or rocky ground.
- 8) Distinctive Land Formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings.
- 9) Resource Areas, including:
 - food or medicinal plants (e.g., migratory routes, spawning areas, and prairie)
 - scarce raw materials (e.g., quartz, copper, ochre or outcrops of chert)
 - resources of importance to early Post-contact industry (e.g., logging, prospecting, and mining)

- 10) Within 300m of Areas of Early Post-contact Settlement, including:
 - military or pioneer settlement (e.g., pioneer homesteads, isolated cabins, and farmstead complexes)
 - early wharf or dock complexes, pioneer churches and early cemeteries
- 11) Within 100m of Early Historical Transportation Routes (e.g., trails, passes, roads, railways, portage routes)
- 12) Heritage Property – A property listed on a municipal register or designated under the Ontario Heritage Act or is a federal, provincial, or municipal historic landmark or site.
- 13) Documented Historical or Archaeological Sites – property that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations. These are properties which have not necessarily been formally recognized or for which there is additional evidence identifying possible archaeological resources associated with historic properties in addition to the rationale for formal recognition.

The study area contains the Pine Creek, which is a primary water source and may have been a navigable waterway in antiquity. The study area is situated within 100m of early settlement roads, Dixie Rd, Kingston Rd and Finch Ave., that appear on the historic atlas maps of 1859 and 1877. The study area also includes an area near to the location of a historic church, the Erskine Presbyterian Church, and its cemetery. Additionally, a total of 31 previously registered archaeological sites have been documented within 1km of the study area including 20 Pre-contact and 11 Post-contact sites. One of these sites, the A. Bunker site, is located within 50m of the study area, demonstrating high archaeological potential for further archaeological resources of Pre-contact/Post-contact activity and occupation with respect to the archaeological assessment of the current study area.

3.1.2 CHARACTERISTICS INDICATING REMOVAL OF ARCHAEOLOGICAL POTENTIAL

Section 1.3.2 of the Standards and Guidelines for Consultant Archaeologists specifies the property characteristics which indicate no archaeological potential or for which archaeological potential has been removed (MTC 2011). These characteristics include:

- 1) Quarrying
- 2) Major Landscaping Involving Grading Below Topsoil
- 3) Building Footprints
- 4) Sewage and Infrastructure Development

The study area contains some areas where archaeological potential has been removed including areas of major landscaping, watercourse diversion and sewage/infrastructure development, as well as built structures, including large retaining walls and a fire station.

3.1.3 SUMMARY OF ARCHAEOLOGICAL POTENTIAL

Table 4 below summarizes the evaluation criteria of the Ministry of Citizenship and Multiculturalism (MCM) together with the results of the Stage 1 Background Study for the proposed undertaking. Based on the criteria, the property is deemed to have archaeological potential on the basis of its proximity to water, proximity to numerous previously documented archaeological sites, and the location of early historic settlement roads and a church and cemetery adjacent to the study area.

TABLE 4 EVALUATION OF ARCHAEOLOGICAL POTENTIAL

FEATURE OF ARCHAEOLOGICAL POTENTIAL		YES	NO	N/A	COMMENT
1	Known archaeological sites within 300m	Y			If Yes, potential determined
PHYSICAL FEATURES					
2	Is there water on or near the property?	Y			If Yes, what kind of water?
2a	Primary water source within 300 m. (lakeshore, river, large creek, etc.)	Y			If Yes, potential determined
2b	Secondary water source within 300 m. (stream, spring, marsh, swamp, etc.)	Y			If Yes, potential determined
2c	Past water source within 300 m. (beach ridge, river bed, relic creek, etc.)		N		If Yes, potential determined
2d	Accessible or Inaccessible shoreline within 300 m. (high bluffs, marsh, swamp, sand bar, etc.)		N		If Yes, potential determined
3	Elevated topography (knolls, drumlins, eskers, plateaus, etc.)		N		If Yes, and Yes for any of 4-9, potential determined
4	Pockets of sandy soil in a clay or rocky area		N		If Yes and Yes for any of 3, 5-9, potential determined
5	Distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.)		N		If Yes and Yes for any of 3-4, 6-9, potential determined
HISTORIC/PREHISTORIC USE FEATURES					
6	Associated with food or scarce resource harvest areas (traditional fishing locations, agricultural/berry extraction areas, etc.)	Y			If Yes, and Yes for any of 3-5, 7-9, potential determined.
7	Early Post-contact settlement area within 300 m.	Y			If Yes, and Yes for any of 3-6, 8-9, potential determined
8	Historic Transportation route within 100 m. (historic road, trail, portage, rail corridors, etc.)	Y			If Yes, and Yes for any 3-7 or 9, potential determined
9	Contains property designated and/or listed under the Ontario Heritage Act (municipal heritage committee, municipal register, etc.)		N		If Yes and, Yes to any of 3-8, potential determined
APPLICATION-SPECIFIC INFORMATION					
10	Local knowledge (local heritage organizations, Pre-contact, etc.)		N		If Yes, potential determined
11	Recent disturbance not including agricultural cultivation (post-1960-confirmed extensive and intensive including industrial sites, aggregate areas, etc.)	Y			If Yes, no potential or low potential in affected part (s) of the study area.

If **YES** to any of 1, 2a-c, or 10 Archaeological Potential is **confirmed**

If **YES** to 2 or more of 3-9, Archaeological Potential is **confirmed**

If **YES** to 11 or No to 1-10 Low Archaeological Potential is **confirmed** for at least a portion of the study area.

4.0 RECOMMENDATIONS

4.1 STAGE 1 RECOMMENDATIONS

The study area has been identified as a property that exhibits potential to yield archaeological deposits of Cultural Heritage Value or Interest (CHVI). The objectives of the Stage 1 Background Study have therefore been met and in accordance with the results of this investigation, the following recommendations are made:

1. *The proposed undertaking has potential for archaeological resources and a Stage 2 Archaeological Property Assessment is recommended.*
2. *No soil disturbances or removal of vegetation shall take place within the study area prior to the MTCS acceptance of a report into the Provincial Registry of Archaeological Reports that recommends all archaeological concerns for the proposed undertaking have been addressed and no further archaeological investigations are required.*

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

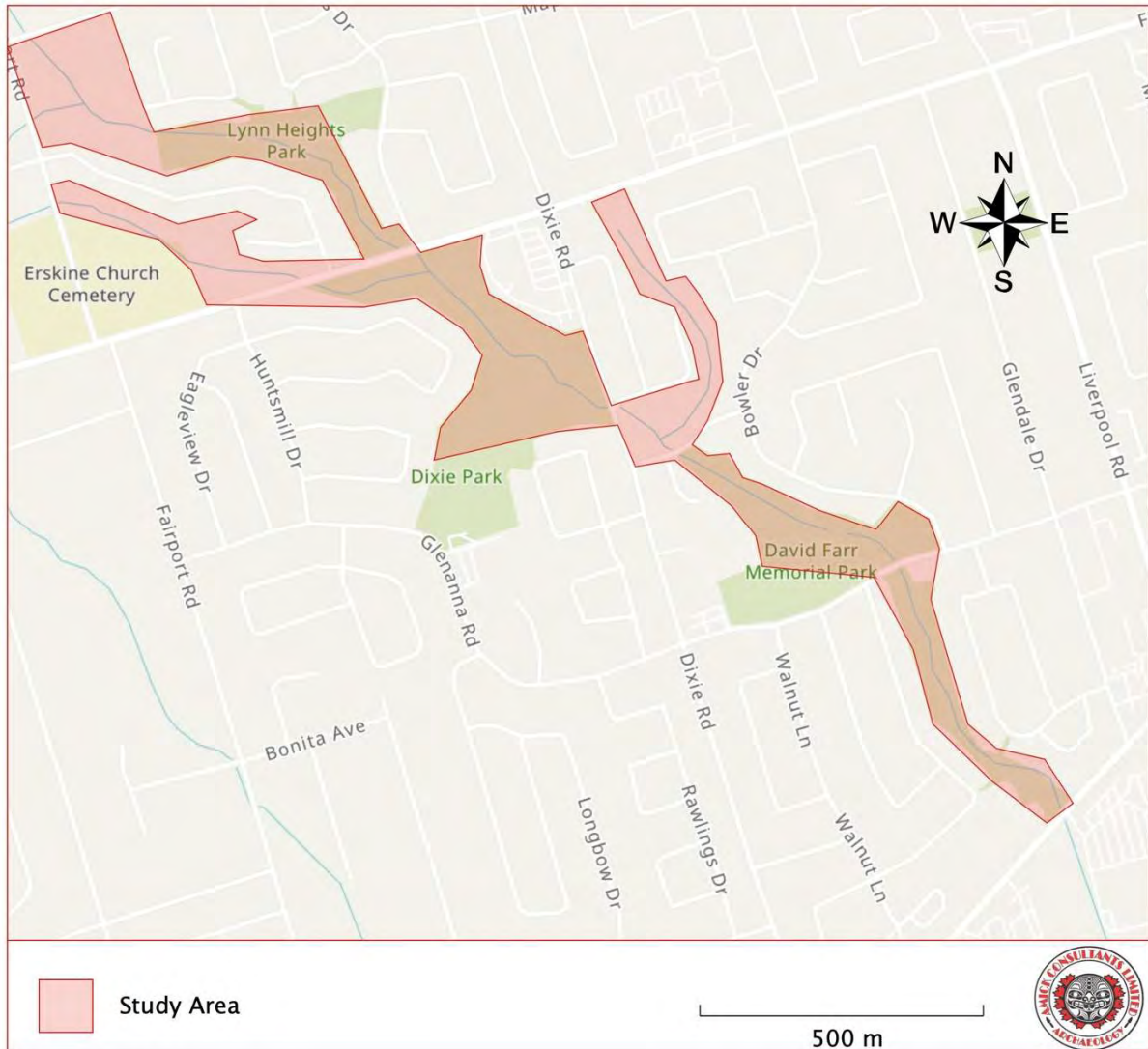
While not part of the archaeological record, this report must include the following standard advisory statements for the benefit of the proponent and the approval authority in the land use planning and development process:

- a. *This report is submitted to the Minister of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c. 0.18. The report is reviewed to ensure that it complies with the standards and guidelines issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Citizenship and Multiculturalism, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.*
- b. *It is an offence under Sections 48 and 69 of the Ontario Heritage Act for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the Ontario Heritage Act.*
- c. *Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.*
- d. *The Cemeteries Act, R.S.O. 1990, c. C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.*
- e. *Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.*

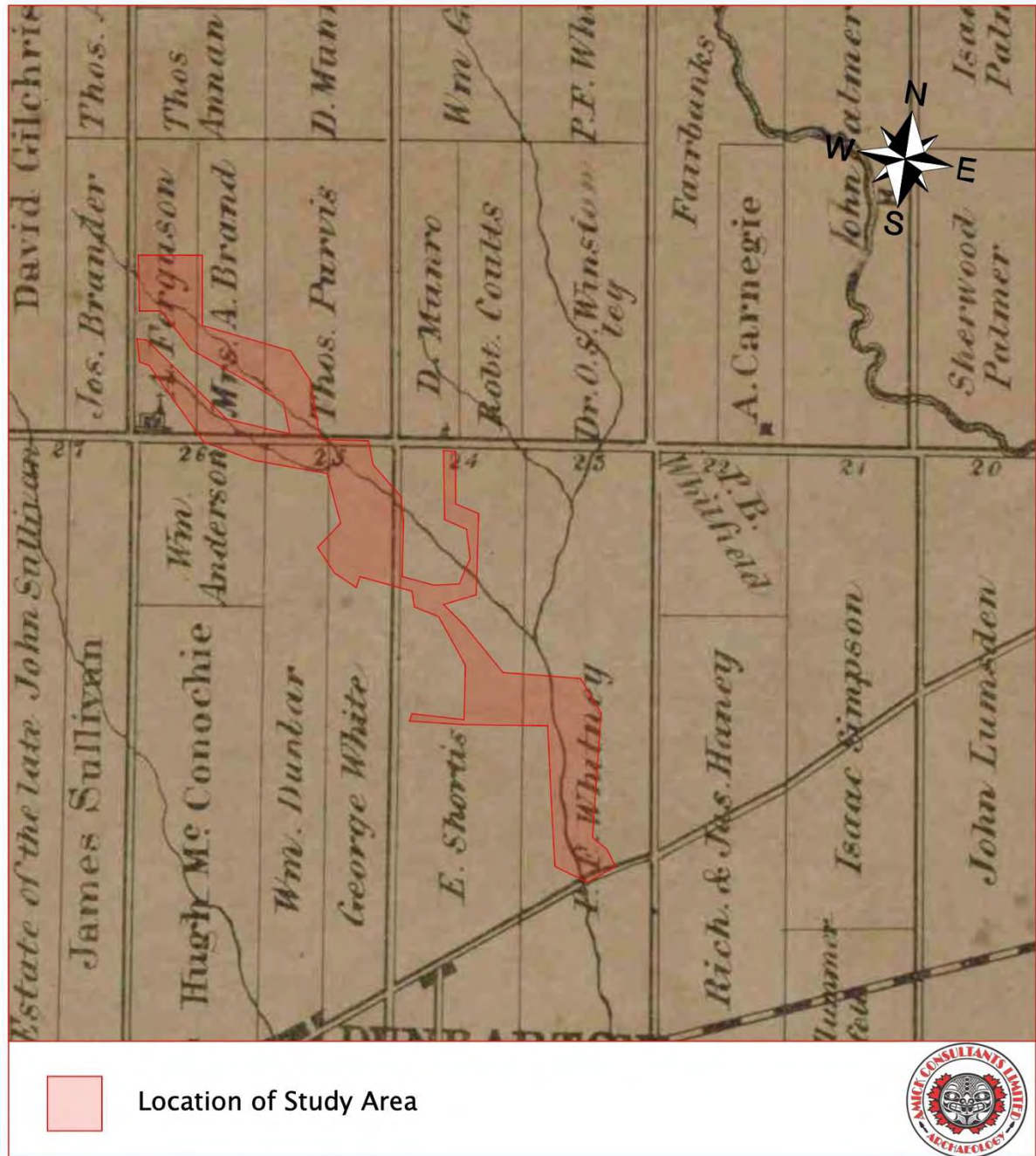
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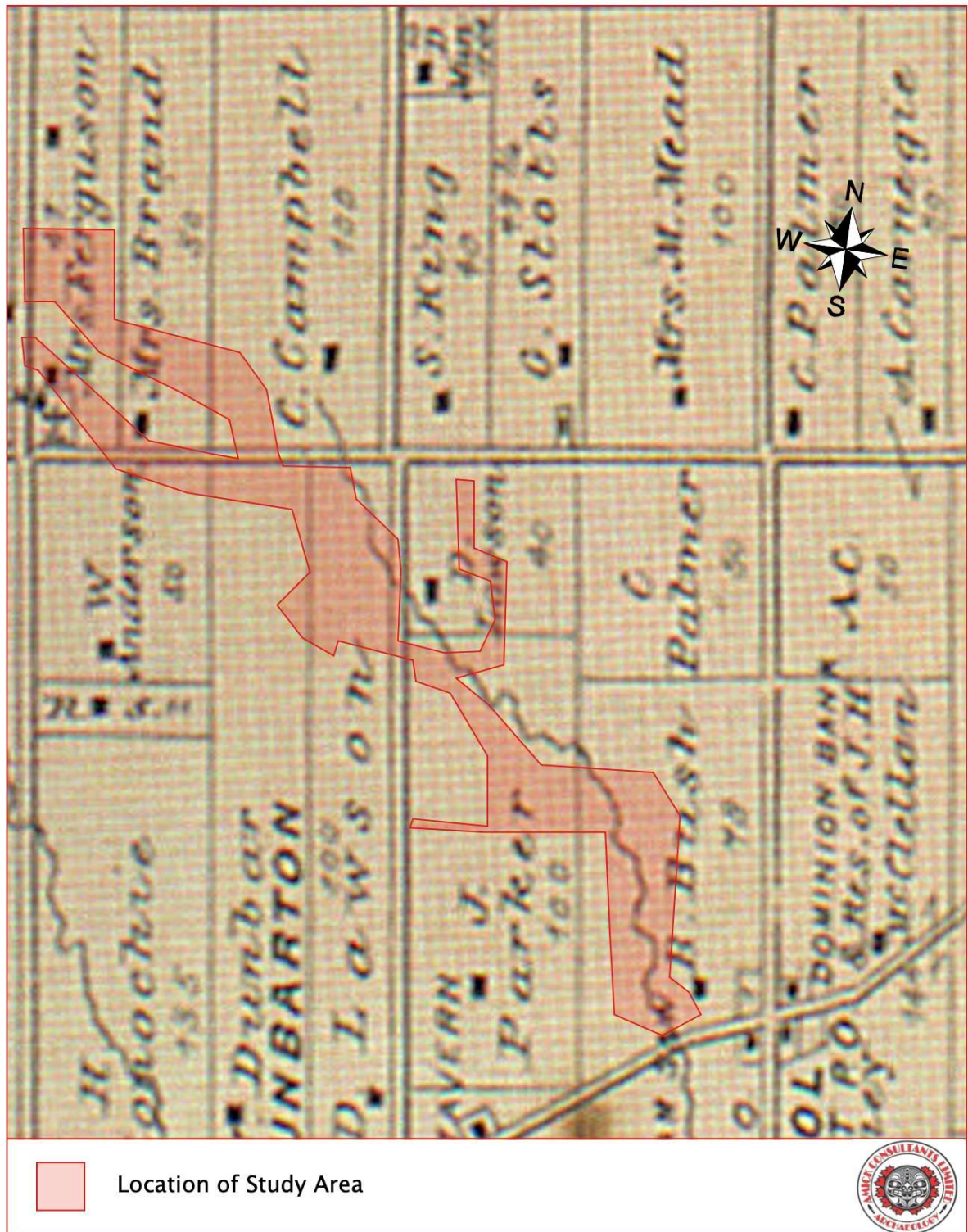
MAPS



MAP 1 LOCATION OF THE STUDY AREA (ESRI 2022)



MAP 2 FACSIMILE SEGMENT OF TREMAINE'S MAP OF THE COUNTY OF ONTARIO
(TREMAINE 1859)



MAP 3 FACSIMILE SEGMENT OF THE HISTORIC ATLAS MAP OF THE TOWNSHIP OF
ONTARIO (BEERS 1877)



**MAP 4 AERIAL PHOTO OF STUDY AREA AND RECOMMENDED STAGE 2 STRATEGY
(GOOGLE EARTH, 2022)**



**MAP 5 AERIAL PHOTO OF THE STUDY AREA INDICATING PHOTO NUMBER AND DIRECTION
(GOOGLE EARTH, 2022)**

IMAGES

	
IMAGE 1 CULVERT UNDER FINCH AVE	IMAGE 2 STEEP SLOPE
	
IMAGE 3 TESTABLE AREA	IMAGE 4 SEASONAL WETLAND
	
IMAGE 5 CREEK BANK	IMAGE 6 STEEP SLOPE

	
IMAGE 7 EVIDENCE OF BURIED INFRASTRUCTURE	IMAGE 8 TESTABLE AREA
	
IMAGE 9 SEASONAL WETLAND	IMAGE 10 TRASH IN SEASONAL WETLAND
	
IMAGE 11 RETAINING WALL BEHIND PLAZA	IMAGE 12 TESTABLE AREA



IMAGE 13 TESTABLE AREA



IMAGE 14 CREEK RUNNING THROUGH TESTABLE AREA



IMAGE 15 TESTABLE AREA



IMAGE 16 TESTABLE AREA



IMAGE 17 TESTABLE AREA



IMAGE 18 LAWN/FIELD AREA



IMAGE 19 TESTABLE LAWN/FIELD AREA



IMAGE 20 TESTABLE LAWN/FIELD AREA



IMAGE 21 WALKING PATH WITH LIGHTING



IMAGE 22 TESTABLE AREA



IMAGE 23 SEASONALLY FLOODED AREA



IMAGE 24 FIRE STATION IN STUDY AREA (GOOGLE EARTH 2021)



IMAGE 25 STORM DRAIN AND RETAINING WALL



IMAGE 26 TESTABLE AREA



IMAGE 27 TESTABLE AREA



IMAGE 28 PLAYGROUND AND PATH WITH LIGHTS