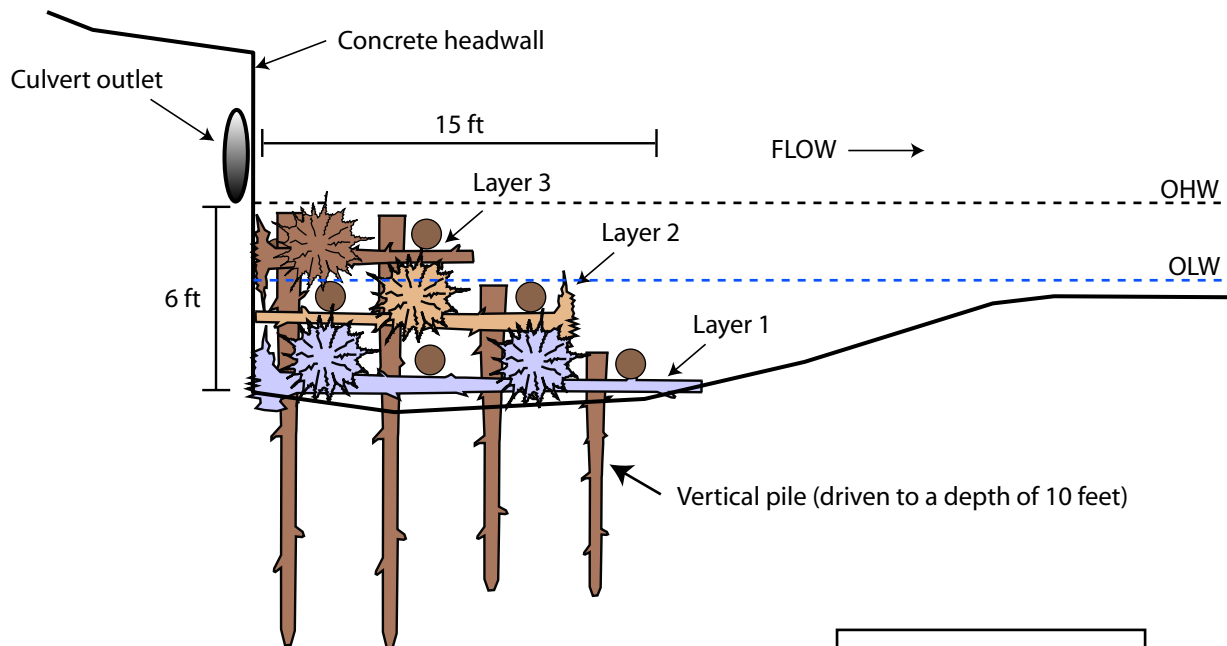
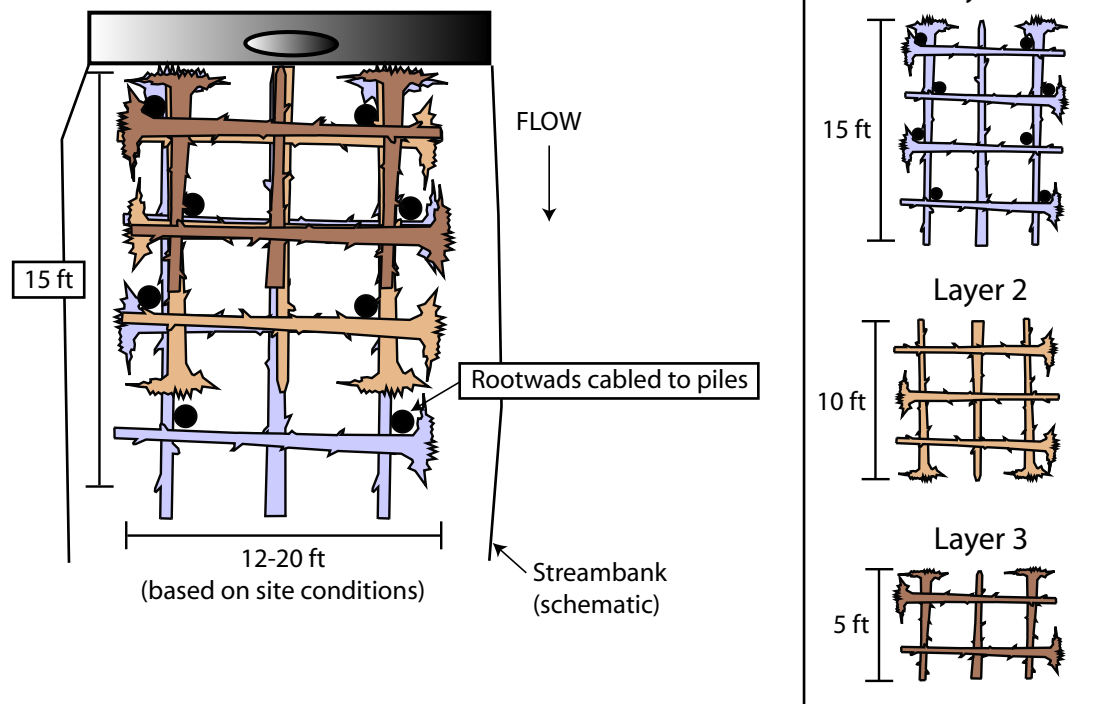


## LONGITUDINAL VIEW



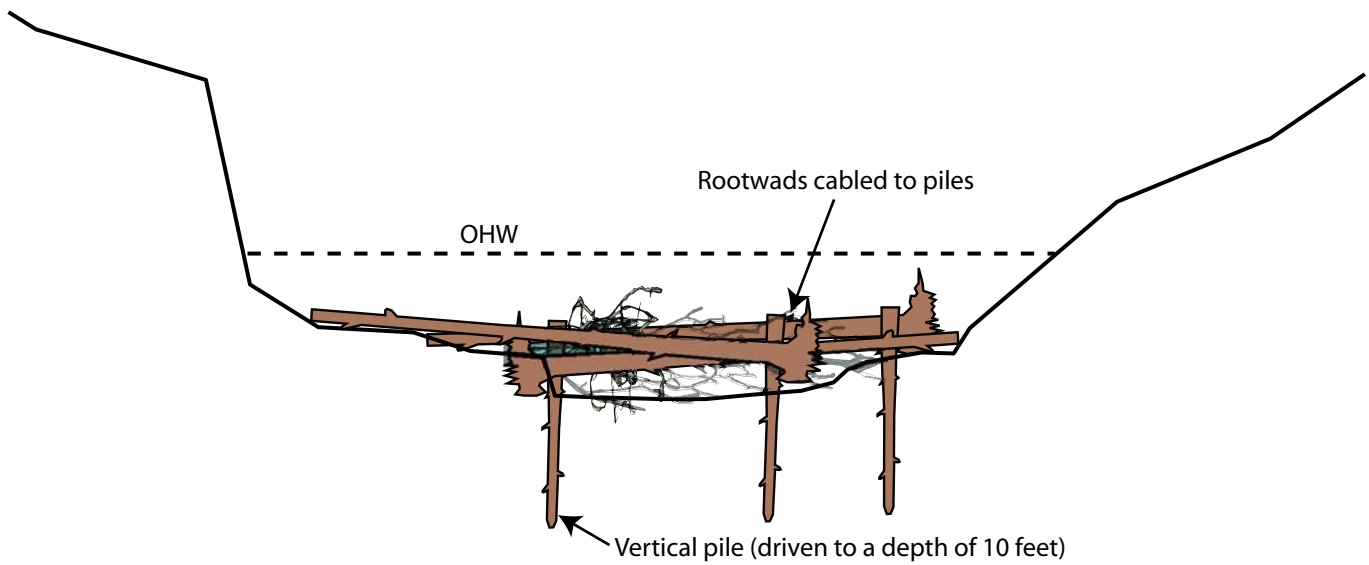
## PLAN VIEW



Note: Structural members only shown for clarity. Basket structure filled with alternating layers of brush/slash and boulders/cobbles for ballast.

Wood basket outfall structure design typical.

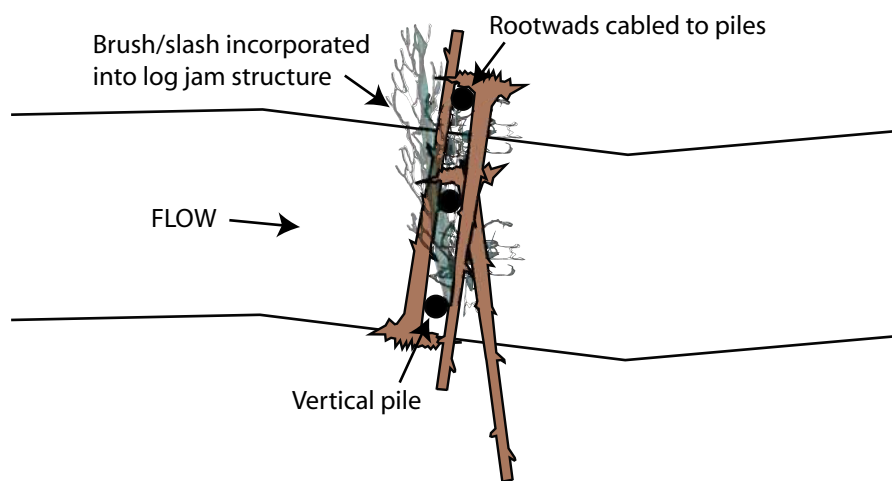
### CROSS SECTION VIEW



Note: Schematic - Not to scale

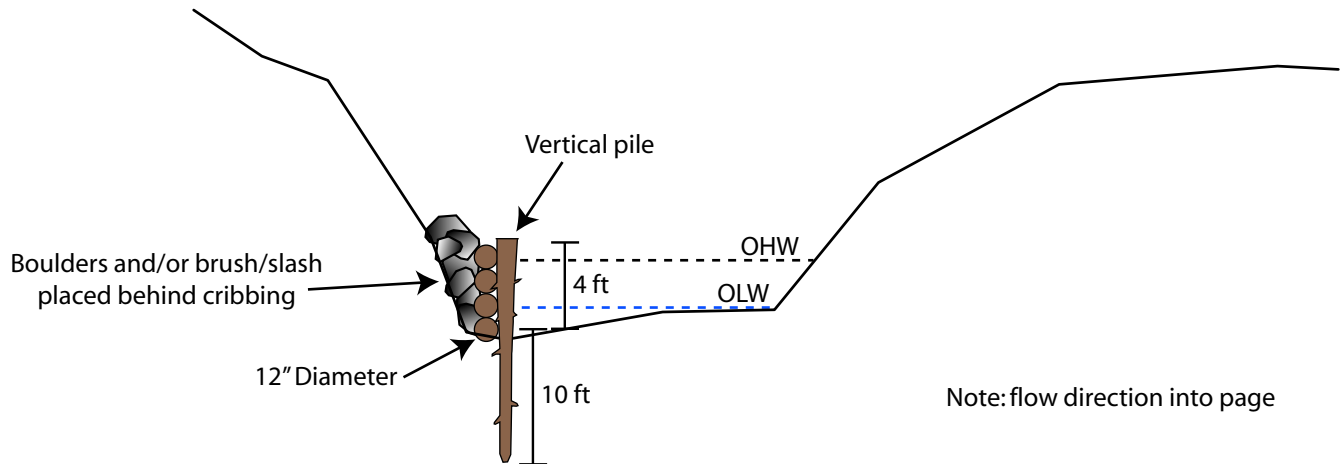
Note: flow direction into page

### PLAN VIEW

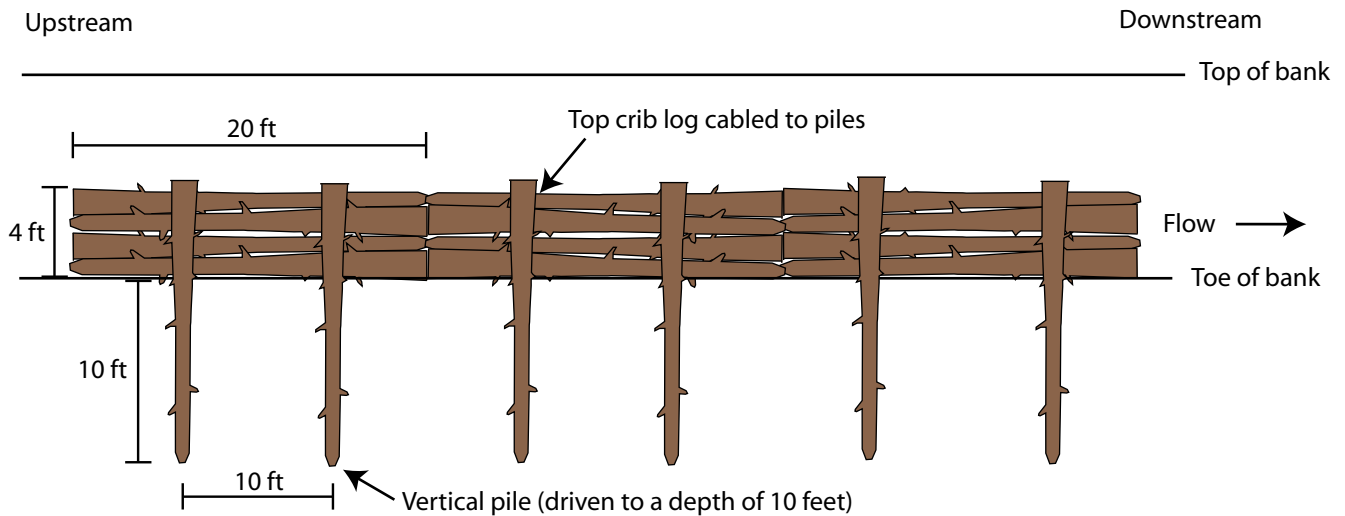


Channel-spanning log jam design typical.

### Cross section view

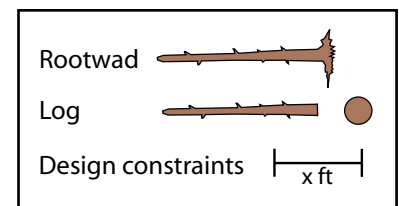


### Longitudinal view



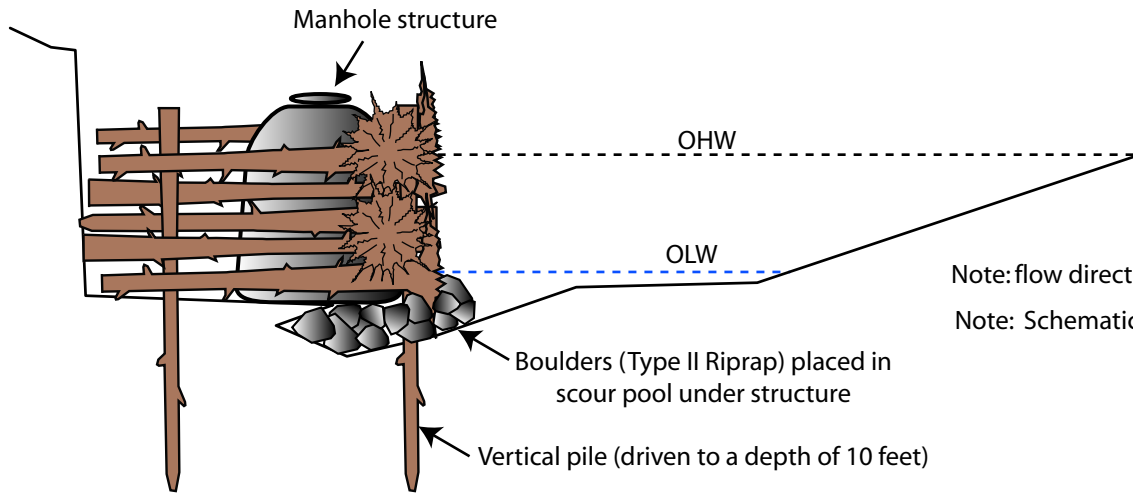
Note: Schematic - Not to scale

\*Only a portion of treatment area displayed to show detail

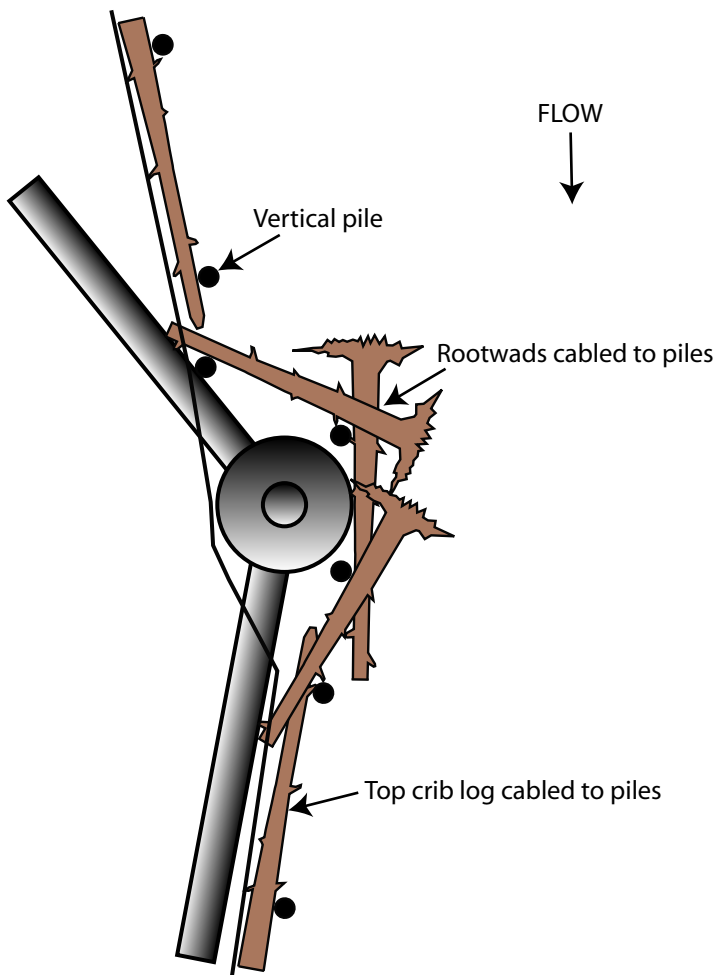


Log crib wall design typical.

## CROSS SECTION VIEW



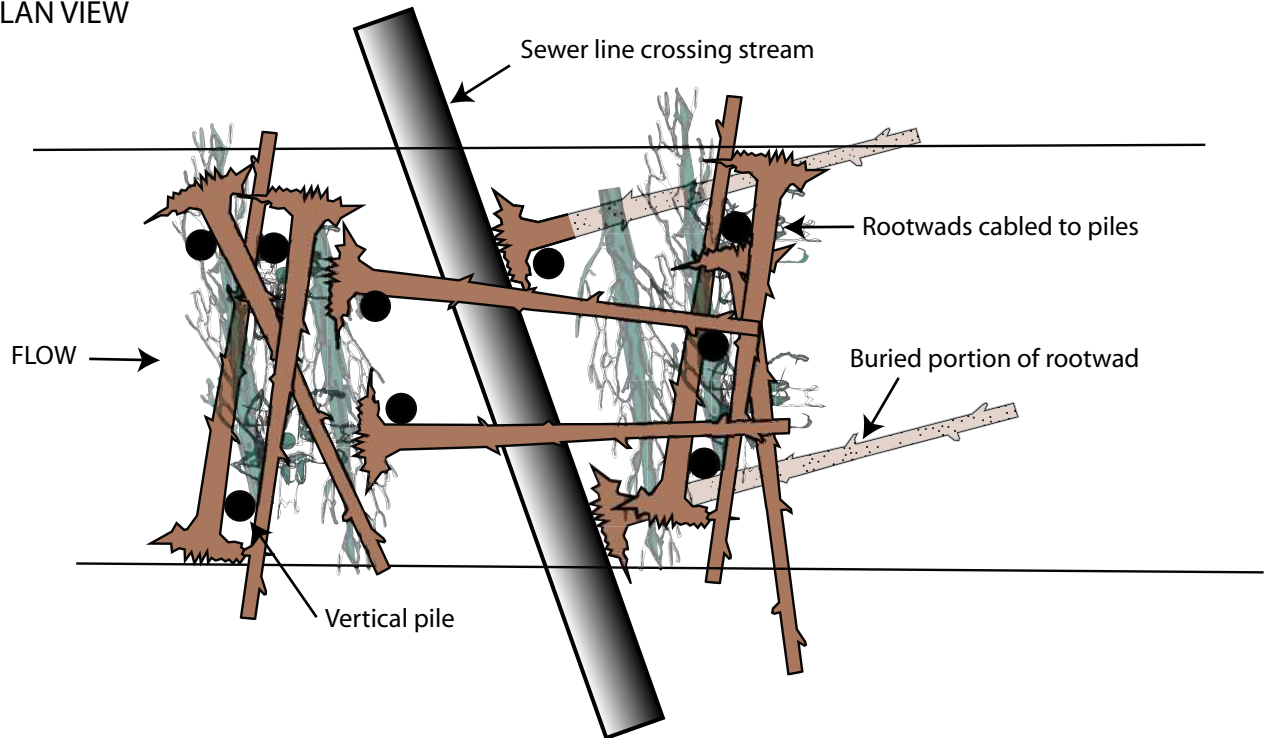
## PLAN VIEW



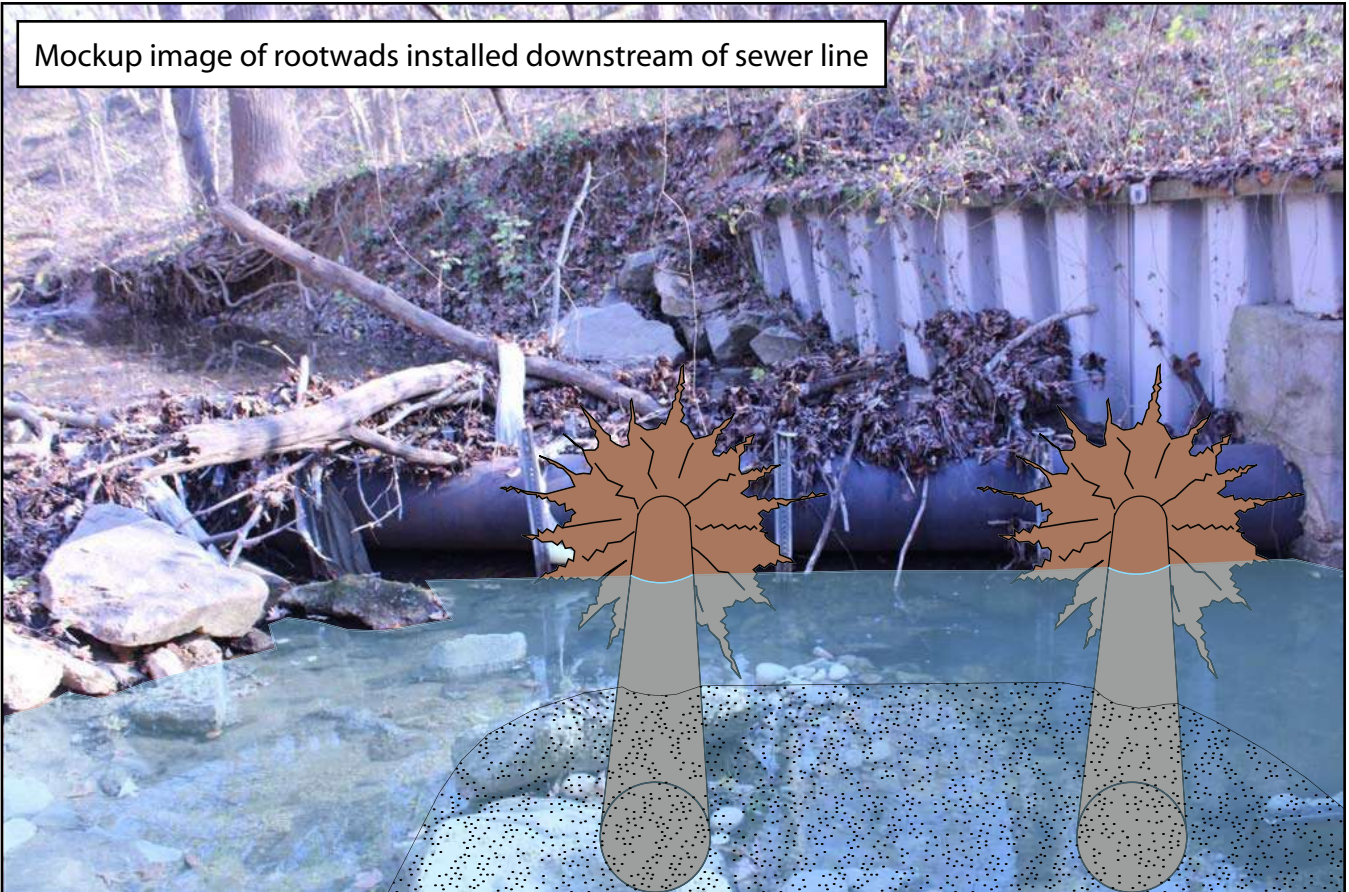
Note: structure filled with brush/slash/tops and boulder ballast (not shown for clarity)

Manhole protection structure design typical.

## PLAN VIEW



Mockup image of rootwads installed downstream of sewer line



Sewer line protection structure design typical.



Taylor Run - Alexandria, VA  
Estimated Materials List

Structure Type	Number of structures	Quantity per structure	Material (description)	Diameter (dimensions)	Length (feet)	Total Count
Log jam	3	3	Rootwads	12+	20	9
		3	Logs (vertical piles)	12+	15	9
		4 cu.yd.	Brush / slash / tops			12
		4 cu.yd.	Boulders (Type II riprap)	1.5 to 2.0 ft	1.5 to 2.0 ft	12
Wood basket outfall	1	15	Rootwads	12+	20	15
		8	Logs (vertical piles)	12+	15	8
		9	Logs (horizontal)	12+	20	9
		16 cu.yd.	Brush / slash / tops			16
		20 cu.yd.	Boulders (Type II riprap)	1.5 to 2.0 ft	1.5 to 2.0 ft	20
Crib wall 380 linear feet	19	5	Logs (cribbing)	12+	20	95
		2	Logs (vertical piles)	12+	15	38
		4 cu.yd.	Brush / slash / tops			76
		8 cu.yd.	Boulders (Type II riprap)	1.5 to 2.0 ft	1.5 to 2.0 ft	152
Sewer line protection structure	2	14	Rootwads	12+	20	28
		10	Logs (vertical piles)	12+	15	20
		4	Logs (horizontal)	12+	20	8
		8 cu.yd.	Brush / slash / tops			16
		8 cu.yd.	Boulders (Type II riprap)	1.5 to 2.0 ft	1.5 to 2.0 ft	16
Manhole protection structure	1	9	Rootwads	12+	20	9
		8	Logs (vertical piles)	12+	15	8
		16	Logs (horizontal)	12+	20	16
		16 cu.yd.	Brush / slash / tops			16
		20 cu.yd.	Boulders (Type II riprap)	1.5 to 2.0 ft	1.5 to 2.0 ft	20

Material	Subtotal	add 10%	Total with contingency	Unit cost	Unit	Material cost
Rootwads (20 ft long)	61	6	67	\$ 600.00	rootwad	\$ 40,200.00
Crib/horizotal logs (20 ft long)	128	13	141	\$ 300.00	log	\$ 42,300.00
Pile logs (15 ft long)	83	8	91	\$ 250.00	log	\$ 22,750.00
Brush / slash / tops	136	14	150	\$ 50.00	cu.yd.	\$ 7,500.00
Boulders (Type II riprap)	220	22	242	\$ 150.00	cu.yd.	\$ 36,300.00

**\$ 149,050.00**

**Construction Cost Estimate - Taylor Run Large Wood Alternative**

January 2023

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL	NOTES
1.0	<b>Construction Surveying</b>					
1.1	Construction Stakeout	3	Day	\$2,100.00	\$6,300.00	From AECOM's Minimal Intervention cost estimate
1.2	As-Built	320	LF	\$12.00	\$3,840.00	Rate from AECOM's Minimal Intervention cost estimate
2.0	<b>Access Roads</b>					
2.1	Deck Mats (Access, Staging, and Stream Crossing)	1800	LF	\$35.00	\$63,000.00	Rate from AECOM's Minimal Intervention cost estimate
2.2	Filter Fabric (placed beneath Deck Mats)	4445	SY	\$5.00	\$22,225.00	Rate from AECOM's Minimal Intervention cost estimate
2.3	Remove and Reinstall Trail Signage	1	EA	\$125.00	\$125.00	From AECOM's Minimal Intervention cost estimate
2.4	Remove and Reinstall Pedestrian Bridge	10	LF	\$20.00	\$200.00	From AECOM's Minimal Intervention cost estimate
3.0	<b>Clearing and Demolition</b>					
3.1	Light Clearing & Grubbing	0.92	AC	\$12,000.00	\$11,040.00	Rate from AECOM's Minimal Intervention cost estimate
4.0	<b>Infrastructure Stabilization/Structure Construction</b>					
4.1	Furnish 15-20' Logs, Roots, Boulders, & Slash (tops)	1	LS	\$149,050.00	\$149,050.00	See materials list for explanation and per item cost
4.2	Sheetpile Wall Removal	62	LF	\$100.00	\$6,200.00	From AECOM's Minimal Intervention cost estimate
4.3	Standard Concrete Encasement (8"-21" Pipe)	136	LF	\$78.00	\$10,608.00	From AECOM's Minimal Intervention cost estimate
4.4	0.5" Galvanized Steel Cable, Clamps, & Accessories	1	LS	\$7,500.00	\$7,500.00	Based on previous projects/To anchor logs to piles
4.5	Installation of Structures (includes mobilization)	1	LS	\$178,860.00	\$178,860.00	20% increase on materials cost (based on similar projects)
4.6	Rental of Drill Attachment to Excavator	1	Week	\$5,000.00	\$5,000.00	Added cost if augering pile holes does not work
5.0	<b>Vegetation</b>					
5.1	Planting and Invasive Control	4445	SY	\$15.00	\$66,675.00	Rate from AECOM's Minimal Intervention cost estimate
6.0	<b>Erosion and Sediment Control</b>					
6.1	Erosion Control	1	LS	\$90,000.00	\$90,000.00	From AECOM's Minimal Intervention cost estimate
7.0	<b>Maintenance of Traffic</b>					
7.1	Temporary Traffic Control Signs	4	EA	\$481.00	\$1,924.00	From AECOM's Minimal Intervention cost estimate
7.2	Trail Closure Signs	3	EA	\$250.00	\$750.00	From AECOM's Minimal Intervention cost estimate
<b>Subtotal</b>					\$623,297.00	

FY22 Escalation Factor Amount \$74,795.64 Increase of 12% as determined by AECOM

Construction Contingency \$349,046.32 50% of subtotal and escalation as per AECOM's estimate

**Total** \$1,047,138.96

**Anticipated 10-Year Maintenance Cost** \$428,327.76 See accompanying spreadsheet

**10-Year Maintenance Cost Estimate - Taylor Run Large Wood Alternative**

January 2023

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL	NOTES
1.0	<b>Access Roads</b>					
1.1	Deck Mats (Access, Staging, and Stream Crossing)	1800	LF	\$35.00	\$63,000.00	From AECOM's Minimal Intervention maintenance cost
1.2	Remove and Reinstall Trail Signage	1	EA	\$125.00	\$125.00	From AECOM's Minimal Intervention cost estimate
1.3	Remove and Reinstall Pedestrian Bridge	10	LF	\$20.00	\$200.00	From AECOM's Minimal Intervention cost estimate
1.4	Filter Fabric (placed beneath Deck Mats)	4445	SY	\$5.00	\$22,225.00	From AECOM's Minimal Intervention maintenance cost
2.0	<b>Clearing and Demolition</b>					
2.1	Light Clearing & Grubbing	0.46	AC	\$12,000.00	\$5,520.00	Rate from AECOM's Minimal Intervention cost estimate
2.2	Clearing & Reuse of Accumulated In-Stream Debris	1	LS	\$7,000.00	\$7,000.00	From AECOM/To prevent flow impoundments
3.0	<b>Infrastructure Stabilization/Structure Construction</b>					
3.1	Furnish 15-20' Logs, Roots, Boulders, & Slash (tops)	1	LS	\$44,715.00	\$44,715.00	Based on need to replace 30% of logs in 10-yr period
3.2	Installation of Structures (includes mobilization)	1	LS	\$53,658.00	\$53,658.00	Based on need to rebuild 30% of structures every 10 yrs
4.0	<b>Vegetation</b>					
4.1	Turfgrass Establishment (Road and staging areas)	3168	SY	\$3.00	\$9,504.00	Rate from AECOM's Minimal Intervention cost
4.2	Invasive Species Control	3168	SY	\$2.00	\$6,336.00	Rate from AECOM's Minimal Intervention cost
5.0	<b>Erosion and Sediment Control</b>					
5.1	Erosion Control	1	LS	\$40,000.00	\$40,000.00	From AECOM's Minimal Intervention maintenance cost
6.0	<b>Maintenance of Traffic</b>					
6.1	Temporary Traffic Control Signs	4	EA	\$481.00	\$1,924.00	From AECOM's Minimal Intervention maintenance cost
6.2	Trail Closure Signs	3	EA	\$250.00	\$750.00	From AECOM's Minimal Intervention maintenance cost
<b>Subtotal</b>					\$254,957.00	

*FY22 Escalation Factor Amount*      \$30,594.84 Increase of 12% as used in AECOM's estimate

*Construction Contingency*      \$142,775.92 50% of subtotal and escalation as per AECOM's estimate

**Anticipated 10-Year Maintenance Cost**      \$428,327.76 See accompanying spreadsheet



## Estimated impacts

Taylor Run			
	Length (linear feet)	Area (sq.ft.)	Area (acres)
Travel	1,260	20,160	0.463
Staging areas	220	8,350	0.192
LOD*	320	11,500	0.264
Total	1,800	40,010	0.919

\*LOD = Limit of Disturbance or stream length of proposed treatments

Tree Impacts	Hard Armoring	Bioengineering	Minimal Intervention	Large Wood
Limit of Disturbance (in acres)	2.82	2.63	1.06	0.92
Number of Trees To Be Cleared	202	190	53	40*
Total Trees to Be Planted**	1692	1578	636	552
Net Trees Gained	1490	1388	583	512

\*Based on City direction to assume work occurs from top of bank but can be reduced to 14 if Contractor agrees to do construction from one side of stream and is willing to prune tree canopy

\*\* Disturbed areas will be replanted at 600 stems/acre

Cost Estimate	Hard Armoring	Bioengineering	Minimal Intervention	Large Wood
Construction	\$2.6 million	\$3.4 million	\$915,000	\$1.0 million
Mitigation*	\$1.2 million (1,410 LF)	\$930,600 (1,410 LF)	\$193,000 (220 LF)	\$282,000 (320 LF)
Maintenance**	\$130,000	\$51,000	\$395,000	\$428,000
<b>Grand Total</b>	<b>\$3.9 million</b>	<b>\$4.4 million</b>	<b>\$1.5 million</b>	<b>\$1.8 million</b>

\*Mitigation estimated from the USACE USM Compensation Calculation based on linear feet (LF) of disturbance and a credit purchase rate of \$800/credit

\*\* Maintenance based on expected work and materials during 10-yr storm or over a 10-yr period