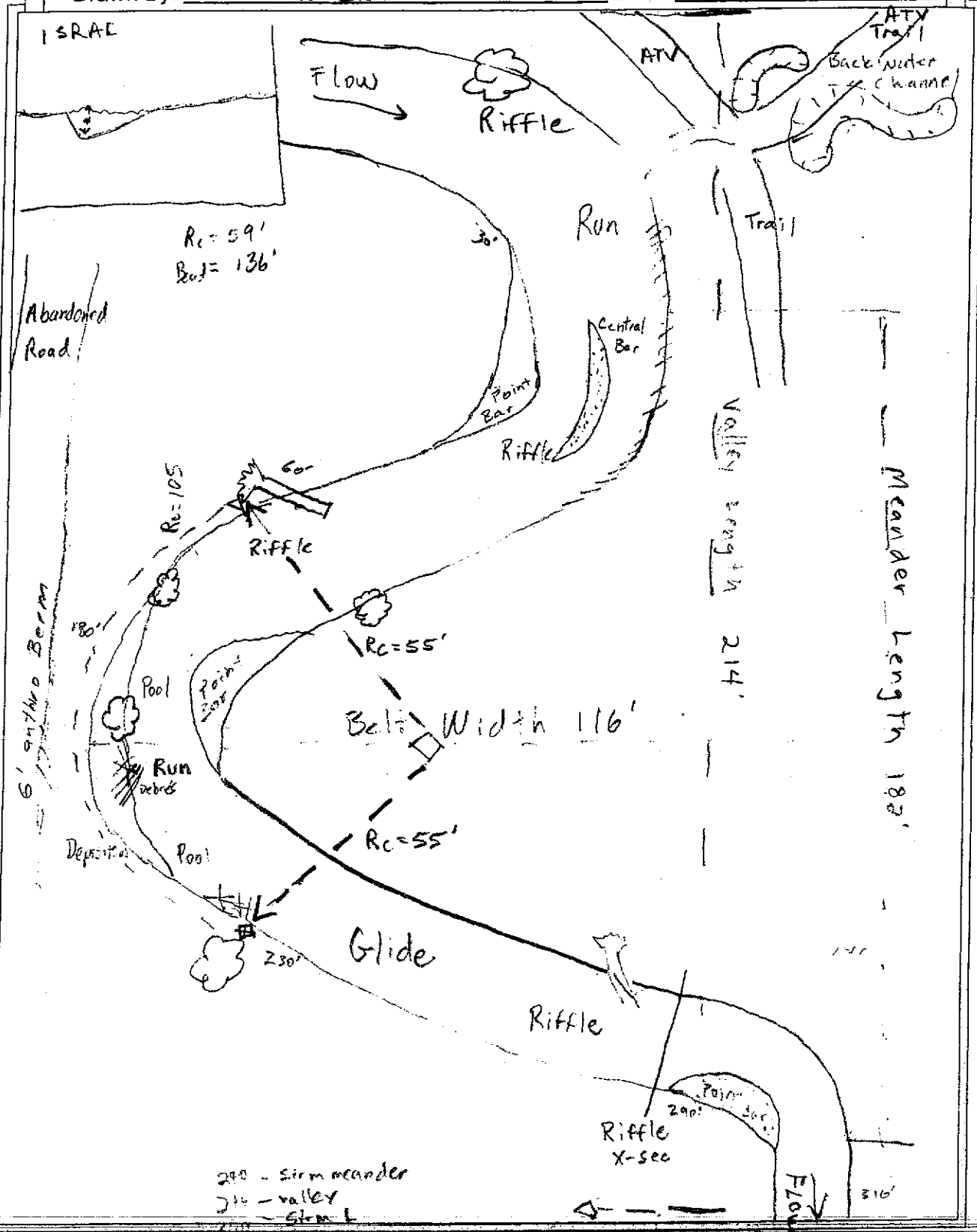
AREA-SITE LOCATION....REACH MAP

Stream: ISRAEL CREEK Reach: Team 2

Drawn By: Damion ciotti Date: 4-21-09



Worksheet A-3. Summary of Morphological Variables.

Stream: TEAM 2's 2009 DATA		Location:	
Team: TEAM 1	Date: 2011	Drainage Area:	

Riffle Channel Dimensions

1. Bankfull Width (W_{bkf}) (ft)	22.7	2. Bankfull Mean Depth (d_{bkf}) (ft)	1.99
3. Width/Depth Ratio (W_{bkf} / d_{bkf})	11.4	4. Bankfull Cross-Sectional Area (A_{bkf}) (ft^2)	45.1
5. Bankfull Maximum Depth (d_{max}) (ft)	3.05	6. Width of Flood-Prone Area (W_{fpa}) (ft)	310
7. Entrenchment Ratio (ER) (W_{fpa} / W_{bkf})	13.66		

Channel Pattern			Dimensionless Ratios		
8. Belt Width (W_{blt}) (ft)	Mean	116	9. Meander Width Ratio (MWR) (W_{blt} / W_{bkf})	Mean	5.1
	Min			Min	
	Max			Max	
10. Stream Meander Length (L_m) (ft)	Mean	182	11. Meander Length Ratio (MLR) (L_m / W_{bkf})	Mean	8.02
	Min			Min	
	Max			Max	
12. Linear Wavelength (λ) (ft)	Mean	290	13. Linear Wavelength to Bankfull Width (λ / W_{bkf})	Mean	12.78
	Min			Min	
	Max			Max	
14. Radius of Curvature (R_c) (ft)	Mean	51.5	15. Radius of Curvature to Bankfull Width (R_c / W_{bkf})	Mean	2.27
	Min	43		Min	
	Max	60		Max	

Channel Particles

Representative Pebble Count					
16. D_{16} (mm)	—	17. D_{35} (mm)	0.65	18. D_{50} (mm)	2.00
19. D_{84} (mm)	11	20. D_{95} (mm)	16	21. D_{100} (mm)	45.00
Active Bed Riffle Pebble Count					
22. D_{16} (mm)	0.33	23. D_{35} (mm)	3.2	24. D_{50} (mm)	5.7
25. D_{84} (mm)	10	26. D_{95} (mm)	17.0	27. D_{100} (mm)	23

Classification

28. Sinuosity (k)	1.5	29. Average Water Surface Slope (S)	0.0029
30. Stream Type	C5	31. Valley Type	8

Velocity & Discharge

32. Friction Factor (u / u*)	12.9	33. Relative Roughness (R / D_{84})	51.21
34. Manning's "n" from Friction Factor / Relative Roughness	0.025	35. Manning's "n" from Stream Type	0.05
36. Estimated Mean Velocity (u_{bkf}) (ft/sec)	4.81	37. Estimated Bankfull Discharge (cfs)	216.9
38. Estimation Method Selected for Velocity & Discharge	#2 – Data measured		

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Worksheet A-1. Field Form for Level II Stream Classification.

Stream:	3327
Basin:	Drainage Area: ~~704~~ acres 5.3 mi^2
Location:	
Twp.&Rge:	Sec.&Qtr.:
Cross-Section Monuments (Lat./Long.):	Date:
Observers: TEAM 1 2011	Valley Type: 8

Bankfull WIDTH (W_{bkf}) WIDTH of the stream channel at bankfull stage elevation, in a riffle section.	22.7	ft
Bankfull DEPTH (d_{bkf}) Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section ($d_{bkf} = A_{bkf} / W_{bkf}$).	1.99	ft
Bankfull X-Section AREA (A_{bkf}) AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.	45.1	ft^2
Width/Depth Ratio (W_{bkf} / d_{bkf}) Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.	11.41	ft/ft
Maximum DEPTH (d_{max}) Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and Thalweg elevations, in a riffle section.	3.05	ft
WIDTH of Flood-Prone Area (W_{fpa}) Twice maximum DEPTH, or (2 x d_{mbkf}) = the stage/elevation at which flood-prone area WIDTH is determined in a riffle section.	310	ft
Entrenchment Ratio (ER) The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH (W_{fpa} / W_{bkf}) (riffle section).	13.66	ft/ft
Channel Materials (Particle Size Index) D_{50} The D_{50} particle size index represents the median or dominant diameter of channel materials, as sampled proportionately from the channel surface, between the bankfull stage and Thalweg elevations.	2	mm
Water Surface SLOPE (S) Channel slope = "rise over run" for a reach approximately 20–30 bankfull channel widths in length, with the "riffle-to-riffle" water surface slope representing the gradient at bankfull stage.	0.003	ft/ft
Channel SINUOSITY (k) Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL / VL); or estimated from a ratio of valley slope divided by channel slope (S_{val} / S).	1.5	

Stream Type C5 **See Classification Key (Figure A-2)**

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Worksheet A-2. Computations of velocity and discharge using various methods.

Bankfull VELOCITY & DISCHARGE Estimates

Stream:		Location:	
Date:		Stream Type:	
Valley Type:		Observers:	TEAM 1
HUC:	-- -- -- -- -- -- -- -- -- -- --		

INPUT VARIABLES			OUTPUT VARIABLES		
Bankfull Riffle Cross-Sectional AREA	45.1	A_{bkf} (ft^2)	Bankfull Riffle Mean DEPTH	1.99	d_{bkf} (ft)
Bankfull Riffle WIDTH	22.7	W_{bkf} (ft)	Wetted PERIMETER ~ $(2 * d_{bkf}) + W_{bkf}$	26.69	W_p (ft)
D_{84} at Riffle	10	Dia. (mm)	D_{84} (mm) / 304.8	0.0328	D_{84} (ft)
Bankfull SLOPE	0.003	S_{bkf} (ft / ft)	Hydraulic RADIUS A_{bkf} / W_p	1.69	R (ft)
Gravitational Acceleration	32.2	g (ft / sec^2)	Relative Roughness R(ft) / D_{84} (ft)	51.21	R / D_{84}
Drainage Area	5.3	DA (mi^2)	Shear Velocity $u^* = (gRS)^{1/2}$	0.40	u^* (ft/sec)

ESTIMATION METHODS

1. Friction Factor / Relative Roughness $u = [2.83 + 5.66 * Log\{R / D_{84}\}] u^*$	5.00	ft / sec	225.5	cfs
2. Roughness Coefficient: a) Manning's *n* from Friction Factor / Relative Roughness (Figs. A-27, A-28) $u = 1.49*R^{2/3}*S^{1/2}/n$ $n =$ 0.024	4.81	ft / sec	216	cfs
2. Roughness Coefficient: b) Manning's *n* from Stream Type (Fig. A-29) $u = 1.49*R^{2/3}*S^{1/2}/n$ $n =$ 0.054	2.27	ft / sec	102.3	cfs
2. Roughness Coefficient: c) Manning's *n* from Jarrett (USGS): $u = 1.49*R^{2/3}*S^{1/2}/n$ $n = 0.39*S^{0.38}*R^{-0.16}$ Note: This equation is applicable to steep, step/pool, high boundary roughness, cobble- and boulder-dominated stream systems; i.e., for Stream Types A1, A2, A3, B1, B2, B3, C2 & E3 $n =$ 0.0394	2.93	ft / sec	132.14	cfs
3. Other Methods (Hey, Darcy-Weisbach, Chezy C, etc.)		ft / sec		cfs
3. Other Methods (Hey, Darcy-Weisbach, Chezy C, etc.)		ft / sec		cfs
4. Continuity Equations: a) Regional Curves $u = Q / A$ Return Period for Bankfull Discharge Q = 299.4 year	6.64	ft / sec	299.4	cfs
4. Continuity Equations: b) USGS Gage Data $u = Q / A$		ft / sec		cfs

Protrusion Height Options for the D_{84} Term in the Relative Roughness Relation (R/D_{84}) - Estimation Method 1

Option 1.	For **sand-bed** channels: Measure 100 **"protrusion heights"** of sand dunes from the downstream side of feature to the top of feature. Substitute the D_{84} sand dune protrusion height in ft for the D_{84} term in method 1.
Option 2.	For **boulder-dominated** channels: Measure 100 **"protrusion heights"** of boulders on the sides from the bed elevation to the top of the rock on that side. Substitute the D_{84} boulder protrusion height in ft for the D_{84} term in method 1.
Option 3.	For **bedrock-dominated** channels: Measure 100 **"protrusion heights"** of rock separations, steps, joints or uplifted surfaces above channel bed elevation. Substitute the D_{84} bedrock protrusion height in ft for the D_{84} term in method 1.
Option 4.	For **log-influenced** channels: Measure **"protrusion heights"** proportionate to channel width of log diameters or the height of the log on upstream side if embedded. Substitute the D_{84} protrusion height in ft for the D_{84} term in method 1.

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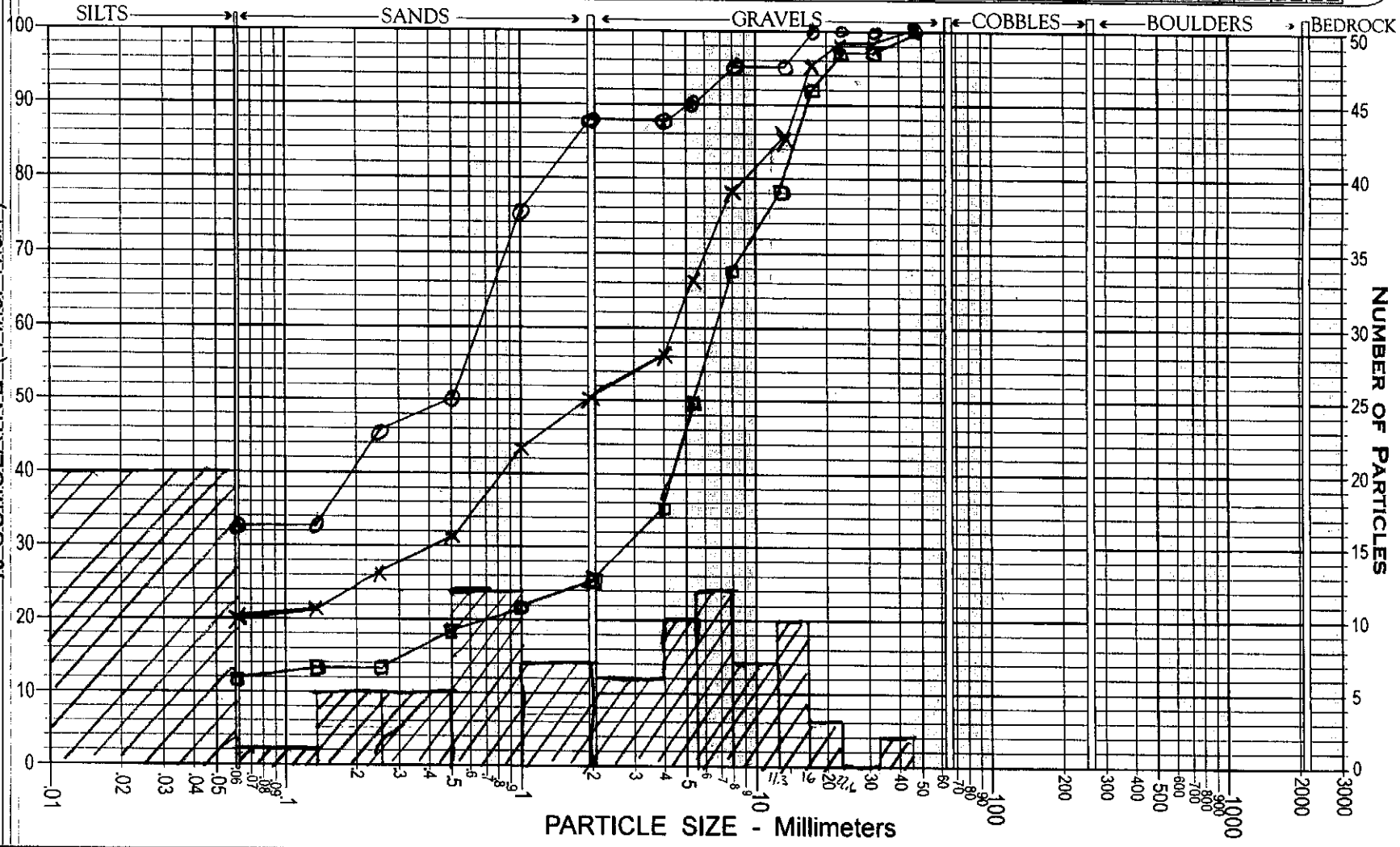
Pool
Riffle
Total

Representative

PEBBLE COUNT DATA

LOCATION: Reach 1
Date:
REACH:
PARTY: Team 1
Stream Type:
Valley Type:
HUC:



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PEBBLE COUNT DATA

LOCATION:

REACH: 1

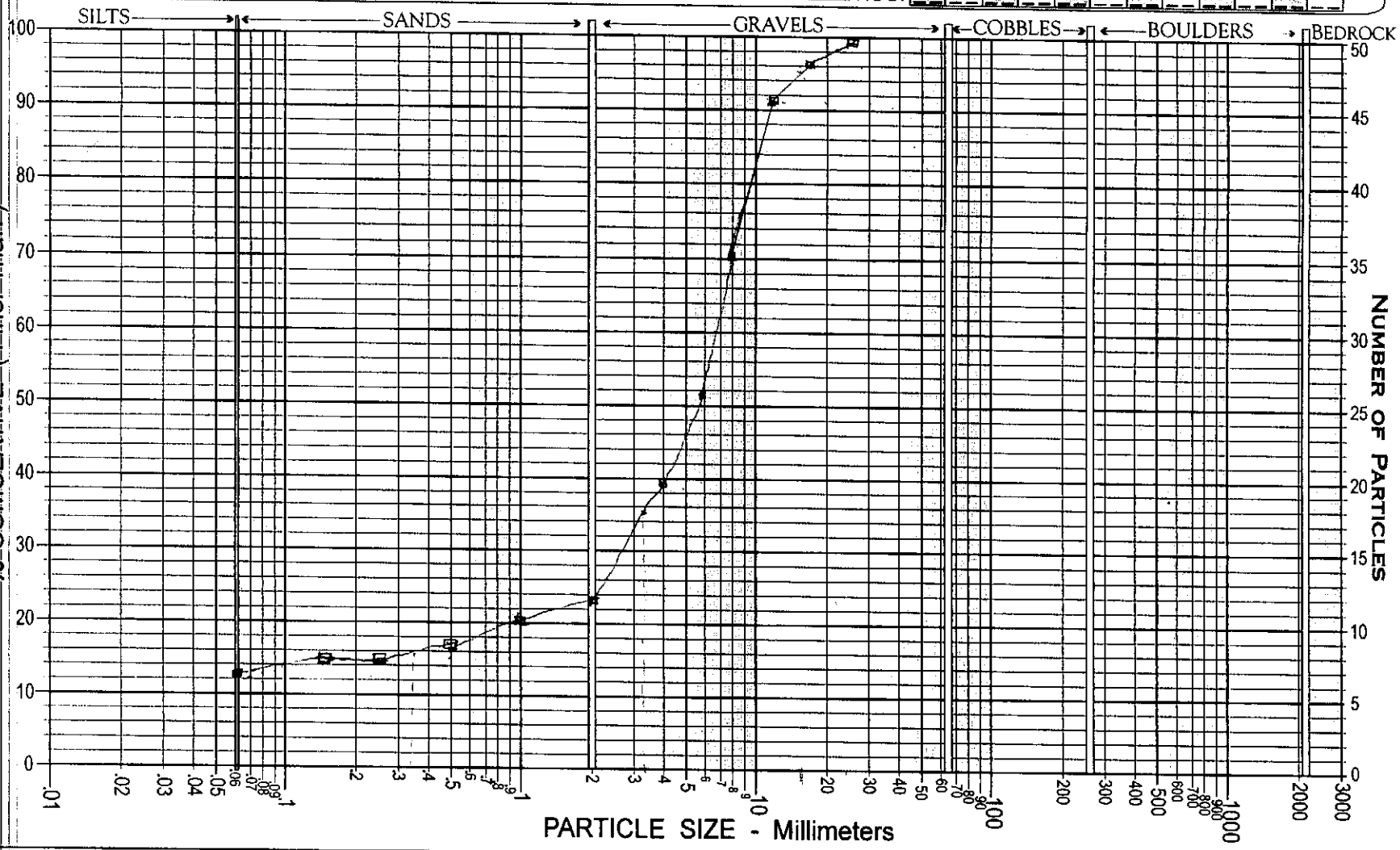
PARTY: Group 1

Date:

Stream Type:

Valley Type:

HUC:



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SURVEY DATA → LONGITUDINAL PROFILE 1

SITE: Israel CR Date: 4/21/09

Location:

Party / Notes: HUC:

3.50

4.56 H 1

HI 2 4.52

	Distance, Point, or STATION ft	Back-Sight BS ft	Height of Instrument HI ft	Thalweg Fore-Sight FS ft	Thalweg Elevation Elev. ft	Water Surface Fore-Sight FS ft	Water Surface Elevation Elev. ft	Bankfull Fore-Sight FS ft	Bankfull Elevation Elev. ft	Low Bank HI Fore-Sight FS ft	Low Bank HI Elevation Elev. ft	NOTES e.g. Riffle Run Pool Glide
1	0+00	3.50	1035	7.59	95.91	6.54	96.96	4.7	98.6			~~TP~~ R
2	23+00			7.93	95.57	6.63	96.87					~~End~~ TP
3	43+00			7.83	95.67	6.61	96.89					mid pool
4	0+80			7.79	95.71	6.67	96.83			4.35	99.15	
5	0+93			7.59	96.21	6.66	96.84		5.31			~~TP~~ R
6	1+16			7.44	96.06	6.93	96.57		98.19			~~TP~~
7	1+34			8.65	94.85	7.04	96.46					Pool
8	1+42			7.96	95.54	7.04	96.46					~~T~~ Run
9	1+62			8.05	95.45	7.15	96.35		5.31	4.81	98.69	Run
10	1+72			8.47	95.03	7.21	96.29		98.19	4.35	99.15	~~Pool~~ TP
11	1+99			8.79	94.71	7.16	96.34					pool
12	2+07			8.91	94.59	7.27	96.23	~~4.9~~	5.31			pool
13	2+16			8.34	95.16	7.22	96.28		98.19	5.00	98.5	glide
14	2+25			8.28	95.22	7.16	96.34					pool
15	2+45			10.04	93.46	7.15	96.35			4.75	98.75	pool
16	2+54			8.75	94.75	7.29	96.21	5.55	97.95			pool
17	2+71			7.84	95.66	7.46	96.04			5.35	98.15	~~[illegible]~~ TR
18	2+88			8.19	95.31	7.28	96.22					X-section
19	2+93			8.29	95.21	7.41	96.09					bar
20	3+11			8.41	95.09	7.33	96.17					
21	3+17			8.51	94.99	7.43	96.07	5.85	97.65			~~End Riffle~~ TP
22	3+27			9.41	94.09							TR
23	2+84							5.35	98.15			X-section
24	0+31							4.89	98.61	4.21	99.29	
25	0+16							4.71	98.79			
26	2+81			7.65	95.65	6.81	96.49					Riffle
27	2+90			7.79	95.51	6.94	96.36					Bottom Riffle

x of order

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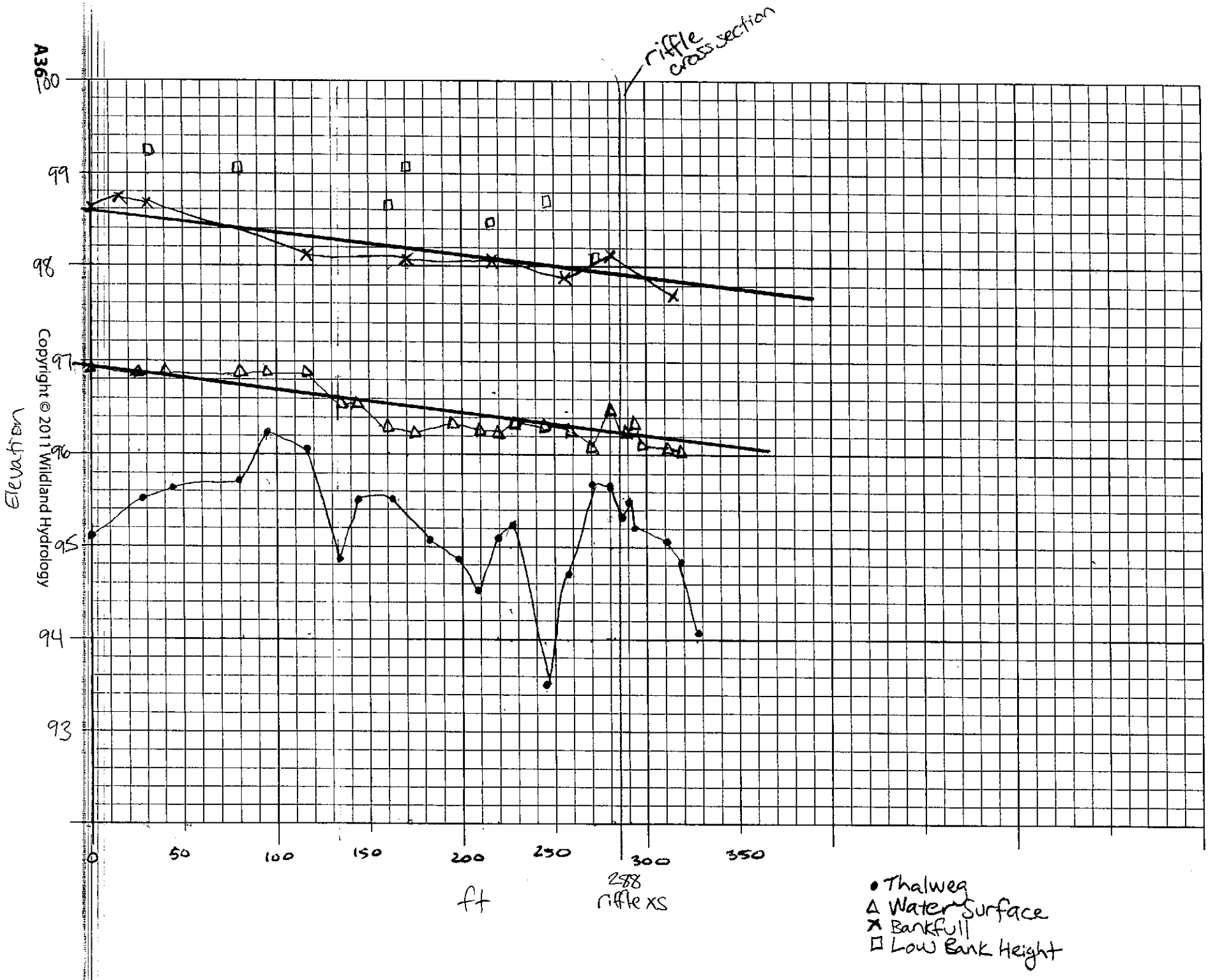
TEAM 1 2011



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SURVEY DATA ⟹ **CROSS - SECTION 1**

SITE: Israel Creek Date: 4/21/09

Location: Reach 2

Party / Notes: Group 2 HUC:

Item	Distance, Point, or STATION (ft)	Back-Sight BS (ft)	Height of Instrument HI (ft)	Fore-Sight FS (ft)	Elevation (ft)	REMARKS / COMMENTS / NOTES
1	0		4.56	5.22	98.28	
2	6.0			5.24	98.26	
3	12.0			5.14	98.36	
4	13.0			5.49	98.01	LEB
5	14.7			7.28	96.22	LEW
6	16.0			7.76	95.74	
7	17.5			8.36	95.14	TW
8	18.5			8.19	95.31	
9	20.0			8.14	95.36	
10	21.0			8.12	95.38	
11	22.0			7.99	95.51	
12	25.6			7.59	95.91	
13	27.0			7.58	95.92	
14	29.2			7.29	96.21	REW
15	32.0			6.86	96.64	
16	34.0			6.15	97.35	
17	35.6			5.31	98.19	BFR
18	38.0			5.07	98.43	
19	41.0			5.03	98.47	
20	49.0			5.09	98.41	
21						
22			4.56	3.50		Benchmark
23						
24			4.57			2nd setup
25						
26						
27						
28						

50
50
50
50
50
50
50
10
310
Flood prone width

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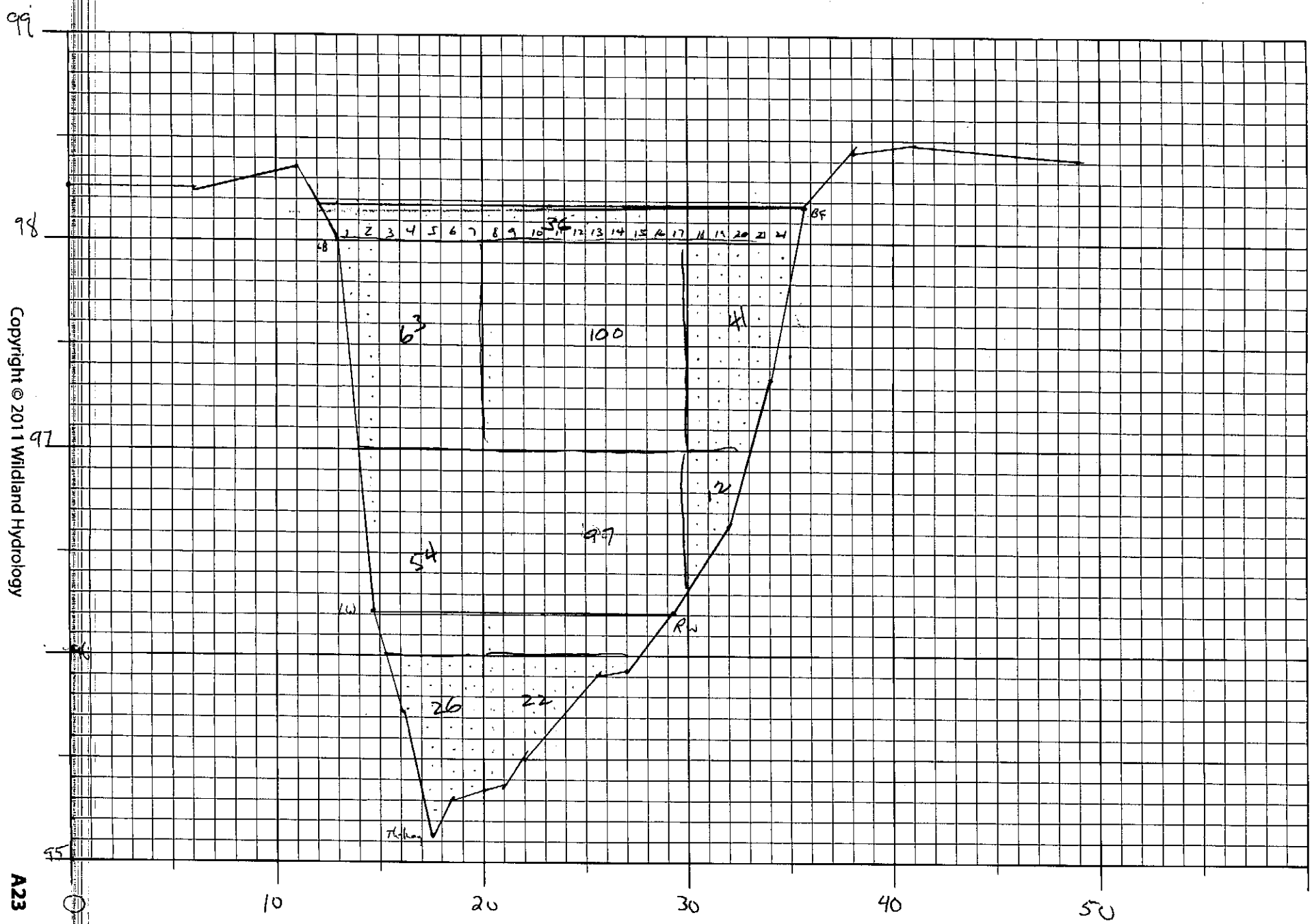
Team 1 2011



0.1 ft² = 1 square 451 45.1 ft²

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