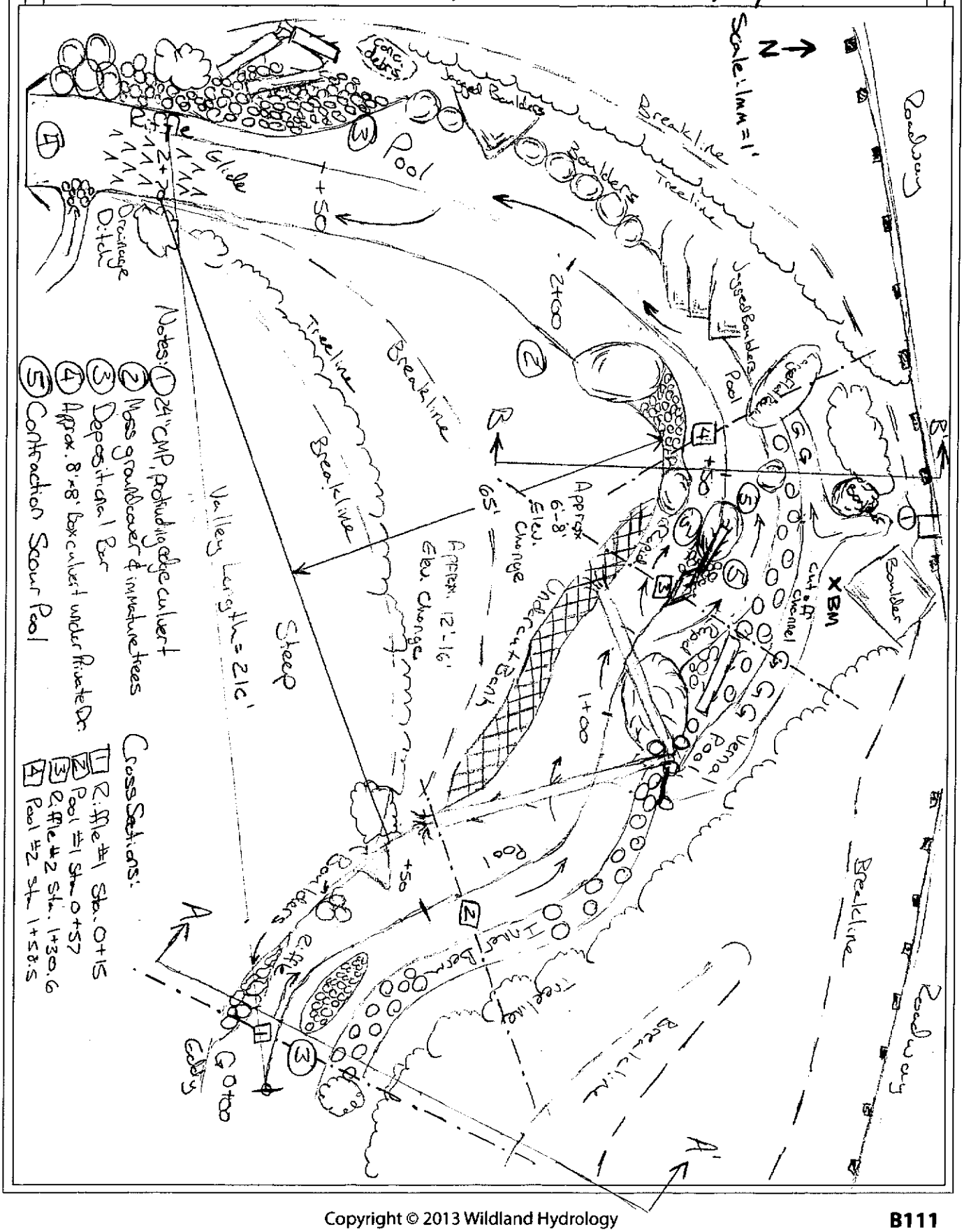
AREA-SITE LOCATION....REACH MAP

Stream: Sharman's Branch Reach: 3

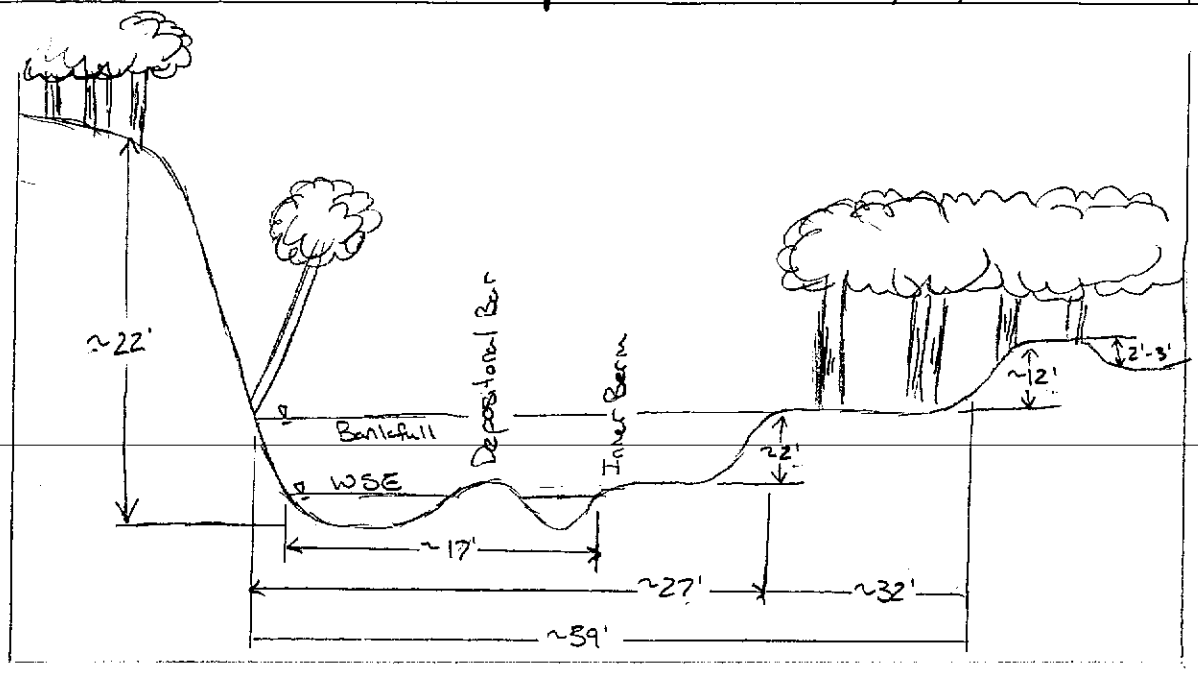
Drawn By: Pat Zinkan Group 3 Date: 04/16/13


Scale: 1mm = 1'
N
Roadway
Breakline
Treeline
Jagged Boulders
Boulders
Pool
Glide
Riffle
Drainage Ditch
Notes:
1 24" CMP, protruding culvert
2 Moss groundcover & immature trees
3 Depositional Bar
4 Approx. 8'x8' Box culvert under private Dr.
5 Contraction Scour Pool
Cross Sections:
R Riffle #1 Sta. 0+15
P Pool #1 Sta. 0+57
R Riffle #2 Sta. 1+30.6
P Pool #2 Sta. 1+58.5
Valley Length = 216'
Steep
Approx. 12'-16' Elev. Change
Approx. 6'-8' Elev. Change
65'
Undercut Bank
Cut off Channel
XBM
Bouldery
Gravel Bar
Gravel Bar
Gravel Bar

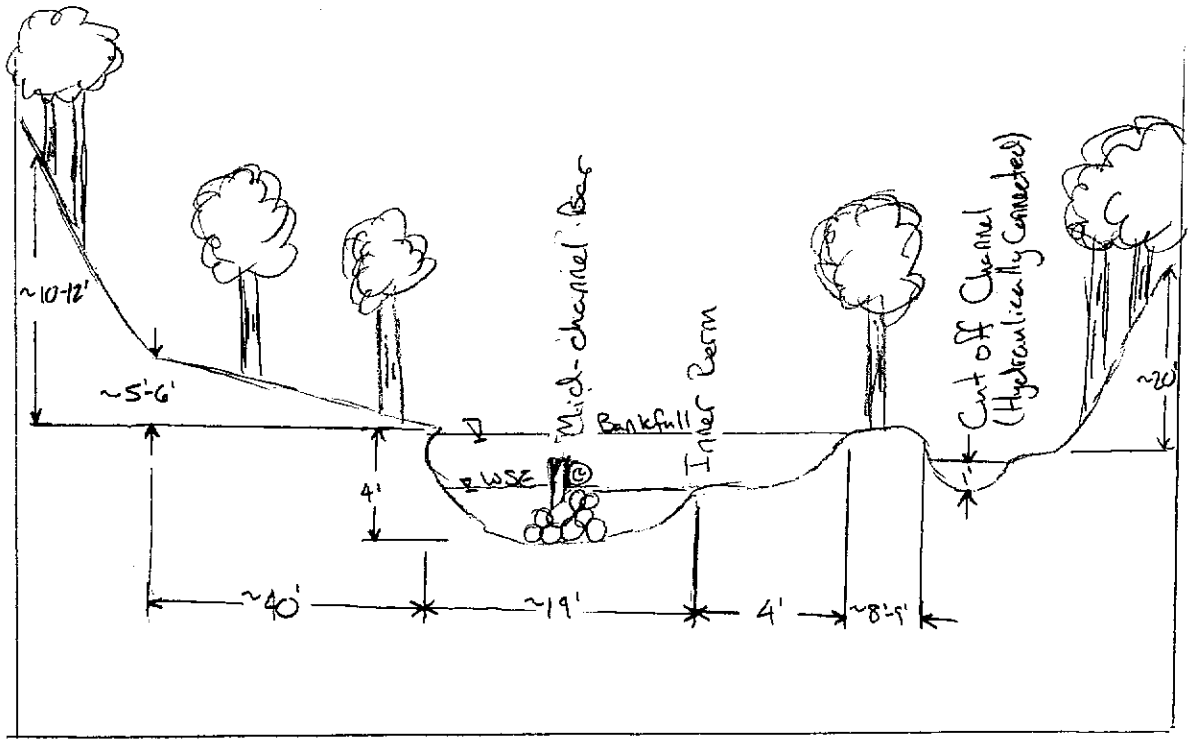
AREA-SITE LOCATION....REACH MAP

Stream: Sharman's Branch Reach: 3

Drawn By: Pat Zinkan Group 3 Date: 04/16/13



A Section A-A' (Approx. Sta 0+15) → To Roadway A'



B Section B-B' (Approx. Sta. 1+50) → To Roadway B'

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Worksheet B-3b. Morphological relations, including dimensionless ratios (*First Field Day*).

Stream: Sharmans Branch Location:

Observers: Team 3 Date: 4/16/13 Valley Type: VI Stream Type: B4

River Reach Summary Data.....2

Hydraulics

Streamflow: Estimated Mean Velocity at Bankfull Stage ($\bar{u}_{bkf}$)	3.38	ft/sec	Estimation Method	Jarrett	
Streamflow: Estimated Discharge at Bankfull Stage (Q_{bkf})	146	cfs	Drainage Area	3.6	mi^2

Channel Pattern

Geometry	Mean	Min	Max		Dimensionless Geometry Ratios	Mean	Min	Max
Linear Wavelength (λ)	—	—	—	ft	Linear Wavelength to Riffle Width (λ / W_{bkf})	—	—	—
Stream Meander Length (L_m)	270	—	—	ft	Stream Meander Length Ratio (L_m / W_{bkf})	10	—	—
Radius of Curvature (R_c)	—	—	—	ft	Radius of Curvature to Riffle Width (R_c / W_{bkf})	—	—	—
Belt Width (W_{blt})	65	—	—	ft	Meander Width Ratio (W_{blt} / W_{bkf})	2.4	—	—
Arc Length (L_a)	—	—	—	ft	Arc Length to Riffle Width (L_a / W_{bkf})	—	—	—
Riffle Length (L_r)	30	NA	NA	ft	Riffle Length to Riffle Width (L_r / W_{bkf})	1.1	—	—
Individual Pool Length (L_p)	36	32	40	ft	Individual Pool Length to Riffle Width (L_p / W_{bkf})	1.34	1.19	1.49
Pool to Pool Spacing (P_s)	65	NA	NA	ft	Pool to Pool Spacing to Riffle Width (P_s / W_{bkf})	2.42	—	—

Channel Profile

Valley Slope (S_{val})	0.03	ft/ft	Average Water Surface Slope (S)	0.028	ft/ft	Sinuosity (S_{val} / S)	1.07
Stream Length (SL)	270	ft	Valley Length (VL)	216	ft	Sinuosity (SL / VL)	1.25

Low Bank Height (LBH)	start	ft	Max Depth (d_{max})	start	2.06 ft	Bank-Height Ratio (BHR) (LBH / d_{max})	start	
	end	ft		end	2.64 ft		end	

Facet Slopes	Mean	Min	Max		Dimensionless Facet Slope Ratios	Mean	Min	Max
Riffle Slope (S_{rif})	0.086	0.05	NA	ft/ft	Riffle Slope to Average Water Surface Slope (S_{rif} / S)	1.25	NA	NA
Run Slope (S_{run})	NA	NA	NA	ft/ft	Run Slope to Average Water Surface Slope (S_{run} / S)	NA	NA	NA
Pool Slope (S_p)	0.01	0.006	0.016	ft/ft	Pool Slope to Average Water Surface Slope (S_p / S)	0.36	0.21	0.57
Glide Slope (S_g)	NA	NA	NA	ft/ft	Glide Slope to Average Water Surface Slope (S_g / S)	NA	NA	NA
Step Slope (S_s)	[illegible]	NA	NA	ft/ft	Step Slope to Average Water Surface Slope (S_s / S)	2.39	NA	NA

Max Depths[a]	Mean	Min	Max		Dimensionless Depth Ratios	Mean	Min	Max
Max Riffle Depth (d_{maxrif})	2.47	NA	2.47	ft	Max Riffle Depth to Mean Riffle Depth (d_{maxrif} / d_{bkf})	1.53	—	—
Max Run Depth (d_{maxrun})	—	—	—	ft	Max Run Depth to Mean Riffle Depth (d_{maxrun} / d_{bkf})	—	—	—
Max Pool Depth (d_{maxp})	3.45	3.09	3.82	ft	Max Pool Depth to Mean Riffle Depth (d_{maxp} / d_{bkf})	2.14	1.92	2.37
Max Glide Depth (d_{maxg})	—	—	—	ft	Max Glide Depth to Mean Riffle Depth (d_{maxg} / d_{bkf})	—	—	—
Max Step Depth (d_{maxs})	2.48	—	2.48	ft	Max Step Depth to Mean Riffle Depth (d_{maxs} / d_{bkf})	1.54	—	—

Channel Materials

	Reach[b]	Riffle[c]	Bar		Reach[b]	Riffle[c]	Bar	Protrusion Height[d]	
% Silt/Clay	0	0		D_{16}	7			0	mm
% Sand	6	8.4		D_{35}	24			1.0	mm
% Gravel	68	57.6		D_{50}	39			9.85	mm
% Cobble	25	33.7		D_{84}	99			7.5	mm
% Boulder	1	0		D_{95}	175			0	mm
% Bedrock	0	0		D_{100}	260			0	mm

[a] Min, max & mean depths are measured from Thalweg to bankfull at mid-point of feature for riffles, runs & steps, the deepest part of pools, & at the tail-out of glides.

[b] Composite sample of riffles and pools within the designated reach. [c] Active bed of a riffle. [d] Height of roughness feature above bed.

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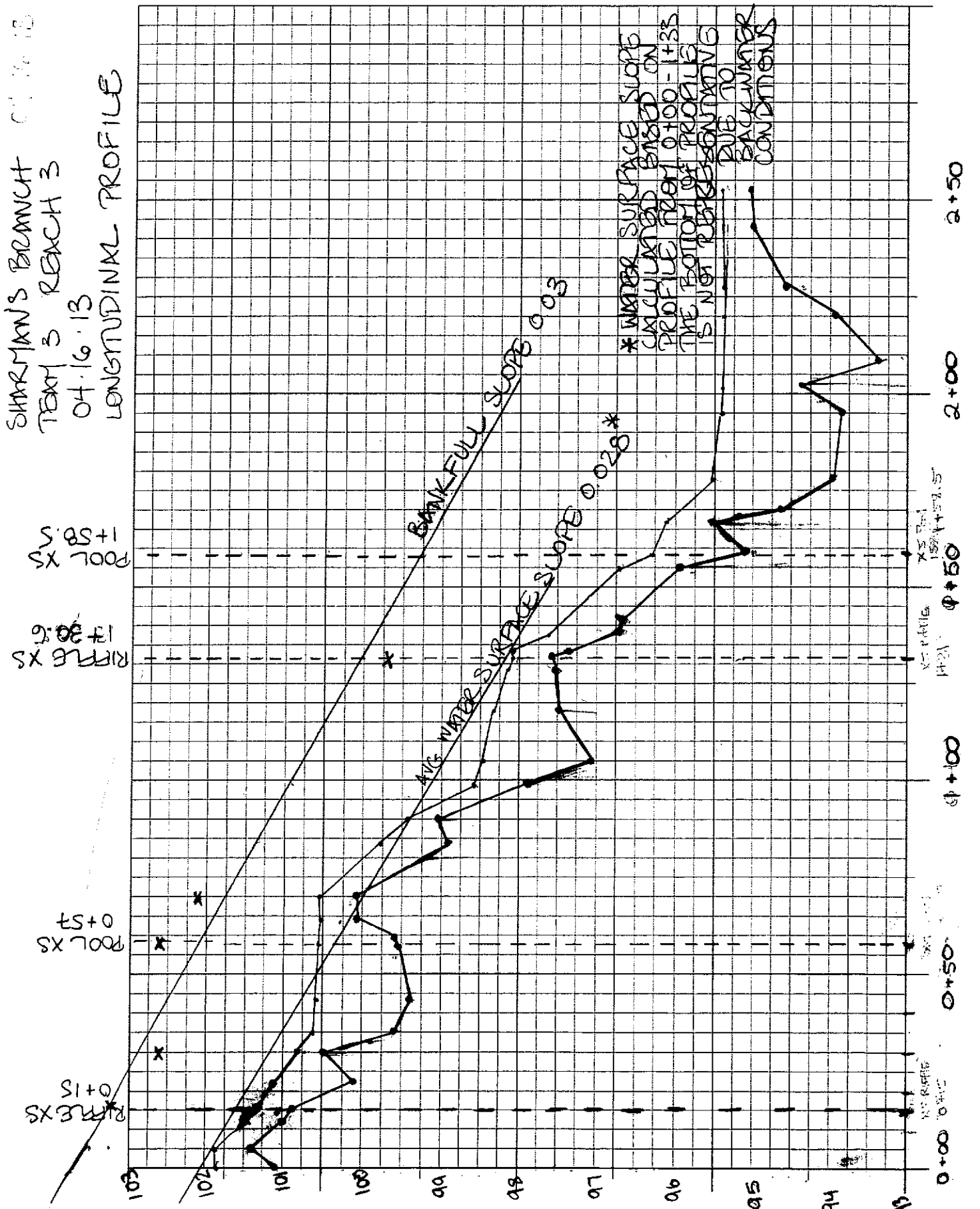

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Worksheet B-2. Computations of velocity and discharge using various methods (*First Field Day*).

Bankfull VELOCITY & DISCHARGE Estimates

Stream:	Sharmans Branch	Location:	
Date:	4/16/13	Stream Type:	B4
Valley Type:	VI		
Observers:	Team 3	HUC:	-- -- -- -- -- -- -- -- -- -- --

INPUT VARIABLES			OUTPUT VARIABLES		
Bankfull Riffle Cross-Sectional AREA	43.2	A_{bkf} (ft^2)	Bankfull Riffle Mean DEPTH	1.61	d_{bkf} (ft)
Bankfull Riffle WIDTH	26.9	W_{bkf} (ft)	Wetted PERIMETER ~ $(2 * d_{bkf}) + W_{bkf}$	30.12	W_p (ft)
D_{84} at Riffle	100 89	Dia. (mm)	D_{84} (mm) / 304.8	0.33	D_{84} (ft)
Bankfull SLOPE	0.030	S_{bkf} (ft / ft)	Hydraulic RADIUS A_{bkf} / W_p	1.43	R (ft)
Gravitational Acceleration	32.2	g (ft / sec^2)	Relative Roughness R(ft) / D_{84} (ft)	4.33	R / D_{84}
Drainage Area	3.6	DA (mi^2)	Shear Velocity $u^* = (gRS)^{1/2}$	1.18	u^* (ft/sec)

ESTIMATION METHODS	Bankfull VELOCITY		Bankfull DISCHARGE	
1. Friction Factor / Relative Roughness $\bar{u} = [\ 2.83 + 5.66 * Log\ \{ R / D_{84} \}\ ]\ u^*$	7.59	ft / sec	328	cfs
2. Roughness Coefficient: a) Manning's n from Friction Factor / Relative Roughness (Figs. B-34, B-35) $\bar{u} = 1.49*R^{2/3}*S^{1/2}/n$ $n =$ 0.033	9.93	ft / sec	429	cfs
2. Roughness Coefficient: b) Manning's n from Stream Type (Fig. B-36) $\bar{u} = 1.49*R^{2/3}*S^{1/2}/n$ $n =$ 0.0365	8.97	ft / sec	388	cfs
2. Roughness Coefficient: c) Manning's n from Jarrett (USGS): $\bar{u} = 1.49*R^{2/3}*S^{1/2}/n$ $n = 0.39*S^{0.38}*R^{-0.16}$ 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 $n =$ 0.097	3.38	ft / sec	146	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) USGS Gage Data $\bar{u} = Q / A$ Return Period for Bankfull Discharge Q = ____ year		ft / sec		cfs
4. Continuity Equations: b) Regional Curves $\bar{u} = Q / A$		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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Worksheet B-3a. Morphological relations, including dimensionless ratios (*First Field Day*).

Stream: Sharman Branch Location: Reach 3

Observers: Team 3 Date: 7/16/13 Valley Type: V1 Stream Type: B4

River Reach Dimension Summary Data.....1

Riffle Dimensions*, **, *

Riffle Dimensions*, **, ***	Mean	Min	Max		Riffle Dimensions & Dimensionless Ratios****	Mean	Min	Max
Riffle Width (W_{bkf})	28.9	26.9	30.9	ft	Riffle Cross-Sectional Area (A_{bkf}) (ft^2)	42.4	41.6	43.2
Riffle Mean Depth (d_{bkf})	1.48	1.34	1.61	ft	Riffle Width/Depth Ratio (W_{bkf} / d_{bkf})	19.9	16.7	23.1
Riffle Maximum Depth (d_{max})	2.21	2.10	2.31	ft	Riffle Max Depth to Riffle Mean Depth (d_{max} / d_{bkf})	1.50	1.43	1.57
Width of Flood-Prone Area (W_{fpa})	—	—	55.3	ft	Entrenchment Ratio (W_{fpa} / W_{bkf})	—	—	2.06
Riffle Inner Berm Width (W_{ib})	—	—	19.5	ft	Riffle Inner Berm Width to Riffle Width (W_{ib} / W_{bkf})		0.72	
Riffle Inner Berm Depth (d_{ib})	—	—	0.54	ft	Riffle Inner Berm Depth to Mean Depth (d_{ib} / d_{bkf})		0.34	
Riffle Inner Berm Area (A_{ib})	—	—	10.6	ft^2	Riffle Inner Berm Area to Riffle Area (A_{ib} / A_{bkf})		0.25	
Riffle Inner Berm W/D Ratio (W_{ib} / d_{ib})	—	—	36.11					

Pool Dimensions*, **, *

Pool Dimensions*, **, ***	Mean	Min	Max		Pool Dimensions & Dimensionless Ratios****	Mean	Min	Max
Pool Width (W_{bkfp})	25.3	22.8	27.8	ft	Pool Width to Riffle Width (W_{bkfp} / W_{bkf})	0.94	0.85	1.03
Pool Mean Depth (d_{bkfp})	1.88	1.76	1.99	ft	Pool Mean Depth to Riffle Mean Depth (d_{bkfp} / d_{bkf})	1.17	1.09	1.24
Pool Cross-Sectional Area (A_{bkfp})	47.8	40.2	55.4	ft	Pool Area to Riffle Area (A_{bkfp} / A_{bkf})	1.11	0.93	1.28
Pool Maximum Depth (d_{maxp})	2.90	2.70	2.90	ft	Pool Max Depth to Riffle Mean Depth (d_{maxp} / d_{bkf})	1.74	1.68	1.80
Pool Inner Berm Width (W_{ibp})	–	–	–	ft	Pool Inner Berm Width to Pool Width (W_{ibp} / W_{bkfp})	–	–	–
Pool Inner Berm Depth (d_{ibp})	–	–	–	ft	Pool Inner Berm Depth to Pool Depth (d_{ibp} / d_{bkfp})	–	–	–
Pool Inner Berm Area (A_{ibp})	–	–	–	ft^2	Pool Inner Berm Area to Pool Area (A_{ibp} / A_{bkfp})	–	–	–
Point Bar Slope (S_{pb})	–	–	–	ft/ft	Pool Inner Berm Width/Depth Ratio (W_{ibp} / d_{ibp})	–	–	–

Run Dimensions*

Run Dimensions*	Mean	Min	Max		Run Dimensionless Ratios****	Mean	Min	Max
Run Width (W_{bkfr})				ft	Run Width to Riffle Width (W_{bkfr} / W_{bkf})			
Run Mean Depth (d_{bkfr})				ft	Run Mean Depth to Riffle Mean Depth (d_{bkfr} / d_{bkf})			
Run Cross-Sectional Area (A_{bkfr})				ft	Run Area to Riffle Area (A_{bkfr} / A_{bkf})			
Run Maximum Depth (d_{maxr})				ft	Run Max Depth to Riffle Mean Depth (d_{maxr} / d_{bkf})			
Run Width/Depth Ratio (W_{bkfr} / d_{bkfr})				ft				

Glide Dimensions*

Glide Dimensions*	Mean	Min	Max		Glide Dimensions & Dimensionless Ratios****	Mean	Min	Max
Glide Width (W_{bkfg})				ft	Glide Width to Riffle Width (W_{bkfg} / W_{bkf})			
Glide Mean Depth (d_{bkfg})				ft	Glide Mean Depth to Riffle Mean Depth (d_{bkfg} / d_{bkf})			
Glide Cross-Sectional Area (A_{bkfg})				ft	Glide Area to Riffle Area (A_{bkfg} / A_{bkf})			
Glide Maximum Depth (d_{maxg})				ft	Glide Max Depth to Riffle Mean Depth (d_{maxg} / d_{bkf})			
Glide Width/Depth Ratio (W_{bkfg} / d_{bkfg})				ft/ft	Glide Inner Berm Width/Depth Ratio (W_{ibg} / d_{ibg})			
Glide Inner Berm Width (W_{ibg})				ft	Glide Inner Berm Width to Glide Width (W_{ibg}/W_{bkfg})			
Glide Inner Berm Depth (d_{ibg})				ft	Glide Inner Berm Depth to Glide Depth (d_{ibg} / d_{bkfg})			
Glide Inner Berm Area (A_{ibg})				ft^2	Glide Inner Berm Area to Glide Area (A_{ibg} / A_{bkfg})			

Step**

Step Dimensions**	Mean	Min	Max		Step Dimensionless Ratios****	Mean	Min	Max
Step Width (W_{bkfs})				ft	Step Width to Riffle Width (W_{bkfs} / W_{bkf})			
Step Mean Depth (d_{bkfs})				ft	Step Mean Depth to Riffle Mean Depth (d_{bkfs} / d_{bkf})			
Step Cross-Sectional Area (A_{bkfs})				ft	Step Area to Riffle Area (A_{bkfs} / A_{bkf})			
Step Maximum Depth (d_{maxs})				ft	Step Max Depth to Riffle Mean Depth (d_{maxs} / d_{bkf})			
Step Width/Depth Ratio (W_{bkfs} / d_{bkfs})								

*Riffle–Pool system (i.e., C, E, F stream types) bed features include riffles, runs, pools and glides.

**Step–Pool system (i.e., A, B, G stream types) bed features include riffles, rapids, chutes, pools and steps (note: include rapids and chutes in riffle category).

***Convergence-Divergence system (i.e., D stream types) bed features include riffles and pools; cross-sections taken at riffles for classification purposes.

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Worksheet B-1. Field Form for Level II Stream Classification (*First Field Day*).

Stream: SHARMAN'S BRANCH	
Basin:	Drainage Area: 2,304 acres 3.6 mi²
Location: REACH 3	
Twp.&Rge:	Sec.&Qtr.:
Cross-Section Monuments (Lat./Long.):	Date: 4/16/13
Observers: TBKM 3	Valley Type:

Bankfull WIDTH (W_{bkf}) WIDTH of the stream channel at bankfull stage elevation, in a riffle section.	26.9	ft
Bankfull DEPTH (d_{bkf}) Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section ($d_{bkf} = A_{bkf} / W_{bkf}$).	1.61	ft
Bankfull X-Section AREA (A_{bkf}) AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.	43.2	ft^2
Width/Depth Ratio (W_{bkf} / d_{bkf}) Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.	16.7	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.	2.31	ft
WIDTH of Flood-Prone Area (W_{fpa}) Twice maximum DEPTH, or ($2 \times d_{mbkf}$) = the stage/elevation at which flood-prone area WIDTH is determined in a riffle section.	55.3	ft
Entrenchment Ratio (ER) The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH (W_{fpa} / W_{bkf}) (riffle section).	2.06	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.	33	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.	0.028	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).	1.25	

Stream Type → [redacted] with bedrock control ← **See Classification Key (Figure B-2)**

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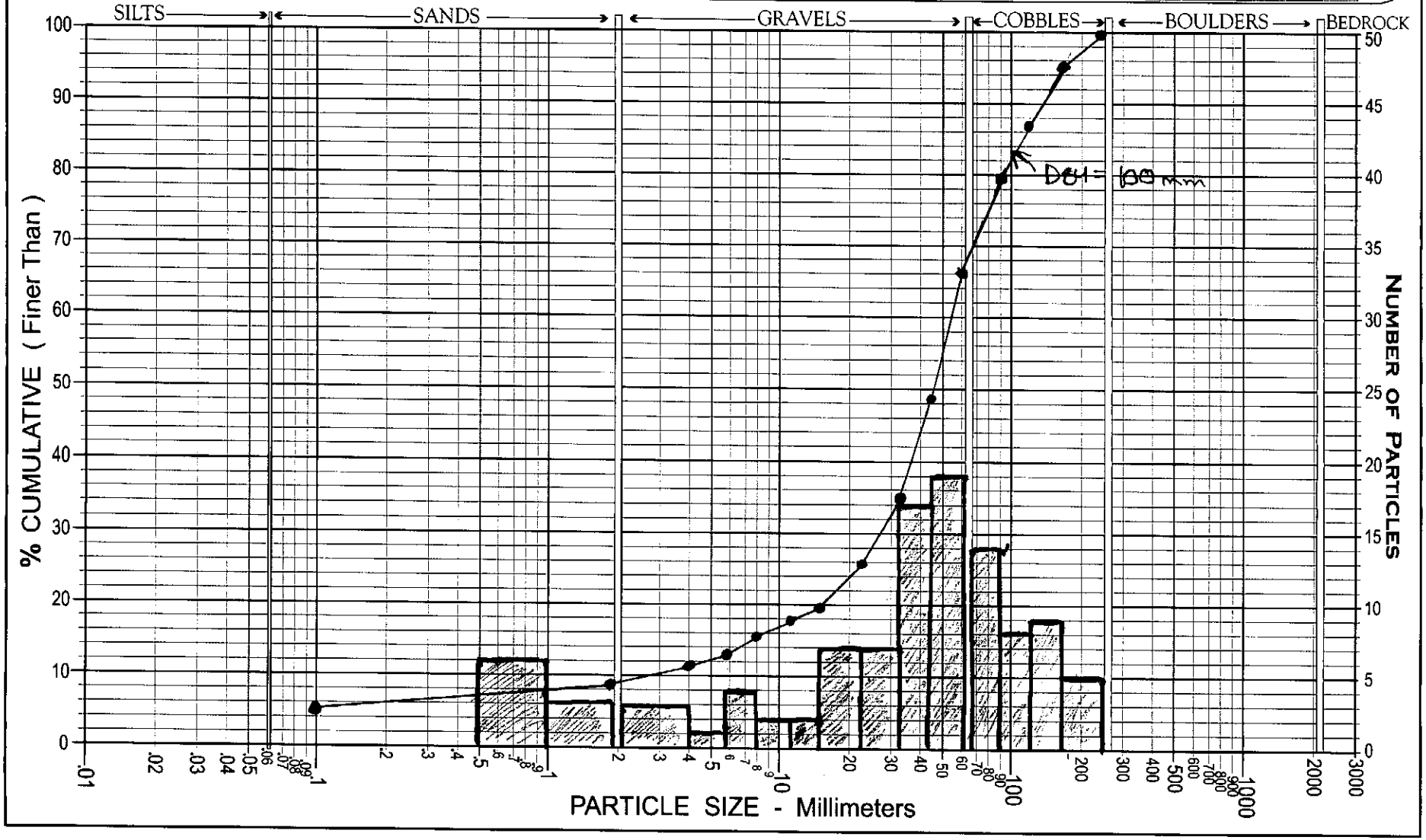
PEBBLE COUNT DATA

LOCATION: Sharmans Branch
Date: 4/16/2013
REACH: Active Bed Riffle
PARTY: Team 3
Stream Type: B4
Valley Type: V1
HUC:



D16 = (8.5 mm) D35 = (32 mm) D50 = (45 mm) D84 = (100 mm) D95 = (185 mm) D100 =

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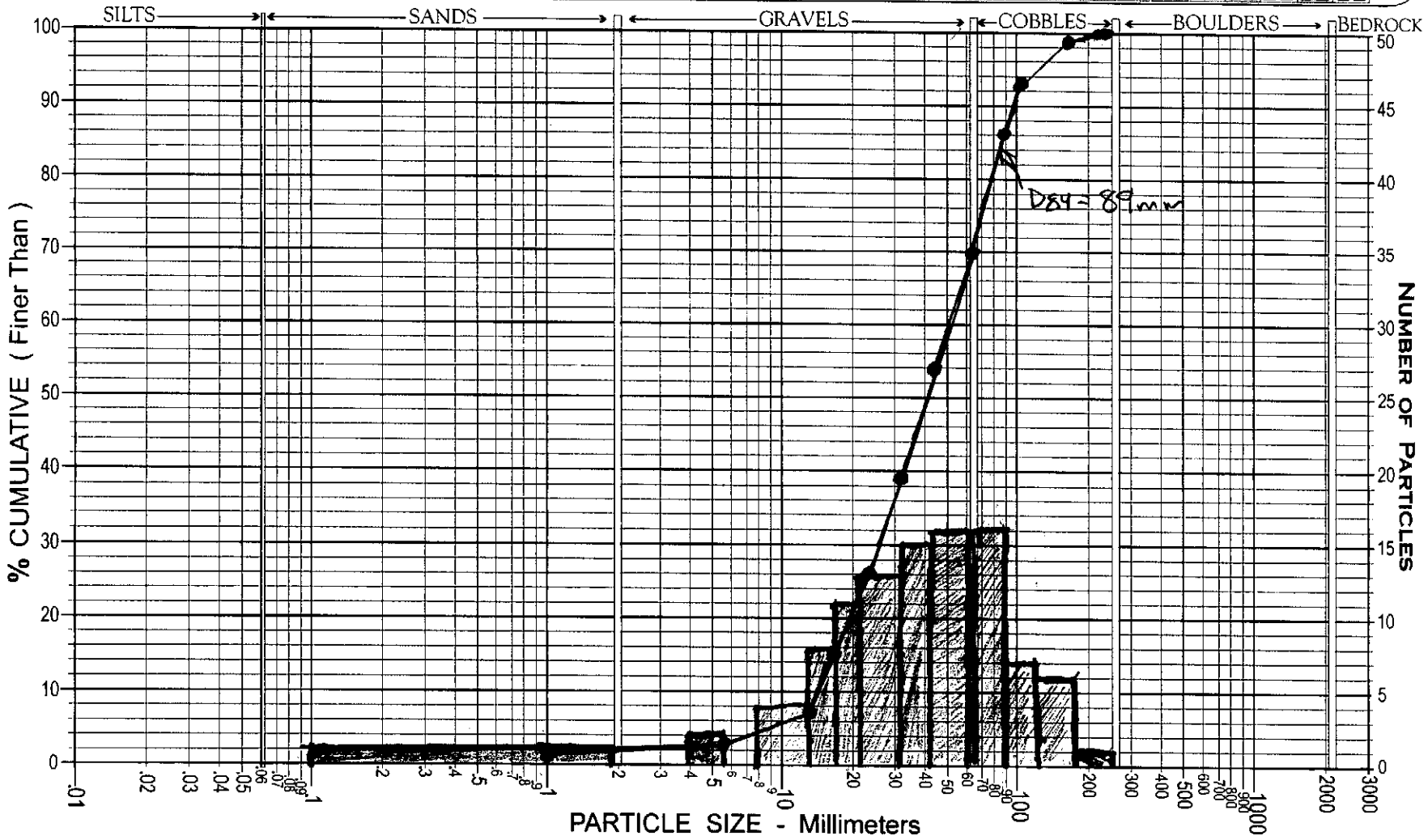
PEBBLE COUNT DATA

LOCATION: Sharmans Branch
Date: 4/16/2013
REACH: Protrusion
PARTY: Team 3
Stream Type: B4
Valley Type: V1
HUC:



D16 = (17mm) D35 = (28mm) D50 = (41mm) D84 = (89mm) D95 = (130mm) D100 = (256)

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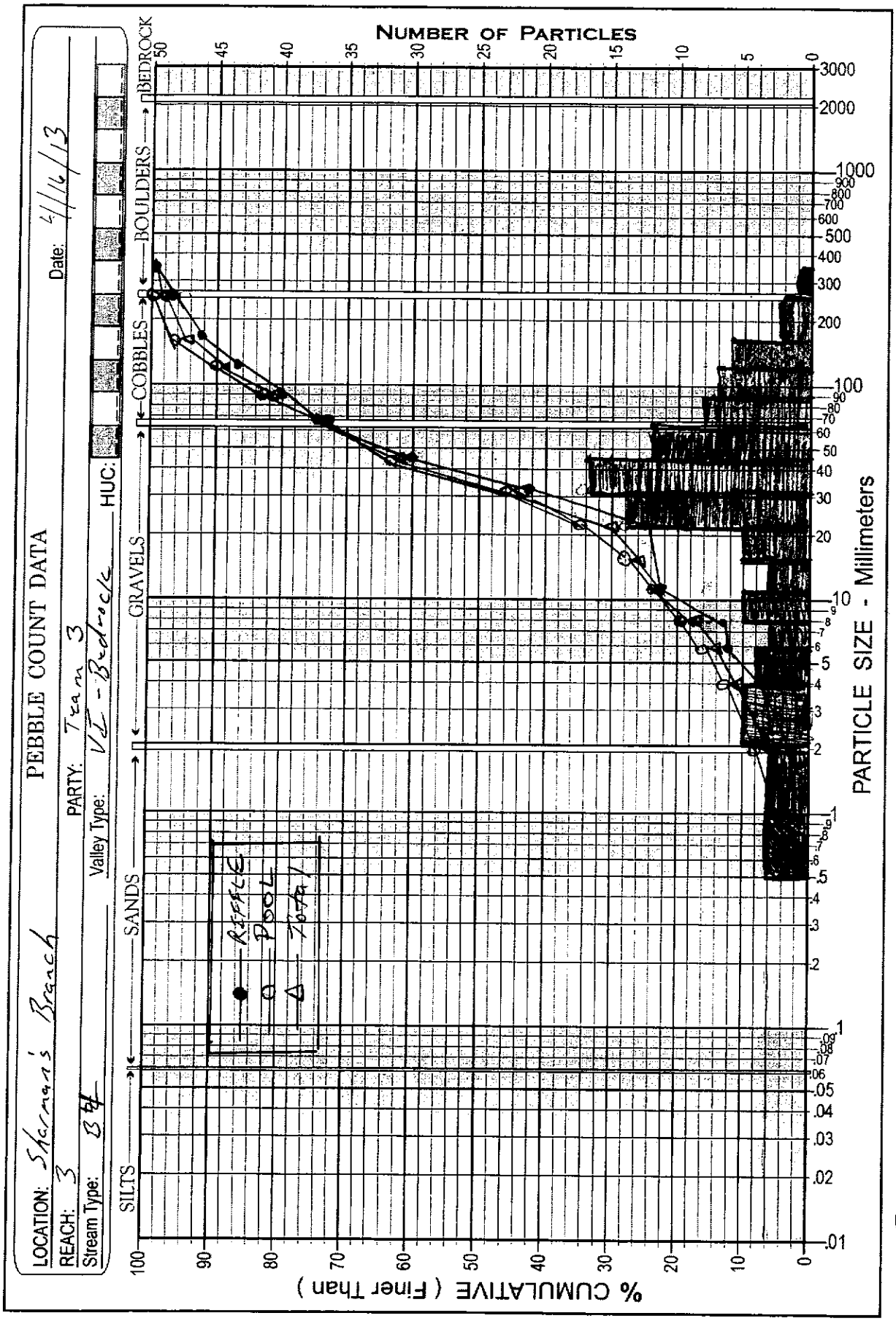

D_{50} - 34mm
D_{84} - 99mm

6 pools
4 riffles

Representative reach

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Team 3 Sharmans Branch

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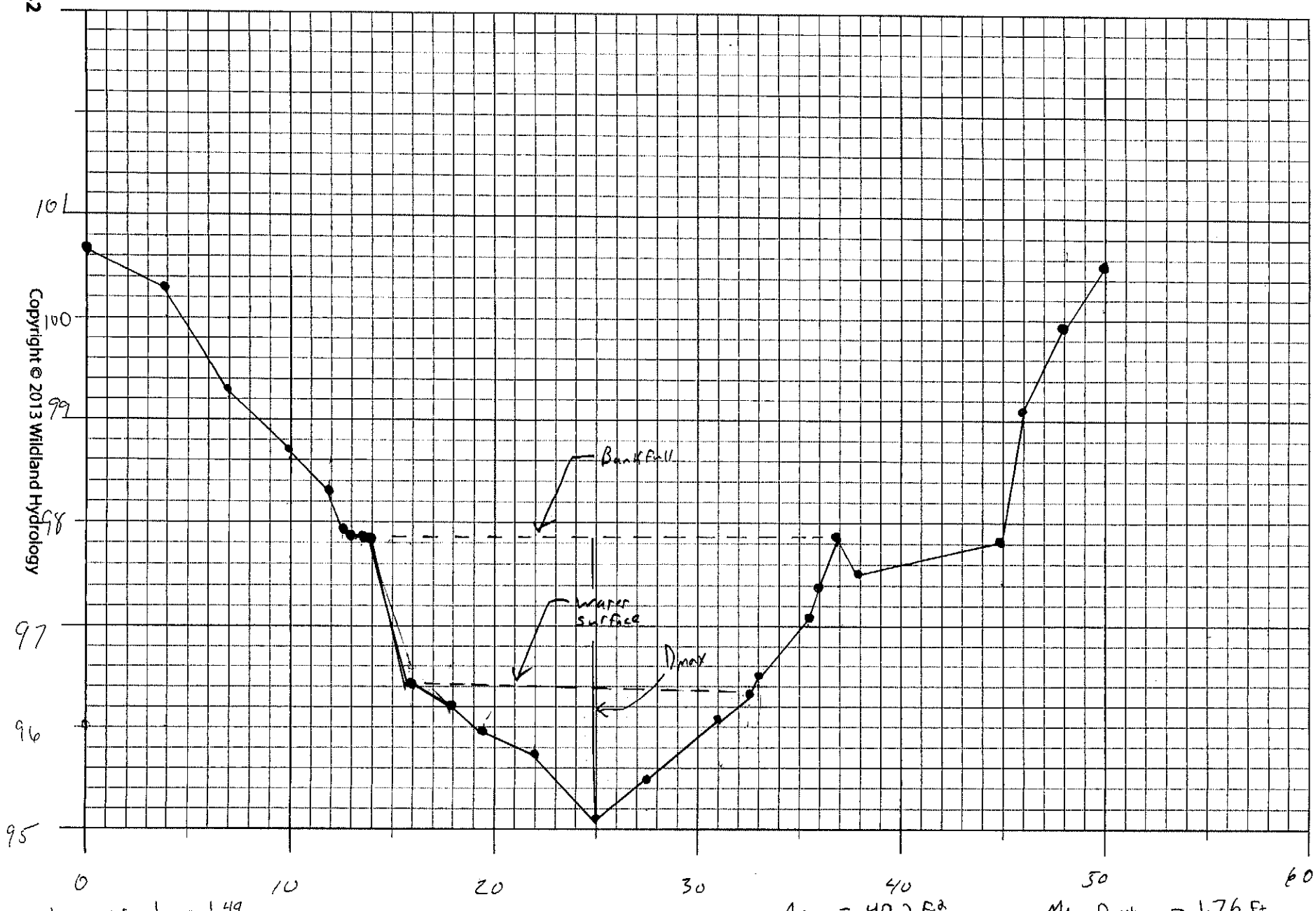


WS - BKF elev = 1.49

Reach 3 - Pool #2 - RS 1+58.5

A_{BKF} = 40.2 ft^2

W_{BKF} = 22.8 ft

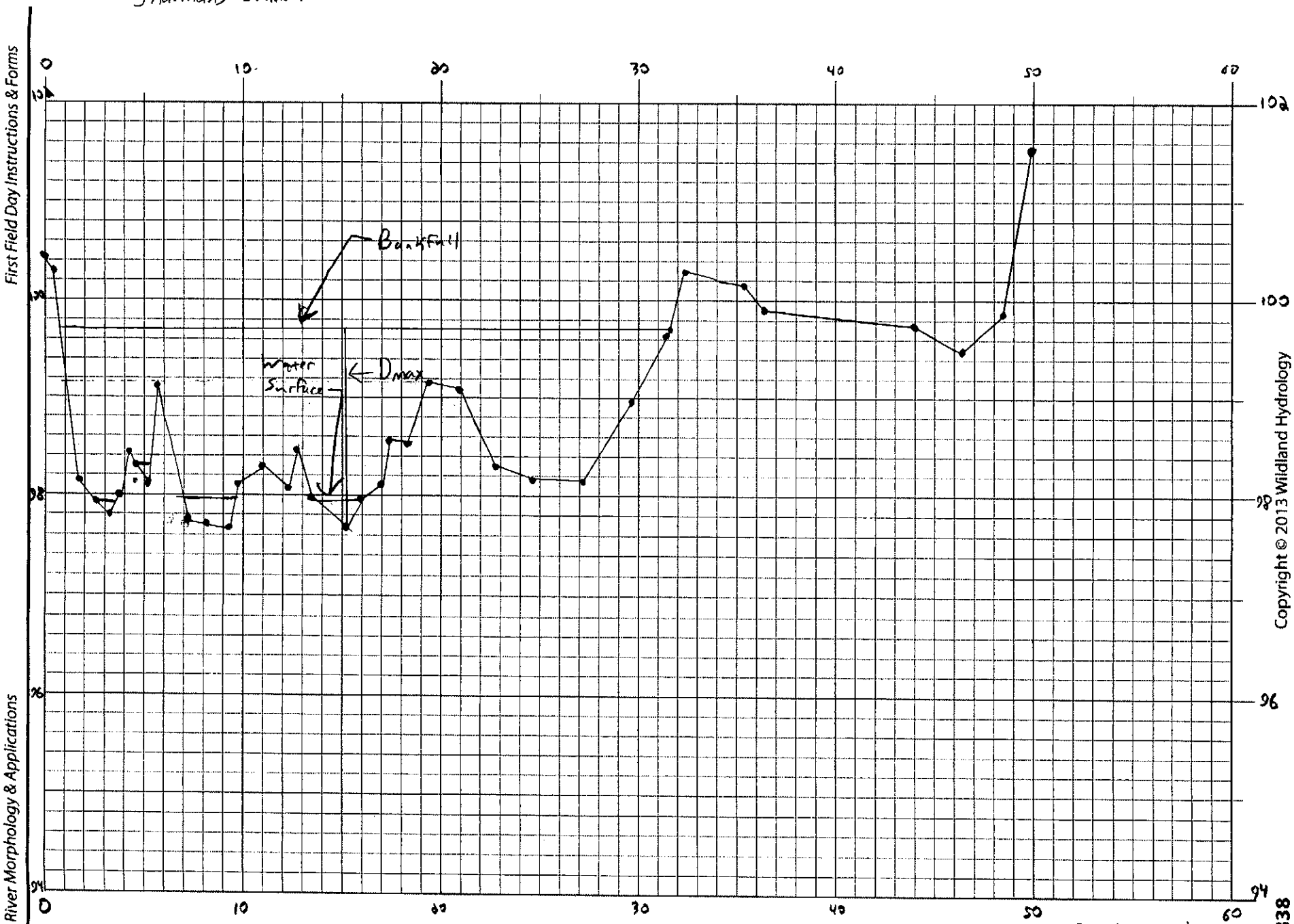
Mean $Depth_{BFL}$ = 1.76 ft

w/D Ratio = 13.0

Max Depth = 2.90 ft

Team 3
Sharmans Branch

4/16/13



WS- BKF elev = 1.74

Reach 3 - Riffle #2 - RS 1+30.6

A_{BKF} = 41.56 ft²

W_{BKF} = 30.9 ft

Mean $Depth_{BKF}$ = 1.34 ft

W/D Ratio = 23.1

Max Depth = 2.10 ft

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Team #3 WS/BKF DIFF = 4/16/13

Sharmans Branch

55.4 sq ft

Reach 3 - Pool #1 - RS 0+57.0 WS-BKF elev - 1.97 ft

A_{BKF} = 55.4 sq. ft W_{BKF} = 27.8' W/D = 14.0

Mean $Depth_{BKF}$ = 1.99 ft Max $Depth_{BKF}$ = 2.9 ft

First Field Day Instructions & Forms
River Morphology & Applications
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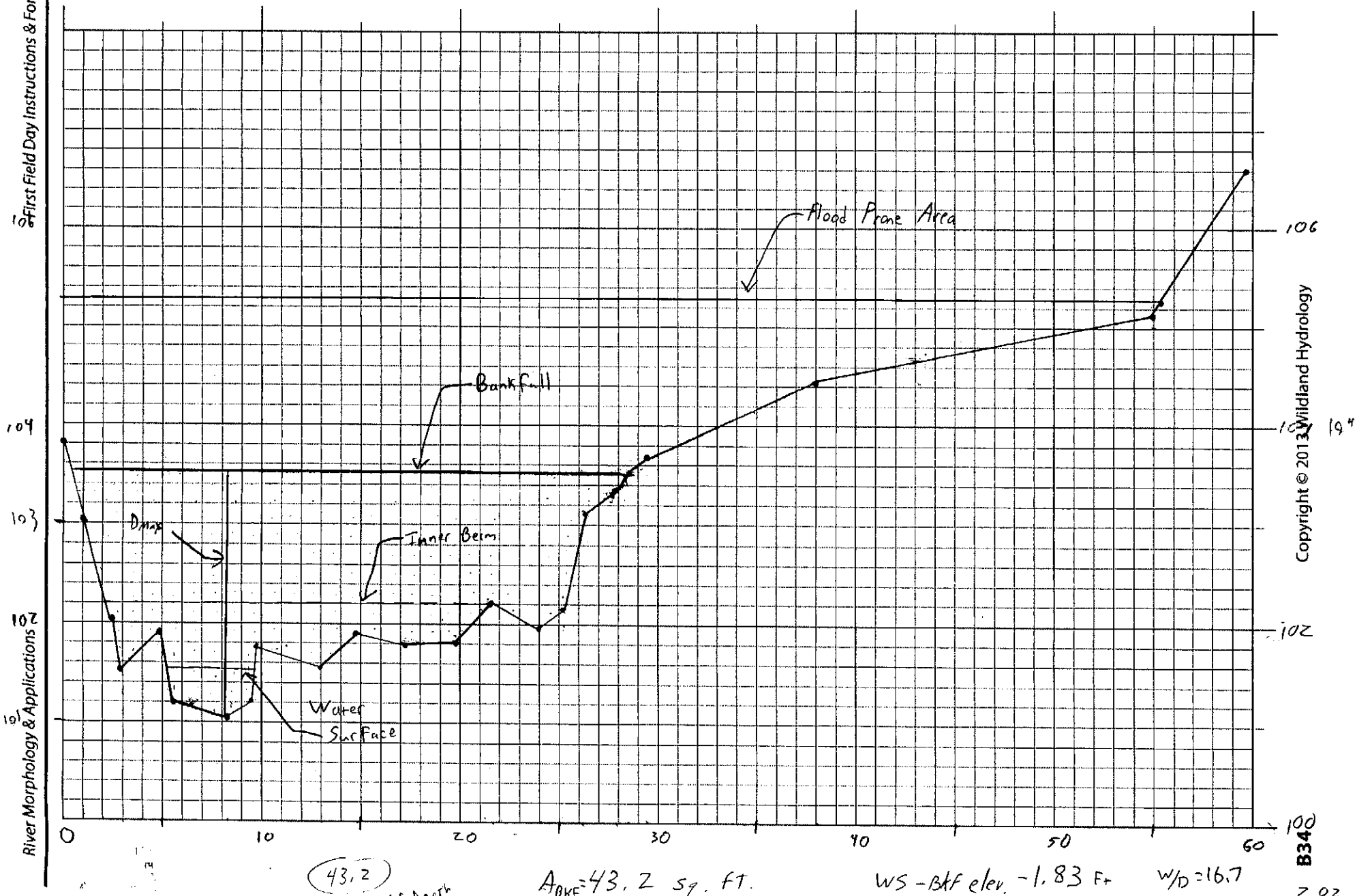
Team#3 Classification

Sharmans Branch Reach 3 - Riffle #1 - RS 0+15

A Inner Berm = 10.6 Ft²

W_IB = 19.5 Ft



43.2
mean bkf Depth 1.61

A_{BKF} = 43.2 sq. ft.

1.61 = Mean Bkf D

2.31 = Max Bkf

WS - Bkf elev. -1.83 Ft

Flood Prone Width = 55.3 Ft

Entrenchment Ratio = 2.06 Ft

W/D = 16.7

W_{BKF} = 26.9

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Worksheet B-2. Computations of velocity and discharge using various methods (*First Field Day*).

Bankfull VELOCITY & DISCHARGE Estimates

Stream:	SHARMAN'S BRANCH	Location:	
Date:	04·16·13	Stream Type:	
Valley Type:			
Observers:	TEAM 3	HUC:	-- -- -- -- -- -- -- -- -- -- --

INPUT VARIABLES			OUTPUT VARIABLES		
Bankfull Riffle Cross-Sectional AREA	43.2	A_{bkf} (ft^2)	Bankfull Riffle Mean DEPTH	1.61	d_{bkf} (ft)
Bankfull Riffle WIDTH	26.9	W_{bkf} (ft)	Wetted PERIMETER ~ $(2 * d_{bkf}) + W_{bkf}$	30.12	W_p (ft)
D_{84} at Riffle	100 (89)	Dia. (mm)	D_{84} (mm) / 304.8	0.33 (0.28)	D_{84} (ft)
Bankfull SLOPE	0.03	S_{bkf} (ft / ft)	Hydraulic RADIUS A_{bkf} / W_p	1.43	R (ft)
Gravitational Acceleration	32.2	g (ft / sec^2)	Relative Roughness R(ft) / D_{84} (ft)	4.33 (4.93)	R / D_{84}
Drainage Area	3.6	DA (mi^2)	Shear Velocity $u^* = (gRS)^{1/2}$	1.18	u^* (ft/sec)

ESTIMATION METHODS	Bankfull VELOCITY		Bankfull DISCHARGE	
1. Friction Factor / Relative Roughness $\bar{u} = [\,2.83 + 5.66 * Log\,\{R / D_{84}\}\,]\,u^*$	7.59 (7.96)	ft / sec	328 (344)	cfs
2. Roughness Coefficient: a) Manning's *n* from Friction Factor / Relative Roughness (Figs. B-34, B-35) $\bar{u} = 1.49*R^{2/3}*S^{1/2}/n$ $n =$ 0.33	9.93	ft / sec	429	cfs
2. Roughness Coefficient: b) Manning's *n* from Stream Type (Fig. B-36) $\bar{u} = 1.49*R^{2/3}*S^{1/2}/n$ $n =$ 0.0365	8.97	ft / sec	388	cfs
2. Roughness Coefficient: c) Manning's *n* from Jarrett (USGS): $\bar{u} = 1.49*R^{2/3}*S^{1/2}/n$ $n = 0.39*S^{0.38}*R^{-0.16}$ **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 $n =$ 0.097	3.38	ft / sec	146	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) USGS Gage Data $\bar{u} = Q / A$ Return Period for Bankfull Discharge Q = ____ year		ft / sec		cfs
4. Continuity Equations: b) Regional Curves $\bar{u} = Q / A$	2.3	ft / sec	100	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 **"protrustion 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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SURVEY DATA → **CROSS - SECTION** 1

SITE: Sharman's Branch Date: 4/16/13

Location: Reach 3 - Riffle #1 - Station 0+15

Party / Notes: MRG/RAE 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		109.62	5.81	103.81	Left Pin
2	1			6.59	103.03	LBKF
3	2.6			7.6	102.02	Lt. Toe of Slope
4	2.8			8.13	101.49	Lt. EOW
5	4.9			7.68	101.94	
6	5.3			8.42	101.20	
7	8.2			8.58	101.04	TWG
8	9.6			8.39	101.23	
9	9.8			7.84	101.78	
10	13.1			8.05	101.57	
11	14.7			7.75	101.87	
12	17.2			7.83	101.79	
13	19.7			7.82	101.80	
14	21.6			7.42	102.20	Inner Berm
15	24.0			7.68	101.94	
16	26.1			7.48	102.14	Toe of Slope
17	27.3			6.49	103.13	
18	27.9			6.27	103.35	R BKF
19	28.6			6.08	103.54	
20	29.4			5.97	103.65	
21	38.0			5.2	104.42	
22	55.0			4.48	105.14	Toe of Slope
23	55.3			4.4	105.22	
24	59.6			3.02	106.60	Rt. Pin
25						
26						
27						
28						

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SURVEY DATA → **CROSS - SECTION 2**

SITE: Reach 3 - Pool #1 - RS 0+57.0 Date: 4/16/13

Item	STATION ft	B S ft	H I ft	F S ft	Elevation ft	NOTES COMMENTS REMARKS
29	0		105.14	1.06	104.08	
30	1.5			2.12	103.02	
31	2.0			2.98	102.16	LBKF
32	2.9			3.46	101.68	
33	3.9			3.80	101.34	
34	4.3			3.94	101.20	
35	5.1			4.56	100.58	LEOW
36	5.5			4.98	100.16	
37	6.6			5.00	100.14	
38	7.9			5.54	99.60	TWG
39	9.7			5.40	99.74	
40	11.0			5.14	100.00	
41	12.8			5.19	99.95	
42	14.3			4.65	109.49	
43	15.3			5.04	100.10	
44	17.1			5.27	99.87	
45	18.6			5.04	100.10	
46	19.8			4.73	100.41	
47	21.8			4.54	100.60	REOW
48	23.5			4.17	100.97	
49	25.6			4.12	101.02	Toe of Slope
50	27.9			3.44	101.70	
51	29.9			2.57	102.57	RBKF
52	32.0			2.65	102.49	
53	34.0			2.30	102.84	
54	37.0			1.93	103.21	
55	41.0			1.30	103.84	
56						
57						
58						
59						

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$BKF_w = 27.9$

SURVEY DATA → **CROSS - SECTION 3**

SITE: Reach 3 - Riffle #2 - RS 1+30.6 Date: 4/16/13

Item	STATION ft	BS ft	HI ft	FS ft	Elevation ft	NOTES COMMENTS REMARKS
29	0		104.37	3.96	100.41	
30	0.5			4.06	100.31	
31	1.8			6.24	98.13	
32	2.8			6.46	97.91	LEOW
33	3.2			6.56	97.81	
34	3.8			6.37	98.00	
35	4.3			5.95	98.42	
36	4.7			6.09	98.28	EOW
37	5.1			6.23	98.14	
38	5.8			5.25	99.12	Top of Rock
39	7.3			6.60	97.77	
40	8.1			6.69	97.68	
41	9.3			6.72	97.65	TWG
42	9.7			6.21	98.16	Rock
43	11.0			6.04	98.33	
44	12.3			6.32	98.05	
45	12.8			5.95	98.42	
46	13.5			6.38	97.99	
47	15.1			6.75	97.62	TWG
48	16.0			6.39	97.98	REOW
49	17.0			6.24	98.13	
50	17.3			5.80	98.57	
51	18.3			5.86	98.51	Toe of Slope
52	19.5			5.19	99.18	Top of Slope
53	21.0			5.35	99.02	
54	22.7			6.03	98.34	
55	24.7			6.19	98.18	
56	27.1			6.21	98.16	
57	29.8			5.44	98.93	
58	31.4			4.75	99.62	
59	31.6			4.65	99.72	RBKF

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SURVEY DATA → CROSS - SECTION 5

SITE: Reach 3 – Pool #2 – RS 1+58.5 Date: 4/16/13

Item	STATION ft	BS ft	HI ft	FS ft	Elevation ft	NOTES COMMENTS REMARKS
29		5.92	100			BMI
30			105.92			Instrument Height
31	0.0			5.18	100.74	Ground
32	4.0			5.62	100.3	Edge of Slope
33	7.0			6.59	99.33	Slope Break
34	10.0			7.25	98.67	
35	12.0			7.65	98.27	
36	12.8			7.98	97.94	
37	13.0			8.0	97.92	LBKF *
38	13.5			7.96	97.96	
39	14.0			7.96	97.96	
40	16.0			9.50	96.42	LEOW *
41	18.0			9.68	96.24	deposition
42	19.5			10.0	95.92	deposition
43	22.0			10.18	95.74	boulder
44	25.0			10.79	95.13	TWG
45	27.5			10.38	95.54	edge of pool
46	31.0			9.79	96.13	rock
47	32.8			9.55	96.37	REOW *
48	33.0			9.38	96.54	right toe
49	35.5			8.76	97.16	slope break
50	36.0			8.52	97.40	
51	36.8			8.06	97.86	RBKF *
52	38.0			8.34	97.58	bench
53	45.0			8.12	97.80	bench
54	46.0			6.78	99.14	bedrock
55	48.0			5.95	99.97	bedrock
56	50.0			5.34	100.58	Slope break end
57						
58						
59						

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SURVEY DATA ⟶ **CROSS - SECTION 4**

SITE: Reach 3 - Riffle # 2 - RS 1+30.6 [cont'd] Date:

Item	STATION ft	B S ft	H I ft	F S ft	Elevation ft	NOTES COMMENTS REMARKS
29	32.3			4.03	100.34	
30	35.4			4.23	100.14	
31	36.4			4.50	99.87	
32	44.0			4.62	99.75	
33	46.4			4.91	99.46	
34	48.5			4.51	99.86	
35	50.0			2.84	101.53	Tree
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						
54						
55						
56						
57						
58						
59						

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SURVEY DATA → LONGITUDINAL PROFILE 1

SITE: Sharmans Run Date: 4/16/13

Location: REACH 3

Party / Notes: Team 3 HUC:

	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	BM10	8.22	108.22										
2	0+00			10.11	101.11	9.38	101.84	8.12	103.1			TORi	2.3
3	0+05			9.78	101.44	9.41	101.81					Riffle	
4	0+12			10.22	101	9.69	101.53	8.17				Contraction	RiF
5	0+14			10.84	101.18			8.17	103.05				1.87
6	0+23			11.12	100.1	10.08	101.14	8.62				MORi	
7	0+30			10.72	100.5	10.43	100.79	8.66	102.56			BoRi	2.77
8	0+35			11.60	99.62	10.55	100.67					TOPool	
9	0+44			11.81	99.41	10.57	100.65					MOP	
10	0+59			11.55	99.67	10.59	100.63	9.15	102.07 (1.44)	8.62	102.6		1.97 Flat area too high?
11	0+15			10.34	100.88	9.99	101.3	8.14	103.08			X-sec1	@ constriction 1.78
12	0+64			11.19	100.03	10.69	100.55	9.38	101.84			BOP	
13	0+70			11.10	100.12	10.66	100.56	9.10	102.12			TORapid	1.29 low? 1.56 low?
14	0+84			12.30	98.92	11.46	99.76					M Rapid	
15	0+90			12.17	99.05	11.77	99.45					TO Step	
16	0+99			13.31	97.91	12.61	98.61					BO Step	
17	1+05			14.14	97.08	12.74	98.48	11.93	99.29			MOP	side spring on LB lichen line
18	1+19			13.72	97.5	12.88	98.34						
19	1+29			13.67	97.55	13.05	98.17					TO Rapid	
20	1+33			13.86	97.36	13.10	98.12					TO Step	
21	1+37			14.49	96.73	13.60	97.62					BO Step	
22	1+41			14.80	96.42	13.55	[illegible]					TO Rapid	
23	1+55			15.25	95.97	14.28	[illegible]					BO Rapid	/TOP
24	1+58			16.26	94.96	[illegible]	[illegible]	14.15	97.07	too low		MOP	d_{max} Pool
25	1+67			15.69	95.53	15.04	96.18					BOP/TO Step	
26	1+62							13.60	97.62				
27	1+70			16.52	94.70	16.70	94.52						

X-Sec1 - 0+15

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SURVEY DATA → LONGITUDINAL PROFILE 2

SITE: Sharmans | Date: 4/16/13

Location: REACH 3

Party / Notes: Team 3 | HUC:

130.6 xsec3
158.5 xsec3

	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	
28	1+78			17.30	93.92	15.72	95.5					MOP	1+74 2.10 pool dmax 1.55 low
29	1+95			17.37	93.85	15.82	95.4					MOP	
30	2+02			16.84	94.38	15.80	95.42					Constriction	Point
31	1+99							14.50	96.72				-1.5
32	2+09			17.89	93.33	16.00	95.22	14.69	96.53			Pool	dmax
33	2+20			17.25	93.97	15.81	95.41					Pool	
34	2+27			16.55	94.67	15.80	95.42					TOG	
35	2+34							14.67	96.55				Too low
36	2+44			16.21	95.01	15.85	95.37					MOG	
37	2+26					15.83	95.39	14.32	96.9			i	1.51
38	2+52			16.14	95.08	15.81	95.41	15.20	96.02 (inner berm)			TORi	
39	1+58.5			16.29	94.93	14.95	96.27	13.25	97.97				xsec
40	1+30.6			13.89	97.33	13.13	98.09	11.37	99.85				xsec
41	0+58			11.59	99.63	10.60	100.62	8.75	102.47				xsec
42	0+58							9.28	101.94			BKf too high?	
43	2+13							14.77	96.78	11.94	99.28		
44	BM1			11.22	100								
45													
46													
47													
48													
49													
50													
51													
52													
53													
54													

DO NOT USE

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Sandy

6 pools
4 riffles

Representative Reach

Site: Sharmans Branch
Date: 4-16-13
Location: Reach 3
HUC:
Party: Troy / Brian

Inches	PARTICLE	Millimeters		Dot Count for RIFFLE 1	POOL 2	COMP. 3	RIFFLE (1) 4 TOT #	ITEM %	% CUM	POOL (2) 6 TOT #	ITEM %	% CUM	COMPOSITE (3) TOT #	ITEM %	% CUM
							Reach: 3			Reach: 3			Reach: 3		
							Date: 4-16-13			Date: 4-16-13			Date: 4-16-13		
	Silt / Clay	< .062	S/C												
	Very Fine	.062 - .125	SAND												
	Fine	.125 - .25	SAND												
	Medium	.25 - .50	SAND												
	Coarse	.50 - 1.0	SAND							3	5.0	5.0	3	3.0	3.0
.04 - .08	Very Coarse	1.0 - 2	SAND				1	2.5	2.5	2	3.3	8.3	3	3.0	6.0
.08 - .16	Very Fine	2 - 4	GRAVEL				2	5.0	7.5	3	5.0	13.3	5	5.0	11.0
.16 - .22	Fine	4 - 5.7	GRAVEL				2	5.0	12.5	2	3.3	16.6	4	4.0	15.0
.22 - .31	Fine	5.7 - 8	GRAVEL				1	2.5	15.0	2	3.3	19.9	3	3.0	18.0
.31 - .44	Medium	8 - 11.3	GRAVEL				3	7.5	22.5	2	3.3	23.2	5	5.0	23.0
.44 - .63	Medium	11.3 - 16	GRAVEL							3	5.0	28.2	3	3.0	26.0
.63 - .89	Coarse	16 - 22.6	GRAVEL				1	2.5	25.0	4	6.7	34.9	5	5.0	31.0
.89 - 1.3	Coarse	22.6 - 32	GRAVEL				7	17.5	42.5	7	11.7	46.6	14	14.0	45.0
1.3 - 1.8	Very Coarse	32 - 45	GRAVEL				7	17.5	60.0	10	16.7	63.3	17	17.0	62.0
1.8 - 2.5	Very Coarse	45 - 64	GRAVEL				6	15.0	75.0	6	10.0	73.3	12	12.0	74.0
2.5 - 3.5	Small	64 - 90	COBBLE				2	5.0	80.0	6	10.0	83.3	8	8.0	82.0
3.5 - 5.0	Small	90 - 128	COBBLE				3	7.5	87.5	4	6.7	90	7	7.0	89.0
5.0 - 7.1	Large	128 - 180	COBBLE				2	5.0	92.5	4	6.7	96.7	6	6.0	95.0
7.1 - 10.1	Large	180 - 256	COBBLE				2	5.0	97.5	2	3.3	100	4	4.0	99.0
10.1 - 14.3	Small	256 - 362	BOULDER				1	2.5	100				1	1.0	100.0
14.3 - 20	Small	362 - 512	BOULDER												
20 - 40	Medium	512 - 1024	BOULDER												
40 - 80	Large-Vry Large	1024 - 2048	BOULDER												
	Bedrock		BDRK												
						TOTAL→	40			60			100		

Stream Type: B 4
Valley Type: VI - Bedrock

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Active Bed Pebble Count

Site: Sharmans Branch Date: 4-16-13

Location: Reach 3 HUC:

Party: Troy / Brian

Inches	PARTICLE	Millimeters		Dot Count for RIFFLE 1	POOL 2	COMP. 3	RIFFLE (1) TOT #	ITEM %	% CUM	POOL (2) TOT #	ITEM %	% CUM	COMPOSITE (3) TOT #	ITEM %	% CUM
							Reach: 3			Reach:			Reach:		
							Date: 4/16/13			Date:			Date:		
	Silt / Clay	< .062	S/C												
	Very Fine	.062 - .125	SAND												
	Fine	.125 - .25													
	Medium	.25 - .50													
	Coarse	.50 - 1.0		6			6	5.6%	5.6						
.04 - .08	Very Coarse	1.0 - 2		3			3	2.8	8.4						
.08 - .16	Very Fine	2 - 4	GRAVEL	3			3	2.8	11.2						
.16 - .22	Fine	4 - 5.7		1			1	0.9	12.1						
.22 - .31	Fine	5.7 - 8		4			4	3.7	15.8						
.31 - .44	Medium	8 - 11.3		2			2	1.8	17.6						
.44 - .63	Medium	11.3 - 16		2			2	1.8	19.4						
.63 - .89	Coarse	16 - 22.6		7			7	6.5	25.9						
.89 - 1.3	Coarse	22.6 - 32		7			7	6.5	32.4						
1.3 - 1.8	Very Coarse	32 - 45		17			17	15.9	48.3						
1.8 - 2.5	Very Coarse	45 - 64		19			19	17.7	66.0						
2.5 - 3.5	Small	64 - 90	COBBLE	14			14	13.1	79.1						
3.5 - 5.0	Small	90 - 128		8			8	7.5	86.6						
5.0 - 7.1	Large	128 - 180		9			9	8.4	95.0						
7.1 - 10.1	Large	180 - 256		5			5	4.7	99.7						
10.1 - 14.3	Small	256 - 362	BOULDER												
14.3 - 20	Small	362 - 512													
20 - 40	Medium	512 - 1024													
40 - 80	Large-Vry Large	1024 - 2048													
	Bedrock		BDRK												
Stream Type:			**Valley Type:**			TOTAL→	107								

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Protrusion

Site: Sharmans Branch Date: 4/16/13

Location: Reach 3 HUC:

Party: Troy / Brian

Inches	PARTICLE	Millimeters		Dot Count for RIFFLE 1	POOL 2	COMP. 3	RIFFLE (1) TOT #	ITEM %	% CUM	POOL (2) TOT #	ITEM %	% CUM	COMPOSITE (3) TOT #	ITEM %	% CUM
							Reach: 3			Reach: 3			Reach: 3		
							Date: 4-16-13			Date: 4-16-13			Date: 4-16-13		
	Silt / Clay	< .062	S/C												
	Very Fine	.062 - .125	SAND												
	Fine	.125 - .25													
	Medium	.25 - .50													
	Coarse	.50 - 1.0													
.04 - .08	Very Coarse	1.0 - 2					1	1.0	1.0						
.08 - .16	Very Fine	2 - 4	GRAVEL												
.16 - .22	Fine	4 - 5.7					2	2.0	3.0						
.22 - .31	Fine	5.7 - 8													
.31 - .44	Medium	8 - 11.3					4	4.0	7.0						
.44 - .63	Medium	11.3 - 16					8	8.0	15.0						
.63 - .89	Coarse	16 - 22.6					11	11.0	26.0						
.89 - 1.3	Coarse	22.6 - 32					13	13.0	39.0						
1.3 - 1.8	Very Coarse	32 - 45					15	15.0	54.0						
1.8 - 2.5	Very Coarse	45 - 64					16	16.0	70.0						
2.5 - 3.5	Small	64 - 90	COBBLE				16	16.0	86.0						
3.5 - 5.0	Small	90 - 128					7	7.0	93.0						
5.0 - 7.1	Large	128 - 180					6	6.0	99.0						
7.1 - 10.1	Large	180 - 256					1	1.0	100						
10.1 - 14.3	Small	256 - 362	BOULDER												
14.3 - 20	Small	362 - 512													
20 - 40	Medium	512 - 1024													
40 - 80	Large-Vry Large	1024 - 2048													
	Bedrock		BDRK												
Stream Type: B2			**Valley Type:**			TOTAL→	100								

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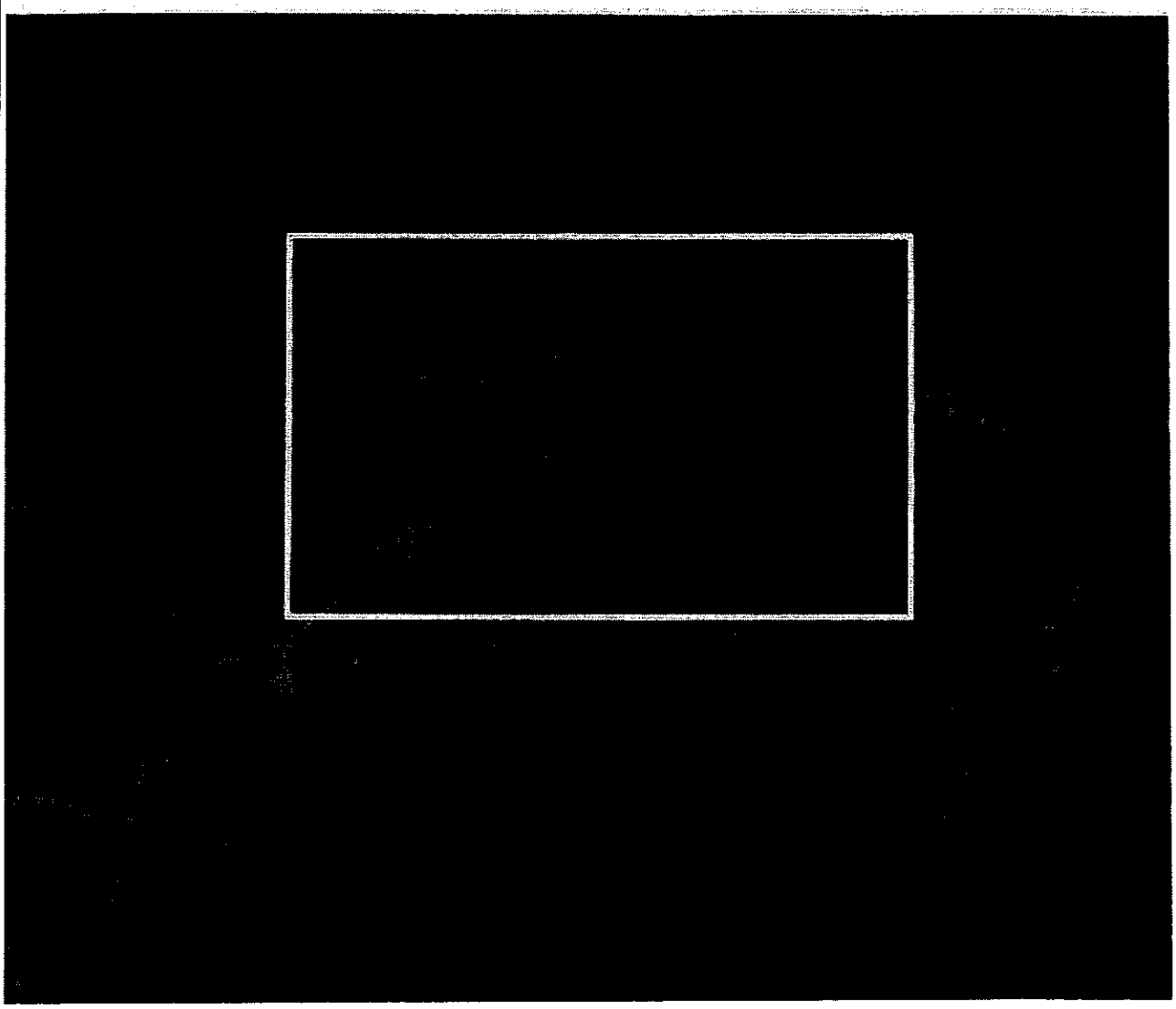
Sharman's Branch
Washington County, MD



300 0 300 600 900 Feet

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S

First Field Exercise: Reference Reach Site

Overview and General Instructions

Objectives

- Reinforce the geomorphic principles discussed in lecture through field application
- Practice applying the Rosgen Stream Classification System in the field
- Practice field determination of bankfull stage

Scope of Exercise

The class will travel to a local stream and collect the basic morphological parameters necessary for stream classification (**Figure B-1**) and stream morphology of a reference reach, including dimensions, pattern, profile and channel materials. The class will be divided into four teams, and each team will be assigned a short stream reach. Your team will be divided into several crews. Each crew will gather a portion of the morphological data and site information required from your reach. By the end of the field session, your team will be able to determine the stream type for your assigned reach. Several forms must be completed using the data you collect in the field. Review the forms before you go to the field so you are familiar with the data requirements (**Worksheet B-1**, **Worksheet B-2** and **Worksheet B-3**). Review the morphological parameters discussed below prior to the exercise.

Field Instructions

1. Perform a toothpick survey with your entire team. Walk your designated reach and look for consistent bankfull indicators and a representative riffle for your stream classification cross-section (see **Figure B-5** for guidelines on selecting a cross-section and **Page B20** for a discussion on identifying bankfull). Estimate the variables in **Table B-1**.

035
101.44
106
92.36

2. As a group, select representative riffle, pool, run and glide cross-sections to survey and select the bankfull elevation at each cross-section. The stream must be free to adjust its boundaries at the riffle cross-sections. More than one cross-section for each bed feature must be measured to obtain a range of values. Note that run and glide bed features may not be present in certain stream types (confirm with Dave the number of cross-sections you need to survey).
3. Divide your team into four crews:
   - Cross-Section Crew (**Page B25**)
   - Longitudinal Profile Crew (**Page B65**)
   - Pebble Count Crew (**Page B91**)
   - Geometry & Sketch Map Crew (**Page B107**)
4. Turn to the appropriate page in *Section A* for instructions for your crew's task.
5. Complete the *Checklist for First Field Day Tasks* (**Page B2**).
6. Combine all team folder items and give folder to Dave.

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Checklist for *First Field Day* Tasks

- ☐ Sketch Map (be sure to include items listed in **Table B-14**, including cross-section locations, meander geometry, stationing and valley cross-section) (**Page B109**)
- ☐ Riffle Cross-Sections: Select (2) *representative* riffles & survey (**Page B25**)
  - ☐ Plot each cross-section and determine bankfull width, bankfull cross-sectional area, bankfull mean depth and bankfull maximum depth (**Page B32**)
  - ☐ Entrenchment ratio: Measure flood-prone area width (**Page B29**)
- ☐ Pool Cross-Sections: Select (2) *representative* pools & survey (**Page B25**)
  - ☐ Measure point bar slope (**Page B30**)
- ☐ Run Cross-Sections: Select (2) *representative* runs & survey (if in a Riffle-Pool system)
- ☐ Glide Cross-Sections: Select (2) *representative* glides & survey (if in a Riffle-Pool system)
- ☐ Longitudinal Profile (through your entire reach) (**Page B65**)
  - ☐ Measure thalweg, water surface, bankfull and lowest bank height (if higher than bankfull)
  - ☐ Note type of feature at each survey point (start riffle, pool, glide, run, etc.)
  - ☐ Tie profile to cross-section in elevation and note the location and the bankfull elevation of the cross-section on the profile
  - ☐ Measure water surface facet slopes and max depth measurements from plotted longitudinal profile
- ☐ Representative Pebble Count for Stream Classification (**Page B93**)
- ☐ Active Bed Riffle Pebble Count for Hydraulic Computations (**Page B93**)
- ☐ Sinuosity (k) (**Page B113**)
- ☐ Linear Wavelength (λ), Stream Meander Length (L_m), Belt Width (W_{blt}), Radius of Curvature (R_c), and Arc Length (L_a): Obtain min., max. and mean values (**Page B113**)
- ☐ Riffle Length (L_r), Pool Length (L_p), and Pool-to-Pool Spacing (P_s) measured from plotted longitudinal profile: Obtain min., max. and mean values (**Page B117**)

Worksheets

- ☐ Stream Classification Form: (**Worksheet B-1, Page B12**)
- ☐ Velocity Computation Form: (**Worksheet B-2, Page B13**)
- ☐ Morphological Relations & Dimensionless Ratios Form (**Worksheet B-3, Pages B14–B15**)

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Presentation Order – *First Field Day*

As a team, prepare to present the following items in order:

1. Sketch Map
2. Cross-Section Graphs:
   - Riffle Cross-Section(s)
   - Pool Cross-Section(s)
   - Run Cross-Section(s) (if applicable)
   - Glide Cross-Section(s) (if applicable)
3. Longitudinal Profile Graph
4. Representative Pebble Count for Stream Classification (Graph)
5. Active Bed Riffle Pebble Count for Hydraulic Calculations (Graph)
6. Velocity Computation Form (**Worksheet B-2**)
7. Stream Classification Form (**Worksheet B-1**)
8. Morphological Relations & Dimensionless Ratios Form (**Worksheet B-3**)

Checklist for Team Folder – *First Field Day*

Folder Holder: Please collect the following items from your team members and insert into your team folder in the order listed below. Please make sure all corrections have been made following your team presentation and give your completed team folder to Dave.

☑ Sketch Map

☐ Cross-Section Raw Data and Graphs for all Cross-sections Measured

☑ Longitudinal Profile Raw Data and Graph

☐ Representative Pebble Count Raw Data and Graph

☐ Active Bed Riffle Pebble Count Raw Data and Graph

☑ Stream Classification Form (**Worksheet B-1**)

☐ Velocity Computation Form (**Worksheet B-2**)

☐ Morphological Relations & Dimensionless Ratios Form (**Worksheet B-3**)

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