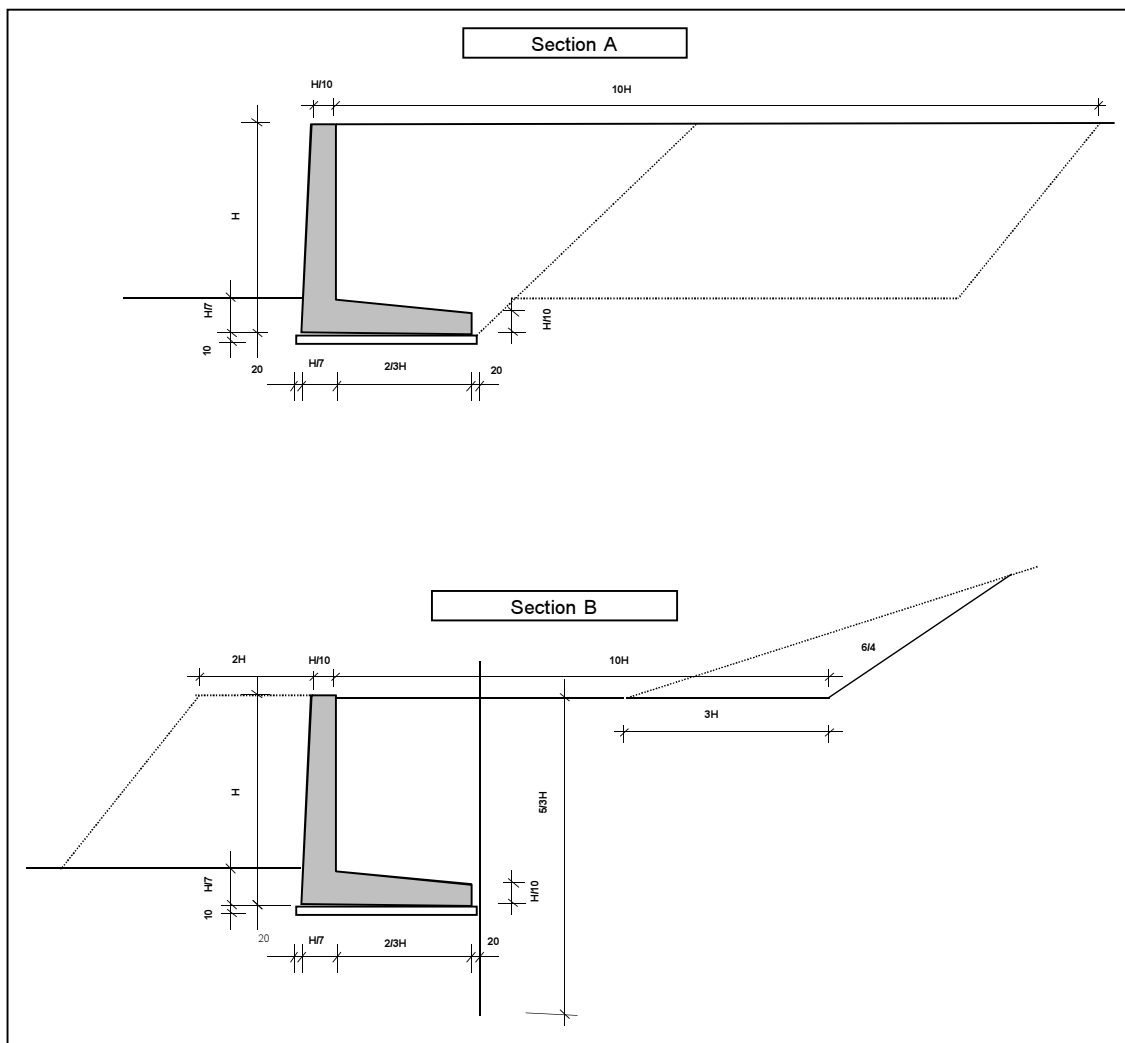


RETAINING WALL - QUANTITIES PER METER

Sect.	Task	Unit	Height of the wall (H [m])												
			1,60	1,80	2,00	2,20	2,40	2,60	2,80	3,00	3,20	3,40	3,60	3,80	4,00
A	Excavating foundation trench	m3	0,99	1,15	1,31	1,49	1,68	1,87	2,08	2,30	2,53	2,78	3,03	3,29	3,56
	Refill along the foundation slab	m3	0,32	0,36	0,40	0,44	0,48	0,52	0,56	0,60	0,64	0,68	0,72	0,76	0,80
	Embankment building	m3	18,10	22,83	28,23	34,19	40,73	47,84	55,52	63,77	72,59	81,99	91,95	102,49	113,60
	Porous backfill behind the wall	m3	4,17	5,56	7,22	9,18	11,46	14,08	17,07	20,45	24,25	28,49	33,19	38,38	44,09
B	Sheetwall piling	m2	2,67	3,00	3,33	3,67	4,00	4,33	4,67	5,00	5,33	5,67	6,00	6,33	6,67
	Pulling out sheetwall planks	m2	2,67	3,00	3,33	3,67	4,00	4,33	4,67	5,00	5,33	5,67	6,00	6,33	6,67
	Excavation at the sheetwall	m3	5,33	6,74	8,33	10,08	11,99	14,07	16,32	18,73	21,32	24,06	26,98	30,06	33,31
	Excavating foundation trench	m3	0,64	0,76	0,89	1,03	1,18	1,34	1,51	1,69	1,88	2,08	2,29	2,51	2,74
	Refill along the foundation slab	m3	0,01	0,01	0,01	0,01	0,01	0,01	0,02	0,02	0,02	0,02	0,03	0,03	0,03
	Porous backfill behind the wall	m3	2,13	2,65	3,22	3,85	4,54	5,29	6,09	6,95	7,86	8,83	9,86	10,95	12,09
	Slope (hollow) excavation	m3	3,84	4,86	6,00	7,26	8,64	10,14	11,76	13,50	15,36	17,34	19,44	21,66	24,00
	Grading	m2	1,70	1,86	2,02	2,18	2,34	2,50	2,67	2,83	2,99	3,15	3,31	3,48	3,64
A&B	Blinding	m3	0,17	0,19	0,20	0,22	0,23	0,25	0,27	0,28	0,30	0,32	0,33	0,35	0,36
	Shuttering foundation slab	m2	0,39	0,44	0,49	0,53	0,58	0,63	0,68	0,73	0,78	0,83	0,87	0,92	0,97
	Reinforcing foundation slab	to	0,02	0,03	0,03	0,04	0,05	0,05	0,06	0,07	0,08	0,09	0,10	0,11	0,13
	Concreting foundation slab	m3	0,25	0,32	0,39	0,48	0,57	0,66	0,77	0,88	1,01	1,14	1,27	1,42	1,57
	Shuttering wall, internal	m2	1,37	1,54	1,71	1,89	2,06	2,23	2,40	2,57	2,74	2,91	3,09	3,26	3,43
	Reinforcing wall + spout holes	to	0,02	0,03	0,03	0,04	0,05	0,06	0,07	0,07	0,09	0,10	0,11	0,12	0,13
	Shuttering wall, external + scaffold	m2	1,34	1,54	1,71	1,89	2,06	2,23	2,40	2,57	2,74	2,91	3,09	3,26	3,43
	Concreting wall	m3	0,27	0,34	0,42	0,50	0,60	0,70	0,82	0,94	1,07	1,20	1,35	1,50	1,67



Bill of quantities: Retaining wall "A+B"; L=340 m (110+230); H=3.6 m

Activity				Labour				Equipment*				Duration	
ID	Name	Unit	Quantity	Skill	Time Std. [hour/unit]	Work [hour]	Cap.	Type	Std.Perform. [unit/hour]	Work [hour]	Cap.	Calc. [hour]	Sched. [shift]
1	Topsoil excavation	m ³	1360,0					Dozer	60,00	22,67	1	22,67	2
								Excavator	90,00	15,11	1		
2	Sheetwall piling	m ²	1456,0	Blacksmith	-	-	2	Pile driver	5,00	291,20	1	291,20	30
				Labourer	-	-	6	Crawler crane ⁺	-	-	1		
3	Excavation at the sheetwall	m ³	6914,0					Excavator	85,00	81,34	1	81,34	8
4	Excavating foundation trench	m ³	1119,0					Excavator	35,00	31,97	1	31,97	3
5	Grading	10m ²	118,3	Labourer	3,8100	450,72	4					112,68	13
6	Blinding	m ³	119,0	Labourer	4,4300	527,17	6	Tamper	-	-	2	87,86	13
7	Reinforcing foundation slab	t	37,4	Steel fitter	14,2000	531,08	4					132,77	13
				Labourer	7,6000	284,24	2						
8	Shuttering foundation slab	m ²	312,8	Carpenter	0,3800	118,86	4					29,72	3
				Labourer	0,0900	28,15	1						
9	Concreting foundation slab	m ³	482,8	Labourer	1,2600	608,33	6	Mixer truck ⁺	5,00	-	1	101,39	13
10	Dismantle shuttering of foundation slab	m ²	312,8	Carpenter	0,1000	31,28	4					7,82	1
				Labourer	0,0200	6,26	1						
11	Refill along the foundation slab	m ³	272,0	Labourer	0,8500	231,20	4	Tamper	-	-	2	57,80	6
12	Shuttering wall, internal	m ²	1108,4	Carpenter	0,3800	421,19	4					105,30	13
				Labourer	0,0900	4910,21	1						
13	Reinforcing wall + placing spout holes	t	40,8	Steel fitter	14,2000	579,36	4					144,84	13
				Labourer	7,6000	310,08	2						
14	Shuttering wall, external + scaffold	m ²	1108,4	Carpenter	1,4300	1585,01	10					158,50	13
				Labourer	0,5900	653,96	4						
15	Concreting wall	m ³	510,0	Labourer	1,2600	642,60	6	Mixer truck ⁺	5,00	-	1	107,10	13
								Concrete pump ⁺	40,00	-	1		
16	Dismantle wall shuttering + scaffold	m ²	2216,8	Carpenter	0,5200	1152,74	10					115,27	13
				Labourer	0,2800	620,70	4						
17	Cascading old embankment	m ³	187,0	Labourer	1,7100	319,77	10	Excavator	35,00	5,34	1	31,98	3
18	Embankment building	m ³	11274,0					Dozer	110,00	102,49	1	102,49	10
								Vibro roller ⁺	120,00	-	1		
19	Porous backfill behind the wall	m ³	6734,0	Labourer	0,1000	0,00	4	Excavator	55,00	122,44	1	122,44	13
								Tamper	-	-	2		
20	Pulling out sheetwall planks	m ²	1456,0	Blacksmith	-	-	2	Pile driver	10,00	145,60	1	145,60	15
				Labourer	-	-	6	Crawler crane ⁺	-	-	1		
21	Gutter (drain) construction	m	340,0	Labourer	1,4100	479,40	4					119,85	13
22	Slope (hollow) excavation	m ³	4981,8					Excavator	85,00	58,61	1	58,61	6
23	Rendering the slope	10m ²	612,0	Labourer	1,0200	624,24	10					62,42	6
24	Levelling the ground	10m ²	2304,0	Labourer	-	-	2	Grader	300,00	7,68	1	7,68	1
25	Grassing	10m ²	2141,0	Labourer	0,4000	856,40	8					107,05	10

* Trucks/Lorries and/or power tools (e.g. poker vibrator, saw, bender, etc.) not indicated

⁺ For further technical parameters and/or estimates see Technical Report

Remarks:

Earth/gravel pit is on 7 km distance
 Excavated topsoil should be loaded on trucks and sold
 Excavated earth can be used for embankment building
 For porous backfill, gravel should be added in proportion 1:3
 Any earth fill should be compacted 3 times in not more than 25 cm thick layers
 Poor viscosity concrete for blinding transported by dumper-truck
 Reinforcement bars cut and bended at manufacturing steel-yard 11 km away
 Concrete mixed at a central batching plant some 4 km away

Earth balance calculations: Retaining wall "A+B"; L=340 m (110+230); H=3.6 m

Section "A"; L=110; H=3.6 m			
ID	Name	Unit	Quantity
1	Topsoil excavation	m ³	440,0
3	Excavation at the sheetwall	m ³	0,0
4	Excavating foundation trench	m ³	362,0
11	Refill along the foundation slab	m ³	-88,0
17	Cascading old embankment	m ³	187,0
18	Embankment building	m ³	-11274,0
19	Porous backfill behind the wall	m ³	-4221,0
22	Slope (hollow) excavation	m ³	0,0

Σ -10813,0

Section "B"; L=230; H=3.6 m			
ID	Name	Unit	Quantity
1	Topsoil excavation	m ³	920,0
3	Excavation at the sheetwall	m ³	6914,0
4	Excavating foundation trench	m ³	757,0
11	Refill along the foundation slab	m ³	-184,0
17	Cascading old embankment	m ³	0,0
18	Embankment building	m ³	0,0
19	Porous backfill behind the wall	m ³	-2513,0
22	Slope (hollow) excavation	m ³	4981,8

Σ 12468,8

Remarks:

Excavated topsoil (of 440+920=1360 m³) should be loaded on trucks and sold

Assuming density (compaction) of earth fills should equal to that of original (excavated/natural) earth on site:

- Gravel (of 2247 m³) as 1/3 part of porous backfill (of 4221+2513=6734 m³) is to be brought from the pit 7 km away
- For completing porous backfill (6734-2247)-(12468.8-10813)=2833.8 m³ is to be brought from the pit 7 km away

For transportation estimated bulking coefficient of earth/gravel is 1.28