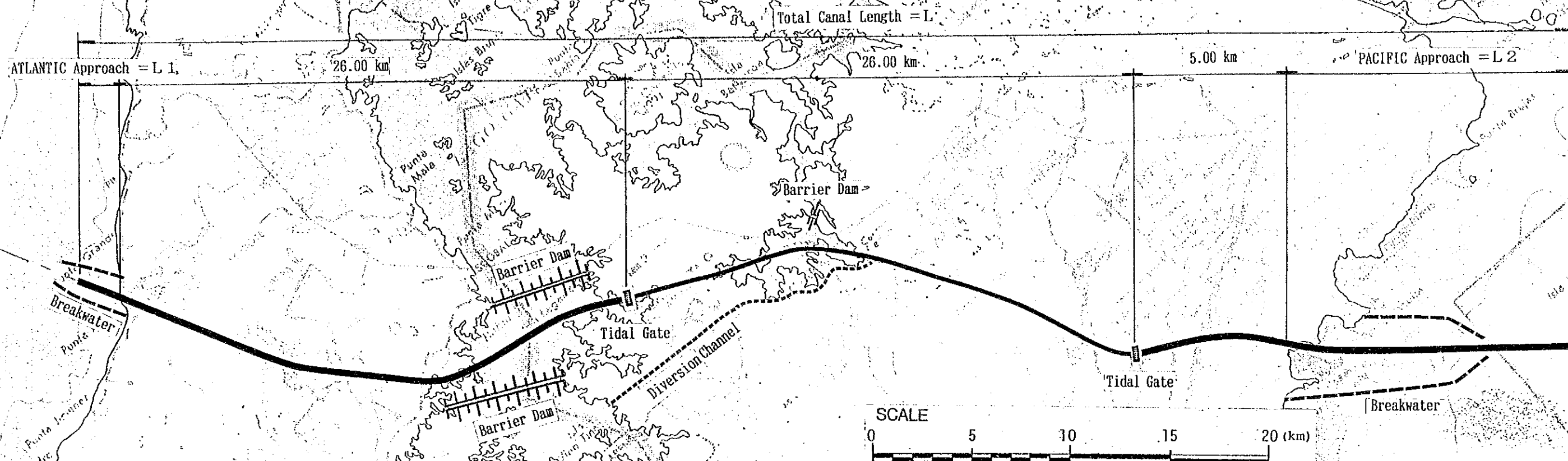


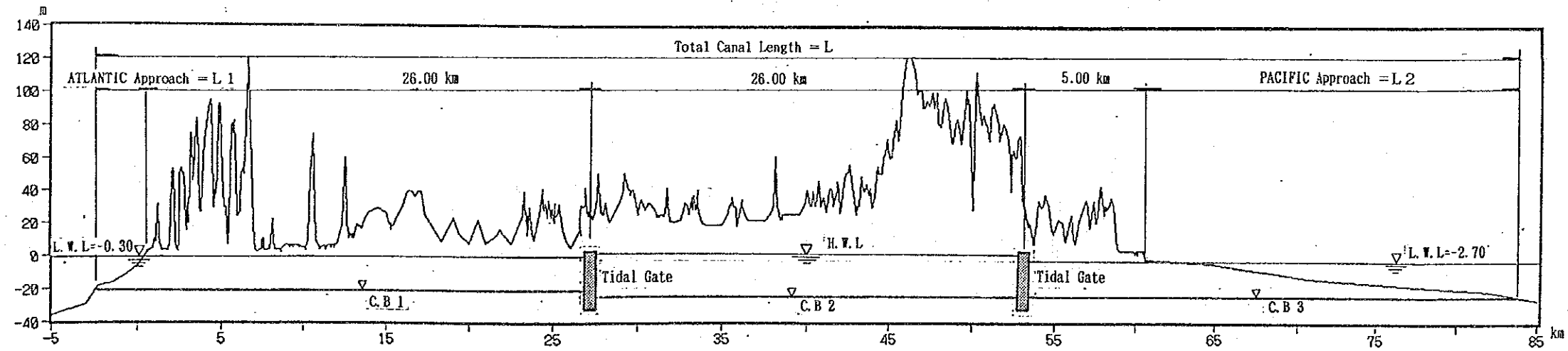
Route 10 Sea Level Layout Plan (S-13, S-14, S-15)



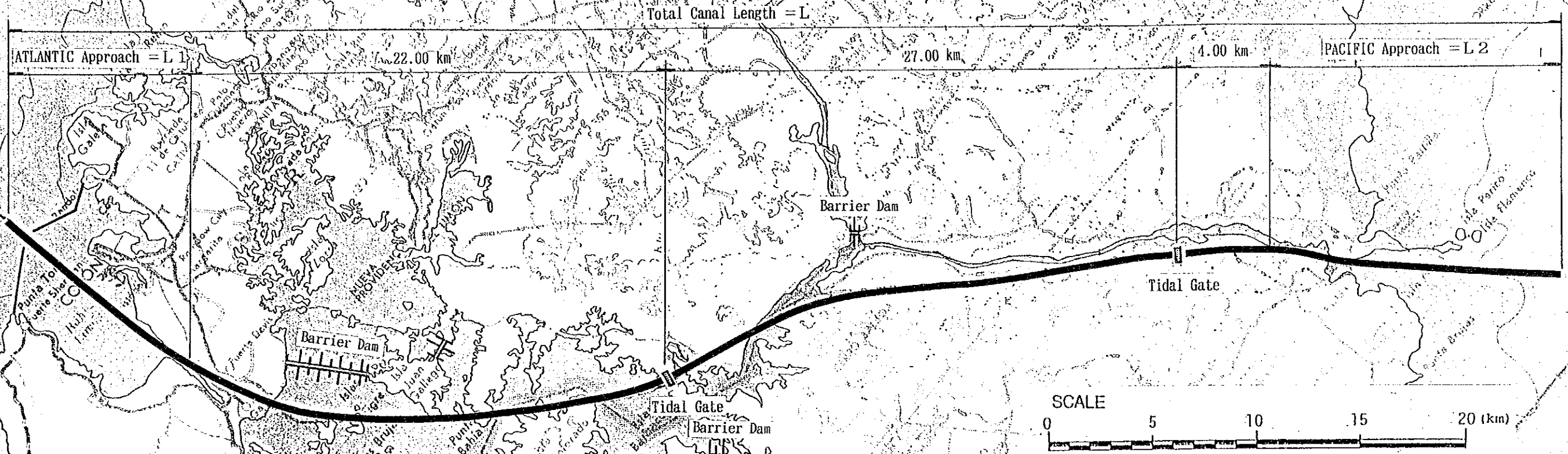
CANAL DIMENSIONS OF EACH CASE

Cases	Route	Water Level (feet)	No. of Lift	No. of Lane	Ship Size (DWT)	Canal Size			H. W. L (m)	C. B 1 (m)	C. B 2 (m)	C. B 3 (m)		
						Width (m)	Depth (m)	L (km)						
S-13	10	0	0	50%-1	150,000	147	20.9	86.2	3.5	25.7	3.3	-21.2	-23.3	-23.6
				50%-2		343	20.9							
S-14	10	0	0	50%-1	250,000	171	24.2	88.55	3.85	27.7	3.3	-24.5	-26.6	-26.9
				50%-2		399	24.2							
S-15	10	0	0	50%-1	300,000	183	25.3	89.6	3.9	28.7	3.3	-25.6	-27.7	-28.0
				50%-2		424	25.3							

Profile



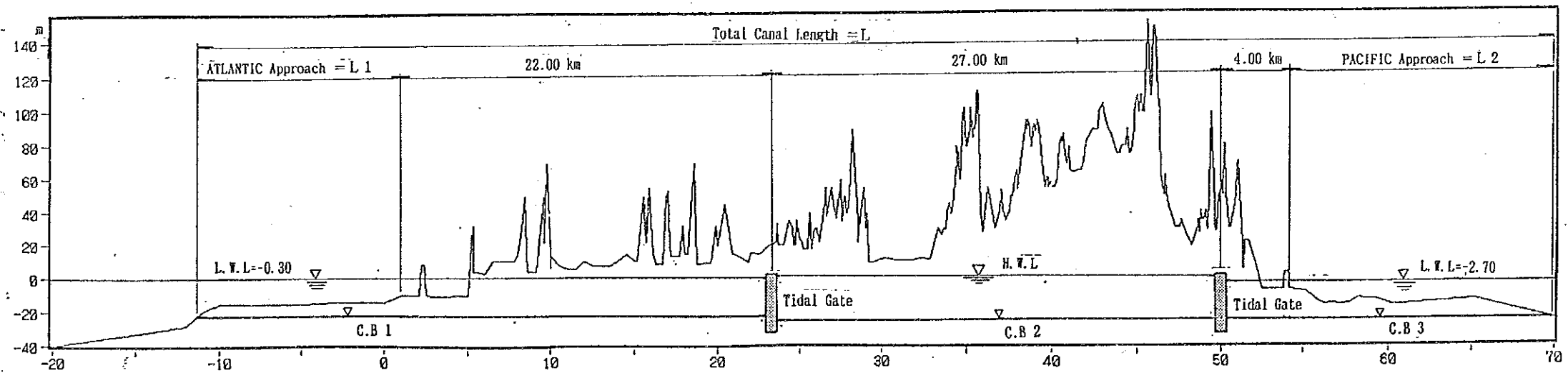
Route 14S Sea Level Layout Plan (S-7, S-8, S-9, S-10, S-11, S-12)



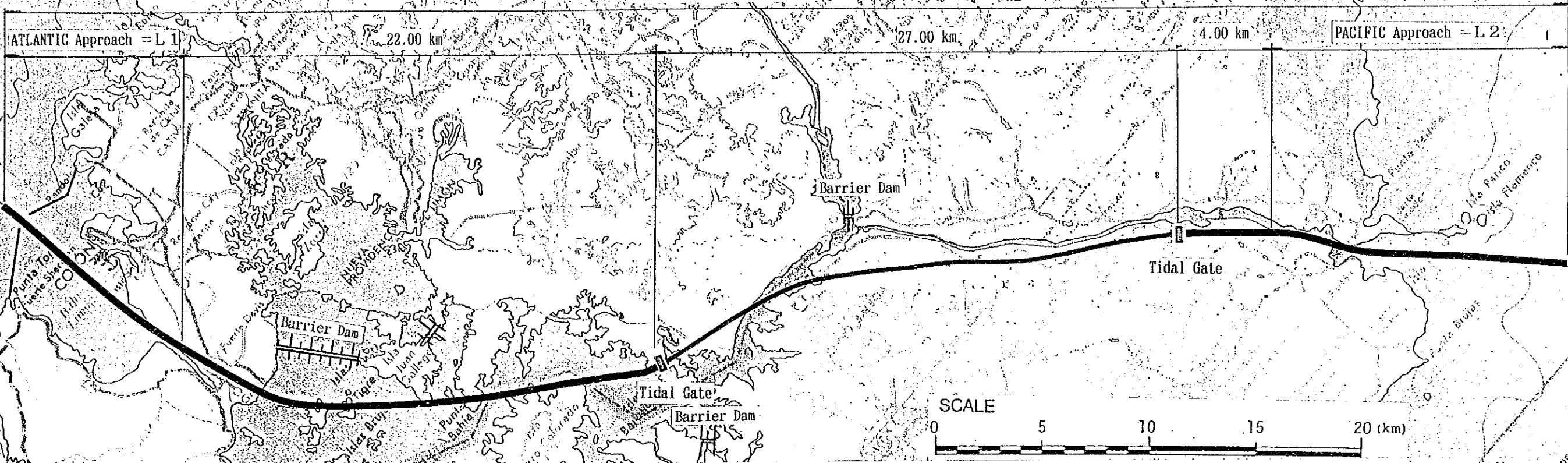
CANAL DIMENSIONS OF EACH CASE

Cases	Route	Water Level (feet)	No. of Lift	No. of Lane	Ship Size (DWT)	Canal Size		L (km)	L1 (km)	L2 (km)	H.W.L (m)	C.B 1 (m)	C.B 2 (m)	C.B 3 (m)
						Width (m)	Depth (m)							
S-7	14-S	0	0	1	150,000	147	20.9	82.6	12.1	17.5	3.3	-21.2	-23.3	-23.6
S-8	14-S	0	0	2	150,000	343	20.9	82.6	12.1	17.5	3.3	-21.2	-23.3	-23.6
S-9	14-S	0	0	1	250,000	171	24.2	87.4	12.5	21.9	3.3	-24.5	-26.6	-26.9
S-10	14-S	0	0	2	250,000	399	24.2	87.4	12.5	21.9	3.3	-24.5	-26.6	-26.9
S-11	14-S	0	0	1	300,000	183	25.3	88.8	12.6	23.2	3.3	-25.6	-27.7	-28.0
S-12	14-S	0	0	2	300,000	424	25.3	88.8	12.6	23.2	3.3	-25.6	-27.7	-28.0

Profile



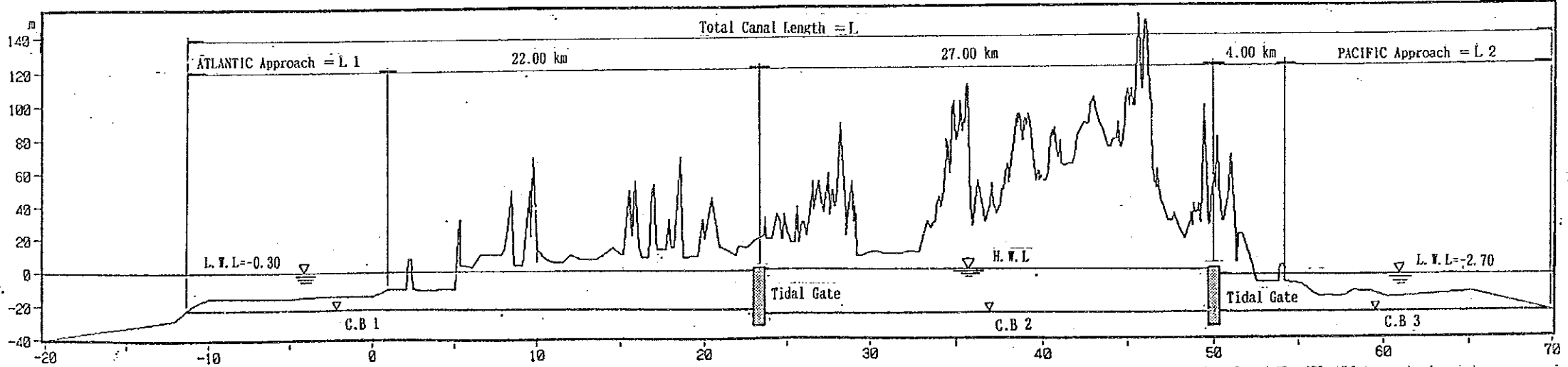
Route14S Sea Level Layout Plan (S-16, S-17, S-18)



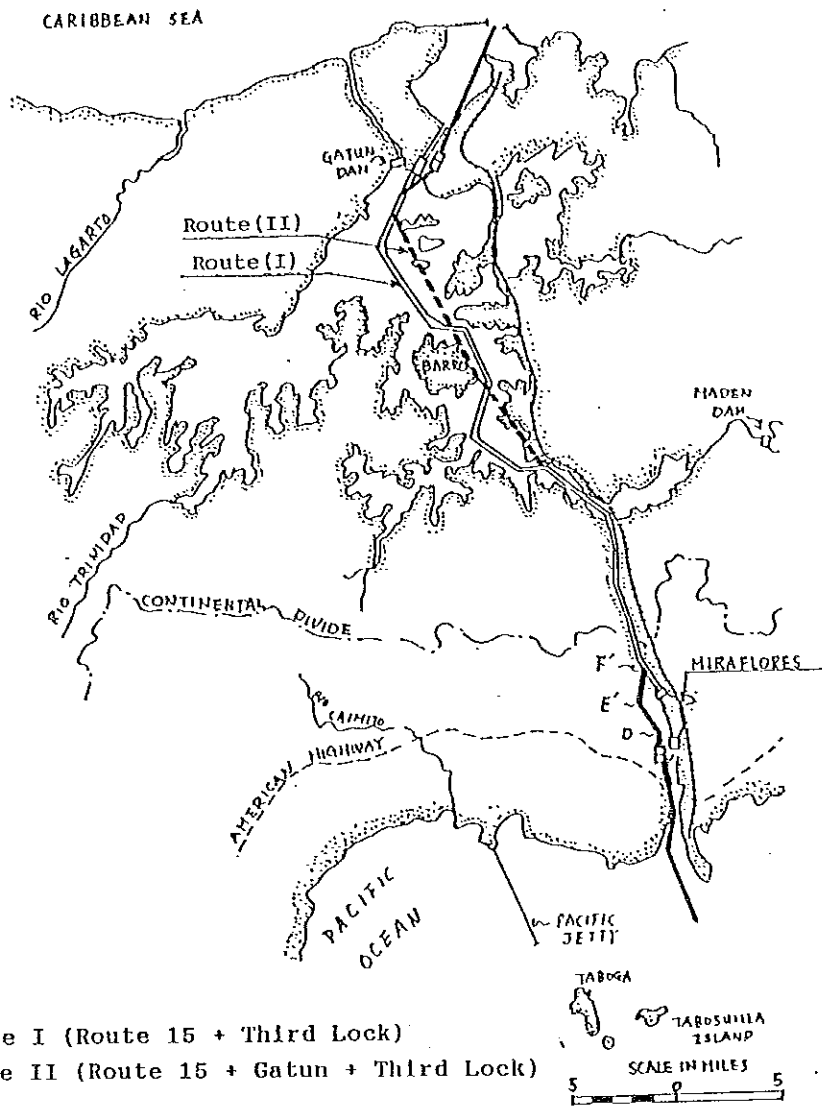
CANAL DIMENSIONS OF EACH CASE

Cases	Route	Water Level (feet)	No. of Lift	No. of Lane	Ship Size (DWT)	Canal Size		L (km)	L1 (km)	L2 (km)	H.W.L (m)	C.B 1 (m)	C.B 2 (m)	C.B 3 (m)
						Width (m)	Depth (m)							
S-16	14-S	0	0	50%-1	150,000	147	20.9	82.6	12.1	17.5	3.3	-21.2	-23.3	-23.6
				50%-2		343	20.9							
S-17	14-S	0	0	50%-1	250,000	171	24.7	87.4	12.5	21.9	3.3	-25.0	-26.7	-27.4
				50%-2		399	24.7							
S-18	14-S	0	0	50%-1	300,000	183	25.3	88.8	12.6	23.2	3.3	-25.6	-27.7	-28.0
				50%-2		424	25.3							

Profile



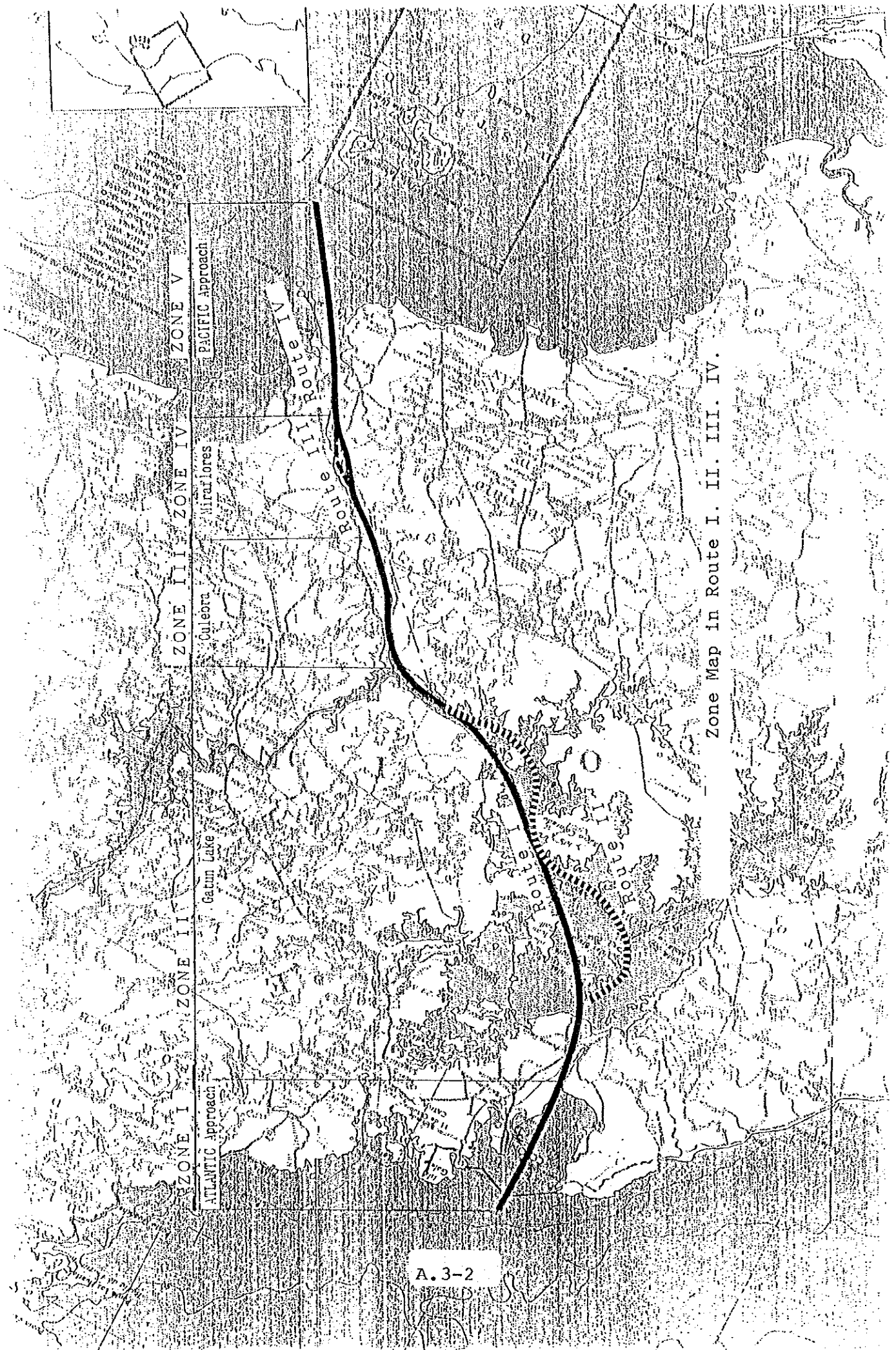
APPENDIX 3 : CALCULATION TABLES OF
EXCAVATION VOLUME



Route I (Route 15 + Third Lock)
 Route II (Route 15 + Gatun + Third Lock)

Study Case	Route	W. Level	No. of Lifts	No. of Lanes	Ship Size (1000 DWT)	Canal Size (m)
L-1	I	90'	2	2	100	301 x 18.7
2	I	85'	2	2	100	301 x 18.7
4	I	90'	2	2	150	343 x 20.9
5	I	85'	2	2	150	343 x 20.9
7	I	90'	2	2	250	399 x 24.2
8	I	85'	2	2	250	399 x 24.2
2'	I	85'	1	2	100	301 x 18.7
10	II	85'	2	2	100	301 x 18.7
13	II	85'	2	2	150	343 x 20.9
16	II	85'	2	2	250	399 x 24.2

Layout of High Rise Lock System for Group A Study Cases



Zone Map in Route I. II. III. IV.

L-1 Calculation Table of Excavation Volume

Station (STA)	Dis (ft)	Dis (s)	Hard Rock						Soft Rock						Soil						Wad					
			Ao		Yo		Dry V2		Ao		Yo		Dry V2		Ao		Yo		Dry V2		Ao		Yo			
10.80	7.800		0	0	0	0	0	0	6,357,000	6,357,000	380	22,500	88,250	1,500	69,500	0	0	0	0	0	680	2,850,000	0	0		
1.09	4,000		0	940,000	0	940,000	0	1,830	6,260,000	1,830	4,020,000	2,240,000	680	2,840,000	660	2,840,000	0	0	0	0	740	0	0	760	0	
Sum 1	11,800		0	940,000	0	940,000	0	1,500	12,617,000	380	10,377,000	2,240,000	740	5,492,000	740	5,492,000	0	0	0	0	0	0	0	2,860,000	0	
1.00	50		470	93,750	470	35,500	58,250	1,500	120,750	380	22,500	88,250	1,500	69,500	0	0	0	0	0	0	0	0	0	69,500	0	
1.05	1,150		3,280	3,772,000	350	1,092,500	2,679,500	3,330	3,829,500	520	598,000	3,231,500	1,280	1,472,000	0	0	0	0	0	0	0	0	0	1,472,000	0	
2.20	10		3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	0	0	0	0	0	0	0	0	17,800	0	
2.21	190		3,280	623,200	950	180,500	442,700	3,330	632,700	520	88,600	533,900	2,280	433,200	0	0	0	0	0	0	0	0	0	433,200	0	
2.40	10		3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	0	0	0	0	0	0	0	0	17,800	0	
2.41	590		3,280	1,935,200	950	560,500	1,374,700	3,330	1,964,700	520	306,800	1,657,900	1,280	755,200	0	0	0	0	0	0	0	0	0	755,200	0	
3.00	2,000		3,280	6,940,000	950	950,000	5,990,000	3,330	28,725,000	520	520,000	26,205,000	1,280	2,540,000	0	0	0	0	0	0	0	0	0	2,540,000	0	
5.00	300		3,660	1,098,000	0	0	1,098,000	23,355	7,018,500	0	0	2,339,500	2,250	528,000	0	0	0	0	0	0	0	0	0	528,000	0	
5.30	200		3,660	366,000	0	0	366,000	23,355	2,339,500	0	0	2,339,500	2,250	226,000	0	0	0	0	0	0	0	0	0	226,000	0	
5.50	1,500		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7.00	3,000		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10.00	6,000		0	3,210,000	0	3,210,000	0	0	900,000	0	900,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16.00	4,000	1,070	0	2,760,000	1,070	2,760,000	0	300	1,220,000	300	1,220,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20.00	5,000	310	0	2,350,000	310	2,350,000	0	310	1,550,000	310	1,550,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25.00	5,000	630	0	1,575,000	630	1,575,000	0	310	775,000	310	775,000	0	0	650,000	0	650,000	0	0	0	0	0	0	0	650,000	0	
30.00	6,000	0	0	0	0	0	0	0	3,030,000	0	3,030,000	0	260	1,580,000	260	1,580,000	0	0	0	0	0	0	0	1,580,000	0	
36.00	3,000	0	0	660,000	0	660,000	0	1,010	1,965,000	1,010	1,965,000	0	300	900,000	300	900,000	0	0	0	0	0	0	0	900,000	0	
39.00	4,120	440	0	4,202,400	440	906,400	3,296,000	300	15,450,000	300	3,254,800	12,195,200	300	618,000	300	618,000	0	0	0	0	0	0	0	0	618,000	0
43.12	1,684	0	1,600	0	0	0	0	7,200	0	1,280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sum 2	42,120		29,651,150		14,299,400	16,670,150			67,587,250		14,251,300	59,268,750		9,907,500		3,848,000							6,059,500			
43.12	1,684	180	2,240	896,871	0	896,871	0,080	1,061,885	1,280	115,168	946,717	0	182,649	0	182,649	0	0	0	0	0	0	0	0	182,649	0	
1,690	3	7,728	11,785	0	0	11,785	1,722	2,626	0	0	2,626	2,030	10,568	0	10,568	0	0	0	0	0	0	0	0	10,568	0	
1,690	61	0	0	0	0	0	0	0	0	0	0	4,900	298,900	0	298,900	0	0	0	0	0	0	0	0	298,900	0	
1,692	27	0	0	0	0	0	0	0	0	0	0	4,900	134,505	0	134,505	0	0	0	0	0	0	0	0	134,505	0	
1,693	3	0	11,785	0	0	11,785	0	2,626	0	0	2,626	4,900	10,568	0	10,568	0	0	0	0	0	0	0	0	10,568	0	
1,693	214	7,728	1,228,479	0	103,014	1,125,465	1,722	235,560	0	4,484	251,076	2,030	264,527	0	6,405	258,122	0	0	0	0	0	0	0	258,122	0	
1,700	275	3,780	1,037,610	965	264,893	772,718	672	184,464	42	11,529	172,935	448	122,976	60	18,470	105,506	0	0	0	0	0	0	0	105,506	0	
1,709	15	3,760	28,823	965	7,358	21,464	672	5,124	42	320	4,804	448	40,779	60	458	40,321	0	0	0	0	0	0	0	40,321	0	
1,710	15	0	0	0	0	0	0	0	0	0	0	4,900	74,725	0	74,725	0	0	0	0	0	0	0	0	74,725	0	
1,710	15	0	58,926	0	0	58,926	0	13,130	0	0	13,130	4,900	52,841	0	52,841	0	0	0	0	0	0	0	0	52,841	0	
1,711	46	7,728	353,556	0	0	353,556	1,722	78,782	0	0	78,782	2,030	92,873	0	92,873	0	0	0	0	0	0	0	0	92,873	0	
1,712	153	7,728	1,077,168	0	91,500	985,668	1,722	291,428	0	9,150	282,278	2,030	154,788	0	154,788	0	0	0	0	0	0	0	0	154,788	0	
1,717	305	6,388	1,951,390	1,200	366,000	1,585,390	2,160	640,500	120	36,600	603,900	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1,722	15	6,388	48,785	1,200	9,150	39,635	2,100	32,025	120	915	31,110	0	48,785	0	48,785	0	0	0	0	0	0	0	0	48,785	0	
1,728	76	0	0	0	0	0	0	160,125	0	0	160,125	6,388	487,848	0	487,848	0	0	0	0	0	0	0	0	487,848	0	
1,730	92	0	0	0	0	0	0	192,150	0	0	192,150	6,388	585,417	0	585,417	0	0	0	0	0	0	0	0	585,417	0	
1,733	15	0	24,873	0	0	24,873	2,100	40,138	0	0	40,138	6,388	61,702	0	61,702	0	0	0	0	0	0	0	0	61,702	0	
1,734	229	3,262	746,183	0	0	746,183	3,164	723,785	0	0	723,785	1,694	387,503	0	387,503	0	0	0	0	0	0	0	0	387,503	0	
1,741	6	3,262	9,949	0	0	9,949	3,164	19,300	0	0	19,300	1,694	20,283	0	20,283	0	0	0	0	0	0	0	0	20,283	0	
1,741	146	0	0	0	0	0	0	3,164	463,210	0	463,210	4,956	725,558	0	725,558	0	0	0	0	0	0	0	0	725,558	0	
1,746	15	0	24,873	0	9,150	15,723	3,164	48,251	0	0	48,251	4,956	50,706	0	50,706	0	0	0	0	0	0	0	0	50,706	0	
1,747	137	3,262	447,210	1,200	164,700	283,010	3,164	434,259	0	0	434,259	1,694	232,502	0	232,502	0	0	0	0	0	0	0	0	232,502	0	
1,751	397	3,262	1,293,363	1,200	475,800	817,563	3,164	1,254,528	0	0	1,254,528	1,694	671,671	0	671,671	0	0	0	0	0	0	0	0	671,671	0	
1,764	15	3,262	24,873	1,200	9,150	15,723	3,164	150,945	0	8,540	142,405	1,694	16,333	0	16,333	0	0	0	0	0	0	0	0	16,333	0	
1,765	168	0	0	0	0	0	0	2,790,018	1,120	187,880	2,602,138	448	75,152	0	75,152	0	0	0	0	0	0	0	0	75,152	0	
1,770	9	0	0	0	0	0	0	152,183	1,120	10,248	141,935	448	4,099	0	4,099	0	0	0	0	0	0	0	0	4,099	0	
1,770	143	0																								

55.00	1,000	7,430	8,660,000	0	35,000	8,625,000	3,500	3,500,000	0	0	3,500,000	1,290	1,200,000	0	0	1,200,000	0	0	
56.00	1,000	9,890	9,800,000	70	35,000	9,565,000	3,500	3,500,000	0	0	3,500,000	1,110	1,080,000	0	0	1,080,000	0	0	
57.00	3,000	9,310	22,605,000	0	0	22,605,000	3,500	14,325,000	0	0	14,325,000	1,050	2,855,000	0	0	2,855,000	0	0	
60.00	1,000	5,760	8,195,000	0	0	8,195,000	6,050	4,135,000	0	0	4,135,000	860	1,180,000	0	0	1,180,000	0	0	
61.00	1,000	10,630	6,485,000	0	0	6,485,000	2,220	2,220,000	0	0	2,220,000	1,480	1,500,000	0	0	1,500,000	0	0	
62.00	0	2,340	0	0	0	0	2,220	0	0	0	0	1,520	0	0	0	0	0	0	
Sum 4	9,000		64,150,000		705,000	63,445,000		33,245,000		0	33,245,000		10,275,000		0	10,275,000		0	
62.00	10	2,340	23,400	2,340	23,400	0	2,220	22,200	2,220	22,200	0	760	7,600	760	7,600	0	760	7,600	
62.01	1,990	2,340	4,099,400	2,340	4,099,400	0	2,220	3,442,700	2,220	3,442,700	0	760	1,512,400	760	1,512,400	0	760	2,547,200	
64.00	3,000	1,780	2,670,000	1,780	2,670,000	0	1,240	3,435,000	1,240	3,435,000	0	760	2,190,000	760	2,190,000	0	1,800	3,750,000	
62.00	2,000	0	0	0	0	0	1,050	1,400,000	1,050	1,400,000	0	700	1,400,000	700	1,400,000	0	700	1,400,000	
69.00	7,300	0	0	0	0	0	350	1,277,500	350	1,277,500	0	700	2,555,000	700	2,555,000	0	700	2,555,000	
76.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sum 5	14,300		6,792,800		6,792,800	0		9,577,400		9,577,400	0		7,665,000		7,665,000	0		10,259,800	
U-1																			
Sum 1	11,800		940,000		940,000	0		12,617,000		12,617,000	2,240,000		5,492,000		5,492,000	0		2,880,000	
Sum 2	12,120		29,651,150		14,299,400	16,670,150		67,587,250		64,251,300	59,268,750		9,907,500		3,843,000	6,059,500		0	
Sum 3	9,882		49,370,188		5,804,351	42,992,814		61,996,045		4,038,597	57,829,897		24,687,888		23,333	24,513,991		0	
Sum 4	9,000		64,150,000		705,000	63,445,000		33,245,000		0	33,245,000		10,275,000		0	10,275,000		0	
Sum 5	14,300		6,792,800		6,792,800	0		9,577,400		9,577,400	0		7,665,000		7,665,000	0		10,259,800	
Total	87,102		850,904,138		28,542,151	823,107,564		985,022,695		108,244,297	852,583,647		68,027,188		17,028,333	80,618,491		13,139,800	

Total Excavation Vol. 407,093,821
 Dry 316,540,102
 Wet 90,553,719

Calculation Table of Excavation Volume

Station No.	Dis (ft)	Dis (m)	Hard Rock			Soft Rock					Soil					Mud			
			As	Vo	Ret A1	Ret V1	Dry V2	As	Vo	Ret A1	Ret V1	Dry V2	As	Vo	Ret A1	Ret V1	Dry V2	As	Vo
10.80	7,800	0	0	0	0	0	6,357,000	0	6,357,000	0	0	2,852,000	0	2,852,000	0	0	0	0	2,652,000
-3.00	4,000	0	940,000	0	940,000	0	1,630	6,260,000	1,630	4,020,000	2,240,000	660	2,840,000	660	2,640,000	0	680	2,880,000	0
1.00	0	470	0	470	0	0	1,500	0	360	0	0	740	0	740	0	0	0	780	0
Sum 1	11,800	0	940,000	0	940,000	0	12,617,000	0	10,377,000	2,240,000	0	740	5,492,000	0	5,492,000	0	0	5,532,000	0
1.00	50	470	83,750	470	35,500	58,250	1,500	120,750	360	22,500	98,250	1,500	69,500	0	69,500	0	0	69,500	0
1.05	1,150	3,280	3,772,000	950	1,092,500	2,679,500	3,330	3,829,500	520	598,000	3,231,500	1,280	1,422,000	0	1,422,000	0	1,422,000	0	0
2.20	10	3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	17,800	0	0	17,800	0
2.21	190	3,280	623,200	950	180,500	442,700	3,330	632,700	520	98,800	533,900	2,280	433,200	0	433,200	0	0	433,200	0
2.40	10	3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	17,800	0	0	17,800	0
2.41	590	3,280	1,935,200	950	560,500	1,374,700	3,330	1,954,700	520	306,800	1,657,900	1,280	755,200	0	755,200	0	0	755,200	0
3.00	2,000	4,130	7,410,000	950	950,000	6,460,000	3,330	26,950,000	520	520,000	26,430,000	1,280	2,540,000	0	2,540,000	0	0	2,540,000	0
5.00	300	4,130	1,239,000	0	0	0	0	1,239,000	3,620	2,086,000	0	0	0	0	0	0	0	378,000	0
5.30	260	4,130	413,000	0	0	413,000	3,620	2,362,000	0	0	2,362,000	1,260	126,000	0	126,000	0	0	126,000	0
5.50	1,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.00	3,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.00	6,000	0	4,560,000	0	4,560,000	0	0	900,000	0	900,000	0	0	0	0	0	0	0	0	0
16.00	4,000	1,520	4,560,000	1,520	4,560,000	0	300	1,220,000	300	1,220,000	0	0	0	0	0	0	0	0	0
20.00	5,000	760	4,600,000	760	4,600,000	0	310	1,550,000	310	1,550,000	0	0	0	0	0	0	0	0	0
25.00	5,000	1,080	2,700,000	1,080	2,700,000	0	310	1,800,000	310	1,800,000	0	0	750,000	0	750,000	0	0	0	0
30.00	6,000	0	0	0	0	0	410	5,610,000	410	5,610,000	0	300	1,800,000	300	1,800,000	0	0	0	0
36.00	3,000	0	1,335,000	0	1,335,000	0	1,460	2,640,000	1,460	2,640,000	0	300	900,000	300	900,000	0	0	0	0
39.00	4,120	890	7,374,800	890	1,833,400	5,541,400	300	21,630,000	300	3,254,800	18,375,200	300	618,000	300	618,000	0	0	0	0
43.12	1,684	1,600	0	0	0	0	7,200	0	1,280	0	0	0	0	0	0	0	0	0	0
Sum 2	42,120	0	40,681,550	0	22,428,400	18,255,150	0	76,362,250	0	18,531,300	59,830,950	0	9,877,500	0	4,068,000	0	5,809,500	0	0
43.12	1,684	180	2,650	977,848	0	977,848	0,200	1,063,478	1,280	115,168	968,311	0	182,649	0	182,649	0	0	182,649	0
1,690	3	8,178	13,158	0	0	13,158	1,842	2,892	0	2,892	2,030	10,568	0	10,568	0	0	10,568	0	0
1,690	61	450	27,450	0	0	27,450	1,842	7,320	0	7,320	4,900	298,900	0	298,900	0	0	298,900	0	0
1,692	27	450	12,350	0	0	12,350	120	3,294	0	3,294	4,900	134,505	0	134,505	0	0	134,505	0	0
1,693	3	450	13,158	0	0	13,158	120	2,992	0	2,992	4,900	10,568	0	10,568	0	0	10,568	0	0
1,693	214	8,178	1,324,554	0	103,014	1,221,540	1,842	281,180	0	4,484	276,666	2,030	264,527	60	6,405	258,122	0	0	0
1,700	275	4,230	1,161,135	955	284,893	876,243	792	217,404	42	11,529	205,875	448	122,976	60	16,470	106,506	0	0	0
1,709	15	4,230	35,885	955	7,358	28,527	792	6,954	42	320	6,334	448	40,779	60	458	40,321	0	0	0
1,710	15	450	6,663	0	0	6,663	120	1,830	0	1,830	4,900	74,725	0	74,725	0	0	74,725	0	0
1,710	15	450	65,789	0	0	65,789	120	14,960	0	14,960	4,900	52,841	0	52,841	0	0	52,841	0	0
1,711	46	8,178	374,144	0	0	374,144	1,842	84,272	0	0	84,272	2,030	92,873	0	92,873	0	0	92,873	0
1,712	153	8,178	1,145,733	0	91,500	1,054,233	1,842	309,728	0	9,150	300,578	2,030	154,788	0	154,788	0	0	154,788	0
1,717	305	6,848	2,088,640	1,200	366,090	1,722,550	2,220	677,100	120	36,600	640,500	0	0	0	0	0	0	0	0
1,727	15	6,848	55,647	1,200	9,150	46,497	2,220	33,855	120	915	32,940	0	48,785	0	48,785	0	0	48,785	0
1,728	76	450	34,313	0	0	34,313	2,220	168,275	0	0	168,275	6,398	487,848	0	487,848	0	0	487,848	0
1,730	92	450	41,175	0	0	41,175	2,220	203,130	0	0	203,130	6,398	585,417	0	585,417	0	0	585,417	0
1,733	15	450	31,735	0	0	31,735	2,220	41,968	0	0	41,968	6,398	61,702	0	61,702	0	0	61,702	0
1,734	229	3,712	819,120	0	0	819,120	3,284	751,215	0	0	751,215	1,694	387,503	0	387,503	0	0	387,503	0
1,741	6	3,712	12,694	0	0	12,694	3,284	20,032	0	0	20,032	1,694	20,283	0	20,283	0	0	20,283	0
1,741	148	450	65,880	0	0	65,880	3,284	460,778	0	0	460,778	4,956	725,558	0	725,558	0	0	725,558	0
1,746	15	450	31,735	0	9,150	22,585	3,284	50,081	0	0	50,081	4,956	50,706	0	50,706	0	0	50,706	0
1,747	137	3,712	509,472	1,200	164,700	344,772	3,284	450,729	0	0	450,729	1,694	232,502	0	232,502	0	0	232,502	0
1,751	397	7,712	1,471,808	1,200	475,800	996,008	3,284	1,302,106	0	0	1,302,106	1,694	671,671	0	671,671	0	0	671,671	0
1,764	15	3,712	31,735	1,200	9,150	22,585	3,284	152,775	0	8,540	144,235	1,694	16,333	0	16,333	0	0	16,333	0
1,765	168	450	75,488	0	0	75,488	1,120	187,650	1,120	187,650	2,622,288	448	75,152	0	75,152	0	0	75,152	0
1,770	9	450	4,117	0	0	4,117	1,120	153,281	1,120	10,248	143,033	448	4,099	0	4,099	0	0	4,099	0
1,770	143	450	579,277	0	0	579,277	1,120	1,986,974	1,120	145,217	1,840,757	448	64,221	0	64,221	0	0	64,221	0
1,775	6	7,632	33,816	0	0	33,816	920	66,917	920	5,612	61,305	448	15,372	0	15,372	0	0	15,372	0
1,775	238	3,488	829,795	0	0	829,795	920	2,615,710	920	218,868	2,396,842	4,592	1,092,437	0	1,092,437	0	0	1,092,437	0
1,783	397	3,488	1,963,072	0	227,988	1,735,084	1,020	2,784,620	920	192,303	2,592,317	4,592	910,364	0	910,364	0	0	910,364	0
1,795	61	6,414	391,254	1,150	70,150	321,104	3,026	184,568	50	3,050	181,538	0	0	0	0	0	0	0	0
1,798	61	6,414	459,147	1,150	102,175	356,972	3,026	145,302	50	1,525	143,777	0	55,510	0	55,510	0	0	55,510	0
1,800	183	8,640	1,581,120	2,200	402,600	1,178,520	1,738	318,054	0	0	318,054	1,820	333,060	0	333,060	0	0	333,060	0
1,806	183	8,640	1,501,698	2,200	314,760	1,186,938	1,738	258,762	0	0	258,762	1,820	386,862	0	386,862	0	0	386,862	0
1,812	122	7,772	918,184</																

55.00	1,000	7,970	9,260,000	0	35,000	9,165,000	3,530	3,530,000	0	0	3,530,000	1,290	1,290,000	0	0	1,290,000	0	0	
56.00	1,000	10,430	10,995,000	70	35,000	10,060,000	3,530	3,530,000	0	0	3,530,000	1,110	1,080,000	0	0	1,080,000	0	0	
57.00	3,000	9,760	24,315,000		0	24,315,000	3,530	14,415,000	0	0	14,415,000	1,050	2,745,000	0	0	2,745,000	0	0	
60.00	1,000	6,450	8,540,000		0	8,540,000	6,080	4,165,000	0	0	4,165,000	780	1,130,000	0	0	1,130,000	0	0	
61.00	1,000	10,630	6,720,000		0	6,720,000	2,250	2,250,000	0	0	2,250,000	1,480	1,500,000	0	0	1,500,000	0	0	
62.00	0	2,810	0		0	0	2,250	0	0	0	0	1,520	0	0	0	0	0	0	
Sum 4	9,000		68,195,000		705,000	67,490,000		33,500,000			33,500,000		10,015,000			10,015,000		0	
62.00	10	2,810	28,100	2,340	23,400	4,700	2,250	22,500	2,220	22,200	300	760	7,600	760	7,600	0	760	7,600	
62.01	1,990	2,810	4,567,050	2,340	4,099,400	467,650	2,250	3,472,550	2,220	3,442,700	29,850	760	1,512,400	760	1,512,400	0	760	2,547,200	
64.00	3,000	1,780	2,670,000	1,780	2,670,000	0	1,240	3,435,000	1,240	3,435,000	0	760	2,190,000	760	2,190,000	0	1,800	3,750,000	
67.00	2,000	0	0	0	0	0	1,050	3,400,000	1,050	1,400,000	0	700	1,400,000	700	1,400,000	0	700	1,400,000	
69.00	7,300	0	0	0	0	0	350	1,277,500	350	1,277,500	0	700	2,555,000	700	2,555,000	0	700	2,555,000	
76.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sum 5	14,300		7,265,150		6,792,800	472,350		9,807,550		9,572,400	30,150		7,665,000		7,665,000		0	10,259,800	
Sum 1	11,800		940,000		940,000	0		12,617,000		10,377,000	2,240,000		5,492,000		5,492,000	0		5,532,000	
Sum 2	12,120		40,681,550		22,426,400	18,255,150		78,362,250		18,531,300	59,830,950		9,877,500		4,068,000	5,809,500		0	
Sum 3	9,882		53,128,002		5,804,951	47,323,051		64,162,155		4,038,597	60,123,558		24,537,323		23,333	24,513,991		0	
Sum 4	9,000		68,195,000		705,000	67,490,000		33,500,000		0	33,500,000		10,015,000		0	10,015,000		0	
Sum 5	14,300		7,265,150		6,792,800	472,350		9,807,550		9,572,400	30,150		7,665,000		7,665,000	0		10,259,800	
Total	67,102		170,209,702		35,663,151	133,540,551		198,248,955		42,524,297	155,724,658		57,646,823		17,248,333	40,398,491		15,791,800	

Total Excavation Vol 441,897,280
 DRY 329,663,700
 WET 112,233,580

53.00	2,008	1,000	5,840	4,145,000	1,270	635,000	3,510,000	1,890	2,675,000	0	0	2,675,000	2,450	2,255,000	0	0	2,235,000	0	
54.00		1,000	2,350	5,730,000	0	0	5,730,000	3,680	3,780,000	0	0	3,780,000	2,140	1,930,000	0	0	1,930,000	0	
55.00		1,000	9,010	10,420,000	0	35,000	10,385,000	3,900	9,950,000	0	0	9,950,000	1,720	1,565,000	0	0	1,505,000	0	
56.00		1,000	11,830	11,150,000	70	35,000	11,115,000	4,000	9,900,000	0	0	9,900,000	1,290	1,245,000	0	0	1,245,000	0	
57.00		3,000	0,470	26,505,000	0	0	26,505,000	3,800	16,980,000	0	0	16,980,000	1,200	3,120,000	0	0	3,120,000	0	
60.00		1,000	7,200	10,000,000	0	0	10,000,000	7,520	5,095,000	0	0	5,005,000	880	1,210,000	0	0	1,210,000	0	
61.00		1,000	2,800	8,310,000	0	0	8,310,000	2,490	2,595,000	0	0	2,595,000	1,660	1,730,000	0	0	1,730,000	0	
62.00		0	3,820	0	0	0	0	2,700	0	0	0	0	1,800	0	0	0	0	0	
Sum 4		9,000		76,260,000		705,000	75,555,000		38,885,000		0	38,885,000		13,095,000		0	13,095,000	0	
62.00		10	3,820	38,200	3,820	38,200	0	2,700	27,000	2,700	27,000	0	900	9,000	900	9,000	0	900	9,000
62.01		1,990	3,820	6,139,150	3,820	6,139,150	0	2,700	5,373,000	2,700	5,373,000	0	900	1,791,000	900	1,791,000	0	900	2,905,400
64.00		3,000	2,350	3,525,000	2,350	3,525,000	0	2,700	7,665,000	2,700	7,665,000	0	900	2,610,000	900	2,610,000	0	2,020	4,290,000
67.00		2,000	0	0	0	0	0	2,410	4,410,000	2,410	4,410,000	0	840	1,640,000	840	1,640,000	0	840	1,640,000
69.00		10,500	0	0	0	0	0	2,000	10,500,000	2,000	10,500,000	0	800	4,200,000	800	4,200,000	0	800	4,200,000
79.50		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sum 5		17,500		9,702,350		9,702,350	0		27,975,000		27,975,000	0	0	10,250,000		10,250,000	0		13,044,400
L-4																			
Sum 1		12,100		2,060,000		2,060,000	0		19,501,500		19,501,500	0		6,419,500		6,419,500	0		6,419,500
Sum 2		12,120		55,492,538		31,237,800	24,254,738		88,878,198		23,823,800	85,054,388		12,099,000		4,746,000	7,353,000		0
Sum 3		9,882		62,463,570		5,804,951	56,658,619		80,415,076		4,038,597	76,376,479		32,748,247		23,333	32,724,915		0
Sum 4		9,000		76,260,000		705,000	75,555,000		38,885,000		0	38,885,000		13,095,000		0	13,095,000		0
Sum 5		17,500		9,702,350		9,702,350	0		27,975,000		27,975,000	0		10,250,000		10,250,000	0		13,044,400
Total		80,602		205,978,458		49,510,101	156,468,357		255,854,773		75,338,897	260,315,877		74,611,747		21,438,833	53,172,915		19,463,900

Total Excavation Vol.	555,708,879
DRY	389,957,149
WET	165,751,730

Calculation Table of Excavation Volume

Station (STA)	(ft)	Dis (m)	Hard Rock				Soft Rock				Soil				Mad	
			Ret Al	Vo	Ret V1	Dry V2	Ret Al	Vo	Ret V1	Dry V2	Ret Al	Vo	Ret V1	Dry V2	Ret Al	Vo
11.10		8,100	0	0	0	0	0	8,841,500	0	8,841,500	0	0	0	0	0	0
-3.00		4,000	0	2,060,000	0	0	2,430	5,660,000	2,430	9,860,000	0	0	790	3,220,000	790	3,220,000
1.00		0	1,030	0	1,030	0	0	2,400	0	2,400	0	0	820	0	820	0
Sum 1		12,100		2,060,000				19,501,500		19,501,500				6,419,500		6,419,500
1.00	50	1,030	158,250	470	35,500	122,150	2,400	123,000	380	12,500	100,500	1,640	85,000	0	0	85,000
1.05	1,150	5,300	6,095,000	950	1,092,500	5,002,500	2,520	2,898,000	520	598,000	2,300,000	1,760	2,024,000	0	0	2,024,000
2.20	10	5,300	63,600	950	9,500	43,500	2,520	25,200	520	5,200	20,000	1,760	22,600	0	0	22,600
2.21	190	5,300	1,007,000	950	180,500	826,500	2,520	478,800	520	98,800	380,000	2,760	524,400	0	0	524,400
2.40	10	5,300	53,000	950	9,500	43,500	2,520	25,200	520	5,200	20,000	2,760	22,600	0	0	22,600
2.41	590	5,300	3,127,000	950	560,500	2,566,500	2,520	1,486,600	520	306,800	1,180,000	1,760	1,038,400	0	0	1,038,400
3.00	2,000	5,300	10,690,000	950	1,900,000	8,790,000	2,520	28,610,000	520	1,040,000	27,570,000	1,760	3,100,000	0	0	3,100,000
5.00	300	5,300	1,612,000	950	285,000	1,327,000	26,090	7,827,000	520	156,000	7,671,000	1,340	402,000	0	0	402,000
5.30	200	5,300	539,000	950	95,000	444,000	26,090	2,730,000	520	173,000	2,557,000	1,340	134,000	0	0	134,000
5.50	1,500	0	0	0	0	0	1,210	907,500	1,210	907,500	0	0	0	0	0	0
7.00	3,000	0	0	0	0	0	0	1,020,000	0	1,020,000	0	0	0	0	0	0
10.00	6,000	0	7,530,000	0	7,530,000	0	680	3,090,600	680	3,090,600	0	0	0	0	0	0
16.00	4,000	2,510	7,400,000	2,510	7,400,000	0	350	2,020,600	350	2,020,600	0	0	0	0	0	0
20.00	5,000	1,190	7,625,000	1,190	7,625,000	0	660	2,525,000	660	2,525,000	0	0	0	0	0	0
25.00	5,000	1,860	4,650,000	1,860	4,650,000	0	350	3,475,000	350	3,475,000	0	0	875,000	875,000	0	0
30.00	6,000	0	0	0	0	0	1,040	9,600,000	1,040	9,600,000	0	350	2,100,000	350	2,100,000	0
36.00	3,000	0	3,885,000	0	3,885,000	0	2,160	3,785,000	2,160	3,785,000	0	350	1,050,000	350	1,050,000	0
39.00	4,120	2,590	12,211,488	2,590	5,335,400	6,876,088	350	27,100,498	350	3,357,800	23,742,698	350	721,000	350	721,000	0
43.12	1,684	0	3,200	0	3,200	0	7,200	0	7,200	0	0	0	0	0	0	0
Sum 2		42,120	66,640,738		40,593,400	26,047,338		97,706,998		32,165,860	65,541,198		12,099,000		4,746,000	7,353,000
43.12	1,581	180	3,338	1,224,037	0	1,224,037	2,806	1,354,982	1,280	115,168	1,239,814	0	230,587	0	0	230,587
1,690	3	0	268	16,434	0	16,434	2,254	3,559	0	0	3,559	2,563	13,342	0	0	13,342
1,690	61	510	31,110	0	0	31,110	80	4,880	0	4,880	5,186	377,349	0	0	0	377,349
1,692	27	510	14,000	0	0	14,000	80	2,195	0	2,195	5,186	169,807	0	0	0	169,807
1,693	3	510	16,434	0	0	16,434	80	3,559	0	3,559	5,186	13,342	0	0	0	13,342
1,691	214	0	268	1,659,789	0	103,014	1,556,775	2,254	339,713	0	4,484	335,230	2,563	333,954	0	6,405
1,700	275	5,282	1,449,935	965	264,893	1,185,042	928	254,838	42	11,529	243,309	566	155,252	60	16,470	138,782
1,709	15	5,282	44,165	965	7,358	36,807	928	7,689	42	320	7,369	566	51,481	60	458	51,024
1,710	15	510	7,778	0	0	7,778	80	1,220	0	1,220	6,186	34,337	0	0	0	34,337
1,710	15	510	82,163	0	0	82,163	80	17,796	0	17,796	6,186	66,710	0	0	0	66,710
1,711	46	0	268	469,882	0	469,882	2,254	103,118	0	103,118	2,563	117,248	0	0	0	117,248
1,712	153	0	268	1,515,639	0	91,500	1,424,139	2,254	405,737	0	9,150	396,587	2,563	195,413	0	195,413
1,717	305	6,111	2,931,341	1,200	368,000	2,565,341	3,067	935,491	120	36,600	898,891	0	0	0	0	0
1,727	15	9,611	77,172	1,200	9,150	68,022	3,067	46,775	120	915	45,860	0	69,395	0	0	69,395
1,728	76	510	38,888	0	0	38,888	3,067	233,873	0	233,873	9,101	693,948	0	0	0	693,948
1,730	92	510	45,665	0	0	45,665	3,067	280,647	0	280,647	9,101	832,737	0	0	0	832,737
1,733	15	510	43,158	0	0	43,158	3,067	58,315	0	58,315	9,101	87,768	0	0	0	87,768
1,734	229	5,150	1,138,083	0	0	1,178,083	4,581	1,047,833	0	1,047,833	2,410	551,210	0	0	0	551,210
1,741	6	5,150	17,253	0	0	17,253	4,581	27,942	0	27,942	2,410	28,851	0	0	0	28,851
1,741	146	510	74,664	0	0	74,664	4,581	651,979	0	651,979	7,050	997,163	0	0	0	997,163
1,746	15	510	40,764	0	0	40,764	4,326	65,973	0	65,973	0	65,973	6,573	67,247	0	67,247
1,747	137	4,836	663,754	1,200	164,700	499,054	4,326	593,761	0	593,761	2,247	308,346	0	0	0	308,346
1,751	397	4,836	1,917,511	1,200	475,800	1,441,711	4,326	1,715,309	0	1,715,309	2,247	890,776	0	0	0	890,776
1,764	15	4,836	40,764	1,200	9,150	31,614	4,326	202,189	0	202,189	8,540	193,626	2,247	21,661	0	21,661
1,765	168	510	85,553	0	0	85,553	22,188	3,721,955	1,120	187,880	3,534,075	594	99,667	0	0	99,667
1,770	9	510	4,665	0	0	4,665	22,188	203,016	1,120	10,248	192,768	594	5,436	0	0	5,436
1,770	143	510	755,801	0	0	755,801	22,188	2,630,966	1,120	146,217	2,484,749	594	85,170	0	0	85,170
1,775	6	0	0	44,450	0	44,450	88,568	920	5,612	82,956	594	20,386	0	0	0	20,386
1,775	238	4,539	1,073,027	0	0	1,073,027	14,519	3,435,797	920	218,668	3,216,929	6,090	1,438,512	0	0	1,438,512
1,783	397	4,482	2,535,416	0	227,988	2,307,428	14,365	3,623,788	920	192,303	3,431,484	6,003	1,190,186	0	0	1,190,186
1,796	81	8,307	506,738	1,150	70,150	436,588	3,914	238,746	50	3,050	235,696	0	0	0	0	0
1,798	81	8,307	585,500	1,150	102,175	483,325	3,914	187,387	50	1,525	185,862	0	72,572	0	0	72,572
1,800	183	8,127	2,052,783	2,200	402,600	1,650,183	2,230	408,083	0	408,083	2,379	435,434	0	0	0	435,434
1,806	183	8,127	1,919,407	2,200	314,760	1,604,647	2,230	322,326	0	322,326	2,379	496,058	0	0	0	496,058
1,812	122	9,760	1,190,687	1,240	151,260	1,039,427	1,293	157,712	0	157,712	3,042	371,121	0	0	0	371,121
1,816	214	9,760	1,874,138	1,240	132,370	1,741,768	1,293	900,915	0	900,915	3,042	690,997	0	0	0	690,997
1,823	214	7,797	1,664,573	0	0	1,664,573	7,147	1,525,834	0	1,525,834	3,431	732,533	0	0	0	732,533
1,830	15	7,797	129,417	0	0	129,417	7,147	89,745	0	89,745	3,431	38,299	0	0	0	38,299
1,831	137	9,176	1,259,419	1,340	183,915	1,075,504	2,009	274,522	0	274,522	1,592	218,465	0	0	0	218,465
1,835	183	9,176	1,622,587	1,340	224,175	1,398,412	2,000	422,669	0	422,669	1,592	356,017	0	0	0	356,017
1,841	427	8,557	3,551,403	1,110	446,215	3,105,188	2,619	976,708	0	976,708	2,299	1,735,906	0	0	0	1,735,906
1,855	214	8,077	1,724,454	980	209,230	1,515,224	1,956	417,516								

55.00	1,000	9,610	11,020,000	0	35,000	10,985,000	3,930	3,980,000	0	0	3,980,000	1,720	1,505,000	0	0	1,505,000	0	0
56.00	1,000	2,430	11,715,000	70	35,000	11,680,000	4,030	3,930,000	0	0	3,930,000	1,290	1,245,000	0	0	1,245,000	0	0
57.00	3,000	1,000	28,275,000		0	28,275,000	3,830	17,070,000	0	0	17,070,000	1,200	3,120,000	0	0	3,120,000	0	0
60.00	1,000	7,850	10,620,000		0	10,620,000	7,550	5,035,000	0	0	5,035,000	880	1,270,000	0	0	1,270,000	0	0
61.00	1,000	3,390	9,125,000		0	9,125,000	2,520	2,625,000	0	0	2,625,000	1,660	1,730,000	0	0	1,730,000	0	0
62.00	0	4,860	0		0	0	2,730	0	0	0	1,600	0	0	0	0	0	0	0
Sum 4	9,000		61,450,000		705,000	60,745,000		39,140,000		0	39,140,000		13,095,000		0	13,095,000		0
62.00	10	4,350	43,500	3,820	38,200	5,300	2,730	27,300	2,700	27,000	300	900	9,000	900	9,000	0	900	9,000
62.01	1,990	4,350	6,668,500	3,820	6,139,150	527,350	2,730	5,402,850	2,700	5,373,000	29,850	900	1,791,000	900	1,791,000	0	900	2,905,400
64.00	3,000	2,350	3,525,000	2,350	3,525,000	0	2,700	7,665,000	2,700	7,665,000	0	900	2,510,000	900	2,610,000	0	2,020	4,290,000
67.00	2,000	0	0	0	0	0	2,410	4,410,000	2,410	4,410,000	0	840	1,640,000	840	1,640,000	0	840	1,640,000
69.00	10,500	0	0	0	0	0	2,000	10,500,000	2,000	10,500,000	0	800	4,200,000	800	4,200,000	0	800	4,200,000
79.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sum 5	17,500		10,235,000		9,702,350	532,550		28,005,150		27,975,000	30,150		10,250,000		10,250,000	0		13,044,400
L-5																		
Sum 1	12,100		2,060,000		2,060,000	0		19,501,500		19,501,500	0		6,419,500		6,419,500	0		6,419,500
Sum 2	42,120		66,640,738		40,597,400	26,047,338		97,706,998		32,165,800	85,541,198		12,099,000		4,746,000	7,353,000		0
Sum 3	9,882		67,371,172		5,804,951	61,566,221		82,681,018		4,038,597	78,652,420		32,748,247		23,333	32,724,915		0
Sum 4	9,000		61,450,000		705,000	60,745,000		39,140,000		0	39,140,000		13,095,000		0	13,095,000		0
Sum 5	17,500		10,235,000		9,702,350	532,550		28,005,150		27,975,000	30,150		10,250,000		10,250,000	0		13,044,400
Total	90,602		227,756,910		58,665,701	168,891,210		267,044,664		63,680,897	183,363,767		74,611,747		21,438,833	53,172,915		19,463,900

Total Excavation Vol. 588,877,222
 DRY 405,427,892
 NET 183,449,330

53.00	2,008	1,000	5,840	4,970,000	1,270	635,000	4,335,000	1,690	2,995,000	0	0	2,995,000	2,450	2,510,000	0	0	2,510,000	0	
54.00		1,000	4,100	7,790,000	0	0	7,790,000	4,300	4,500,000	0	0	4,500,000	2,570	2,225,000	0	0	2,225,000	0	
55.00		1,000	11,480	13,020,000	0	35,000	12,985,000	4,700	4,700,000	0	0	4,700,000	1,880	1,690,000	0	0	1,690,000	0	
56.00		1,000	14,560	13,405,000	70	35,000	13,370,000	4,700	4,800,000	0	0	4,800,000	1,500	1,425,000	0	0	1,425,000	0	
57.00		3,000	12,250	33,675,000		0	33,675,000	4,500	18,805,000	0	0	18,805,000	1,350	3,525,000	0	0	3,525,000	0	
60.00		1,000	10,200	18,635,000		0	18,635,000	8,570	5,710,000	0	0	5,710,000	1,000	1,450,000	0	0	1,450,000	0	
61.00		1,000	17,050	11,740,000		0	11,740,000	2,850	3,015,000	0	0	3,015,000	1,900	2,010,000	0	0	2,010,000	0	
62.00		0	6,430	0		0	0	3,180	0	0	0	0	2,170	0	0	0	0	0	
Sum 4		9,000		98,225,000		705,000	97,520,000		45,125,000			0	45,125,000	14,835,000		0	14,835,000	0	
62.00		10	6,430	64,300	6,430	64,300	0	3,180	31,800	3,180	31,800	0	1,060	10,600	1,060	10,600	0	1,060	10,600
62.01		1,990	6,430	11,372,850	6,430	11,372,850	0	3,180	6,268,500	3,180	6,268,500	0	1,060	2,089,500	1,060	2,089,500	0	1,060	3,512,350
64.00		3,000	5,000	9,860,000	5,000	9,860,000	0	3,120	3,180,000	3,120	3,180,000	0	1,040	3,060,000	1,040	3,060,000	0	2,470	5,205,000
67.00		2,000	1,640	3,350,000	1,640	3,350,000	0	3,000	5,700,000	3,000	5,700,000	0	1,000	1,940,000	1,000	1,940,000	0	1,000	1,940,000
69.00		14,900	1,710	12,739,500	1,710	12,739,500	0	2,700	20,115,000	2,700	20,115,000	0	940	7,003,000	940	7,003,000	0	940	7,003,000
83.90		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sum 5		21,900		37,486,650		37,486,650	0	0	41,295,300		41,295,300	0	0	14,103,100		14,103,100	0		17,670,950
L-7																			
Sum 1		12,500		20,842,500		20,842,500	0		21,750,000		21,750,000	0		8,000,000		8,000,000	0		8,000,000
Sum 2		47,120		115,293,060		115,293,060	0		114,518,572		114,518,572	76,257,072		17,556,200		17,556,200	9,000,000		688,500
Sum 3		9,882		80,802,288		80,802,288	5,804,951		108,710,560		108,710,560	4,038,597		44,171,959		44,171,959	23,333		84,148,627
Sum 4		9,000		98,225,000		98,225,000	705,000		97,520,000		97,520,000	45,125,000		14,835,000		14,835,000	0		14,835,000
Sum 5		21,900		37,486,650		37,486,650	0		41,295,300		41,295,300	0		14,103,100		14,103,100	0		17,670,950
Total		85,402		352,749,498		352,749,498	210,175,948		329,387,432		329,387,432	105,343,397		224,054,035		224,054,035	98,866,259		304,959,030

Total Excavation Vol. 807,172,639
 DRY 502,213,699
 WET 304,959,030

Station (STA)	(ft)	Dis (ft)	Hard Rock				Soft Rock				Soil				Bad		
			As	Vo	Net V1	Dry V2	As	Vo	Net V1	Dry V2	As	Vo	Net V1	Dry V2	As	Vo	
-11.50		8.500	0	9,222,500	0	9,222,500	0	10,710,000	10,710,000	0	4,080,000	4,080,000	0	0	4,080,000	0	
-3.00		3,000	2,170	11,620,000	2,170	11,620,000	2,520	11,040,000	2,520	11,040,000	980	3,920,000	980	3,920,000	0	3,920,000	
1.00		3,640	3,640		3,640		3,000		3,000	1,000		1,000		1,000		1,000	
Sum 1		92,500	20,842,500		20,842,500	0	21,750,000		21,750,000	0	8,000,000		8,000,000	0	8,000,000	0	
1.00	50	3,640	292,000	3,640	114,750	177,250	3,000	150,000	380	22,500	127,500	2,000	100,000	0	100,000	0	
1.05	1,150	8,040	9,246,000	950	1,092,500	8,153,500	3,000	3,450,000	520	598,000	2,852,000	2,000	2,300,000	0	2,300,000	0	
2.20	18	8,040	80,400	950	9,500	70,900	3,000	30,000	520	5,200	24,800	2,000	25,000	0	25,000	0	
2.21	190	8,040	1,527,600	950	180,500	1,347,100	3,000	570,000	520	98,800	471,200	2,000	570,000	0	570,000	0	
2.40	10	8,040	80,400	950	9,500	70,900	3,000	30,000	520	5,200	24,800	2,000	25,000	0	25,000	0	
2.41	590	8,040	4,743,600	950	580,500	4,163,100	3,000	1,770,000	520	305,800	1,463,200	2,000	1,180,000	0	1,180,000	0	
3.00	2,000	8,040	16,160,000	950	1,900,000	14,260,000	3,000	31,350,000	520	1,040,000	30,310,000	2,000	4,000,000	0	4,000,000	0	
5.00	300	8,120	2,436,000	950	285,000	2,151,000	28,350	8,505,000	520	156,000	8,249,000	2,000	600,000	0	600,000	0	
5.30	200	8,120	812,000	950	95,000	717,000	28,350	2,933,000	520	150,000	2,783,000	2,000	281,000	0	281,000	0	
5.50	1,500	0	0	0	0	0	980	735,000	980	735,000	0	810	1,065,000	810	1,065,000	0	
7.00	3,000	0	2,745,000	0	2,745,000	0	0	600,000	0	600,000	0	610	915,000	610	915,000	0	
10.00	6,000	1,830	19,320,000	1,830	19,320,000	0	400	2,400,000	400	2,400,000	0	0	0	0	0	0	
16.00	4,000	4,610	14,520,000	4,610	14,520,000	0	400	2,400,000	400	2,400,000	0	0	0	0	0	0	
20.00	5,000	2,650	16,450,000	2,650	16,450,000	0	800	3,025,000	800	3,025,000	0	0	0	0	0	0	
25.00	5,000	3,930	9,825,000	3,930	9,825,000	0	410	8,200,000	410	8,200,000	0	0	0	0	0	0	
30.00	6,000	0	5,490,000	0	5,490,000	0	2,870	14,790,000	2,870	14,790,000	0	410	2,460,000	410	2,460,000	0	
36.00	3,000	1,830	10,575,000	1,830	10,575,000	0	2,060	3,720,000	2,060	3,720,000	0	410	1,245,000	410	1,245,000	0	
39.00	4,120	5,220	19,271,000	5,220	10,753,200	8,517,800	420	33,715,972	420	3,502,000	30,213,972	420	865,200	420	865,200	0	
41.12	1,684	3,200		3,200			1,200		1,200			0					
Sum 2	42,120		33,574,050		93,925,450	39,648,610		16,373,972		41,754,500	76,619,472		16,656,200		7,656,200	9,000,000	688,500
43.12	1,684	180	4,175	1,523,298	0	0	1,523,298	5,947	1,682,930	1,280	115,168	1,567,762	0	288,234	0	288,234	0
1,690	3	2,795	20,428	0	0	0	20,428	2,757	4,266	0	0	4,266	3,203	16,877	0	16,877	0
1,690	61	600	36,600	0	0	0	36,600	40	2,440	0	0	2,440	7,733	471,686	0	471,686	0
1,692	27	600	16,470	0	0	0	16,470	40	1,098	0	0	1,098	7,733	212,258	0	212,258	0
1,693	3	600	20,428	0	0	0	20,428	40	4,266	0	0	4,266	7,733	16,877	0	16,877	0
1,693	214	2,795	2,066,730	0	103,014	1,963,716	2,757	411,832	0	4,484	407,348	3,203	417,442	0	6,405	411,037	0
1,700	275	6,565	1,802,124	965	264,893	1,537,232	1,100	302,078	42	11,529	290,549	707	194,085	60	16,470	173,995	0
1,709	15	6,565	54,634	965	7,358	47,276	1,100	8,696	42	320	8,376	707	64,351	60	458	63,894	0
1,710	15	600	9,150	0	0	9,150	40	610	0	0	610	7,733	117,922	0	117,922	0	
1,710	15	600	102,140	0	0	102,140	40	21,330	0	0	21,330	7,733	83,387	0	83,387	0	
1,711	46	2,795	585,387	0	0	585,387	2,757	126,153	0	0	126,153	3,203	146,560	0	146,560	0	
1,712	153	2,795	1,987,056	0	91,500	1,895,556	2,757	520,261	0	9,150	521,111	3,203	244,266	0	244,266	0	
1,717	305	3,264	4,045,641	1,200	366,000	3,679,641	4,197	1,280,025	120	35,600	1,243,425	0	0	0	0	0	
1,727	15	3,264	105,715	1,200	9,150	96,565	4,197	64,001	120	915	63,086	0	96,566	0	96,566	0	
1,728	76	600	45,750	0	0	45,750	4,197	320,006	0	0	320,006	2,664	965,660	0	965,660	0	
1,730	92	600	54,900	0	0	54,900	4,197	384,008	0	0	384,008	2,664	1,158,792	0	1,158,792	0	
1,733	15	600	58,384	0	0	58,384	4,197	80,060	0	0	80,060	2,664	122,134	0	122,134	0	
1,734	229	7,057	1,514,266	0	0	1,514,266	6,303	1,441,792	0	1,441,792	3,353	767,034	0	767,034	0		
1,741	6	7,057	23,354	0	0	23,354	6,303	38,448	0	0	38,448	3,353	40,148	0	40,148	0	
1,741	145	600	87,840	0	0	87,840	6,303	885,955	0	885,955	9,810	1,363,672	0	1,363,672	0		
1,746	15	600	53,412	0	9,150	44,262	5,800	88,456	0	88,456	8,819	90,233	0	90,233	0		
1,747	137	6,405	879,061	1,200	164,700	714,361	5,800	796,108	0	796,108	3,015	413,743	0	413,743	0		
1,751	397	6,405	2,539,511	1,200	475,800	2,063,711	5,800	2,299,869	0	2,299,869	3,015	1,195,257	0	1,195,257	0		
1,764	15	6,405	53,412	1,200	9,150	44,262	5,800	271,202	0	8,540	262,662	3,015	28,065	0	28,065	0	
1,765	168	600	100,650	0	100,650	29,767	4,993,431	1,120	187,880	4,805,551	797	133,735	0	133,735	0		
1,770	9	600	5,490	0	0	5,490	29,767	272,359	1,120	10,248	262,121	797	7,295	0	7,295	0	
1,770	143	600	1,002,057	0	1,002,057	29,767	3,529,634	1,120	148,217	3,383,417	797	114,283	0	114,283	0		
1,775	6	3,381	59,130	0	0	59,130	18,815	920	5,612	113,203	797	27,355	0	27,355	0		
1,775	238	6,006	1,401,457	0	0	1,401,457	18,815	4,539,430	920	218,888	4,320,562	8,172	1,902,577	0	1,902,577	0	
1,783	397	5,776	3,278,318	0	227,988	3,050,330	4,708,490	920	192,303	4,516,187	7,823	1,550,944	0	1,550,944	0		
1,796	61	80,751	656,396	1,150	70,159	586,236	5,056	309,004	50	3,050	305,954	0	0	0	0		
1,798	61	80,751	772,052	1,150	102,175	669,877	5,056	242,077	50	1,525	240,552	0	94,570	0	94,570	0	
1,800	183	4,553	2,563,183	2,200	402,600	2,160,583	2,871	525,453	0	525,453	3,101	567,419	0	567,419	0		
1,805	183	4,553	2,492,266	2,200	314,760	2,177,506	2,871	409,207	0	409,207	3,101	647,367	0	647,367	0		
1,812	122	6,685	1,547,566	1,240	151,200	1,396,366	1,801	195,308	0	195,308	3,974	484,877	0	484,877	0		
1,816	214	82,885	2,434,439	1,240	132,370	2,302,069	1,601	1,158,258	0	1,158,258	3,974	902,802	0	902,802	0		
1,823	214	80,120	2,160,638	0	0	2,160,638	9,249	1,974,726	0	1,974,726	4,483	957,059	0	957,059	0		
1,830	15	80,120	168,074	0	10,218	157,857	9,249	89,760	0	89,760	4,483	50,038	0	50,038	0		
1,831	137	81,922	1,636,354	1,340	183,915	1,452,439	2,525	346,579	0	346,579	2,080	285,429	0	285,429	0		
1,835	183	81,922	2,107,805	1,340	224,175	1,883,630	2,525	536,105	0	536,105	2,080	465,144	0	465,144	0		
1,841	427	81,114	4,563,085	1,110	448,215	4,114,870	3,334	1,240,285	0	1,240,285	3,001						

55.00	1,000	2,170	13,710,000	0	35,000	13,675,000	4,730	4,730,000	0	0	4,730,000	1,860	1,690,000	0	0	1,690,000	0	
56.00	1,000	5,250	14,055,000	70	35,000	14,020,000	4,730	4,630,000	0	0	4,630,000	1,500	1,425,000	0	0	1,425,000	0	
57.00	3,000	2,860	35,580,000		0	35,580,000	4,530	19,695,000	0	0	19,695,000	1,350	3,525,000	0	0	3,525,000	0	
60.00	1,000	8,860	14,390,000		0	14,390,000	8,600	5,725,000	0	0	5,725,000	1,000	1,450,000	0	0	1,450,000	0	
61.00	1,000	7,740	12,400,000		0	12,400,000	2,850	3,040,000	0	0	3,040,000	1,900	2,010,000	0	0	2,010,000	0	
62.00		7,060					3,230		0			2,120						
Sum 4	9,000		63,750,000		705,000	63,045,000		45,360,000		0	45,360,000		14,635,000		0	14,635,000	0	
62.00	10	7,140	71,400	6,430	64,300	7,100	3,150	31,500	3,150	31,500	0	1,040	10,400	1,040	10,400	0	1,040	10,400
62.01	1,890	7,140	12,079,300	6,430	11,372,850	706,450	3,150	6,238,650	3,150	6,238,650	0	1,040	2,069,600	1,040	2,069,600	0	1,040	3,492,450
64.00	3,000	5,000	9,960,000	5,000	9,960,000	0	3,120	9,180,000	3,120	9,180,000	0	1,040	3,060,000	1,040	3,060,000	0	2,470	5,205,000
67.00	2,000	1,640	3,350,000	1,640	3,350,000	0	3,000	5,700,000	3,000	5,700,000	0	1,000	1,940,000	1,000	1,940,000	0	1,000	1,940,000
69.00	4,900	1,710	12,739,500	1,710	12,739,500	0	2,700	20,115,000	2,700	20,115,000	0	940	7,903,000	940	7,903,000	0	940	7,903,000
83.90		0					0		0			0		0				
Sum 5	21,900		38,200,200		37,486,650	713,550		41,265,150		41,265,150	0		14,083,000		14,083,000	0		17,650,850
I - B																		
Sum 1	82,500		20,842,500		20,842,500	0		21,750,000		21,750,000	0		8,000,000		8,000,000	0		8,000,000
Sum 2	82,120		133,574,060		93,925,450	39,648,610		118,373,972		41,754,900	78,619,472		16,656,200		7,656,200	9,000,000		888,500
Sum 3	9,882		86,675,938		5,804,951	80,870,988		109,024,168		4,038,597	104,985,571		44,171,959		23,333	14,148,627		0
Sum 4	9,000		63,750,000		705,000	63,045,000		45,360,000		0	45,360,000		14,635,000		0	14,635,000		0
Sum 5	21,900		38,200,200		37,486,650	713,550		41,265,150		41,265,150	0		14,083,000		14,083,000	0		17,650,850
Total	85,402		183,642,693		158,784,551	224,278,148		335,773,290		108,803,247	226,965,043		17,746,159		29,762,533	67,983,627		26,339,350

Total Excavation Vol.	842,901,498
DRY	519,226,818
NET	323,674,680

L-10 Calculation Table of Excavation Volume

Station (STA)	(ft)	Dls (m)	Hard Rock					Soft Rock					Soil					Mad			
			Ac	Vo	Net A1	Net V1	Dry V2	Ac	Vo	Net A1	Net V1	Dry V2	Ac	Vo	Net A1	Net V1	Dry V2	Ac	Ve		
10.80		3.800	0	0	0	0	0	6,357,000	0	6,357,000	0	0	0	0	0	0	0	0	2,652,000	0	2,652,000
-3.00		4.000	0	940,000	0	940,000	0	1,630	6,260,000	1,630	4,020,000	2,240,000	680	2,810,600	680	2,840,000	0	660	2,880,000	0	2,880,000
1.00		4.70	470	0	470	0	1,500	0	380	0	0	0	740	0	740	0	760	0	0	0	5,532,000
Sum 1		11,800	940,000	0	940,000	0	12,617,000	0	10,377,000	2,240,000	5,492,000	5,492,000	0	0	0	0	0	0	0	0	0
1.00	50	470	93,750	470	35,600	58,250	1,500	120,750	380	22,500	98,250	1,500	69,500	0	0	0	0	0	0	0	69,500
1.05	1,150	3,280	3,772,000	950	1,092,500	2,679,500	3,330	3,829,500	520	598,000	3,231,500	1,280	1,472,000	0	0	0	0	0	0	0	1,472,000
2.20	10	3,280	32,600	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	0	0	0	0	0	0	17,800
2.21	190	3,280	623,200	950	180,500	442,700	3,330	632,700	520	98,800	533,900	2,280	433,200	0	0	0	0	0	0	0	433,200
2.40	10	3,280	32,600	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	0	0	0	0	0	0	17,800
2.41	590	3,280	1,935,200	950	560,500	1,374,700	3,330	1,984,700	520	306,800	1,677,900	1,280	755,200	0	0	0	0	0	0	0	755,200
3.00	2,000	3,280	7,410,000	950	950,000	6,460,000	3,330	7,410,000	520	520,000	6,890,000	1,280	2,540,000	0	0	0	0	0	0	0	2,540,000
5.00	300	4,130	1,239,000	0	0	1,239,000	23,620	1,086,000	0	0	1,086,000	1,250	378,000	0	0	0	0	0	0	0	378,000
5.30	290	4,130	413,000	0	0	413,000	23,620	2,362,000	0	0	2,362,000	1,250	126,000	0	0	0	0	0	0	0	126,000
5.50	1,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.00	1,000	0	295,000	0	295,000	0	0	600,000	0	600,000	0	150,000	0	0	0	0	0	0	0	0	150,000
8.00	2,000	590	970,000	590	970,000	0	1,200	2,440,000	1,200	2,440,000	0	300	610,000	300	610,000	0	0	0	0	0	610,000
10.00	3,500	360	1,085,000	360	1,085,000	0	1,240	4,340,000	1,240	4,340,000	0	310	1,085,000	310	1,085,000	0	0	0	0	0	1,085,000
13.50	2,500	240	9,450,000	240	9,450,000	0	1,240	3,500,000	1,240	3,500,000	0	310	875,000	310	875,000	0	0	0	0	0	875,000
16.00	3,000	7,320	10,980,000	7,320	10,980,000	0	1,560	3,525,000	1,560	3,525,000	0	390	1,050,000	390	1,050,000	0	0	0	0	0	1,050,000
18.00	1,000	0	2,525,000	0	2,525,000	0	780	1,095,000	780	1,095,000	0	310	300,000	310	300,000	0	0	0	0	0	300,000
20.00	4,000	5,050	16,680,000	5,050	16,680,000	0	1,400	5,360,000	1,400	5,360,000	0	350	1,340,000	350	1,340,000	0	0	0	0	0	1,340,000
24.00	1,000	3,250	3,495,000	3,250	3,495,000	0	1,280	1,320,000	1,280	1,320,000	0	320	330,000	320	330,000	0	0	0	0	0	330,000
25.00	1,000	3,740	4,550,000	3,740	4,550,000	0	1,360	1,380,000	1,360	1,380,000	0	340	345,000	340	345,000	0	0	0	0	0	345,000
26.00	1,000	5,360	7,280,000	5,360	7,280,000	0	1,490	1,400,000	1,400	1,400,000	0	350	350,000	350	350,000	0	0	0	0	0	350,000
27.00	1,000	9,200	11,285,000	9,200	11,285,000	0	1,400	1,480,000	1,400	1,480,000	0	350	370,000	350	370,000	0	0	0	0	0	370,000
28.00	1,000	13,370	12,605,000	13,370	12,605,000	0	1,560	1,540,000	1,560	1,540,000	0	390	385,000	390	385,000	0	0	0	0	0	385,000
29.00	1,000	11,840	6,720,000	11,840	6,720,000	0	1,520	1,400,000	1,520	1,400,000	0	380	350,000	380	350,000	0	0	0	0	0	350,000
30.00	0	1,600	0	1,600	0	0	1,280	0	1,280	0	0	320	0	320	0	0	0	0	0	0	320
35.20	2,800	1,600	3,485,000	1,600	3,485,000	0	1,280	2,212,000	1,280	2,212,000	0	320	868,000	320	868,000	0	0	0	0	0	868,000
39.00	4,120	890	5,129,400	890	1,833,400	3,296,000	300	15,450,000	300	3,254,800	12,195,200	0	0	0	0	0	0	0	0	0	618,000
43.12	1,684	1,600	0	0	0	0	1,200	0	1,200	0	0	0	0	0	0	0	0	0	0	0	0
Sum 2	05,920	112,007,150	0	95,997,400	16,009,750	0	90,054,250	0	36,403,300	53,650,950	0	14,885,500	0	9,055,000	5,809,500	0	0	0	0	0	0
43.12	1,684	180	2,590	977,848	0	977,848	0,200	1,083,479	1,280	115,168	968,311	0	182,649	0	0	0	0	0	0	0	182,649
1,690	3	8,178	13,158	0	0	13,158	1,842	2,992	0	2,992	2,030	10,568	0	0	0	0	0	0	0	0	10,568
1,690	61	450	27,450	0	0	27,450	120	7,320	0	7,320	4,900	298,900	0	0	0	0	0	0	0	0	298,900
1,692	27	450	12,350	0	0	12,350	120	3,294	0	3,294	4,900	134,505	0	0	0	0	0	0	0	0	134,505
1,693	3	450	13,158	0	0	13,158	120	2,992	0	2,992	4,900	10,568	0	0	0	0	0	0	0	0	10,568
1,693	214	8,178	1,324,554	0	103,014	1,221,540	1,842	281,180	0	4,484	276,696	2,030	264,527	0	0	0	0	0	0	0	264,527
1,700	275	4,230	1,161,135	985	264,893	896,243	792	217,404	42	11,529	205,875	448	122,976	60	16,470	0	0	0	0	0	16,470
1,709	15	4,230	35,685	985	7,358	28,327	792	6,954	42	320	6,634	448	40,729	60	458	0	0	0	0	0	40,729
1,710	15	450	6,863	0	0	6,863	120	1,830	0	1,830	4,900	74,725	0	0	0	0	0	0	0	0	74,725
1,710	15	450	65,789	0	0	65,789	120	14,950	0	14,950	4,900	52,841	0	0	0	0	0	0	0	0	52,841
1,711	46	8,178	374,144	0	0	374,144	1,842	84,272	0	84,272	2,030	92,873	0	0	0	0	0	0	0	0	92,873
1,712	153	8,178	1,145,733	0	91,590	1,054,233	1,842	309,728	0	9,150	300,578	2,030	154,788	0	0	0	0	0	0	0	154,788
1,712	305	6,848	2,088,640	1,200	366,000	1,722,640	2,220	677,100	120	36,600	640,500	0	0	0	0	0	0	0	0	0	0
1,722	15	6,848	55,647	1,200	9,150	46,497	2,220	33,855	120	915	32,940	0	0	0	0	0	0	0	0	0	32,940
1,728	76	450	34,313	0	0	34,313	2,220	168,275	0	0	169,275	6,398	487,848	0	0	0	0	0	0	0	487,848
1,730	92	450	41,135	0	0	41,135	2,220	203,130	0	0	203,130	6,398	585,417	0	0	0	0	0	0	0	585,417
1,733	15	450	31,735	0	0	31,735	2,220	41,968	0	0	41,968	6,398	61,702	0	0	0	0	0	0	0	61,702
1,734	229	3,712	849,120	0	0	849,120	3,284	751,215	0	0	751,215	1,694	387,503	0	0	0	0	0	0	0	387,503
1,741	6	3,712	12,694	0	0	12,694	3,284	20,032	0	0	20,032	1,694	20,283	0	0	0	0	0	0	0	20,283
1,741	146	450	85,880	0	0	85,880	3,284	480,778	0	0	480,778	4,956	725,558	0	0	0	0	0	0	0	725,558
1,746	15	450	31,735	0	9,150	22,585	3,284	50,081	0	0	50,081	4,956	50,706	0	0	0	0	0	0	0	50,706
1,747	137	3,712	509,472	1,200	164,700	344,772	3,284	450,729	0	0	450,729	1,694	232,502	0	0	0	0	0	0	0	232,502
1,751	397	3,712	1,471,808	1,200	475,800	996,008	3,284	1,302,													

	1,991	519	450	1,547,723	0	329,248	1,218,475	62,482	3,554,836	1,170	307,323	3,251,514	0	375,913	0	0	375,913	0	0	
53.00	2,008		8,178		1,270			2,122		0			2,030							
Sum 3	9,882		53,128,002		5,804,951	47,323,051		64,162,155		4,038,597	60,123,558		24,537,323		23,333	24,513,991			0	
53.00	2,008	1,000	5,520	4,050,000	1,270	635,600	3,415,000	1,230	2,230,000	0	0	2,230,000	1,450	1,250,000	0	0	1,250,000	0	0	
54.00		1,000	2,580	5,275,000	0	0	5,275,000	3,230	3,380,000	0	0	3,380,000	1,050	1,170,000	0	0	1,170,000	0	0	
55.00		1,000	7,970	9,200,000	0	35,000	9,165,000	3,530	3,530,000	0	0	3,530,000	1,290	1,200,000	0	0	1,200,000	0	0	
56.00		1,000	0,430	10,095,000	70	35,000	10,060,000	3,530	3,530,000	0	0	3,530,000	1,110	1,080,000	0	0	1,080,000	0	0	
57.00		3,800	9,760	24,315,000	0	24,315,000	3,530	14,415,000	0	0	14,415,000	1,050	2,745,000	0	0	2,745,000	0	0	0	
60.00		1,000	6,450	8,540,000	0	8,540,000	6,080	4,165,000	0	0	4,165,000	780	1,130,000	0	0	1,130,000	0	0	0	
61.00		1,000	0,630	6,720,000	0	6,720,000	2,250	2,250,000	0	0	2,250,000	1,480	1,500,000	0	0	1,500,000	0	0	0	
62.00			2,810					2,250		0		1,520								
Sum 4	9,000		68,195,000		705,000	67,490,000		33,500,000		0	33,500,000		10,075,000		0	10,075,000			0	
62.00		10	2,810	28,100	2,340	23,400	4,700	2,250	22,500	2,220	22,200	300	760	7,600	760	7,600	0	760	7,600	
62.01		1,990	2,810	4,567,050	2,340	4,099,400	467,650	2,250	3,472,550	2,220	3,442,700	29,850	760	1,512,400	760	1,512,400	0	760	2,547,200	
64.00		3,000	1,780	2,670,000	1,780	2,670,000	0	1,240	3,435,000	1,240	3,435,000	0	760	2,190,000	760	2,190,000	0	1,800	3,750,000	
67.00		2,000	0	0	0	0	0	1,050	1,400,000	1,050	1,400,000	0	700	1,400,000	700	1,400,000	0	700	1,400,000	
69.00		7,300	0	0	0	0	0	350	1,277,500	350	1,277,500	0	700	2,555,000	700	2,555,000	0	700	2,555,000	
76.30			0					0		0		0								
Sum 5	14,300		7,265,150		6,792,800	472,350		9,607,550		9,577,400	30,150		7,665,000		7,665,000				10,259,800	
L-10																				
Sum 1		11,800		940,000		940,000	0	12,617,000		10,377,000	2,240,000		5,492,000		5,492,000		0		5,532,000	
Sum 2		35,920		12,007,150		95,997,400	16,009,750	90,054,250		36,403,300	53,650,950		14,865,500		9,056,000		5,809,500		0	
Sum 3		9,882		53,128,002		5,804,951	47,323,051	64,162,155		4,038,597	60,123,558		24,537,323		23,333		24,513,991		0	
Sum 4		9,000		68,195,000		705,000	67,490,000	33,500,000		0	33,500,000		10,075,000		0		10,075,000		0	
Sum 5		14,300		7,265,150		6,792,800	472,350	9,607,550		9,577,400	30,150		7,665,000		7,665,000		0		10,259,800	
Total	80,902		241,535,302		110,240,151	131,295,151		208,940,955		60,396,297	149,544,658		62,634,823		22,236,333		40,398,491		85,791,800	

Total Excavation Vol.	529,902,860
DRY	321,238,300
NET	208,664,560

53.00	1,991	519	510	1,646,238	0	329,248	1,316,990	84,994	4,325,372	1,170	303,323	4,022,049	0	635,163	0	0	635,163	0	
Sum. J	2,008		9,980		1,270			2,470		0			2,488		0			0	
		9,882		67,371,172		5,804,951	61,566,221		82,691,016		4,038,597	78,652,420		32,748,247		23,333	32,724,915	0	
53.00	2,008	1,000	5,840	4,405,000	1,270	635,000	3,770,000	1,690	2,690,000	0	0	2,890,000	2,450	2,295,000	0	0	2,295,000	0	
54.00		1,000	2,970	6,290,000	0	0	6,290,000	3,690	3,810,000	0	0	3,810,000	2,140	1,930,000	0	0	1,930,000	0	
55.00		1,000	9,610	11,020,000	0	35,000	10,985,000	3,930	3,980,000	0	0	3,980,000	1,720	1,505,000	0	0	1,505,000	0	
56.00		1,000	27,430	11,715,000	70	35,000	11,680,000	4,030	3,930,000	0	0	3,930,000	1,290	1,245,000	0	0	1,245,000	0	
57.00		1,000	11,000	28,275,000	0	0	28,275,000	3,830	17,070,000	0	0	17,070,000	1,200	3,120,000	0	0	3,120,000	0	
60.00		1,000	7,850	10,620,000	0	0	10,620,000	7,550	5,035,000	0	0	5,035,000	880	1,270,000	0	0	1,270,000	0	
61.00		1,000	3,390	9,125,000	0	0	9,125,000	2,520	2,625,000	0	0	2,625,000	1,660	1,730,000	0	0	1,730,000	0	
62.00			4,860					2,730		0			1,800						
Sum. 4		9,000		81,450,000		705,000	80,745,000	39,140,000		0	39,140,000		13,095,000		0	13,095,000		0	
62.00		10	4,350	43,500	3,820	38,200	5,300	2,730	27,300	2,700	27,000	300	900	9,000	900	9,000	0	900	9,000
62.01		1,990	4,350	6,666,500	3,820	6,139,150	527,350	2,730	5,402,850	2,700	5,373,000	29,850	900	1,791,000	900	1,791,000	0	900	2,905,400
64.00		3,000	2,350	3,525,000	2,350	3,525,000	0	2,700	7,685,000	2,700	7,685,000	0	900	2,610,000	900	2,610,000	0	2,020	4,290,000
67.00		2,000	0	0	0	0	0	2,410	4,410,000	2,410	4,410,000	0	840	1,640,000	840	1,640,000	0	840	1,640,000
69.00		10,500	0	0	0	0	0	2,000	10,500,000	2,000	10,500,000	0	800	4,200,000	800	4,200,000	0	800	4,200,000
79.50			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sum. 5		17,500		10,235,000		9,702,350	532,650	28,005,150		27,975,000	30,150		10,250,000		10,250,000		0		13,044,400
C-1																			
Sum. 1		12,100		2,060,000		2,060,000	0	19,501,500		19,501,500	0		6,419,500		6,419,500		0		6,419,500
Sum. 2		15,920		846,366,150		27,194,900	19,171,250	97,309,500		43,308,800	53,993,700		17,600,500		10,247,500		7,353,000		0
Sum. 3		9,882		67,371,172		5,804,951	61,566,221	82,691,016		4,038,597	78,652,420		32,748,247		23,333		32,724,915		0
Sum. 4		9,000		81,450,000		705,000	80,745,000	39,140,000		0	39,140,000		13,095,000		13,095,000		0		0
Sum. 5		17,500		10,235,000		9,702,350	532,650	28,005,150		27,975,000	30,150		10,250,000		10,250,000		0		13,044,400
Total		84,402		907,482,322		845,487,201	162,015,121	266,638,165		84,821,897	171,816,270		80,113,247		26,940,333		53,172,915		19,463,900

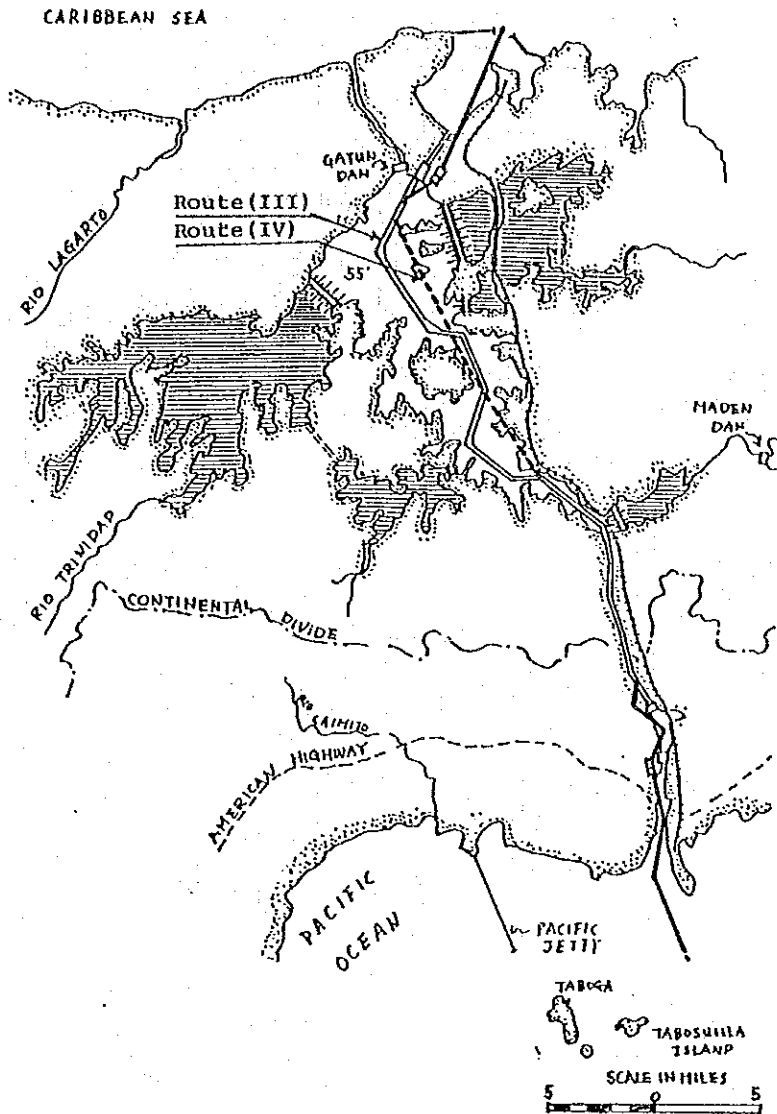
Total Excavation Vol.	673,697,636
DRY	387,004,306
WET	286,693,330

I-16 Calculation Table of Excavation Volume

Station (STA)	(ft)	Dis (ft)	Hard Rock						Soft Rock						Soil						Mad	
			At	Vo	Ret At	Wet V1	Dry V2	At	Vo	Ret At	Wet V1	Dry V2	At	Vo	Ret At	Wet V1	Dry V2	At	Vo			
11.50	0	8,500	0	9,222,500	0	9,222,500	0	10,710,000	0	10,710,000	0	4,000,000	0	4,000,000	0	0	0	0	4,000,000	0		
-3.00	0	4,000	2,170	11,620,000	2,170	11,620,000	0	2,520	11,040,000	2,520	11,040,000	0	960	3,920,000	960	3,920,000	0	960	3,920,000	0		
1.00	0	0	3,640	0	3,640	0	0	3,000	0	3,000	0	1,000	0	1,000	0	0	0	1,000	0	0		
Sum 1	0	12,500	20,812,500	20,812,500	0	21,750,000	21,750,000	0	8,000,000	8,000,000	0	8,000,000	8,000,000	0	81,000	200,000	0	81,000	200,000	0		
1.00	50	3,640	292,000	3,640	114,750	117,250	3,000	150,000	380	22,500	127,500	2,000	100,000	0	0	0	0	100,000	0	0		
1.05	1,150	8,040	9,248,000	950	1,092,500	8,153,500	3,000	3,450,000	520	598,000	2,852,000	2,000	2,300,000	0	0	0	0	2,300,000	0	0		
2.20	10	8,040	80,400	950	9,500	20,900	3,000	30,000	520	5,200	24,800	2,000	25,000	0	0	0	0	25,000	0	0		
2.21	190	8,040	1,527,600	950	180,500	1,347,100	3,000	570,000	520	98,600	471,200	3,000	570,000	0	0	0	0	570,000	0	0		
2.40	10	8,040	80,400	950	9,500	20,900	3,000	30,000	520	5,200	24,800	2,000	25,000	0	0	0	0	25,000	0	0		
2.41	590	8,040	4,743,600	950	560,500	4,183,100	3,000	1,770,000	520	306,800	1,463,200	2,000	1,180,000	0	0	0	0	1,180,000	0	0		
3.00	2,000	8,040	16,160,000	950	1,900,000	14,260,000	3,000	31,350,000	520	1,040,000	30,310,000	2,000	4,000,000	0	0	0	0	4,000,000	0	0		
5.00	300	8,120	2,436,000	950	285,000	2,151,000	3,000	8,505,000	520	156,000	8,349,000	2,000	600,000	0	0	0	0	600,000	0	0		
5.30	200	8,120	812,000	950	85,000	717,000	3,000	2,933,000	520	150,000	2,783,000	2,000	281,000	0	0	0	0	281,000	0	0		
5.50	1,500	0	0	0	0	0	0	960	735,000	960	735,000	0	810	1,065,000	810	1,065,000	0	810	1,065,000	0		
7.00	1,000	0	1,430,000	0	1,430,000	0	0	840,000	0	840,000	0	610	515,000	610	515,000	0	0	515,000	0	0		
8.00	2,800	2,860	5,800,000	2,860	5,800,000	0	0	3,360,000	1,680	3,360,000	0	420	840,000	420	840,000	0	0	840,000	0	0		
10.00	3,500	2,940	10,517,500	2,940	10,517,500	0	0	5,915,000	1,680	5,915,000	0	420	1,487,500	420	1,487,500	0	0	1,487,500	0	0		
13.50	2,500	3,070	20,175,000	3,070	20,175,000	0	0	4,475,000	1,700	4,475,000	0	430	1,125,000	430	1,125,000	0	0	1,125,000	0	0		
16.00	3,000	3,070	22,035,000	3,070	22,035,000	0	0	5,340,000	1,880	5,340,000	0	470	1,335,000	470	1,335,000	0	0	1,335,000	0	0		
19.00	1,000	1,620	5,730,000	1,620	5,730,000	0	0	1,760,000	1,680	1,760,000	0	420	440,000	420	440,000	0	0	440,000	0	0		
20.00	4,000	9,840	32,440,000	9,840	32,440,000	0	0	7,040,000	1,840	7,040,000	0	460	1,760,000	460	1,760,000	0	0	1,760,000	0	0		
24.00	1,000	6,380	6,810,000	6,380	6,810,000	0	0	1,740,000	1,680	1,740,000	0	420	435,000	420	435,000	0	0	435,000	0	0		
25.00	1,000	7,240	6,375,000	7,240	6,375,000	0	0	1,800,000	1,800	1,800,000	0	450	450,000	450	450,000	0	0	450,000	0	0		
26.00	1,000	9,510	11,795,000	9,510	11,795,000	0	0	1,820,000	1,800	1,820,000	0	450	455,000	450	455,000	0	0	455,000	0	0		
27.00	1,000	14,080	17,260,000	14,080	17,260,000	0	0	1,920,000	1,840	1,920,000	0	460	480,000	460	480,000	0	0	480,000	0	0		
28.00	1,000	20,440	19,200,000	20,440	19,200,000	0	0	2,000,000	2,000	2,000,000	0	500	490,000	500	490,000	0	0	490,000	0	0		
29.00	1,000	27,960	11,410,000	27,960	11,410,000	0	0	1,820,000	1,920	1,820,000	0	480	455,000	480	455,000	0	0	455,000	0	0		
30.00	6,200	4,860	30,132,000	4,860	30,132,000	0	0	10,664,000	1,720	10,664,000	0	430	2,666,000	430	2,666,000	0	0	2,666,000	0	0		
35.00	0	4,860	0	4,860	0	0	0	1,720	0	1,720	0	0	0	0	0	0	0	0	0	0		
39.00	4,120	5,220	17,345,200	5,220	17,345,200	0	0	15,637,200	420	3,502,000	12,135,200	420	865,200	420	865,200	0	0	865,200	0	0		
43.12	1,684	0	3,200	3,200	0	0	0	7,200	1,280	0	0	0	0	0	0	0	0	0	0	0		
Sum 2	0	39,320	255,832,700	224,701,950	31,130,750	115,674,200	57,073,500	58,600,700	23,944,700	14,944,700	9,000,000	688,500	0	0	0	0	0	0	0	0		
43.12	180	4,135	1,523,288	0	0	1,523,288	5,947	1,682,930	1,280	115,168	1,567,762	0	288,234	0	0	0	0	288,234	0	0		
1.890	3	12,795	20,428	0	0	20,428	2,757	4,266	0	0	4,266	3,203	16,677	0	0	0	0	16,677	0	0		
1.890	61	600	36,600	0	0	36,600	40	2,440	0	2,440	7,233	471,685	0	0	0	0	0	471,685	0	0		
1.892	27	600	16,470	0	0	16,470	40	1,098	0	1,098	7,233	212,259	0	0	0	0	0	212,259	0	0		
1.893	3	600	20,428	0	0	20,428	40	4,266	0	4,266	7,233	16,677	0	0	0	0	0	16,677	0	0		
1.893	214	2,795	2,068,790	0	103,014	1,965,776	2,757	411,832	0	4,484	407,348	3,203	417,442	0	0	0	0	417,442	0	0		
1.700	275	6,565	1,802,124	965	264,893	1,537,231	1,100	302,078	42	11,529	290,549	707	194,065	60	16,470	177,595	0	177,595	0	0		
1.709	15	6,565	54,634	965	7,358	47,276	1,100	8,659	42	320	8,376	707	64,351	60	458	63,893	0	63,893	0	0		
1.710	15	600	9,150	0	0	9,150	40	810	0	0	610	7,733	117,922	0	0	0	0	117,922	0	0		
1.710	15	600	102,140	0	0	102,140	40	21,330	0	21,330	7,733	82,387	0	0	0	0	0	82,387	0	0		
1.711	45	22,795	585,387	0	0	585,387	2,757	126,153	0	0	126,153	3,203	146,569	0	0	0	0	146,569	0	0		
1.712	153	22,795	1,987,055	0	0	1,987,055	2,757	530,261	0	0	530,261	3,203	244,266	0	0	0	0	244,266	0	0		
1.717	305	13,264	4,045,641	1,200	366,000	3,679,641	4,197	1,280,025	120	36,600	1,243,425	0	0	0	0	0	0	0	0	0		
1.727	15	13,264	105,716	1,200	9,150	95,566	4,197	64,001	120	915	63,086	0	95,566	0	0	0	0	95,566	0	0		
1.728	75	600	45,750	0	0	45,750	4,197	320,006	0	0	320,006	12,664	955,650	0	0	0	0	955,650	0	0		
1.730	92	600	54,900	0	0	54,900	4,197	384,008	0	0	384,008	12,664	1,158,792	0	0	0	0	1,158,792	0	0		
1.733	15	600	58,384	0	0	58,384	4,197	80,050	0	0	80,050	12,664	122,134	0	0	0	0	122,134	0	0		
1.734	229	7,057	1,614,266	0	0	1,614,266	5,303	1,441,792	0	0	1,441,792	3,353	767,034	0	0	0	0	767,034	0	0		
1.741	6	7,057	23,354	0	0	23,354	6,303	38,448	0	0	38,448	3,353	40,148	0	0	0	0	40,148	0	0		
1.741	146	600	87,840	0	0	87,840	6,303	885,965	0	0	885,965	9,810	1,353,672	0	0	0	0	1,353,672	0	0		
1.746	15	600	53,412	0	0	53,412	9,150	44,262	5,800	88,455	8,819	90,233	0	0	0	0	0	90,233	0	0		
1.747	137	6,405	879,061	1,200	164,700	714,361	5,800	795,108	0	0	795,108	3,015	413,743	0	0	0	0	413,743	0	0		
1.751	397	6,405	2,539,511	1,200	475,800	2,063,711	5,800	2,299,869	0	0	2,299,869	3,015	1,195,257	0	0	0	0	1,195,257	0	0		

1.952	15	38,693	590,075	0	0	590,075	9,296	141,767	1,340	20,435	121,332	0	0	0	0	0	0	0	0
1.953	160	38,693	5,126,033	0	109,038	5,016,995	9,296	1,350,933	1,340	112,393	1,438,560	0	35,971	0	0	0	0	35,971	0
1.958	15	22,422	341,931	1,300	19,825	322,108	9,195	140,228	0	0	140,228	429	6,510	0	0	0	0	6,510	0
1.959	45	22,422	1,025,794	1,300	59,475	966,319	9,195	420,684	0	0	420,684	429	19,621	0	0	0	0	19,621	0
1.970	183	22,422	4,586,436	1,300	235,155	4,351,281	9,195	890,778	0	0	890,778	429	39,241	0	0	0	0	39,241	0
1.976	183	27,703	4,185,622	1,270	140,910	4,044,712	540	498,369	0	115,290	381,079	0	0	0	0	0	0	0	0
1.982	92	38,041	1,650,775	270	24,765	1,626,070	4,885	446,959	1,260	115,290	331,669	0	0	0	0	0	0	0	0
1.985	15	18,041	142,140	270	2,059	140,081	4,885	126,553	1,260	17,995	108,558	0	0	0	0	0	0	0	0
1.986	15	600	9,150	0	0	9,150	0	0	0	0	0	0	0	0	0	0	0	0	0
1.986	153	600	91,500	0	0	91,500	1,712	2,278,812	1,100	173,088	2,106,824	0	0	0	0	0	0	0	0
1.991	519	600	1,669,570	0	329,248	1,340,323	18,188	5,153,410	1,120	303,321	4,850,087	0	835,163	0	0	0	0	835,163	0
53.00	2,008	9,882	86,675,938	1,270	5,804,951	80,870,988	3,077	309,024,168	0	4,038,597	104,985,571	3,167	44,171,959	23,333	44,148,627	0	0	0	0
Sum 3	9,882																		
53.00	2,008	1,000	5,840	5,270,000	1,270	635,000	4,635,000	1,890	3,010,000	0	3,010,000	2,450	2,510,000	0	0	0	0	2,510,000	0
54.00	1,000	4,700	8,435,000	0	0	8,435,000	4,330	4,530,000	0	0	4,530,000	2,570	2,225,000	0	0	0	0	2,225,000	0
55.00	1,000	12,170	13,710,000	0	35,000	13,675,000	4,730	4,730,000	0	0	4,730,000	1,880	1,690,000	0	0	0	0	1,690,000	0
56.00	1,000	5,250	14,055,000	70	35,000	14,020,000	4,730	4,630,000	0	0	4,630,000	1,500	1,425,000	0	0	0	0	1,425,000	0
57.00	3,000	2,860	35,580,000	0	35,580,000	35,580,000	4,530	19,695,000	0	0	19,695,000	1,350	3,525,000	0	0	0	0	3,525,000	0
60.00	1,000	0,860	14,300,000	0	14,300,000	14,300,000	6,600	5,725,000	0	0	5,725,000	1,000	1,450,000	0	0	0	0	1,450,000	0
61.00	1,000	7,740	12,400,000	0	12,400,000	12,400,000	2,850	3,040,000	0	0	3,040,000	1,900	2,010,000	0	0	0	0	2,010,000	0
62.00		7,080					3,230		0			2,120							
Sum 4	9,000		103,750,000		705,000	103,045,000		45,360,000		0	45,360,000		14,835,000					14,835,000	
62.00	10	7,140	71,400	8,430	64,300	7,100	3,180	31,800	3,180	31,800	0	1,040	10,400	1,040	10,400	0	1,040	10,400	0
62.01	1,990	7,140	12,079,300	8,430	11,372,850	706,450	3,180	6,268,500	3,180	6,268,500	0	1,040	2,069,600	1,040	2,069,600	0	1,040	3,497,450	0
64.00	3,000	5,000	9,960,000	5,000	9,960,000	0	3,120	9,180,000	3,120	9,180,000	0	1,040	3,060,000	1,040	3,060,000	0	2,470	5,205,000	0
67.00	2,000	1,640	3,350,000	1,640	3,350,000	0	3,000	5,700,000	3,000	5,700,000	0	1,000	1,940,000	1,000	1,940,000	0	1,000	1,940,000	0
69.00	4,900	1,710	12,739,500	1,710	12,739,500	0	2,700	20,115,000	2,700	20,115,000	0	940	7,003,000	940	7,003,000	0	940	7,003,000	0
83.00		0					0		0			0		0					
Sum 5	21,900		38,200,200		37,466,650	713,550		41,295,300		41,295,300	0		14,083,000		14,083,000	0		17,650,850	
L-16																			
Sum 1	12,500		20,842,500		20,842,500	0		21,750,000		21,750,000	0		8,000,000		8,000,000	0		8,000,000	
Sum 2	09,320		255,832,700		224,701,950	31,130,750		115,674,200		57,073,500	58,600,700		23,944,700		14,944,700	9,000,000		888,500	
Sum 3	9,882		86,675,938		5,804,951	80,870,988		309,024,168		4,038,597	104,985,571		44,171,959		23,333	44,148,627		0	
Sum 4	9,000		103,750,000		705,000	103,045,000		45,360,000		0	45,360,000		14,835,000		0	14,835,000		0	
Sum 5	21,900		38,200,200		37,466,650	713,550		41,295,300		41,295,300	0		14,083,000		14,083,000	0		17,650,850	
Total	92,602		605,301,318		289,541,051	215,760,288		824,157,397		824,157,397	208,946,271		37,051,033		67,983,627	26,339,350			

Total Excavation Vol. 969,779,016
 DRY 492,690,186
 WET 477,088,830



Route III (Route 15 + Miraflores + Third Lock)
 Route IV (Route 15 + Gatun + Miraflores + Third Lock)

Study Case	Route	W. Level	No. of Lifts	No. of Lanes	Ship Size (1000 DWT)	Canal Size (m)
L-3	III	55'	1	2	100	301 x 18.7
6	III	55'	1	2	150	301 x 20.9
9	III	55'	1	2	250	399 x 24.2
11	IV	55'	1	2	100	301 x 18.7
14	IV	55'	1	2	150	343 x 20.9
17	IV	55'	1	2	250	399 x 24.2

Layout of Low Rise Lock System for Group B Study Cases (55')

L-3

L-3

Calculation Table of Excavation Volume

Station No.	Dis (ft)	Hard Rock				Soft Rock				Earth				Mad	
		As	Vo	Wet V1	Dry V2	As	Vo	Wet V1	Dry V2	As	Vo	Wet V1	Dry V2	As	Vo
-10.80	7,800	0	0	0	0	6,357,000	6,357,000	0	0	0	2,652,000	2,652,000	0	0	2,652,000
-3.00	4,000	0	940,000	0	940,000	0	1,630	6,260,000	1,630	4,020,000	2,240,000	680	2,840,000	680	2,840,000
1.00	0	470	0	470	0	0	1,500	0	380	0	0	740	0	740	0
Sum 1	11,800		940,000		940,000		12,617,000		10,377,000		2,240,000		5,492,000		5,492,000
1.00	50	470	93,750	470	35,500	58,250	1,500	120,750	380	27,500	58,250	1,500	69,500	0	69,500
1.05	1,150	3,280	3,772,000	950	1,092,500	2,679,500	3,330	3,828,500	520	598,000	3,231,500	1,280	1,472,000	0	1,472,000
2.70	10	3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	17,800
2.71	190	3,280	623,200	950	180,500	442,700	3,330	832,700	520	98,800	533,900	2,280	433,200	0	433,200
2.40	10	3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	17,800
2.41	590	3,280	1,935,200	950	580,500	1,374,700	3,330	1,984,700	520	206,800	1,657,900	1,280	3,800,000	0	3,800,000
3.00	7,000	3,280	18,640,000	950	1,020,000	17,640,000	3,330	6,930,000	520	520,000	6,410,000	1,280	3,800,000	0	3,800,000
5.00	500	15,380	3,845,000	70	17,500	3,827,500	3,600	1,275,000	0	375,000	900,000	2,520	787,500	0	787,500
5.50	1,500	0	0	0	0	0	1,500	1,792,500	1,500	1,792,500	0	610	915,000	610	915,000
7.00	3,000	0	0	0	0	0	890	3,705,000	890	3,705,000	0	610	1,830,000	610	1,830,000
10.00	6,000	0	5,730,000	0	5,730,000	0	1,580	10,320,000	1,580	10,320,000	0	610	3,720,000	610	3,720,000
16.00	4,600	1,910	5,600,000	1,910	5,600,000	0	1,860	6,780,000	1,860	6,780,000	0	630	2,480,000	630	2,480,000
20.00	5,600	890	5,025,000	890	5,025,000	0	1,520	6,425,000	1,520	6,425,000	0	610	3,075,000	610	3,075,000
25.00	8,000	1,120	3,300,000	1,120	3,300,000	0	1,850	9,075,000	1,850	9,075,000	0	620	3,100,000	620	3,100,000
30.00	6,000	800	4,140,000	200	4,140,000	0	1,780	10,920,000	1,780	10,920,000	0	620	3,720,000	620	3,720,000
35.00	3,600	1,160	8,325,000	1,160	8,325,000	0	1,860	2,865,000	1,860	2,865,000	0	620	975,000	620	975,000
39.00	4,000	4,370	29,660,000	4,370	13,500,000	16,160,000	50	3,520,000	50	460,000	3,060,000	30	2,340,000	0	2,340,000
43.00	0	10,460	0	2,380	0	0	1,710	0	180	0	0	1,140	0	60	0
Sum 2	42,000		80,774,750		48,545,500	42,229,250		72,201,750		56,254,000	15,947,750		29,503,000		20,042,500
43.00	1,000	10,460	9,055,000	2,380	2,125,000	6,940,000	1,710	1,750,000	180	145,000	1,605,000	1,140	1,140,000	60	30,000
44.00	1,000	7,870	8,930,000	1,870	1,910,000	7,020,000	1,790	1,850,000	110	140,000	1,710,000	1,140	1,190,000	0	20,000
45.00	1,000	10,190	13,565,000	1,950	1,965,000	11,600,000	1,910	2,215,000	170	85,000	2,130,000	1,240	1,550,000	40	20,000
46.00	1,000	16,940	15,865,000	1,980	1,940,000	13,925,000	2,520	2,235,000	0	0	2,235,000	1,860	1,600,000	0	1,600,000
47.00	1,000	14,790	15,375,000	1,900	1,940,000	13,435,000	1,950	1,980,000	0	0	1,980,000	1,340	1,380,000	0	1,380,000
48.00	1,000	15,850	17,910,000	1,980	2,115,000	15,795,000	2,010	2,145,000	0	0	2,145,000	1,470	1,530,000	0	1,530,000
49.00	1,000	19,860	15,420,000	2,250	2,550,000	12,870,000	2,280	2,090,000	0	95,000	1,995,000	1,640	1,440,000	0	35,000
50.00	1,000	10,980	14,125,000	2,850	3,045,000	11,080,000	1,900	2,300,000	190	185,000	2,115,000	1,240	1,520,000	70	65,000
51.00	1,000	17,270	20,605,000	3,240	2,780,000	17,845,000	2,700	2,390,000	160	90,000	2,300,000	1,800	1,620,000	60	30,000
52.00	1,000	23,940	24,550,000	2,280	2,070,000	22,480,000	2,080	2,285,000	0	0	2,285,000	1,440	1,540,000	0	1,540,000
53.00	0	25,160	0	1,860	0	0	2,490	0	0	0	0	1,640	0	0	0
Sum 3	10,000		355,410,000		22,420,000	32,990,000		21,240,000		740,000	20,500,000		14,510,000		206,000
53.00	1,000	25,160	23,500,000	1,860	930,000	22,570,000	2,490	2,760,000	0	0	2,760,000	1,640	1,660,000	0	1,660,000
54.00	1,000	21,840	15,005,000	0	0	15,005,000	3,030	2,685,000	0	0	2,685,000	2,080	1,830,000	0	1,830,000
55.00	500	8,170	3,995,000	0	0	3,995,000	2,340	1,197,500	0	0	1,197,500	1,580	790,000	0	790,000
55.50	500	7,810	3,090,000	0	0	3,090,000	2,290	1,110,000	0	0	1,110,000	1,580	760,000	0	760,000
56.00	1,000	4,550	7,030,000	0	365,000	6,665,000	2,150	2,390,000	0	245,000	2,145,000	1,450	1,660,000	0	1,660,000
57.00	1,000	9,510	6,450,000	730	1,015,000	5,435,000	2,630	2,180,000	490	630,000	1,550,000	1,860	1,340,000	320	200,000
58.00	1,000	3,390	5,270,000	1,300	1,190,000	4,080,000	1,730	1,750,000	710	470,000	1,280,000	820	970,000	80	50,000
59.00	1,000	7,150	8,690,000	1,060	2,690,000	6,000,000	1,770	1,810,000	170	290,000	1,520,000	1,120	1,085,000	20	35,000
60.00	1,000	10,230	11,095,000	4,300	2,815,000	8,280,000	1,850	1,750,000	410	205,000	1,545,000	1,050	1,075,000	50	25,000
61.00	1,000	11,990	7,665,000	1,330	1,430,000	6,235,000	1,850	1,930,000	0	535,000	1,395,000	1,100	1,025,000	0	35,000
62.00	0	3,370	0	1,530	0	0	2,210	0	1,070	0	0	950	0	70	0
Sum 4	9,000		91,790,000		10,435,000	81,355,000		19,522,500		2,375,000	17,147,500		12,335,000		505,000
62.00	2,000	3,370	7,740,000	1,530	3,830,000	3,910,000	2,210	3,010,000	1,070	1,070,000	1,940,000	950	1,940,000	70	70,000
64.00	3,000	4,370	6,765,000	2,300	3,660,000	3,105,000	800	3,075,000	0	1,875,000	1,200,000	990	2,460,000	0	975,000
67.00	6,000	140	420,000	140	420,000	0	1,250	5,370,000	1,250	5,370,000	0	650	3,960,000	650	3,960,000
73.00	3,300	0	0	0	0	0	540	891,000	540	891,000	0	650	1,072,500	650	1,072,500
76.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sum 5	14,300		14,925,000		7,910,000	7,015,000		12,346,000		9,206,000	3,140,000		9,372,500		6,017,500
L-3															
Sum 1	11,800		940,000		940,000	0		12,617,000		10,377,000	2,240,000		5,492,000		5,492,000
Sum 2	42,000		80,774,750		48,545,500	42,229,250		72,201,750		56,254,000	15,947,750		29,503,000		20,042,500
Sum 3	10,000		355,410,000		22,420,000	32,990,000		21,240,000		740,000	20,500,000		14,510,000		206,000
Sum 4	9,000		91,790,000		10,435,000	81,355,000		19,522,500		2,375,000	17,147,500		12,385,000		505,000
Sum 5	14,300		14,925,000		7,910,000	7,015,000		12,346,000		9,206,000	3,140,000		9,372,500		6,017,500
Total	87,100		953,839,750		90,250,500	263,589,250		227,927,250		78,952,000	58,975,250		71,272,500		32,257,000

Total Excavation Vol.	594,945,500
DRY	361,560,000
WET	233,385,500

L-6 Calculation Table of Excavation Volume

Station No.	Dfs (ft)	Hard Rock				Soft Rock				Earth				Mud	
		As	Vo	Wet V1	Dry V2	As	Vo	Wet V1	Dry V2	As	Vo	Wet V1	Dry V2	As	Vo
-11.10	8.100	0	0	0	0	0	9,841,500	0	0	0	0	0	0	0	3,199,500
-3.00	4,000	0	2,060,000	0	0	2,430	9,680,000	2,430	9,680,000	0	0	790	3,220,000	790	3,220,000
1.00	0	1,030	0	1,030	0	0	2,400	0	2,400	0	0	820	0	820	0
Sum 1	12,100		2,060,000		0		19,501,500		19,501,500			0	6,419,500	6,419,500	0
1.00	50	1,030	158,250	470	35,500	122,750	2,400	123,000	380	22,500	100,500	1,640	85,000	0	85,000
1.05	1,150	5,300	6,095,000	950	1,092,500	5,002,500	2,520	2,898,000	520	598,000	2,300,000	1,760	2,024,000	0	2,024,000
2.20	10	5,300	53,000	950	9,500	43,500	2,520	25,200	520	5,200	20,000	1,760	22,600	0	22,600
2.21	190	5,300	1,007,000	950	180,500	826,500	2,520	478,800	520	98,800	380,000	2,760	524,400	0	524,400
2.40	10	5,300	53,000	950	9,500	43,500	2,520	25,200	520	5,200	20,000	2,760	27,600	0	27,600
2.41	990	5,300	3,127,000	950	560,500	2,566,500	2,520	1,486,800	520	308,800	1,180,000	1,760	1,038,400	0	1,038,400
3.00	2,000	5,300	23,380,000	950	1,000,000	22,380,000	2,520	6,300,000	520	520,000	5,780,000	1,760	4,400,000	0	4,400,000
5.00	500	18,080	4,620,000	50	112,500	4,507,500	3,780	1,465,000	0	520,000	945,000	2,640	835,000	0	175,000
5.50	1,500	400	300,000	400	300,000	0	2,080	2,857,500	2,080	2,857,500	0	700	1,050,000	700	1,050,000
7.00	3,000	0	930,000	0	930,000	0	1,730	5,715,000	1,730	5,715,000	0	700	2,100,000	700	2,100,000
10.00	6,000	820	10,710,000	820	10,710,000	0	2,080	12,540,000	2,080	12,540,000	0	700	4,260,000	700	4,260,000
16.00	4,000	2,950	8,980,000	2,950	8,980,000	0	2,000	8,200,000	2,000	8,200,000	0	720	2,840,000	720	2,840,000
20.00	5,000	1,540	9,100,000	1,540	9,100,000	0	2,000	10,325,000	2,000	10,325,000	0	700	3,525,000	700	3,525,000
25.00	5,000	2,100	7,950,000	2,100	7,950,000	0	2,130	10,650,000	2,130	10,650,000	0	710	3,550,000	710	3,550,000
30.00	6,000	1,080	9,900,000	1,080	9,900,000	0	2,130	12,780,000	2,130	12,780,000	0	718	4,290,000	718	4,290,000
35.00	3,000	2,220	12,865,000	2,220	12,735,000	150,000	2,130	3,720,000	2,130	3,360,000	360,000	720	1,380,000	720	1,080,000
39.00	4,000	6,370	38,000,000	6,270	17,900,000	20,100,000	350	6,520,000	110	620,000	5,900,000	200	2,960,000	200	2,760,000
43.00	0	12,630	0	2,680	0	0	2,910	0	200	0	0	1,280	0	100	0
Sum 2	42,000		37,248,250		81,505,500	55,742,750		66,109,500		69,124,000	16,985,500		34,907,000		23,070,000
41.00	1,000	12,630	11,260,000	2,680	2,405,000	8,855,000	2,910	2,495,000	200	155,000	2,340,000	1,280	1,300,000	100	50,000
44.00	1,000	9,890	11,490,000	2,130	2,205,000	9,285,000	2,080	2,135,000	110	140,000	1,995,000	1,320	1,380,000	0	20,000
45.00	1,000	13,090	16,950,000	2,280	2,280,000	14,670,000	2,190	2,355,000	170	85,000	2,270,000	1,440	1,740,000	40	20,000
46.00	1,000	20,810	19,525,000	2,280	2,230,000	17,295,000	2,520	2,375,000	0	0	2,375,000	2,040	1,760,000	0	1,780,000
47.00	1,000	18,240	18,790,000	2,180	2,205,000	16,585,000	2,230	2,855,000	0	0	2,255,000	1,520	1,560,000	0	1,560,000
48.00	1,000	19,240	21,755,000	2,230	2,400,000	19,355,000	2,280	2,340,000	0	0	2,340,000	1,600	1,620,000	0	1,620,000
49.00	1,000	24,170	19,425,000	2,570	2,895,000	16,530,000	2,400	2,285,000	0	95,000	2,190,000	1,640	1,535,000	0	35,000
50.00	1,000	14,680	18,470,000	3,220	3,510,000	14,960,000	2,170	2,570,000	190	185,000	2,385,000	1,490	1,690,000	70	65,000
51.00	1,000	22,260	25,380,000	3,800	3,195,000	22,185,000	2,970	2,895,000	160	90,000	2,575,000	1,950	1,745,000	80	30,000
52.00	1,000	28,500	28,450,000	2,590	2,330,000	26,120,000	2,360	2,545,000	0	0	2,545,000	1,540	1,680,000	0	1,660,000
53.00	0	28,400	0	2,070	0	0	2,730	0	0	0	0	1,820	0	0	0
Sum 3	10,000		91,495,000		25,655,000	165,840,000		24,020,000		750,000	23,270,000		16,030,000		220,000
53.00	1,000	28,400	27,365,000	2,070	1,035,000	26,330,000	2,730	2,960,000	0	0	2,960,000	1,820	1,985,000	0	1,985,000
54.00	1,000	26,330	18,280,000	0	0	18,280,000	3,190	2,885,000	0	0	2,885,000	2,150	1,960,000	0	1,960,000
55.00	500	10,230	4,995,000	0	0	4,995,000	2,580	1,305,000	0	0	1,305,000	1,770	885,000	0	885,000
55.50	500	9,750	4,072,500	0	0	4,072,500	2,640	1,267,500	0	0	1,267,500	1,770	857,500	0	857,500
56.00	1,000	6,540	10,275,000	0	470,000	9,805,000	2,430	2,670,000	0	245,000	2,425,000	1,660	1,810,000	0	1,810,000
57.00	1,000	14,010	9,480,000	940	1,320,000	8,160,000	2,910	2,515,000	490	630,000	1,885,000	1,960	1,490,000	320	200,000
58.00	1,000	4,950	2,480,000	1,700	1,530,000	5,950,000	2,120	2,060,000	770	470,000	1,590,000	1,020	1,160,000	80	50,000
59.00	1,000	10,010	11,200,000	1,360	2,975,000	8,225,000	2,000	2,075,000	170	290,000	1,785,000	1,300	1,280,000	20	35,000
60.00	1,000	12,390	13,310,000	4,590	3,095,000	10,215,000	2,150	2,050,000	410	205,000	1,845,000	1,220	1,255,000	50	25,000
61.00	1,000	14,230	9,725,000	1,600	2,815,000	7,910,000	1,950	2,260,000	0	535,000	1,725,000	1,290	1,240,000	0	35,000
62.00	0	5,220	0	2,030	0	0	2,570	0	1,070	0	0	1,190	0	70	0
Sum 4	9,000		816,182,500		12,240,000	803,942,500		22,047,500		2,375,000	19,672,500		13,902,500		345,000
62.00	2,000	5,220	11,430,000	2,030	4,830,000	6,600,000	2,570	3,870,000	1,070	1,070,000	2,800,000	1,190	2,240,000	70	70,000
64.00	3,000	6,210	10,485,000	2,800	5,370,000	5,115,000	1,300	4,580,000	0	2,610,000	1,950,000	1,050	2,700,000	0	1,125,000
67.00	8,000	780	2,910,000	780	2,910,000	0	1,740	9,960,000	1,740	9,960,000	0	750	4,530,000	750	4,530,000
73.00	8,500	190	617,500	190	617,500	0	1,580	5,135,000	1,580	5,135,000	0	760	2,470,000	760	2,470,000
79.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sum 5	17,500		25,442,500		13,727,500	11,715,000		23,525,000		18,775,000	4,750,000		11,940,000		8,195,000
L-6															
Sum 1	12,100		2,060,000		2,060,000	0		19,501,500		19,501,500	0		6,419,500		6,419,500
Sum 2	42,000		37,248,250		81,505,500	55,742,750		66,109,500		69,124,000	16,985,500		34,907,000		23,070,000
Sum 3	10,000		91,495,000		25,655,000	165,840,000		24,020,000		750,000	23,270,000		16,030,000		220,000
Sum 4	9,000		816,182,500		12,240,000	803,942,500		22,047,500		2,375,000	19,672,500		13,902,500		345,000
Sum 5	17,500		25,442,500		13,727,500	11,715,000		23,525,000		18,775,000	4,750,000		11,940,000		8,195,000
Total	90,600		872,428,250		835,188,000	937,240,250		875,203,500		810,525,500	64,678,000		83,199,000		38,249,500

Total Excavation Vol. 768,765,250
 Dry 416,857,750
 Wet 321,897,500

L-9 Calculation Table of Excavation Volume

L-9

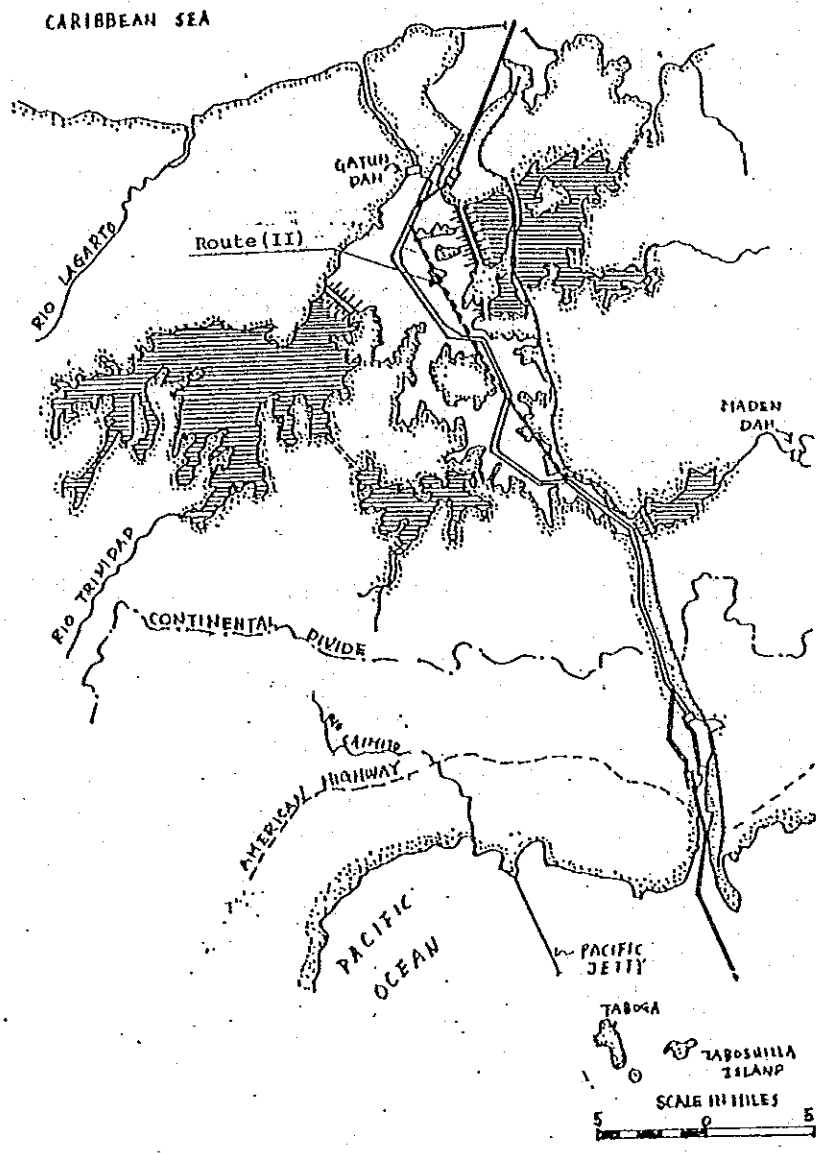
Station No.	Dis (ft)	Hard Rock					Soft Rock					Earth					Mad	
		As	Vo	Net V1	Dry V2		As	Vo	Net V1	Dry V2		As	Vo	Net V1	Dry V2	As	Vo	
-11.50	8,500	0	0	0	0	0	10,327,500	0	10,327,500	0	0	3,357,500	0	3,357,500	0	0	3,357,500	
-2.00	4,000	0	2,060,000	0	2,060,000	0	2,430	3,660,000	2,430	3,660,000	0	790	3,220,000	790	3,220,000	0	790	
1.00	0	1,030	0	1,030	0	0	2,400	0	2,400	0	0	820	0	820	0	820	0	
Sum 1	12,500		2,060,000		2,060,000	0		19,987,500		19,987,500	0		6,577,500		6,577,500	0	6,577,500	
1.00	50	1,030	158,250	470	35,500	122,750	2,400	123,000	380	22,500	100,500	1,640	85,000	0	0	85,000	0	
1.05	1,150	5,300	6,095,000	950	1,092,500	5,002,500	2,520	2,898,000	520	598,000	2,300,000	1,760	2,024,000	0	0	2,024,000	0	
2.70	10	5,300	53,000	950	9,500	43,500	2,520	25,200	520	5,200	20,000	1,760	32,800	0	0	22,600	0	
2.21	190	5,300	1,007,000	950	180,500	826,500	2,520	478,800	920	98,800	380,000	2,760	524,400	0	0	524,400	0	
2.40	10	5,300	53,000	950	9,500	43,500	2,520	25,200	520	5,200	20,000	2,760	32,800	0	0	22,600	0	
2.41	590	5,300	3,127,000	950	580,500	2,546,500	2,520	1,486,800	520	306,800	1,180,000	1,760	1,034,400	0	0	1,034,400	0	
3.00	2,000	5,300	27,910,000	950	1,060,000	26,850,000	2,520	6,570,000	520	520,000	6,050,000	1,760	4,600,000	0	0	4,600,000	0	
5.00	500	22,610	6,027,500	110	402,500	5,625,000	4,050	1,622,500	0	610,000	1,012,500	2,840	915,000	0	205,000	710,000	207,500	
5.50	1,500	1,500	1,680,000	1,500	1,680,000	0	2,440	3,652,500	2,440	3,652,500	0	820	1,230,000	820	1,230,000	0	830	
7.00	3,000	740	3,930,000	740	3,930,000	0	2,430	2,290,000	2,430	2,290,000	0	820	2,460,000	820	2,460,000	0	830	
10.00	8,000	1,880	19,280,000	1,880	19,280,000	0	2,430	14,790,000	2,430	14,790,000	0	820	4,980,000	820	4,980,000	0	830	
16.00	4,000	4,780	14,960,000	4,780	14,960,000	0	2,560	10,040,000	2,560	10,040,000	0	840	3,320,000	840	3,320,000	0	850	
20.00	5,000	2,700	16,175,000	2,700	16,175,000	0	2,520	12,500,000	2,520	12,500,000	0	820	4,125,000	820	4,125,000	0	830	
25.00	5,000	3,770	16,325,000	3,770	16,325,000	0	2,480	12,450,000	2,480	12,450,000	0	830	4,175,000	830	4,175,000	0	840	
30.00	6,000	2,760	19,170,000	2,760	19,170,000	0	2,500	14,970,000	2,500	14,970,000	0	840	5,040,000	840	5,040,000	0	850	
35.00	3,000	3,630	18,930,000	3,630	18,930,000	2,025,000	2,490	4,635,000	2,490	3,900,000	735,000	840	1,920,000	840	1,260,000	660,000	850	
39.00	4,000	8,990	47,900,000	7,640	24,140,000	23,760,000	600	5,340,000	1,110	940,000	4,400,000	440	3,440,000	0	200,000	3,240,000	0	
43.00	0	14,960	0	4,430	0	0	2,070	0	360	0	1,280	0	100	0	0	0	0	
Sum 2	42,000		203,480,750		36,615,500	66,865,250		98,897,000		82,699,000	16,198,000		39,922,000		26,995,000	12,927,000	27,117,500	
43.00	1,000	4,460	14,305,000	4,430	3,465,000	10,840,000	2,070	2,365,000	360	235,000	2,070,000	1,280	1,470,000	100	50,000	1,420,000	0	
44.00	1,000	33,850	15,335,000	2,500	2,600,000	12,735,000	2,540	2,555,000	110	140,000	2,415,000	1,660	1,665,000	0	20,000	1,645,000	0	
45.00	1,000	17,020	21,940,000	2,700	2,600,000	19,340,000	2,570	2,635,000	170	85,000	2,550,000	1,670	1,915,000	40	20,000	1,895,000	0	
46.00	1,000	26,860	25,105,000	2,500	2,500,000	22,605,000	2,700	2,660,000	0	0	2,660,000	2,160	2,060,000	0	0	2,060,000	0	
47.00	1,000	23,350	23,910,000	2,500	2,550,000	21,360,000	2,620	2,440,000	0	0	2,640,000	1,840	1,850,000	0	0	1,850,000	0	
48.00	1,000	24,470	28,940,000	2,600	2,750,000	24,190,000	2,660	2,665,000	0	0	2,665,000	1,860	1,840,000	0	0	1,840,000	0	
49.00	1,000	29,410	24,770,000	2,900	3,370,000	21,400,000	2,670	2,605,000	0	95,000	2,510,000	1,820	1,745,000	0	35,000	1,710,000	0	
50.00	1,000	20,130	24,505,000	3,840	4,220,000	20,285,000	2,540	2,890,000	190	185,000	2,705,000	1,670	1,925,000	70	65,000	1,860,000	0	
51.00	1,000	28,880	31,645,000	4,600	3,800,000	27,845,000	3,240	2,970,000	180	80,000	2,880,000	2,180	1,980,000	60	30,000	1,950,000	0	
52.00	1,000	34,410	35,975,000	3,000	2,700,000	33,275,000	2,700	2,850,000	0	0	2,850,000	1,780	1,920,000	0	0	1,920,000	0	
53.00	0	37,540	0	2,400	0	0	3,000	0	0	0	2,080	0	0	0	0	0	0	
Sum 3	10,000		244,430,000		30,555,000	213,875,000		26,775,000		630,000	25,845,000		18,310,000		220,000	18,090,000	0	
53.00	1,000	37,540	34,855,000	2,400	1,200,000	33,655,000	3,000	3,230,000	0	0	3,230,000	2,660	2,195,000	0	0	2,195,000	0	
54.00	1,000	32,170	22,750,000	0	0	22,750,000	3,460	3,209,000	0	0	3,200,000	2,330	2,155,000	0	0	2,155,000	0	
55.00	500	33,330	6,535,000	0	0	6,535,000	2,940	1,487,500	0	0	1,487,500	1,980	1,002,500	0	0	1,002,500	0	
55.50	500	12,810	5,587,500	0	0	5,587,500	3,010	1,457,500	0	0	1,457,500	2,030	987,500	0	0	987,500	0	
56.00	1,000	9,540	14,950,000	0	850,000	14,300,000	2,820	3,665,000	0	245,000	2,820,000	1,920	2,120,000	0	0	2,120,000	0	
57.00	1,000	20,360	13,920,000	1,300	1,805,000	12,120,000	3,310	2,910,000	490	630,000	2,280,000	2,320	1,810,000	320	200,000	1,610,000	0	
58.00	1,000	7,480	10,505,000	2,300	2,020,000	8,485,000	2,510	2,435,000	770	470,000	1,965,000	1,300	1,410,000	80	50,000	1,360,000	0	
59.00	1,000	33,530	14,715,000	1,740	4,420,000	10,295,000	2,380	2,285,000	170	290,000	1,995,000	1,520	1,400,000	20	35,000	1,365,000	0	
60.00	1,000	15,900	16,785,000	7,100	4,450,000	12,335,000	2,210	2,255,000	410	295,000	2,050,000	1,280	1,400,000	50	25,000	1,375,000	0	
61.00	1,000	17,670	12,810,000	1,800	2,185,000	10,625,000	2,300	2,635,000	0	535,000	2,100,000	1,520	1,495,000	0	35,000	1,460,000	0	
62.00	0	7,950	0	2,570	0	0	2,970	0	1,070	0	0	1,470	0	70	0	0	0	
Sum 4	9,000		153,412,500		16,725,000	136,687,500		24,960,000		2,375,000	22,585,000		15,975,000		345,000	15,630,000	0	
62.00	2,000	7,950	16,520,000	2,570	6,020,000	10,500,000	2,970	4,710,000	1,070	1,070,000	3,640,000	1,470	2,870,000	70	70,000	2,800,000	0	
64.00	3,000	8,570	15,705,000	3,450	8,025,000	7,680,000	1,740	6,495,000	0	3,795,000	2,610,000	1,400	3,450,000	0	1,350,000	2,100,000	0	
67.00	6,000	1,900	9,240,000	1,800	9,240,000	0	2,530	15,210,000	2,530	15,210,000	0	900	5,430,000	900	5,430,000	0	930	
73.00	10,800	1,180	6,431,000	1,180	6,431,000	0	2,540	13,843,000	2,540	13,843,000	0	910	4,959,500	910	4,959,500	0	920	
83.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sum 5	21,900		47,836,000		29,716,000	18,180,000		40,168,000		33,918,000	6,250,000		18,709,500		11,809,500	4,900,000	11,959,000	
L-9																		
Sum 1	12,500		2,060,000		2,060,000	0		19,987,500		19,987,500	0		6,577,500		6,577,500	0	6,577,500	
Sum 2	42,000		203,480,750		36,615,500	66,865,250		98,897,000		82,699,000	16,198,000		39,922,000		26,995,000	12,927,000	27,117,500	
Sum 3	10,000		244,430,000		30,555,000	213,875,000		26,775,000		630,000	25,845,000		18,310,000		220,000	18,090,000	0	
Sum 4	9,000		153,412,500		16,725,000	136,687,500		24,960,000		2,375,000	22,585,000		15,975,000		345,000	15,630,000	0	
Sum 5	21,900		47,836,000	</														

L-11 Calculation Table of Excavation Volume

Station No.	Dis (ft)	Hard Rock					Soft Rock					Earth					Mad		
		As	Vs	Wet A1	Wet V1	Dry V2	As	Vs	Wet A1	Wet V1	Dry V2	As	Vs	Wet A1	Wet V1	Dry V2	As	Vs	
-10.00	7.800	0	0	0	0	0	6,357,000	0	6,357,000	0	22,500	88,250	1,500	69,500	0	0	69,500	0	0
-3.00	4,000	0	940,000	0	940,000	0	6,260,000	1,630	4,020,000	2,240,000	680	2,810,000	680	2,810,000	0	0	680	2,880,000	0
1.00	0	470	0	470	0	1,500	0	380	0	0	740	0	740	0	0	0	760	0	0
Sum 1	11,600		940,000		940,000		12,617,000		10,377,000	2,240,000		5,492,000		5,492,000	0				5,532,000
1.00	50	470	93,250	470	35,500	58,250	1,500	120,750	380	22,500	88,250	1,500	69,500	0	0	69,500	0	0	
1.05	1,150	3,280	3,772,000	950	1,092,500	2,679,500	3,330	3,629,500	920	588,000	3,231,500	1,280	1,472,000	0	0	1,472,000	0	0	
2.20	10	3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	0	17,800	0	0	
2.21	180	3,280	623,200	950	180,500	442,700	3,330	632,700	520	98,600	533,900	2,280	433,200	0	0	433,200	0	0	
2.40	10	3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	0	17,800	0	0	
2.41	590	3,280	1,935,200	950	560,500	1,374,700	3,330	1,374,700	520	305,600	1,657,900	1,280	755,200	0	0	755,200	0	0	
3.00	2,000	3,280	5,210,000	950	2,880,000	2,330,000	3,330	5,190,000	520	2,380,000	2,810,000	1,280	1,910,000	0	0	1,910,000	0	0	
5.00	3,000	1,930	5,790,000	1,930	5,790,000	0	1,860	1,380,000	1,860	1,380,000	0	630	620,000	630	620,000	0	640	630,000	0
8.00	1,000	1,930	965,000	1,930	965,000	0	1,860	1,380,000	1,860	1,380,000	0	630	620,000	630	620,000	0	640	630,000	0
9.00	1,000	0	715,000	0	715,000	0	1,860	1,380,000	1,860	1,380,000	0	630	625,000	630	625,000	0	640	635,000	0
10.00	1,000	1,430	715,000	1,430	715,000	0	1,860	1,380,000	1,860	1,380,000	0	630	620,000	630	620,000	0	640	630,000	0
11.00	1,000	0	530,000	0	530,000	0	1,860	1,380,000	1,860	1,380,000	0	630	620,000	630	620,000	0	640	630,000	0
12.00	1,000	1,060	720,000	1,060	720,000	0	1,860	1,380,000	1,860	1,380,000	0	630	615,000	630	615,000	0	640	630,000	0
13.00	500	380	397,500	380	397,500	0	1,860	937,500	1,860	937,500	0	640	317,500	640	317,500	0	650	322,500	0
13.50	500	1,210	660,000	1,210	660,000	0	1,860	937,500	1,860	937,500	0	630	630,000	630	630,000	0	640	640,000	0
14.00	1,000	1,430	1,295,000	1,430	1,295,000	0	1,860	1,860,000	1,860	1,860,000	0	630	1,085,000	630	315,000	770,000	640	320,000	0
15.00	1,000	1,160	5,005,000	1,160	580,000	4,425,000	1,860	2,115,000	1,860	930,000	1,185,000	630	1,085,000	630	210,000	1,310,000	0	0	
16.00	1,000	8,850	9,110,000	0	885,000	8,225,000	2,370	2,415,000	0	345,000	2,070,000	1,940	1,520,000	0	0	1,520,000	0	325,000	
17.00	1,000	9,370	6,555,000	1,770	2,785,000	3,800,000	2,460	2,190,000	690	1,305,000	885,000	1,500	1,070,000	420	530,000	540,000	0	650	640,000
18.00	1,000	3,740	2,340,000	3,740	2,340,000	0	1,920	1,830,000	1,920	1,830,000	0	640	630,000	640	630,000	0	630	315,000	0
19.00	1,000	940	3,750,000	940	1,570,000	2,180,000	1,860	1,995,000	1,860	1,530,000	465,000	620	1,040,000	620	700,000	340,000	630	320,000	0
20.00	1,000	6,560	4,455,000	2,200	2,215,000	2,180,000	2,130	2,010,000	1,200	1,545,000	465,000	1,460	1,045,000	780	705,000	340,000	630	320,000	0
21.00	1,000	2,350	1,810,000	2,350	1,810,000	0	1,890	1,890,000	1,890	1,890,000	0	630	630,000	630	630,000	0	640	840,000	0
22.00	1,000	1,270	2,685,000	1,270	2,685,000	0	1,890	1,890,000	1,890	1,890,000	0	630	650,000	630	650,000	0	640	660,000	0
23.00	1,000	3,940	4,295,000	3,940	4,295,000	0	1,890	1,890,000	1,890	1,890,000	0	670	1,035,000	670	725,000	310,000	680	340,000	0
24.00	1,000	4,650	4,835,000	4,650	3,810,000	1,225,000	1,950	1,995,000	1,950	1,560,000	435,000	670	1,035,000	670	725,000	310,000	680	340,000	0
25.00	1,000	5,020	5,955,000	2,570	2,580,000	3,405,000	2,040	2,115,000	1,170	1,050,000	1,065,000	1,400	1,440,000	780	690,000	750,000	0	0	
26.00	1,000	6,890	8,980,000	2,530	1,265,000	7,715,000	2,190	2,295,000	930	465,000	1,770,000	1,480	1,530,000	600	300,000	1,230,000	0	0	
27.00	1,000	11,070	13,305,000	0	0	13,305,000	2,280	2,415,000	0	0	2,415,000	1,580	1,660,000	0	0	1,660,000	0	0	
28.00	1,000	15,540	15,155,000	0	465,000	14,690,000	2,550	2,590,000	0	115,000	2,475,000	1,740	1,750,000	0	70,000	1,880,000	0	0	
29.00	1,000	14,770	9,080,000	3,320	2,880,000	6,200,000	2,630	2,350,000	230	1,150,000	1,200,000	1,760	1,590,000	140	780,000	810,000	0	0	
30.00	Brake 0	3,230	0	3,230	0	0	2,070	0	2,070	0	0	1,420	0	1,420	0	0	0	0	
35.00	3,000	3,230	11,400,000	3,230	11,400,000	0	2,070	3,160,000	2,070	3,180,000	0	1,420	2,175,000	1,420	2,130,000	45,000	0	0	
39.00	4,000	4,370	29,660,000	4,370	11,500,000	16,160,000	50	3,520,000	50	460,000	3,060,000	30	2,340,000	0	120,000	2,220,000	0	0	
43.00	0	10,460	0	2,380	0	0	1,710	0	160	0	1,140	0	60	0	0	0	0	0	
Sum 2	38,000		161,702,250		70,540,500	91,161,750		67,994,250		42,116,500	25,377,750		32,753,000		16,702,500	16,050,500		11,197,500	
43.00	1,000	10,460	9,085,000	2,380	2,125,000	6,940,000	1,710	1,750,000	180	145,000	1,805,000	1,140	1,140,000	60	30,000	1,110,000	0	0	
44.00	1,000	7,670	8,930,000	1,810	1,910,000	7,020,000	1,790	1,850,000	110	140,000	1,710,000	1,140	1,190,000	0	20,000	1,170,000	0	0	
45.00	1,000	10,180	13,585,000	1,950	1,965,000	11,600,000	1,910	2,215,000	170	85,000	2,130,000	1,240	1,550,000	40	20,000	1,530,000	0	0	
46.00	1,000	16,940	15,865,000	1,980	1,940,000	13,925,000	2,520	2,235,000	0	0	2,235,000	1,660	1,690,000	0	0	1,690,000	0	0	
47.00	1,000	14,790	15,375,000	1,900	1,940,000	13,435,000	1,950	1,990,000	0	0	1,990,000	1,340	1,380,000	0	0	1,380,000	0	0	
48.00	1,000	15,960	17,910,000	1,860	2,115,000	15,795,000	2,010	2,145,000	0	0	2,145,000	1,420	1,530,000	0	0	1,530,000	0	0	
49.00	1,000	19,860	15,420,000	2,250	2,550,000	12,870,000	2,280	2,090,000	0	95,000	1,995,000	1,640	1,440,000	0	35,000	1,405,000	0	0	
50.00	1,000	10,980	14,125,000	2,850	3,045,000	11,080,000	1,900	2,300,000	190	185,000	2,115,000	1,240	1,520,000	70	65,000	1,455,000	0	0	
51.00	1,000	17,270	20,605,000	3,240	2,760,000	17,845,000	2,700	2,390,000	180	90,000	2,300,000	1,800	1,820,000	60	30,000	1,590,000	0	0	
52.00	1,000	23,940	24,550,000	2,280	2,070,000	22,480,000	2,080	2,285,000	0	0	2,285,000	1,440	1,540,000	0	0	1,540,000	0	0	
53.00	0	25,160	0	1,860	0	0	2,490	0	0	0	0	1,640	0	0	0	0	0	0	
Sum 3	10,000		55,410,000		22,420,000	32,990,000		21,240,000		740,000	20,500,000		14,510,000		200,000	14,310,000		0	
53.00	1,000	25,160	23,500,000	1,860	930,000	22,570,000	2,490	2,750,000	0	0	2,760,000	1,640	1,860,000	0	0	1,860,000	0	0	
54.00	1,000	21,840	15,065,000	0	0	15,065,000	3,030	2,685,000	0	0	2,685,000	2,080	1,830,000	0	0	1,830,000	0	0	
55.00	500	8,170	3,995,000	0	0	3,995,000	2,340	1,157,500	0	0	1,157,500	1,580	790,000						

L-17 Calculation Table of Excavation Volume

Station No.	Dis (ft)	Hard Rock				Soft Rock				Earth				Mad		
		Ho	Vo	Wet V1	Dry V2	Ho	Vo	Wet V1	Dry V2	Ho	Vo	Wet V1	Dry V2	Ho	Vo	
-11.50	8,500	0	0	0	0	0	10,327,500	10,327,500	0	0	3,357,500	0	0	0	3,357,500	
-7.00	4,000	0	2,060,000	0	2,050,000	0	2,430	9,660,000	2,430	9,660,000	0	0	790	3,220,000	790	3,220,000
1.00	0	1,030	0	1,030	0	2,400	0	2,400	0	0	820	0	820	0	820	
Sum 1	12,500		2,060,000	2,060,000	0		19,987,500	19,987,500	0		6,577,500	0	6,577,500	0	6,577,500	
1.00	50	1,030	158,250	470	35,500	2,400	123,000	380	22,500	100,500	1,640	85,000	0	0	85,000	
1.05	1,150	5,300	6,095,000	950	1,092,500	2,520	2,898,000	520	598,000	2,300,000	1,760	2,024,000	0	0	2,024,000	
2.20	10	5,300	53,000	950	9,500	2,520	25,200	520	5,200	20,000	1,760	22,600	0	0	22,600	
2.21	190	5,300	1,097,000	950	180,500	2,520	478,900	520	98,800	380,000	2,760	524,400	0	0	524,400	
2.40	10	5,300	53,000	950	9,500	2,520	25,200	520	5,200	20,000	2,760	22,600	0	0	22,600	
2.41	590	5,300	3,125,000	850	560,500	2,560	1,486,800	520	305,800	1,180,000	1,760	1,038,400	0	0	1,038,400	
3.00	2,000	5,300	9,490,000	850	5,140,000	2,520	5,010,000	520	3,018,000	2,000,000	1,760	2,600,000	0	0	2,600,000	
5.00	3,000	4,190	12,570,000	4,190	12,570,000	2,490	2,490,000	2,490	2,490,000	0	840	2,520,000	840	2,520,000	840	
8.00	1,000	4,190	2,465,000	4,190	2,465,000	2,490	2,460,000	2,490	2,460,000	0	840	830,000	840	830,000	840	
9.00	1,000	740	2,440,000	740	2,440,000	2,490	2,460,000	2,490	2,460,000	0	840	830,000	840	830,000	840	
10.00	1,000	4,140	3,050,000	4,140	3,050,000	2,490	2,490,000	2,490	2,490,000	0	840	835,000	840	835,000	840	
11.00	1,000	1,960	2,775,000	1,960	2,775,000	2,490	2,490,000	2,490	2,490,000	0	840	830,000	840	830,000	840	
12.00	1,000	3,590	3,135,000	3,590	3,135,000	2,490	2,490,000	2,490	2,490,000	0	840	830,000	840	830,000	840	
13.00	500	2,680	1,760,000	2,680	1,760,000	2,490	1,265,000	2,490	1,265,000	0	830	430,000	830	430,000	840	
13.50	500	4,360	2,127,500	4,360	2,127,500	2,570	1,265,000	2,570	1,265,000	0	830	432,500	830	432,500	900	
14.00	1,000	4,150	3,935,000	4,150	3,935,000	2,490	2,490,000	2,490	2,490,000	0	840	840,000	840	840,000	850	
15.00	1,000	3,720	9,255,000	3,720	8,600,500	2,490	2,700,000	2,490	1,245,000	1,455,000	840	1,375,000	840	420,000	955,000	
16.00	1,000	84,790	14,365,000	0	2,185,000	2,910	3,015,000	0	480,000	2,535,000	1,910	1,905,000	0	283,000	1,625,000	
17.00	1,000	9,940	10,325,000	4,330	5,520,000	3,120	2,820,000	960	1,740,000	1,080,000	1,900	1,375,000	560	705,000	670,000	
18.00	1,000	8,710	5,175,000	6,710	5,175,000	2,580	2,505,000	2,580	2,505,000	0	850	645,000	850	645,000	860	
19.00	1,000	3,640	7,660,000	3,640	3,820,000	2,490	2,645,000	2,490	2,600,000	645,000	840	1,340,000	840	890,000	450,000	
20.00	1,000	91,720	8,395,000	4,000	4,535,000	3,880,000	2,860,000	1,510	2,915,000	645,000	1,840	1,345,000	940	895,000	450,000	
21.00	1,000	5,070	4,430,000	5,070	4,430,000	2,520	2,520,000	2,520	2,520,000	0	850	850,000	850	850,000	860	
22.00	1,000	3,790	5,555,000	3,790	5,555,000	2,520	2,520,000	2,520	2,520,000	0	850	850,000	850	850,000	860	
23.00	1,000	7,320	7,580,000	7,320	7,580,000	2,520	2,535,000	2,520	2,535,000	0	850	850,000	850	850,000	860	
24.00	1,000	7,840	6,320,000	7,840	5,935,000	2,550	2,825,000	2,550	2,825,000	600,000	850	1,340,000	850	915,000	425,000	
25.00	1,000	8,800	10,270,000	4,150	4,345,000	5,925,000	2,700	2,775,000	1,500	1,380,000	1,385,000	1,830	1,875,000	980	900,000	
26.00	1,000	31,740	13,820,000	4,540	2,270,000	11,550,000	2,850	2,910,000	1,260	630,000	2,280,000	1,920	1,970,000	820	410,000	
27.00	1,000	5,900	19,500,000	0	0	19,500,000	2,370	3,090,000	0	0	3,090,000	2,020	2,110,000	0	2,110,000	
28.00	1,000	29,100	22,490,000	0	1,100,000	21,390,000	3,210	3,210,000	0	255,000	2,200	2,180,000	0	160,000	2,020,000	
29.00	1,000	21,880	14,340,000	2,200	4,500,000	9,840,000	3,210	2,840,000	510	1,690,000	1,350,000	2,160	2,010,000	320	1,090,000	
30.00	break	6,600	0	6,600	0	0	2,670	0	2,670	0	1,660	0	1,660	0	0	
36.00	3,000	2,220	12,885,000	2,220	12,735,000	150,000	2,190	3,720,000	2,190	3,360,000	360,000	710	1,365,000	710	1,065,000	
39.00	4,000	6,370	38,000,000	6,270	17,900,000	20,100,000	350	6,520,000	110	620,000	5,900,000	200	2,960,000	0	200,000	
43.00	0	2,630	0	2,680	0	0	2,910	0	200	0	1,260	0	100	0	0	
Sum 2	36,000		266,625,750	30,770,500	335,855,250		86,637,000		56,346,500	30,290,500		41,239,500		20,542,500	20,697,000	
43.00	1,000	4,960	14,305,000	4,430	3,465,000	10,340,000	2,070	2,305,000	360	235,000	2,070,000	1,280	1,470,000	100	50,000	
44.00	1,000	3,850	15,335,000	2,500	2,600,000	12,735,000	2,540	2,520,000	110	140,000	2,380,000	1,660	1,665,000	0	20,000	
45.00	1,000	97,020	21,940,000	2,700	2,600,000	19,340,000	2,500	2,600,000	170	65,000	2,515,000	1,670	1,515,000	40	20,000	
46.00	1,000	26,860	25,105,000	2,500	2,500,000	22,605,000	2,700	2,660,000	0	0	2,660,000	2,160	2,000,000	0	0	
47.00	1,000	23,350	23,910,000	2,500	2,550,000	21,360,000	2,620	2,640,000	0	0	2,640,000	1,840	1,850,000	0	0	
48.00	1,000	24,470	26,940,000	2,600	2,750,000	24,190,000	2,660	2,655,000	0	0	2,655,000	1,860	1,840,000	0	0	
49.00	1,000	29,410	24,710,000	2,900	3,370,000	21,400,000	2,670	2,605,000	0	95,000	2,510,000	1,820	1,745,000	0	35,000	
50.00	1,000	20,130	24,505,000	3,640	4,220,000	20,285,000	2,540	2,890,000	190	165,000	2,705,000	1,670	1,925,000	70	65,000	
51.00	1,000	28,880	31,645,000	4,600	3,800,000	27,845,000	3,240	2,970,000	180	90,000	2,880,000	2,180	1,980,000	60	30,000	
52.00	1,000	84,410	35,975,000	3,000	2,700,000	33,275,000	2,760	2,850,000	0	0	2,850,000	1,780	1,920,000	0	1,920,000	
53.00	0	97,540	0	2,400	0	0	3,000	0	0	0	2,060	0	0	0	0	
Sum 3	10,000		244,430,000	30,555,000	213,875,000		26,705,000		830,000	25,815,000		18,310,000		220,000	18,090,000	
53.00	1,000	97,540	34,855,000	2,400	1,200,000	33,855,000	3,000	3,230,000	0	0	3,230,000	2,050	2,195,000	0	2,195,000	
54.00	1,000	92,170	21,750,000	0	0	21,750,000	3,460	3,200,000	0	0	3,200,000	2,330	2,155,000	0	2,155,000	
55.00	500	11,330	6,035,000	0	0	6,035,000	2,940	1,487,500	0	0	1,487,500	1,960	1,002,500	0	1,002,500	
55.50	500	2,810	5,587,500	0	0	5,587,500	3,010	1,457,500	0	0	1,457,500	2,030	987,500	0	987,500	
56.00	1,000	9,540	14,950,000	0	650,000	14,300,000	2,820	3,085,000	0	245,000	2,820,000	1,920	2,120,000	0	2,120,000	
57.00	1,000	20,360	13,920,000	1,300	1,800,000	12,120,000	3,210	2,910,000	490	630,000	2,820,000	2,320	1,810,000	320	200,000	
58.00	1,000	7,480	10,505,000	2,300	2,020,000	8,485,000	3,510	2,435,000	770	470,000	1,965,000	1,300	1,410,000	60	50,000	
59.00	1,000	13,530	14,715,000	1,740	4,420,000	10,295,000	2,380	2,285,000	170	290,000	1,995,000	1,520	1,400,000	20	35,000	
60.00	1,000	15,900	16,785,000	7,100	4,450,000	12,335,000	2,210	2,255,000	410	205,000	2,050,000	1,280	1,400,000	50	25,000	
61.00	1,000	17,670	12,810,000	1,800	2,185,000	10,625,000	2,300	2,635,000	0	535,000	2,100,000	1,520	1,495,000	0	35,000	
62.00	0	7,950	0	2,570	0	0	2,970									



Study Case	Route	W. Level	No. of Lifts	No. of Lanes	Ship Size (1000 DWT)	Canal Size (m)
L-12	II	30'	1	2	100	301 x 18.7
15	II	30'	1	2	150	343 x 20.9
18	II	30'	1	2	250	399 x 24.2

Layout of Low Rise Lock System for Group B Study Cases (30')

L-12 Calculation Table of Excavation Volume

Station No.	Dls (ft)	Hard Rock				Soft Rock				Earth				Mad					
		As	Vo	Wet A1	Wet V1	Dry V2	As	Vo	Wet A1	Wet V1	Dry V2	As	Vo	Wet A1	Wet V1	Dry V2	As	Vo	
-10.00	7.500	0	0	0	0	0	6,357,000	0	6,357,000	0	0	2,652,000	0	2,652,000	0	0	680	2,880,000	
-3.00	4.000	0	840,000	0	940,000	0	1,630	6,280,000	1,630	6,280,000	0	680	2,840,000	680	2,840,000	0	0	760	0
1.00	0	470	0	470	0	0	1,500	0	1,500	0	0	740	0	740	0	0	0	5,532,000	
Sum 1	11,800		940,000		940,000		12,617,000		12,617,000			5,492,000		5,492,000					
1.00	50	470	93,750	470	35,500	58,250	1,500	120,750	380	22,500	98,250	1,500	69,500	0	0	69,500	0	0	
1.05	1,150	3,280	3,772,000	950	1,092,500	2,679,500	3,330	3,629,500	520	598,000	3,231,500	1,280	1,472,000	0	0	1,472,000	0	0	
2.20	10	3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	1,280	17,800	0	0	17,800	0	0	
2.21	190	3,280	623,200	950	180,500	442,700	3,330	632,700	520	98,800	533,900	2,280	433,200	0	0	433,200	0	0	
2.40	10	3,280	32,800	950	9,500	23,300	3,330	33,300	520	5,200	28,100	2,280	17,800	0	0	17,800	0	0	
2.41	590	3,280	1,935,200	950	560,500	1,374,700	3,330	1,954,700	520	306,800	1,657,900	1,280	755,200	0	0	755,200	0	0	
3.00	2,000	3,280	7,410,000	950	950,000	6,460,000	3,330	25,950,000	520	520,000	26,430,000	1,280	2,540,000	0	0	2,540,000	0	730,000	
5.00	500	4,130	1,557,500	0	535,000	1,022,500	23,620	6,372,500	0	487,500	5,905,000	1,280	472,500	720	337,500	135,000	730	342,500	
5.50	500	2,140	1,170,000	2,140	1,170,000	0	1,870	945,000	1,870	945,000	0	630	317,500	630	317,500	0	650	645,000	
6.00	1,000	2,540	1,920,000	2,540	1,920,000	0	1,910	1,890,000	1,910	1,890,000	0	640	635,000	640	635,000	0	640	665,000	
7.00	1,000	1,300	2,745,000	1,300	2,745,000	0	1,870	1,905,000	1,870	1,905,000	0	630	655,000	630	655,000	0	690	665,000	
8.00	1,000	4,190	2,905,000	4,190	2,905,000	0	1,940	1,910,000	1,940	1,910,000	0	680	655,000	680	655,000	0	640	665,000	
9.00	1,000	1,620	2,925,000	1,620	2,925,000	0	1,880	1,910,000	1,880	1,910,000	0	630	645,000	630	645,000	0	690	670,000	
10.00	1,000	4,230	3,125,000	4,230	3,125,000	0	1,940	1,925,000	1,940	1,925,000	0	660	650,000	660	650,000	0	650	655,000	
11.00	1,000	2,070	2,685,000	2,070	2,685,000	0	1,910	1,915,000	1,910	1,915,000	0	640	645,000	640	645,000	0	660	660,000	
12.00	1,000	3,350	2,975,000	3,350	2,975,000	0	1,920	1,920,000	1,920	1,920,000	0	650	650,000	650	650,000	0	660	660,000	
13.00	500	2,600	1,627,500	2,600	1,627,500	0	1,920	897,500	1,920	897,500	0	650	335,000	650	335,000	0	700	342,500	
13.50	500	3,910	1,960,000	3,910	1,960,000	0	2,070	1,005,000	2,070	1,005,000	0	660	655,000	660	655,000	0	670	665,000	
14.00	1,000	3,530	3,785,000	3,530	3,785,000	0	1,950	1,945,000	1,950	1,945,000	0	660	655,000	660	655,000	0	660	660,000	
15.00	1,000	3,640	7,895,000	3,640	1,820,000	6,075,000	1,940	2,160,000	1,940	970,000	1,190,000	650	1,145,000	650	325,000	820,000	660	320,000	
16.00	1,000	12,150	13,075,000	0	2,315,000	10,760,000	2,380	1,910,000	0	80,000	1,820,000	1,640	1,280,000	0	45,000	1,235,000	0	0	
17.00	1,000	14,000	10,200,000	4,630	5,515,000	4,685,000	1,470	1,705,000	180	1,075,000	630,000	920	795,000	90	380,000	415,000	0	365,000	
18.00	1,000	5,400	4,780,000	6,400	4,780,000	0	1,970	1,845,000	1,970	1,945,000	0	670	655,000	670	655,000	0	730	690,000	
19.00	1,000	3,120	6,880,000	3,120	4,415,000	2,465,000	1,920	1,650,000	1,920	1,170,000	490,000	640	665,000	640	320,000	345,000	650	325,000	
20.00	1,000	10,840	7,725,000	5,710	5,280,000	2,465,000	1,400	1,675,000	420	1,185,000	490,000	690	690,000	0	340,000	345,000	0	350,000	
21.00	1,000	4,810	4,130,000	4,810	4,130,000	0	1,950	1,950,000	1,950	1,950,000	0	690	670,000	690	670,000	0	700	680,000	
22.00	1,000	3,450	4,895,000	3,450	4,895,000	0	1,950	2,665,000	1,950	2,665,000	0	650	690,000	650	690,000	0	660	700,000	
23.00	1,000	6,340	6,650,000	6,340	6,650,000	0	2,180	2,155,000	2,180	2,155,000	0	730	725,000	730	725,000	0	740	735,000	
24.00	1,000	6,950	8,050,000	6,950	6,380,000	1,670,000	2,130	1,755,000	2,130	1,293,000	465,000	720	735,000	720	415,000	320,000	730	365,000	
25.00	1,000	9,140	10,675,000	5,800	5,600,000	4,475,000	1,360	1,435,000	450	340,000	1,095,000	750	785,000	110	55,000	730,000	0	0	
26.00	0	11,010	0	5,400	0	0	1,480	0	230	0	820	0	0	0	0	0	0	0	
26.00	1,000	11,350	12,810,000	5,630	2,815,000	9,995,000	1,580	1,995,000	230	115,000	1,880,000	900	1,280,000	0	0	1,280,000	0	0	
27.00	1,000	14,270	16,630,000	0	0	16,630,000	2,410	2,535,000	0	0	2,535,000	1,660	1,750,000	0	0	1,750,000	0	0	
28.00	1,000	18,930	18,460,000	0	950,000	17,510,000	2,660	2,625,000	0	65,000	2,560,000	1,840	1,700,000	0	0	1,700,000	0	0	
29.00	1,000	17,930	11,815,000	1,990	3,800,000	8,015,000	2,590	2,775,000	130	3,145,000	1,230,000	1,560	1,150,000	0	370,000	780,000	750	375,000	
30.00	1,000	5,700	8,215,000	5,700	5,430,000	2,785,000	2,160	2,325,000	2,160	1,125,000	600,000	740	785,000	740	370,000	415,000	0	345,000	
31.00	1,000	10,730	7,600,000	5,160	4,815,000	2,785,000	1,290	1,645,000	90	1,045,000	600,000	830	755,000	0	340,000	415,000	0	345,000	
32.00	1,000	4,470	6,250,000	4,470	5,300,000	950,000	2,000	1,335,000	2,000	1,015,000	320,000	680	340,000	680	340,000	150,000	690	345,000	
33.00	1,000	8,930	12,165,000	6,130	3,065,000	9,100,000	670	1,600,000	30	15,000	1,585,000	300	1,005,000	0	0	1,005,000	0	0	
34.00	1,000	16,306	24,785,000	0	0	28,785,000	2,530	2,870,000	0	0	2,870,000	1,710	1,935,000	0	0	1,935,000	0	0	
35.00	1,000	41,270	29,970,000	0	0	29,970,000	3,210	3,075,000	0	0	3,075,000	2,150	2,080,000	0	0	2,080,000	0	0	
36.00	1,000	18,670	15,835,000	0	1,700,000	14,135,000	2,940	2,345,000	0	90,000	2,255,000	2,020	1,600,000	0	30,000	1,570,000	0	0	
37.00	0	13,000	0	3,400	0	0	1,750	0	180	0	1,180	0	60	0	0	0	0	0	
Sum 2	36,000		298,159,750		110,810,500	185,349,250		102,744,250		39,141,500	63,802,750		35,333,000		13,312,500	22,020,500		13,347,500	
37.00	1,000	13,000	11,175,000	3,400	2,635,000	8,540,000	1,750	1,785,000	180	145,000	1,640,000	1,180	1,170,000	60	30,000	1,140,000	0	0	
38.00	1,000	9,350	10,880,000	1,870	1,910,000	8,770,000	1,820	1,890,000	110	990,000	890,000	1,160	1,210,000	0	20,000	1,190,000	0	0	
39.00	1,000	12,010	15,700,000	1,950	1,965,000	13,735,000	1,940	2,245,000	1,870	1,020,000	1,225,000	1,260	1,570,000	40	20,000	1,550,000	0	0	
40.00	1,000	19,390	18,140,000	1,880	1,940,000	16,200,000	2,550	2,265,000	170	85,000	2,180,000	1,820	1,620,000	0	0	1,620,000	0	0	
41.00	1,000	16,890	17,510,000	1,900	1,940,000	15,570,000	1,980	2,045,000	0	0	2,045,000	1,350	1,400,000	0	0	1,400,000	0	0	
42.00	1,000	18,130	20,115,000	1,980	2,115,000	18,000,000	2,710	2,245,000	0	0	2,245,000	1,440	1,550,000	0	0	1,550,000	0	0	
43.00	1,000	22,100	17,450,000	2,250	2,550,000	14,900,000	2,380	2,155,000	0	95,000	2,060,000	1,660	1,460,000	0	35,000	1,425,000	0	0	

L-15 Calculation Table of Excavation Volume

Handwritten mark

Station No.	Dis (ft)	Hard Rock					Soft Rock					Earth					Mad	
		Ao	Vo	Ret A1	Ret V1	Dry V2	Ao	Vo	Ret A1	Ret V1	Dry V2	Ao	Vo	Ret A1	Ret V1	Dry V2	Ao	Vo
-11.10	8.100	0	0	0	0	0	9,841,500	0	9,841,500	0	0	0	3,199,500	0	3,199,500	0	0	3,199,500
-3.00	4,000	0	2,060,000	0	2,060,000	0	2,430	9,660,000	2,430	9,660,000	0	790	3,220,000	790	3,220,000	0	790	3,220,000
1.00	0	1,030	0	1,030	0	0	2,400	0	2,400	0	820	0	820	0	820	0	820	0
Sum 1	12.100		2,060,000		2,060,000			19,501,500		19,501,500			6,419,500		6,419,500			6,419,500
1.00	50	1,030	158,250	470	35,500	122,750	2,400	123,000	380	22,500	100,500	1,840	85,000	0	0	85,000	0	0
1.05	1,150	5,300	6,095,000	950	1,092,500	5,002,500	2,520	2,898,000	520	598,000	2,300,000	1,760	2,024,000	0	0	2,024,000	0	0
2.20	10	5,300	53,000	950	9,500	43,500	2,520	25,200	520	5,200	20,000	1,760	22,600	0	0	22,600	0	0
2.21	190	5,300	1,007,000	950	180,500	826,500	2,520	478,800	520	98,800	380,000	2,760	524,400	0	0	524,400	0	0
2.40	10	5,300	53,000	950	9,500	43,500	2,520	25,200	520	5,200	20,000	2,760	22,600	0	0	22,600	0	0
2.41	590	5,300	3,127,000	950	560,500	2,566,500	2,520	1,486,800	520	308,800	1,180,000	1,760	1,038,400	0	0	1,038,400	0	0
3.00	2,000	5,300	7,950,000	950	3,600,000	4,350,000	2,520	4,850,000	520	2,850,000	2,000,000	1,760	2,480,000	0	0	2,480,000	0	0
5.00	500	2,650	1,445,000	2,650	1,445,000	0	2,130	1,072,500	2,130	1,072,500	0	720	352,500	720	352,500	0	720	352,500
5.50	500	3,130	1,807,500	3,130	1,807,500	0	2,160	1,010,000	2,160	1,010,000	0	730	365,000	730	365,000	0	730	365,000
6.00	1,000	4,100	3,190,000	4,100	3,190,000	0	1,880	2,015,000	1,880	2,015,000	0	730	725,000	730	725,000	0	730	725,000
7.00	1,000	2,280	3,935,000	2,280	3,935,000	0	2,150	2,180,000	2,150	2,180,000	0	720	745,000	720	745,000	0	720	745,000
8.00	1,000	5,590	4,005,000	5,590	4,005,000	0	2,210	2,180,000	2,210	2,180,000	0	770	745,000	770	745,000	0	770	745,000
9.00	1,000	2,420	3,980,000	2,420	3,980,000	0	2,150	2,185,000	2,150	2,185,000	0	720	735,000	720	735,000	0	720	735,000
10.00	1,000	5,540	4,375,000	5,540	4,375,000	0	2,220	2,145,000	2,220	2,145,000	0	750	740,000	750	740,000	0	750	740,000
11.00	1,000	3,210	3,970,000	3,210	3,970,000	0	2,070	2,135,000	2,070	2,135,000	0	730	735,000	730	735,000	0	730	735,000
12.00	1,000	4,730	4,370,000	4,730	4,370,000	0	2,200	2,185,000	2,200	2,185,000	0	740	740,000	740	740,000	0	740	740,000
13.00	500	4,010	2,415,000	4,010	2,415,000	0	2,170	1,125,000	2,170	1,125,000	0	740	380,000	740	380,000	0	740	380,000
13.50	500	5,650	2,752,500	5,650	2,752,500	0	2,330	1,140,000	2,330	1,140,000	0	780	382,500	780	382,500	0	780	382,500
14.00	1,000	5,360	5,075,000	5,360	5,075,000	0	2,230	2,220,000	2,230	2,220,000	0	750	745,000	750	745,000	0	750	745,000
15.00	1,000	4,790	9,815,000	4,790	2,395,000	7,420,000	2,210	2,415,000	2,210	1,105,000	1,310,000	740	1,285,000	740	370,000	895,000	780	390,000
16.00	1,000	14,840	15,820,000	0	3,305,000	12,515,000	2,670	2,145,000	0	145,000	2,000,000	1,790	1,385,000	0	60,000	1,325,000	0	0
17.00	1,000	16,800	12,290,000	6,610	7,185,000	5,095,000	1,670	1,950,000	290	1,760,000	890,000	980	885,000	120	435,000	430,000	0	395,000
18.00	1,000	7,780	6,190,000	7,780	6,190,000	0	2,230	2,210,000	2,230	2,210,000	0	750	745,000	750	745,000	0	750	745,000
19.00	1,000	4,800	8,955,000	4,800	5,620,000	3,135,000	2,190	1,865,000	2,190	1,305,000	560,000	740	780,000	740	370,000	390,000	750	375,000
20.00	1,000	13,310	9,785,000	7,040	6,650,000	3,135,000	1,540	1,875,000	420	1,315,000	560,000	780	775,000	0	385,000	390,000	0	390,000
21.00	1,000	6,250	5,635,000	6,250	5,635,000	0	2,210	2,210,000	2,210	2,210,000	0	770	755,000	770	755,000	0	770	755,000
22.00	1,000	5,010	6,515,000	5,010	6,515,000	0	2,210	2,260,000	2,210	2,260,000	0	740	775,000	740	775,000	0	750	785,000
23.00	1,000	8,070	8,280,000	8,070	8,280,000	0	2,310	2,340,000	2,310	2,340,000	0	810	815,000	810	815,000	0	820	825,000
24.00	1,000	8,540	10,020,000	8,540	7,855,000	2,165,000	2,370	1,950,000	2,370	1,410,000	640,000	820	835,000	820	485,000	370,000	830	415,000
25.00	1,000	11,500	12,445,000	7,170	6,885,000	5,560,000	1,530	1,580,000	450	340,000	1,240,000	850	885,000	110	55,000	830,000	0	0
26.00	0	13,390	0	6,800	0	0	1,630	0	230	0	0	920	0	0	0	0	0	0
26.00	1,000	13,740	15,110,000	6,840	3,420,000	11,690,000	1,710	2,205,000	230	115,000	2,090,000	1,020	1,430,000	0	0	1,430,000	0	0
27.00	1,000	16,460	19,485,000	0	0	19,485,000	2,700	2,795,000	0	2,795,000	1,840	1,980,000	0	0	1,980,000	0	0	0
28.00	1,000	22,490	21,390,000	0	1,380,000	20,010,000	2,890	2,815,000	0	65,000	2,750,000	2,080	1,870,000	0	0	1,870,000	0	0
29.00	1,000	21,490	14,440,000	2,760	5,075,000	9,365,000	2,790	2,590,000	130	1,285,000	1,305,000	1,660	1,820,000	0	430,000	830,000	0	435,000
30.00	1,000	7,390	10,570,000	7,390	8,780,000	3,790,000	2,440	2,005,000	2,440	1,285,000	740,000	860	910,000	860	430,000	480,000	870	435,000
31.00	1,000	13,750	9,710,000	6,170	5,920,000	3,790,000	1,570	1,925,000	80	1,185,000	740,000	960	865,000	0	385,000	480,000	0	390,000
32.00	1,000	5,670	7,995,000	5,670	6,545,000	1,450,000	2,280	1,545,000	2,280	1,155,000	390,000	770	585,000	770	385,000	200,000	780	390,000
33.00	1,000	10,320	14,730,000	7,420	3,710,000	11,020,000	810	1,795,000	30	15,000	1,780,000	400	1,150,000	0	0	1,150,000	0	0
34.00	1,000	19,140	32,650,000	0	0	32,650,000	2,780	3,100,000	0	0	3,100,000	1,900	2,115,000	0	0	2,115,000	0	0
35.00	1,000	46,160	34,270,000	0	0	34,270,000	3,420	3,360,000	0	0	3,360,000	2,330	2,275,000	0	0	2,275,000	0	0
36.00	1,000	27,380	18,845,000	0	1,840,000	17,005,000	3,300	2,805,000	0	100,000	2,505,000	2,220	1,770,000	0	50,000	1,720,000	0	0
37.00	0	15,310	0	3,680	0	0	1,910	0	200	0	1,320	0	100	0	0	0	0	0
Sum 2	36,000		365,308,250		48,203,000	217,105,250		80,819,500		46,364,000	34,455,500		39,647,000		15,030,000	24,617,000		15,025,000
37.00	1,000	15,310	13,580,000	3,680	2,905,000	10,675,000	1,910	2,010,000	200	185,000	1,855,000	1,320	1,330,000	100	50,000	1,280,000	0	0
38.00	0	11,850	0	2,130	0	0	2,110	0	110	0	0	1,340	0	0	0	0	0	0
39.00	1,000	15,260	19,400,000	2,220	2,385,000	17,015,000	2,220	2,385,000	170	85,000	2,300,000	1,460	1,760,000	40	20,000	1,740,000	0	0
40.00	1,000	23,540	20,215,000	2,550	2,405,000	17,810,000	2,550	2,405,000	0	0	2,405,000	2,060	1,800,000	0	0	1,800,000	0	0
41.00	1,000	16,890	19,305,000	2,260	2,320,000	16,985,000	2,260	2,320,000	0	0	2,320,000	1,540	1,580,000	0	0	1,580,000	0	0
42.00	1,000	21,720	24,240,000	2,360	2,440,000	21,880,000	2,360	2,440,000	0	0	2,440,000	1,620	1,640,000	0	0	1,640,000	0	0
43.00	1,000	26,780	21,770,000	2,500	2,350,000	19,420,000	2,500	2,350,000	0	95,000	2,255,000	1,860	1,535,000	0	0	1,535,000	0	0
44.00</																		