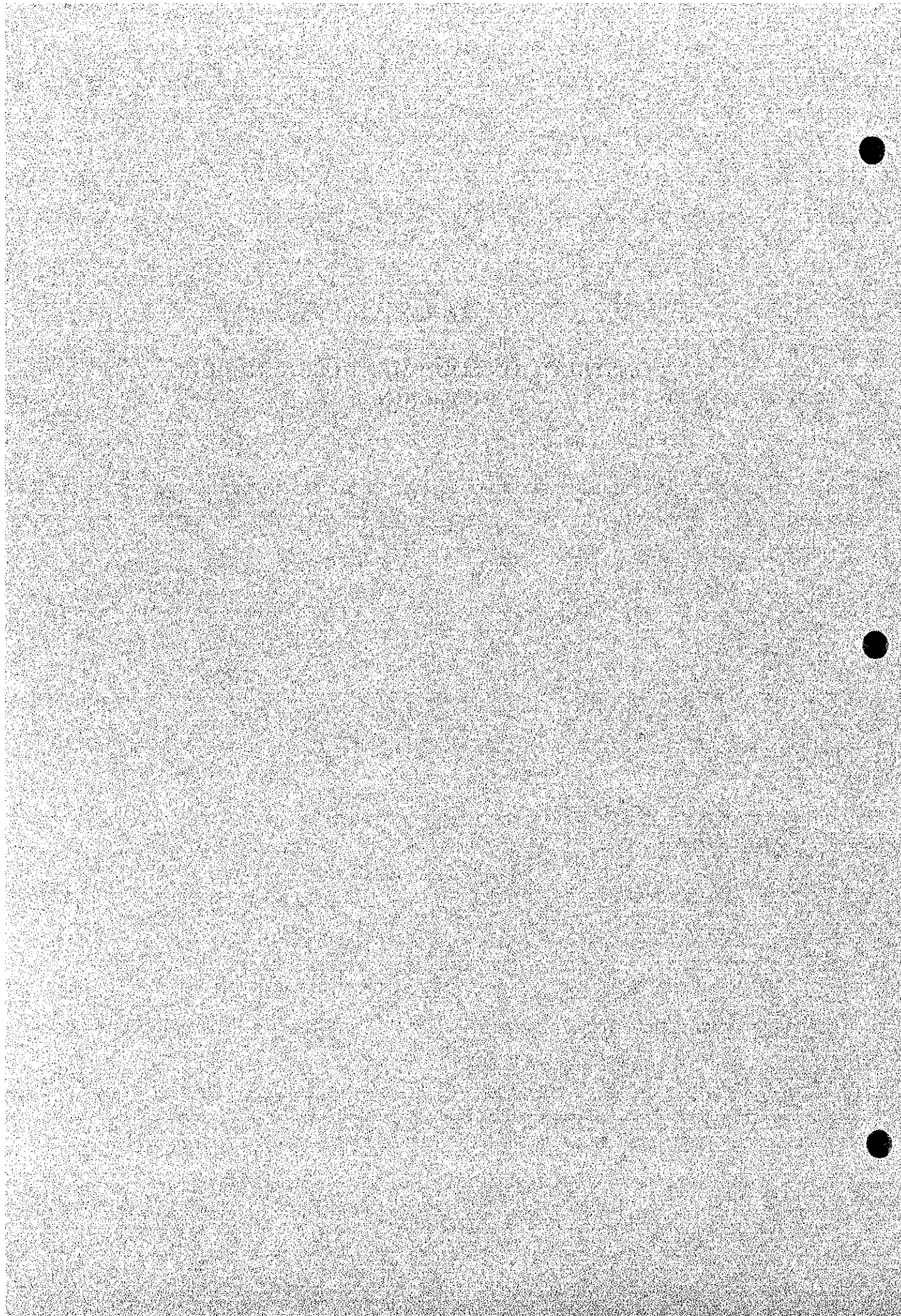


**ANNEX VI**

**CONSTRUCTION EQUIPMENT USE SCHEDULE,  
PACKAGE 1**







Construction Equipment Schedule, Package 1

Equipment Description	1997												1998												1999												2000												2001															
	J	J	A	S	O	N	D	J	F	M	A	M	J	J	J	A	S	O	N	D	J	F	M	A	M	J	J	J	A	S	O	N	D	J	F	M	A	M	J	J	J	A	S	O	N	D	J	F	M	A	M	J	J	J	A	S	O	N	D	J	F	M	A	M
16 Vibrating roller, 4t (1)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					
17 Vibrating roller, 1t (2)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
18 Concrete plant, 1.0m <sup>3</sup> (2)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					
19 Agitator truck, 3m <sup>3</sup>																																																																
Inlet																																																																
Tunnel																																																																
Access road																																																																
Subtotal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
20 Concrete pump car, 45m <sup>3</sup> /hr (1)																																																																
21 Truck crane, 30t (1)																																																																
22 Truck crane, 20t (1)																																																																
23 Trailer, 20t (1)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
24 Area tunnel machine, 110kW (3)																																																																
25 Muck loader, 0.4m <sup>3</sup> (2)																																																																
26 Muck car, 4.5m <sup>3</sup> (30)																																																																
27 Battery locomotive, 8t (6)																																																																
28 Air compressor, 16m <sup>3</sup> /min (3)																																																																
29 Vent fan, 300m <sup>3</sup> /min (19)																																																																
30 Vent fan, 100m <sup>3</sup> /min (3)																																																																
31 Winch, 150kW (3)																																																																
32 Winch, 100kW (3)																																																																
33 Shotcrete gun, 10m <sup>3</sup> /hr (3)																																																																
34 Concrete placer, 6m <sup>3</sup> (6)																																																																
35 Battery locomotive, 6t (6)																																																																
36 Agitator car, 4.5m <sup>3</sup> (6)																																																																

Construction Equipment Schedule, Package I

	1997	1998	1999	2000	2001
	J J A S O M O J F H A N J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O	J J A S O M O J F H A N J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O	J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O	J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O	J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O J J A S O M O
37 Sliding form, 3.7m dia, 12m (3)			3	3	3
38 Boring machine, 5.5kW (6)					6
39 Grout pump, 11kW (4)					4
40 Grout mixer, 200 x 2 (4)					4
41 Diesel generator, 300kVA (6)			6	6	6
42 Diesel generator, 150kVA (1)	1	1	1	1	1
43 Diesel generator, 100kVA (1)	1	1	1	1	1
44 Motor grader, 3.7m (2)	2	2	2	2	2
45 Macadam roller, 10t (1)	1	1	1	1	1
46 Tire roller, 20t (2)	2	2	2	2	2
47 Water sprinkler, 5.5kl (3)	3	3	3	3	3
48 Dredger, 200 HP (1)					1

**ANNEX VII**

**CONSTRUCTION EQUIPMENT USE SCHEDULE,  
PACKAGE 2**











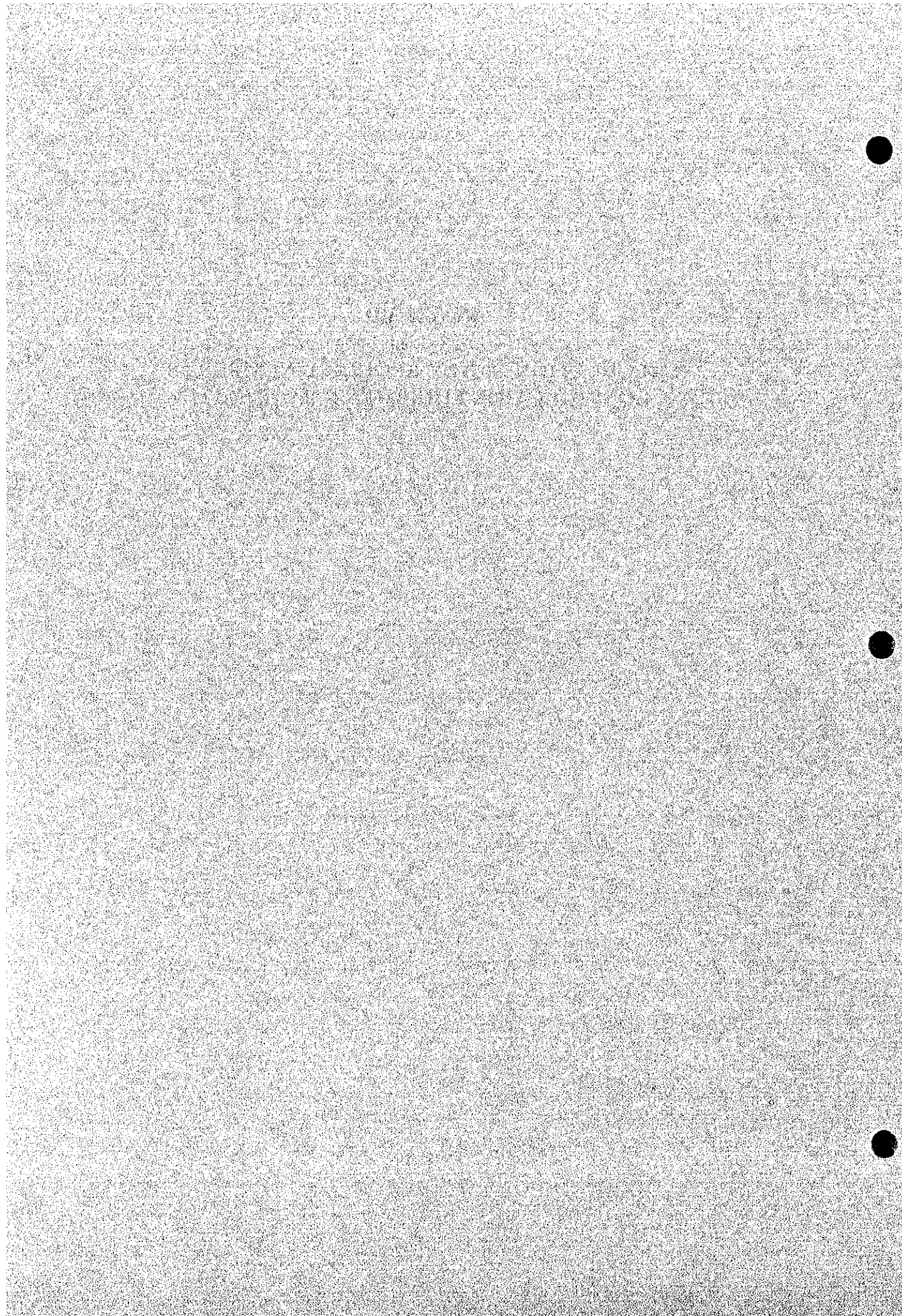






**ANNEX VIII**

**CALCULATION OF THE REQUIRED NUMBER OF  
CONSTRUCTION EQUIPMENT, PACKAGE 1**





Construction Equipment for Earthwork, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Construction		Scheduled Hours	Nos. of Equip.
							Hours	Period		
1 Diversion Tunnel										
Conguillo Inlet	Excavation, common	m3	6,020	Bulldozer	21 t	127.0	47	2 month	260	0.19
	Dozing	m3	6,020	Tractor shovel	2.2 m3	71.0	85	(40*6.5)	260	0.33
	Hauling, 2km	m3	6,020	Dump truck	11 t	18.2	331		260	1.27
	Spoil bank	m3	6,020	Bulldozer	11 t	175.0	34		260	0.13
Excavation, weathered rock	Ripping	m3	18,870	Bulldozer	32 t	114.0	166	2 month	260	0.64
	Loading	m3	18,870	Tractor shovel	2.2 m3	51.0	370	(40*6.5)	260	1.42
	Hauling, 2km	m3	18,870	Dump truck	11 t	16.6	1,137		260	4.37
	Spoil bank	m3	18,870	Bulldozer	11 t	323.0	58		260	0.22
Membrillo Outlet	Excavation, common	m3	4,690	Bulldozer	21 t	127.0	37	1 month	130	0.28
	Dozing	m3	4,690	Tractor shovel	2.2 m3	71.0	66	(20*6.5)	130	0.51
	Hauling, 2km	m3	4,690	Dump truck	11 t	18.2	258		130	1.98
	Spoil bank	m3	4,690	Bulldozer	11 t	175.0	27		130	0.21
Excavation, weathered rock	Ripping	m3	2,580	Bulldozer	32 t	114.0	23	1 month	130	0.17
	Loading	m3	2,580	Tractor shovel	2.2 m3	51.0	51	(20*6.5)	130	0.39
	Hauling, 2km	m3	2,580	Dump truck	11 t	16.6	155		130	1.20
	Spoil bank	m3	2,580	Bulldozer	11 t	323.0	8		130	0.06
Excavation, rock	Drilling	m3	400	Crawler drill	10 m3/min	23.0	17	1 month	130	0.13
	Gathering	m3	400	Air compressor	13.5 m3/min	23.0	17	(20*6.5)	130	0.13
	Loading	m3	400	Bulldozer	32 t	167.0	2		130	0.02
	Hauling, 2km	m3	400	Tractor shovel	2.2 m3	47.0	9		130	0.07
Conguillo Inlet, shaft	Spoil bank	m3	400	Dump truck	11 t	14.3	28		130	0.22
	Excavation, common	m3	400	Bulldozer	11 t	375.0	1		130	0.01
	Hauling to spoil(2nd)	m3	8,570	Tractor shovel	2.2 m3	47.0	182	4 month	520	0.35
	Spoil bank	m3	8,570	Dump truck	11 t	14.3	599	(80*6.5)	520	1.15
		m3	8,570	Bulldozer	11 t	375.0	23		520	0.04

Construction Equipment for Earthwork, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Hours	Construction Period	Scheduled Hours	Nos. of Equip.
Conguillo Inlet, tunnel	Hauling to spoil(2nd)	m3	440	Tractor shovel	2.2 m3	47.0	9	1 month	130	0.07
		m3	440	Dump truck	11 t	14.3	31	(20*6.5)	130	0.24
		m3	440	Bulldozer	11 t	375.0	1		130	0.61
Conguillo Inlet, dredge	Hauling to spoil(2nd)	m3	3,000	Tractor shovel	2.2 m3	71.0	42	7 month	910	0.05
		m3	3,000	Dump truck	11 t	18.2	165	(140*6.5)	910	0.18
		m3	3,000	Bulldozer	11 t	175.0	17		910	0.02
Tunnel Excav. Second haul, tunnel rock	Sta.0-166	m3	3,100	Tractor shovel	1.2 m3	25.0	124	1.5 month	621	0.20
		m3	3,100	Dump truck	8 t	9.7	320	(34.5*18)	621	0.51
		m3	3,100	Bulldozer	11 t	375.0	8		621	0.01
Second haul, tunnel rock	Sta.166-3000	m3	52,730	Tractor shovel	1.2 m3	25.0	2,109	25.5 month	10,566	0.20
		m3	52,730	Dump truck	8 t	9.7	5,436	(587*18)	10,566	0.51
		m3	52,730	Bulldozer	11 t	375.0	141		10,566	0.01
Second haul, tunnel rock	Sta.3000-5500	m3	46,700	Tractor shovel	1.2 m3	25.0	1,868	26 month	10,764	0.17
		m3	46,700	Dump truck	8 t	12.5	3,736	(498*18)	10,764	0.35
		m3	46,700	Bulldozer	11 t	375.0	125		10,764	0.01
Second haul, tunnel rock	Sta.5500-8170	m3	49,640	Tractor shovel	1.2 m3	25.0	1,986	26 month	10,764	0.18
		m3	49,640	Dump truck	8 t	9.7	5,118	(598*18)	10,764	0.48
		m3	49,640	Bulldozer	11 t	375.0	132		10,764	0.01
Second haul, tunnel rock	Sta.8170-8305	m3	2,470	Tractor shovel	1.2 m3	25.0	99	1 month	414	0.24
		m3	2,470	Dump truck	11 t	9.7	255	(23*18)	414	0.62
		m3	2,470	Bulldozer	11 t	375.0	7		414	0.02
2 Conguillo Work Adit	Excavation, common	m3	3,070	Bulldozer	21 t	127.0	24	1 month	130	0.19
		m3	3,070	Tractor shovel	2.2 m3	71.0	43	(20*6.5)	130	0.33
		m3	3,070	Dump truck	11 t	18.2	169		130	1.30
		m3	3,070	Bulldozer	11 t	175.0	18		130	0.13

Construction Equipment for Earthwork, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Hours	Construction Period	Scheduled Hours	Nos. of Equip.	
										Hours	Equip.
Excavation, weathered rock	Ripping	m <sup>3</sup>	10,800	Bulldozer	21 t	114.0	95	1 month	130	0.73	
	Loading	m <sup>3</sup>	10,800	Tractor shovel	2.2 m <sup>3</sup>	51.0	212	(20*6.5)	130	1.63	
	Hauling, 2km	m <sup>3</sup>	10,800	Dump truck	11 t	16.6	651		130	5.00	
	Spoil bank	m <sup>3</sup>	10,800	Bulldozer	11 t	323.0	33		130	0.26	
Excavation, rock	Drilling	m <sup>3</sup>	570	Crawler drill	10 m <sup>3</sup> /min	23.0	25	1 month	130	0.19	
	Gathering	m <sup>3</sup>	570	Air compressor	13.5 m <sup>3</sup> /min	23.0	25	(20*6.5)	130	0.19	
	Loading	m <sup>3</sup>	570	Bulldozer	32 t	167.0	3		130	0.03	
	Hauling, 2km	m <sup>3</sup>	570	Tractor shovel	2.2 m <sup>3</sup>	47.0	12		130	0.09	
Second haul, inclined tunnel	Spoil bank	m <sup>3</sup>	570	Dump truck	11 t	14.3	40		130	0.31	
	Loading	m <sup>3</sup>	570	Bulldozer	11 t	375.0	2		130	0.01	
	Hauling, 2km	m <sup>3</sup>	3,560	Tractor shovel	1.2 m <sup>3</sup>	25.0	142	2 month	828	0.17	
	Stockpile	m <sup>3</sup>	3,560	Dump truck	8 t	9.7	367	(46*18)	828	0.44	
Excavation, common	Dozing	m <sup>3</sup>	3,730	Bulldozer	21 t	127.0	29	1 month	130	0.23	
	Loading	m <sup>3</sup>	3,730	Tractor shovel	2.2 m <sup>3</sup>	71.0	53	(20*6.5)	130	0.40	
	Hauling, 1km	m <sup>3</sup>	3,730	Dump truck	11 t	24.8	150		130	1.16	
	Spoil bank	m <sup>3</sup>	3,730	Bulldozer	11 t	175.0	21		130	0.16	
Excavation, weathered rock	Ripping	m <sup>3</sup>	7,300	Bulldozer	21 t	114.0	64	1 month	130	0.49	
	Loading	m <sup>3</sup>	7,300	Tractor shovel	2.2 m <sup>3</sup>	51.0	143	(20*6.5)	130	1.10	
	Hauling, 1km	m <sup>3</sup>	7,300	Dump truck	11 t	22.0	332		130	2.55	
	Spoil bank	m <sup>3</sup>	7,300	Bulldozer	11 t	323.0	23		130	0.17	
Excavation, rock	Drilling	m <sup>3</sup>	390	Crawler drill	10 m <sup>3</sup> /min	23.0	17	1 month	130	0.13	
	Gathering	m <sup>3</sup>	390	Air compressor	13.5 m <sup>3</sup> /min	23.0	17	(20*6.5)	130	0.13	
	Loading	m <sup>3</sup>	390	Bulldozer	32 t	167.0	2		130	0.02	
	Hauling, 1km	m <sup>3</sup>	390	Tractor shovel	2.2 m <sup>3</sup>	47.0	8		130	0.06	
3 El Guasmo Work Adit	Spoil bank	m <sup>3</sup>	390	Dump truck	11 t	18.9	21		130	0.16	
	Spoil bank	m <sup>3</sup>	390	Bulldozer	11 t	375.0	1		130	0.01	

Construction Equipment for Earthwork, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per hour	Operating Hours	Construction Period	Scheduled Hours	Nos. of Equip.
Second haul, inclined tunnel	Loading	m <sup>3</sup>	6,560	Tractor shovel	1.2 m <sup>3</sup>	25.0	262	5 month	2,070	0.13
	Hauling, 1km	m <sup>3</sup>	6,560	Dump truck	8	12.5	347	(115*18)	2,070	0.17
	Stockpile	m <sup>3</sup>	6,560	Bulldozer	11 t	375.0	17		2,070	0.01
4 Hambrillo Work Adit	Dozing	m <sup>3</sup>	2,560	Bulldozer	21 t	127.0	20	1 month	130	0.16
	Loading	m <sup>3</sup>	2,560	Tractor shovel	2.2 m <sup>3</sup>	71.0	36	(20*6.5)	130	0.28
	Hauling, 2km	m <sup>3</sup>	2,560	Dump truck	11 t	18.2	141		130	1.08
	Spoil bank	m <sup>3</sup>	2,560	Bulldozer	11 t	175.0	15		130	0.11
Excavation, weathered rock	Ripping	m <sup>3</sup>	4,040	Bulldozer	21 t	114.0	35	1 month	130	0.27
	Loading	m <sup>3</sup>	4,040	Tractor shovel	2.2 m <sup>3</sup>	51.0	79	(20*6.5)	130	0.61
	Hauling, 2km	m <sup>3</sup>	4,040	Dump truck	11 t	16.6	243		130	1.87
	Spoil bank	m <sup>3</sup>	4,040	Bulldozer	11 t	323.0	13		130	0.10
Excavation, rock	Drilling	m <sup>3</sup>	210	Crawler drill	10 m <sup>3</sup> /min	23.0	9	1 month	130	0.07
	Gathering	m <sup>3</sup>	210	Air compressor	13.5 m <sup>3</sup> /min	23.0	9	(20*6.5)	130	0.07
	Loading	m <sup>3</sup>	210	Bulldozer	32 t	167.0	1		130	0.01
	Hauling, 2km	m <sup>3</sup>	210	Tractor shovel	2.2 m <sup>3</sup>	47.0	4		130	0.03
	Spoil bank	m <sup>3</sup>	210	Dump truck	11 t	14.3	15		130	0.11
Second haul, inclined tunnel	Loading	m <sup>3</sup>	2,550	Tractor shovel	1.2 m <sup>3</sup>	25.0	102	2 month	828	0.12
	Hauling, 2km	m <sup>3</sup>	2,550	Dump truck	8 t	9.7	263	(46*18)	828	0.32
	Stockpile	m <sup>3</sup>	2,550	Bulldozer	11 t	375.0	7		828	0.01
5 Congillo Access Road	Dozing	m <sup>3</sup>	246,100	Bulldozer	32 t	188.0	1,309	13 month	1,690	0.77
	Loading	m <sup>3</sup>	246,100	Tractor shovel	2.2 m <sup>3</sup>	64.0	3,845	(260*6.5)	1,690	2.28
	Haul, 0.5km	m <sup>3</sup>	246,100	Dump truck	11 t	27.3	9,015		1,690	5.33
	Spreading	m <sup>3</sup>	246,100	Bulldozer	21 t	231.0	1,055		1,690	0.63
	Compacting	m <sup>3</sup>	246,100	Tamp roller	20 t	373.0	660		1,690	0.39
Filling, weathered rock	Ripping	m <sup>3</sup>	246,100	Bulldozer	32 t	125.0	1,909	13 month	1,690	1.16
	Loading	m <sup>3</sup>	246,100	Tractor shovel	2.2 m <sup>3</sup>	59.0	4,171	(260*6.5)	1,690	2.47
	Haul, 0.5km	m <sup>3</sup>	246,100	Dump truck	11 t	33.4	7,368		1,690	4.36

Construction Equipment for Earthwork, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per hour	Operating Hours	Construction Period	Scheduled Hours	Nos. of Equip.
	Spreading	m3	246,100	Bulldozer	21 t	231.0	1,065		1,690	0.63
	Compacting	m3	246,100	Tamp roller	20 t	373.0	660		1,690	0.39
Filling, common	Dozing	m3	116,550	Bulldozer	32 t	188.0	620	13 month	1,690	0.37
	Loading	m3	116,550	Tractor shovel	2.2 m3	64.0	1,821	(260*6.5)	1,690	1.08
	Hauling, 1km	m3	116,550	Dump truck	11 t	27.3	4,269		1,690	2.53
	Spreading	m3	116,550	Bulldozer	21 t	231.0	505		1,690	0.30
	Compacting	m3	116,550	Tamp roller	20 t	373.0	312		1,690	0.18
Filling, weathered rock	Ripping	m3	116,550	Bulldozer	32 t	125.0	932	13 month	1,690	0.55
	Loading	m3	116,550	Tractor shovel	2.2 m3	59.0	1,975	(260*6.5)	1,690	1.17
	Hauling, 1km	m3	116,550	Dump truck	11 t	33.4	3,490		1,690	2.06
	Spreading	m3	116,550	Bulldozer	21 t	231.0	505		1,690	0.30
	Compacting	m3	116,550	Tamp roller	20 t	373.0	312		1,690	0.18
Spoil, common	Dozing	m3	398,600	Bulldozer	21 t	127.0	3,139	13 month	1,690	1.86
	Loading	m3	398,600	Tractor shovel	2.2 m3	71.0	5,614	(260*6.5)	1,690	3.32
	Hauling, 5km	m3	398,600	Dump truck	11 t	10.1	39,465		1,690	23.35
	Spoil bank	m3	398,600	Bulldozer	11 t	175.0	2,278		1,690	1.35
Spoil, weathered rock	Ripping	m3	398,600	Bulldozer	32 t	114.0	3,496	13 month	1,690	2.07
	Loading	m3	398,600	Tractor shovel	2.2 m3	51.0	7,816	(260*6.5)	1,690	4.62
	Hauling, 5km	m3	398,600	Dump truck	11 t	9.6	41,521		1,690	24.57
	Spoil bank	m3	398,600	Bulldozer	11 t	323.0	1,234		1,690	0.73
Spoil, rock	Drilling	m3	8,000	Crawler drill	10 m3/min	23.0	348	13 month	1,690	0.21
	Gathering	m3	8,000	Air compressor	13.5 m3/min	23.0	348	(260*6.5)	1,690	0.21
	Loading	m3	8,000	Bulldozer	32 t	167.0	48		1,690	0.03
	Hauling, 5km	m3	8,000	Tractor shovel	2.2 m3	47.0	170		1,690	0.10
	Spoil bank	m3	8,000	Dump truck	11 t	8.2	976		1,690	0.58
Excavation, for structure	Dozing	m3	16,293	Bulldozer	21 t	127.0	128	2 month	260	0.49
	Loading	m3	16,293	Backhoe	0.6 m3	35.0	466	(40*6.5)	260	1.79

Construction Equipment for Earthwork, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Hours	Construction Period	Scheduled Hours	Nos. of Equip.
	Hauling, 1 km	m3	16,293	Dump truck	11 t	18.2	895		260	3.44
	Spoil bank	m3	16,293	Bulldozer	11 t	175.0	93		260	0.36
Backfill from stockpile	Loading	m3	9,581	Tractor shovel	2.2 m3	59.0	162	2 month (40*6.5)	260	0.62
	Hauling, 1 km	m3	9,581	Dump truck	11 t	27.3	351		260	1.35
	Spreading	m3	9,581	Bulldozer	11 t	280.0	34		260	0.13
	Compacting	m3	9,581	Vibrating roller	4 t	36.0	266		260	1.02
Subbase, hauling from quarry	** Purchased mat'l									
Subbase	Spreading	m3	20,470	Bulldozer	11 t	140.0	146	6 month (120*6.5)	780	0.19
	Compacting	m3	20,470	Vibrating roller	10 t	98.0	209		780	0.27
6 El Guaso Access Road	Dozing	m3	10,900	Bulldozer	32 t	188.0	58	4 month (80*6.5)	520	0.11
	Loading	m3	10,900	Tractor shovel	2.2 m3	64.0	170		520	0.33
	Haul, 0.5 km	m3	10,900	Dump truck	11 t	27.3	399		520	0.77
	Spreading	m3	10,900	Bulldozer	21 t	231.0	47		520	0.09
	Compacting	m3	10,900	Tamp roller	20 t	373.0	29		520	0.06
Filling, weathered rock	Ripping	m3	10,900	Bulldozer	32 t	125.0	87	4 month (80*6.5)	520	0.17
	Loading	m3	10,900	Tractor shovel	2.2 m3	59.0	185		520	0.36
	Haul, 0.5 km	m3	10,900	Dump truck	11 t	33.4	326		520	0.63
	Spreading	m3	10,900	Bulldozer	21 t	231.0	47		520	0.09
	Compacting	m3	10,900	Tamp roller	20 t	373.0	29		520	0.06
Filling, common	Dozing	m3	10,350	Bulldozer	32 t	188.0	55	4 month (80*6.5)	520	0.11
	Loading	m3	10,350	Tractor shovel	2.2 m3	64.0	162		520	0.31
	Haul, 3 km	m3	10,350	Dump truck	11 t	12.9	802		520	1.54
	Spreading	m3	10,350	Bulldozer	21 t	231.0	45		520	0.09
	Compacting	m3	10,350	Tamp roller	20 t	373.0	28		520	0.05
Filling, weathered rock	Ripping	m3	10,350	Bulldozer	32 t	125.0	83	4 month (80*6.5)	520	0.16
	Loading	m3	10,350	Tractor shovel	2.2 m3	59.0	175		520	0.34

Construction Equipment for Earthwork, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Hours	Construction Period	Scheduled Hours	Nos. of Equip.
	Haul, 3km	m3	10,350	Dump truck	11 t	15.8	655		520	1.26
	Spreading	m3	10,350	Bulldozer	21 t	231.0	45		520	0.09
	Compacting	m3	10,350	Tamp roller	20 t	373.0	28		520	0.05
Spoil, common	Dozing	m3	200	Bulldozer	21 t	127.0	2	4 month	520	0.00
	Loading	m3	200	Tractor shovel	2.2 m3	71.0	3	(80%6.5)	520	0.01
	Hauling, 1km	m3	200	Dump truck	11 t	24.8	8		520	0.02
	Spoil bank	m3	200	Bulldozer	11 t	175.0	1		520	0.00
Spoil, weathered rock	Ripping	m3	200	Bulldozer	32 t	114.0	2	4 month	520	0.00
	Loading	m3	200	Tractor shovel	2.2 m3	51.0	4	(80%6.5)	520	0.01
	Hauling, 1km	m3	200	Dump truck	11 t	22.0	9		520	0.02
	Spoil bank	m3	200	Bulldozer	11 t	323.0	1		520	0.00
Spoil, rock	Drilling	m3	100	Crawler drill	10 m3/min	23.0	4	4 month	520	0.01
	Gathering	m3	100	Air compressor	13.5 m3/min	23.0	4	(80%6.5)	520	0.01
	Loading	m3	100	Bulldozer	32 t	167.0	1		520	0.00
	Hauling, 1km	m3	100	Tractor shovel	2.2 m3	47.0	2		520	0.00
	Spoil bank	m3	100	Dump truck	11 t	18.9	5		520	0.01
Excavation, for structure	Dozing	m3	905	Bulldozer	21 t	127.0	7	1 month	130	0.05
	Loading	m3	905	Backhoe	0.6 m3	35.0	26	(20%6.5)	130	0.20
	Hauling, 1km	m3	905	Dump truck	11 t	18.2	50		130	0.38
	Spoil bank	m3	905	Bulldozer	11 t	175.0	5		130	0.04
Backfill from stockpile	Loading	m3	341	Tractor shovel	2.2 m3	59.0	6	1 month	130	0.04
	Hauling, 1km	m3	341	Dump truck	11 t	27.3	12	(20%6.5)	130	0.10
	Spreading	m3	341	Bulldozer	11 t	280.0	1		130	0.01
	Compacting	m3	341	Vibrating roller	4 t	36.0	9		130	0.07

Subbase, hauling from quarry \*\*  
Purchased mat'l

Construction Equipment for Earthwork, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Hours	Construction Period	Scheduled Hours	Nos. of Equip.	
											Hours
Subbase	Spreading	m3	943	Bulldozer	11 t	140.0	7	6 month	780	0.01	
	Compacting	m3	943	Vibrating roller	10 t	98.0	10	(120*6.5)	780	0.01	
7 Membrillo Access Road	Dozing	m3	3,600	Bulldozer	32 t	188.0	19	4 month	520	0.04	
	Loading	m3	3,600	Tractor shovel	2.2 m3	64.0	56	(80*6.5)	520	0.11	
	Haul, 0.5km	m3	3,600	Dump truck	11 t	27.3	132		520	0.25	
	Spreading	m3	3,600	Bulldozer	21 t	231.0	16		520	0.03	
	Compacting	m3	3,600	Tamp roller	20 t	373.0	10		520	0.02	
			m3	3,600	Bulldozer	32 t	125.0	29	4 month	520	0.06
Filling, weathered rock	Loading	m3	3,600	Tractor shovel	2.2 m3	59.0	61	(80*6.5)	520	0.12	
	Haul, 0.5km	m3	3,600	Dump truck	11 t	33.4	108		520	0.21	
	Spreading	m3	3,600	Bulldozer	21 t	231.0	16		520	0.03	
	Compacting	m3	3,600	Tamp roller	20 t	373.0	10		520	0.02	
			m3	1,120	Bulldozer	21 t	127.0	9	4 month	520	0.02
			m3	1,120	Tractor shovel	2.2 m3	71.0	16	(80*6.5)	520	0.03
Spoil, common	Hauling, 1km	m3	1,120	Dump truck	11 t	24.8	45		520	0.09	
	Spoil bank	m3	1,120	Bulldozer	11 t	175.0	6		520	0.01	
			m3	1,120	Bulldozer	32 t	114.0	10	4 month	520	0.02
			m3	1,120	Tractor shovel	2.2 m3	51.0	22	(80*6.5)	520	0.04
Spoil, weathered rock	Hauling, 1km	m3	1,120	Dump truck	11 t	22.0	51		520	0.10	
	Spoil bank	m3	1,120	Bulldozer	11 t	323.0	3		520	0.01	
			m3	100	Crawler drill	10 m3/min	23.0	4	4 month	520	0.01
			m3	100	Air compressor	13.5 m3/min	23.0	4	(80*6.5)	520	0.01
Spoil, rock	Gathering	m3	100	Bulldozer	32 t	167.0	1		520	0.00	
	Loading	m3	100	Tractor shovel	2.2 m3	47.0	2		520	0.00	
	Hauling, 1km	m3	100	Dump truck	11 t	18.9	5		520	0.01	
	Spoil bank	m3	100	Bulldozer	11 t	375.0	0		520	0.00	
			m3	100	Bulldozer	11 t	375.0	0		520	0.00



Construction Equipment for Earthwork, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Hours	Construction Period	Scheduled Hours	Mos. of Equip.
Excavation, for structure	Dozing	m3	3,295	Bulldozer	21 t	127.0	26	1 month	130	0.20
	Loading	m3	3,295	Backhoe	0.6 m3	35.0	94	(20*6.5)	130	0.72
	Hauling, 1km	m3	3,295	Dump truck	11 t	18.2	181		130	1.39
	Spoil bank	m3	3,295	Bulldozer	11 t	175.0	19		130	0.14
Backfill from stockpile	Loading	m3	2,767	Tractor shovel	2.2 m3	59.0	47	1 month	130	0.36
	Hauling, 1km	m3	2,767	Dump truck	11 t	27.3	101	(20*6.5)	130	0.78
	Spreading	m3	2,767	Bulldozer	11 t	280.0	10		130	0.08
	Compacting	m3	2,767	Vibrating roller	4 t	36.0	77		130	0.59
Subbase, hauling from quarry	** Purchased mat'l									
Subbase	Spreading	m3	212	Bulldozer	11 t	140.0	2	6 month	780	0.00
	Compacting	m3	212	Vibrating roller	10 t	98.0	2	(120*6.5)	780	0.00

Construction Equipment for Drain Hole, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Hours	Construction Period	Scheduled Hours	Nos. of Equip.
1 Drain hole	Diversion tunnel Drilling		6,310	Boring machine	5.5 kW	0.65	9,708	5.5 month (126*18)	2,268	4.28

Construction Equipment for Concrete Work, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Hours	Construction Period	Scheduled Hours	Mos. of Equip.
1 Diversion Tunnel	Inlet structure	Transporting m3	50	Agitator truck	3 m3	12.0	4	1day(6.5hr)	6.5	0.64
		Placing m3	50	Bucket/crane	1 m3	14.0	4		6.5	0.55
	Tunnel lining Sta.0-166	Transporting m3	72	Agitator truck	3 m3	12.0	6	1day(4hr)	4.0	1.50
	Tunnel lining Sta.166-3000	Transporting m3	72	Agitator truck	3 m3	12.0	6	1day(4hr)	4.0	1.50
2 Conguillo Work Adit	Tunnel lining Sta.3000-8170	Transporting m3	72	Agitator truck	3 m3	3.1	23	1day(4hr)	4.0	5.81
	Tunnel lining Sta.8170-8305	Transporting m3	72	Agitator truck	3 m3	12.0	6	1day(4hr)	4.0	1.50
	Tunnel lining	Transporting m3	20	Agitator truck	3 m3	12.0	2	1day(4hr)	4.0	0.42
3 El Guasmo Work Adit	Portal concrete	Transporting m3	20	Agitator truck	3 m3	12.0	2	1day(6.5hr)	6.5	0.26
		Placing m3	20	Bucket/crane	1 m3	14.0	1		6.5	0.22
4 Membrillo Work Adit	Tunnel lining	Transporting m3	20	Agitator truck	3 m3	3.1	6	1day(4hr)	4.0	1.61
	Portal concrete	Transporting m3	20	Agitator truck	3 m3	3.1	6	1day(6.5hr)	6.5	0.99
		Placing m3	20	Bucket/crane	1 m3	14.0	1		6.5	0.22
	Tunnel lining	Transporting m3	20	Agitator truck	3 m3	12.0	2	1day(4hr)	4.0	0.42
	Portal concrete	Transporting m3	20	Agitator truck	3 m3	12.0	2	1day(6.5hr)	6.5	0.26
		Placing m3	20	Bucket/crane	1 m3	14.0	1		6.5	0.22

Construction Equipment for Concrete Work, Package 1

Description	Detailed Work	Unit	Quantity	Equipment	Spec.	Output per Hour	Operating Hours	Construction Period	Scheduled Hours	Nos. of Equip.
5. Conguillo Access Road	Transporting	m <sup>3</sup>	10	Agitator truck	3 m <sup>3</sup>	5.2	2	1day(6.5hr)	6.5	0.30
	Placing	m <sup>3</sup>	10	Bucket/crane	1 m <sup>3</sup>	14.0	1		6.5	0.11
Box culvert	Transporting	m <sup>3</sup>	20	Agitator truck	3 m <sup>3</sup>	5.2	4	1day(6.5hr)	6.5	0.59
	Placing	m <sup>3</sup>	20	Bucket/crane	1 m <sup>3</sup>	14.0	1		6.5	0.22
6 El Guasmo Access Road	Transporting	m <sup>3</sup>	10	Agitator truck	3 m <sup>3</sup>	5.2	2	1day(6.5hr)	6.5	0.30
	Placing	m <sup>3</sup>	10	Bucket/crane	1 m <sup>3</sup>	14.0	1		6.5	0.11
Box culvert	Transporting	m <sup>3</sup>	20	Agitator truck	3 m <sup>3</sup>	5.2	4	1day(6.5hr)	6.5	0.59
	Placing	m <sup>3</sup>	20	Bucket/crane	1 m <sup>3</sup>	14.0	1		6.5	0.22