



SUSITNA-WATANA HYDRO

Cross Section Survey Data Sheet

Date / Time: 8-14-14 - 9:00 AM
 River: Caswell Cr.
 Cross Section: CA-1
 Length: 135.5 ft.

Crew: WTF, RET
 Northing / Lat: Previously obtained
 Easting / Long: 0
 Est. Q (cfs): 35 cfs
 Comments: X-Section @ mouth of Creek /
Confluence w/ Susitna Side channel.
Very little if any flow in SC. May all be
from Caswell Cr. - water is pool

Point	BS (+)	HI	FS (-)	Elev	Notes
LEP B&C	5.57	105.57		100.00	Assumed 100.00 Elev. STA 0+00
REP B&C	4.25		4.50	101.57	
		105.32			
LEP B&C			5.33	99.99	$\Delta = 0.01$ ✓

Station	Rod	Depth	Elevation	Description	Notes
0+00	5.57			End shrubs start edges	
0+10	5.06			End edges, low veg, TOB	
0+16	7.75			Fines, POB	
0+21	9.75	0.0		LEW, Fines	
0+26	12.00	0.0 3.1		Toe Bank, Fines	
0+32	13.83	4.1		Fines	
0+40	13.50	3.8		Fines	
0+50	12.70	3.0		Fines	
0+58	13.02	3.4		Start Submerged aquatic Veg (SAV)	
0+65	11.63	2.0		Start Emergent Aquatic Veg (EAV)	
0+71	10.68	1.0		EAV	
0+75	9.60	0.0		REW, Sand, Fines	EAV
0+84	0.68			EAV	
1+00	8.22			EAV	
1+11	8.17			Start dense willows	
1+26	7.87			Toe bank, dense willows	
1+30	5.22			TOB, start alders & Greenlight willows	
1+35.5	4.50			GND @ B&C	



Cross Section Survey Data Sheet

Date / Time: 8/14/14, 9:40 AM
 River: Caswell Creek
 Cross Section: CA-2
 Length: 0.9 ft.

Crew: WTF, RET
 Northing / Lat: Previously obtained
 Easting / Long:
 Est. Q (cfs) ~35 cfs
 Comments: Pooled up

Point	BS (+)	HI <u>104.13</u>	FS (-)	Elev	Basis of	Notes
LEP Bdc	5.17	105.17		98.96	Elev.	(see field book - Data CA-1-100100)
REP Bdc	5.40	104.44	5.09	99.04		
LEP Bdc			5.40	98.95	$\Delta = 98.95$	$\Delta = -0.01$ ok ✓

Station	Rod	Depth	Elevation	Description	Notes
0+00	5.17			GND @ LEP	Pt. on slope, willows
0+06	6.95			Edge Veg, Start gravel	Edge Veg, Start
0+13	8.18	0.0		LEW, fines w/ S&S	Fines
0+18	9.06	0.9		Fines over G&S	Start submerged aquatic veg (SAV)
0+22	9.99	1.8		Scattered Scattered SAV	Scattered SAV, fine
0+27	11.38	3.2		" " "	Fines, cobble
0+35	11.64	3.4		SAV (scattered), fines	
0+45	10.80	2.6		SAV, fines	
0+55	10.57	2.3		" " "	
0+65	9.84	1.6		Start emergent aquatic	Veg (EAV) fines
0+73	8.21	0.0		REW, EAV, fines	
0+78	7.61			EAV, G, TOP	
0+84	6.59			POS (Pt. on slope)	Grosses & willows
0+94	5.40			Grosses & willows	
0+99	5.09			" " "	GND @ REP



Cross Section Survey Data Sheet

Date / Time: 8/14/14, 10:30 AM
 River: Caswell Cr.
 Cross Section: CA-3
 Length: 98.5 feet

Crew: WTF, RET
 Northing / Lat: Previously obtained
 Easting / Long:
 Est. Q (cfs): ~35 cfs
 Comments: X-sections pooled up

Reset instrument after bumping it

Point	BS (+)	HI	FS (-)	Elev	Notes
LEP B/C	5.07	104.96		99.89	Elev carried from CA-1 LEP assumed 100.00
REP B/C	6.00	105.11	5.85	99.11	STA 98.5
LEP B/C			5.17	99.94	D = -0.01 OK ✓

Station	Rod (ft)	Depth	Elevation	Description	Notes
0+00	5.07		99.89	GND @ REP, Thick Grass	Pos (At river edge)
0+06	6.62		6.62	TOB grasses	
0+11	9.00	0.00		LEW, EAV (Emergent Aquatic Veg)	
0+12	9.75	0.8		Toe, Fms, submerged Aquatic Veg (SAV)	
0+17	10.71	1.7		Fms, SAV	
0+24	11.96	3.1		Fms over Gravel, SAV	
0+27	12.14	3.2		" " " , SAV	
0+34	12.17	3.2		" " " "	
0+40	11.89	2.9		" " " "	
0+43	10.70	1.7		Toe willow & grasses	
0+43	9.00	0.0		REW	
0+45	7.39			TOB willow & EAV	
0+55	7.81			EAV	
0+65	8.24			EAV, Unconsolidated	Fms (UF)
0+75	8.58			EAV, UF	
0+86	9.01			Toe Upper Bank, willow & grasses	
0+93	7.01			willow & grasses	
0+98.5	5.85			GND @ B/C, willow & grasses	



Cross Section Survey Data Sheet

Date / Time: 8/14/14, Noon
 River: Caswell
 Cross Section: CA-5
 Length: 58'

Crew: WTF, RET
 Northing / Lat: Previously obtained
 Easting / Long: _____
 Est. Q (cfs): ~35 cfs
 Comments: X-Section is pooled up, slight current

Point	BS (+)	HI	FS (-)	Elev	Notes
LEP Bdc	5.81	105.83		100.02	Elev. carried from CA-1 LEP across
REP Bdc	4.32	105.66 97.02	4.49	101.34	
LEP Bdc			5.64	100.02	D = 0.00 ✓ ok

Station	Rod	Depth	Elevation	Description	Notes
0+00	5.81			GND @ LEP, willows & grasses	
0+06	6.89			TOB	
0+07	9.79	0.00		LEW	
0+10	11.09	1.3		Toe of Bank (TOB), Fines over G, SAV	
0+11	11.55	1.7		Fines over G, SAV	
0+17	12.00	2.2		Fines SAV	
0+24	11.97	2.2		Fines over G, SAV	
0+28	11.75	2.00		G, SAV	
0+35	11.89	2.10		S, SAV	
0+41	11.95	2.1		Toe of bank, F, SAV	
0+42	9.82	0.0		REW, Fines	
0+43	8.25			TOB, willows & grasses	
0+52	6.40			Pt. on Slope	
0+58	4.49			GND @ Bdc	



Cross Section Survey Data Sheet

Date / Time: 8/14/14
 River: Caswell Cr.
 Cross Section: CA-6
 Length: 53 feet

Crew: WTE, PET
 Northing / Lat: previously obtained
 Easting / Long:
 Est. Q (cfs) ~35 cfs
 Comments: Current is apparent but < 1 ft/sec
 Entire bed has Submerged Aquatic Veg
 (SAV)

Point	BS (+)	HI /	FS (-)	Elev	Notes
LEP38C	4.86	4.86		100.29	Elev. carried forward from previous (100.29 CA-)
REP38C	4.89	105.21	4.83	100.32	
LEP38C			4.93	100.28	$\Delta = -0.01$ ✓ OK

Station	Rod	Depth	Elevation	Description	Notes
0+00	4.86			GND @ LEP Willow & grasses	
0+05	5.46			TOR " " "	
0+09	9.08	0.0		(LEW)	
0+09	10.02	0.9		Toe, Fine SAV (Submerged aquatic Veg)	
0+12	10.88	1.8		Fines over G, SAV	
0+18	11.20	2.1		G, SAV	
0+25	10.76	1.7		G, SAV	
0+32	10.64	1.6		G, SAV	
0+39	10.53	1.5		Fines over G SAV	
0+45	9.70	0.6		F, SAV, Toe of bank	
0+45	9.05	0.0		REW	Pt. on Slope
0+46	7.71			TOR Willow & grasses	
0+50	5.51			TOR " " "	
0+53	4.83			GND @ REP	



Cross Section Survey Data Sheet

Date / Time: 8/14/14, 2:15 PM
 River: Caswell Creek
 Cross Section: CA-7
 Length: 50 ft

Crew: WTF, RET
 Northing / Lat: previously obtained
 Easting / Long:
 Est. Q (cfs): ~35 cfs
 Comments: Current is approximately 1 ft/sec in portion of the section

Point	BS (+)	HI	FS (-)	Elev	Notes
REP B/C	2.78	103.56		100.78	Carried elev from connection @ CA-1
		103.44			
LEP B/C	5.14	5.26	5.26	98.30	
REP B/C			2.66	100.78	$\Delta = 0.00$ Vok

Station	Rod	Depth	Elevation	Description	Notes
0+02	5.26			GND O LEP, Thick Grass	
0+02	5.62			Thick Grass	
0+09	5.86			TOB, Grass	
0+10	7.34	0.00		LEW, fines	
0+10	7.68	0.3		Fines over gravel, Tree Bank	
0+13	8.19	0.9		G, S SAV	
0+20	9.28	2.0		G, S SAV	
0+25	10.00	2.7		G, SAV	
0+30	9.89	2.6		G, C, SAV	
0+34	9.40	2.1		G, C, SAV	
0+37	8.17	0.8		TOB, Fines, Willow	
0+37	7.38	0.0		REW, Fines, Willow	
0+40	4.32			TOB, willow & grasses	
0+45	3.97			Willow & grasses	
0+50	2.78			REP & GND Willow & grasses	



Date / Time: 8/14/14
 River: Caswell Cr.
 Cross Section: CA-7

Station	Rod	Depth	Elevation	Description	Notes

Photo Log

Photo #	Description
	Tetra Tech Camera #2
0178	From LEP looking toward REP
0179	Looking U/S from center of channel
0180	" " D/S " " " "
0181	From REP looking toward LEP

Comments: Manning's n-value Estimate
 Estimate in office based on veg



Cross Section Survey Data Sheet

Date / Time: 8/14/14, 3:00PM
 River: Coswell Cr.
 Cross Section: CA-8
 Length: 61.5 ft.

Crew: WTF, RET
 Northing / Lat: Previously obtained
 Easting / Long: _____
 Est Q (cfs): ~35 cfs
 Comments: Current ~ 1 ft/sec in center of channel - Profile has been a lot/flatter bed to here

Point	BS (+)	HI	FS (-)	Elev	Notes
REPBK	5.07	104.62		99.55	Carried assumed elev from CA-1 (102.00)
		104.55			
LEPBK	5.28	98.99	5.35	99.27	
REPBK			4.99	99.56	D = +0.01 ✓ OK

Station	Rod	Depth	Elevation	Description	Notes
0+02	5.35			Grp & LEF Willowed grasses	
0+04	5.45			TOB Willowed & grasses	
0+08	6.72			Grado Break, Grasses	
0+15	7.40			Top of Inner Bank, Gravel & EAV	
0+16	8.31	0.0		LEW Fines	
0+16	8.80	0.4		Top of bank, Fines	
0+20	9.13	0.8		UF (unconsolidated fines) EAV	
0+27	9.08	0.8		UF, EAV and, Start SAV	
0+30	10.10	1.8		Fines SAV	
0+35	11.15	2.9		G, SAV	
0+40	11.38	3.1		G, SAV	
0+44	11.04	2.7		Fines over gravel, SAV	
0+47	10.50	2.3		Fines, SAV	
0+52	9.66	1.4		Top, Fines, sticks/roots	
0+52	8.30	0.0		LEW Fines	
0+54	6.26			TOB grasses & willows	
0+56	5.58			willowed grasses	
0+61.5	5.06			Grp & REP	



Date / Time: 8/14/14 3:00 PM
River: Caswell Creek
Cross Section: CA-08 CA-8

Station	Rod	Depth	Elevation	Description	Notes

Photo Log

Photo #	Description
0184	From LEA -> REP
0185	Looking up from center of channel
#0186	" " " " " "
0187	From REP -> LEA

Comments: Manning's n-value estimate
Use vegetation characteristics, look-up
back in profile



Cross Section Survey Data Sheet

Date / Time: 8/14/14 3:30 PM
 River: Caswell Cr.
 Cross Section: CA-9
 Length: 53 feet

Crew: WTF, RET
 Northing / Lat: Obtained Previously
 Easting / Long:
 Est. Q (cfs) ~35 cfs
 Comments: Flow ~1 ft/sec in center of channel. Has been flat thru way / please be careful from CA-7 to here

Point	BS (+)	HI	FS (-)	Elev	Notes
LEP BIC #	4.76	103.46		98.70	Carried assumed elev from CA-1 forward
REP BIC #	4.24	103.32	4.38	99.08	
LEP BIC			4.61	98.71	$\Delta = +0.01$ ✓ OK

Station	Rod	Depth	Elevation	Description	Notes
0+00	4.76			GND LEP, Grasses & willows	
0+05	5.26			TUB (Inner), Grasses & willows	
0+06	6.91				
0+10	8.09			Top of bank, Fines	← EAV, UF
0+15	7.10			Top of bar, Fines, EAV	
0+20	6.40			Sand deposit, EAV	
0+25	7.07	0.00		LEW, F, EAV	
0+27	8.00	0.8		Tree bark, G S, SAV	
0+32	8.20	1.2		Gravel, SAV	
0+37	8.79	1.8		G, SAV	
0+41	8.46	1.4		Fine over G, SAV	
0+43	8.53	1.5		Tree bark, Fines over G	
0+43	7.05	0.0		REW, Fines	
0+45	5.41			Top inner bank, grasses & willows	
0+53	4.38			GND REP, willows & grasses	



Cross Section Survey Data Sheet

Date / Time: 8/14/14 4:00 PM

Crew: WTF, RFT

River: Casswell Cr.

Northing / Lat: Previously obtained

Cross Section: CA-10, CA-10.5, CA-11

Easting / Long:

Length: CA-10 50 feet

Est. Q (cfs) ~35 cfs

CA-10.5 44 feet

Comments: CA-10 across gravel wave/control

CA-11 62 feet

CA-10.5 across gravel wave/control

(Note transposed .97 → .79) → 98.99
 needed to recalculate CA-11 across run

Point	BS (+)	HI 4.32	FS (-)	Elev	Notes
LEP BPC CA-10	5.35	104.14	4.34	98.79	Corred assumed 100 elev from CA-1 LEP
		104.55		99.55	
REP BPC CA-11 TP	5.00	104.37	4.77	99.37	
				98.95	
LEP BPC CA-10			5.60	98.77	Δ = -0.02 ✓ OK
	Notes: Shoot CA-10 & CA-10.5 from this set-up also				

Station	Rod	Depth	Elevation	Description	Notes
0+00	5.35			GND LEP, Grasses & willows - CA-10	
0+08	6.15			TOB, Grasses willows	
0+09	7.62	0.0		LEW, Fines, EAV	
0+09	8.23	0.8		Toe EAV, Gravel w/ Fines	
0+12	8.80	1.2		Gravel, SAV	
0+16	8.45	0.8		Gravel, SAV	
0+24	8.47	0.8		Gravel, Cobble, SAV	
0+32	8.45	0.7		G.C SAV, Toe of bar	
0+32	7.79	0.0		REW (Notes, double checked REP & LEW - OK)	
0+34	7.01			Top of bar, grasses/sedges	
0+42	7.40			Toe of bar, Fines, grasses	
0+47	8.15			UF (unconsolidated Fines)	
0+51	7.84			UF, Toe Bank	
0+53	5.28			TOB, grasses & willows	
0+59	7.47			GND @ REP	
0+59	4.46			BPC @ REP CA-10	

CA-10 ↓

CA-10.5 ↓

Station	Rod	Depth	Elevation	Description	Notes
0+00	5.33			LEP BPC (Starte 4:30 PM) CA-10.5	
0+00	5.33			GND BPC willows & grasses	
0+03	6.09			TOB	
0+04	7.57	0.0		LEW, Fines	Ineffective FLOW
0+04	8.35	0.8		UF, EAV	
0+07	8.76	1.2		UF, EAV	SAV is scattered
0+14	8.44	0.9		Fines over gravel, SAV	
0+19	7.95	0.4		Gravel, SAV	SAV is scattered
0+24	8.45	0.9		G, SAV	
0+30	8.98	1.5		G, SAV	SAV is scattered
0+36	8.85	1.3		Toe of bank, Fines over gravel	
0+36	7.59	0.0		REW	
0+36	6.70			Pl. on bank, EAV	
0+40	5.47			TOB, grasses	

Use TO INTERPOLATE CROSS SECTION U/S & D/S



Date / Time: 8/14/14, 4:00 PM
 River: Caswell Cr.
 Cross Section: CA-10

Depth 15' u/s of

Depth 15' U/S of CA-10 is 1.9'
 Depth 15' D/S of CA-10 is 2.0'

Depth 15' U/S of CA-10.5
 Control is 2.2'
 Depth 15' D/S of CA10.5 is 1.7'

CA-10.5
 CONT.

Station	Rod	Depth	Elevation	Description	Notes
	CA-10.5 (CONT.)				
* 0+44	5.11			GND @ REP	
* 0+44	5.11			REP B&C CA-10.5	
CA-11					
* 0+00	5.00			REP LEP B&C	CA-11 (START @ 5:00 PM)
0+00	5.00			GND @ LEP	Willows & Grasses
0+02	4.96			TOB	Willows & grasses
0+04	7.91	0.0		LEW	
0+04	7.86	0.5		UF (unconsolidated fines)	
0+09	8.42	1.1		Fines over G, SAV	scattered
0+13	8.55	1.2		Gravel, Sand	
0+17	8.30	0.9		G, SAV dense	
0+22	9.01	1.6		G, S SAV scattered	
0+26	8.53	1.1		S over gravel, thick SAV	
0+33	7.42	0.0		PEW, EAV, UF	high point
0+36	6.55			Top of bank, grasses & sedges	
0+45	6.50			Grasses, Sand deposit, high point	
0+53	8.18			UF, Grasses	
0+58	6.70			Top of bank, grasses	
0+60	4.70			Top of bank, willows & grasses	
0+62	4.77			GND @ REP	Willows & grasses
* 0+62	4.77			REP B&C CA-11	

Photo Log

Photo #	Description
Tetra Tech Camera # 2 (Folder 104)	
0196	Looking from LEP → REP CA-10
0197	Look u/s from center of channel CA-10
0198	Looking D/S from center of channel CA-10
0199	Looking from REP → LEP CA-10
0200	Looking from LEP → REP CA-10.5
0201	Look u/s from center of channel CA-10.5
0202	l = D/S = = = =
0203	Looking from REP → LEP CA-10.5
0204	Looking from LEP → REP CA-11
0205	Looking u/s from center of channel CA-11

Comments: 0206 = D/S = = = =
 0207 Looking from REP → LEP CA-11

Manning's n-value estimate
 Use vegetation descriptions & bed to look up n-value



Cross Section Survey Data Sheet

Date / Time: 8/14/14, 5:45 Start CA-12
 River: Caswell Crake
 Cross Section: CA-12, CA-13, CA-14, CA-15
 Length: CA-12 40 feet
 CA-13 48.5 feet
 CA-14 46.5 feet
 CA-15 63.5 feet

Crew: WTF, RET
 Northing / Lat: previously obtained
 Easting / Long:
 Est. Q (cfs) ~35 cfs
 Comments: CA-12 D/S of Gravel Wave/control
 CA-13 @ Gravel Wave/control/ripole
 CA-14 @ of gravel control, in pool
 CA-15 further U/S of gravel control, in pool

Point	BS (+)	HI	FS (-)	Elev	Notes
REP B/C CA-12 II	4.94	104.60 104.78		99.66 99.84	Carried assumed elev. 100.00 from CA-1 LEP
REP B/C CA-15 F	5.41	104.59	5.42	99.18 99.84	
REP B/C CA-12			4.93	99.66	D=0.00 ✓ ok

Station	Rod	Depth	Elevation	Description	Notes
CA-12					
* 0+00	5.05			B/C REP CA-12 / GND also	TOB willows
0+05	7.77	0.0		LEW EAV, UF	← INEFFECTIVE FLOW
0+08	8.62	0.8		UF, Toe of bank, SAV	
0+10	8.88	1.1		G, EAV SAV	
0+16	8.40	0.6		Fines over G, SAV	
0+22	9.00	1.2		G, SAV scattered	
0+30	8.95	1.2		G, S, SAV scattered	
0+33	8.63	0.9		Toe of bank, scattered SAV	
0+34	7.74	0.0		REW, grasses	
0+35	7.44			Top inner bank grasses	
0+40	8.03			Toe of bank, willow & grass	
0+44	5.09			TOB	
0+49	4.94			REP B/C / GND also	willows & grasses
CA-13					
* 0+00	5.08			LEP B/C, GND also, willows & grasses	TOB
0+05	6.30			H. on Bank	willows & grasses
0+08	6.63			Grade Bank / inner bank	willows & grasses
0+09	7.76	0.0		LEW, SAV	
0+09	8.37	0.6		Toe bank, SAV	Fines over Gravel
0+12	9.04	1.3		G, S scattered SAV	
0+18	8.43	0.7		G, C " "	
0+22	7.90	0.2		G, C " "	
0+27	8.49	0.8		G, C " "	
0+33	8.36	0.7		G " "	
0+38	8.21	0.5		Toe of Bank, G, S, scattered SAV	
0+38	7.69	0.0		REW	
0+39	6.81			Top Inner bank, willow & grasses	
0+43	6.41			Toe of bank, " "	
0+45	4.13			TOB	
0+48.5	4.17			REP B/C / also GND, " "	



Date / Time: 8/14/14
 River: Caswell Cr.
 Cross Section: CA-12, CA-13, CA-14, CA-15

CA-14

Station	Rod	Depth	Elevation	Description	Notes
0+00	4.75			LEP REP / A / GND / willows & grasses	TOB
0+05	7.49			Toe of bank, UF, Sedges	
0+16	7.32			Edge bar, Sedges	
0+17	7.65	0.00		LEW, Sedges, UF	
0+19	8.55	0.0		Fines over gravel, SAV	
0+23	9.60	2.0		" " "	"
0+25	10.04	2.52		Gravel, scattered SAV	
0+32	10.15	2.5		Gravel, " "	
0+34	9.90	2.3		Toe of bank, Fines over gravel, SAV	
0+36	7.65	0.0		REW, Fines, grasses, willows	
0+42	4.85			TOB, willows & grasses	
0+46.5	4.24			REP REP / GND / willows & grasses	
CA-15					
0+00	4.08			LEP REP / GND / willows & grasses	
0+04	4.82			TOB, willows & grasses	
0+13	7.20			Toe, Sedges	
0+18	6.69			edge, bar, Sedges	
0+19	7.66	0.0		LEW, Fines, Sedges	
0+19	8.61	1.0		Fines over gravel, scattered SAV	
0+25	9.13	1.5		G, scattered SAV	
0+31	9.42	1.8		UF over gravel, dense SAV	
0+37	9.62	2.0		Gravel, dense SAV	
0+39	9.75	2.1		Toe of bank, Fines over gravel, scattered SAV	
0+39	7.63	0.0		REW, grasses	
0+39	7.32			Top of fine bank, SAV	
0+48	7.46			Fines, Sedges	
0+56	6.95			Toe of bank, Fines, grasses	
0+59	5.07			TOB, willows & grasses	
0+63.5	5.42			REP REP / GND / willows & grasses	

Photo Log

Photo #	Description
0210	LEP → REP - CA-12
0211	From center of channel looking U/S CA-12
0212	" " " " " CA-12
0213	REP → LEP - CA-12
0214	LEP → REP - CA-13
0215	From center of channel looking U/S CA-13
0216	" " " " " U/S CA-13
0217	From REP → LEP CA-13
0218	From LEP → REP CA-14
0219	From center of channel looking U/S CA-14
0220	" " " " " U/S CA-14
0221	From REP → LEP CA-14
0222	From LEP → REP CA-15
0223	From center of channel looking U/S
0224	" " " " " U/S
0225	From REP → LEP

Manolog's A-value estimate → Use veg. & bed in office & look-up