Project Code: PN16107 pid Stream Assessment Technique Jate: Stream/Reach: 16.2017 Weather: Location: New Sudbury Field Staff: Watershed/Subwatershed: inction Creek Evaluation Poor Fair Good **Excellent** Category < 50% of bank network 50-70% of bank network · 71-80% of bank network > 80% of bank network stable stable stable stable Recent bank sloughing, Infrequent signs of bank · Recent signs of bank · No evidence of bank slumping or failure sloughing, slumping or sloughing, slumping or sloughing, slumping or frequently observed failure fairly common failure failure · Stream bend areas highly Stream bend areas · Stream bend areas stable Stream bend areas very unstable unstable · Outer bank height 0.6-0.9 stable m above stream bank (1.2-Outer bank height 1.2 m Outer bank height 0.9-Height < 0.6 m above above stream bank 1.2 m above stream 1.5 m above stream bank stream (< 1.2 m above (2.1 m above stream bank for large mainstem areas) stream bank for large bank for large mainstem (1.5-2.1 m above stream · Bank overhang 0.6-0.8 m mainstem areas) bank for large mainstem areas) Bank overhang < 0.6 m Bank overhang > 0.8-1.0 areas) · Bank overhang 0.8-0.9m Channel Stability · Young exposed tree roots · Young exposed tree roots · Exposed tree roots · Exposed tree roots old, abundant common predominantly old and large and woody > 6 recent large tree falls large, maller young roots 4-5 recent large tree falls Generally 0-1 recent large per stream mile per stream mile scarce tree falls per stream mile 2-3 recent large tree falls per stream mile · Bottom 1/3 of bank is generally highly erodible highly erodible materia generally highly resistant generally highly resistant Plant/soil matrix sev∉rely material plant/soil matrix or material plant/soil matrix or compromised がant/soil matrix material compromised · Channel cross-section is hannel cross-section is · Channel cross-section is · Channel cross-section is generally trapezoidally generally trapezoidallygenerally V- or U-shaped generally V- or U-shaped shaped shaped Point range **0 0 1 0 2** □ 3 4 🗆 5 □ 6 □ 7 □ 8 □ 10 □ 11 > 75% embedded (> 50-75% émbèdded (60-· 25-49% embedded (35-• Riffle embeddedness < 85% embedded for large 85% embedded for large 59% embedded for large 25% sand-silt (< 35% mainstem areas) mainstem areas) embedded for large mainstem areas) mainstem areas) · Few, if any, deep pools · Low to moderate number Moderate number of deep · High number of deep pools Pool substrate of deep pools Pool (> 61 cm deep) composition >81% sand- Pool substrate Pool substrate composition (> 122 cm deep for large silt composition 30-89% sand-silt mainstem areas) 60-80% sand-silt Pool substrate composition <30% sand-silt Streambed streak marks · Streambed streak marks · Streambed streak marks Streambed streak marks Channel and/or "banana"-shaped and/or "banana"-shaped and/or "banana"-shaped Scouring/ and/or "banana"-shaped sediment deposits sèdiment deposits sediment deposits sediment deposits absent Sediment common common uncommon Deposition Fresh, large sand · Fresh, large sand · Fresh, large sand deposits Fresh, large sand deposits deposits very common in deposits common in uncommon in channel rare or absent from channel channel · Small localized areas of channel Moderate to heavy sand Small localized areas of fresh sand deposits along No evidence of fresh deposition along major fresh sand deposits along top of low banks sediment deposition on portion of overbank area top of low banks overbank Point bars present at · Point bars common, · Point bars small and stable, Point bars few, small and most stream bends, moderate to large and well-vegetated and/or stable, well-vegetated moderate to large and unstable with high armoured with little or no and/or armoured with little unstable with high amount of fresh sand fresh sand or no fresh sand amount of fresh sand 5 □ 6 Point range □ 0 □ 1 □ 2 □ 3 · □ 4 □ 7 □ 8

Date:	May 16, 2017	Reach: JC15	Project Code:	PM1607	
Evaluation Category	Poor	Fair	Good	Excellent	
	Wetted perimeter < 40% of bottom channel width (< 45% for large mainstem areas)	Wetted perimeter 40- 60% of bottom channel width (45-65% for large mainstem areas)	Wetted perimeter 61-85% of bottom channel width (66-90% for large mainstem areas)	Wetted perimeter > 85% of bottom channel width (> 90% for large mainstem areas)	
	Dominated by one habitat type (usually runs) and by one velocity and depth condition (slow and shallow) (for large mainstem areas, few riffles present, runs and pools dominant, velocity and depth diversity low)	Few pools present, riffles and runs dominant. Velocity and depth generally slow and shallow (for large mainstem areas, runs and pools dominant, velocity and depth diversity intermediate)	Good mix between riffles, runs and pools Relatively diverse velocity and depth of flow .	Riffles, runs and pool habitat present Diverse velocity and depth of flow present (i.e., slow, fast, shallow and deep water) Riffles, runs and pool habitation flowers.	
Physical Instream	Riffle substrate composition: predominantly gravel with high amount of sand < 5% cobble	 Riffle substrate composition: predominantly small cobble, gravel and sand 5-24% cobble 	Riffle substrate composition: good mix of gravel, cobble, and rubble material 25-49%-cebble	Riffle substrate composition: cobble, gravel, rubble, boulder mix with little sand > 50% cobble	
Habitat	Riffle depth < 10 cm for large mainstem areas	Riffle depth 10-15 cm for large mainstem areas	Riffle depth 15-20 cm for large mainstem areas	Riffle depth > 20 cm for large mainstem areas	
v .	Large pools generally < 30 cm deep (< 61 cm for large mainstem areas) and devoid of overhead cover/structure	Large pools generally 30- 46 cm deep (61-91 cm for large mainstem areas) with little or no overhead cover/structure	Large pools generally 46-61 cm deep (91-122 cm for large mainstem areas) with some overhead cover/structure	Large pools generally > 61 cm deep (> 122 cm for large mainstem areas) with good overhead cover/structure	
Extensive channel alteration and/or point bar formation/enlargement		Moderate amount of channel alteration and/or moderate increase in point bar formation/enlargement	Slight amount of channel alteration and/or slight increase in point bar formation/enlargement	No channel alteration or significant point bar formation/enlargement	
	• Riffle/Pool ratio 0.49:1 ; ≥1.51(1	• Riffle/Pool ratio 0.5- 0.69:1; 1.31-1.5:1	• Riffle/Pool ratio 0.7-0.89:1 ; 1.11-1.3:1	• Riffle/Pool ratio 0.9-1.1:1	
	Summer afternoon water temperature > 27°C	Summer afternoon water temperature 24-27°C	Summer afternoon water temperature 20-24°C	Summer afternoon water temperature < 20°C	
Point range	□ 0 □ 1 □ 2	□ 3 □ 4	5 🗆 6	□ 7 □ 8	
	Substrate fouling level: High (> 50%)	Substrate fouling level: Moderate (21-50%)	Substrate fouling level: Very light (11-20%)	Substrate fouling level: Rock underside (0-10%)	
Water Quality	Brown colour TDS: x 150 mg/L	• Grey colour • TDS: 101-150 mg/L	Slightly grey colour TDS: 50-100 mg/L	• Clear flow • TDS: < 50 mg/L	
water quality	Objects visible to depth < 0.15m below surface	 Objects visible to depth 0.15-0.5m below surface 	Objects visible to depth 0.5-1.0m below surface	Objects visible to depth 1.0m below surface	
	Moderate to strong organic odour	 Slight to moderate organic odour 	Slight organic odour	· No octour	
Point range	□ 0 □ 1 □ 2	⊠ 3 □ 4	□ 5 □ 6	□ 7 □ 8	
Riparian Habitat	Narrow riparian area of mostly non-woody vegetation	Riparian area predominantly wooded but with major localized gaps	Forested buffer generally > 31 m wide along major portion of both banks	Wide (> 60 m) mature forested buffer along both banks	
Conditions	Canopy coverage: <50% shading (30% for large mainstem areas)	 Canopy coverage: 50- 60% shading (30-44% for large mainstem areas) 	Canopy coverage: 60-79% shading (45-59% for large mainstem areas)	• Canopy coverage: >80% shading (> 60% for large mainstem areas)	
Point range	001	⊠ 2 □ 3	O 4 O 5	□ 6 □ 7	
Total overall s	core (0-42) = \Q	Poor (<13) Fa	Good (25-3	(34) Excellent (>35)	

Completed by: _____ Checked by:

15



4 fill & Shall strom V (ion colour 23015 (pics) -) HI Connected stroms

Shopping ants, 144

GEO Project Code/Phase: PN 1610 1

Reach Characteristics

P H -

ω Ο Σ

area of 303 Staining **Turbidity** (Table 17) Odour (Table 16) 4,5 Coronge Evidence: IVON Water Quality くのは New Sundous Coverage of Reach (%) ころいという ☑Groundwater Density of WD: ☐ Moderate □ Low Aquatic/Instream Vegetation ☑ Present in Cutbank ☐ Present in Channel Watershed/Subwatershed: Flow Type (Table 5) Type (Table8) Woody Debris UTM (Downstream) Stream/Reach: Channel Zone (Table 4) Location: (Table 4) Encroachment: (Table 7) ☐ Established (5-30) ☐ Immature (<5) T Age Class (yrs): Mature (>30) Channel Type (Table 3) 小 4-10 □ > 10 \Box 1-4 Channel widths May Valley Type (Table 2) Fragmented ☐ Continuous Coverage: None Riparian Vegetation Land Use 7.4 (Table 1) UTIM (Upstream) (Table 6) 1, 2 Dominant Type: Field staff: Weather: Species: Date:

L/High

☐ Not Present

Channel Characteristics												
Sinuosity (Type)	Sinuosity (Degree)	Gradient	Number of Channels		Clay/Silt	Sand (Gravel (Cobble	Boulder	Parent	Rootlets	
(Table 9)	(Table 10)	(Table 11)	(Table 12)	Riffle Substrate			7					
Entrenchment	Type of Bank Failure	Downs's Classification	,	Pool Substrate		Þ	Þ					
(Table 13)	(Table 14)	(Table 15)		Bank Material	B							
Bankfull Width (m) Bankfull Depth (m) Riffle/Pool Spacing (m) Pool Depth (m) OF >1,2 Veloctity (m/s)		7.5		Meander Amplitude: Compared Stimated Compared Science Compared Com		Bank Angle 0 - 30 30 - 60 70 - 90 Undercut	Bank Erosion	5	Notes: 10-15 of cools (1) New Franch Heoder Cools (1) New Still water that to within the cool of the	The control of the co	Notes: 10-15 of coorts (1.1-1) e conver tour H lecope a rea contra de contra contra de contra de contra de contra contra de co	1 1 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
	2000			300 (45) 	8		ರ ₌	ó		- A 102 0% CACOTTO (OCT)	

undersof or ended in some sections due to deep/dark

y couldn't tell it bank was

Come to come

Share / bank , beside

and wellted creptin holliers begins and collivers of ones

Bank angle to about 900

presty mich o

かしまつけおしろ

on opposite side of the rood, post the second creek, water gets more shallow > can now see point bours on meanders and more evidence of emsion.

more debris (woody) upstream as well

General Site Characteristics

Project Code: PN 16 107

Date: May	14,2017 Street	am/Reach:	5 J 1 W	
Weather: Sunr	Loca	tion:		
Field Staff: AVI	SC/AW Water	ershed/Subwatershed:	Junction	creek,

Field S	taff:	AVISCI AW	Watershed/Subwatershed: Junction Creek
Feature	es		Site Sketch:
	Reach break		
* *	Cross-section		VS (
	Flow direction		
~~	Riffle		N
\bigcirc	Pool		
	Medial bar		
HHHHHH	Eroded bank		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	Undercut bank		1 4 4 4
XXXXXX	Rip rap/stabilization	ı/gabion	
	Leaning tree		4
xx	Fence		63 \ \\(\)
	Culvert/outfall		
	Swamp/wetland		
WWW	Grasses		(5)
(3)	Tree		+ flow
	Instream log/tree		S X SV. A
***	Woody debris		C + 52
只	Station location		Six I Free
VV	Vegetated island		5V52 J 7977
Flow T	уре		3 13 142 53
H1	Standing water		7412 53
H2	Scarcely perceptible	e flow	73
нз	Smooth surface floo	W	\SV2
H4	Upwelling		m m
Н5	Rippled		W J X X
Н6	Unbroken standing	wave	2 + 153
H7	Broken standing wa	ave	7 x 1 2 x
Н8	Chute		
Н9	Free fall		S1/3/2
Substi	rate		
S1	Silt	S6 Small boulder	
S2	Sand	S7 Large boulder	The state of the s
S3	Gravel	S8 Bimodal	1 / Y / X J F F F F F F F F F
S4	Small cobble	S9 Bedrock/till	
S5	Large cobble		Mynz
Other			FP \$152
вм	Benchmark	EP Erosion pin	
BS	Backsight	RB Rebar	(area was
DS	Downstream	US Upstream	previously DS
WDJ	Woody debris jam	TR Terrace	flooded)
VWC	Valley wall contact		Scale:
BOS	Bottom of slope	FP Flood plain	Additional Notes:
TOS	Top of slope	KP Knick point	

nid Geomo	orph	ic Assessment		Project Code:	PN1610	14_		
			Stream/F	Reach:	#J16			
	lay		Location:		New S	da	MY	
ather:	Jul	nny			TC			
ld Staff:	44.	AW, SC	Watersho	ed/Subwatershed:	00		-12	-
		Ge	eomorphic Inc	dicator		Prese		Factor Value
Process	No.	Description				Yes	No	
	1	Lobate bar			,			
	2	Coarse materials in riffle	es embedded					
	3	Siltation in pools						1/
vidence of ggradation	4	Medial bars					V/	7
(AI)	 5	Accretion on point bars					V	
	6	Poor longitudinal sorting	g of bed mate	erials				
	7	Deposition in the overb				V.	10	0.14
		Doposition		Sı	um of indices =		6	0.14
		LL : L - facting	/c)					
	1	Exposed bridge footing	(5)	nalina / etc			V	
	2	Exposed sanitary / stor	m sewer / pi	penne / ccc.		NA		ν.
	3	Elevated storm sewer of	outrail(s)	oto aprons / etc.		3,1	\checkmark	1/8
	4	Undermined gabion ba	skets / concre	/ storm sewer outlet	rs		V	10
Evidence of Degradation	5	Scour pools downstrea	m of culverus	/ Storm sewer outloo			V	
(DI)	6	Cut face on bar forms				•		
, ,	7	Head cutting due to kr	nick point mig	ration			V	
	8	Terrace cut through ol	der bar mate	riai				
	9	Suspended armour lay	er visible in t	Dank bodrock		1		
	10	Channel worn into unc	listurbed ove	rburden / bedrock	Sum of indices =	1	8	0.13
				-	Jan C. Maria			
	1	Fallen / leaning trees	/ fence posts	/ etc.		V		
	2	Occurrence of large or	rganic debris			V		
	3	Exposed tree roots				IV_	-	-
	4	Basal scour on inside	meander ber	nds			- V	5/0
Evidence of	5	Basal scour on both s	ides of chann	el through riffle		1	-	19
Widening	6	Outflanked gabion ba	skets / concrete walls / etc.				- V	-
(WI)	7	Longth of basal scour	>50% throu	gh subject reach		1	+	-
	8		eviously burie	ed pipe / cable / etc.				-
	9	i	op of bank			100		
	10					No	BU	0.50
					Sum of indices	= 2	יישני	10.54
			.)				V	
	1	Formation of chute(s	ol to multiple	channel			//	
Evidence of	2		to form to lov	hed relief form			V	
Planimetric			ie ioiii to iov	V Dea Fellot 1911			I V	0/1
Form	. 4		a)					
Adjustment (PI)	-	Formation of island(Thalweg alignment of	sut of phase i	with meander form			1	
		1 (mod / rework	red / removed				
		7 Bar forms poorly for	med / Tewori	(ca / remains	Sum of indices	= 0	17_	0.0
				Stability In	dex (SI) = (AI	+DI+W	I+PI)/4	= 0.2
Additional no	otes:		Condition	In Regime	In Transition	2000	In Adj	ustment
			SI score =	□ 0.00 - 0.20	0.21 - 0	0.40	口	0.41
`			DI 30010	A STATE OF THE STA	1			

Completed by: ____ Checked by:

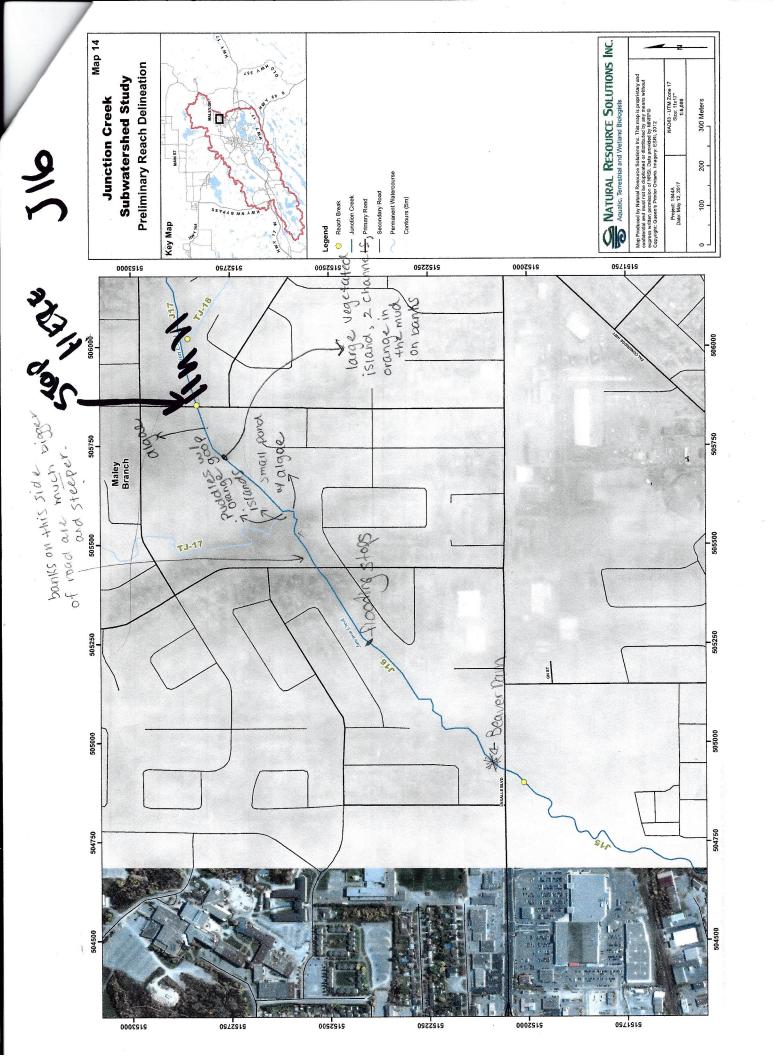
Rapid Stream Assessment Technique

Project Code: PN 16 107

Date:	May 16, 2017	Stream/Reach:	75/16	
Weather:	Sunnis	Location:	News	doury
Field Staff:	AV, AW, SC	Watershed/Subwater	shed: JC)
Evaluation Category	Poor	Fair	Good	Excellent
e e	stable	 50-70% of bank network stable Recent signs of bank sloughing, slumping or failure fairly common 	 71-80% of bank network stable Infrequent signs of bank sloughing, slumping or failure 	 > 80% of bank network stable No evidence of bank sloughing, slumping or failure
Channel	unstable Outer bank height 1.2 m above stream bank (2.1 m above stream bank for large mainstem areas) Bank overhang > 0.8-1.0	 Stream bend areas unstable Outer bank height 0.9-1.2 m above stream bank (1.5-2.1 m above stream bank for large mainstem areas) Bank overhang 0.8-0.9m 	Stream bend-areas stable Outer bank height 0.6-0.9 m above stream bank (12-1.5 m above stream bank) for large mainstem areas) Bank overhang 0.6-0.8 m	 Stream bend areas very stable Height < 0.6 m above stream (< 1.2 m above stream bank for large mainstem areas) Bank overhang < 0.6 m
Stability	abundant	 Young exposed tree roots common 4-5 recent large tree falls per stream mile 	Exposed tree roots predominantly old and large, smaller young roots scarce 2-3 recent large tree falls per stream mile	Exposed tree roots old, large and woody Generally 0-1 recent large tree falls per stream mile
	Bottom 1/3 of bank is highly erodible material Plant/soil matrix severely compromised	Bottom 1/3 of bank is generally highly erodible material Plant/soil matrix compromised	Bottom 1/3 of bank is generally highly resistant plant/soil matrix or material	Bottom 1/3 of bank is generally highly resistant plant/soil matrix or material
	Channel cross-section is generally trapezoidally- shaped	 Channel cross-section is generally trapezoidally- shaped 	Channel cross-section is generally V- or U-shaped	Channel cross-section is generally V- or U-shaped
Point range	□ 0 □ 1 □ 2	3 4 5	6 0 7 0 8	0 9 0 10 0 11
_	• > 75% embedded (> 85% embedded for large mainstem areas)	• 50-75% embedded (60- 85% embedded for large mainstem areas)	• 25-49% embedded (35- 59% embedded for large mainstem areas)	Riffle embeddedness < 25% sand-silt (< 35% embedded for large mainstem areas)
	Few, if any, deep pools Pool substrate composition >81% sand- silt	 Low to moderate number of deep pools Pool substrate composition 60-80% sand-silt 	Moderate number of deep pools Pool substrate composition 30-59% sand-silt	High number of deep pools (> 61 cm deep) (> 122 cm deep for large mainstem areas) Pool substrate composition <30% sand-silt
Channel Scouring/ Sediment Deposition	Streambed streak marks and/or "banana"-shaped sediment deposits common	 Streambed streak marks and/or "banana"-shaped sediment deposits common 	Streambed streak marks and/or "banana"-shaped sediment deposits uncommon	Streambed streak marks and/or "banana"-shaped sediment deposits absent
2000000	Fresh, large sand deposits very common in channel Moderate to heavy sand deposition along major portion of overbank area	 Fresh, large sand deposits common in channel Small localized areas of fresh sand deposits along top of low banks 	Fresh, large sand deposits uncommon in channel Small localized areas of fresh sand deposits along top of low banks	Fresh, large sand deposits rare or absent from channel No evidence of fresh sediment deposition on overbank
	Point bars present at most stream bends, moderate to large and unstable with high amount of fresh sand	Point bars common, moderate to large and unstable with high amount of fresh sand	Point bars small and stable, well-vegetated and/or armoured with little or no fresh sand	Point bars few, small and stable, well-vegetated and/or armoured with little or no fresh sand
Point range	□ 0 □ 1 □ 2 _.	□ 3 □ 4	5 🗆 6	□ 7 □ 8

Date:	May , 2017	Reach: J/6	Project Code:	P1416107	
Evaluation Category	Poor	Fair	Good	Excellent	
	• Wetted perimeter < 40% of bottom channel width (< 45% for large mainstem areas)	Wetted perimeter 40- 60% of bottom channel width (45-65% for large mainstem areas)	Wetted perimeter 61-85% of bottom channel width (66-90% for large mainstem areas)	Wetted perimeter > 85% of bottom channel width (> 90% for large mainstem areas)	
	Dominated by one habitat type (usually runs) and by one velocity and depth condition (slow and shallow) (for large mainstem areas, few riffles present, runs and pools dominant, velocity and depth diversity low)	 Few pools present, riffles and runs dominant. Velocity and depth generally slow and shallow (for large mainstem areas, runs and pools dominant, velocity and depth diversity intermediate) 	 Good mix between riffles, runs and pools Relatively diverse velocity and depth of flow 	Riffles, runs and pool habitat present Diverse velocity and depth of flow present (i.e., slow, fast, shallow and deep water) Riffles, runs and pool habitation for the present of the pool habitation for the pool habitatio	
Physical Instream	 Riffle substrate composition: predominantly gravel with high amount of sand < 5% cobble 	 Riffle substrate composition: predominantly small cobble, gravel and sand 5-24% cobble 	Riffle substrate composition: good mix of gravel, cobble, and rubble material 25-49% cobble	Riffle substrate composition: cobble, gravel, rubble, boulder mix with little sand > 50% cobble	
Habitat	 Riffle depth < 10 cm for large mainstem areas 	Riffle depth 10-15 cm for large mainstem areas	Riffle depth 15-20 cm for large mainstem areas	Riffle depth > 20 cm for large mainstem areas	
7	 Large pools generally < 30 cm deep (< 61 cm for large mainstem areas) and devoid of overhead cover/structure 	Large pools generally 30- 46 cm deep (61-91 cm for large mainstem areas) with little or no overhead cover/structure	Large pools generally 46-61 cm deep (91-122 cm for large mainstem areas) with some overhead cover/structure	Large pools generally > 61 cm deep (> 122 cm for large mainstem areas) with good overhead cover/structure	
	Extensive channel alteration and/or point bar formation/enlargement	Moderate amount of channel alteration and/or moderate increase in point bar formation/enlargement	Slight amount of channel alteration and/or slight increase in point bar formation/enlargement	No channel alteration or significant point bar formation/enlargement	
	• Riffle/Pool ratio 0.49:1 ; ≥1.51:1	• Riffle/Pool ratio 0.5- 0.69:1; 1.31-1.5:1	• Riffle/Pool ratio 0.7-0.89:1 ; 1.11-1.3:1	Riffle/Pool ratio 0.9-1.1:1	
ND	Summer afternoon water temperature > 27°C	Summer afternoon water temperature 24-27°C	Summer afternoon water temperature 20-24°C	• Summer afternoon water temperature < 20°C	
Point range	0 0 1 0 2	0304	0506	□ 7 □ 8	
	 Substrate fouling level: High (> 50%) 	Substrate fouling level: Moderate (21-50%)	Substrate fouling level: Very light (11-20%)	Substrate fouling level: Rock underside (0-10%)	
Water Quality	Brown colourTDS: > 150 mg/L	• Grey colour • TDS: 101-150 mg/L	Slightly grey colour TDS: 50-100 mg/L	Clear flow TDS: < 50 mg/L Objects visible to depth > 1.0m below surface	
Water Quality	 Objects visible to depth 0.15m below surface 	Objects visible to depth 0.15-0.5m below surface	Objects visible to depth 0.5-1.0m below surface		
1.0	 Moderate to strong organic odour 	Slight to moderate organic odour	Slight organic odour	No odour	
Point range	O O 1 O 2	□ 3 □ 4	5 0 6	□ 7 □ 8	
Riparian Habitat	 Narrow riparian area of mostly non-woody vegetation 	Riparian area predominantly wooded but with major localized gaps	Forested buffer generally 31 m wide along major portion of both banks	Wide (> 60 m) mature forested buffer along both banks	
Conditions	• Canopy coverage: <50% shading (30% for large mainstem areas)	Canopy coverage: 50- 60% shading (30-44% for large mainstem areas)	• Canopy coverage: 60-79% shading (45-59% for large mainstem areas)	Canopy coverage: >80% shading (> 60% for large mainstem areas)	
Point range	O O I	□ 2 × 3	□ 4 □ 5	□ 6 □ 7	
Total overall so			air (13-24) Good (25-		

Completed by: ____ Checked by



Reach Characteristics

Project Code/Phase: V N 16107

						ſ
Date:	Son	Stream/Reach:	171			
Weather:		Location:	1- bodos my	cosin		
Field staff:) >) >	Watershed/Subwatershed:	Trotton Circk			T
UTM (Upstream)		UTM (Downstream)				
Land Use (15) Valley Type (Table 1)	Channel Type (Table 3) (Table 3)	Table 4) (Table 5) (Table 5)	ZGroundwater	Evidence:	iron staining	
Riparian Vegetation		Aquatic/Instream Vegetation	etation	Water Quality	lity	200 m
Dominant Type: Coverage: widths	Age Class (yrs): Encroachment:	rt: Type (Table8)	Coverage of Reach (%)	,	Odour (Table 16)	-
	☐ Immature (<5) (Table 7)	7) Woody Debris	Density of WD:	······································	_	
Species: Fragmented 4-10	☐ Established (5-30)	Present in Cutbank	Low WDJ/50m:		Turbidity (Table 17)	
]	(SO)	□ Not Present	High	0	•	
Channel Characteristics						
Sinuosity (Type) Sinuosity (Degree)	Gradient	Number of Channels	Clay/Silt Sand Gravel	Cobble	Boulder Parent R	Rootlets
(Table 9)	(Table 11) 7 (Tab	(Table 12) (Riffle Substrate				
Entrenchment Type of Bank Failure	lure Downs's Classification	Pool Substrate		D X	×	
(Table 13) (Table 14) 5	(Table 15) <i>E</i>	Bank Material		/ []	\bowtie	
				L		
Bankfull Width (m) $q.2$ 50	7.3 Wetted Width (m)	6.4 4.0 3.7	Bank Angle Bank Erc	sion	Notes: +111 Ocousits +	154243
Bankfull Depth (m)	() Wetted Depth (m)	0.6	☐ 30 – 60 ☐ 5- ☐ 30 – 60 ☐ 30	☐ 5 – 30% ☐ 30 – 60%	To soo say	100 AU
Riffle/Pool-Spacing (m) % Ri	% Riffles: 6 % Pools: 100	Weander Amplitude:	*	Z 60 – 100%	ruly hips orange	17500
Pool Depth (m) N.A. Riffle Length (m)	ungth (m) Undercuts (m)	Comments: Couldn't measure	182 B	10 to	100, 10m 1411 bit of	bitof
Velocity (m/s) (0.57)	1.09	/ Estimated Dec 40.Sr	to set 4 deep		Under Cot, mossly crosion	10,5002
ay banks in paids.	SK INGOD I NISE	DOLUTE IN THINKE	Completed by: DA	De 15 6	wast er full & rift A	
						,

major debails charist entre bronks & buyer a more stornging 451/4 Willess being Has from proper, isless that

Floodplain partially confirmed.

Bridge tootings above circle of this area very evodred into they backs

Single tootings above circle of this area very evodred into they backs

Not rittles & pools but good flow

under cutting near the hydrolines & stumping banks & water

couple of Big islands past of

about 50m upstream of Maley Dr. Water's very orange

very deep, overhanging vegetation & narrow near the end (Maley)

gravel timell rocks at Maley - some from evoded trust

but most upstream

One Slab failure + one rotational slip (pics)

- DN 16 107

Gene	ral Site Ch	ara	cteristics	Project Code: PN 16 107
Date:	participas de la contraction	Wo	19172017	Stream/Reach:
Weathe	er:	S	mny	Location: New Sudbury
Field St	taff:	Αu	u,se,AV	Watershed/Subwatershed: Junction Creek
Feature	s			Site Sketch:
	Reach break			
××	Cross-section			1
	Flow direction			
	Riffle			N
	Pool			4-5-
erentarities	Medial bar			
	Eroded bank			V
	Undercut bank			SI TIXE
4.4	Rip rap/stabilizatio	n/gab	pion	0 1 0 0 7
	Leaning tree		İ	To Wat
	Fence			J. The Date of
	Culvert/outfall			() 34 EO OFKE
-	Swamp/wetland Grasses			W 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
~~~	Tree			
_	Instream log/tree			
	Woody debris			
	Station location			
	/egetated island			
Flow Ty				( ) The White of
	Standing water			
<b>H2</b> 9	Scarcely perceptibl	e flow	,	
<b>H3</b> S	Smooth surface flo	w		9/// 10//6
H4 L	Jpwelling			12 / / 12 / O/ Xr
	Rippled			
	Jnbroken standing		:	W W IV
	Broken standing wa	ave		M/ U/A
	Chute			
	ree fall			Y V V YX Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z
Substrat				
	Silt Sand		Small boulder	W / TOW / OF
	sand Gravel	S7	Large boulder	VI V X X C)
	Small cobble	S8 S9	Bimodal Bodrock/till	A V COXX Y W
	arge cobble	37	Bedrock/till	
Other	ar ge cobble			
	Benchmark	ЕP	Erosion pin	
	Backsight	RB	Rebar	
	ownstream	US	Upstream	
	Voody debris jam	TR	Terrace	1// 4 1 1 2
	alley wall contact	FC	Flood chute	Scale:
	Sottom of slope	FP	Flood plain	Additional Notes:
- T	() <b>1</b> (1(2))	-	F. S	Additional Notes.

New Old Moody, where

Knick point

Top of slope

TOS

Completed by: A Checked by:

**Rapid Geomorphic Assessment** 

Project Code: PN 16 107

Date:	M	lay 17, 2017	Stre	am/Reach:	731	1		
Weather:	2	5°C	Loca	tion:	New S	udbu	4	
Field Staff:	AL	~1 AV, SC	Wate	ershed/Subwaters	hed: Tarch	ion	Creek	L
Process			Geomorph	ic Indicator		Pre	sent?	Factor
FTOCESS	No.	Description				Yes	No	Value
	1	Lobate bar					X	
	2	Coarse materials in	riffles embed	dded			X	1
Evidence of	3	Siltation in pools					X	17/
Aggradation	4	Medial bars	······································	T # 10 10 10 10 10 10 10 10 10 10 10 10 10			X	77
(AI)	5	Accretion on point b	ars				X	
	6	Poor longitudinal so	rting of bed r	materials		X	/	1
*	7	Deposition in the ov	erbank zone			X		1
					Sum of indices =	2	5	0.29
	(1)	Exposed bridge foot	ing(s)				X	T .
	2	Exposed sanitary / s	storm sewer	/ pipeline / etc.			X'	1
	3	Elevated storm sew	er outfall(s)			NA	1	1
	4	Undermined gabion	baskets / co	ncrete aprons / etc.		NA		1 1.
Evidence of Degradation	5	Scour pools downst	ream of culve	erts / storm sewer ou	ıtlets		1	/8
(DI)	6	Cut face on bar form	ns				7	
	7	Head cutting due to	knick point r	migration			×	1
	8	Terrace cut through	older bar ma	aterial			X	1
	9	Suspended armour	layer visible i	in bank			×	1
	10	Channel worn into u	ındisturbed o	verburden / bedrock		X		
		3			Sum of indices =	ĺ	7	0.13
	1	Fallen / leaning tree	s / fence pos	sts / etc.		X		
	2	Occurrence of large	organic debr	is		X		
	3	Exposed tree roots				X		
F. 14 6	4	Basal scour on insid	e meander b	ends			X	5,
Evidence of Widening	5	Basal scour on both	sides of channel through riffle				X	19
(WI)	6	Outflanked gabion baskets / concrete walls / etc.			NA			
	7	Length of basal scor	ength of basal scour >50% through subject reach			X		
	8	Exposed length of previously buried pipe / cable / etc.					X	
	9	Fracture lines along	top of bank			X		
	10	Exposed building for	undation			`	1	
	***************************************				Sum of indices =	.5	H	0.56
	1	Formation of chute(	s)			1	V	
F	(2)	Single thread chann		e channel			X	
Evidence of Planimetric	3	Evolution of pool-rif					×	
Form	4	Cut-off channel(s)					Ź	1/7
Adjustment	5	Formation of island(	s)				×	·
(PI)	6	Thalweg alignment		with meander form		X		
	7	Bar forms poorly for					×	
					Sum of indices =	1	6	0.14
Additional notes	s:			Stability Ir	ndex (SI) = (AI+D	1+W1+	PI)/4 =	0.28
			Condition	In Regime	1			0
			SI score =	□ 0.00 - 0.20	0.21 - 0.4	0	□ 0	.41

Completed by: _____ Checked by:

Rapid Stream Assessment Technique

Project Code: PNJ6107

Date:	May 17, 2011	Stream/Reach.	101	
Weather:	25%	Location:	New Sud!	20/1
Field Staff:	PHIAVISC	Watershed/Subwater	shed: Jurctia	Clek
Evaluation Category	Poor	Fair	Good	Excellent
category	stable	<ul> <li>50-70% of bank network stable</li> <li>Recent signs of bank sloughing, slumping or failure fairly common</li> <li>Stream bend areas</li> </ul>	<ul> <li>71-80% of bank network stable</li> <li>Infrequent signs of bank sloughing, slumping or failure</li> <li>Stream bend-areas stable</li> </ul>	<ul> <li>&gt; 80% of bank network stable</li> <li>No evidence of bank sloughing, slumping or failure</li> <li>Stream bend areas very</li> </ul>
Channel	unstable  Outer bank height 1.2 m above stream bank (2.1 m above stream bank for large mainstem areas)  Bank overhang > 0.8-1.0 m	unstable  Outer bank height 0.9- 1.2 m above stream bank (1.5-2.1 m above stream bank for large mainstem areas)  Bank overhang 0.8-0.9m	<ul> <li>Outer bank height 0.6-0.9 m above stream bank (1)2-1.5 m above stream bank for large mainstem areas)</li> <li>Bank overhang 0.6-0.8 m</li> </ul>	stable • Height < 0.6 m above stream (< 1.2 m above stream bank for large mainstem areas) • Bank overhang < 0.6 m
Stability	Young exposed tree roots abundant     > 6 recent large tree falls per stream mile	Young exposed tree roots common     4-5 recent large tree falls per stream mile	<ul> <li>Exposed tree roots predominantly old and large, smaller young roots scarce</li> <li>2-3 recent large tree falls per stream mile</li> </ul>	<ul> <li>Exposed tree roots old, large and woody</li> <li>Generally 0-1 recent large tree falls per stream mile</li> </ul>
	Bottom 1/3 of bank is highly erodible material     Plant/soil matrix severely compromised	<ul> <li>Bottom 1/3 of bank is generally highly erodible material</li> <li>Plant/soil matrix compromised</li> </ul>	Bottom 1/3 of bank is generally highly resistant plant/soil matrix or material	Bottom 1/3 of bank is generally highly resistant plant/soil matrix or material
	Channel cross-section is generally trapezoidally- shaped	• Channel cross-section is generally trapezoidally- shaped	Channel cross-section is generally V- or U-shaped	Channel cross-section is generally V- or U-shaped
Point range	O O 1 O 2	3 0 4 0 5	□ 6 □ <b>7</b> □ 8	□ 9 □ 10 □ 11
	75% embedded (>)     85% embedded for large     mainstem areas)	• 50-75% embedded (60- 85% embedded for large mainstem areas)	• 25-49% embedded (35- 59% embedded for large mainstem areas)	Riffle embeddedness < 25% sand-silt (< 35% embedded for large mainstem areas)
	Few, if any, deep pools     Pool substrate     composition >81% sand- silt	Low to moderate number of deep pools     Pool substrate composition 60-80% sand-silt	Moderate number of deep pools     Pool substrate composition 30-59% sand-silt	High number of deep pools (> 61 cm deep) (> 122 cm deep for large mainstem areas) Pool substrate composition <30% sand-silt
Channel Scouring/ Sediment	Streambed streak marks and/or "banana"-shaped sediment deposits common	Streambed streak marks and/or "banana"-shaped sediment deposits common	Streambed streak marks and/or "banana"-shaped sediment deposits uncommon	Streambed streak marks and/of "banana"-shaped sediment deposits absent
Deposition	<ul> <li>Fresh, large sand deposits very common in channel</li> <li>Moderate to heavy sand deposition along major portion of overbank area</li> </ul>	<ul> <li>Fresh, large sand deposits common in channel</li> <li>Small localized areas of fresh sand deposits along top of low banks</li> </ul>	<ul> <li>Fresh, large sand deposits uncommon in channel</li> <li>Small localized areas of fresh sand deposits along top of low banks</li> </ul>	Fresh large sand deposits rare or absent from channel     No evidence of fresh sediment deposition on overbank
	Point bars present at most stream bends, moderate to large and unstable with high amount of fresh sand	Point bars common, moderate to large and unstable with high amount of fresh sand	Point bars small and stable, well-vegetated and/or armoured with little or no fresh sand	Point bars few, small and stable, well-vegetated and/or armoured with littl or no fresh sand
Point range	□ 0 □ 1 □ 2	□ 3 □ 4	5 🗆 6	□ 7 □ 8

Date:	May 17, 2017	Reach: 17	Project Code:	PM16107
Evaluation Category	Poor	Fair	Good	Excellent
3	Wetted perimeter < 40% of bottom channel width (< 45% for large mainstem areas)	Wetted perimeter 40- 60% of bottom channel width (45-65% for large mainstem areas)	Wetted perimeter 61-85% of bottom channel width (66-90% for large mainstem areas)	Wetted perimeter > 85% of bottom channel width (> 90% for large mainstem areas)
-	Dominated by one habitat type (usually runs) and by one velocity and depth condition (slow and shallow) (for large mainstem areas, few riffles present, runs and pools dominant, velocity and depth diversity low)	Few pools present, riffles and runs dominant.     Velocity and depth generally slow and shallow (for large mainstem areas, runs and pools dominant, velocity and depth diversity intermediate)	Good mix between riffles, runs and pools     Relatively diverse velocity and depth of flow	Riffles, runs and pool habitat present     Diverse velocity and depth of flow present (i.e., slow, fast, shallow and deep water)
Physical Instream	Riffle substrate composition: predominantly gravel with high amount of sand      < 5% cobble	Riffle substrate composition: predominantly small cobble, gravel and sand     5-24% cobble	Riffle substrate composition: good mix of gravel, cobble, and rubble material     25-49% cobble	Riffle substrate composition: cobble, gravel, rubble, boulder mix with little sand     > 50% cobble
Habitat	Riffle depth < 10 cm for large mainstem areas	Riffle depth 10-15 cm for large mainstem areas	Riffle depth 15-20 cm for large mainstem areas	Riffle depth > 20 cm for large mainstem areas
ų.	<ul> <li>Large pools generally &lt; 30 cm deep (&lt; 61 cm for large mainstem areas) and devoid of overhead cover/structure</li> </ul>	Large pools-generally 30- 46 cm deep (61-91 cm for large mainstem areas) with little or no overhead cover/structure	Large pools generally 46-61 cm deep (91-122 cm for large mainstem areas) with some overhead cover/structure	Large pools generally > 61 cm deep (> 122 cm for large mainstem areas) with good overhead cover/structure
	Extensive channel alteration and/or point bar formation/enlargement	Moderate amount of channel alteration and/or moderate increase in point bar formation/enlargement	Slight amount of channel alteration and/or slight increase in point bar formation/enlargement	No channel alteration or significant point bar formation/enlargement
	• Riffle/Pool ratio 0,49:1 ; ≥1.51:1	• Riffle/Pool ratio 0.5- 0.69:1; 1.31-1.5:1	• Riffle/Pool ratio 0.7-0.89:1 ; 1.11-1.3:1	• Riffle/Pool ratio 0.9-1.1:1
	• Summer afternoon water temperature > 27°C	<ul> <li>Summer afternoon water temperature 24-27°C</li> </ul>	Summer afternoon water temperature 20-24°C	• Summer afternoon water temperature < 20°C
Point range	O O I O O	□ 3 🖟 4	□ 5 □ 6	□ <b>7</b> □ <b>8</b>
	<ul> <li>Substrate fouling level: High (&gt; 50%)</li> </ul>	Substrate fouling level:     Moderate (21-50%)	Substrate fouling level:     Very light (11-20%)	Substrate fouling level:     Rock underside (0-10%)
Water Quality	Brown colour     TDS: > 150 mg/L	• Grey colour • TDS: 101-150 mg/L	Slightly grey colour     TDS: 50-100 mg/L	• Clear flow • TDS: < 50 mg/L
water Quality	<ul> <li>Objects visible to depth</li> <li>0.15m below surface</li> </ul>	Objects visible to depth     0.15-0.5m below surface	Objects visible to depth     0.5-1 0m below surface	Objects visible to depth     1.0m below surface
	<ul> <li>Moderate to strong organic odour</li> </ul>	Slight to moderate organic odour	• Slight organic odour	No odour
Point range	□ 0 □ 1 □ 2	□ 3 □ 4	<b>⋈</b> 5 □ 6	D 7 D 8
Riparian Habitat	Narrow riparian area of mostly non-woody vegetation	<ul> <li>Riparian area predominantly wooded but with major localized gaps</li> </ul>	Forested buffer generally     31 m wide along major portion of both banks	Wide (> 60 m) mature forested buffer along both banks
Conditions	Canopy coverage:     <50% shading (30% for large mainstem areas)	Canony coverage: 50- 60% shading (30-44% for large mainstem areas)	• Canopy coverage: 60-79% shading (45-59% for large mainstem areas)	• Canopy coverage: >80% shading (> 60% for large mainstem areas)
Point range	□ <b>0</b> □ <b>1</b>	□ 2 □ 3	4 🗆 5	□ 6 □ <b>7</b>
Total overall so	core (0-42) = 2\	Poor (<13) F	air (13-24) Good (25-3	34) Excellent (>35)

Completed by: A Checked by:



NATURAL RESOURCE SOLUTIONS INC. To Aquatic, Terrestrial and Welland Biologists Map 15 Preliminary Reach Delineation **Subwatershed Study** 300 Meters **Junction Creek** 17-17 Project 1844A Date: May 12, 2017 Contours (5m) Key Map Welland ( Kelly Lake to Maley Branch 

# Appendix F4 Detailed Summaries



# **Detailed Geomorphological Assessment Summary**

#### Reach TJ-14-1

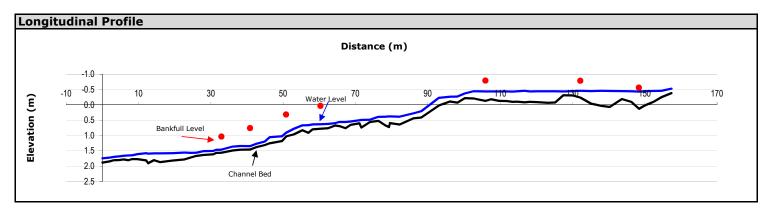
<b>Project Number:</b>	PN 16107	Date:	May 17, 2017
Client:	City of Greater Sudbury	Length Surveyed (m):	157.4
Location:	Lasalle Blvd.	# of Cross-Sections:	7

**Reach Characteristics** Not measured Drainage Area: **Dominant Riparian Vegetation Type:** Trees Geology/Soils: Bedrock **Extent of Riparian Cover:** Fragmented Surrounding Land Use: Commercial and residential Width of Riparian Cover: 1-4 Channel widths Established Valley Type: Confined Age Class of Riparian Vegetation: Dominant Instream Vegetation Type: Attached algae Moderate **Extent of Encroachment into Channel:** Portion of Reach with Vegetation: 60% Low **Density of Woody Debris:** 

Hydrology			
Measured Discharge (m³/s):	Not Measured	Calculated Bankfull Discharge (m ³ /s):	Not Calculated
Modelled 2-year Discharge (m³/s):	Not modelled	Calculated Bankfull Velocity (m/s):	Not Calculated
Modelled 2-year Velocity (m/s):	Not modelled		

Profile Characteristics	
Bankfull Gradient (%):	1.37
Channel Bed Gradient (%):	1.50
Riffle Gradient (%):	2.06
Riffle Length (m):	50.33
Riffle-Pool Spacing (m):	0.00

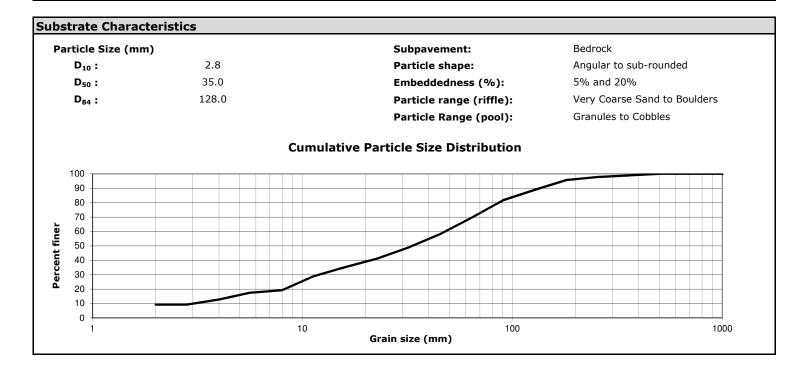
Planform Characteristics	
Sinuosity:	1.21
Meander Belt Width (m):	Not measured
Radius of Curvature (m):	Not measured
Meander Amplitude (m):	Not measured
Meander wavelength (m):	Not measured



Bank Characteristics							
	Minimum	Maximum	Average		Minimum	Maximum	Average
Bank Height (m):	0.4	1.00	0.56				
Bank Angle (deg):	20	90	50	Torvane Value (kg/cm²):		Not measured	
Root Depth (m):	0.10	0.50	0.29	Penetrometer Value (kg/cm ³ ):		Not measured	
Root Density (%):	5	80	21	Bank Material (range):	Cla	y to large Bould	ler
Bank Undercut (m):	None	None	N/A				

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	Minimum	Maximum	Average				
ankfull Width (m):	4.70	6.40	5.66			V	
verage Bankfull Depth (m):	0.37	0.69	0.46	*** AV	24	YX	
ankfull Width/Depth (m/m):	7	16	13				
etted Width (m):	2.70	4.45	3.51				
verage Water Depth (m):	0.07	0.43	0.18				A   \
etted Width/Depth (m/m):	7	46	27				
ntrenchment (m):	N/A	Not measured	N/A				
ntrenchment Ratio (m/m):	N/A	Not measured	N/A				进行
aximum Water Depth (m):	0.13	0.56	0.28				
anning's <i>n</i> :		0.04					2017
				Pho	otograph at cross	section 7 (lookin	g downstream)
		Represent	tative Cross-		otograph at cross	section 7 (lookin	g downstream)
		Represent	tative Cross- Distance (m)		otograph at cross	section 7 (lookin	g downstream)
0.0 1.0	2.0	Represent			otograph at cross	section 7 (lookin	g downstream)
0.0 1.0	2.0	-	Distance (m)	Section 2			
	2.0	3.0 4.0	Distance (m)	Section 2			
0.0	2.0	-	Distance (m)	Section 2			
0.0	2.0	3.0 4.0	Distance (m)	Section 2			
0.0	2.0	3.0 4.0	Distance (m)	Section 2	7.0		
0.0 (m) 1.0 1.0	2.0	3.0 4.0	Distance (m)	Section 2	7.0		
0.0 0.5	2.0	3.0 4.0	Distance (m)	Section 2	7.0		
0.0 (m) 1.0 1.0	2.0	3.0 4.0	Distance (m)	Section 2	7.0		



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<b>Channel Thresholds</b>			
Flow Competency (m/s):		Tractive Force at Bankfull (N/m²):	51.40
for D ₅₀ :	1.01	Tractive Force at 2-year flow (N/m ² ):	Not modelled
for D ₈₄ :	1.84	Critical Shear Stress $(D_{50})$ $(N/m^2)$ :	25.49
Unit Stream Power at Bankfull (W/m²):	79.21		

#### **General Field Observations**

#### **Channel Description**

The reach meanders though a confined valley with a bedrock knob mid-survey. Average bankfull depth and width were 5.66 m and 0.46 m, respectively. Bank erosion was noted along the edge of the parking lot along the right bank. Bank material mainly ranged from silt to gravel with some riprap observed throughout. The downstream section of the survey was mainly a long riffle. Riffle material ranged from sand to large boulders. A long pool was observed upstream of the bedrock knob. Pool material consisted of sand, gravel, and small cobbles.



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# **Detailed Geomorphological Assessment Summary**

#### Reach J15

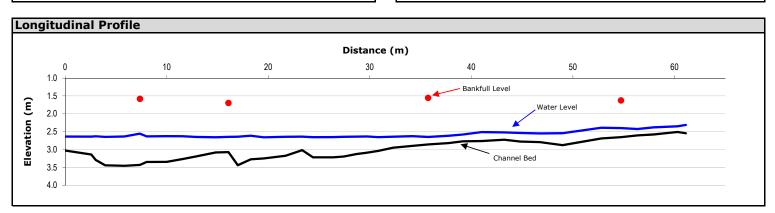
<b>Project Number:</b>	PN 16107	Date:	May 18, 2017
Client:	Fielding Street, Sudbury	Length Surveyed (m):	61.1
Location:	New Sudbury	# of Cross-Sections:	4

Reach Characteristics				
Drainage Area:	Not measured	Dominant Riparian Vegetation Type:	Shrubs and grasses	
Geology/Soils:	Bedrock	Extent of Riparian Cover:	Fragmented	
Surrounding Land Use:	Residential	Width of Riparian Cover:	4 - 10 Channel widths	
Valley Type:	Partially confined	Age Class of Riparian Vegetation:	Mature (>30 years)	
Dominant Instream Vegetation T	ype: Rooted emergent	<b>Extent of Encroachment into Channel:</b>	None	
Portion of Reach with Vegetation	<b>:</b> 5%	Density of Woody Debris:	Low	

Hydrology			
Measured Discharge (m ³ /s):	1.10	Calculated Bankfull Discharge (m ³ /s):	3.80
Modelled 2-year Discharge (m ³ /s):	Not modelled	Calculated Bankfull Velocity (m/s):	0.48
Modelled 2-year Velocity (m/s):	Not modelled		

Profile Characteristics	
Bankfull Gradient (%):	0.03
Channel Bed Gradient (%):	1.38
Riffle Gradient (%):	2.24
Riffle Length (m):	9.23
Riffle-Pool Spacing (m):	N/A

Planform Characteristics	
Sinuosity:	1.20
Meander Belt Width (m):	Not measured
Radius of Curvature (m):	Not measured
Meander Amplitude (m):	Not measured
Meander wavelength (m):	Not measured



Bank Characteristics										
	Minimum	Maximum	Average		Minimum	Maximum	Average			
Bank Height (m):	0.79	1.35	1.02							
Bank Angle (deg):	20	90	52	Torvane Value (kg/cm²):	Not measured					
Root Depth (m):	0.25	1.35	0.87	Penetrometer Value (kg/cm ³ ):		Not measured				
Root Density (%):	5	20	10	Bank Material (range):	Silt and sand (cobbles @ XS4)					
Bank Undercut (m):	0.05	0.2	0.13							

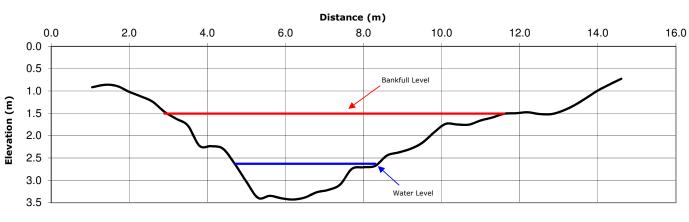
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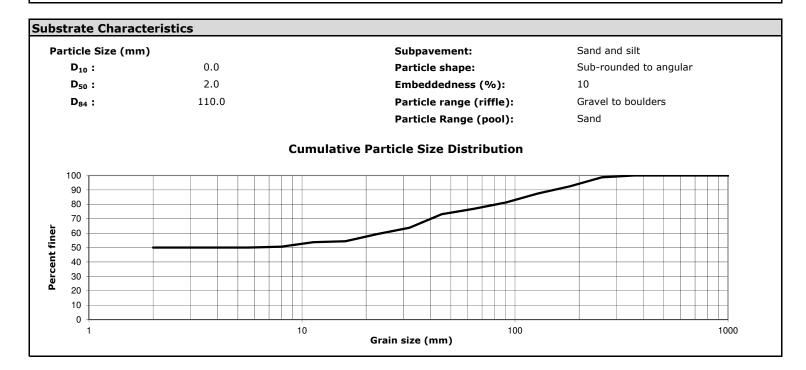
	Minimum	Maximum	Average
Bankfull Width (m):	7.45	8.70	8.13
Average Bankfull Depth (m):	0.81	1.13	0.97
Bankfull Width/Depth (m/m):	7	10	9
Wetted Width (m):	3.60	6.05	4.91
Average Water Depth (m):	0.23	0.55	0.36
Wetted Width/Depth (m/m):	6	27	17
Entrenchment (m):		Not measured	
Entrenchment Ratio (m/m):		Not measured	
Maximum Water Depth (m):	0.32	0.80	0.57
Manning's <i>n</i> :		0.035	



Photograph at cross section 2 (looking at the left bank)

### **Representative Cross-Section 2**





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Channel Thresholds						
Flow Competency (m/s):		Tractive Force at Bankfull (N/m²):	2.85			
for D ₅₀ :	0.27	Tractive Force at 2-year flow (N/m ² ):	Not modelled			
for D ₈₄ :	1.72	Critical Shear Stress (D ₅₀ ) (N/m ² ):	1.46			
Unit Stream Power at Bankfull (W/m²):	1.38					

#### **General Field Observations**

#### **Channel Description**

This reach meanders through a residential and commercial area with a moderate gradient and sinuosity. This reach generally had more runs and pools with few riffles. The detailed assessment was completed where riffle features were available. Average bankfull width and depth were 7.8 m and 0.9 m, respectively. Bank erosion was evident and undercuts up to 0.20 m were measured. Slumping and leaning trees were also present. Bank material consisted of silt and sand. Riffle materials ranged from gravel to boulders. Pools consisted mainly of sand.



**Cross Section 3 - Facing Downstream** 

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