STREAM BANK PROTECTION

Stream channel erosion consists of both stream bed and stream bank erosion. Stream bed erosion occurs as flows cut into the bottom of the channel, making it deeper. This erosion process will continue until the channel reaches a stable slope. The resulting slope is dependent on the channel materials and flow properties. As the stream bed erodes, and the channel deepens, the sides of the channel become unstable and slough off, resulting in stream bank erosion. Stream bank erosion can also occur as soft materials are eroded from the stream bank or at bends in the channel. This type of stream bank erosion results meandering waterways. One significant cause of both steam bed and stream bank erosion is due to the increased frequency and duration of runoff events that are a result of urban development.

It is often necessary in areas where development has occurred in the upstream watershed and full channel flow occurs several times a year. Stream bank protection can be vegetative, structural or a combined method where live plant material is incorporated into a structure (bioengineering). Vegetative protection is least costly and the most compatible with natural stream characteristics. Additional protection is required when hydrologic conditions have been greatly altered. Because each reach of channel is unique, measures for stream bank protection should be installed according to a plan developed for the specific site and watershed.

Structural Protection

Structural protection should be provided in locations where velocities exceed 6 feet per second, along bends, in highly erodible soils and in steep channel slopes. Common materials include riprap, gabions, fabric formed revetments and reinforced concrete. The upstream and downstream ends of the structural protection should begin and end along stable reaches of the stream.

Reinforced concrete may be used to stabilize the stream bed or the stream bank. Reinforced concrete retaining walls provide good erosion protection for stream banks. Anchor the foundation for these structures to a stable, non-erodible base material such as bedrock. Place filter fabric or a granular filter between stream bank material and the retaining wall or bulkhead. Construct water stops at all joints in concrete retaining walls. Construct the top of the retaining wall or bulkhead up to the design water surface elevation plus freeboard, and vegetate the rest of the stream bank

DETAILED ESTIMATE FOR RETAINING WALL TYPE A **1.5M HEIGHT** **NEW**

No	Description	Measurements No	Length	breadth	height	Quantity (m3)	Rate (Rs.)	unit	Amount
1	Earth cutting in ordinary soil for retaining wall average bredth.85+.10/2	1	1.0	0.475	1.5	0.71			
						0.71	940.30	$10m^3$	67.00
2	Earthwork excavation in ordinary soil and depositing on bank with initial lead up to 50m and lift up to 1.50m including breaking clods watering ramm ing and sectioning of spoil bank etc. complete.in or under water	1	1.0	0.95	0.5	0.48			
						0.48	1922.06	$10m^3$	91.30
3	Dry Rubble masonry for retaining walls	1	1.0	0.95	0.5	0.48			
	average bredth.75+.45/2	1	1.0	0.6	1.5	0.90			
						1.38	1358.93	m^3	1868.53
4	CC 1:4:8 over DRM,75mm thick plastered with CM, 1:3,12mm with flush coat over the retaining wall	1	1.0	0.5		0.5			
					M2	0.5	5270.00	$10m^2$	263.50
	total								**2290.32**
	say Rs	**2290**	**/m**						**2290**

DETAILED ESTIMATE FOR RETAINING WALL TYPE A **1.5M HEIGHT** **RE- CONSTRUCTION**

No	Description	Measurements No	Length	breadth	height	Quantity	Rate	unit	Amount
1	Dismantling and clearing away walls of dry rubble works and dry stone. average breadth .75m to.45m	1	1.0	0.6	1.5	0.90			
						0.90	222.18	m^3	199.96
2	Dry Rubble masonry USING DEPT. Rubble average breadth .75m to.45m	1	1.0	0.6	1.5	0.90			
						0.90	566.03	m^3	509.43
3	CC 1:4:8 over DRM,75mm thick plastered with CM, 1:3,12mm with flush coat over the retaining wall	1	1.0	0.5		0.5			
						0.5	5270.00	$10m^2$	263.50
	total								**972.89**
	say	**Rs**	**973**	**/m**				**Rs**	**973**

DETAILED ESTIMATE FOR RETAINING WALL TYPE B **1.0M HEIGHT** **NEW**

No	Description	No	Measurements Length	breadth	height	Quantity (m3)	Rate (Rs.)	unit	Amount
1	Earth cutting in ordinary soil for retaining wall average bredth.70+.10/2	1	1.0	0.4	1.0	0.40			
						0.40	940.30	$10m^3$	37.61
2	Earthwork excavation in ordinary soil and depositing on bank with initial lead up to 50m and lift up to 1.50m including breaking clods watering ramming and sectioning of spoil bank etc. complete.in or under water	1	1.0	0.8	0.5	0.40			
						0.40	1922.06	$10m^3$	76.88
3	Dry Rubble masonry for retaining walls	1	1.0	0.8	0.5	0.40			
	average breadth.60+.45/2	1	1.0	0.525	1.0	0.53			
						0.93	1358.93	m^3	1257.01
4	CC 1:4:8 over DRM,75mm thick plastered with CM, 1:3,12mm with flush coat over the retaining wall	1	1.0	0.45		0.45			
					M2	0.45	5270.00	$10m^2$	237.15
	total								**1608.65**
	say Rs	**1609**	**/m**						**1609**

DETAILED ESTIMATE FOR RETAINING WALL TYPE B **1.0M HEIGHT** **RE- CONSTRUCTION**

No	Description	Measurements No	Length	breadth	height	Quantity	Rate	unit	Amount
1	Dismantling and clearing away walls of dry rubble works and dry stone. average breadth .60m to.45m	1	1.0	0.525	1.0	0.53			
						0.53	222.18	m^3	116.64
2	Dry Rubble masonry USING DEPT. Rubble average breadth .60m to.45m	1	1.0	0.525	1.0	0.53			
						0.53	566.03	m^3	297.17
3	CC 1:4:8 over DRM,75mm thick plastered with CM, 1:3,12mm with flush coat over the retaining wall	1	1.0	0.50		0.5			
						0.5	5270.00	$10m^2$	263.50
	total								**677.31**
	say	**Rs**	**677**	**/m**				**Rs**	**677**