Summary of Quantities for Protection Works

S#	Description		Retaining wall	Gabion	Total Qty
1	Earthwork in Excavation				
a)	Ordinary Soil	Cum	1805	19833	***21638***
b)	Ordinary Rock	Cum	1203	13222	***14425***
c)	Hard Rock	Cum	0	0	***0***
2	PCC M-10 grade	Cum			***0***
3	PCC M-15 grade	Cum	526		***526***
4	Stone Masonary	Cum	6177		***6177***
4	RCC M-30	Cum	427		***427***
5	Reinforcement	MT	26		***26***
6	Filter Media	Cum	1194		***1194***
7	Weep holes	No	1285		***1285***
8	Gabion Wall	Cum		18440	***18440***
9	Chute Drain	M	32		***32***
10	Earthfill (To be reuse excavated earth)	Cum			***0***
11	Drainage Layer	Cum			***0***
12	Blast Spalls	Cum	333		***333***
13	Filter material below pitching	Cum	111		***111***

Inputs

Total Length	350
Ht. of Wall above GL	1.5
Total Ht. (H)	2.5
Depth Below GL	1
Base Width (B)	1.63
Top Width of Ret Wall	1
Thk of Rubble backing	0.5
Thk of PCC	0.15

Quantification for Cement Masonry Retaining Wall RW1, Ht. = 2.5m

S#	Description	Unit	No.	Length	Width	Height	Qty
1	***Excavation***	Cum					
	For Retaining Wall		1	350.00	1.93	1.15	774.81
							774.81
2	***PCC M-15 grade***	Cum					
	Levelling course		1	350.00	1.93	0.15	101.06
							101.06
3	***Cement masonary***	Cum					
	Retaining wall		1	350.00	1.31	2.50	1148.44
							1148.44
4	***Parapet***	Cum					
			97	2.60	0.45	0.60	68.09
							68.09
5	***Rubble backing for drainage (filter media)***	Cum					
			1	350.00	0.50	1.50	262.50
							262.50

Inputs

Total Length	300
Ht. of Wall above GL	2
Total Ht. (H)	3
Depth Below GL	1
Base Width (B)	1.95
Top Width of Ret Wall	1
Thk of Rubble backing	0.5
Thk of PCC	0.15

Quantification for Cement Masonry Retaining Wall RW1, Ht. = 3m

S#	Description	Unit	No.	Length	Width	Height	Qty
1	***Excavation***	Cum					
	For Retaining Wall		1	300.00	2.25	1.15	776.25
							776.25
2	***PCC M-15 grade***	Cum					
	Levelling course		1	300.00	2.25	0.15	101.25
							101.25
3	***Cement masonary***	Cum					
	Retaining wall		1	300.00	1.48	3.00	1327.50
							1327.50
4	***Parapet***	Cum					
			83	2.60	0.45	0.60	58.27
							58.27
5	***Rubble backing for drainage (filter media)***	Cum					
			1	300.00	0.50	2.00	300.00
							300.00

Inputs

Total Length	130
Ht. of Wall above GL	4
Total Ht. (H)	5
Depth Below GL	1
Base Width (B)	3.25
Top Width of Ret Wall	1
Thk of Rubble backing	0.5
Thk of PCC	0.15

Quantification for Cement Masonry Retaining Wall RW2, Ht. = 5 m

S#	Description	Unit	No.	Length	Width	Height	Qty
1	***Excavation***	Cum					
	For Retaining Wall		1	130.00	3.55	1.15	530.73
							530.73
2	***PCC M-15 grade***	Cum					
	Levelling course		1	130.00	3.55	0.15	69.23
							69.23
3	***Cement masonary***	Cum					
	Retaining wall		1	130.00	2.13	5.00	1381.25
							1381.25
4	***Parapet***	Cum					
			36	2.60	0.45	0.60	25.27
							25.27
5	***Rubble backing for drainage (filter media)***	Cum					
			1	130.00	0.50	4.00	260.00
							260.00

Inputs

Total Length	50
Ht. of Wall above GL	5.5
Total Ht. (H)	6.5
Depth Below GL	1
Base Width (B)	4.23
Top Width of Ret Wall	1
Thk of Rubble backing	0.5
Thk of PCC	0.15

Quantification for Cement Masonry Retaining Wall RW2, Ht. = 6.5 m

S#	Description	Unit	No.	Length	Width	Height	Qty
1	***Excavation***	Cum					
	For Retaining Wall		1	50.00	4.53	1.15	260.19
							260.19
2	***PCC M-15 grade***	Cum					
	Levelling course		1	50.00	4.53	0.15	33.94
							33.94
3	***Cement masonary***	Cum					
	Retaining wall		1	50.00	2.61	6.50	849.06
							849.06
4	***Parapet***	Cum					
			14	2.60	0.45	0.60	9.83
							9.83
5	***Rubble backing for drainage (filter media)***	Cum					
			1	50.00	0.50	5.50	137.50
							137.50

Inputs

Total Length	0
Ht. of Wall above GL	6
Total Ht. (H)	7
Depth Below GL	1
Base Width (B)	4.55
Top Width of Ret Wall	1
Thk of Rubble backing	0.5
Thk of PCC	0.15

Quantification for Cement Masonry Retaining Wall RW2, Ht. = 7 m

S#	Description	Unit	No.	Length	Width	Height	Qty
1	***Excavation***	Cum					
	For Retaining Wall		1	0.00	4.85	1.15	0.00
							0.00
2	***PCC M-15 grade***	Cum					
	Levelling course		1	0.00	4.85	0.15	0.00
							0.00
3	***Cement masonary***	Cum					
	Retaining wall		1	0.00	2.78	7.00	0.00
							0.00
4	***Parapet***	Cum					
			0	2.60	0.45	0.60	0.00
							0.00
5	***Rubble backing for drainage (filter media)***	Cum					
			1	0.00	0.50	6.00	0.00
							0.00

Inputs

Balast Wall

Total Length	175
Total Ht. (H)	4.00
Ht. above GL	3.00
Depth Below GL	1.00
Straight Height of footing	0.60
Slant height of footing	0.30
Base Width	1.50
Bottom Width of Ret Wall	0.50
Thk of PCC	0.10
Thk of filter media	0.00

Balast Wall of 4m Ht

S No.	Item	Unit	No.	Length	Width	Height	Qty
1	***Earth Work in Excavation***	Cum					
	Retaining Wall		1	175.00	1.70	1.10	327.25
							327.25
2	***PCC M15 grade below footing***	Cum					
	Retaining Wall		1	175.00	1.70	0.10	29.75
							29.75
3	***RCC M30 grade in footing***	Cum					
	Straight portion		1	175.00	1.50	0.60	157.50
	Slant portion		1	175.00	1.00	0.30	52.50
							210.00
4	***RCC M30 grade in Wall***	Cum					
	Below GL		1	175.00	0.40	3.10	217.00
							217.00
5	***Reinforcement***	Tonnes					
	Retaining Wall		@ 60kg/cum				25.62
							25.62
6	***Filter media***	Cum					
	Retaining Wall		1	175.00	0.00	3.00	0.00
							0.00
7	***Weep holes***	Nos.					
	Retaining Wall		525				**525.00**
8	***Chute Drain***	M					
	On Slope		7	4.50			**31.50**

9	***Stone Pitching on Slope***	Cum					
	On Slope		2	168.00	3.30	0.30	**332.64**

10	***Stone Pitching on Slope***	Cum					
	On Slope		2	168.00	3.30	0.10	**110.88**

Quantification for Cement Masonry Breast Wall RW1, Ht. = 2.5m

S#	Description	Unit	No.	Length	Width	Height	Qty
1	***Excavation***	Cum					
	For Retaining Wall		1	380.00	1.05	0.35	139.65
							139.65
2	***PCC M-15 grade***	Cum					
	Levelling course		1	380.00	1.05	0.15	59.85
							59.85
3	***Cement masonary***	Cum					
	Retaining wall		1	380.00	0.80	1.80	548.57
							548.57
4	***Parapet***	Cum					
			106	2.60	0.45	0.60	74.41
							74.41
5	***Rubble backing for drainage (filter media)***	Cum					
			1	380.00	0.15	1.60	91.20
							91.20

Inputs

Total Length	380
Ht. of Wall above GL	1.60
Total Ht. (H)	1.80
Depth Below GL	0.20
Base Width (B)	1.05
Top Width of Ret Wall	0.55
Thk of Rubble backing	0.15
Thk of PCC	0.15

Quantification for Gabion type Retaining Wall RW4, Ht. = 4m							
S#	**Description**	**Unit**	**No.**	**Length**	**Width**	**Height**	**Qty**
1	***Excavation***	Cum					
	For gabion wall		1	1605.00	2.75	4.00	17655.00
							17655.00
2	***Gabion wall***	Cum					
	Boulder filling		4	1605.00	2.00	1.00	12840.00
							12840.00

Inputs

Total Length	1605
Height of panels	1.00
Width of panels	2.00
Total height of gabion wall	4.00

Quantification for Gabion type Retaining Wall RW4, Ht. = 8m							
S#	**Description**	**Unit**	**No.**	**Length**	**Width**	**Height**	**Qty**
1	***Excavation***	Cum					
	For gabion wall		1	350.00	5.00	4.00	7000.00
	For gabion wall		1	350.00	5.00	4.00	7000.00
	For Berm		1	350.00	1.00	4.00	1400.00
							15400.00
2	***Gabion wall***	Cum					
	Boulder filling		8	350.00	2.00	1.00	5600.00
							5600.00

Inputs

Total Length	350
Height of panels	1
Width of panels	2
height of gabion wall 1	4
height of gabion wall 2	4

Quantification for PCC Breast Wall, Ht. = 2.5m

S#	Description	Unit	No.	Length	Width	Height	Qty
1	***Excavation***	Cum					
	For Breast Wall		1	380.00	1.05	0.50	199.50
							199.50
2	***PCC M-15 grade***	Cum					
	Levelling course		1	380.00	0.90	0.15	51.30
							51.30
3	***Cement masonary***	Cum					
	Breast Wall		1	380.00	0.73	2.50	690.65
				Deduct qty for area of weephole =			-4.48
							686.17
4	***Rubble backing for drainage (filter media)***	Cum					
			1	380.00	0.15	2.50	142.50
							142.50

5	**Weep hole for all height retaining wall**	No	1	380.00	2.00		760.00
							760.00

Inputs

Total Length	380
Height of wall above GL	2.00
Height of wall below GL	0.50
Top width of wall	0.55
Bottom width of wall	0.90
Offset for PCC	0.00
Thickness of PCC	0.15
Filtermedia width	0.15

Muck Disposal Protection Gabion Wall Length

SASB Parking Area	40000	10	400000	
At Exit of Long Tunnel	73090	6	438540	
Scar Area	25915	6	155490	
After Ranga Morh	29805	6	178830	
			1172860	**0**

Quantification for Gabion type Retaining Wall RW4, Ht. = 8m								Inputs	
S#	Description	Unit	No.	Length	Width	Height	Qty	Total Length	0
1	***Excavation***	Cum						Height of panels	1
	For gabion wall		1	0.00	5.00	4.00	0.00	Width of panels	2
	For gabion wall		1	0.00	5.00	4.00	0.00	height of gabion wall 1	4
	For Berm		1	0.00	1.00	4.00	0.00	height of gabion wall 2	4
							0.00		
2	***Gabion wall***	Cum							
	Boulder filling		8	0.00	2.00	1.00	0.00		
							0.00		

QUANTITIES FOR CATCH DAMS AND DEFLECTING STRUCTURES

Sl No	Description of Items	Unit	No	L	B	D	Qty
1	Design, providing construction drawings, providing methodology for construction of Reinforced Earth steepened slope as per *BS 8006:2010, FHWA NHI-10-024 (2009)* , supply of minimum 50mm wide geo synthetic strap , high adherence geosynthetic strap soil reinforcement with higher friction coefficients (varying from 1.5 at top to tanΦ at 6.0 m and below) or ***equivalent*** including galvanized steel mesh facia (made from minimum 8mm diameter bars with hot-dip galvanization of 610 grams per sqm to be used), galvanized steel mechanical connectors (610 grams per sqm hot-dip galvanization), non-woven coir geotextile (if any as per approved drawings) as per the technical specification of Reinforced Earth Technology including technical assistance during installation of the Reinforced Earth Structure. This item has to be done by appointing a specialized agency meeting the eligibility criteria as mentioned in the technical specification to form Reinforced Earth steepened slope composite structure.	Per sqm of fascia	1	630		10.25	6,457.50
2	Supply and laying of PCC leveling pad of M-15 grade (200mm x 250mm) and 100mm thick , L shape , M-15 grade PCC cover on the berm or bench (wherever applicable) as per approved drawing.	Cum	2	630	0.2	0.10	25.20
3	Providing and laying of boulders in front of the Reinforced Earth facia (average thickness 400mm) as per technical specification and drawing , size of boulder > 125 mm dressed , as per guidance of site incharge.	cum	2	630	0.40	10.25	5,166.00
5	Providing and laying of needle punched or continuous filament non-woven geotextile made from polypropylene having minimum mass per unit area as 160 grams per sqmincluding manpower, tools, tackles, all complete.	sqm	1	630	2.80	10.25	18,081.00
7	Supplying and placing of perforated drainage pipes of minimum 150 mm dia meter wrapped with geotextile as horizontal internal drains as per drawings and detailed technical specification including manpower, tools, tackles, all complete.	RM	1	630			
8	Excavation of top soil upto a depth of minimum 2.5 m , as showing the drawings and cross section , including compaction of foundation soil , removal and disposal , as per the direction of engineer - in charge.	Cum	1	630	6.00	1.00	
9	Supply and laying of RCC leveling pad of M-35 grade 500mm thick cover top of avalanche dam as per approved drawing and guidance of engineer - in - charge	Cum	1	630	1.20	0.50	378.00
10	Supplying, fitting and placing HYSD bar reinforcement all complete as per drawing and Technical specifications and as directed by the Engineer-in-charge.	MT	60				22.68
11	Providing ,supplying and laying of erosion control blanket of 600 GSM , made up of coconut coir , sandwitched between polypropylene net , including U hooks , seeds , manpower , machinaries etc. as per the direction of engineer - in charge	sqm of fascia area	1	630	3.60		2,268.00
12	Supply , filling and compacting with select fill for reinforced earth slopes , inlcuding watering, ramming, consolidation and dressing complete as per requiremnt at site , the soil to be used as structural fill should be free draining granular fill, as per Morth Section 3100 guidelines or as per the direction and acceptance of Engineer - in - charge.	Cum	1	630	3.60	8.00	18,144.00

Catch Dam

Ch. From	Ch. to	Total length	Section
2400	2650	250	Section-I
2720	2950	230	
3300	3450	150	
15750	16350		Section-III
17300	17550		
		630	

Deflection Dam

Ch. From	Ch. to	Total length	Section
9800	9850		Section-III
10000	10050		
10500	10600		
11150	11250		
11500	11600		
13000	13075		
13325	13400		
14000	14075		
14275	14350		
14600	14700		
14800	14900		
15300	15750		
16900			
		0	

Blast Wall

Ch. From	Ch. to	Total length	Section
4025	4200	175	Section-I
9100	9250		Section-III
10050	10300		
12100	12300		
12525	13000		
13400	14000		
14350	14650		
14850	15300		
		175	

From	To	LHS	RHS	Length	LHS	RHS	
0	100	2.5	-8	100	rw	G	tcs-4
100	350	2.5	2.5	250	rw	tow	tcs-1
2100	2142.5	-4	-4	42.5	g	g	tcs-8
3000	3100	-4	3	100	g	rw	tcs-4
3100	3300	-4	3	200	g	rw	tcs-4
3300	3350	-4	6.5	50	g	rw	tcs-4
3350	3440	-4		90	g		tcs-5
3490	4200	-4		710	g		tcs-5
4200	4320	-4		120	g		tcs-5
4870	5000	2.5	5	130	tow	rw	tcs-1
5000	5250	-8	-4	250	g	g	tcs-8
6320	6420				g	rw	tcs-4
6420	6563				g	g	tcs-8
6996	7056				g	g	tcs-8
9146	9216				g	rw	
9706	9756				g	rw	

Item	**LHS**	**RHS**	**Total Length**
Gabion 8m ht	250	100	**350**
Gabion 4m ht	1312.5	292.5	**1605**
Breast wall 2.5m	130	250	**380**
RW 2.5m	350		**350**
RW 3m		300	**300**
RW 5m		130	**130**
RW 6.5m		50	**50**
RW 7m		0	**0**
	350	**480**	**830**