Table 3.2.2 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (3/4)

(SECTION A-A)

****

***** ELEMENT VELOCITY *****

****

ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
101	302.00	160.00	-0.5877E-01	-0.9991E+00	0.3554E-02	-0.5739E-04	0.3555E-02	-0.93
102	312.00	160.00	-0.4172E-01	-0.9990E+00	0.3604E-02	-0.8920E-04	0.3605E-02	-1.42
103	330.00	160.00	-0.4218E-01	-0.9991E+00	0.3645E-02	-0.7776E-04	0.3645E-02	-1.22
104	350.00	160.00	-0.4268E-01	-0.9992E+00	0.3687E-02	-0.6983E-04	0.3688E-02	-1.08
105	370.00	160.00	-0.4302E-01	-0.9993E+00	0.3717E-02	-0.6389E-04	0.3718E-02	-0.98
106	390.00	160.00	-0.4339E-01	-0.9992E+00	0.3749E-02	-0.6545E-04	0.3749E-02	-1.00
107	410.00	160.00	-0.4377E-01	-0.9992E+00	0.3782E-02	-0.7089E-04	0.3783E-02	-1.07
108	430.00	160.00	-0.4422E-01	-0.9991E+00	0.3821E-02	-0.7828E-04	0.3822E-02	-1.19
109	450.00	160.00	-0.4474E-01	-0.9990E+00	0.3865E-02	-0.8905E-04	0.3866E-02	-1.32
110	470.00	160.00	-0.4529E-01	-0.9988E+00	0.3913E-02	-0.1051E-03	0.3914E-02	-1.54
111	490.00	160.00	-0.4587E-01	-0.9984E+00	0.3963E-02	-0.1421E-03	0.3966E-02	-2.05
112	510.00	160.00	-0.4663E-01	-0.9971E+00	0.4029E-02	-0.2507E-03	0.4037E-02	-3.56
113	530.00	160.00	-0.4888E-01	-0.9954E+00	0.4224E-02	-0.3937E-03	0.4242E-02	-5.33
114	550.00	160.00	-0.5120E-01	-0.9904E+00	0.4390E-02	-0.8196E-03	0.4466E-02	-10.58
115	570.00	159.58	-0.6710E-01	-0.9919E+00	0.5738E-02	-0.6891E-03	0.5780E-02	-6.85
116	590.00	158.75	-0.7162E-01	-0.1006E+01	0.6172E-02	0.4960E-03	0.6192E-02	4.60
117	610.00	157.92	-0.6895E-01	-0.1035E+01	0.5957E-02	0.3001E-02	0.6671E-02	26.74
118	630.00	157.50	-0.1229E-01	-0.1041E+01	0.1062E-02	0.3577E-02	0.3732E-02	73.46
119	650.00	157.50	-0.2397E-02	-0.1022E+01	0.2071E-03	0.1885E-02	0.1896E-02	83.73
120	110.00	174.75	-0.2914E-01	-0.9693E+00	0.2518E-02	-0.2650E-02	0.3656E-02	-46.47
121	130.00	179.50	-0.5128E-01	-0.9841E+00	0.4286E-02	-0.1325E-02	0.4486E-02	-17.18
122	150.00	179.50	-0.4007E-01	-0.9985E+00	0.3167E-02	-0.1165E-03	0.3169E-02	-2.11
123	170.00	179.50	-0.3828E-01	-0.9982E+00	0.2896E-02	-0.1388E-03	0.2899E-02	-2.74
124	190.00	179.50	-0.3822E-01	-0.9982E+00	0.2765E-02	-0.1318E-03	0.2768E-02	-2.73
125	210.00	179.50	-0.3872E-01	-0.9980E+00	0.2673E-02	-0.1359E-03	0.2676E-02	-2.91
126	230.00	179.50	-0.3951E-01	-0.9979E+00	0.2594E-02	-0.1386E-03	0.2598E-02	-3.06
127	250.00	179.50	-0.4064E-01	-0.9980E+00	0.2528E-02	-0.1270E-03	0.2531E-02	-2.88
128	270.00	179.50	-0.4175E-01	-0.9988E+00	0.2483E-02	-0.6986E-04	0.2484E-02	-1.61
129	290.00	179.50	-0.4080E-01	-0.9990E+00	0.2357E-02	-0.6062E-04	0.2357E-02	-1.47
130	302.00	179.50	-0.5846E-01	-0.9985E+00	0.2414E-02	-0.6326E-04	0.2415E-02	-1.50
131	312.00	179.50	-0.4123E-01	-0.9981E+00	0.2324E-02	-0.1083E-03	0.2327E-02	-2.67
132	330.00	179.50	-0.4276E-01	-0.9981E+00	0.2372E-02	-0.1032E-03	0.2375E-02	-2.49
133	350.00	179.50	-0.4278E-01	-0.9988E+00	0.2330E-02	-0.6736E-04	0.2331E-02	-1.66
134	370.00	179.50	-0.4301E-01	-0.9988E+00	0.2299E-02	-0.6485E-04	0.2300E-02	-1.62
135	390.00	179.50	-0.4330E-01	-0.9987E+00	0.2270E-02	-0.6796E-04	0.2271E-02	-1.71
136	410.00	179.50	-0.4362E-01	-0.9985E+00	0.2243E-02	-0.7614E-04	0.2244E-02	-1.94
137	430.00	179.50	-0.4400E-01	-0.9982E+00	0.2217E-02	-0.8925E-04	0.2219E-02	-2.31
138	450.00	179.50	-0.4452E-01	-0.9979E+00	0.2197E-02	-0.1045E-03	0.2199E-02	-2.72
139	470.00	179.50	-0.4489E-01	-0.9974E+00	0.2180E-02	-0.1247E-03	0.2184E-02	-3.27
140	490.00	179.50	-0.4495E-01	-0.9965E+00	0.2169E-02	-0.1686E-03	0.2176E-02	-4.45
141	510.00	179.50	-0.4473E-01	-0.9949E+00	0.2153E-02	-0.2472E-03	0.2167E-02	-6.55
142	530.00	179.50	-0.4139E-01	-0.9867E+00	0.1988E-02	-0.6380E-03	0.2088E-02	-17.79
143	545.00	174.75	-0.4689E-01	-0.9796E+00	0.3120E-02	-0.1360E-02	0.3404E-02	-23.55
144	131.75	199.50	-0.4230E-01	-0.1027E+01	0.1885E-02	0.1209E-02	0.2239E-02	32.67
145	150.00	199.50	-0.3757E-01	-0.1003E+01	0.1502E-02	0.1267E-03	0.1507E-02	4.82
146	170.00	199.50	-0.3756E-01	-0.1000E+01	0.1371E-02	0.1556E-04	0.1371E-02	0.65
147	190.00	199.50	-0.3779E-01	-0.9993E+00	0.1251E-02	-0.2231E-04	0.1251E-02	-1.02
148	210.00	199.50	-0.3840E-01	-0.9988E+00	0.1139E-02	-0.3709E-04	0.1140E-02	-1.86
149	230.00	199.50	-0.3929E-01	-0.9984E+00	0.1029E-02	-0.4288E-04	0.1030E-02	-2.39
150	250.00	199.50	-0.4078E-01	-0.9982E+00	0.9229E-03	-0.4011E-04	0.9238E-03	-2.49

Table 3.2.2 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (4/4)

(SECTION A-A)

****
***** ELEMENT VELOCITY *****
****

ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
151	270.00	199.50	-0.4236E-01	-0.9982E+00	0.8380E-03	-0.3643E-04	0.8388E-03	-2.49
152	285.00	194.25	-0.4022E-01	-0.9981E+00	0.9623E-03	-0.4627E-04	0.9635E-03	-2.75
153	301.00	199.50	-0.4394E-01	-0.9987E+00	0.7485E-03	-0.2162E-04	0.7488E-03	-1.65
154	312.00	194.25	-0.4061E-01	-0.9984E+00	0.8756E-03	-0.3480E-04	0.8763E-03	-2.28
155	330.00	199.50	-0.4314E-01	-0.9982E+00	0.6675E-03	-0.2753E-04	0.6681E-03	-2.36
156	350.00	199.50	-0.4284E-01	-0.9981E+00	0.6180E-03	-0.2770E-04	0.6186E-03	-2.57
157	370.00	199.50	-0.4284E-01	-0.9980E+00	0.5746E-03	-0.2747E-04	0.5753E-03	-2.74
158	390.00	199.50	-0.4289E-01	-0.9975E+00	0.5317E-03	-0.3139E-04	0.5326E-03	-3.38
159	410.00	199.50	-0.4285E-01	-0.9965E+00	0.4874E-03	-0.3970E-04	0.4890E-03	-4.66
160	430.00	199.50	-0.4265E-01	-0.9947E+00	0.4412E-03	-0.5432E-04	0.4446E-03	-7.02
161	450.00	199.50	-0.4248E-01	-0.9918E+00	0.3954E-03	-0.7601E-04	0.4026E-03	-10.88
162	470.00	199.50	-0.4175E-01	-0.9873E+00	0.3561E-03	-0.1083E-03	0.3722E-03	-16.92
163	490.00	199.50	-0.4081E-01	-0.9812E+00	0.3353E-03	-0.1545E-03	0.3692E-03	-24.74
164	510.00	199.50	-0.3841E-01	-0.9727E+00	0.3110E-03	-0.2210E-03	0.3815E-03	-35.40
165	525.00	194.25	-0.3459E-01	-0.9676E+00	0.3061E-03	-0.2869E-03	0.4195E-03	-43.15
166	135.25	220.00	-0.8119E-02	-0.1029E+01	0.5969E-04	0.2105E-03	0.2188E-03	74.17
167	150.00	220.00	-0.2722E-01	-0.1021E+01	0.1987E-03	0.1548E-03	0.2519E-03	37.93
168	170.00	220.00	-0.3324E-01	-0.1009E+01	0.2394E-03	0.6794E-04	0.2489E-03	15.84
169	190.00	220.00	-0.3600E-01	-0.1004E+01	0.2557E-03	0.3187E-04	0.2577E-03	7.10
170	210.00	220.00	-0.3764E-01	-0.1003E+01	0.2635E-03	0.1785E-04	0.2641E-03	3.88
171	230.00	220.00	-0.3900E-01	-0.1002E+01	0.2689E-03	0.1324E-04	0.2692E-03	2.82
172	250.00	220.00	-0.4056E-01	-0.1002E+01	0.2753E-03	0.1052E-04	0.2755E-03	2.19
173	270.00	220.00	-0.4181E-01	-0.1001E+01	0.2791E-03	0.5681E-05	0.2792E-03	1.17
174	300.00	220.00	-0.4235E-01	-0.1000E+01	0.2754E-03	0.1561E-05	0.2755E-03	0.32
175	330.00	220.00	-0.4284E-01	-0.9999E+00	0.2724E-03	-0.3217E-06	0.2724E-03	-0.07
176	350.00	220.00	-0.4277E-01	-0.9997E+00	0.2705E-03	-0.1767E-05	0.2705E-03	-0.37
177	370.00	220.00	-0.4254E-01	-0.9995E+00	0.2690E-03	-0.3309E-05	0.2691E-03	-0.70
178	390.00	220.00	-0.4223E-01	-0.9990E+00	0.2671E-03	-0.6179E-05	0.2671E-03	-1.33
179	410.00	220.00	-0.4160E-01	-0.9981E+00	0.2631E-03	-0.1193E-04	0.2633E-03	-2.60
180	430.00	220.00	-0.4037E-01	-0.9964E+00	0.2553E-03	-0.2261E-04	0.2563E-03	-5.06
181	450.00	220.00	-0.3820E-01	-0.9929E+00	0.2416E-03	-0.4476E-04	0.2457E-03	-10.50
182	470.00	220.00	-0.3551E-01	-0.9872E+00	0.2246E-03	-0.8120E-04	0.2388E-03	-19.88
183	490.00	220.00	-0.3095E-01	-0.9775E+00	0.1958E-03	-0.1424E-03	0.2421E-03	-36.03
184	505.00	215.00	-0.3302E-01	-0.9712E+00	0.2088E-03	-0.1824E-03	0.2773E-03	-41.14
185	137.00	235.00	-0.1093E-01	-0.1013E+01	0.6912E-04	0.8115E-04	0.1066E-03	49.58
186	150.00	240.00	-0.1554E-01	-0.1009E+01	0.9827E-04	0.5949E-04	0.1149E-03	31.19
187	170.00	240.00	-0.2810E-01	-0.1004E+01	0.1777E-03	0.2760E-04	0.1799E-03	8.83
188	190.00	240.00	-0.3391E-01	-0.1002E+01	0.2145E-03	0.1316E-04	0.2149E-03	3.51
189	210.00	240.00	-0.3689E-01	-0.1001E+01	0.2333E-03	0.7395E-05	0.2334E-03	1.82
190	230.00	240.00	-0.3878E-01	-0.1001E+01	0.2452E-03	0.5177E-05	0.2453E-03	1.21
191	250.00	240.00	-0.4021E-01	-0.1001E+01	0.2543E-03	0.3939E-05	0.2544E-03	0.89
192	270.00	240.00	-0.4127E-01	-0.1000E+01	0.2610E-03	0.2774E-05	0.2610E-03	0.61
193	300.00	240.00	-0.4221E-01	-0.1000E+01	0.2669E-03	0.1442E-05	0.2669E-03	0.31
194	330.00	240.00	-0.4265E-01	-0.1000E+01	0.2697E-03	0.2752E-06	0.2697E-03	0.06
195	350.00	240.00	-0.4261E-01	-0.9999E+00	0.2695E-03	-0.5002E-06	0.2695E-03	-0.11
196	370.00	240.00	-0.4234E-01	-0.9998E+00	0.2677E-03	-0.1249E-05	0.2678E-03	-0.27
197	390.00	240.00	-0.4180E-01	-0.9996E+00	0.2643E-03	-0.2379E-05	0.2644E-03	-0.52
198	410.00	240.00	-0.4078E-01	-0.9993E+00	0.2579E-03	-0.4523E-05	0.2579E-03	-1.00
199	430.00	240.00	-0.3882E-01	-0.9986E+00	0.2455E-03	-0.8810E-05	0.2457E-03	-2.05
200	450.00	240.00	-0.3502E-01	-0.9974E+00	0.2215E-03	-0.1651E-04	0.2221E-03	-4.26
201	470.00	240.00	-0.2672E-01	-0.9912E+00	0.1690E-03	-0.5578E-04	0.1779E-03	-18.27
202	485.00	235.00	-0.2463E-01	-0.9857E+00	0.1557E-03	-0.9023E-04	0.1800E-03	-30.09

Table 3.2.3 RESULT OF THE SEEPAGE ANALYSIS - POTENTIAL AND DISCHARGE (1/5)

(SECTION B-B)

****

***** POTENTIAL AND DISCHARGE VALUE CONDITION--STEDY *****

****

NODAL PT.	CONDITION	TOTAL HEAD (m)	PRES. HEAD (m)	DISCHARGE (m3/day)	MOIS. CO.
1	0	0.1888E+03	0.1488E+03	0.0000E+00	0.1930E+00
2	0	0.1888E+03	0.1488E+03	0.0000E+00	0.1930E+00
3	0	0.1886E+03	0.1486E+03	0.0000E+00	0.1930E+00
4	0	0.1883E+03	0.1483E+03	0.0000E+00	0.1930E+00
5	0	0.1877E+03	0.1477E+03	0.0000E+00	0.1930E+00
6	0	0.1868E+03	0.1468E+03	0.0000E+00	0.1930E+00
7	0	0.1855E+03	0.1455E+03	0.0000E+00	0.1930E+00
8	0	0.1838E+03	0.1438E+03	0.0000E+00	0.1930E+00
9	0	0.1818E+03	0.1418E+03	0.0000E+00	0.1930E+00
10	0	0.1797E+03	0.1397E+03	0.0000E+00	0.1930E+00
11	0	0.1775E+03	0.1375E+03	0.0000E+00	0.1930E+00
12	0	0.1752E+03	0.1352E+03	0.0000E+00	0.1930E+00
13	0	0.1729E+03	0.1329E+03	0.0000E+00	0.1930E+00
14	0	0.1705E+03	0.1305E+03	0.0000E+00	0.1930E+00
15	0	0.1681E+03	0.1281E+03	0.0000E+00	0.1930E+00
16	0	0.1658E+03	0.1258E+03	0.0000E+00	0.1930E+00
17	0	0.1633E+03	0.1233E+03	0.0000E+00	0.1930E+00
18	0	0.1622E+03	0.1222E+03	0.0000E+00	0.1930E+00
19	0	0.1621E+03	0.1221E+03	0.0000E+00	0.1930E+00
20	0	0.1888E+03	0.1088E+03	0.0000E+00	0.1930E+00
21	0	0.1888E+03	0.1088E+03	0.0000E+00	0.1930E+00
22	0	0.1887E+03	0.1087E+03	0.0000E+00	0.1930E+00
23	0	0.1884E+03	0.1084E+03	0.0000E+00	0.1930E+00
24	0	0.1879E+03	0.1079E+03	0.0000E+00	0.1930E+00
25	0	0.1870E+03	0.1070E+03	0.0000E+00	0.1930E+00
26	0	0.1857E+03	0.1057E+03	0.0000E+00	0.1930E+00
27	0	0.1839E+03	0.1039E+03	0.0000E+00	0.1930E+00
28	0	0.1819E+03	0.1019E+03	0.0000E+00	0.1930E+00
29	0	0.1798E+03	0.9977E+02	0.0000E+00	0.1930E+00
30	0	0.1776E+03	0.9755E+02	0.0000E+00	0.1930E+00
31	0	0.1753E+03	0.9526E+02	0.0000E+00	0.1930E+00
32	0	0.1729E+03	0.9293E+02	0.0000E+00	0.1930E+00
33	0	0.1705E+03	0.9053E+02	0.0000E+00	0.1930E+00
34	0	0.1681E+03	0.8807E+02	0.0000E+00	0.1930E+00
35	0	0.1656E+03	0.8565E+02	0.0000E+00	0.1930E+00
36	0	0.1629E+03	0.8288E+02	0.0000E+00	0.1930E+00
37	0	0.1618E+03	0.8178E+02	0.0000E+00	0.1930E+00
38	0	0.1617E+03	0.8168E+02	0.0000E+00	0.1930E+00
39	0	0.1890E+03	0.6898E+02	0.0000E+00	0.1930E+00
40	0	0.1890E+03	0.6897E+02	0.0000E+00	0.1930E+00
41	0	0.1890E+03	0.6896E+02	0.0000E+00	0.1930E+00
42	0	0.1889E+03	0.6894E+02	0.0000E+00	0.1930E+00
43	0	0.1889E+03	0.6889E+02	0.0000E+00	0.1930E+00
44	0	0.1888E+03	0.6882E+02	0.0000E+00	0.1930E+00
45	0	0.1887E+03	0.6869E+02	0.0000E+00	0.1930E+00
46	0	0.1885E+03	0.6849E+02	0.0000E+00	0.1930E+00
47	0	0.1882E+03	0.6816E+02	0.0000E+00	0.1930E+00
48	0	0.1877E+03	0.6769E+02	0.0000E+00	0.1930E+00
49	0	0.1870E+03	0.6703E+02	0.0000E+00	0.1930E+00
50	0	0.1862E+03	0.6623E+02	0.0000E+00	0.1930E+00

Table 3.2.3 RESULT OF THE SEEPAGE ANALYSIS - POTENTIAL AND DISCHARGE (2/5)

(SECTION B-B)

****

***** POTENTIAL AND DISCHARGE VALUE CONDITION--STEDY *****

****

NODAL PT.	CONDITION	TOTAL HEAD (m)	PRES. HEAD (m)	DISCHARGE (m3/day)	MOIS. CO.
51	0	0.1853E+03	0.6529E+02	0.0000E+00	0.1930E+00
52	0	0.1843E+03	0.6428E+02	0.0000E+00	0.1930E+00
53	0	0.1832E+03	0.6322E+02	0.0000E+00	0.1930E+00
54	0	0.1821E+03	0.6214E+02	0.0000E+00	0.1930E+00
55	0	0.1810E+03	0.6104E+02	0.0000E+00	0.1930E+00
56	0	0.1799E+03	0.5993E+02	0.0000E+00	0.1930E+00
57	0	0.1790E+03	0.5904E+02	0.0000E+00	0.1330E+00
58	0	0.1787E+03	0.5873E+02	0.0000E+00	0.1930E+00
59	0	0.1776E+03	0.5761E+02	0.0000E+00	0.1930E+00
60	0	0.1765E+03	0.5648E+02	0.0000E+00	0.1930E+00
61	0	0.1753E+03	0.5534E+02	0.0000E+00	0.1930E+00
62	0	0.1742E+03	0.5418E+02	0.0000E+00	0.1930E+00
63	0	0.1730E+03	0.5301E+02	0.0000E+00	0.1930E+00
64	0	0.1718E+03	0.5182E+02	0.0000E+00	0.1930E+00
65	0	0.1706E+03	0.5059E+02	0.0000E+00	0.1930E+00
66	0	0.1693E+03	0.4932E+02	0.0000E+00	0.1930E+00
67	0	0.1680E+03	0.4801E+02	0.0000E+00	0.1930E+00
68	0	0.1666E+03	0.4664E+02	0.0000E+00	0.1930E+00
69	0	0.1652E+03	0.4522E+02	0.0000E+00	0.1930E+00
70	0	0.1635E+03	0.4352E+02	0.0000E+00	0.1930E+00
71	0	0.1617E+03	0.4166E+02	0.0000E+00	0.1930E+00
72	0	0.1608E+03	0.4080E+02	0.0000E+00	0.1930E+00
73	0	0.1605E+03	0.4047E+02	0.0000E+00	0.1930E+00
74	0	0.1604E+03	0.4040E+02	0.0000E+00	0.1930E+00
75	0	0.1890E+03	0.4899E+02	0.0000E+00	0.2160E+00
76	0	0.1890E+03	0.4899E+02	0.0000E+00	0.2160E+00
77	0	0.1890E+03	0.4898E+02	0.0000E+00	0.2160E+00
78	0	0.1890E+03	0.4896E+02	0.0000E+00	0.2160E+00
79	0	0.1889E+03	0.4892E+02	0.0000E+00	0.2160E+00
80	0	0.1889E+03	0.4886E+02	0.0000E+00	0.2160E+00
81	0	0.1888E+03	0.4876E+02	0.0000E+00	0.2160E+00
82	0	0.1886E+03	0.4858E+02	0.0000E+00	0.2160E+00
83	0	0.1883E+03	0.4829E+02	0.0000E+00	0.2160E+00
84	0	0.1878E+03	0.4783E+02	0.0000E+00	0.2160E+00
85	0	0.1872E+03	0.4718E+02	0.0000E+00	0.2160E+00
86	0	0.1863E+03	0.4633E+02	0.0000E+00	0.2160E+00
87	0	0.1854E+03	0.4536E+02	0.0000E+00	0.2160E+00
88	0	0.1843E+03	0.4432E+02	0.0000E+00	0.2160E+00
89	0	0.1832E+03	0.4324E+02	0.0000E+00	0.2160E+00
90	0	0.1822E+03	0.4215E+02	0.0000E+00	0.2160E+00
91	0	0.1811E+03	0.4105E+02	0.0000E+00	0.2160E+00
92	0	0.1799E+03	0.3994E+02	0.0000E+00	0.2160E+00
93	0	0.1791E+03	0.3906E+02	0.0000E+00	0.2160E+00
94	0	0.1787E+03	0.3874E+02	0.0000E+00	0.1930E+00
95	0	0.1776E+03	0.3762E+02	0.0000E+00	0.2160E+00
96	0	0.1765E+03	0.3649E+02	0.0000E+00	0.2160E+00
97	0	0.1753E+03	0.3535E+02	0.0000E+00	0.2160E+00
98	0	0.1742E+03	0.3420E+02	0.0000E+00	0.2160E+00
99	0	0.1730E+03	0.3303E+02	0.0000E+00	0.2160E+00
100	0	0.1718E+03	0.3184E+02	0.0000E+00	0.2160E+00

Table 3.2.3 RESULT OF THE SEEPAGE ANALYSIS - POTENTIAL AND DISCHARGE (3/5)

(SECTION B-B)

***** POTENTIAL AND DISCHARGE VALUE CONDITION--STEDY *****

NODAL PT.	CONDITION	TOTAL HEAD (m)	PRES. HEAD (m)	DISCHARGE (m3/day)	MOIS. CO.
101	0	0.1706E+03	0.3062E+02	0.0000E+00	0.2160E+00
102	0	0.1694E+03	0.2935E+02	0.0000E+00	0.2160E+00
103	0	0.1680E+03	0.2804E+02	0.0000E+00	0.2160E+00
104	0	0.1667E+03	0.2667E+02	0.0000E+00	0.2160E+00
105	0	0.1652E+03	0.2524E+02	0.0000E+00	0.2160E+00
106	0	0.1634E+03	0.2340E+02	0.0000E+00	0.2160E+00
107	0	0.1613E+03	0.2133E+02	0.0000E+00	0.2160E+00
108	0	0.1605E+03	0.2050E+02	0.0000E+00	0.2160E+00
109	0	0.1603E+03	0.2030E+02	0.0000E+00	0.2160E+00
110	0	0.1602E+03	0.2024E+02	0.0000E+00	0.2160E+00
111	1	0.1890E+03	0.3300E+02	0.6684E-03	0.2160E+00
112	1	0.1890E+03	0.3300E+02	0.1601E-02	0.2160E+00
113	1	0.1890E+03	0.3300E+02	0.2726E-02	0.2160E+00
114	1	0.1890E+03	0.2900E+02	0.4611E-02	0.2160E+00
115	0	0.1890E+03	0.2898E+02	0.0000E+00	0.2160E+00
116	0	0.1889E+03	0.2895E+02	0.0000E+00	0.2160E+00
117	0	0.1889E+03	0.2890E+02	0.0000E+00	0.2160E+00
118	0	0.1888E+03	0.2879E+02	0.0000E+00	0.2160E+00
119	0	0.1886E+03	0.2859E+02	0.0000E+00	0.2160E+00
120	0	0.1882E+03	0.2820E+02	0.0000E+00	0.2160E+00
121	0	0.1875E+03	0.2752E+02	0.0000E+00	0.2160E+00
122	0	0.1866E+03	0.2657E+02	0.0000E+00	0.2160E+00
123	0	0.1855E+03	0.2548E+02	0.0000E+00	0.2160E+00
124	0	0.1844E+03	0.2438E+02	0.0000E+00	0.2160E+00
125	0	0.1833E+03	0.2329E+02	0.0000E+00	0.2160E+00
126	0	0.1822E+03	0.2218E+02	0.0000E+00	0.2160E+00
127	0	0.1811E+03	0.2107E+02	0.0000E+00	0.2160E+00
128	0	0.1800E+03	0.1996E+02	0.0000E+00	0.2160E+00
129	0	0.1791E+03	0.1907E+02	0.0000E+00	0.2160E+00
130	0	0.1788E+03	0.1875E+02	0.0000E+00	0.1930E+00
131	0	0.1776E+03	0.1763E+02	0.0000E+00	0.2160E+00
132	0	0.1765E+03	0.1650E+02	0.0000E+00	0.2160E+00
133	0	0.1754E+03	0.1536E+02	0.0000E+00	0.2160E+00
134	0	0.1742E+03	0.1422E+02	0.0000E+00	0.2160E+00
135	0	0.1731E+03	0.1307E+02	0.0000E+00	0.2160E+00
136	0	0.1719E+03	0.1190E+02	0.0000E+00	0.2160E+00
137	0	0.1707E+03	0.1069E+02	0.0000E+00	0.2160E+00
138	0	0.1694E+03	0.9432E+01	0.0000E+00	0.2160E+00
139	0	0.1681E+03	0.8118E+01	0.0000E+00	0.2160E+00
140	0	0.1667E+03	0.6743E+01	0.0000E+00	0.2160E+00
141	0	0.1653E+03	0.5312E+01	0.0000E+00	0.2160E+00
142	0	0.1635E+03	0.3493E+01	0.0000E+00	0.2160E+00
143	1	0.1600E+03	0.0000E+00	-0.2669E+00	0.2160E+00
144	1	0.1600E+03	0.0000E+00	-0.6677E-01	0.2160E+00
145	1	0.1600E+03	0.0000E+00	-0.2977E-01	0.2160E+00
146	1	0.1600E+03	0.0000E+00	-0.1208E-01	0.2160E+00
147	1	0.1890E+03	0.2100E+02	0.5812E-02	0.2160E+00
148	1	0.1890E+03	0.1900E+02	0.9727E-02	0.2160E+00
149	1	0.1890E+03	0.1700E+02	0.1676E-01	0.2160E+00
150	1	0.1890E+03	0.1500E+02	0.3002E-01	0.2160E+00

Table 3.2.3 RESULT OF THE SEEPAGE ANALYSIS - POTENTIAL AND DISCHARGE (4/5)

(SECTION B-B)

***** POTENTIAL AND DISCHARGE VALUE CONDITION--STEDY *****

NODAL PT.	CONDITION	TOTAL HEAD (m)	PRES. HEAD (m)	DISCHARGE (m3/day)	MOIS. CO.
151	0	0.1889E+03	0.1489E+02	0.0000E+00	0.2160E+00
152	0	0.1886E+03	0.1464E+02	0.0000E+00	0.2160E+00
153	0	0.1880E+03	0.1396E+02	0.0000E+00	0.2160E+00
154	0	0.1868E+03	0.1280E+02	0.0000E+00	0.2160E+00
155	0	0.1856E+03	0.1155E+02	0.0000E+00	0.2160E+00
156	0	0.1844E+03	0.1043E+02	0.0000E+00	0.2160E+00
157	0	0.1833E+03	0.9321E+01	0.0000E+00	0.2160E+00
158	0	0.1822E+03	0.8210E+01	0.0000E+00	0.2160E+00
159	0	0.1811E+03	0.7089E+01	0.0000E+00	0.2160E+00
160	0	0.1800E+03	0.5972E+01	0.0000E+00	0.2160E+00
161	0	0.1791E+03	0.5081E+01	0.0000E+00	0.2160E+00
162	0	0.1788E+03	0.4773E+01	0.0000E+00	0.1930E+00
163	0	0.1777E+03	0.3655E+01	0.0000E+00	0.2160E+00
164	0	0.1765E+03	0.2524E+01	0.0000E+00	0.2160E+00
165	0	0.1754E+03	0.1381E+01	0.0000E+00	0.2160E+00
166	0	0.1742E+03	0.2447E+00	0.0000E+00	0.2160E+00
167	0	0.1731E+03	-0.8908E+00	0.0000E+00	0.2092E+00
168	0	0.1719E+03	-0.2053E+01	0.0000E+00	0.2003E+00
169	0	0.1707E+03	-0.3251E+01	0.0000E+00	0.1911E+00
170	0	0.1695E+03	-0.4487E+01	0.0000E+00	0.1816E+00
171	0	0.1682E+03	-0.5785E+01	0.0000E+00	0.1716E+00
172	0	0.1668E+03	-0.7158E+01	0.0000E+00	0.1611E+00
173	0	0.1654E+03	-0.8567E+01	0.0000E+00	0.1551E+00
174	0	0.1637E+03	-0.1030E+02	0.0000E+00	0.1483E+00
175	1	0.1890E+03	0.1000E+02	0.4796E-01	0.2160E+00
176	1	0.1890E+03	0.5000E+01	0.8225E-01	0.2160E+00
177	1	0.1890E+03	0.0000E+00	0.1734E+00	0.2160E+00
178	0	0.1868E+03	-0.2156E+01	0.0000E+00	0.1995E+00
179	0	0.1856E+03	-0.3407E+01	0.0000E+00	0.1899E+00
180	0	0.1845E+03	-0.4541E+01	0.0000E+00	0.1812E+00
181	0	0.1834E+03	-0.5642E+01	0.0000E+00	0.1727E+00
182	0	0.1822E+03	-0.6761E+01	0.0000E+00	0.1641E+00
183	0	0.1811E+03	-0.7890E+01	0.0000E+00	0.1577E+00
184	0	0.1800E+03	-0.9035E+01	0.0000E+00	0.1532E+00
185	0	0.1791E+03	-0.9894E+01	0.0000E+00	0.1499E+00
186	0	0.1788E+03	-0.1021E+02	0.0000E+00	0.1499E+00
187	0	0.1777E+03	-0.1129E+02	0.0000E+00	0.1444E+00
188	0	0.1766E+03	-0.1245E+02	0.0000E+00	0.1399E+00
189	0	0.1754E+03	-0.1359E+02	0.0000E+00	0.1355E+00
190	0	0.1743E+03	-0.1473E+02	0.0000E+00	0.1311E+00
191	0	0.1731E+03	-0.1586E+02	0.0000E+00	0.1285E+00
192	0	0.1720E+03	-0.1701E+02	0.0000E+00	0.1265E+00
193	0	0.1708E+03	-0.1819E+02	0.0000E+00	0.1245E+00
194	0	0.1696E+03	-0.1939E+02	0.0000E+00	0.1224E+00
195	0	0.1684E+03	-0.2063E+02	0.0000E+00	0.1202E+00
196	0	0.1671E+03	-0.2192E+02	0.0000E+00	0.1180E+00
197	0	0.1658E+03	-0.2321E+02	0.0000E+00	0.1158E+00
198	-2	0.1645E+03	-0.2453E+02	0.0000E+00	0.1135E+00
199	0	0.1866E+03	-0.1291E+02	0.0000E+00	0.1381E+00
200	0	0.1854E+03	-0.2462E+02	0.0000E+00	0.1133E+00

Table 3.2.3 RESULT OF THE SEEPAGE ANALYSIS - POTENTIAL AND DISCHARGE (5/5)

(SECTION B-B)

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***** POTENTIAL AND DISCHARGE VALUE CONDITION--STEDY *****

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NODAL PT.	CONDITION	TOTAL HEAD (m)	PRES. HEAD (m)	DISCHARGE (m3/day)	MOIS. CO.
201	0	0.1844E+03	-0.2560E+02	0.0000E+00	0.1116E+00
202	0	0.1833E+03	-0.2669E+02	0.0000E+00	0.1097E+00
203	0	0.1822E+03	-0.2779E+02	0.0000E+00	0.1078E+00
204	0	0.1811E+03	-0.2890E+02	0.0000E+00	0.1059E+00
205	0	0.1800E+03	-0.3003E+02	0.0000E+00	0.1040E+00
206	0	0.1777E+03	-0.3225E+02	0.0000E+00	0.1040E+00
207	0	0.1766E+03	-0.3338E+02	0.0000E+00	0.1040E+00
208	0	0.1755E+03	-0.3451E+02	0.0000E+00	0.1040E+00
209	0	0.1743E+03	-0.3565E+02	0.0000E+00	0.1040E+00
210	0	0.1732E+03	-0.3681E+02	0.0000E+00	0.1040E+00
211	0	0.1720E+03	-0.3796E+02	0.0000E+00	0.1040E+00
212	0	0.1709E+03	-0.3909E+02	0.0000E+00	0.1040E+00
213	0	0.1698E+03	-0.4020E+02	0.0000E+00	0.1040E+00
214	0	0.1687E+03	-0.4128E+02	0.0000E+00	0.1040E+00
215	0	0.1677E+03	-0.4228E+02	0.0000E+00	0.1040E+00
216	0	0.1668E+03	-0.4316E+02	0.0000E+00	0.1040E+00
217	-2	0.1666E+03	-0.4343E+02	0.0000E+00	0.1040E+00
218	0	0.1841E+03	-0.3586E+02	0.0000E+00	0.1040E+00
219	0	0.1827E+03	-0.4730E+02	0.0000E+00	0.1040E+00
220	0	0.1819E+03	-0.4814E+02	0.0000E+00	0.1040E+00
221	0	0.1809E+03	-0.4910E+02	0.0000E+00	0.1040E+00
222	0	0.1799E+03	-0.5010E+02	0.0000E+00	0.1040E+00
223	0	0.1777E+03	-0.5228E+02	0.0000E+00	0.1040E+00
224	0	0.1766E+03	-0.5339E+02	0.0000E+00	0.1040E+00
225	0	0.1755E+03	-0.5452E+02	0.0000E+00	0.1040E+00
226	0	0.1743E+03	-0.5566E+02	0.0000E+00	0.1040E+00
227	0	0.1732E+03	-0.5679E+02	0.0000E+00	0.1040E+00
228	0	0.1721E+03	-0.5791E+02	0.0000E+00	0.1040E+00
229	0	0.1710E+03	-0.5901E+02	0.0000E+00	0.1040E+00
230	0	0.1700E+03	-0.6004E+02	0.0000E+00	0.1040E+00
231	0	0.1690E+03	-0.6095E+02	0.0000E+00	0.1040E+00
232	0	0.1683E+03	-0.6174E+02	0.0000E+00	0.1040E+00
233	-2	0.1674E+03	-0.5261E+02	0.0000E+00	0.1040E+00
234	0	0.1814E+03	-0.6856E+02	0.0000E+00	0.1040E+00
235	0	0.1808E+03	-0.6917E+02	0.0000E+00	0.1040E+00
236	0	0.1799E+03	-0.7014E+02	0.0000E+00	0.1040E+00
237	0	0.1777E+03	-0.7228E+02	0.0000E+00	0.1040E+00
238	0	0.1766E+03	-0.7340E+02	0.0000E+00	0.1040E+00
239	0	0.1755E+03	-0.7453E+02	0.0000E+00	0.1040E+00
240	0	0.1743E+03	-0.7566E+02	0.0000E+00	0.1040E+00
241	0	0.1732E+03	-0.7679E+02	0.0000E+00	0.1040E+00
242	0	0.1721E+03	-0.7790E+02	0.0000E+00	0.1040E+00
243	0	0.1710E+03	-0.7898E+02	0.0000E+00	0.1040E+00
244	0	0.1700E+03	-0.7998E+02	0.0000E+00	0.1040E+00
245	0	0.1692E+03	-0.8084E+02	0.0000E+00	0.1040E+00
246	-2	0.1687E+03	-0.8126E+02	0.0000E+00	0.1040E+00

FLOWIN = 0.3755E+00

FLOWOUT = -0.3755E+00

TOTAL = -0.1222E-05

Table 3.2.4 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (1/5)

(SECTION B-B)

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***** ELEMENT VELOCITY *****

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ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
1	10.00	60.00	-0.6627E-03	-0.9986E+00	0.5725E-05	-0.1201E-04	0.1330E-04	-64.51
2	40.00	60.00	-0.2918E-02	-0.9983E+00	0.2521E-04	-0.1492E-04	0.2929E-04	-30.63
3	80.00	60.00	-0.7068E-02	-0.9974E+00	0.6107E-04	-0.2265E-04	0.6513E-04	-20.35
4	120.00	60.00	-0.1355E-01	-0.9960E+00	0.1171E-03	-0.3431E-04	0.1220E-03	-16.33
5	160.00	60.00	-0.2288E-01	-0.9949E+00	0.1977E-03	-0.4431E-04	0.2026E-03	-12.63
6	200.00	60.00	-0.3369E-01	-0.9949E+00	0.2911E-03	-0.4445E-04	0.2944E-03	-8.68
7	240.00	60.00	-0.4306E-01	-0.9961E+00	0.3720E-03	-0.3408E-04	0.3736E-03	-5.23
8	280.00	60.00	-0.4939E-01	-0.9975E+00	0.4267E-03	-0.2180E-04	0.4273E-03	-2.92
9	320.00	60.00	-0.5327E-01	-0.9985E+00	0.4603E-03	-0.1266E-04	0.4604E-03	-1.58
10	360.00	60.00	-0.5543E-01	-0.9991E+00	0.4789E-03	-0.8102E-05	0.4790E-03	-0.97
11	400.00	60.00	-0.5713E-01	-0.9993E+00	0.4936E-03	-0.6459E-05	0.4937E-03	-0.75
12	440.00	60.00	-0.5846E-01	-0.9993E+00	0.5051E-03	-0.5920E-05	0.5051E-03	-0.67
13	480.00	60.00	-0.5987E-01	-0.9994E+00	0.5173E-03	-0.5336E-05	0.5173E-03	-0.59
14	520.00	60.00	-0.6072E-01	-0.1000E+01	0.5246E-03	0.7756E-06	0.5246E-03	0.08
15	560.00	60.00	-0.5901E-01	-0.1002E+01	0.5093E-03	0.1988E-04	0.5103E-03	2.23
16	607.50	60.00	-0.4803E-01	-0.1007E+01	0.4150E-03	0.6222E-04	0.4196E-03	8.53
17	657.50	60.00	-0.2383E-01	-0.1011E+01	0.2059E-03	0.9449E-04	0.2265E-03	24.65
18	690.00	60.00	-0.5469E-02	-0.1011E+01	0.4725E-04	0.9696E-04	0.1079E-03	64.02
19	5.00	90.00	-0.5858E-03	-0.9962E+00	0.5061E-05	-0.3299E-04	0.3337E-04	-81.28
20	20.00	110.00	-0.4014E-03	-0.9960E+00	0.3468E-05	-0.3486E-04	0.3504E-04	-84.32
21	35.00	90.00	-0.2619E-02	-0.9950E+00	0.2263E-04	-0.4336E-04	0.4891E-04	-62.44
22	60.00	110.00	-0.1755E-02	-0.9943E+00	0.1517E-04	-0.4960E-04	0.5187E-04	-73.00
23	75.00	90.00	-0.6472E-02	-0.9922E+00	0.5592E-04	-0.6747E-04	0.8763E-04	-50.35
24	100.00	110.00	-0.5089E-02	-0.9908E+00	0.4397E-04	-0.7967E-04	0.9100E-04	-61.11
25	115.00	90.00	-0.1280E-01	-0.9876E+00	0.1106E-03	-0.1068E-03	0.1537E-03	-43.99
26	140.00	110.00	-0.1324E-01	-0.9862E+00	0.1144E-03	-0.1191E-03	0.1651E-03	-46.16
27	155.00	90.00	-0.2248E-01	-0.9832E+00	0.1942E-03	-0.1448E-03	0.2423E-03	-36.71
28	180.00	110.00	-0.2810E-01	-0.9836E+00	0.2428E-03	-0.1413E-03	0.2810E-03	-30.20
29	195.00	90.00	-0.3408E-01	-0.9831E+00	0.2944E-03	-0.1463E-03	0.3288E-03	-26.42
30	220.00	110.00	-0.4361E-01	-0.9861E+00	0.3768E-03	-0.1203E-03	0.3956E-03	-17.70
31	235.00	90.00	-0.4387E-01	-0.9877E+00	0.3790E-03	-0.1062E-03	0.3936E-03	-15.65
32	260.00	110.00	-0.5182E-01	-0.9911E+00	0.4477E-03	-0.7731E-04	0.4543E-03	-9.80
33	275.00	90.00	-0.5000E-01	-0.9926E+00	0.4320E-03	-0.6399E-04	0.4367E-03	-8.43
34	300.00	110.00	-0.5447E-01	-0.9946E+00	0.4706E-03	-0.4650E-04	0.4729E-03	-5.64
35	315.00	90.00	-0.5372E-01	-0.9952E+00	0.4641E-03	-0.4145E-04	0.4660E-03	-5.10
36	339.00	110.00	-0.5551E-01	-0.9960E+00	0.4796E-03	-0.3472E-04	0.4809E-03	-4.14
37	359.00	100.00	-0.5750E-01	-0.9973E+00	0.4968E-03	-0.2333E-04	0.4974E-03	-2.69
38	380.00	110.00	-0.5634E-01	-0.9986E+00	0.4868E-03	-0.1208E-04	0.4869E-03	-1.42
39	395.00	90.00	-0.5725E-01	-0.9983E+00	0.4946E-03	-0.1499E-04	0.4948E-03	-1.74
40	420.00	110.00	-0.5736E-01	-0.9981E+00	0.4956E-03	-0.1601E-04	0.4959E-03	-1.85
41	435.00	90.00	-0.5841E-01	-0.9978E+00	0.5047E-03	-0.1901E-04	0.5050E-03	-2.16
42	460.00	110.00	-0.5915E-01	-0.9978E+00	0.5110E-03	-0.1880E-04	0.5114E-03	-2.11
43	475.00	90.00	-0.5999E-01	-0.9977E+00	0.5183E-03	-0.1949E-04	0.5187E-03	-2.15
44	500.00	110.00	-0.6239E-01	-0.9984E+00	0.5390E-03	-0.1396E-04	0.5392E-03	-1.48
45	515.00	90.00	-0.6131E-01	-0.9995E+00	0.5297E-03	-0.4453E-05	0.5297E-03	-0.48
46	540.00	110.00	-0.6693E-01	-0.1002E+01	0.5783E-03	0.1394E-04	0.5785E-03	1.38
47	555.00	90.00	-0.6063E-01	-0.1005E+01	0.5239E-03	0.4706E-04	0.5260E-03	5.13
48	581.00	110.00	-0.7094E-01	-0.1011E+01	0.6129E-03	0.9199E-04	0.6198E-03	8.54
49	599.75	90.00	-0.5041E-01	-0.1023E+01	0.4356E-03	0.1980E-03	0.4784E-03	24.44
50	633.50	110.00	-0.4857E-01	-0.1030E+01	0.4196E-03	0.2621E-03	0.4948E-03	31.99

Table 3.2.4 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (2/5)

(SECTION B-B)

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***** ELEMENT VELOCITY *****

****

ELEMENT	XC (m)	YC (m)	N.G.(X)	N.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
51	652.50	90.00	-0.2424E-01	-0.1037E+01	0.2094E-03	0.3170E-03	0.3799E-03	56.55
52	680.00	110.00	-0.1012E-01	-0.1033E+01	0.8746E-04	0.2843E-03	0.2974E-03	72.90
53	690.00	90.00	-0.5129E-02	-0.1032E+01	0.4431E-04	0.2776E-03	0.2811E-03	80.93
54	10.00	130.00	-0.1272E-03	-0.9994E+00	0.1099E-04	-0.5012E-04	0.5131E-04	-77.63
55	30.00	130.00	-0.5157E-03	-0.9993E+00	0.4456E-04	-0.6394E-04	0.7793E-04	-55.13
56	50.00	130.00	-0.1067E-02	-0.9990E+00	0.9219E-04	-0.8499E-04	0.1254E-03	-42.67
57	70.00	130.00	-0.2047E-02	-0.9986E+00	0.1768E-03	-0.1193E-03	0.2133E-03	-34.00
58	90.00	130.00	-0.3359E-02	-0.9980E+00	0.2902E-03	-0.1691E-03	0.3359E-03	-30.23
59	110.00	130.00	-0.5848E-02	-0.9971E+00	0.5053E-03	-0.2530E-03	0.5651E-03	-26.60
60	130.00	130.00	-0.9399E-02	-0.9958E+00	0.8120E-03	-0.3594E-03	0.8880E-03	-23.88
61	150.00	130.00	-0.1555E-01	-0.9943E+00	0.1343E-02	-0.4918E-03	0.1430E-02	-20.11
62	170.00	130.00	-0.2311E-01	-0.9932E+00	0.1997E-02	-0.5912E-03	0.2082E-02	-16.49
63	190.00	130.00	-0.3286E-01	-0.9929E+00	0.2839E-02	-0.6117E-03	0.2904E-02	-12.16
64	210.00	130.00	-0.4114E-01	-0.9939E+00	0.3554E-02	-0.5281E-03	0.3593E-02	-8.45
65	230.00	130.00	-0.4789E-01	-0.9957E+00	0.4138E-02	-0.3725E-03	0.4155E-02	-5.14
66	250.00	130.00	-0.5135E-01	-0.9973E+00	0.4437E-02	-0.2373E-03	0.4443E-02	-3.06
67	270.00	130.00	-0.5337E-01	-0.9983E+00	0.4611E-02	-0.1431E-03	0.4614E-02	-1.78
68	290.00	130.00	-0.5428E-01	-0.9989E+00	0.4690E-02	-0.9790E-04	0.4691E-02	-1.20
69	310.00	130.00	-0.5497E-01	-0.9992E+00	0.4749E-02	-0.7078E-04	0.4750E-02	-0.85
70	330.00	130.00	-0.5535E-01	-0.9993E+00	0.4782E-02	-0.5783E-04	0.4782E-02	-0.69
71	348.00	130.00	-0.5569E-01	-0.9993E+00	0.4812E-02	-0.5966E-04	0.4812E-02	-0.71
72	358.00	130.00	-0.7874E-01	-0.9995E+00	0.4762E-02	-0.3207E-04	0.4763E-02	-0.39
73	370.00	130.00	-0.5604E-01	-0.9997E+00	0.4842E-02	-0.3002E-04	0.4842E-02	-0.36
74	390.00	130.00	-0.5654E-01	-0.9996E+00	0.4885E-02	-0.3869E-04	0.4885E-02	-0.45
75	410.00	130.00	-0.5700E-01	-0.9995E+00	0.4925E-02	-0.4261E-04	0.4925E-02	-0.50
76	430.00	130.00	-0.5760E-01	-0.9994E+00	0.4977E-02	-0.5351E-04	0.4977E-02	-0.62
77	450.00	130.00	-0.5837E-01	-0.9992E+00	0.5043E-02	-0.7112E-04	0.5044E-02	-0.81
78	470.00	130.00	-0.5965E-01	-0.9989E+00	0.5154E-02	-0.9442E-04	0.5155E-02	-1.05
79	490.00	130.00	-0.6123E-01	-0.9987E+00	0.5290E-02	-0.1132E-03	0.5292E-02	-1.23
80	510.00	130.00	-0.6340E-01	-0.9985E+00	0.5478E-02	-0.1255E-03	0.5480E-02	-1.31
81	530.00	130.00	-0.6568E-01	-0.9986E+00	0.5675E-02	-0.1245E-03	0.5676E-02	-1.26
82	550.00	130.00	-0.6839E-01	-0.9988E+00	0.5909E-02	-0.1066E-03	0.5910E-02	-1.03
83	570.00	130.00	-0.7110E-01	-0.9989E+00	0.6143E-02	-0.9323E-04	0.6144E-02	-0.87
84	592.00	130.00	-0.7384E-01	-0.1003E+01	0.6380E-02	0.2219E-03	0.6384E-02	1.99
85	619.50	130.00	-0.6341E-01	-0.1011E+01	0.5478E-02	0.9897E-03	0.5567E-02	10.24
86	647.50	130.00	-0.3382E-01	-0.1016E+01	0.2922E-02	0.1384E-02	0.3233E-02	25.34
87	670.00	130.00	-0.1322E-01	-0.1012E+01	0.1142E-02	0.1023E-02	0.1533E-02	41.85
88	690.00	130.00	-0.3265E-02	-0.1008E+01	0.2821E-03	0.6973E-03	0.7522E-03	87.98
89	10.00	148.00	-0.5175E-04	-0.9992E+00	0.4471E-05	-0.6639E-04	0.6654E-04	-86.15
90	30.00	148.00	-0.1897E-03	-0.9989E+00	0.1639E-04	-0.9249E-04	0.9393E-04	-79.95
91	50.00	149.00	-0.6491E-03	-0.9983E+00	0.5609E-04	-0.1465E-03	0.1569E-03	-69.05
92	70.00	150.00	-0.1426E-02	-0.9977E+00	0.1232E-03	-0.2019E-03	0.2365E-03	-58.60
93	90.00	150.00	-0.2268E-02	-0.9965E+00	0.1960E-03	-0.2999E-03	0.3583E-03	-56.84
94	110.00	150.00	-0.3871E-02	-0.9944E+00	0.3344E-03	-0.4811E-03	0.5859E-03	-55.19
95	130.00	150.00	-0.7038E-02	-0.9913E+00	0.6081E-03	-0.7494E-03	0.9651E-03	-50.95
96	150.00	150.00	-0.1242E-01	-0.9874E+00	0.1073E-02	-0.1092E-02	0.1530E-02	-45.50
97	170.00	150.00	-0.2120E-01	-0.9835E+00	0.1831E-02	-0.1428E-02	0.2322E-02	-37.94
98	190.00	150.00	-0.3327E-01	-0.9822E+00	0.2874E-02	-0.1538E-02	0.3260E-02	-28.15
99	210.00	150.00	-0.4493E-01	-0.9854E+00	0.3882E-02	-0.1258E-02	0.4081E-02	-17.96
100	230.00	150.00	-0.5152E-01	-0.9911E+00	0.4451E-02	-0.7722E-03	0.4518E-02	-9.84

Table 3.2.4 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (3/5)

(SECTION B-B)

****

***** ELEMENT VELOCITY *****

****

ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
101	250.00	150.00	-0.5359E-01	-0.9954E+00	0.4630E-02	-0.4007E-03	0.4647E-02	-4.95
102	270.00	150.00	-0.5422E-01	-0.9974E+00	0.4684E-02	-0.2288E-03	0.4690E-02	-2.80
103	290.00	150.00	-0.5482E-01	-0.9982E+00	0.4737E-02	-0.1543E-03	0.4739E-02	-1.87
104	310.00	150.00	-0.5527E-01	-0.9987E+00	0.4775E-02	-0.1087E-03	0.4777E-02	-1.30
105	330.00	150.00	-0.5552E-01	-0.9991E+00	0.4797E-02	-0.8022E-04	0.4798E-02	-0.96
106	348.00	150.00	-0.5558E-01	-0.9992E+00	0.4802E-02	-0.7071E-04	0.4803E-02	-0.84
107	358.00	150.00	-0.7984E-01	-0.9992E+00	0.4829E-02	-0.5120E-04	0.4829E-02	-0.61
108	370.00	150.00	-0.5594E-01	-0.9991E+00	0.4833E-02	-0.7888E-04	0.4834E-02	-0.94
109	390.00	150.00	-0.5651E-01	-0.9991E+00	0.4882E-02	-0.8169E-04	0.4883E-02	-0.96
110	410.00	150.00	-0.5698E-01	-0.9991E+00	0.4923E-02	-0.8140E-04	0.4924E-02	-0.95
111	430.00	150.00	-0.5728E-01	-0.9989E+00	0.4949E-02	-0.9919E-04	0.4950E-02	-1.15
112	450.00	150.00	-0.5785E-01	-0.9982E+00	0.4998E-02	-0.1542E-03	0.5000E-02	-1.77
113	470.00	150.00	-0.5911E-01	-0.9974E+00	0.5107E-02	-0.2228E-03	0.5112E-02	-2.50
114	490.00	150.00	-0.6090E-01	-0.9968E+00	0.5262E-02	-0.2794E-03	0.5269E-02	-3.04
115	510.00	150.00	-0.6305E-01	-0.9962E+00	0.5447E-02	-0.3268E-03	0.5457E-02	-3.43
116	530.00	150.00	-0.6574E-01	-0.9959E+00	0.5680E-02	-0.3540E-03	0.5691E-02	-3.57
117	550.00	150.00	-0.6862E-01	-0.9960E+00	0.5929E-02	-0.3470E-03	0.5939E-02	-3.35
118	570.00	150.00	-0.7135E-01	-0.9963E+00	0.6165E-02	-0.3189E-03	0.6173E-02	-2.96
119	592.00	150.00	-0.7632E-01	-0.9959E+00	0.6594E-02	-0.3558E-03	0.6603E-02	-3.09
120	619.50	150.00	-0.8976E-01	-0.1031E+01	0.7755E-02	0.2661E-02	0.8199E-02	18.94
121	647.50	150.00	-0.1661E-01	-0.1046E+01	0.1435E-02	0.3938E-02	0.4191E-02	69.98
122	670.00	150.00	-0.4889E-02	-0.1020E+01	0.4224E-03	0.1721E-02	0.1772E-02	76.21
123	690.00	150.00	-0.1468E-02	-0.1014E+01	0.1269E-03	0.1172E-02	0.1179E-02	83.82
124	70.00	162.00	-0.1096E-02	-0.9973E+00	0.9467E-04	-0.2367E-03	0.2549E-03	-68.20
125	90.00	164.50	-0.9354E-03	-0.9959E+00	0.8082E-04	-0.3510E-03	0.3602E-03	-77.03
126	110.00	165.50	-0.1639E-02	-0.9930E+00	0.1416E-03	-0.6046E-03	0.6210E-03	-76.82
127	130.00	166.50	-0.3209E-02	-0.9881E+00	0.2772E-03	-0.1030E-02	0.1067E-02	-74.94
128	150.00	167.00	-0.7933E-02	-0.9819E+00	0.6854E-03	-0.1567E-02	0.1711E-02	-66.38
129	170.00	167.00	-0.1593E-01	-0.9735E+00	0.1376E-02	-0.2290E-02	0.2672E-02	-59.00
130	190.00	167.00	-0.3389E-01	-0.9687E+00	0.2928E-02	-0.2707E-02	0.3988E-02	-42.76
131	210.00	167.00	-0.5273E-01	-0.9761E+00	0.4556E-02	-0.2068E-02	0.5003E-02	-24.41
132	230.00	167.00	-0.5846E-01	-0.9891E+00	0.5051E-02	-0.9444E-03	0.5138E-02	-10.59
133	250.00	167.00	-0.5564E-01	-0.9958E+00	0.4808E-02	-0.3657E-03	0.4822E-02	-4.35
134	270.00	167.00	-0.5506E-01	-0.9971E+00	0.4758E-02	-0.2530E-03	0.4764E-02	-3.04
135	290.00	167.00	-0.5535E-01	-0.9978E+00	0.4782E-02	-0.1896E-03	0.4786E-02	-2.27
136	310.00	167.00	-0.5576E-01	-0.9985E+00	0.4817E-02	-0.1297E-03	0.4819E-02	-1.54
137	330.00	167.00	-0.5575E-01	-0.9990E+00	0.4817E-02	-0.8284E-04	0.4817E-02	-0.99
138	348.00	167.00	-0.5563E-01	-0.9993E+00	0.4806E-02	-0.6379E-04	0.4807E-02	-0.76
139	358.00	167.00	-0.7831E-01	-0.9989E+00	0.4736E-02	-0.6538E-04	0.4737E-02	-0.79
140	370.00	167.00	-0.5591E-01	-0.9985E+00	0.4831E-02	-0.1265E-03	0.4833E-02	-1.50
141	390.00	167.00	-0.5654E-01	-0.9986E+00	0.4885E-02	-0.1223E-03	0.4886E-02	-1.43
142	410.00	167.00	-0.5706E-01	-0.9987E+00	0.4930E-02	-0.1104E-03	0.4931E-02	-1.28
143	430.00	167.00	-0.5695E-01	-0.9986E+00	0.4921E-02	-0.1173E-03	0.4922E-02	-1.37
144	450.00	167.00	-0.5710E-01	-0.9980E+00	0.4823E-02	-0.1686E-03	0.4826E-02	-2.00
145	470.00	167.00	-0.5842E-01	-0.9971E+00	0.4676E-02	-0.2338E-03	0.4682E-02	-2.86
146	490.00	167.00	-0.6027E-01	-0.9961E+00	0.4516E-02	-0.2904E-03	0.4526E-02	-3.68
147	510.00	167.00	-0.6230E-01	-0.9949E+00	0.4340E-02	-0.3530E-03	0.4355E-02	-4.65
148	530.00	167.00	-0.6529E-01	-0.9937E+00	0.4192E-02	-0.4060E-03	0.4211E-02	-5.53
149	550.00	167.00	-0.6868E-01	-0.9930E+00	0.4093E-02	-0.4161E-03	0.4114E-02	-5.80
150	570.00	167.00	-0.7102E-01	-0.9922E+00	0.4039E-02	-0.4455E-03	0.4064E-02	-6.29

Table 3.2.4 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (4/5)

(SECTION B-B)

****

***** ELEMENT VELOCITY *****

****

ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
151	592.00	167.00	-0.7407E-01	-0.9884E+00	0.4069E-02	-0.6347E-03	0.4119E-02	-8.87
152	611.75	163.50	-0.1127E+00	-0.9855E+00	0.7906E-02	-0.1019E-02	0.7971E-02	-7.35
153	150.00	175.25	-0.5598E-02	-0.9776E+00	0.4836E-03	-0.1935E-02	0.1994E-02	-75.97
154	170.00	177.75	-0.1014E-01	-0.9685E+00	0.8758E-03	-0.2719E-02	0.2857E-02	-72.15
155	190.00	180.25	-0.2402E-01	-0.9440E+00	0.2075E-02	-0.4841E-02	0.5267E-02	-66.80
156	210.00	181.50	-0.8278E-01	-0.9640E+00	0.6766E-02	-0.2945E-02	0.7379E-02	-23.52
157	230.00	181.50	-0.6254E-01	-0.9973E+00	0.4651E-02	-0.1979E-03	0.4655E-02	-2.44
158	250.00	181.50	-0.5649E-01	-0.9977E+00	0.3910E-02	-0.1625E-03	0.3914E-02	-2.38
159	270.00	181.50	-0.5520E-01	-0.9977E+00	0.3555E-02	-0.1450E-03	0.3558E-02	-2.34
160	290.00	181.50	-0.5575E-01	-0.9978E+00	0.3365E-02	-0.1338E-03	0.3368E-02	-2.28
161	310.00	181.50	-0.5624E-01	-0.9983E+00	0.3247E-02	-0.9712E-04	0.3248E-02	-1.71
162	330.00	181.50	-0.5657E-01	-0.9996E+00	0.3173E-02	-0.2504E-04	0.3173E-02	-0.45
163	348.00	181.50	-0.5467E-01	-0.9994E+00	0.3002E-02	-0.3168E-04	0.3002E-02	-0.60
164	358.00	181.50	-0.7737E-01	-0.9985E+00	0.3121E-02	-0.6163E-04	0.3121E-02	-1.13
165	370.00	181.50	-0.5520E-01	-0.9976E+00	0.2947E-02	-0.1268E-03	0.2950E-02	-2.46
166	390.00	181.50	-0.5714E-01	-0.9974E+00	0.2975E-02	-0.1341E-03	0.2978E-02	-2.58
167	410.00	181.50	-0.5707E-01	-0.9981E+00	0.2895E-02	-0.9557E-04	0.2896E-02	-1.89
168	430.00	181.50	-0.5680E-01	-0.9980E+00	0.2805E-02	-0.9793E-04	0.2807E-02	-2.00
169	450.00	181.50	-0.5673E-01	-0.9979E+00	0.2641E-02	-0.9680E-04	0.2643E-02	-2.10
170	470.00	181.50	-0.5786E-01	-0.9975E+00	0.2420E-02	-0.1025E-03	0.2423E-02	-2.43
171	490.00	181.50	-0.5944E-01	-0.9966E+00	0.2174E-02	-0.1248E-03	0.2177E-02	-3.29
172	510.00	181.50	-0.6091E-01	-0.9947E+00	0.1897E-02	-0.1637E-03	0.1904E-02	-4.93
173	530.00	181.50	-0.6344E-01	-0.9916E+00	0.1618E-02	-0.2140E-03	0.1632E-02	-7.53
174	550.00	181.50	-0.6644E-01	-0.9868E+00	0.1377E-02	-0.2744E-03	0.1404E-02	-11.27
175	570.00	181.50	-0.6755E-01	-0.9799E+00	0.1205E-02	-0.3580E-03	0.1257E-02	-16.55
176	592.00	181.50	-0.6366E-01	-0.9621E+00	0.1001E-02	-0.5958E-03	0.1165E-02	-30.76
177	611.75	174.25	-0.9586E-01	-0.9482E+00	0.3285E-02	-0.1774E-02	0.3733E-02	-28.37
178	210.00	191.63	-0.1078E+00	-0.1024E+01	0.6895E-02	0.1547E-02	0.7066E-02	12.64
179	230.00	196.88	-0.5765E-01	-0.1015E+01	0.2130E-02	0.5483E-03	0.2199E-02	14.44
180	250.00	199.50	-0.5273E-01	-0.1006E+01	0.1574E-02	0.1904E-03	0.1585E-02	6.90
181	270.00	199.50	-0.5477E-01	-0.1002E+01	0.1362E-02	0.5771E-04	0.1364E-02	2.43
182	290.00	199.50	-0.5567E-01	-0.1002E+01	0.1152E-02	0.3743E-04	0.1153E-02	1.86
183	310.00	199.50	-0.5601E-01	-0.1001E+01	0.1004E-02	0.2028E-04	0.1004E-02	1.16
184	330.00	199.50	-0.5667E-01	-0.1000E+01	0.9136E-03	0.1987E-05	0.9136E-03	0.12
185	344.00	194.25	-0.5367E-01	-0.9995E+00	0.1041E-02	-0.8763E-05	0.1041E-02	-0.48
186	359.00	199.50	-0.5768E-01	-0.9988E+00	0.8179E-03	-0.1741E-04	0.8181E-03	-1.22
187	370.00	194.25	-0.5448E-01	-0.9980E+00	0.9364E-03	-0.3448E-04	0.9370E-03	-2.11
188	390.00	199.50	-0.5715E-01	-0.9975E+00	0.6876E-03	-0.3051E-04	0.6883E-03	-2.54
189	410.00	199.50	-0.5673E-01	-0.9967E+00	0.6059E-03	-0.3570E-04	0.6069E-03	-3.37
190	430.00	199.50	-0.5685E-01	-0.9964E+00	0.5309E-03	-0.3319E-04	0.5320E-03	-3.58
191	450.00	199.50	-0.5727E-01	-0.9971E+00	0.4840E-03	-0.2468E-04	0.4846E-03	-2.92
192	470.00	199.50	-0.5755E-01	-0.9976E+00	0.4692E-03	-0.1983E-04	0.4696E-03	-2.42
193	490.00	199.50	-0.5780E-01	-0.9964E+00	0.4621E-03	-0.2881E-04	0.4630E-03	-3.57
194	510.00	199.50	-0.5784E-01	-0.9932E+00	0.4532E-03	-0.5307E-04	0.4563E-03	-6.68
195	530.00	199.50	-0.5794E-01	-0.9873E+00	0.4444E-03	-0.9745E-04	0.4550E-03	-12.37
196	550.00	199.50	-0.5712E-01	-0.9766E+00	0.4284E-03	-0.1752E-03	0.4629E-03	-22.24
197	570.00	199.50	-0.5432E-01	-0.9600E+00	0.3980E-03	-0.2928E-03	0.4941E-03	-36.34
198	587.75	199.50	-0.5131E-01	-0.9461E+00	0.3669E-03	-0.3857E-03	0.5323E-03	-46.43
199	250.00	212.50	-0.4875E-01	-0.1026E+01	0.3581E-03	0.1929E-03	0.4068E-03	28.31
200	270.00	217.50	-0.5605E-01	-0.1029E+01	0.3836E-03	0.2010E-03	0.4331E-03	27.65

Table 3.2.4 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (5/5)

(SECTION B-B)

****

***** ELEMENT VELOCITY *****

****

ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
201	290.00	220.00	-0.4873E-01	-0.1024E+01	0.3263E-03	0.1623E-03	0.3644E-03	26.44
202	310.00	220.00	-0.5162E-01	-0.1014E+01	0.3380E-03	0.8912E-04	0.3495E-03	14.77
203	330.00	220.00	-0.5311E-01	-0.1007E+01	0.3398E-03	0.4300E-04	0.3425E-03	7.21
204	360.00	220.00	-0.5503E-01	-0.1002E+01	0.3480E-03	0.1563E-04	0.3484E-03	2.57
205	390.00	220.00	-0.5626E-01	-0.1001E+01	0.3558E-03	0.5358E-05	0.3558E-03	0.86
206	410.00	220.00	-0.5642E-01	-0.1000E+01	0.3569E-03	0.3139E-05	0.3569E-03	0.50
207	430.00	220.00	-0.5681E-01	-0.1000E+01	0.3593E-03	0.2355E-05	0.3593E-03	0.38
208	450.00	220.00	-0.5729E-01	-0.9997E+00	0.3624E-03	-0.1956E-05	0.3624E-03	-0.31
209	470.00	220.00	-0.5682E-01	-0.9985E+00	0.3593E-03	-0.9717E-05	0.3595E-03	-1.55
210	490.00	220.00	-0.5565E-01	-0.9968E+00	0.3520E-03	-0.2017E-04	0.3525E-03	-3.28
211	510.00	220.00	-0.5367E-01	-0.9938E+00	0.3394E-03	-0.3907E-04	0.3417E-03	-6.57
212	530.00	220.00	-0.4974E-01	-0.9877E+00	0.3146E-03	-0.7790E-04	0.3241E-03	-13.91
213	550.00	220.00	-0.4474E-01	-0.9783E+00	0.2830E-03	-0.1373E-03	0.3145E-03	-25.88
214	570.00	217.50	-0.3453E-01	-0.9636E+00	0.2184E-03	-0.2305E-03	0.3175E-03	-46.55
215	581.75	212.50	-0.3874E-01	-0.9445E+00	0.2450E-03	-0.3508E-03	0.4279E-03	-55.07
216	290.00	235.00	-0.4204E-01	-0.1021E+01	0.2659E-03	0.1327E-03	0.2972E-03	26.52
217	310.00	240.00	-0.3908E-01	-0.1012E+01	0.2472E-03	0.7825E-04	0.2593E-03	17.56
218	330.00	240.00	-0.4916E-01	-0.1003E+01	0.3109E-03	0.1758E-04	0.3114E-03	3.24
219	360.00	240.00	-0.5402E-01	-0.1001E+01	0.3416E-03	0.6748E-05	0.3417E-03	1.13
220	390.00	240.00	-0.5587E-01	-0.1000E+01	0.3534E-03	0.1843E-05	0.3534E-03	0.30
221	410.00	240.00	-0.5636E-01	-0.1000E+01	0.3564E-03	0.1206E-05	0.3564E-03	0.19
222	430.00	240.00	-0.5663E-01	-0.1000E+01	0.3581E-03	0.3943E-06	0.3581E-03	0.06
223	450.00	240.00	-0.5657E-01	-0.9998E+00	0.3578E-03	-0.1035E-05	0.3578E-03	-0.17
224	470.00	240.00	-0.5591E-01	-0.9994E+00	0.3536E-03	-0.3537E-05	0.3536E-03	-0.57
225	490.00	240.00	-0.5425E-01	-0.9988E+00	0.3431E-03	-0.7661E-05	0.3432E-03	-1.28
226	510.00	240.00	-0.5089E-01	-0.9976E+00	0.3218E-03	-0.1524E-04	0.3222E-03	-2.71
227	530.00	240.00	-0.4432E-01	-0.9955E+00	0.2803E-03	-0.2825E-04	0.2817E-03	-5.75
228	550.00	240.00	-0.3017E-01	-0.9849E+00	0.1908E-03	-0.9529E-04	0.2133E-03	-26.54
229	565.00	232.50	-0.3104E-01	-0.9756E+00	0.1963E-03	-0.1543E-03	0.2497E-03	-38.17

Table 3.2.5 RESULT OF THE SEEPAGE ANALYSIS - POTENTIAL AND DISCHARGE (1/4)

(SECTION C-C)

****

***** POTENTIAL AND DISCHARGE VALUE CONDITION--STEDY *****

****

NODAL PT.	CONDITION	TOTAL HEAD (m)	PRES. HEAD (m)	DISCHARGE (m3/day)	MOIS. CO.
1	0	0.1868E+03	0.1668E+03	0.0000E+00	0.1930E+00
2	0	0.1864E+03	0.1664E+03	0.0000E+00	0.1930E+00
3	0	0.1854E+03	0.1654E+03	0.0000E+00	0.1930E+00
4	0	0.1836E+03	0.1636E+03	0.0000E+00	0.1930E+00
5	0	0.1812E+03	0.1612E+03	0.0000E+00	0.1930E+00
6	0	0.1783E+03	0.1583E+03	0.0000E+00	0.1930E+00
7	0	0.1760E+03	0.1560E+03	0.0000E+00	0.1930E+00
8	0	0.1734E+03	0.1534E+03	0.0000E+00	0.1930E+00
9	0	0.1699E+03	0.1499E+03	0.0000E+00	0.1930E+00
10	0	0.1660E+03	0.1460E+03	0.0000E+00	0.1930E+00
11	0	0.1619E+03	0.1419E+03	0.0000E+00	0.1930E+00
12	0	0.1576E+03	0.1376E+03	0.0000E+00	0.1930E+00
13	0	0.1536E+03	0.1336E+03	0.0000E+00	0.1930E+00
14	0	0.1507E+03	0.1307E+03	0.0000E+00	0.1930E+00
15	0	0.1496E+03	0.1296E+03	0.0000E+00	0.1930E+00
16	0	0.1871E+03	0.1271E+03	0.0000E+00	0.1930E+00
17	0	0.1868E+03	0.1268E+03	0.0000E+00	0.1930E+00
18	0	0.1858E+03	0.1258E+03	0.0000E+00	0.1930E+00
19	0	0.1840E+03	0.1240E+03	0.0000E+00	0.1930E+00
20	0	0.1814E+03	0.1214E+03	0.0000E+00	0.1930E+00
21	0	0.1785E+03	0.1185E+03	0.0000E+00	0.1930E+00
22	0	0.1769E+03	0.1169E+03	0.0000E+00	0.1930E+00
23	0	0.1752E+03	0.1152E+03	0.0000E+00	0.1930E+00
24	0	0.1735E+03	0.1135E+03	0.0000E+00	0.1930E+00
25	0	0.1700E+03	0.1100E+03	0.0000E+00	0.1930E+00
26	0	0.1662E+03	0.1062E+03	0.0000E+00	0.1930E+00
27	0	0.1620E+03	0.1020E+03	0.0000E+00	0.1930E+00
28	0	0.1575E+03	0.9752E+02	0.0000E+00	0.1930E+00
29	0	0.1531E+03	0.9314E+02	0.0000E+00	0.1930E+00
30	0	0.1497E+03	0.8972E+02	0.0000E+00	0.1930E+00
31	0	0.1483E+03	0.8833E+02	0.0000E+00	0.1930E+00
32	0	0.1890E+03	0.5899E+02	0.0000E+00	0.1930E+00
33	0	0.1888E+03	0.6125E+02	0.0000E+00	0.1930E+00
34	0	0.1888E+03	0.6342E+02	0.0000E+00	0.1930E+00
35	0	0.1884E+03	0.6536E+02	0.0000E+00	0.1930E+00
36	0	0.1879E+03	0.6711E+02	0.0000E+00	0.1930E+00
37	0	0.1869E+03	0.6843E+02	0.0000E+00	0.1930E+00
38	0	0.1857E+03	0.6952E+02	0.0000E+00	0.1930E+00
39	0	0.1841E+03	0.7030E+02	0.0000E+00	0.1930E+00
40	0	0.1825E+03	0.7096E+02	0.0000E+00	0.1930E+00
41	0	0.1808E+03	0.7154E+02	0.0000E+00	0.1930E+00
42	0	0.1790E+03	0.7209E+02	0.0000E+00	0.1930E+00
43	0	0.1773E+03	0.7266E+02	0.0000E+00	0.1930E+00
44	0	0.1764E+03	0.7296E+02	0.0000E+00	0.1930E+00
45	0	0.1760E+03	0.7299E+02	0.0000E+00	0.1930E+00
46	0	0.1755E+03	0.7267E+02	0.0000E+00	0.1930E+00
47	0	0.1738E+03	0.7159E+02	0.0000E+00	0.1930E+00
48	0	0.1721E+03	0.7049E+02	0.0000E+00	0.1930E+00
49	0	0.1704E+03	0.6943E+02	0.0000E+00	0.1930E+00
50	0	0.1687E+03	0.6529E+02	0.0000E+00	0.1930E+00

Table 3.2.5 RESULT OF THE SEEPAGE ANALYSIS - POTENTIAL AND DISCHARGE (2/4)

(SECTION C-C)

****

***** POTENTIAL AND DISCHARGE VALUE CONDITION--STEDY *****

****

NODAL PT.	CONDITION	TOTAL HEAD (m)	PRES. HEAD (m)	DISCHARGE (m3/day)	MOIS. CO.
51	0	0.1668E+03	0.6095E+02	0.0000E+00	0.1930E+00
52	0	0.1647E+03	0.5644E+02	0.0000E+00	0.1930E+00
53	0	0.1624E+03	0.5177E+02	0.0000E+00	0.1930E+00
54	0	0.1599E+03	0.4682E+02	0.0000E+00	0.1930E+00
55	0	0.1571E+03	0.4164E+02	0.0000E+00	0.1930E+00
56	0	0.1540E+03	0.3604E+02	0.0000E+00	0.1930E+00
57	0	0.1504E+03	0.3009E+02	0.0000E+00	0.1930E+00
58	0	0.1466E+03	0.2383E+02	0.0000E+00	0.1930E+00
59	0	0.1429E+03	0.1769E+02	0.0000E+00	0.1930E+00
60	0	0.1414E+03	0.1370E+02	0.0000E+00	0.1930E+00
61	0	0.1412E+03	0.1115E+02	0.0000E+00	0.1930E+00
62	0	0.1790E+03	0.6904E+02	0.0000E+00	0.2160E+00
63	0	0.1773E+03	0.6733E+02	0.0000E+00	0.2160E+00
64	0	0.1765E+03	0.6649E+02	0.0000E+00	0.2160E+00
65	0	0.1760E+03	0.6602E+02	0.0000E+00	0.1930E+00
66	0	0.1755E+03	0.6552E+02	0.0000E+00	0.2160E+00
67	0	0.1738E+03	0.6383E+02	0.0000E+00	0.2160E+00
68	0	0.1721E+03	0.6212E+02	0.0000E+00	0.2160E+00
69	0	0.1704E+03	0.6042E+02	0.0000E+00	0.2160E+00
70	0	0.1687E+03	0.5866E+02	0.0000E+00	0.2160E+00
71	0	0.1668E+03	0.5675E+02	0.0000E+00	0.2160E+00
72	0	0.1890E+03	0.5895E+02	0.0000E+00	0.2160E+00
73	0	0.1888E+03	0.5883E+02	0.0000E+00	0.2160E+00
74	0	0.1885E+03	0.5852E+02	0.0000E+00	0.2160E+00
75	0	0.1880E+03	0.5798E+02	0.0000E+00	0.2160E+00
76	0	0.1871E+03	0.5710E+02	0.0000E+00	0.2160E+00
77	0	0.1859E+03	0.5589E+02	0.0000E+00	0.2160E+00
78	0	0.1844E+03	0.5440E+02	0.0000E+00	0.2160E+00
79	0	0.1827E+03	0.5274E+02	0.0000E+00	0.2160E+00
80	0	0.1810E+03	0.5100E+02	0.0000E+00	0.2160E+00
81	0	0.1792E+03	0.4924E+02	0.0000E+00	0.2160E+00
82	0	0.1775E+03	0.4749E+02	0.0000E+00	0.2160E+00
83	0	0.1766E+03	0.4663E+02	0.0000E+00	0.2160E+00
84	0	0.1761E+03	0.4614E+02	0.0000E+00	0.1930E+00
85	0	0.1756E+03	0.4562E+02	0.0000E+00	0.2160E+00
86	0	0.1739E+03	0.4390E+02	0.0000E+00	0.2160E+00
87	0	0.1722E+03	0.4218E+02	0.0000E+00	0.2160E+00
88	0	0.1704E+03	0.4043E+02	0.0000E+00	0.2160E+00
89	0	0.1686E+03	0.3862E+02	0.0000E+00	0.2160E+00
90	0	0.1667E+03	0.3670E+02	0.0000E+00	0.2160E+00
91	0	0.1646E+03	0.3461E+02	0.0000E+00	0.2160E+00
92	0	0.1623E+03	0.3233E+02	0.0000E+00	0.2160E+00
93	0	0.1598E+03	0.2981E+02	0.0000E+00	0.2160E+00
94	0	0.1570E+03	0.2702E+02	0.0000E+00	0.2160E+00
95	0	0.1538E+03	0.2382E+02	0.0000E+00	0.2160E+00
96	0	0.1503E+03	0.2026E+02	0.0000E+00	0.2160E+00
97	0	0.1463E+03	0.1628E+02	0.0000E+00	0.2160E+00
98	0	0.1426E+03	0.1264E+02	0.0000E+00	0.2160E+00
99	1	0.1890E+03	0.5600E+02	0.4463E-02	0.2160E+00
100	1	0.1890E+03	0.4860E+02	0.1252E-01	0.2160E+00

Table 3.2.5 RESULT OF THE SEEPAGE ANALYSIS - POTENTIAL AND DISCHARGE (3/4)

(SECTION C-C)

****

***** POTENTIAL AND DISCHARGE VALUE CONDITION--STEDY *****

****

NODAL PT.	CONDITION	TOTAL HEAD (m)	PRES. HEAD (m)	DISCHARGE (m3/day)	MOIS. CO.
101	1	0.1890E+03	0.4120E+02	0.2691E-01	0.2160E+00
102	0	0.1889E+03	0.3889E+02	0.0000E+00	0.2160E+00
103	0	0.1885E+03	0.3852E+02	0.0000E+00	0.2160E+00
104	0	0.1877E+03	0.3772E+02	0.0000E+00	0.2160E+00
105	0	0.1865E+03	0.3649E+02	0.0000E+00	0.2160E+00
106	0	0.1849E+03	0.3486E+02	0.0000E+00	0.2160E+00
107	0	0.1831E+03	0.3307E+02	0.0000E+00	0.2160E+00
108	0	0.1812E+03	0.3123E+02	0.0000E+00	0.2160E+00
109	0	0.1794E+03	0.2941E+02	0.0000E+00	0.2160E+00
110	0	0.1776E+03	0.2763E+02	0.0000E+00	0.2160E+00
111	0	0.1768E+03	0.2675E+02	0.0000E+00	0.2160E+00
112	0	0.1762E+03	0.2625E+02	0.0000E+00	0.1930E+00
113	0	0.1757E+03	0.2572E+02	0.0000E+00	0.2160E+00
114	0	0.1740E+03	0.2398E+02	0.0000E+00	0.2160E+00
115	0	0.1722E+03	0.2224E+02	0.0000E+00	0.2160E+00
116	0	0.1705E+03	0.2050E+02	0.0000E+00	0.2160E+00
117	0	0.1687E+03	0.1871E+02	0.0000E+00	0.2160E+00
118	0	0.1668E+03	0.1682E+02	0.0000E+00	0.2160E+00
119	0	0.1647E+03	0.1474E+02	0.0000E+00	0.2160E+00
120	0	0.1624E+03	0.1244E+02	0.0000E+00	0.2160E+00
121	0	0.1599E+03	0.9941E+01	0.0000E+00	0.2160E+00
122	0	0.1572E+03	0.7172E+01	0.0000E+00	0.2160E+00
123	0	0.1541E+03	0.4095E+01	0.0000E+00	0.2160E+00
124	2	0.1500E+03	0.0000E+00	-0.1216E+00	0.2160E+00
125	2	0.1460E+03	0.0000E+00	-0.1197E+00	0.2160E+00
126	1	0.1410E+03	0.0000E+00	-0.3300E+00	0.2160E+00
127	1	0.1410E+03	0.0000E+00	-0.9056E-01	0.2160E+00
128	1	0.1410E+03	0.0000E+00	-0.1805E-01	0.2160E+00
129	1	0.1890E+03	0.3380E+02	0.5286E-01	0.2160E+00
130	1	0.1890E+03	0.2640E+02	0.9216E-01	0.2160E+00
131	1	0.1890E+03	0.1900E+02	0.2135E+00	0.2160E+00
132	0	0.1874E+03	0.1742E+02	0.0000E+00	0.2160E+00
133	0	0.1855E+03	0.1549E+02	0.0000E+00	0.2160E+00
134	0	0.1834E+03	0.1339E+02	0.0000E+00	0.2160E+00
135	0	0.1814E+03	0.1143E+02	0.0000E+00	0.2160E+00
136	0	0.1795E+03	0.9545E+01	0.0000E+00	0.2160E+00
137	0	0.1777E+03	0.7734E+01	0.0000E+00	0.2160E+00
138	0	0.1768E+03	0.6843E+01	0.0000E+00	0.2160E+00
139	0	0.1764E+03	0.6353E+01	0.0000E+00	0.1930E+00
140	0	0.1758E+03	0.5821E+01	0.0000E+00	0.2160E+00
141	0	0.1741E+03	0.4058E+01	0.0000E+00	0.2160E+00
142	0	0.1723E+03	0.2308E+01	0.0000E+00	0.2160E+00
143	0	0.1706E+03	0.5833E+00	0.0000E+00	0.2160E+00
144	0	0.1689E+03	-0.1144E+01	0.0000E+00	0.2072E+00
145	0	0.1670E+03	-0.2964E+01	0.0000E+00	0.1933E+00
146	0	0.1650E+03	-0.4974E+01	0.0000E+00	0.1778E+00
147	0	0.1628E+03	-0.7234E+01	0.0000E+00	0.1605E+00
148	0	0.1603E+03	-0.9714E+01	0.0000E+00	0.1506E+00
149	-2	0.1580E+03	-0.1202E+02	0.0000E+00	0.1416E+00
150	-2	0.1548E+03	-0.5236E+01	0.0000E+00	0.1758E+00

Table 3.2.5 RESULT OF THE SEEPAGE ANALYSIS - POTENTIAL AND DISCHARGE (4/4)

(SECTION C-C)

****

***** POTENTIAL AND DISCHARGE VALUE CONDITION--STEDY *****

****

NODAL PT.	CONDITION	TOTAL HEAD (m)	PRES. HEAD (m)	DISCHARGE (m3/day)	MOIS. CO.
151	1	0.1890E+03	0.0000E+00	0.2776E+00	0.2160E+00
152	0	0.1858E+03	-0.3167E+01	0.0000E+00	0.1917E+00
153	0	0.1836E+03	-0.5405E+01	0.0000E+00	0.1745E+00
154	0	0.1816E+03	-0.7437E+01	0.0000E+00	0.1595E+00
155	0	0.1796E+03	-0.9358E+01	0.0000E+00	0.1520E+00
156	0	0.1778E+03	-0.1119E+02	0.0000E+00	0.1448E+00
157	0	0.1769E+03	-0.1207E+02	0.0000E+00	0.1414E+00
158	0	0.1765E+03	-0.1253E+02	0.0000E+00	0.1451E+00
159	0	0.1759E+03	-0.1306E+02	0.0000E+00	0.1376E+00
160	0	0.1741E+03	-0.1485E+02	0.0000E+00	0.1306E+00
161	0	0.1724E+03	-0.1661E+02	0.0000E+00	0.1272E+00
162	0	0.1707E+03	-0.1832E+02	0.0000E+00	0.1243E+00
163	0	0.1690E+03	-0.1999E+02	0.0000E+00	0.1214E+00
164	0	0.1673E+03	-0.2171E+02	0.0000E+00	0.1184E+00
165	0	0.1654E+03	-0.2358E+02	0.0000E+00	0.1151E+00
166	0	0.1634E+03	-0.2563E+02	0.0000E+00	0.1116E+00
167	-2	0.1615E+03	-0.2750E+02	0.0000E+00	0.1083E+00
168	0	0.1855E+03	-0.1452E+02	0.0000E+00	0.1319E+00
169	0	0.1836E+03	-0.1642E+02	0.0000E+00	0.1275E+00
170	0	0.1815E+03	-0.1848E+02	0.0000E+00	0.1240E+00
171	0	0.1797E+03	-0.2035E+02	0.0000E+00	0.1207E+00
172	0	0.1778E+03	-0.2216E+02	0.0000E+00	0.1176E+00
173	0	0.1760E+03	-0.2396E+02	0.0000E+00	0.1145E+00
174	0	0.1743E+03	-0.2574E+02	0.0000E+00	0.1114E+00
175	0	0.1725E+03	-0.2747E+02	0.0000E+00	0.1084E+00
176	0	0.1709E+03	-0.2912E+02	0.0000E+00	0.1055E+00
177	0	0.1693E+03	-0.3071E+02	0.0000E+00	0.1040E+00
178	0	0.1676E+03	-0.3237E+02	0.0000E+00	0.1040E+00
179	0	0.1658E+03	-0.3417E+02	0.0000E+00	0.1040E+00
180	-2	0.1639E+03	-0.3608E+02	0.0000E+00	0.1040E+00
181	0	0.1823E+03	-0.3770E+02	0.0000E+00	0.1040E+00
182	0	0.1810E+03	-0.3898E+02	0.0000E+00	0.1040E+00
183	0	0.1795E+03	-0.4053E+02	0.0000E+00	0.1040E+00
184	0	0.1778E+03	-0.4220E+02	0.0000E+00	0.1040E+00
185	0	0.1761E+03	-0.4392E+02	0.0000E+00	0.1040E+00
186	0	0.1744E+03	-0.4562E+02	0.0000E+00	0.1040E+00
187	0	0.1727E+03	-0.4727E+02	0.0000E+00	0.1040E+00
188	0	0.1712E+03	-0.4880E+02	0.0000E+00	0.1040E+00
189	0	0.1698E+03	-0.5015E+02	0.0000E+00	0.1040E+00
190	-2	0.1686E+03	-0.5138E+02	0.0000E+00	0.1040E+00
191	-2	0.1663E+03	-0.4372E+02	0.0000E+00	0.1040E+00
192	0	0.1806E+03	-0.5938E+02	0.0000E+00	0.1040E+00
193	0	0.1805E+03	-0.5947E+02	0.0000E+00	0.1040E+00
194	0	0.1794E+03	-0.6064E+02	0.0000E+00	0.1040E+00
195	0	0.1778E+03	-0.6223E+02	0.0000E+00	0.1040E+00
196	0	0.1761E+03	-0.6391E+02	0.0000E+00	0.1040E+00
197	0	0.1744E+03	-0.6559E+02	0.0000E+00	0.1040E+00
198	0	0.1728E+03	-0.6721E+02	0.0000E+00	0.1040E+00
199	0	0.1713E+03	-0.6868E+02	0.0000E+00	0.1040E+00
200	0	0.1702E+03	-0.6980E+02	0.0000E+00	0.1040E+00
201	-2	0.1701E+03	-0.6994E+02	0.0000E+00	0.1040E+00

FLOWIN = 0.6799E+00

FLOWOUT = -0.6800E+00

TOTAL = -0.8583E-05

Table 3.2.6 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (1/4)

(SECTION C-C)

****

***** ELEMENT VELOCITY *****

****

ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
1	20.00	40.00	-0.8537E-02	-0.9915E+00	0.7376E-04	-0.7306E-04	0.1038E-03	-44.73
2	60.00	40.00	-0.2548E-01	-0.9910E+00	0.2201E-03	-0.7808E-04	0.2335E-03	-19.53
3	100.00	40.00	-0.4455E-01	-0.9908E+00	0.3849E-03	-0.7973E-04	0.3931E-03	-11.70
4	140.00	40.00	-0.6163E-01	-0.9928E+00	0.5325E-03	-0.6179E-04	0.5361E-03	-6.62
5	180.00	40.00	-0.7302E-01	-0.9953E+00	0.6309E-03	-0.4031E-04	0.6322E-03	-3.66
6	212.50	40.00	-0.7985E-01	-0.9965E+00	0.6899E-03	-0.3053E-04	0.6906E-03	-2.53
7	230.00	40.00	-0.8193E-01	-0.9972E+00	0.7078E-03	-0.2422E-04	0.7083E-03	-1.96
8	247.50	40.00	-0.8471E-01	-0.9971E+00	0.7319E-03	-0.2536E-04	0.7323E-03	-1.98
9	280.00	40.00	-0.8910E-01	-0.9971E+00	0.7698E-03	-0.2472E-04	0.7702E-03	-1.84
10	320.00	40.00	-0.9580E-01	-0.9962E+00	0.8277E-03	-0.3312E-04	0.8284E-03	-2.29
11	360.00	40.00	-0.1040E+00	-0.9964E+00	0.8987E-03	-0.3082E-04	0.8993E-03	-1.96
12	400.00	40.00	-0.1091E+00	-0.9996E+00	0.9427E-03	-0.3663E-05	0.9427E-03	-0.22
13	440.00	40.00	-0.1042E+00	-0.1007E+01	0.9007E-03	0.6151E-04	0.9028E-03	3.91
14	480.00	40.00	-0.7938E-01	-0.1018E+01	0.6858E-03	0.1593E-03	0.7041E-03	13.07
15	520.00	40.00	-0.3096E-01	-0.1028E+01	0.2675E-03	0.2455E-03	0.3631E-03	42.55
16	15.00	94.42	-0.5414E-02	-0.9714E+00	0.4678E-04	-0.2472E-03	0.2516E-03	-79.29
17	40.00	109.04	-0.9025E-02	-0.9689E+00	0.7798E-04	-0.2690E-03	0.2801E-03	-73.84
18	55.00	75.77	-0.2477E-01	-0.9657E+00	0.2140E-03	-0.2966E-03	0.3658E-03	-54.19
19	80.00	105.58	-0.3458E-01	-0.9655E+00	0.2987E-03	-0.2982E-03	0.4221E-03	-44.94
20	95.00	74.62	-0.4507E-01	-0.9654E+00	0.3894E-03	-0.2985E-03	0.4907E-03	-37.48
21	120.00	102.12	-0.6527E-01	-0.9697E+00	0.5639E-03	-0.2617E-03	0.6217E-03	-24.90
22	135.00	73.46	-0.6320E-01	-0.9734E+00	0.5460E-03	-0.2302E-03	0.5926E-03	-22.86
23	160.00	98.65	-0.8200E-01	-0.9795E+00	0.7085E-03	-0.1770E-03	0.7303E-03	-14.02
24	185.00	84.04	-0.7809E-01	-0.9854E+00	0.6747E-03	-0.1264E-03	0.6864E-03	-10.61
25	210.00	82.88	-0.8283E-01	-0.9900E+00	0.7157E-03	-0.8646E-04	0.7209E-03	-6.89
26	222.50	82.02	-0.8459E-01	-0.9911E+00	0.7309E-03	-0.7654E-04	0.7349E-03	-5.98
27	231.00	81.62	-0.8633E-01	-0.9928E+00	0.7459E-03	-0.6249E-04	0.7485E-03	-4.79
28	238.50	81.45	-0.8252E-01	-0.9943E+00	0.7130E-03	-0.4939E-04	0.7147E-03	-3.96
29	250.00	81.26	-0.8501E-01	-0.9939E+00	0.7345E-03	-0.5274E-04	0.7364E-03	-4.11
30	275.00	80.95	-0.8743E-01	-0.9924E+00	0.7554E-03	-0.6575E-04	0.7583E-03	-4.97
31	295.00	80.65	-0.8299E-01	-0.9891E+00	0.7171E-03	-0.9394E-04	0.7232E-03	-7.46
32	305.00	81.10	-0.8764E-01	-0.9891E+00	0.7572E-03	-0.9394E-04	0.7630E-03	-7.07
33	325.00	82.31	-0.9612E-01	-0.9860E+00	0.8305E-03	-0.1213E-03	0.8393E-03	-8.31
34	355.00	83.52	-0.1052E+00	-0.9870E+00	0.9091E-03	-0.1119E-03	0.9160E-03	-7.02
35	380.00	98.00	-0.1207E+00	-0.9911E+00	0.1043E-02	-0.7727E-04	0.1046E-02	-4.24
36	395.00	73.27	-0.1115E+00	-0.9971E+00	0.9634E-03	-0.2541E-04	0.9638E-03	-1.51
37	420.00	101.63	-0.1479E+00	-0.1007E+01	0.1278E-02	0.5870E-04	0.1279E-02	2.63
38	435.00	74.48	-0.1094E+00	-0.1024E+01	0.9452E-03	0.2049E-03	0.9671E-03	12.23
39	460.00	105.25	-0.1789E+00	-0.1045E+01	0.1546E-02	0.3893E-03	0.1594E-02	14.13
40	475.00	75.69	-0.8555E-01	-0.1077E+01	0.7391E-03	0.6677E-03	0.9961E-03	42.10
41	500.00	108.90	-0.1170E+00	-0.1105E+01	0.1011E-02	0.9106E-03	0.1361E-02	42.01
42	525.00	94.42	-0.2277E-01	-0.1109E+01	0.1968E-03	0.9451E-03	0.9654E-03	78.24
43	190.00	108.85	-0.8684E-01	-0.9894E+00	0.7503E-02	-0.9185E-03	0.7559E-02	-6.98
44	210.00	107.88	-0.8554E-01	-0.9902E+00	0.7391E-02	-0.8488E-03	0.7439E-02	-6.55
45	225.00	107.02	-0.8416E-01	-0.9901E+00	0.7272E-02	-0.8579E-03	0.7322E-02	-6.73
46	232.00	106.62	-0.1136E+00	-0.9928E+00	0.6873E-02	-0.4330E-03	0.6887E-02	-3.60
47	237.00	106.45	-0.8275E-01	-0.9960E+00	0.7150E-02	-0.3441E-03	0.7158E-02	-2.76
48	250.00	106.26	-0.8437E-01	-0.9965E+00	0.7289E-02	-0.3044E-03	0.7296E-02	-2.39
49	270.00	105.95	-0.8522E-01	-0.9968E+00	0.7363E-02	-0.2805E-03	0.7368E-02	-2.18
50	290.00	105.65	-0.8429E-01	-0.9991E+00	0.7282E-02	-0.7673E-04	0.7283E-02	-0.60

Table 3.2.6 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (2/4)

(SECTION C-C)

****

***** ELEMENT VELOCITY *****

****

ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
51	310.00	106.10	-0.8697E-01	-0.1004E+01	0.7514E-02	0.3245E-03	0.7521E-02	2.47
52	330.00	107.31	-0.9520E-01	-0.1007E+01	0.8225E-02	0.6318E-03	0.8249E-02	4.39
53	345.00	107.48	-0.1036E+00	-0.1008E+01	0.8955E-02	0.6629E-03	0.8979E-02	4.23
54	10.00	129.42	-0.1743E-02	-0.9958E+00	0.1506E-03	-0.3589E-03	0.3892E-03	-67.24
55	30.00	128.27	-0.6383E-02	-0.9955E+00	0.5515E-03	-0.3928E-03	0.6771E-03	-35.46
56	50.00	127.12	-0.1629E-01	-0.9911E+00	0.1408E-02	-0.7696E-03	0.1604E-02	-28.66
57	70.00	125.96	-0.2690E-01	-0.9884E+00	0.2324E-02	-0.1000E-02	0.2530E-02	-23.29
58	90.00	124.81	-0.4556E-01	-0.9850E+00	0.3936E-02	-0.1298E-02	0.4145E-02	-18.25
59	110.00	123.65	-0.5983E-01	-0.9834E+00	0.5170E-02	-0.1432E-02	0.5364E-02	-15.48
60	130.00	122.50	-0.7452E-01	-0.9842E+00	0.6438E-02	-0.1362E-02	0.6581E-02	-11.95
61	150.00	121.35	-0.8186E-01	-0.9857E+00	0.7073E-02	-0.1236E-02	0.7180E-02	-9.91
62	170.00	120.19	-0.8613E-01	-0.9882E+00	0.7442E-02	-0.1023E-02	0.7512E-02	-7.83
63	190.00	119.81	-0.8740E-01	-0.9896E+00	0.7551E-02	-0.8980E-03	0.7605E-02	-6.78
64	210.00	120.00	-0.8645E-01	-0.9910E+00	0.7469E-02	-0.7804E-03	0.7510E-02	-5.96
65	225.00	120.00	-0.8517E-01	-0.9924E+00	0.7358E-02	-0.6559E-03	0.7388E-02	-5.09
66	232.00	120.00	-0.1210E+00	-0.9935E+00	0.7316E-02	-0.3951E-03	0.7326E-02	-3.09
67	237.00	120.00	-0.8457E-01	-0.9944E+00	0.7307E-02	-0.4869E-03	0.7323E-02	-3.81
68	250.00	120.00	-0.8520E-01	-0.9956E+00	0.7361E-02	-0.3824E-03	0.7371E-02	-2.97
69	270.00	120.00	-0.8570E-01	-0.9968E+00	0.7405E-02	-0.2782E-03	0.7410E-02	-2.15
70	290.00	120.00	-0.8630E-01	-0.9983E+00	0.7456E-02	-0.1480E-03	0.7458E-02	-1.14
71	310.00	120.00	-0.8924E-01	-0.1000E+01	0.7711E-02	0.4143E-04	0.7711E-02	0.31
72	330.00	120.00	-0.9573E-01	-0.1002E+01	0.8271E-02	0.1820E-03	0.8273E-02	1.26
73	350.00	119.56	-0.1039E+00	-0.1003E+01	0.8976E-02	0.2767E-03	0.8981E-02	1.77
74	370.00	119.73	-0.1133E+00	-0.1005E+01	0.9787E-02	0.4014E-03	0.9795E-02	2.35
75	390.00	120.94	-0.1257E+00	-0.1006E+01	0.1086E-01	0.4812E-03	0.1087E-01	2.54
76	410.00	122.15	-0.1385E+00	-0.1007E+01	0.1196E-01	0.5936E-03	0.1198E-01	2.84
77	430.00	123.35	-0.1590E+00	-0.1010E+01	0.1374E-01	0.8429E-03	0.1376E-01	3.51
78	450.00	124.56	-0.1766E+00	-0.1014E+01	0.1526E-01	0.1221E-02	0.1531E-01	4.57
79	470.00	125.77	-0.1938E+00	-0.1028E+01	0.1674E-01	0.2431E-02	0.1692E-01	8.26
80	490.00	126.98	-0.1816E+00	-0.1043E+01	0.1569E-01	0.3707E-02	0.1612E-01	13.30
81	505.00	127.00	-0.6799E-01	-0.1044E+01	0.5875E-02	0.3802E-02	0.6998E-02	32.91
82	10.00	133.35	-0.1687E-02	-0.9956E+00	0.1458E-03	-0.3809E-03	0.4079E-03	-69.06
83	30.00	137.05	-0.4617E-02	-0.9922E+00	0.3989E-03	-0.6762E-03	0.7851E-03	-59.46
84	50.00	139.45	-0.1126E-01	-0.9857E+00	0.9726E-03	-0.1239E-02	0.1575E-02	-51.87
85	70.00	140.00	-0.2278E-01	-0.9774E+00	0.1968E-02	-0.1950E-02	0.2771E-02	-44.73
86	90.00	140.00	-0.4184E-01	-0.9712E+00	0.3615E-02	-0.2489E-02	0.4389E-02	-34.55
87	110.00	140.00	-0.6114E-01	-0.9697E+00	0.5283E-02	-0.2620E-02	0.5897E-02	-26.38
88	130.00	140.00	-0.7780E-01	-0.9737E+00	0.6722E-02	-0.2272E-02	0.7095E-02	-18.67
89	150.00	140.00	-0.8646E-01	-0.9804E+00	0.7470E-02	-0.1693E-02	0.7659E-02	-12.77
90	170.00	140.00	-0.8952E-01	-0.9861E+00	0.7735E-02	-0.1200E-02	0.7827E-02	-8.82
91	190.00	140.00	-0.8937E-01	-0.9900E+00	0.7722E-02	-0.8659E-03	0.7770E-02	-6.40
92	210.00	140.00	-0.8817E-01	-0.9923E+00	0.7618E-02	-0.6645E-03	0.7647E-02	-4.99
93	225.00	140.00	-0.8716E-01	-0.9936E+00	0.7531E-02	-0.5541E-03	0.7551E-02	-4.21
94	232.00	140.00	-0.1244E+00	-0.9942E+00	0.7524E-02	-0.3499E-03	0.7532E-02	-2.66
95	237.00	140.00	-0.8672E-01	-0.9947E+00	0.7493E-02	-0.4622E-03	0.7507E-02	-3.53
96	250.00	140.00	-0.8652E-01	-0.9954E+00	0.7475E-02	-0.3968E-03	0.7486E-02	-3.04
97	270.00	140.00	-0.8657E-01	-0.9964E+00	0.7480E-02	-0.3114E-03	0.7486E-02	-2.38
98	290.00	140.00	-0.8727E-01	-0.9967E+00	0.7540E-02	-0.2824E-03	0.7545E-02	-2.14
99	310.00	140.00	-0.8981E-01	-0.9961E+00	0.7760E-02	-0.3389E-03	0.7767E-02	-2.50
100	330.00	140.00	-0.9548E-01	-0.9948E+00	0.8250E-02	-0.4516E-03	0.8262E-02	-3.13

Table 3.2.6 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (3/4)

(SECTION C-C)

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***** ELEMENT VELOCITY *****

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ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
101	350.00	140.00	-0.1042E+00	-0.9937E+00	0.9004E-02	-0.5403E-03	0.9020E-02	-3.43
102	370.00	140.00	-0.1146E+00	-0.9938E+00	0.9902E-02	-0.5335E-03	0.9916E-02	-3.08
103	390.00	140.00	-0.1253E+00	-0.9939E+00	0.1083E-01	-0.5256E-03	0.1084E-01	-2.78
104	410.00	140.00	-0.1390E+00	-0.9930E+00	0.1201E-01	-0.6017E-03	0.1203E-01	-2.87
105	430.00	140.00	-0.1569E+00	-0.9894E+00	0.1356E-01	-0.9146E-03	0.1359E-01	-3.86
106	450.00	140.00	-0.1915E+00	-0.9996E+00	0.1655E-01	-0.3694E-04	0.1655E-01	-0.13
107	470.00	139.00	-0.2009E+00	-0.1015E+01	0.1736E-01	0.1282E-02	0.1741E-01	4.22
108	490.00	136.75	-0.2248E+00	-0.1071E+01	0.1942E-01	0.6144E-02	0.2037E-01	17.55
109	510.00	134.92	-0.3627E-01	-0.1083E+01	0.3134E-02	0.7196E-02	0.7849E-02	66.47
110	530.00	134.92	-0.4447E-02	-0.1022E+01	0.3842E-03	0.1913E-02	0.1951E-02	78.64
111	50.00	150.20	-0.7972E-02	-0.9785E+00	0.6888E-03	-0.1862E-02	0.1985E-02	-69.70
112	70.00	154.45	-0.1552E-01	-0.9665E+00	0.1341E-02	-0.2896E-02	0.3192E-02	-65.16
113	90.00	158.15	-0.2989E-01	-0.9459E+00	0.2583E-02	-0.4676E-02	0.5342E-02	-61.09
114	110.00	160.00	-0.7036E-01	-0.9447E+00	0.6079E-02	-0.4782E-02	0.7734E-02	-38.19
115	130.00	160.00	-0.8890E-01	-0.9609E+00	0.7681E-02	-0.3374E-02	0.8389E-02	-23.72
116	150.00	160.00	-0.9733E-01	-0.9762E+00	0.8409E-02	-0.2055E-02	0.8656E-02	-13.73
117	170.00	160.00	-0.9512E-01	-0.9870E+00	0.8218E-02	-0.1126E-02	0.8295E-02	-7.80
118	190.00	160.00	-0.9237E-01	-0.9917E+00	0.7981E-02	-0.7166E-03	0.8013E-02	-5.13
119	210.00	160.00	-0.8984E-01	-0.9941E+00	0.7763E-02	-0.5140E-03	0.7780E-02	-3.79
120	225.00	160.00	-0.8845E-01	-0.9951E+00	0.7642E-02	-0.4243E-03	0.7653E-02	-3.18
121	232.00	160.00	-0.1243E+00	-0.9951E+00	0.7515E-02	-0.2979E-03	0.7521E-02	-2.27
122	237.00	160.00	-0.8789E-01	-0.9950E+00	0.7594E-02	-0.4354E-03	0.7606E-02	-3.28
123	250.00	160.00	-0.8763E-01	-0.9957E+00	0.7571E-02	-0.3743E-03	0.7581E-02	-2.83
124	270.00	160.00	-0.8725E-01	-0.9965E+00	0.7538E-02	-0.3054E-03	0.7544E-02	-2.32
125	290.00	160.00	-0.8672E-01	-0.9963E+00	0.7493E-02	-0.3237E-03	0.7500E-02	-2.47
126	310.00	160.00	-0.8778E-01	-0.9943E+00	0.7367E-02	-0.4757E-03	0.7383E-02	-3.69
127	330.00	160.00	-0.9288E-01	-0.9910E+00	0.7201E-02	-0.6969E-03	0.7234E-02	-5.53
128	350.00	160.00	-0.1022E+00	-0.9874E+00	0.7076E-02	-0.8707E-03	0.7130E-02	-7.01
129	370.00	160.00	-0.1140E+00	-0.9847E+00	0.6983E-02	-0.9350E-03	0.7046E-02	-7.63
130	390.00	160.00	-0.1245E+00	-0.9833E+00	0.6986E-02	-0.9397E-03	0.7049E-02	-7.66
131	410.00	160.00	-0.1270E+00	-0.9713E+00	0.6761E-02	-0.1530E-02	0.6932E-02	-12.75
132	430.00	157.50	-0.1450E+00	-0.9509E+00	0.8383E-02	-0.2840E-02	0.8851E-02	-18.72
133	445.00	152.50	-0.2047E+00	-0.9331E+00	0.1537E-01	-0.5020E-02	0.1617E-01	-18.08
134	110.00	174.75	-0.7901E-01	-0.9168E+00	0.6826E-02	-0.7186E-02	0.9911E-02	-46.47
135	130.00	179.50	-0.1275E+00	-0.9494E+00	0.1014E-01	-0.4028E-02	0.1091E-01	-21.66
136	150.00	179.50	-0.1084E+00	-0.9856E+00	0.7359E-02	-0.9796E-03	0.7424E-02	-7.58
137	170.00	179.50	-0.9991E-01	-0.9910E+00	0.6011E-02	-0.5430E-03	0.6036E-02	-5.16
138	190.00	179.50	-0.9503E-01	-0.9938E+00	0.5337E-02	-0.3462E-03	0.5348E-02	-3.71
139	210.00	179.50	-0.9119E-01	-0.9956E+00	0.4920E-02	-0.2383E-03	0.4925E-02	-2.77
140	225.00	179.50	-0.8849E-01	-0.9959E+00	0.4633E-02	-0.2129E-03	0.4638E-02	-2.63
141	232.00	179.50	-0.1181E+00	-0.9947E+00	0.4652E-02	-0.2096E-03	0.4657E-02	-2.58
142	237.00	179.50	-0.8843E-01	-0.9937E+00	0.4509E-02	-0.3224E-03	0.4520E-02	-4.09
143	250.00	179.50	-0.8897E-01	-0.9945E+00	0.4414E-02	-0.2722E-03	0.4423E-02	-3.53
144	270.00	179.50	-0.8779E-01	-0.9957E+00	0.4246E-02	-0.2099E-03	0.4251E-02	-2.83
145	290.00	179.50	-0.8566E-01	-0.9953E+00	0.4116E-02	-0.2239E-03	0.4122E-02	-3.11
146	310.00	179.50	-0.8493E-01	-0.9932E+00	0.3852E-02	-0.3066E-03	0.3864E-02	-4.55
147	330.00	179.50	-0.8863E-01	-0.9893E+00	0.3432E-02	-0.4160E-03	0.3457E-02	-6.91
148	350.00	179.50	-0.9688E-01	-0.9830E+00	0.2926E-02	-0.5148E-03	0.2970E-02	-9.98
149	370.00	179.50	-0.1079E+00	-0.9737E+00	0.2367E-02	-0.5767E-03	0.2436E-02	-13.69
150	390.00	179.50	-0.1088E+00	-0.9523E+00	0.1800E-02	-0.7886E-03	0.1965E-02	-23.66

Table 3.2.6 RESULT OF THE SEEPAGE ANALYSIS - ELEMENT VELOCITY (4/4)

(SECTION C-C)

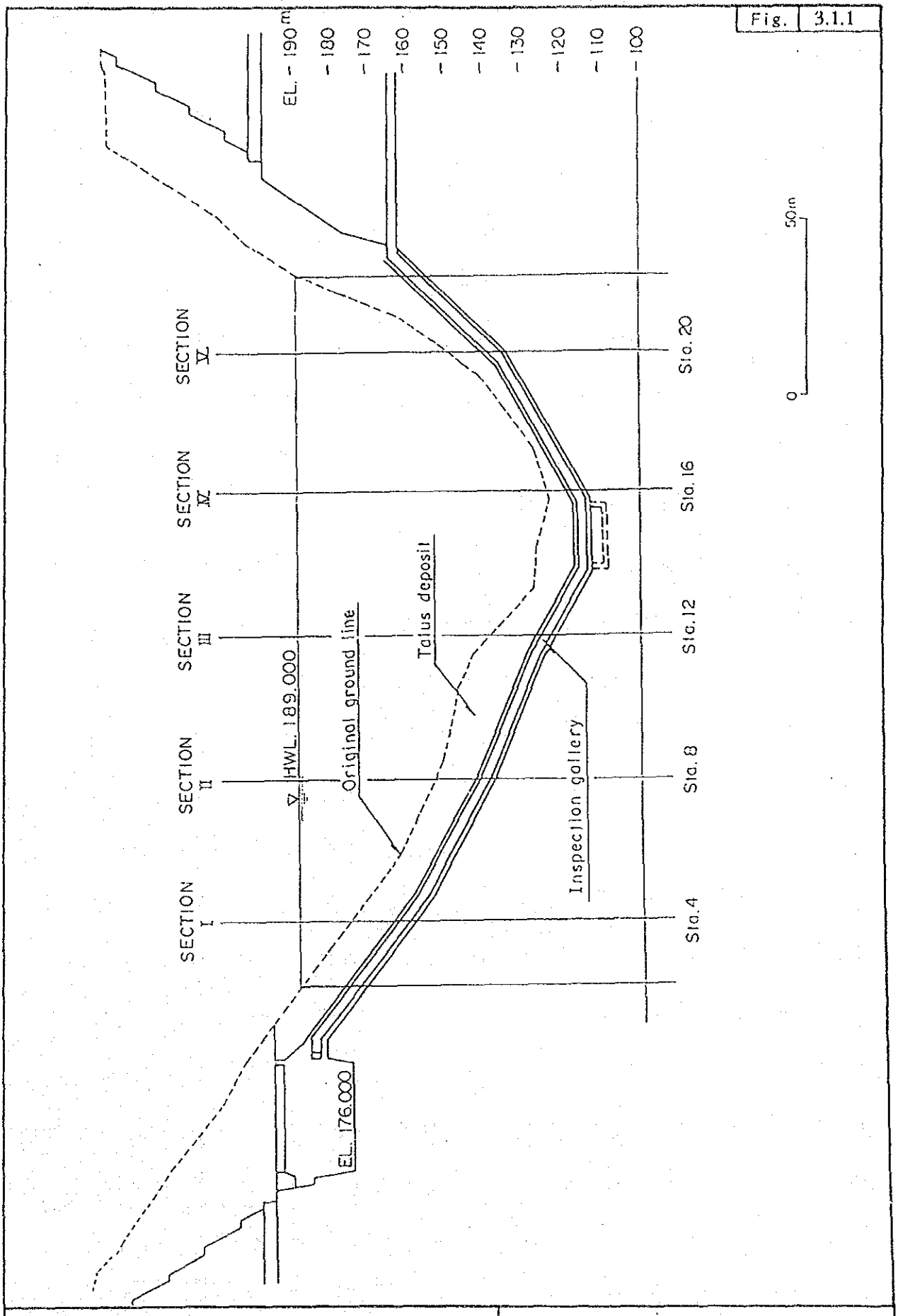
****

***** ELEMENT VELOCITY *****

****

ELEMENT	XC (m)	YC (m)	H.G.(X)	H.G.(Y)	VX (m/day)	VY (m/day)	VXY (m/day)	ANGLE (degree)
151	405.00	174.75	-0.1155E+00	-0.9363E+00	0.2021E-02	-0.1115E-02	0.2308E-02	-28.88
152	130.00	191.75	-0.1584E+00	-0.1032E+01	0.9633E-02	0.1955E-02	0.9830E-02	11.47
153	150.00	194.50	-0.1034E+00	-0.1017E+01	0.3105E-02	0.4992E-03	0.3145E-02	9.13
154	170.00	194.50	-0.1023E+00	-0.1002E+01	0.2232E-02	0.5124E-04	0.2232E-02	1.32
155	190.00	194.50	-0.9485E-01	-0.1001E+01	0.1665E-02	0.2408E-04	0.1665E-02	0.83
156	210.00	194.50	-0.9110E-01	-0.9979E+00	0.1375E-02	-0.3229E-04	0.1375E-02	-1.35
157	222.50	191.75	-0.8795E-01	-0.9966E+00	0.1415E-02	-0.5491E-04	0.1416E-02	-2.22
158	231.00	194.50	-0.9401E-01	-0.9950E+00	0.1172E-02	-0.6232E-04	0.1173E-02	-3.05
159	237.00	191.75	-0.8832E-01	-0.9910E+00	0.1221E-02	-0.1243E-03	0.1227E-02	-5.81
160	250.00	194.50	-0.8939E-01	-0.9903E+00	0.9181E-03	-0.1001E-03	0.9235E-03	-6.22
161	270.00	194.50	-0.8730E-01	-0.9881E+00	0.7666E-03	-0.1042E-03	0.7737E-03	-7.74
162	290.00	194.50	-0.8381E-01	-0.9844E+00	0.6909E-03	-0.1283E-03	0.7027E-03	-10.52
163	310.00	194.50	-0.8157E-01	-0.9786E+00	0.6400E-03	-0.1679E-03	0.6617E-03	-14.70
164	330.00	194.50	-0.8463E-01	-0.9721E+00	0.6397E-03	-0.2108E-03	0.6735E-03	-18.24
165	350.00	194.50	-0.9153E-01	-0.9660E+00	0.6696E-03	-0.2487E-03	0.7143E-03	-20.38
166	370.00	194.50	-0.9909E-01	-0.9563E+00	0.6988E-03	-0.3083E-03	0.7638E-03	-23.81
167	385.00	191.75	-0.9363E-01	-0.9497E+00	0.6630E-03	-0.3563E-03	0.7527E-03	-28.26
168	150.00	205.00	-0.9481E-01	-0.1064E+01	0.9317E-03	0.6309E-03	0.1125E-02	34.10
169	170.00	210.00	-0.8339E-01	-0.1045E+01	0.6685E-03	0.3578E-03	0.7582E-03	28.15
170	190.00	210.00	-0.8574E-01	-0.1017E+01	0.6646E-03	0.1331E-03	0.6778E-03	11.33
171	210.00	210.00	-0.8677E-01	-0.1006E+01	0.6511E-03	0.4253E-04	0.6525E-03	3.74
172	230.00	210.00	-0.8801E-01	-0.9999E+00	0.6389E-03	-0.4003E-06	0.6389E-03	-0.04
173	250.00	210.00	-0.8720E-01	-0.9961E+00	0.6121E-03	-0.2753E-04	0.6127E-03	-2.58
174	270.00	210.00	-0.8445E-01	-0.9922E+00	0.5727E-03	-0.5291E-04	0.5752E-03	-5.28
175	290.00	210.00	-0.7937E-01	-0.9869E+00	0.5202E-03	-0.8556E-04	0.5272E-03	-9.34
176	310.00	210.00	-0.7378E-01	-0.9779E+00	0.4710E-03	-0.1409E-03	0.4916E-03	-16.66
177	330.00	210.00	-0.7214E-01	-0.9612E+00	0.4562E-03	-0.2454E-03	0.5180E-03	-28.28
178	350.00	207.50	-0.9139E-01	-0.9519E+00	0.5780E-03	-0.3041E-03	0.6531E-03	-27.75
179	365.00	202.50	-0.9546E-01	-0.9551E+00	0.6037E-03	-0.2841E-03	0.6673E-03	-25.20
180	173.50	230.00	-0.5244E-01	-0.1036E+01	0.3316E-03	0.2277E-03	0.4023E-03	34.47
181	190.00	230.00	-0.6819E-01	-0.1015E+01	0.4312E-03	0.9450E-04	0.4415E-03	12.36
182	210.00	230.00	-0.8135E-01	-0.1003E+01	0.5145E-03	0.2195E-04	0.5150E-03	2.44
183	230.00	230.00	-0.8499E-01	-0.1001E+01	0.5375E-03	0.4762E-05	0.5375E-03	0.51
184	250.00	230.00	-0.8473E-01	-0.9991E+00	0.5358E-03	-0.5535E-05	0.5359E-03	-0.59
185	270.00	230.00	-0.8152E-01	-0.9976E+00	0.5156E-03	-0.1514E-04	0.5158E-03	-1.68
186	290.00	230.00	-0.7496E-01	-0.9955E+00	0.4741E-03	-0.2830E-04	0.4749E-03	-3.42
187	310.00	230.00	-0.6189E-01	-0.9882E+00	0.3914E-03	-0.7434E-04	0.3984E-03	-10.75
188	327.25	230.00	-0.4723E-01	-0.9682E+00	0.2987E-03	-0.2012E-03	0.3602E-03	-33.96

Fig. 3.1.1

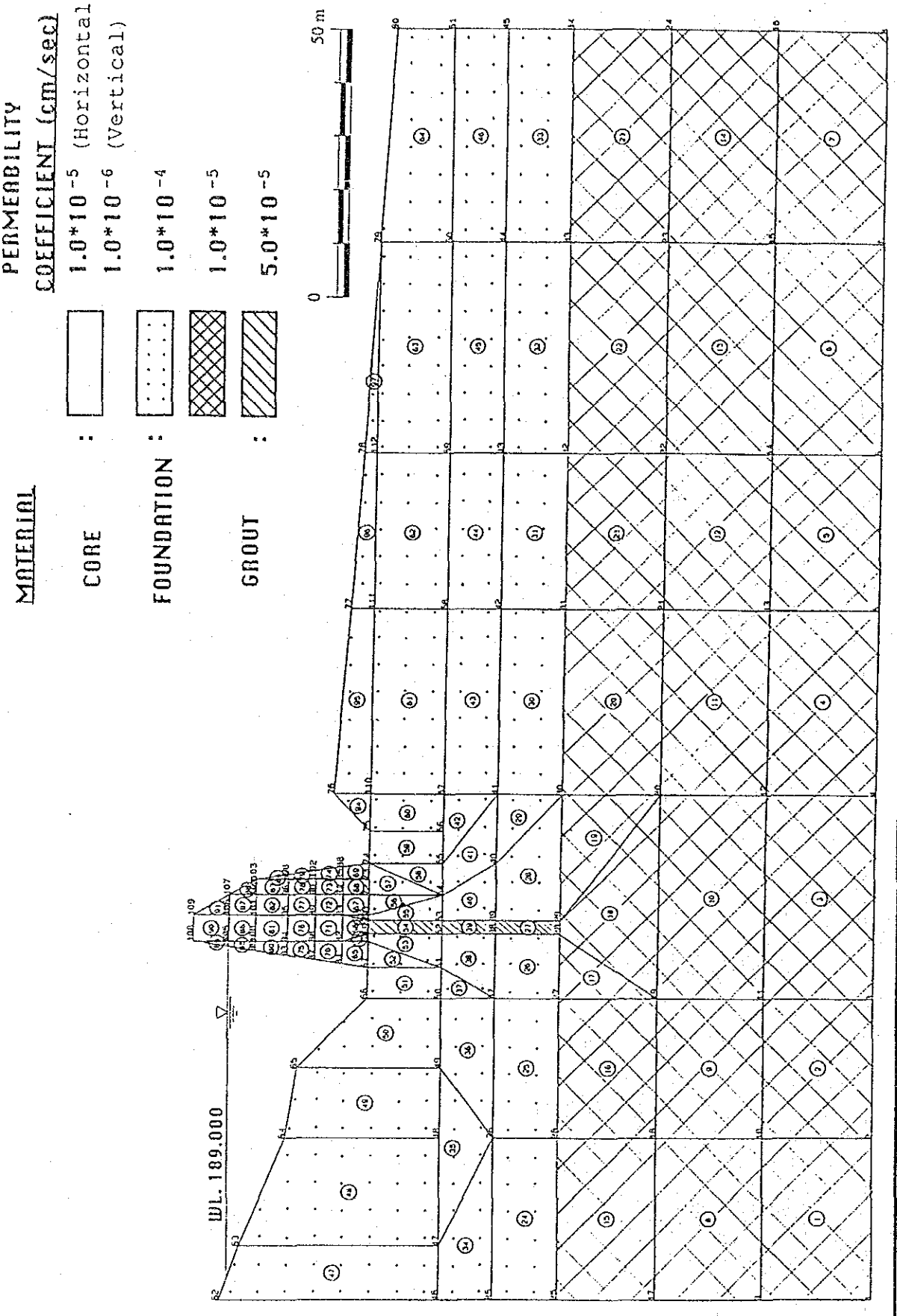


DAM SECTIONS FOR WHICH SEEPAGE ANALYSIS WAS CARRIED OUT

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.1.2

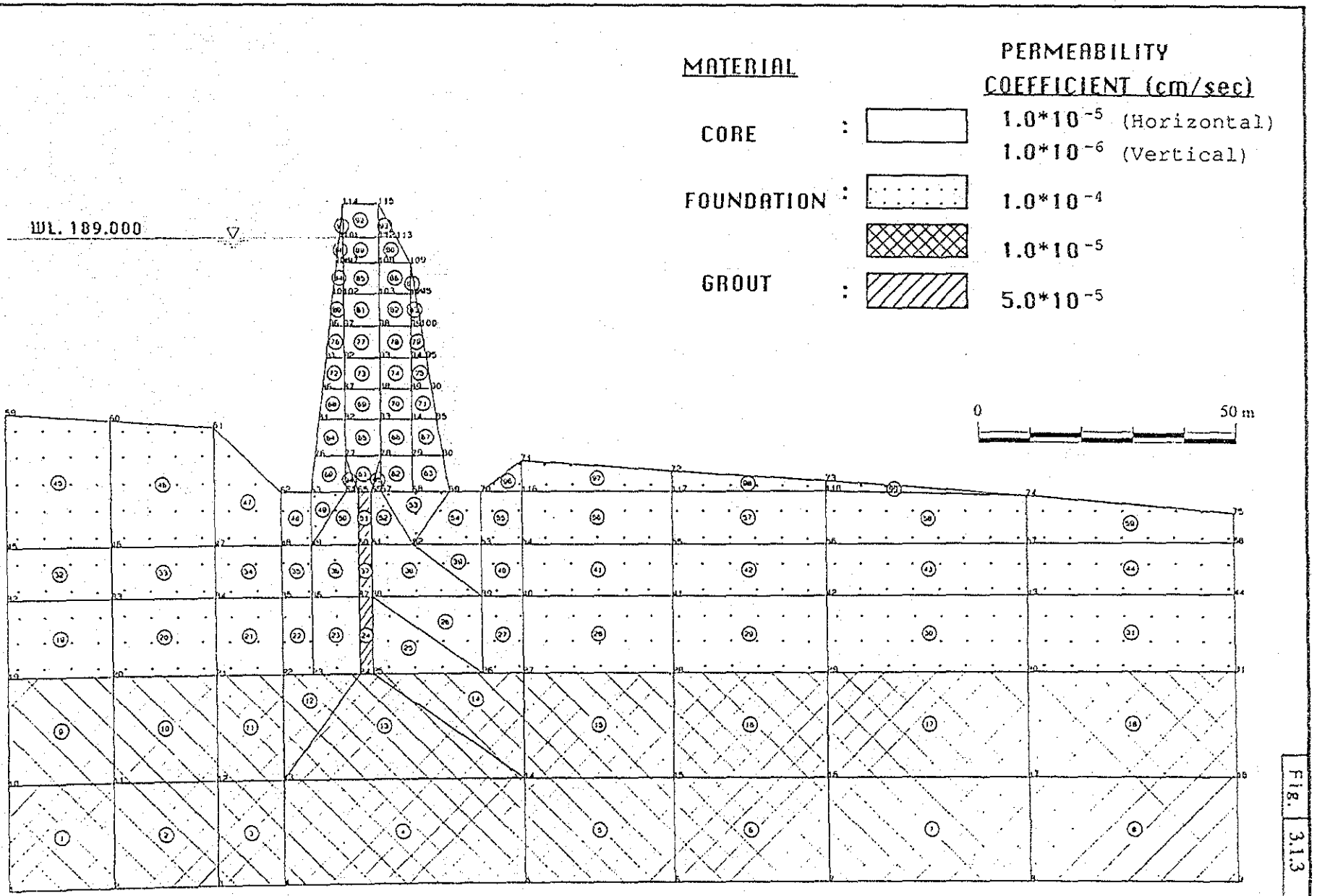


MODEL FOR F.E.M. SEEPAGE ANALYSIS
(SECTION NO. I : Sta No. 4)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

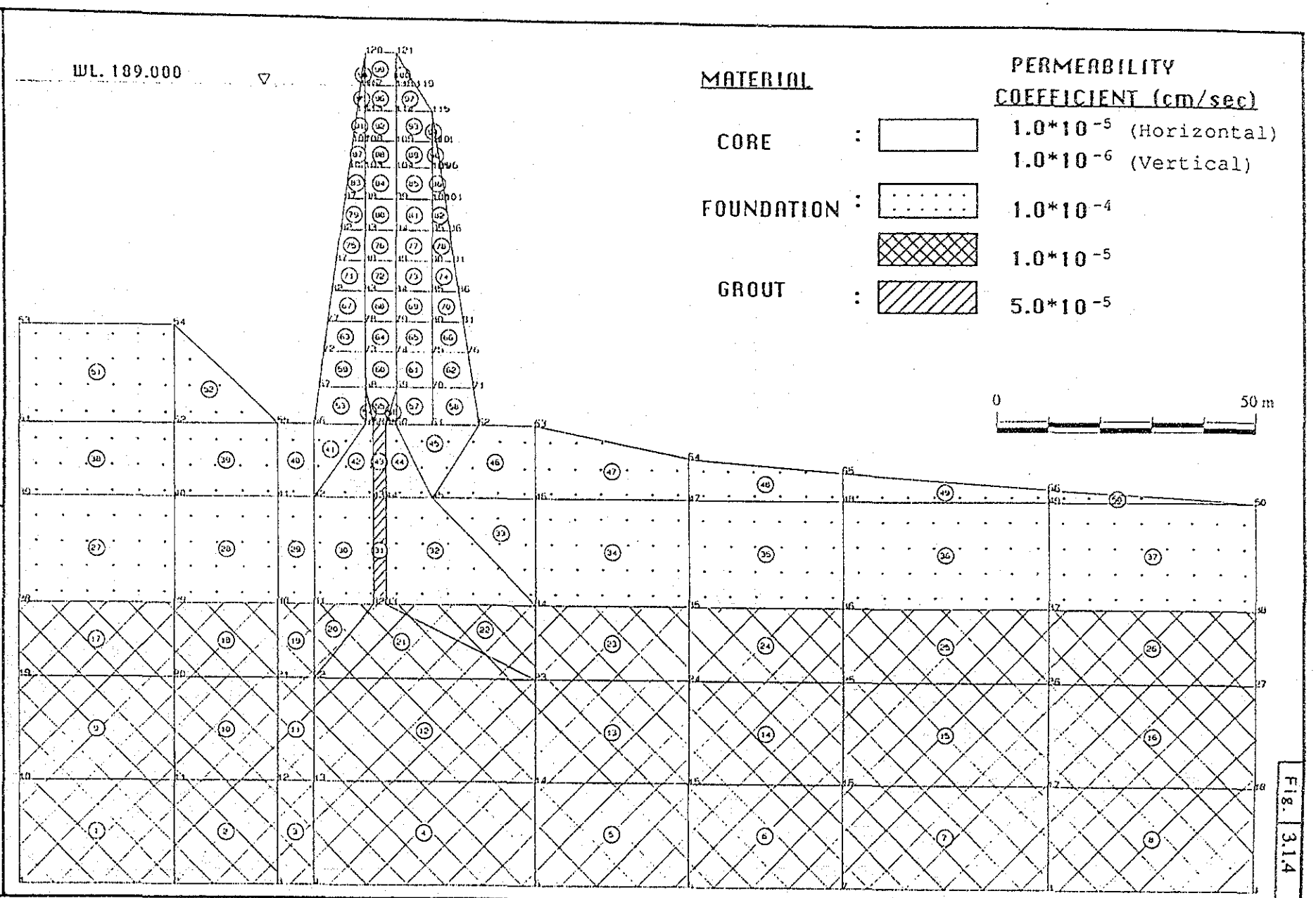
JAPAN INTERNATIONAL COOPERATION AGENCY

MODEL FOR F.E.M. SEEPAGE ANALYSIS
(SECTION NO. II : Sta No. 8)



GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.1.3



MODEL FOR F.E.M. SEEPAGE ANALYSIS
(SECTION NO. III ; Sta No. 12)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.1.4

MODEL FOR F.E.M. SEEPAGE ANALYSIS
(SECTION NO. IV : Sta No. 16)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

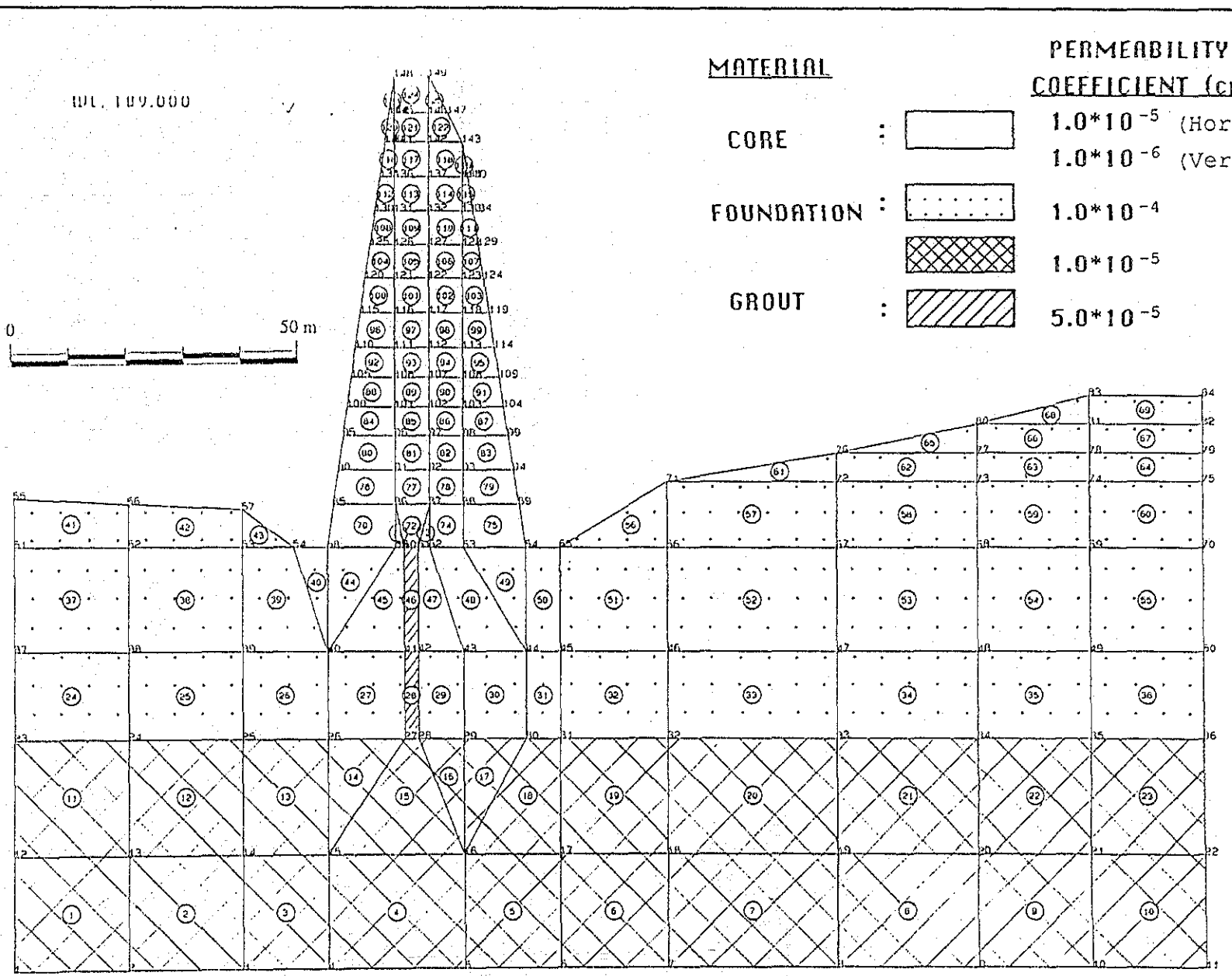


Fig. 3.1.5

MODEL FOR F.E.M. SEEPAGE ANALYSIS
(SECTION NO. V : Sta No. 20)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

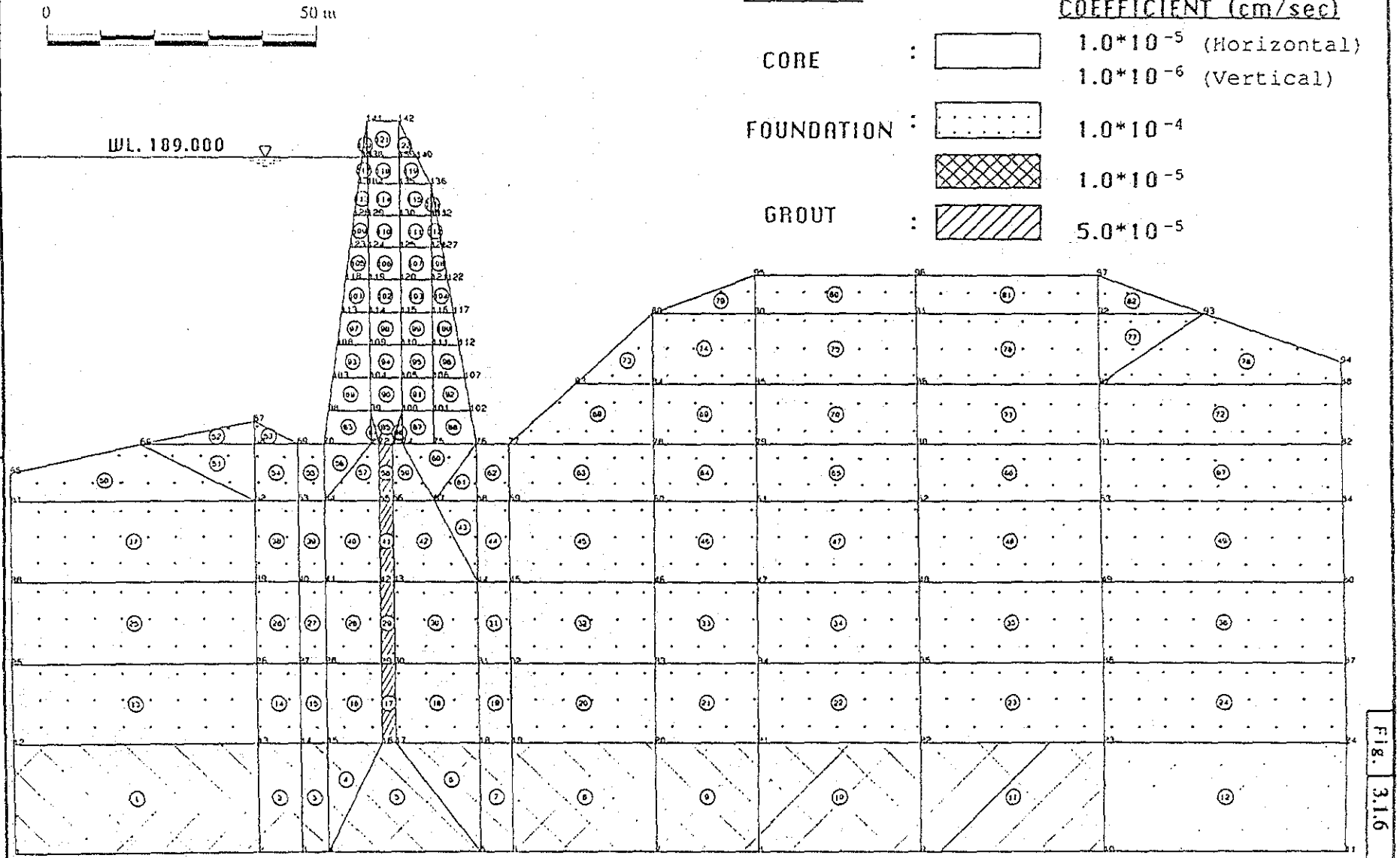
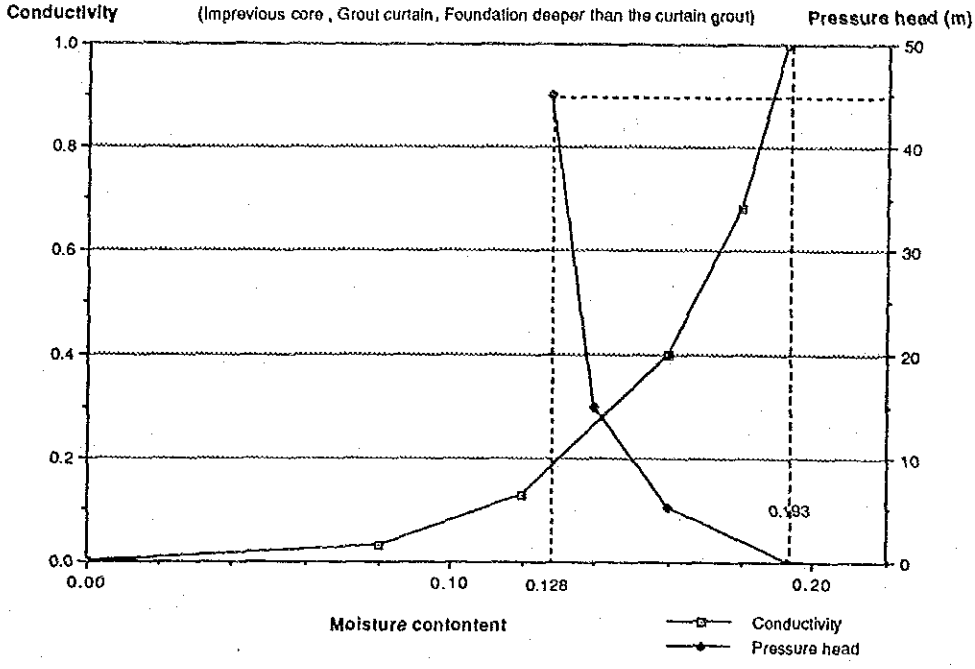


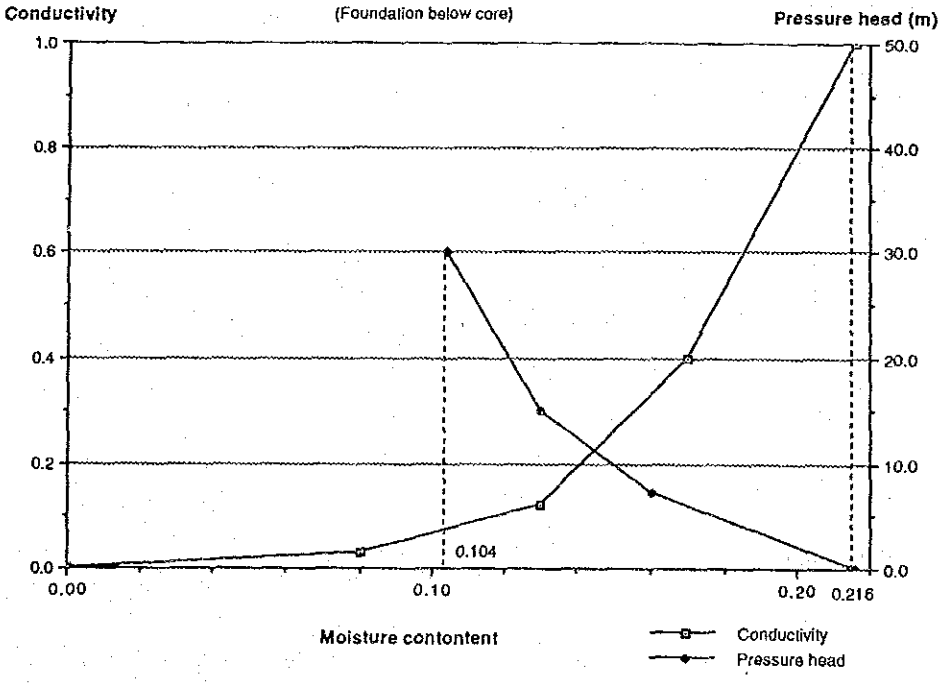
Fig. 3.1.6

Fig. 3.1.7

SAMPLE-A

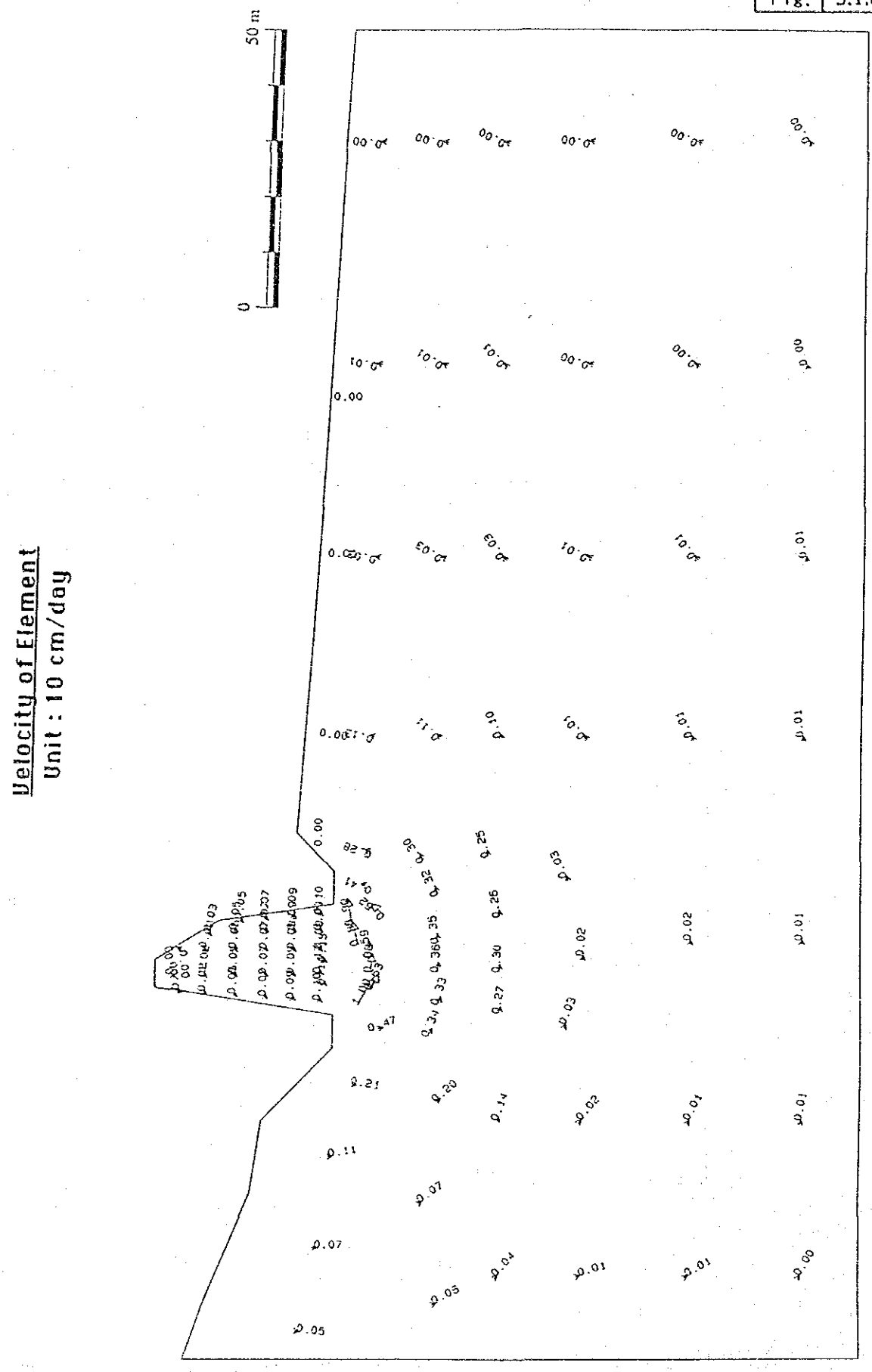


SAMPLE-B



RELATION ASSUMED AMONG MOISTURE CONTENT, CONDUCTIVITY SND PRESSURE HHEAD	GOVERNMENT OF MAURITIUS PORT LOUIS WATER SUPPLY PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.1.8

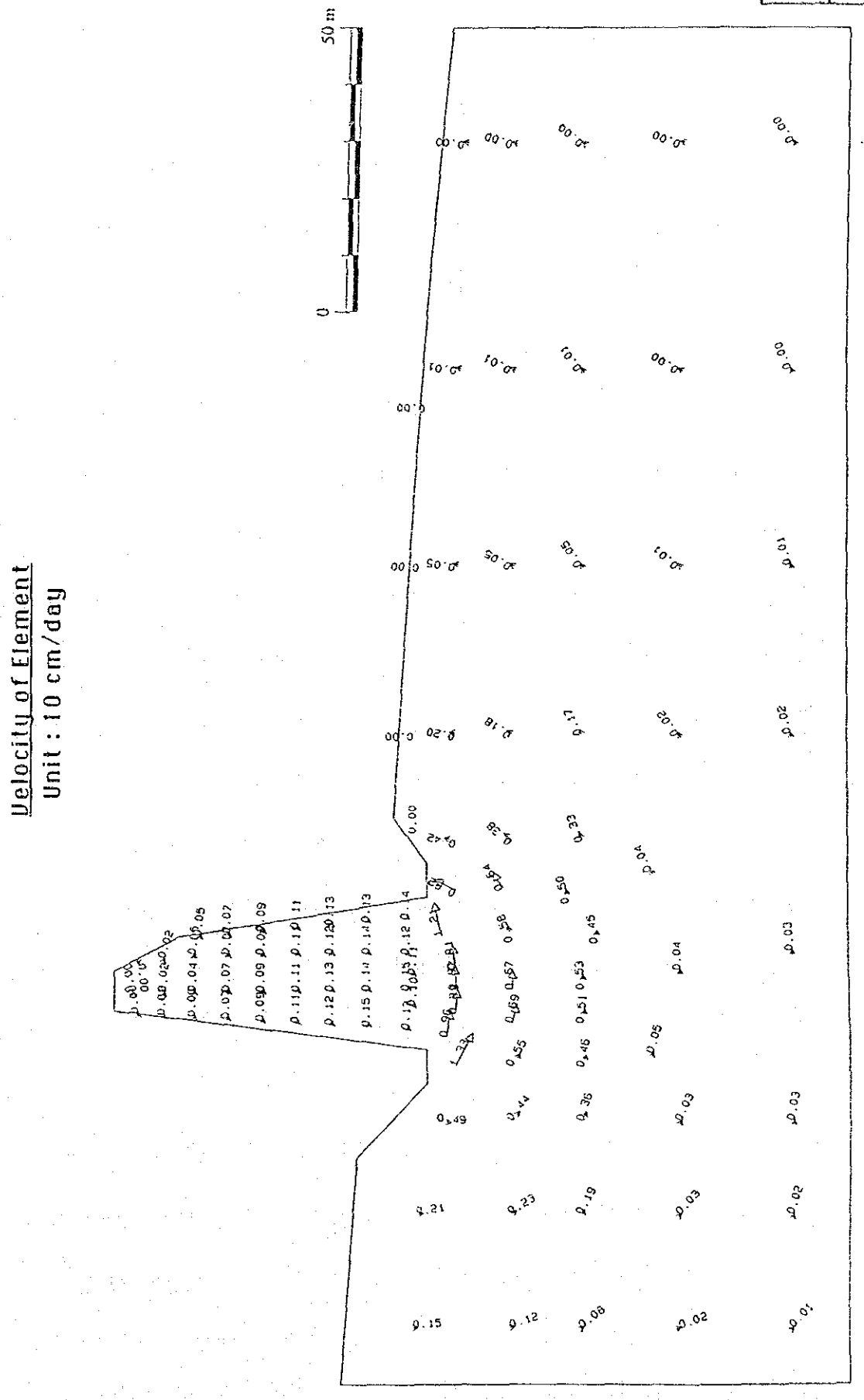


SEEPAGE FLOW DISTRIBUTION
(SECTION NO. I : Sta No. 4)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.1.9

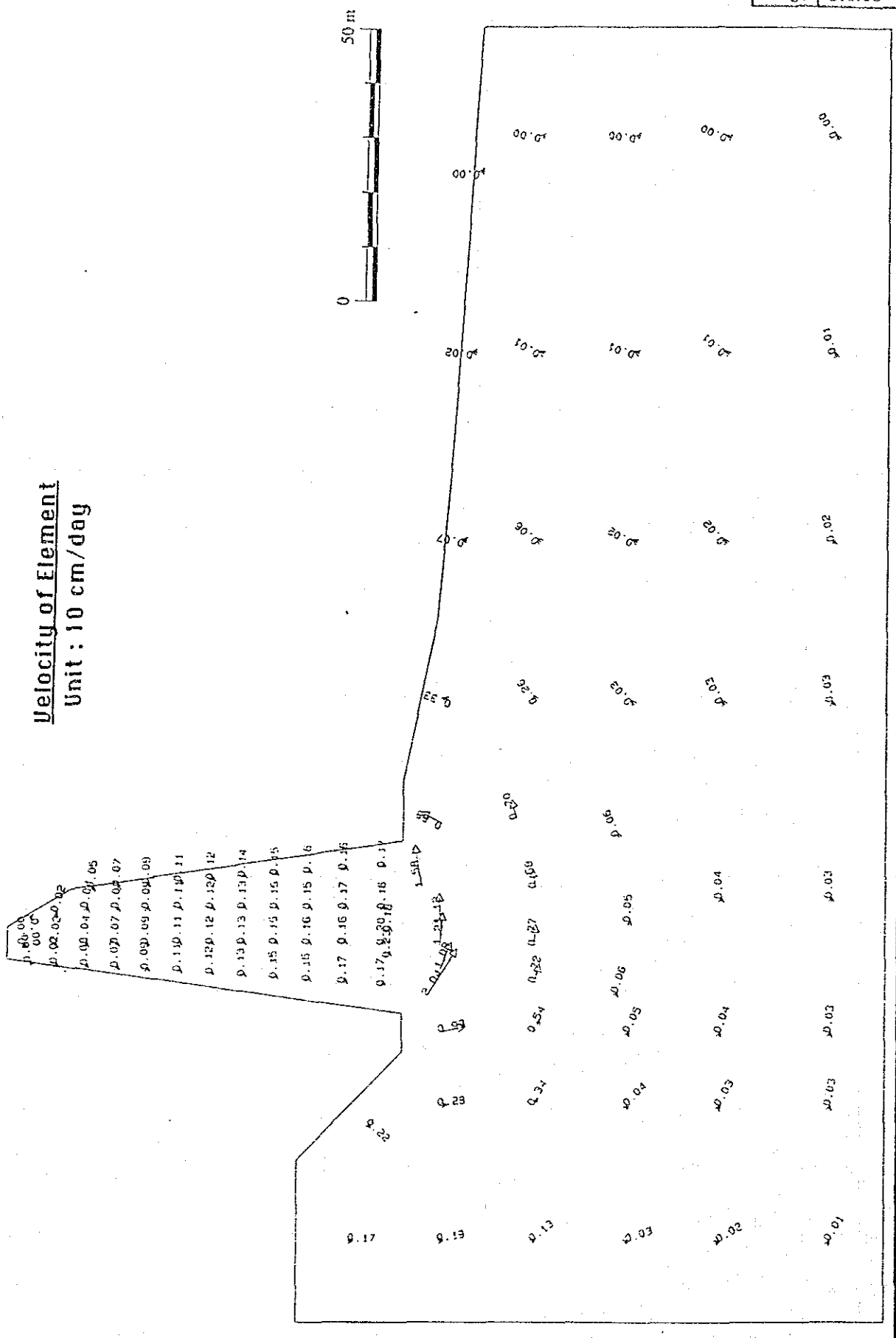


SEEPAGE FLOW DISTRIBUTION
(SECTION NO. II : Sta No. 8)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.1.10

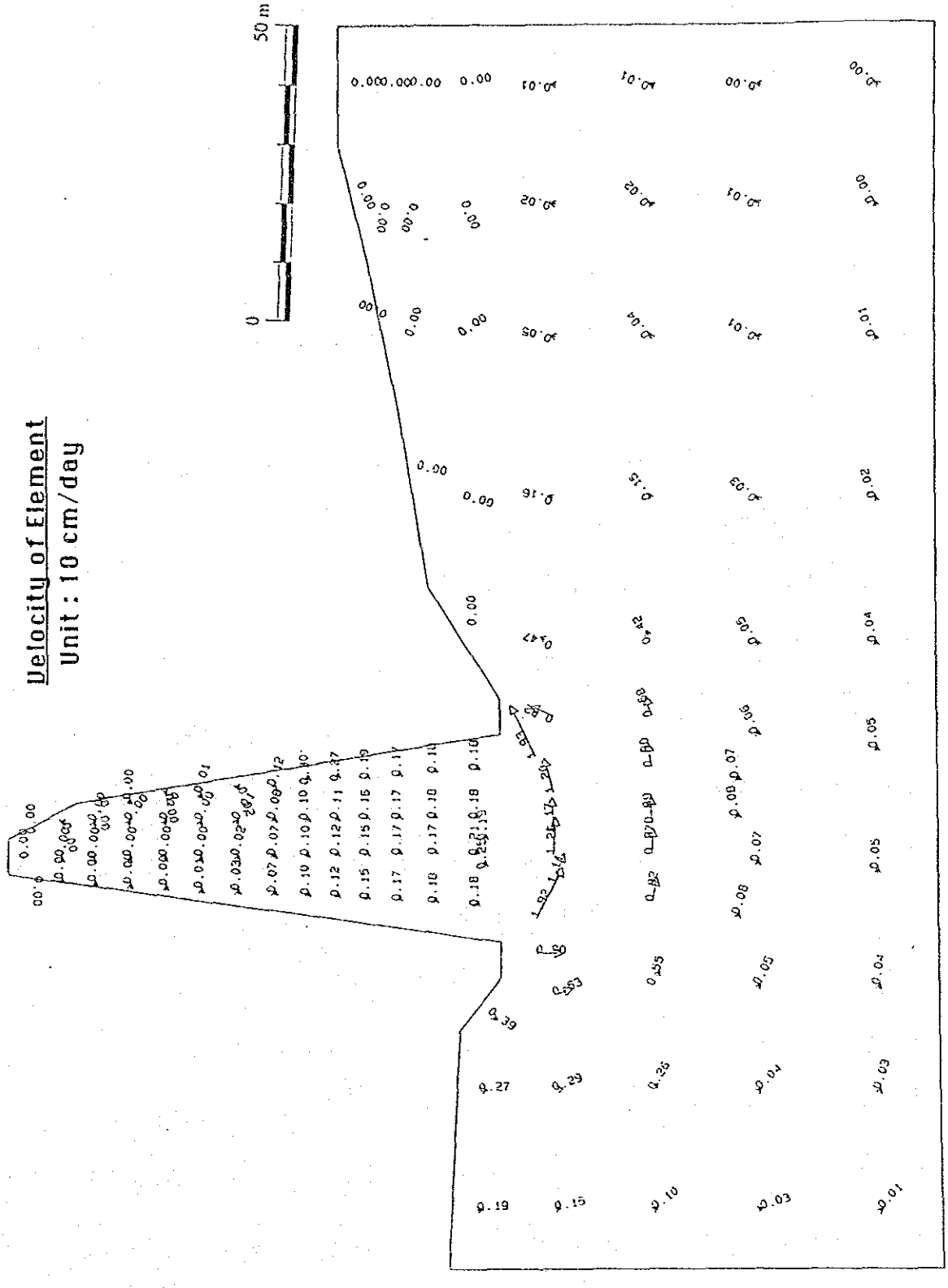


SEEPAGE FLOW DISTRIBUTION
(SECTION NO. III : Sta No. 12)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.1.11

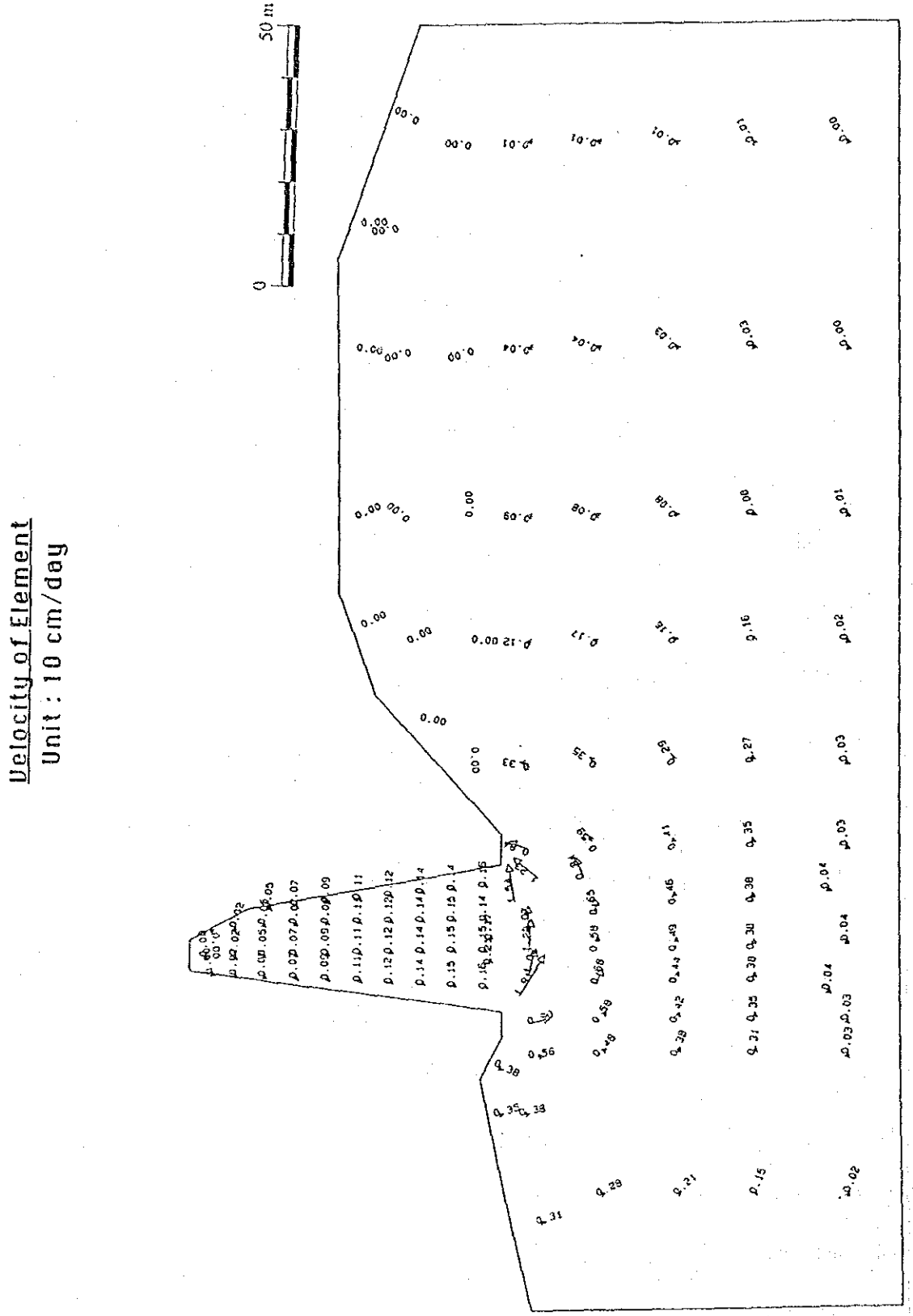


SEEPAGE FLOW DISTRIBUTION
(SECTION NO. IV : Sta No.16)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.1.12

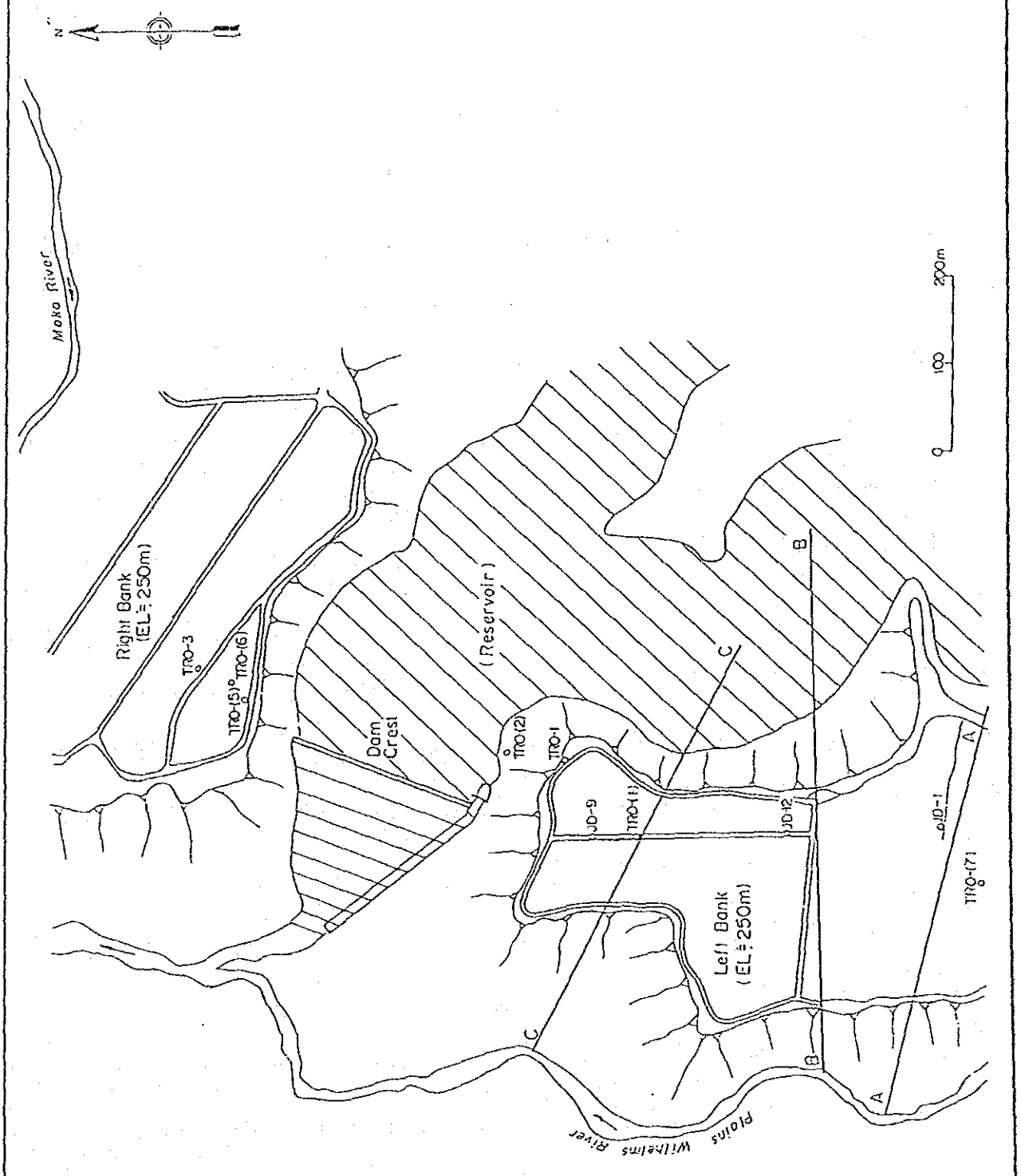


SEEPAGE FLOW DISTRIBUTION
(SECTION NO. V: Sta No. 20)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.2.1

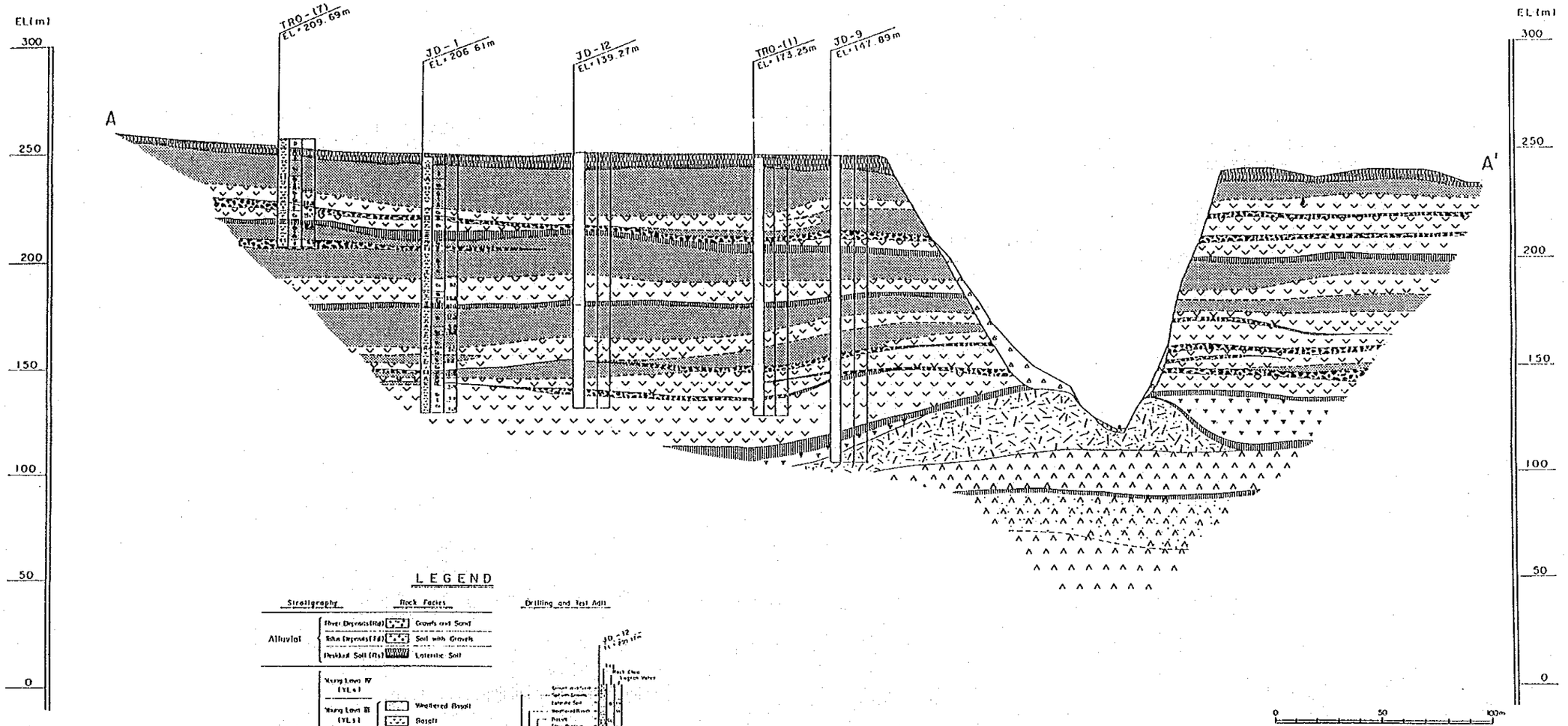


DAM SITE GENERAL MAP

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

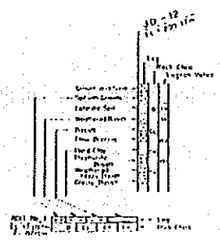
Fig. 3.2.2



LEGEND

Stratigraphy		Rock Facies
Alluvial	River Deposits (Ra)	Gravels and Sand
	Talus Deposits (Ta)	Soil with Gravels
	Residual Soil (Rs)	Lateritic Soil
Young Lava	Young Lava IV (YL+1)	
	Young Lava III (YL+1)	Weathered Basalt
		Basalt
	Young Lava II (YL+2)	Flow Breccia
		Hard Clay
	Young Lava I (YL+1)	
	Pyroclastic Flow (YL+0)	Pyroclastic Flow
Old Lava	Porphyritic Basalt (OL-3)	Porphyritic Basalt
	Glassy Basalt II (OL-2)	Weathered Glassy Basalt
		Glassy Basalt II
	Glassy Basalt I (OL-1)	Hard Clay (Flow Breccia)

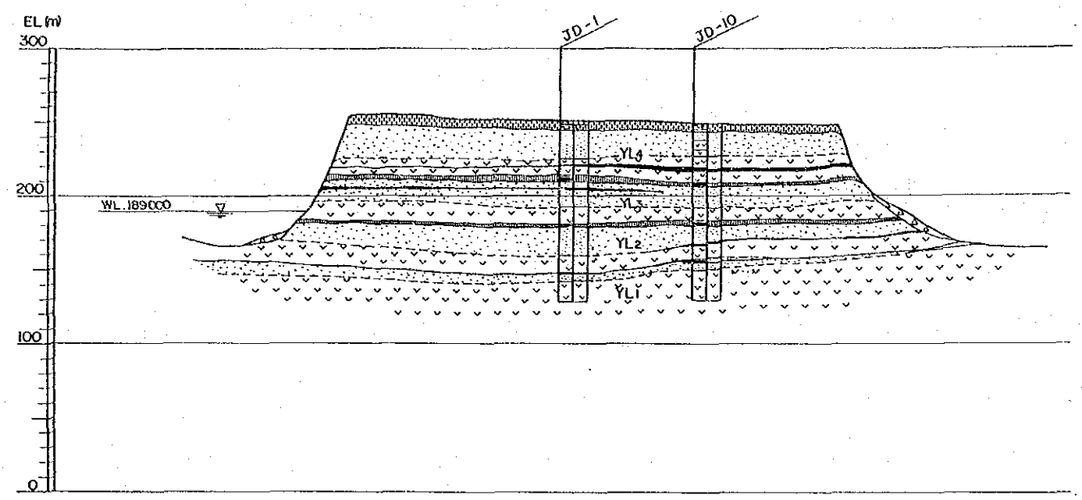
Drilling and Test Adit



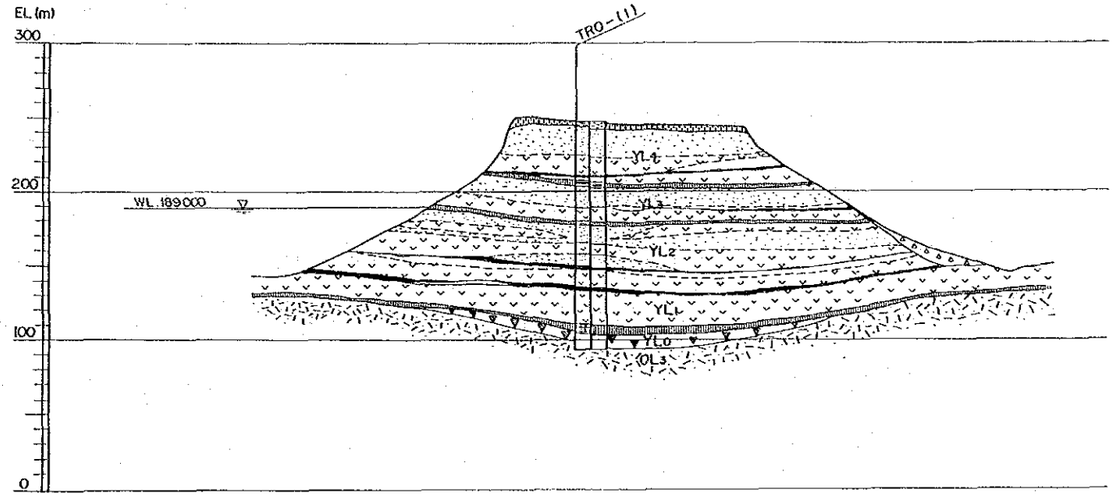
GENERAL
GEOLOGICAL PROFILE ALONG
THE DAM AXIS

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

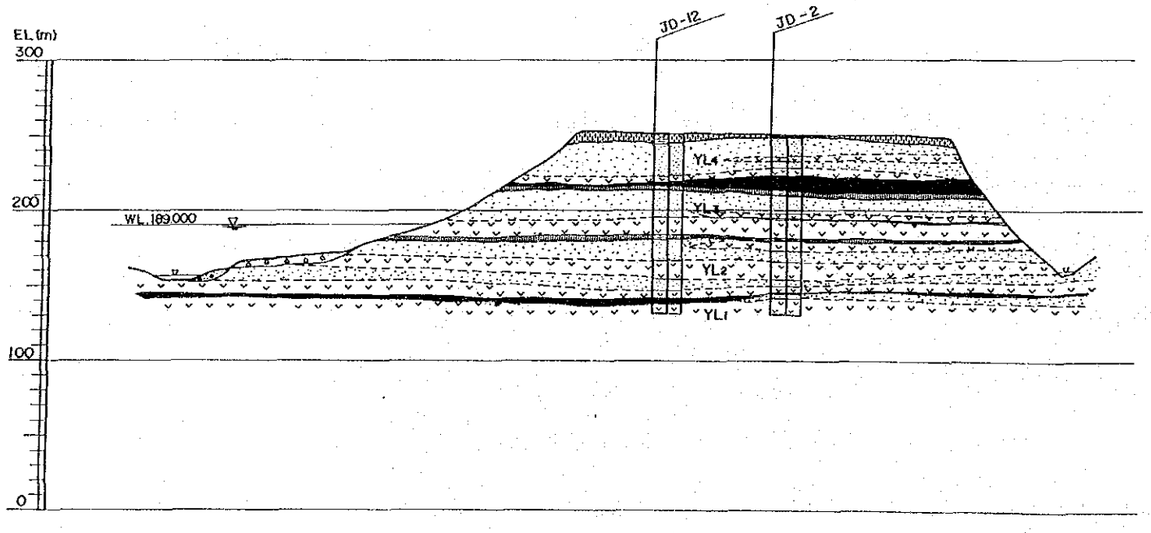
SECTION A－A



SECTION C－C



SECTION B－B



LEGEND

Alluvial	River Deposits		Gravels and Sand
	Talus Deposits		Soil with Gravels
	Residual Soil		Lateritic Soil
Young Lava	Young Lava Ⅳ (YL4)		Weathered Basalt
	Young Lava Ⅲ (YL3)		Basalt
	Young Lava Ⅱ (YL2)		Flow Breccia
	Young Lava Ⅰ (YL1)		Hard Clay
	Pyroclastic Flow (YLo)		Pyroclastic Flow
Old Lava	Porphyritic Basalt (OL3)		Porphyritic Basalt

TYPICAL GEOLOGICAL SECTIONS IN LEFT BANK

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

MODEL FOR F.E.M. SEEPAGE ANALYSIS
(LEFT BANK, SECTION A-A)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

MATERIAL		PERMEABILITY COEFFICIENT (cm/sec)
FOUNDATOIN :		$1.0*10^{-4}$
		$1.0*10^{-5}$
GROUT :		$7.0*10^{-5}$

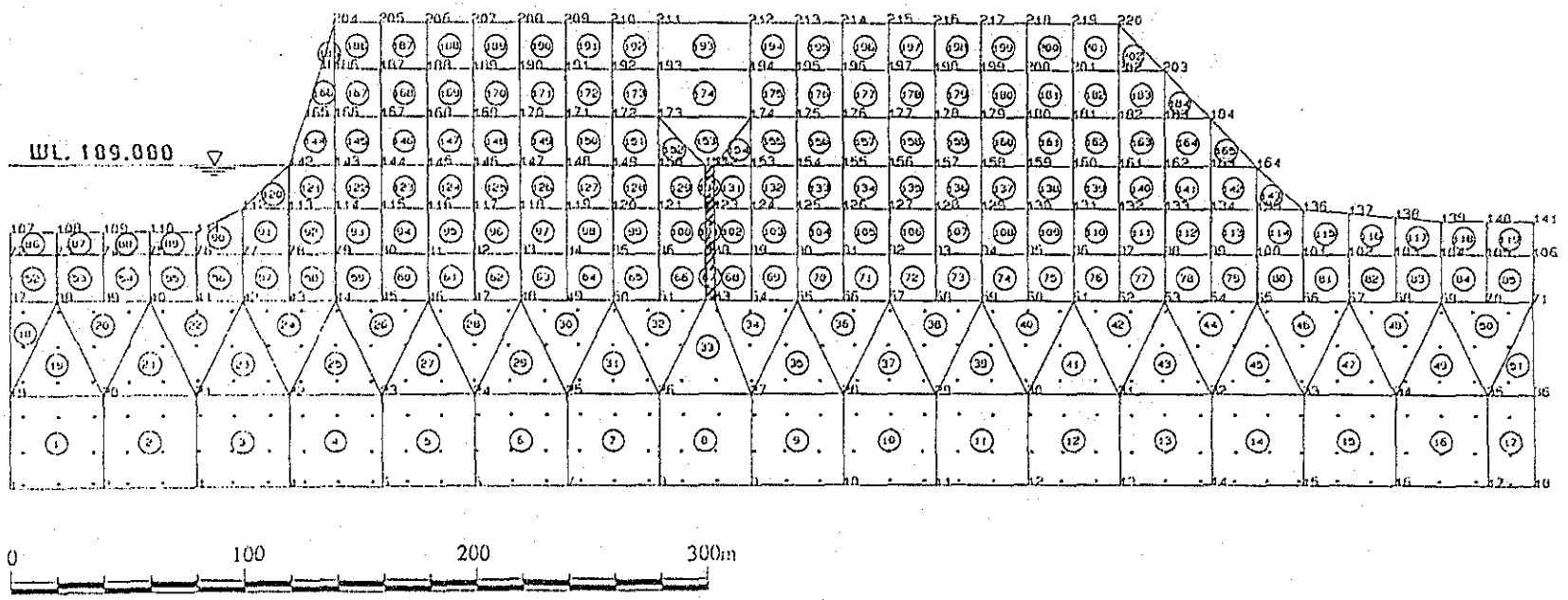


Fig. 3.2.4

MODEL FOR F.E.M. SEEPAGE ANALYSIS
(LEFT BANK, SECTION B–B)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

MATERIAL		PERMEABILITY COEFFICIENT (cm/sec)
FOUNDATOIN :		$1.0*10^{-4}$
		$1.0*10^{-5}$
GROUT :		$7.0*10^{-5}$

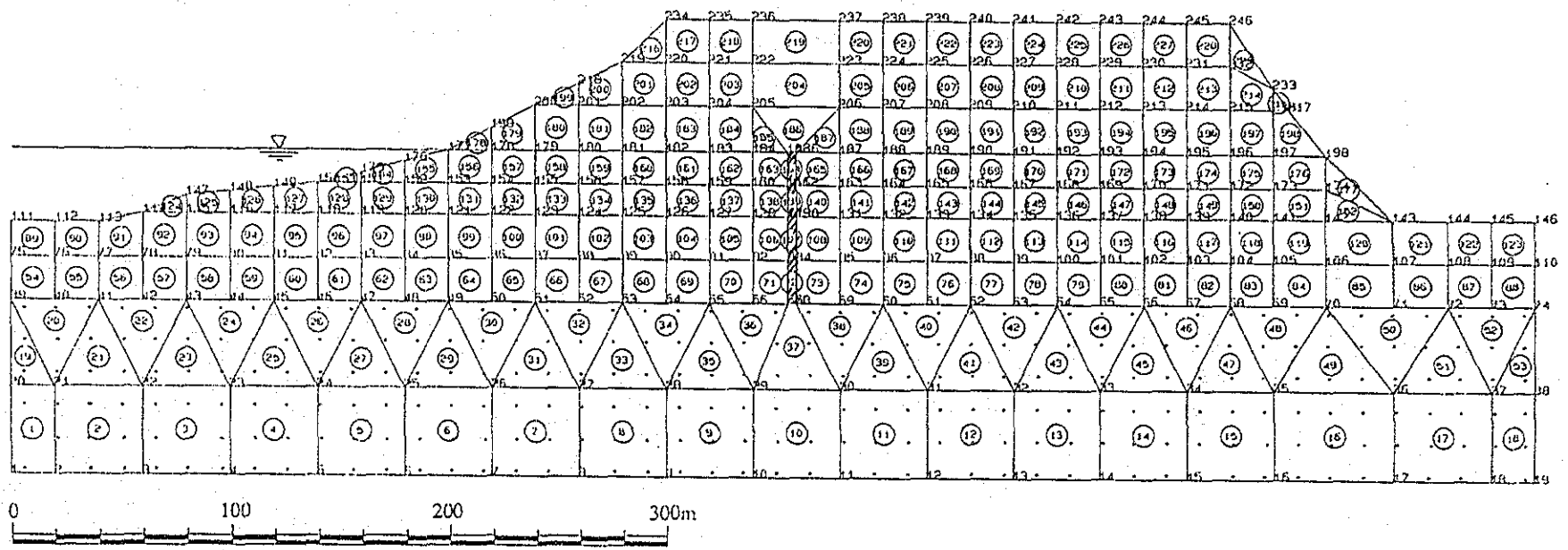


Fig. 3.2.5

MODEL FOR F.E.M. SEEPAGE ANALYSIS
(LEFT BANK, SECTION C-C)

GOVERNMENT OF MAURITIUS
PORT LOUIS WATER SUPPLY PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

MATERIAL		PERMEABILITY COEFFICIENT (cm/sec)
FOUNDATOIN :		$1.0*10^{-4}$
		$1.0*10^{-5}$
GROUT :		$7.0*10^{-5}$

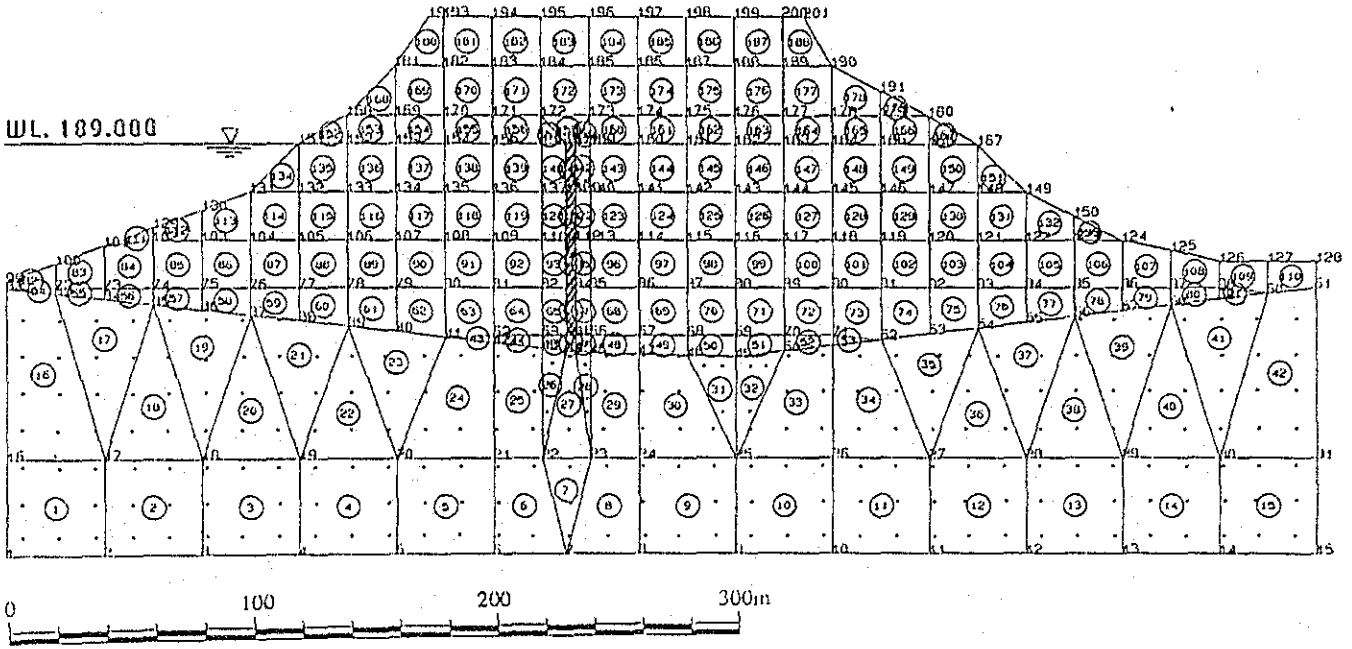


Fig. 3.2.6

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Section C-C (Normal Condition)														
2	(1) Body Force							(2) Earth Presuure							
3	No.	A	X	Y	Gx	Gy		No.	A	X	Y	Gx	Gy		
4	1	-20.000	0.500	11.500	-10.000	-230.000		1	5.400	2.700	18.500	14.580	99.900		
5	2	-19.838	4.150	3.833	-82.326	-76.044		2	1.800	2.400	21.000	4.320	37.800		
6	3	-27.600	6.500	5.750	-179.400	-158.700		3	30.800	5.500	18.000	169.400	554.400		
7	4	-1.350	7.400	12.500	-9.990	-16.875		Sigma	38.000			188.300	692.100		
8	5	-5.400	2.700	18.500	-14.580	-99.900			X-Coord.	4.955	W2g	73.340	Uw	1.930	1.23
9	6	-1.800	2.400	21.000	-4.320	-37.800			Y-Coord.	18.213	W2s	3.667	Kh	0.050	
10	7	-30.800	5.500	18.000	-169.400	-554.400			theta	0	0		Kv	0.000	
11	8	165.550	3.850	10.750	637.368	1779.663			fai	36	0.628				
12	Sigma	58.763			167.352	605.944			tseta	36	0.628	tseta '	0.314		
13		X-Coord.	2.848		W1g	141.030			alpha	0	0.000				
14		Y-Coord.	10.312		W1s	7.052			Ka	0.241					
15					Uw	2.400			Ka'	0.264					
16					Kh	0.050			theta 0	0.050					
17															
18	(3) Stability Analysis								D29	3	6.424	12.848			
19		V	H	X	Y	Mx	My		x0 =	0.5315936					
20	W1g	141.030		2.848		401.645	0.000		x1 =	1.9156526					
21	Pw		105.125		4.833	0.000	508.104		l1 =	2.4472462					
22	W2g	73.340		4.955		363.419	0.000			Li		Pa			
23	Pe		11.407		16.833	0.000	192.023		1	2.4472462	4.9934462	2.0404348			
24	U	-55.825		2.567		-143.284	0.000		2	4.0132921	13.429091	3.3461533			
25	Sigma	158.545	116.532			621.779	700.128		3	5.5793381	25.954366	4.6518719			
26									4	7.1453841	42.569272	5.9575904			
27									5	8.7114301	63.273808	7.263309			
28		Mx / My =	0.888	> 1.5					6	10.277476	88.067975	8.5690275			
29		(f*V)/H =	0.748	> 1.5					7	11.843522	116.95177	9.8747461			
30		f =	0.55						8	13.843522	159.78583	11.542281			
31									9	15.409568	197.98213	12.848			
32	(a) Stability against Overturning										713.00769	66.093414			
33	e = B/2 - SigmaM / SigmaV =		4.344	B/6 =	1.283										
34									Ma =		713.00769				
35	(b) Stability against Sliding								Mx / My =		1.9064911	> 1.5			
36	C =	20	100						Fa =	66.093					
37	B =	7.7	3.35						Va =	18.991803					
38	Fs = (f * SigmaV + C * A) / Sigma H =				1.3232358	> 1.5			Ha =	63.30601					
39															
40									Fs = (f * SigmaV + C * A) / Sigma H =				1.8664842	> 1.5	
41									q = V/B	23.056728	<	100			
42															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Section C-C (Seismic Condition)														
2	(1) Body Force								(2) Earth Presuure						
3	No.	A	X	Y	Gx	Gy		No.	A	X	Y	Gx	Gy		
4	1	-20.000	0.500	11.500	-10.000	-230.000		1	5.400	2.700	18.500	14.580	99.900		
5	2	-19.838	4.150	3.833	-82.326	-76.044		2	1.800	2.400	21.000	4.320	37.800		
6	3	-27.600	6.500	5.750	-179.400	-158.700		3	30.800	5.500	18.000	169.400	554.400		
7	4	-1.350	7.400	12.500	-9.990	-16.875		Sigma	38.000			188.300	692.100		
8	5	-5.400	2.700	18.500	-14.580	-99.900			X-Coord.	4.955	W2g	73.340	Uw	1.930	1.23
9	6	-1.800	2.400	21.000	-4.320	-37.800			Y-Coord.	18.213	W2s	3.667	Kh	0.050	
10	7	-30.800	5.500	18.000	-169.400	-554.400			theta	0	0		Kv	0.000	
11	8	165.550	3.850	10.750	637.368	1779.663			fai	36	0.628				
12	Sigma	58.763			167.352	605.944			tseta	36	0.628	tseta '	0.314		
13		X-Coord.	2.848		W1g	141.030			alpha	0	0.000				
14		Y-Coord.	10.312		W1s	7.052			Ka	0.241					
15					Uw	2.400			Ka'	0.264					
16					Kh	0.050			theta 0	0.050					
17															
18	(3) Stability Analysis								D29	3	6.424	12.848			
19		V	H	X	Y	Mx	My		x0 =	0.5315936					
20	W1g	141.030		2.848		401.645	0.000		x1 =	1.9156526					
21	Wis		7.052		10.312	0.000	72.713		l1 =	2.4472462					
22	Pw		105.125		4.833	0.000	508.104			Li		Pa			
23	W2g	73.340		4.955		363.419	0.000		1	2.4472462	4.9934462	2.0404348			
24	W2s		3.667		18.213	0.000	66.788		2	4.0132921	13.429091	3.3461533			
25	Pe		12.469		16.833	0.000	209.889		3	5.5793381	25.954366	4.6518719			
26	U	-55.825		2.567		-143.284	0.000		4	7.1453841	42.569272	5.9575904			
27	Sigma	158.545	128.312			621.779	857.494		5	8.7114301	63.273808	7.263309			
28									6	10.277476	88.067975	8.5690275			
29									7	11.843522	116.95177	9.8747461			
30		Mx / My =	0.725	> 1.2					8	13.843522	159.78583	11.542281			
31		(f*V)/H =	0.680	> 1.2					9	15.409568	197.98213	12.848			
32		f =	0.55								713.00769	66.093414			
33															
34	(a) Stability against Overturning								Ma =		713.00769				
35	e = B/2 - SigmaM / SigmaV =		5.337	B/6 =	1.283				Mx / My =		1.5566141	> 1.2			
36									Fa =	66.093					
37	(b) Stability against Sliding								Va =	18.991803					
38	C =	20	150						Ha =	63.30601					
39	B =	7.7	3.35												
40	Fs = (f * SigmaV + C * A) / Sigma H =				1.201755	> 1.2			Fs = (f * SigmaV + C * A) / Sigma H =				1.69513	> 1.2	
41									q = V/B	23.056728	< 150				
42															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Section g-g (Normal Condition)														
2	(1) Body Force								(2) Earth Presuure						
3	No.	A	X	Y	Gx	Gy		No.	A	X	Y	Gx	Gy		
4	1	-20.000	0.500	11.500	-10.000	-230.000		1	7.412	8.500	13.696	62.998	101.508		
5	2	-9.600	3.450	2.667	-33.120	-25.600		2	11.412	4.167	18.598	47.550	212.240		
6	3	-46.000	7.125	4.000	-327.750	-184.000		3	25.677	7.750	17.647	198.997	453.122		
7	4	-1.088	7.193	8.898	-7.825	-9.680		4	8.500	5.750	21.000	48.875	178.500		
8	5	-6.835	8.731	9.347	-59.675	-63.882		Sigma	53.000			358.419	945.370	1.720	0.8
9	6	-0.238	9.803	10.962	-2.334	-2.610			X-Coord.	6.763	W2g	84.342	Uw	0.050	
10	7	-7.412	8.500	13.696	-62.998	-101.508			Y-Coord.	17.837	W2s	4.217	Kh	0.000	
11	8	-11.412	4.167	18.598	-47.550	-212.240			theta	0	0		Kv		
12	9	-25.677	7.750	17.647	-198.997	-453.122			fai	30	0.524				
13	10	-8.500	5.750	21.000	-48.875	-178.500			tseta	30	0.524	tseta '	0.262		
14	11	215.000	5.000	10.750	1075.000	2311.250			alpha	0	0.000				
15	Sigma	78.239			275.876	850.108			Ka	0.297					
16		X-Coord.	3.526		W1g	187.773			Ka'	0.333					
17		Y-Coord.	10.866		W1s	9.389			theta 0	0.050					
18					Uw	2.400									
19					Kh	0.050			D29	3	6.424	19.272			
20									x0 =	0.5315936					
21	(3) Stability Analysis								x1 =	1.9156526					
22		V	H	X	Y	Mx	My		l1 =	2.4472462					
23	W1g	187.773		3.526		662.103	0.000			Li	Ma	Fa			
24	Pw		105.125		4.833	0.000	508.104		1	2.4472462	11.23041	4.5869991			
25	W2g	84.342		6.763		570.370	0.000		2	4.0132921	30.202428	7.5255993			
26	Pe1		12.523		16.833	0.000	210.802		3	5.5793381	58.372148	10.462199			
27	Pe2		2.496		13.000	0.000	32.451		4	7.1453841	95.73957	13.3988			
28	Pe3		1.070		12.500	0.000	13.373		5	8.7114301	142.30469	16.3354			
29	U	-72.500		3.333		-241.667	0.000		6	10.277476	198.06752	19.272			
30	Sigma	199.615	121.214			990.807	764.730				535.91677	71.582997			
31															
32									Ma =		535.91677				
33		Mx / My =	1.296	> 1.5					Mx / My =		1.996422	> 1.5			
34		(f*V)/H =	0.906	> 1.5					Fa =	71.583					
35		f =	0.55						Va =	20.569223					
36									Ha =	68.564076					
37	(a) Stability against Overturning														
38	e = B/2 - SigmaM / SigmaV =		3.867	B/6 =		1.667			Fs = (f * SigmaV + C * A) / Sigma H =				2.494699	> 1.5	
39									q = V/B	22.018421	< 100				
40	(b) Stability against Sliding														
41	C =	20	100												
42	B =	10	6.202												
43	Fs = (f * SigmaV + C * A) / Sigma H		1.9290539	> 1.5											

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Section g-g (Seismic Condition)														
2	(1) Body Force								(2) Earth Presuure						
3	No.	A	X	Y	Gx	Gy		No.	A	X	Y	Gx	Gy		
4	1	-20.000	0.500	11.500	-10.000	-230.000		1	7.412	8.500	13.696	62.998	101.508		
5	2	-9.600	3.450	2.667	-33.120	-25.600		2	11.412	4.167	18.598	47.550	212.240		
6	3	-46.000	7.125	4.000	-327.750	-184.000		3	25.677	7.750	17.647	198.997	453.122		
7	4	-1.088	7.193	8.898	-7.825	-9.680		4	8.500	5.750	21.000	48.875	178.500		
8	5	-6.835	8.731	9.347	-59.675	-63.862		Sigma	53.000			358.419	945.370	1.720	0.8
9	6	-0.238	9.803	10.962	-2.334	-2.610			X-Coord.	6.763	W2g	84.342	Uw	0.050	
10	7	-7.412	8.500	13.696	-62.998	-101.508			Y-Coord.	17.837	W2s	4.217	Kh	0.000	
11	8	-11.412	4.167	18.598	-47.550	-212.240			theta	0	0		Kv		
12	9	-25.677	7.750	17.647	-198.997	-453.122			tai	30	0.524				
13	10	-8.500	5.750	21.000	-48.875	-178.500			tseta	30	0.524	tseta '	0.262		
14	11	215.000	5.000	10.750	1075.000	2311.250			alpha	0	0.000				
15	Sigma	78.239			275.876	850.108			Ka	0.297					
16		X-Coord.	3.526		W1g	187.773			Ka'	0.333					
17		Y-Coord.	10.866		W1s	9.389			theta 0	0.050					
18					Uw	2.400									
19					Kh	0.050			D29	3	6.424	19.272			
20									x0 =	0.5315936					
21	(3) Stability Analysis								x1 =	1.9156526					
22		V	H	X	Y	Mx	My		l1 =	2.4472462					
23	W1g	187.773		3.526		662.103	0.000			Li		Fa			
24	W1s		9.389		10.866	0.000	102.013		1	2.4472462	11.23041	4.5889991			
25	Pw		105.125		4.833	0.000	508.104		2	4.0132921	30.202428	7.5255993			
26	W2g	84.342		6.763		570.370	0.000		3	5.5793381	58.372148	10.462199			
27	W2s		4.217		17.837	0.000	75.221		4	7.1453841	95.73957	13.3988			
28	Pe1		14.025		16.833	0.000	236.091		5	8.7114301	142.30469	16.3354			
29	Pe2		2.796		13.000	0.000	36.344		6	10.277476	198.06752	19.272			
30	Pe3		1.198		12.500	0.000	14.977				535.91677	71.582997			
31	U	-72.500		3.333		-241.667	0.000								
32	Sigma	199.615	136.750			990.807	972.750		Ma =		535.91677				
33									Mx / My =		1.5694926	> 1.2			
34									Fa =	71.583					
35		Mx / My =	1.019	> 1.2					Va =	20.569223					
36		(f*V)/H =	0.803	> 1.2					Ha =	68.564076					
37		f =	0.55												
38									Fs = (f * SigmaV + C * A) / Sigma H =				2.2112813	> 1.2	
39	(a) Stability against Overturning								e = V/B	22.018421	< 150				
40	e = B/2 - SigmaM / SigmaV =		4.910	B/6 =		1.667									
41															
42	(b) Stability against Sliding														
43	C =	20	150												
44	B =	10	6.202												
45	Fs = (f * SigmaV + C * A) / Sigma H				2.2653649	> 1.2									

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	chuteway(seismic)													Uw	1.930	1.23
2	(1) Body Force													Kh	0.050	
3	No.	A	X	Y	Gx	Gy			theta	0		0		Kv	0.000	
4	1	-9.600	3.600	2.667	-34.560	-25.600			fai	36		0.628				
5	2	-5.081	3.065	8.951	-15.573	-45.483			tseta	36		0.628				
6	3	-0.262	1.615	9.334	-0.422	-2.441			alpha	0		0.000				
7	4	-0.088	1.653	8.511	-0.146	-0.750			Ka	0.241						
8	5	-8.903	0.500	5.451	-4.451	-48.535			Ka'	0.264			tseta '	0.314		
9	6	43.573	2.200	4.951	95.861	215.753			theta 0	0.050						
10	Sigma	19.640			40.708	92.945			D29	3	6.424	12.848				
11		X-Coord.	2.073		W1g	47.135				Li	Ma	Pa				
12		Y-Coord.	4.733		W1s	2.357			1	1.0440307	1.9162437	1.8354286				
13					Uw	2.400			2	2.6100766	11.976523	4.5885714				
14					Kh	0.050			3	4.1761226	30.659899	7.3417143				
15									4	5.7421686	57.966372	10.094857				
16	(3) Stability Analysis								5	7.3082146	93.895941	12.848				
17		V	H	X	Y	Mx	My		Ma =		196.41498	36.708571				
18	W1g	47.135		2.073		97.700	0.000		Mx / My =		26.370092	> 1.2				
19	Wis		2.357		4.733	0.000	11.153		Fa =	36.709						
20	Pw		0.000		2.667	0.000	0.000		Va =	10.54813						
21	Sigma	47.135	2.357			97.700	11.153		Ha =	35.160435						
22																
23									Fs = (f * SigmaV + C * A) / Sigma H =				42.891549	> 1.2		
24		Mx / My =	8.760	> 1.2					q =	13.109806	< 150					
25		(f*V)/H =	11.000	> 1.2												
26		f =	0.55													
27																
28	(a) Stability against Overturning															
29	e = B/2 - SigmaM / SigmaV =		0.364	B/6 =		0.733										
30																
31	(b) Stability against Sliding															
32	C =	20	150													
33	B =	4.4	2													
34	Fs = (f * SigmaV + C * A) / Sigma H =		27.97252	> 1.2												
35																
36	(c) Stability against Bearing															
37	Q1 = SigmaV/B*(1+6*e/B) =		16.028	<		150										
38	Q2 = SigmaV/B*(1-6*e/B) =		5.3973	<		150										

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Section E-E (Normal)															
2	(1) Body Force							(2) Earth Presuure								
3	No.	A	X'	X	Y	Gx	Gy	No.	A	x'	x	Y	Gx	Gy		
4	1	-42.500	1.700	5.000	6.250	-212.500	-265.625	1	23.800	1.700	5.000	19.000	119.000	452.200		
5	2	-1.350	0.300	6.400	13.500	-8.640	-18.225	2	5.400	4.000	2.700	19.500	14.580	105.300		
6	3	-11.719	4.025	2.675	4.167	-31.348	-48.828	3	1.800	4.300	2.400	22.000	4.320	39.600		
7	4	-23.800	1.700	5.000	19.000	-119.000	-452.200	Sigma	31.000				137.900	597.100		
8	5	-5.400	4.000	2.700	19.500	-14.580	-105.300		X-Coord	4.448		W2g	59.830	Uw	1.930	1.23
9	6	-1.800	4.300	2.400	22.000	-4.320	-39.600		Y-Coord	19.261		W2s	2.992	Kh	0.050	
10	7	-21.000	6.200	0.500	12.000	-10.500	-252.000		theta	0		0		Kv	0.000	
11	8	150.750	3.350	3.350	11.250	505.013	1695.938									
12	9	0.500	5.450	1.250	23.000	0.625	11.500									
13	Sigma	43.681				104.750	525.659									
14		X-Coord.		2.398		W1g	104.835		fai	36		0.628				
15		Y-Coord.		12.034		W1s	5.242		tseta	36		0.628	tseta '	0.314		
16						Uw	2.400		alpha	0		0.000				
17						Kh	0.050		Ka	0.241						
18									Ka'	0.264						
19	(3) Stability Analysis								theta 0	0.050						
20		V		H	X	Y	Mx	My								
21	W1g	104.835			2.398		251.400	0.000		D 29	3		6.424	12.848		
22	Pw1			-45.125		3.167	0.000	-142.896		x1 =	2.3			x2 =	6.04	
23	Pw2			45.125		3.167	0.000	142.896		Delta (x)=	0.2225107			Delta (x)=	0.4310218	
24	Pw3	8.000			0.500		4.000	0.000		y 1=	113			y2 =	123.8	
25	W2g	59.830			4.448		266.147	0.000		Delta (y)=	1.4834045			Delta (y)=	1.4367394	
26	Pe1			11.407		17.833	0.000	203.431		sin(a) =	0.1483405			sin(a) =	0.2873479	
27	U	-31.825			1.675		-53.307	0.000		cos(a) =	0.9889364			cos(a) =	0.9578263	
28	Sigma	140.840		11.407			468.240	203.431		X	Y	Mx	My	15.3	MA	Fa
29									1	2.3	2.5	4.38351972	31.764636	3.4327638	9.8953676	2.8826241
30									2	2.07749	3.9834045	3.959441481	50.612557	4.9161683	20.295398	4.1282961
31		Mx / My =		2.302	> 1.5				3	1.85498	5.4668091	3.535363241	69.460479	6.3995728	34.3911	5.3739681
32		(f*V)/H =		6.791	> 1.5				4	1.63247	6.9502136	3.111285001	88.308401	7.8829774	52.182473	6.6196401
33		f =		0.55					5	1.40996	8.4336181	2.687206762	107.15632	9.3663819	73.669516	7.8653121
34									6	1.18745	9.9170226	2.263128522	126.00424	10.849786	98.852231	9.110984
35	(a) Stability against Overturning								7	0.96494	11.400427	1.839050283	144.85217	12.333191	127.73062	10.356656
36	e = B/2 - SigmaM / SigmaV =				1.470	B/6 =	1.117		8	6.04	13.3	22.29874763	163.67182	13.816595	160.30467	11.602328
37									9	5.60898	14.736739	20.70748157	181.35256	15.3	196.5744	12.848
38	(b) Stability against Sliding								Toal			64.78522421	963.18319		773.89577	70.787808
39	C =	20		100					Ma =		773.89577					
40	B =	6.7	3.925						Mx / My =		6.1059374	> 1.5				
41	Fs = (f * SigmaV + C * A) / Sigma H =					13.672083	> 1.5		Fa =	70.788						
42									Va =	20.3407						
43									Ha =	67.8024						
44																
45									Fs = (f * SigmaV + C * A) / Sigma H =				19.615841	> 1.5		
46									q = V/B	24.0568	< 100					
47																

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Section E-E (Seismic)															
2	(1) Body Force								(2) Earth Presuure							
3	No.	A	X'	X	Y	Gx	Gy		No.	A	x'	x	Y	Gx	Gy	
4	1	-42.500	1.700	5.000	6.250	-212.500	-265.625		1	23.800	1.700	5.000	19.000	119.000	452.200	
5	2	-1.350	0.300	6.400	13.500	-8.640	-18.225		2	5.400	4.000	2.700	19.500	14.580	105.300	
6	3	-11.719	4.025	2.675	4.167	-31.348	-48.828		3	1.800	4.300	2.400	22.000	4.320	39.600	
7	4	-23.800	1.700	5.000	19.000	-119.000	-452.200		Sigma	31.000				137.900	597.100	
8	5	-5.400	4.000	2.700	19.500	-14.580	-105.300			X-Coord.		4.448	W2g	59.830	Uw	1.930
9	6	-1.800	4.300	2.400	22.000	-4.320	-39.600			Y-Coord.		19.261	W2s	2.992	Kh	0.050
10	7	-21.000	6.200	0.500	12.000	-10.500	-252.000			theta		0	0		Kv	0.000
11	8	150.750	3.350	3.350	11.250	505.013	1695.938									
12	9	0.500	5.450	1.250	23.000	0.625	11.500									
13	Sigma	43.681				104.750	525.659									
14		X-Coord.		2.398		W1g	104.835			fai		36	0.628			
15		Y-Coord.		12.034		W1s	5.242			tseta		36	0.628	tseta '	0.314	
16						Uw	2.400			alpha		0	0.000			
17						Kh	0.050			Ka		0.241				
18										Ka'		0.264				
19	(3) Stability Analysis									theta 0		0.050				
20		V		H	X	Y	Mx	My								
21	W1g	104.835			2.398		251.400	0.000		D 29		3	6.424	12.848		
22	W1s			5.242		12.034	0.000	63.079		x1 =		2.3		x2 =	6.04	
23	Pw1			-45.125		3.167	0.000	-142.896		Delta (x)=		0.2225107		Delta (x)=	0.4310218	
24	Pw2			45.125		3.167	0.000	142.896		y 1=		113		y2 =	123.8	
25	Pw3	8.000			0.500		4.000	0.000		Delta (y)=		1.4834045		Delta (y)=	1.4367394	
26	W2g	59.830			4.448		266.147	0.000		sin(a) =		0.1483405		sin(a) =	0.2873479	
27	W2s			2.992		19.261	0.000	57.620		cos(a) =		0.9889364		cos(a) =	0.9578263	
28	Pe1			12.469		17.833	0.000	222.357		x	Y	Mx	My	15.3	MA	Fa
29	U	-31.825			1.675		-53.307	0.000	1	2.3	2.5	4.3835197	31.764636	3.4327638	9.8953676	2.8826241
30	Sigma	140.840		20.702			468.240	343.057	2	2.07749	3.983404529	3.9594415	50.612557	4.9161683	20.295398	4.1282961
31									3	1.85498	5.466809059	3.5353632	69.460479	6.3995728	34.3911	5.3739681
32									4	1.63247	6.950213588	3.111285	88.308401	7.8829774	52.182473	6.6196401
33		Mx / My =		1.365	> 1.2				5	1.40996	8.433618117	2.6872068	107.15632	9.3663819	73.669516	7.8653121
34		(f*V)/H =		3.742	> 1.2				6	1.18745	9.917022647	2.2631285	126.00424	10.849786	98.852231	9.110984
35		f =		0.55					7	0.96494	11.40042718	1.8390503	144.85217	12.333191	127.73062	10.356656
36									8	6.04	13.3	22.298748	163.67182	13.816595	160.30467	11.602328
37	(a) Stability against Overturning								9	5.60898	14.73673943	20.707482	181.35256	15.3	196.5744	12.848
38	e = B/2 - SigmaM / SigmaV =				2.461	B/3 =	1.117		Toal			64.785224	963.18319		773.89577	70.787808
39									Ma = MX + MY =			773.89577				
40	(b) Stability against Sliding								Mx / My =			3.620788	> 1.2			
41	C =	20		150					Fa =	70.788						
42	B =	6.7	3.925						Va =	20.3407						
43	Fs = (f * SigmaV + C * A) / Sigma H =					7.5337084	> 1.2		Ha =	67.8024						
44									Fs = (f * SigmaV + C * A) / Sigma H =				10.808889	> 1.2		
45									q = V/B	24.0568	< 150					
46																

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Section E-E (Flood)															
2	(1) Body Force								(2) Earth Presuure							
3	No.	A	X'	X	Y	Gx	Gy		No.	A	x'	x	Y	Gx	Gy	
4	1	-42.500	1.700	5.000	6.250	-212.500	-265.625		1	23.800	1.700	5.000	19.500	119.000	464.100	
5	2	-1.350	0.300	6.400	13.500	-8.640	-18.225		2	5.400	4.000	2.700	20.000	14.580	108.000	
6	3	-11.719	4.025	2.675	4.167	-31.348	-48.828		3	1.800	4.300	2.400	22.500	4.320	40.500	
7	4	-23.800	1.700	5.000	19.000	-119.000	-452.200		Sigma	31.000				137.900	612.600	
8	5	-5.400	4.000	2.700	19.500	-14.580	-105.300			X-Coord.		4.448	W2g	59.830	Uw	1.930
9	6	-1.800	4.300	2.400	22.000	-4.320	-39.600			Y-Coord.		19.761	W2s	2.992	Kh	0.050
10	7	-21.000	6.200	0.500	12.000	-10.500	-252.000			theta		0	0		Kv	0.000
11	8	150.750	3.350	3.350	11.250	505.013	1695.938									
12	9	0.500	5.450	1.250	23.000	0.625	11.500									
13	Sigma	43.681				104.750	525.659									
14		X-Coord.	2.398			W1g	104.835			fai		36	0.628			
15		Y-Coord.	12.034			W1s	5.242			tseta		36	0.628	tseta '	0.314	
16						Uw	2.400			alpha		0	0.000			
17						Kh	0.050			Ka		0.241				
18										Ka'		0.264				
19	(3) Stability Analysis									theta 0		0.050				
20		V	H		X	Y	Mx	My								
21	W1g	104.835			2.398		251.400	0.000		D29		3	6.424	12.848		
22	Pw1		-45.125			3.167	0.000	-142.896		x1 =		2.3		x2 =	6.04	0.66
23	Pw2		120.125	FWL=126		7.167	0.000	860.896		Delta (x)=		0.2225107		Delta (x)=	0.4310218	0.4310218
24	Pw3	8.000			0.500		4.000	0.000		y 1=		113		y2 =	123.8	123.8
25	W2g	59.830			4.448		266.147	0.000		Delta (y)=		1.4834045		Delta (y)=	1.4367394	1.4367394
26	Pe1		11.407			17.833	0.000	203.431		sin(a) =		0.1483405		sin(a) =	0.2873479	0.2873479
27	U1	0.000		FWL=126	4.313		0.000	0.000		cos(a) =		0.9889364		cos(a) =	0.9578263	0.9578263
28	U2	-18.288			0.963		-17.602	0.000		X	Y	Mx	My	15.3	MA	Fa
29	U3	-37.006		FWL=126	3.517		-130.139	0.000	1	2.3	2.5	4.3835197	31.764636	3.4327638	9.8953676	2.8826241
30	U4	-5.775		FWL=126	1.283		-7.411	0.000	2	2.07749	3.983404529	3.9594415	50.612557	4.9161683	20.295398	4.1282961
31	Sigma	111.596	86.407				366.395	921.431	3	1.85498	5.466809059	3.5353632	69.460479	6.3995728	34.3911	5.3739681
32									4	1.63247	6.950213588	3.111285	88.308401	7.8829774	52.182473	6.6196401
33									5	1.40996	8.433618117	2.6672068	107.15632	9.3663819	73.669516	7.8653121
34		Mx / My =	0.398		> 1.2				6	1.18745	9.917022647	2.2631285	126.00424	10.849786	98.852231	9.110984
35		(f*V)/H =	0.710		> 1.2				7	0.96494	11.40042718	1.8390503	144.85217	12.333191	127.73062	10.356656
36		f =	0.55						8	6.04	13.3	22.298748	163.67182	13.816595	160.30467	11.602328
37									9	5.60898	14.73673943	20.707482	181.35256	15.3	196.5744	12.848
38	(a) Stability against Overturning								Toal			64.785224	963.18319		773.89577	70.787808
39	e = B/2 - SigmaM / SigmaV =				8.324	<= B/3	1.117		Ma =			773.89577				
40									Mx / My =			1.2375219	> 1.2			
41	(b) Stability against Sliding								Fa =	70.788						
42	C =	20	150						Va =	20.3407						
43	B =	6.7	3.925						Ha =	67.8024						
44	Fs = (f * SigmaV + C * A) / Sigma H =					1.6188202	> 1.2									
45									Fs = (f * SigmaV + C * A) / Sigma H =				2.4035039	> 1.2		
46	(c) Stability against Bearing								q =	19.6921	< 150					
47	Q1 = SigmaV/B*(1+6*e/B) =				140.811	<	150									
48	Q2 = SigmaV/B*(1-6*e/B) =				-107.498	<	150									

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Section I-I (Normal Condition)														
2	(1) Body Force							(2) Earth Presuure							
3	No.	A	X	Y	Gx	Gy		No.	A	X	Y	Gx	Gy		
4	1	-14.500	0.500	8.250	-7.250	-119.625		1	2.600	4.400	5.667	11.440	14.733		
5	2	-0.100	0.333	15.567	-0.033	-1.557		2	8.800	5.900	5.000	51.920	44.000		
6	3	-18.150	3.700	10.333	-67.155	-187.550		Sigma	11.400			63.360	58.733		
7	4	-6.600	3.150	15.000	-20.790	-99.000			X-Coord.	5.558	W2g	22.002	Uw	1.930	1.23
8	5	-28.600	5.900	9.500	-168.740	-271.700			Y-Coord.	5.152	W2s	1.100	Kh	0.050	
9	6	112.000	3.500	8.000	392.000	896.000			theta	0	0		Kv	0.000	
10	Sigma	44.050			128.032	216.568			fai	36	0.628				
11		X-Coord.	2.907		W1g	105.720			tseta	36	0.628	tseta '	0.314		
12		Y-Coord.	4.916		W1s	5.286			alpha	0	0.000				
13					Uw	2.400			Ka	0.241					
14					Kh	0.050			Ka'	0.264					
15									theta 0	0.050					
16	(3) Stability Analysis														
17		V	H	X	Y	Mx	My								
18	W1g	105.720		2.907		307.276	0.000								
19	Pw1		2.000		0.667	0.000	1.333								
20	W2g	22.002		5.558		122.285	0.000								
21	Pe1		5.820		3.667	0.000	21.340								
22	Pe2		1.484		1.000	0.000	1.484								
23	Pe3		0.593		0.667	0.000	0.396								
24	U	-7.000		3.500		-24.500	0.000								
25	Sigma	120.722	9.897			405.061	24.553								
26															
27															
28		Mx / My =	16.497	> 1.5											
29		(f*V)/H =	6.709	> 1.5											
30		f =	0.55												
31															
32	(a) Stability against Overturning														
33	e = B/2 - SigmaM / SigmaV =		0.348	B/6 =		1.167									
34															
35	(b) Stability against Sliding														
36	C =	20	100												
37	B =	7													
38	Fs = (f * SigmaV + C * A) / Sigma H =		20.854093	> 1.5											
39															
40	(c) Stability against Bearing														
41	q = V/B	17.246	<	100											
42															

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Section I-I (Seismic Condition)														
2	(1) Body Force								(2) Earth Presuure						
3	No.	A	X	Y	Gx	Gy		No.	A	X	Y	Gx	Gy		
4	1	-14.500	0.500	8.250	-7.250	-119.625		1	2.600	4.400	5.667	11.440	14.733		
5	2	-0.100	0.333	15.567	-0.033	-1.557		2	8.800	5.900	5.000	51.920	44.000		
6	3	-18.150	3.700	10.333	-67.155	-187.550		Sigma	11.400			63.360	58.733		
7	4	-6.600	3.150	15.000	-20.790	-99.000			X-Coord.	5.558	W2g	22.002	Uw	1.930	1.23
8	5	-28.600	5.900	9.500	-168.740	-271.700			Y-Coord.	5.152	W2s	1.100	Kh	0.050	
9	6	112.000	3.500	8.000	392.000	896.000			theta	0	0		Kv	0.000	
10	Sigma	44.050			128.032	216.568			fai	36	0.628				
11		X-Coord.	2.907		W1g	105.720			tseta	36	0.628	tseta '	0.314		
12		Y-Coord.	4.916		W1s	5.286			alpha	0	0.000				
13					Uw	2.400			Ka	0.241					
14					Kh	0.050			Ka'	0.264					
15									theta 0	0.050					
16	(3) Stability Analysis														
17		V	H	X	Y	Mx	My								
18	W1g	105.720		2.907		307.276	0.000								
19	W1s		5.286		4.916		25.988								
20	Pw1		2.000		0.667	0.000	1.333								
21	W2g	22.002		5.558		122.285	0.000								
22	W2s		1.100		5.152		5.668								
23	Pe1		6.362		3.667	0.000	23.326								
24	Pe2		1.622		1.000	0.000	1.622								
25	Pe3		0.649		0.667	0.000	0.432								
26	U	-7.000		3.500		-24.500	0.000								
27	Sigma	120.722	17.018			405.061	58.369								
28		Mx / My =	6.940	> 1.2											
29		(f*V)/H =	3.902	> 1.2											
30		f =	0.55												
31															
32	(a) Stability against Overturning														
33	e = B/2 - SigmaM / SigmaV =		0.628	B/3 =		2.333									
34															
35	(b) Stability against Sliding														
36	C =	20	150												
37	B =	7													
38	Fs = (f * SigmaV + C * A) / Sigma H =			12.128141	> 1.2										
39															
40	(c) Stability against Bearing														
41	q = V/B	17.246	<	150											
42	B =	7													

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Section I-I (Flood Condition)														
2	(1) Body Force								(2) Earth Presuure						
3	No.	A	X	Y	Gx	Gy		No.	A	X	Y	Gx	Gy		
4	1	-14.500	0.500	8.250	-7.250	-119.625		1	2.600	4.400	5.667	11.440	14.733		
5	2	-0.100	0.333	15.567	-0.033	-1.557		2	8.800	5.900	5.000	51.920	44.000		
6	3	-18.150	3.700	10.333	-67.155	-187.550		Sigma	11.400			63.360	58.733		
7	4	-6.600	3.150	15.000	-20.790	-99.000			X-Coord.	5.558	W2g	22.002	Uw	1.930	1.23
8	5	-28.600	5.900	9.500	-168.740	-271.700			Y-Coord.	5.152	W2s	1.100	Kh	0.050	
9	6	112.000	3.500	8.000	392.000	896.000			theta	0	0		Kv	0.000	
10	Sigma	44.050			128.032	216.568			fai	36	0.628				
11		X-Coord.	2.907		W1g	105.720			tseta	36	0.628	tseta '	0.314	0	
12		Y-Coord.	4.916		W1s	5.286			alpha	0	0.000				
13					Uw	2.400			Ka	0.241					
14					Kh	0.050			Ka'	0.264					
15									theta 0	0.050					
16	(3) Stability Analysis								Kp	3.852					
17		V	H	X	Y	Mx	My								
18	W1g	105.720		2.907		307.276	0.000								
19	Pw1		60.500		3.667	0.000	221.833								
20	Pw2	13.000		0.500		6.500									
21	Pw3		-98.000		4.667		-457.333								
22	W2g	22.002		5.558		122.285	0.000								
23	Pe1		116.075		2.333	0.000	270.842								
24	Pe2		0.000		0.000	0.000	0.000								
25	Pe3		0.000		0.000	0.000	0.000								
26	U1	-77.000		3.500		-269.500	0.000								
27	U2	-10.500		2.333		-24.500	0.000								
28	Sigma	53.222	78.575			142.061	35.342								
29															
30															
31		Mx / My =	4.020	> 1.2											
32		(f*V)/H =	0.373	> 1.2											
33		f =	0.55												
34															
35	(a) Stability against Overturning														
36	e = B/2 - SigmaM / SigmaV =		1.495	B/3 =	2.333										
37															
38	(b) Stability against Sliding														
39	C =	20	150												
40	B =	7													
41	Fs = (f * SigmaV + C * A) / Sigma H =				2.1542705	> 1.2									
42															
43	(c) Stability against Bearing														
44	q = V/B	7.603143	<	150											
45	B =	7													

PART IV STRUCTURAL CALCULATION

PART IV. STRUCTURAL CALCULATION

4.1 Spillway

4.1.1 Stability Analysis

4.1.1.1 General

The spillway is a side channel type with an open chuteway, having dimensions of about 30 m in width, about 364 m in length and 75 m in height.

The spillway is composed of the following components:

(i) Side channel
(ii) Chuteway
(iii) Stilling basin (Energy dissipator)

These structures are the reinforced concrete structure with anchor bars.

This section examines the stability of those structures hereunder.

4.1.1.2 Design Value

The design values for examining the stability of the structures are determined on the basin of the field test results and/or the design standards and are summarized as follows:

(1) Unit weight

Material		Unit Weight (t/m^3)
Concrete		2.40
Water		1.00
Backfill material	(wet	1.93
	(submerged)	1.23
Impervious core for dam embankment	(wet)	1.72
	(submerged)	0.80
Rock and riprap for dam embankment	(wet)	2.13
	(submerged)	1.37

(2) Internal friction angle (ϕ) and cohesion (C)

Material	ϕ (deg)	C (t/m^2)
Backfill material (Free Draining)	36	0
Foundation rock	50	100
Impervious core for dam embankment	30	0
Rock and riprap for dam embankment	40	0

(3) Friction coefficient with concrete

Material	Coefficient
Concrete to concrete	0.65
Concrete to rock	0.55

(4) Modulus of elasticity (E) and Poisson's ratio (P)

Material		E (kg/cm^2)	P
Reinforced concrete	(SIG28 = 180 kg/cm^2)	2.4×10^5	0.2
	(SIG28 = 210 kg/cm^2)	2.55×10^5	0.2
Steel	(reinforcement bar)	2.1×10^6	0.3

Note: 1) SIG28 means compressive strength at the age of 28 days.
2) Reinforced concrete of SIG28 = 210 kg/cm^2 is applied only to spillway bridge.

(5) Seismic coefficient

Horizontal component	Kh	0.05
Vertical component	Kv	0

(6) Allowable stress

(A) Reinforced concrete

SIG28 (kg/cm^2)	Allowable stress (kg/cm^2)				
	Compression	Tension	Shearing*	Bond	Bearing
180	60	-	4, 8	14	54
210	70	-	4.25, 8.5	16	63

* The first value is for beam and second for slab.

(B) Steel (reinforcement bar)

Tensile stress (ultimate) 3,000 kg/cm^2

(C) Foundation rock

Bearing stress 100 t/m^2

4.1.1.3 Design Criteria

Design criteria for stability analyses of the spillway structure follow the standards for retaining walls and are summarized below:

(1) Body force

Dead load is a self weight of structure including weight of earth, water and others are as formulated below.

$$W = U_W \cdot V \text{ (or } Uw \cdot A)$$

where, W : dead load (t)

U_W : unit weight (t)

V : volume (in case of 3-dimensional calculation)

A : area (in case of 2-dimensional calculation)

Seismic force originated in self weight above is calculated by the following formula.

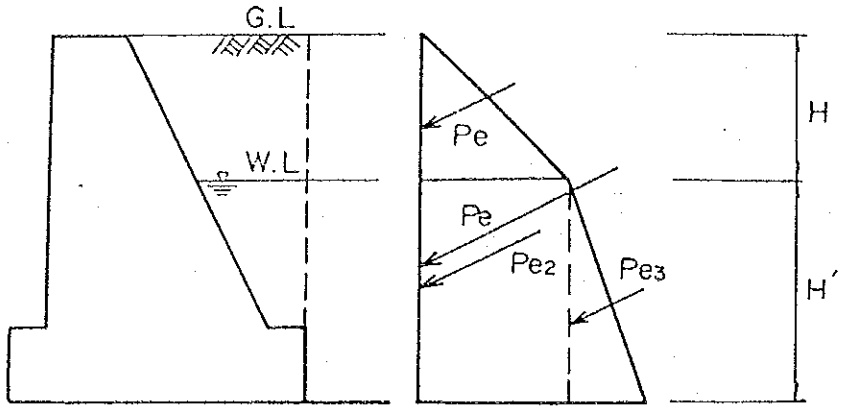
$$Ws = Kh \cdot W$$

where, Ws : seismic force (t)

Kh : seismic coefficient

(2) Earth pressure

Earth pressure acting on the structures is given as follows:



$$Pe = Pe_1 + Pe_2 + Pe_3$$
$$= \frac{1}{2} K\gamma_{wet} H2 + K\gamma_{sub} HH' + \frac{1}{2} K\gamma_{sub} H'2$$

where, Pe : earth pressure (t)
K : coefficient of earth pressure
γ_{wet} : unit weight of earth in wet condition (t/m^3)
γ_{sub} : unit weight of earth in submerged condition (t/m^3)
H : height from ground level to water level (m)
H' : height below water level (m)

Coefficient of Coulomb's active earth pressure shown below is applied for the load of structural calculation.

- under normal condition

$$ka = \frac{\cos^2(\phi - \theta)}{\cos^2\theta \cdot \cos(\theta + \delta) \cdot \left(1 + \sqrt{\frac{\sin(\phi + \delta) \cdot \sin(\phi - \alpha)}{\cos(\theta + \delta) \cdot \cos(\theta - \alpha)}}\right)^2}$$

where, q : inclination of the back with the vertical
f : internal friction angle of backfill material
d : angle of wall friction between the back and backfill material
a : surface slope of back fill with the horizontal

- under seismic condition

$$kae = \frac{\cos^2(\phi - \theta o - \theta)}{\cos\theta o \cdot \cos^2\theta \cdot \cos(\delta + \theta + \theta o) \cdot \left(1 + \sqrt{\frac{\sin(\phi + \delta) \cdot \sin(\phi - \alpha - \theta o)}{\cos(\delta + \theta + \theta o) \cdot \cos(\theta - \alpha)}}\right)^2}$$

where, θo : combined angle = $\tan^{-1} Kh/(1-Kv)$

Kh : horizontal component of seismic coefficient

Kv : vertical component of seismic coefficient

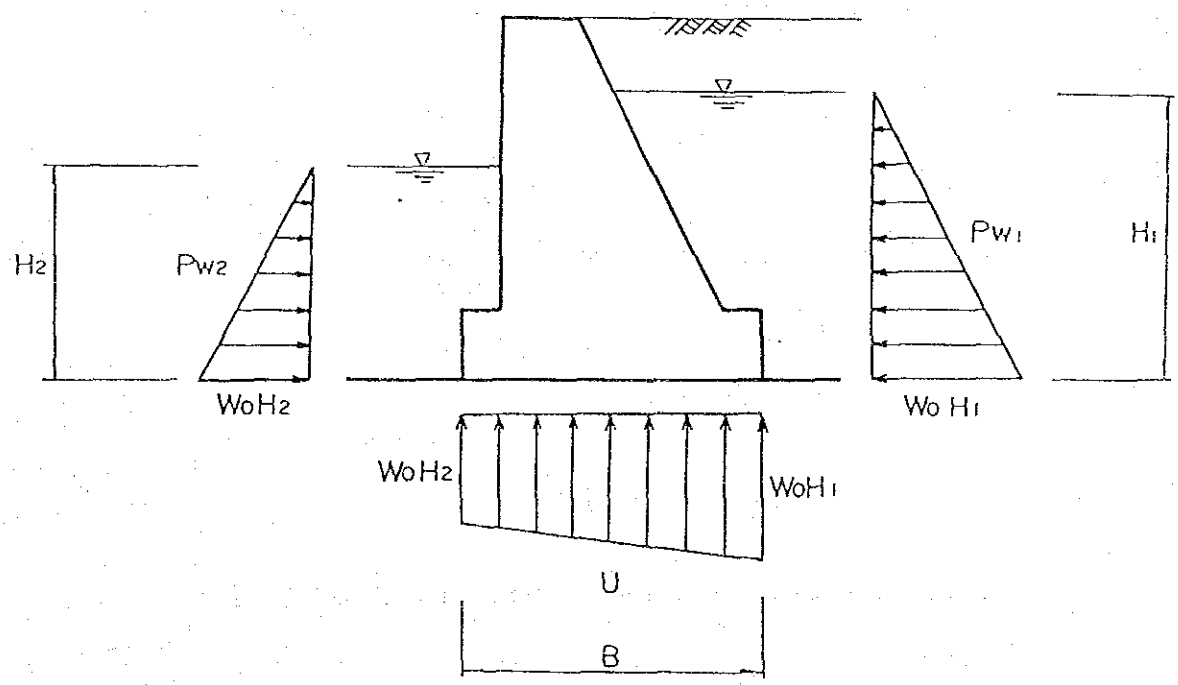
θ, ϕ, δ and α: above-mentioned

The following values are adopted for wall friction angle (d) in accordance with conditions:

Condition	δ
Stability calculation (earth to earth), normal	ϕ
Stability calculation (earth to earth), seismic	$\phi/2$
Stress calculation (earth to concrete), normal	$\phi/3$
Stress calculation (earth to concrete), seismic	0

(3) Hydraulic pressure

Hydraulic pressures act on the structure are as follows:



Static water pressure $P_{w1} = \frac{1}{2} Wo\ H_1^2$

$P_{w2} = \frac{1}{2} Wo\ H_2^2$

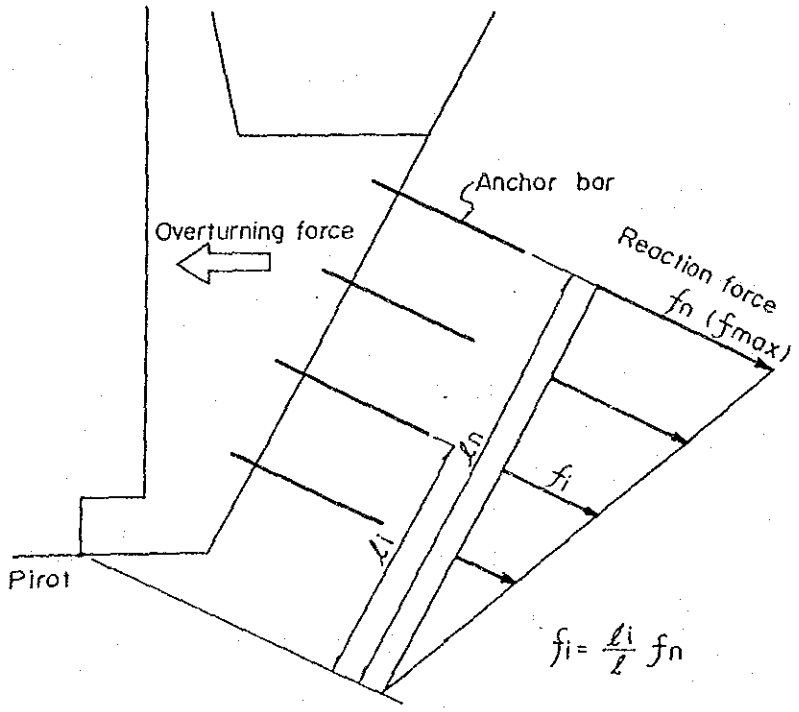
where, Pw1, Pw2 : Static water pressure (t)

U : uplift pressure (t)

Wo : unit weight of water (t/m^3)

(4) Resisting force of anchor bar

As a concrete structure is assumed to be rigid, the reaction force to be caused in a series of anchor bars is proportional to the distance from overturning pivot as follows:



The expective maximum resisting force in the uppermost anchor bar is

$$f_{max} = \sigma_{su} \cdot As$$

where, f_{max} : maximum resisting force (kg)

σ_{su} : tensile stress (ultimate) of steel bar (kg/cm^2)

As : sectional area of steel bar (cm^2)

Anchor bar	σ_{su} (kg/cm^2)	As (cm^2)	fmax (t)
D25	3,000	5.067	15.201
D29	3,000	6.424	19.272
D32	3,000	7.942	23.826

Total resisting moment is calculated by the following equation.

$$M_{ra} = \sum_{i=1}^{n} fi \cdot li = \sum_{i=1}^{n} \frac{fn}{ln} \cdot li^2$$

where, M_{ra} : total resisting moment of anchor bars (t.m)
fi : resisting force of each anchor bar (t)
li : distance from overturning pivot to anchor bar (m)
fn : resisting force of uppermost anchor bar (t)
ln : distance from overturning pivot to uppermost anchor bar (m)
n : numbers of anchor bars

(5) Stability calculation

(A) Stability against sliding

Stability against sliding is judged by the safety factor calculated below.

$$Fs = \frac{f\Sigma V = \tau A + Ha}{\Sigma H}$$

where, Fs : safety factor for sliding
ΣV : sum of vertical forces (t)
ΣH : sum of horizontal forces (t)
τ : shearing strength (= 20 t/m2 from result of soil test)
A : area of horizontal base (m2)
Ha : Resisting force of anchor bar (t) (Horizontal component)

(B) Stability against overturning

Stability against overturning is examined by the following equation.

$$Fs = \frac{\Sigma Mr}{\Sigma Mt}$$

where, Fs : safety factor for overturning
ΣMr : sum of resisting moment (t.m)
ΣMt : sum of overturning moment (t.m)

(C) Stability against bearing capacity of foundation

Bearing stress of foundation is calculated as below:

$$q = \frac{\Sigma V}{B} < qa$$

where, q : maximum bearing stress of foundation (t/m^2)
qa : allowable bearing stress of foundation (t/m^2)
ΣV : sum of vertical force (t)
B : projected base (m)

(D) Safety factor requirement

Condition of stability	Loading condition	
	Normal	Extreme*
Safety factor for sliding	1.5	1.2
Safety factor for overturning (for retaining wall of reinforced type)	1.5	1.2

* Flood or seismic conditions

4.1.1.4 Analysis

(1) Analysis for Side Walls

Stability analyses for the side walls of the side channel, transition portion, chuteway and stilling basin are made in Table 4.1.1 to Table 4.1.12.

Cases and loading conditions of the stability analyses are summarized as follows (As for section name, reference is made to figures of spillway structure design):

Section of Wall	Loading Case No.	Conditions of Loading
(a) Side Channel: (Section C-C)	Case I	- Normal condition
		- It is assumed that water from the reservoir comes to the back side of the wall under the condition of side channel empty.
		- Water pressure above HWL of the reservoir is considered to be released through drain system.
	Case II	- Seismic condition
		- This case considers that under the condition of Case I above.
(b) Transition portion (Section G-G)	Case I	- Normal condition
		- This case also assumes that water pressure from the reservoir acts to the back side of the wall.
	Case II	- Seismic condition
		- The case considers the seismic force acts to the wall under the condition of Case I above.
(c) Chuteway: (Section A-A)	Case I	- Normal condition
		- The case does not consider any water pressure from back side of the wall since water will be drained by the drain system provided in the back side of the wall.
	Case II	- Seismic condition
		- Seismic force is loaded under the above Case I.
(d) Stilling basin: (Section E-E)	Case I	- Normal condition
		- Water levels are considered to be balanced at EL. 120.0 m between the stilling basin side and back side of the wall.

		Case II	- Seismic condition
			- Seismic force is loaded under the above Case I.
		Case III	- Flood condition
			- Water level in the stilling basin side is set at EL. 120.0 m. (Hydraulic model test indicates the water level in the stilling basin does not lower below EL. 120.0 m at flooding time)
			- Water level in back side of the wall is set at EL. 126.0 m which is the uppermost level in the back side of the wall at flooding time. Water above EL. 126.0 m will be drained through weep holes.
(e)	Stilling basin (Section I-I)	Case I	- Normal condition
			- No water pressure in the stilling basin side is assumed with earth and water pressure in back side of the wall.
		Case II	- Seismic condition
			- Seismic force is loaded under the above Case I.
		Case III	- Flood condition
			- FWL EL. 132.0 m up to which water level will rise is assumed in the stilling basin side.

(2) Examination on Length of Anchor Bar in Side Walls

Anchor bars are required to be examined on the shearing strength around bore hole and on the bond strength between anchor bar and mortar.
Then, necessary length to withstand the acting force has to be provided for the anchor bar.

Assuming the bore hole diameter of 64 mm and reinforcement bar diameter of D29 mm, the necessary length of anchor bar is examined as follows :

$F_1 = \pi \cdot D_1 \cdot \tau_1 \cdot l = 3.14 \times 6.4 \times 2 \times 100 = 4{,}019$ kg/m

$F_2 = \pi \cdot D_2 \cdot \tau_2 \cdot l = 3.14 \times 2.9 \times 14 \times 100 = 12{,}748$ kg/m

where, F_1 : shearing strength around bore hole for anchor bar per meter (kg/m)

F_2 : bond strength between anchor bar and mortar for anchor bar per meter (kg/m)

D_1 : diameter of bore hole (cm)

D_2 : diameter of anchor bar (cm)

τ_1 : shearing strength around bore hole (2 kg/cm^2 for highly weathered rock)

τ_2 : bond strength between anchor bar and mortar (14 kg/cm^2), and

l : length of anchor bar (100 cm)

As seen above, the shearing strength around bore hole is much less than the bond strength between anchor bar and mortar. Thus, the necessary length of anchor bar is determined on the basis of the shearing strength around bore hole.

The necessary length of anchor bar is calculated by the following equation :

$$l = l_0 + F_{max} / (\pi \cdot D_1 \cdot \tau_1)$$

where, l : necessary length of anchor bar (m),

F : maximum tensile force of anchor bar (kg),

D_1 : diameter of bore hole (64×10^{-3} m),

τ_1 : shearing strength around bore hole (2×10^4 kg/m^2), and

l_0 : loose depth of rock due to excavation work (0.5m)

The necessary length of anchor bar will be as follows :

For D29 anchor bar :

$$l = 0.5 + 19.272 \times 10^3 / (3.14 \times 64 \times 10^{-3} \times 2 \times 10^4)$$
$$= 5.295 \text{ (m)}$$

For D25 anchor bar :

$$l = 0.5 + 15.201 \times 10^3 / (3.14 \times 64 \times 10^{-3} \times 2 \times 10^4)$$
$$= 4.282 \text{ (m)}$$

(3) Examination on Anchor Bar in Side Channel Slab

The side channel slab will be subject to uplift pressure under the condition of side channel empty, requiring anchor bars to withstand the uplift pressure. The anchor bars of D29 will be provided under the slab at 1.0 m interval.

Tensile force acting to anchor bar, tensile stress of anchor bar and necessary length of anchor bar after the flood (P.M.F) are examined as follows :

Tensile force acting to one anchor bar :

Body force : $W = 1.0m \times 1.0m \times 1.5m \times 2.4t/m^3 = 3.6\ t$

Uplift : $U = (193.5 - 176.0)t/m^2 \times 1.0m \times 1.0m = 17.5\ t$

Acting Force : $F = U - W = 17.5 - 3.6 = 13.9\ t$

Tensile stress of anchor bar :

$\sigma_S = F/As = 13,900\ kg/\ 6.602\ cm^2 = 2,105\ kg/cm^2$

$F_S = 3,000 / 2,105 = 1.43 > 1.2$

Necessary length of anchor bar :

The shearing strength around bore hole determines the necessary length of anchor bar as follows :

$l = lo + F / (\pi \cdot D_1 \cdot \tau_1)$

$= 0.5 + 13,900 / (3.14 \times 64 \times 10^{-3} \times 2 \times 10^4)$

$= 3.96\ m$

(4) Examination on Anchor Bar in Stilling Basin Slab

The stilling basin slab will be subject to the remaining uplift pressure after floods. Hence, anchor bars are provided to withstand the above uplift pressure. D32 anchor bars will be provided at 1.5m interval. Tensile force acting to the anchor bar, its tensile stress and necessary length of the anchor bar are examined below :

Tensile force acting to one anchor bar :

The loading condition considers the following case that is, the water level in the stilling basin will rise up to EL.132.0m during the flood (P.M.F). The water level will lower down to EL.120.0m (the top elevation of end sill) after the flood. However, the uplift pressure of EL. 132.0m will remain under the stilling basin slab.

Thus,

Body force : $W = (2.4 \times 1.5 + 1.0 \times 8.0) \times 2.25 = 26.10\ t$

Uplift : $U = (132 - 112) \times 2.25 = 45.0\ t$

Acting Force : $F = U - W = 45.0 - 26.10 = 18.9\ t$

Tensile stress of anchor bar :

$\sigma_S = F / As = 18{,}900kg / 8.038\ cm^2 = 2{,}351\ kg/cm^2$

$F_S = 3{,}000 / 2{,}351 = 1.28 > 1.2$

Necessary length of anchor bar :

The shearing strength around bore hole is the factor to determine the necessary length of anchor bar which is calculated as follows :

$$l = lo + F / (\pi \cdot D_1 \cdot \tau_1)$$
$$= 0.5 + 18{,}900 / (3.14 \times 64 \times 10^{-3} \times 2 \times 10^4)$$
$$= 4.7\ m$$

(5) Analysis for Overflow Weir

The stability analysis for the spillway overflow weir is made in Table 4.1.13 to Table 4.1.15.

The analysis is made for the following three (3) loading condition :

(i) Normal condition :
This case assumes that the reservoir water level is at H.W.L EL.189.0 m and that the base of the weir is subject to the full uplift pressure of 5.5 m (EL.189.0 - EL. 183.5).

(ii) Seismic condition :
In this case, the seismic force acts to the weir under the above normal condition.

(iii) After the flood (P.M.F) :
This case assumes that the base of the weir is subject to the remaining uplift pressure of 10.0 m (EL.193.5 - EL.183.5) after the flood (P.M.F).

As seen in the analyses, anchor bars will be required to withstand the loading condition after the flood (P.M.F). D29 anchor bars will be provided at 2.0 m interval. Necessary length of anchor bar which is determined by the shearing strength around bore hole is $l = 5.295$ m (= 5.5m).

4.1.2 Stress Analysis of Reinforced Concrete

Reinforced concrete stress analyses for the spillway side walls are made in Table 4.1.16 to Table 4.1.20, based on bending moments, shear forces and axial forces acting to the walls, of which calculations are given in the Data Book.