Barnard

LABOR	RATE	# HOURS	TOTAL
2 Laborors	$35	65	$2,275
Labor Total			$2,275
EQUIPMENT			
excavator	$120	65	$7,800
excavator mobilization	500		$500
2 10 wheel dump trucks	$70	65	$4,550
3 cy bucket loader	$65	30	$1,950
excavator 2	$120	65	$7,800
Equipment Total			$22,600
MATERIALS	Rate	Amount	Total
4' minus rip rap 550 cu yd delivered	$41.67	852	$35,500
smaller chinking stone on site			$0
Material Total			$35,500.00
MISC.			
Misc. Total			
GRAND TOTAL			$60,375
MATCH			

+ 11,950

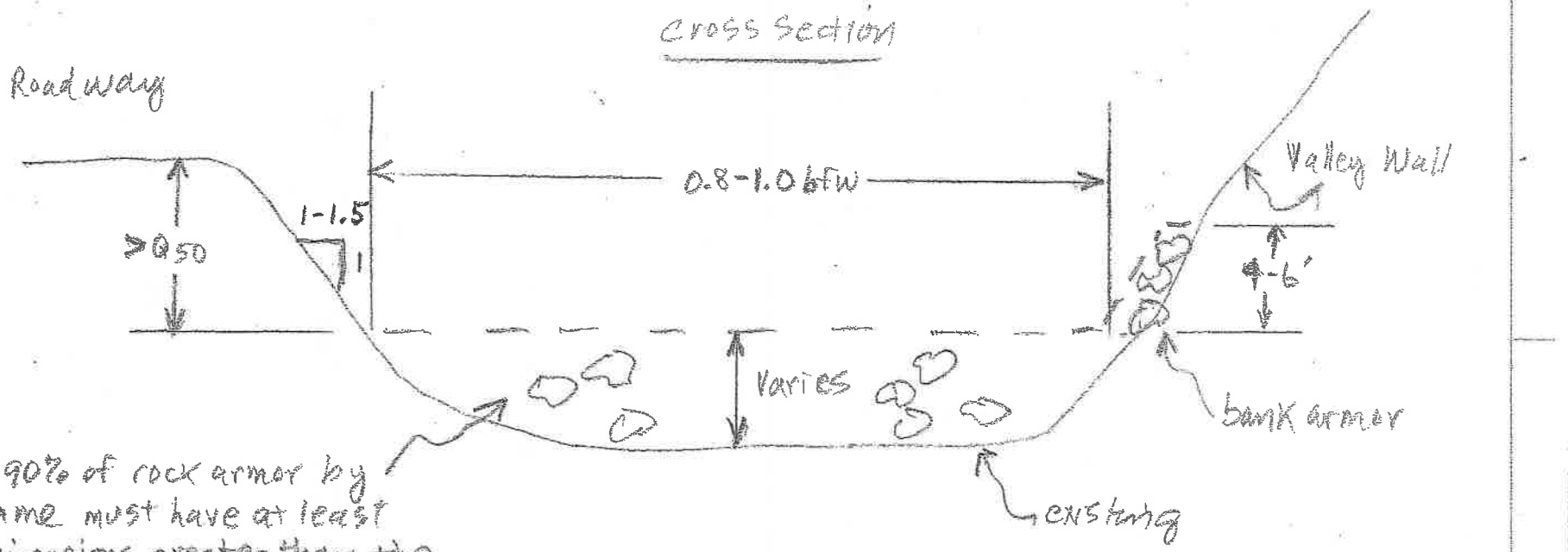
72,325

6A@5% 3,616

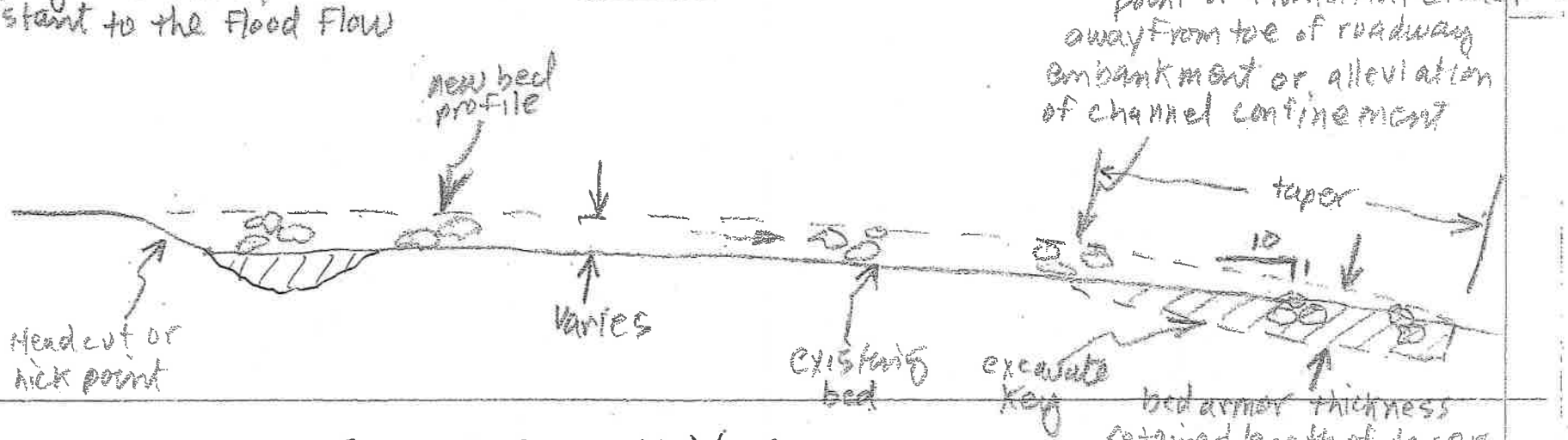
75,941

CHANNEL BED ARMOR AND ELEVATION TYPICAL

Drawing: B. Lahoen
date: 07/25/12
Not to scale



90% of rock armor by volume must have at least 2 dimensions greater than the average dimension of any existing bed armor particles resistant to the Flood Flow



* EXAMPLE ONLY *

Streambed Stone Fill Design Guidance

Type	Velocity Range (fps)*	Embeddedness (in)
E1	$V \leq 9$	18
E2	$9 < V \leq 11$	24
E3	$11 < V \leq 13$	36
E4	$13 < V \leq 15$	48

*Maximum velocity should be based on a minimum 50-year design flow rate and calculated at the structure outlet.

Item xxx.xxx CY Streambed Stone Fill Specification

Type E1. The longest dimension of the stone shall be at least 18 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E2. The longest dimension of the stone shall be at least 24 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 18 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E3. The longest dimension of the stone shall be at least 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 24 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

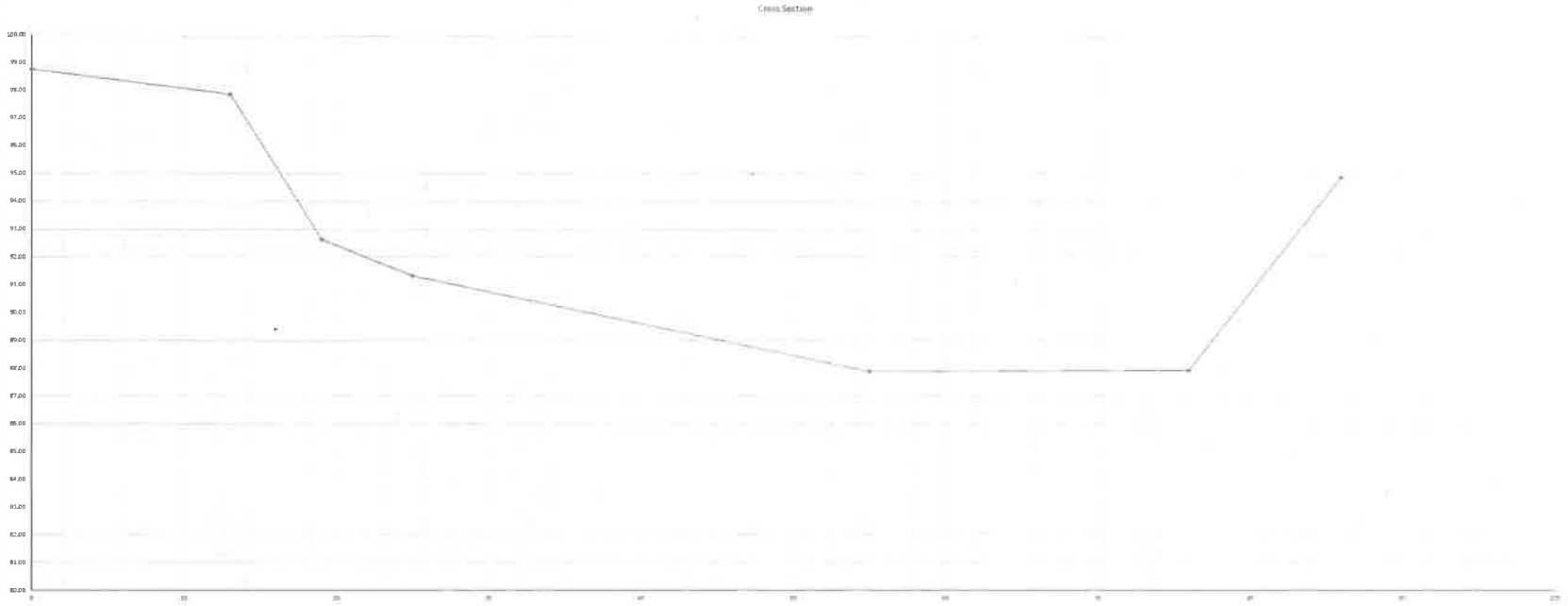
Type E4. The longest dimension of the stone shall be at least 48 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 36 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Notes

- The streambed stone fill shall be hard, blasted, angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). Similar sized river sediment is an acceptable alternative as is a mixture of angular material and river sediment.
- Stone placed inside of a closed structure shall be placed such that the structure is not damaged.
- Care shall be taken to limit segregation of the materials.
- Add sand borrow item as needed to seal the bed and prevent subsurface flow.
- There shall be no subsurface flow upon final inspection.

USE TYPE IV STONE FILL W/ RIVER GRAVEL TO SEAL BED.

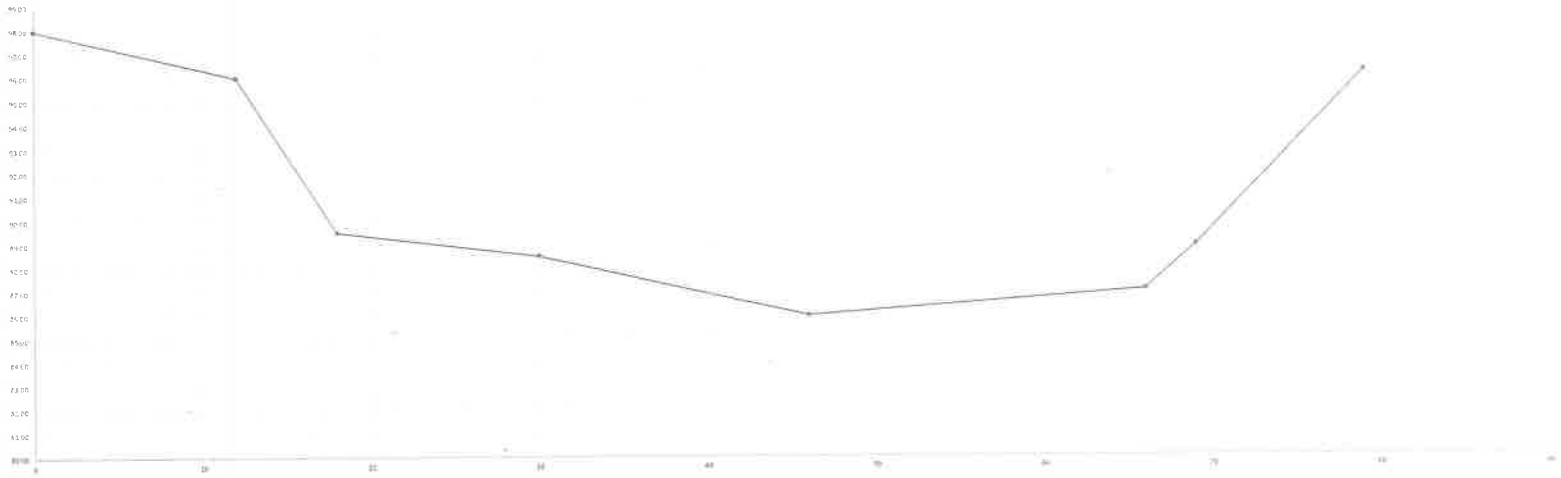
Criss Section	Station	BS	HI	FS	Elevation	Bankfull width is 40'
	BM1		102.67	2.67	100.00	
0+00	0			3.90	98.77 Edge of Road Shoulder	
	13			4.81	97.86 Top of Bank	
	19			10.05	92.62 bottom of bank right	
	25			11.36	91.31 bankfull right elevation	
	55			14.79	87.88 center channel	
	76			14.74	87.93 bottom of bank left and bankfull elevation	
	86			7.80	94.87 slope	



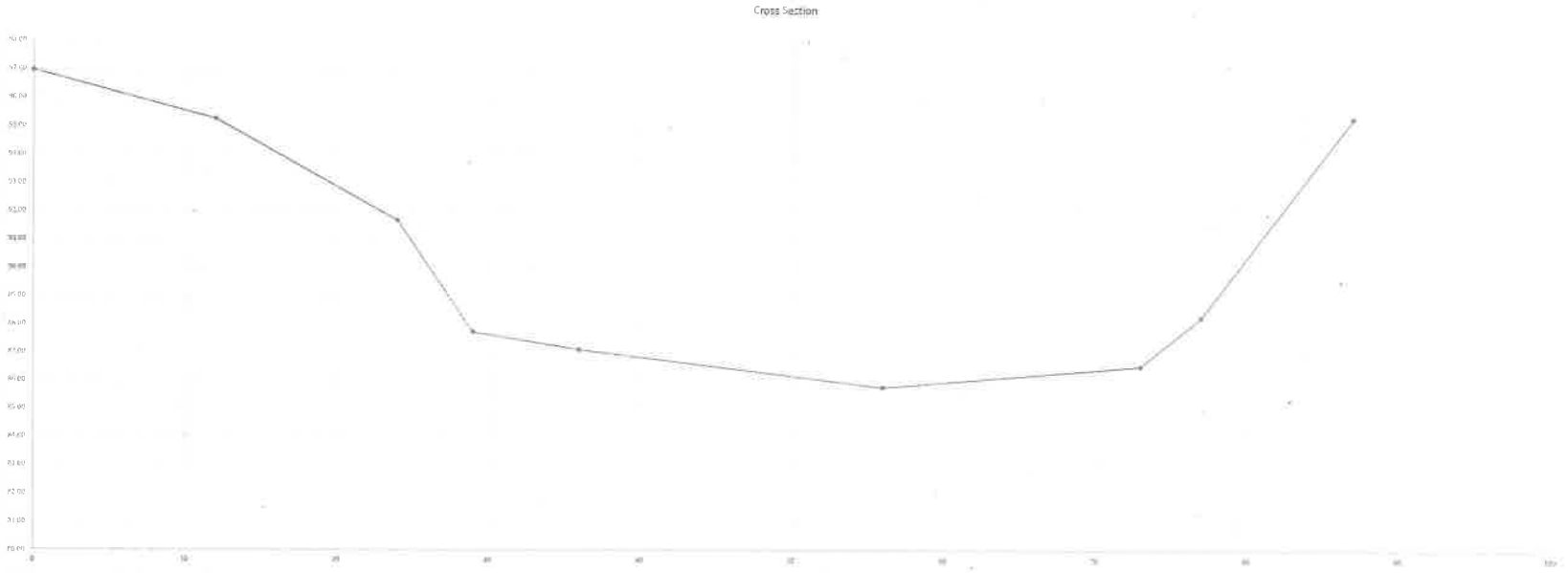
Cross Section	Station	BS	HI	FS	Elevation	Note
	BM1		102.67	2.67	100.00	Nail set at 100.00' in Pine Tree base
0+50	0			4.65	98.02	Edge of Shoulder
	12			6.66	96.01	Top of bank
	18			13.13	89.54	bottom of bank river right
	30			14.15	88.52	bankfull right bank elevation
	46			16.70	85.97	center of channel
	66			15.61	87.06	bottom of bank river left
	69			13.74	88.93	bankfull left elevation
	79			6.44	96.23	slope

Bankfull width is 40'

Cross Section



Cross Section	Station	BS	HI	FS	Elevation	Note
	BM1		101.58	1.58	100.00	Nail set at 100.00' in Pine Tree base
1+15	0			4.60	96.98	Edge of Shoulder
	12			6.31	95.27	Top of bank
	24			9.89	91.69	top of bench in bank
	29			13.86	87.72	bottom of bank river right
	36			14.49	87.09	bankfull right bank elevation
	56			15.82	85.76	center of channel
	73			15.07	86.51	bottom of bank river left
	77			13.31	88.27	bankfull left elevation
	87			6.26	95.32	slope



Profile	Station	Elevation	Note
	0	87.88	center channel
	25	83.00	sewer hole estimated at 3 feet deep no section
	50	85.97	center channel
	115	85.76	center channel

Stone Fill	
0	87.88
0	83.88
50	83.97
115	83.76
115	85.76
50	85.97
0	87.88