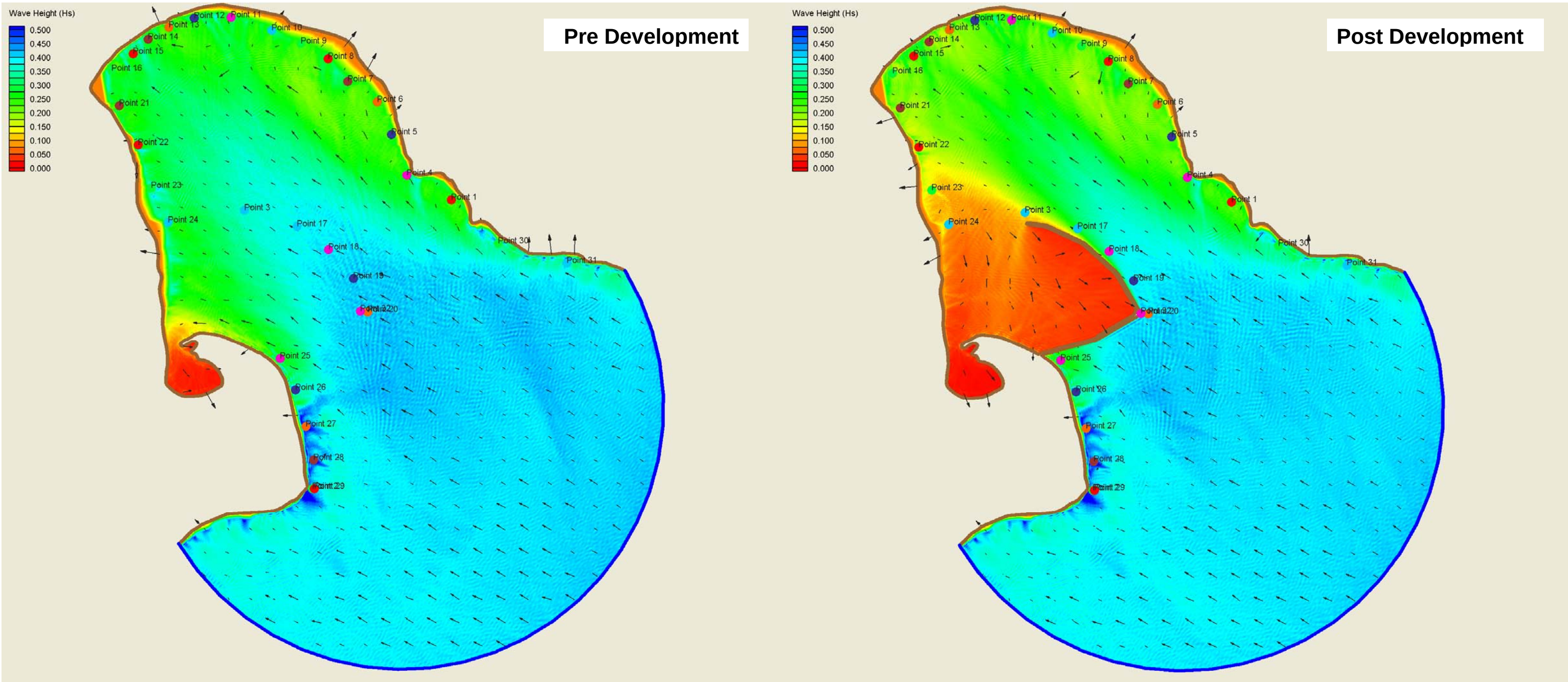


FIGURE 17



FIGURE 18



CGWAVE MODEL OUTPUT
(pre and post development)
 $H_s = 0.4\text{m}$ $T_p = 3.5\text{s}$ $W_D = 135^\circ$

Reflected Wave Height Comparison (Pre and Post Marina Development)

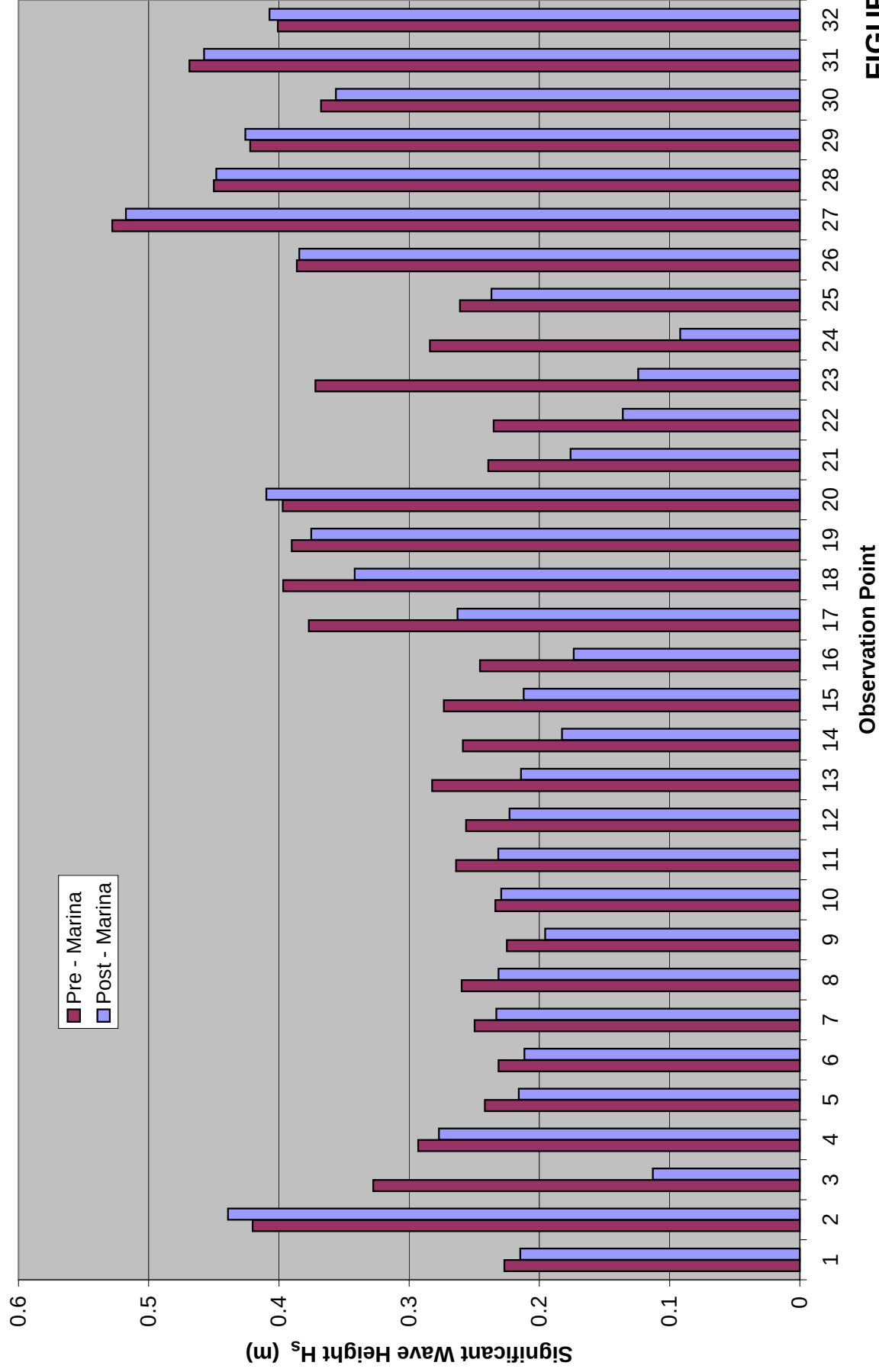
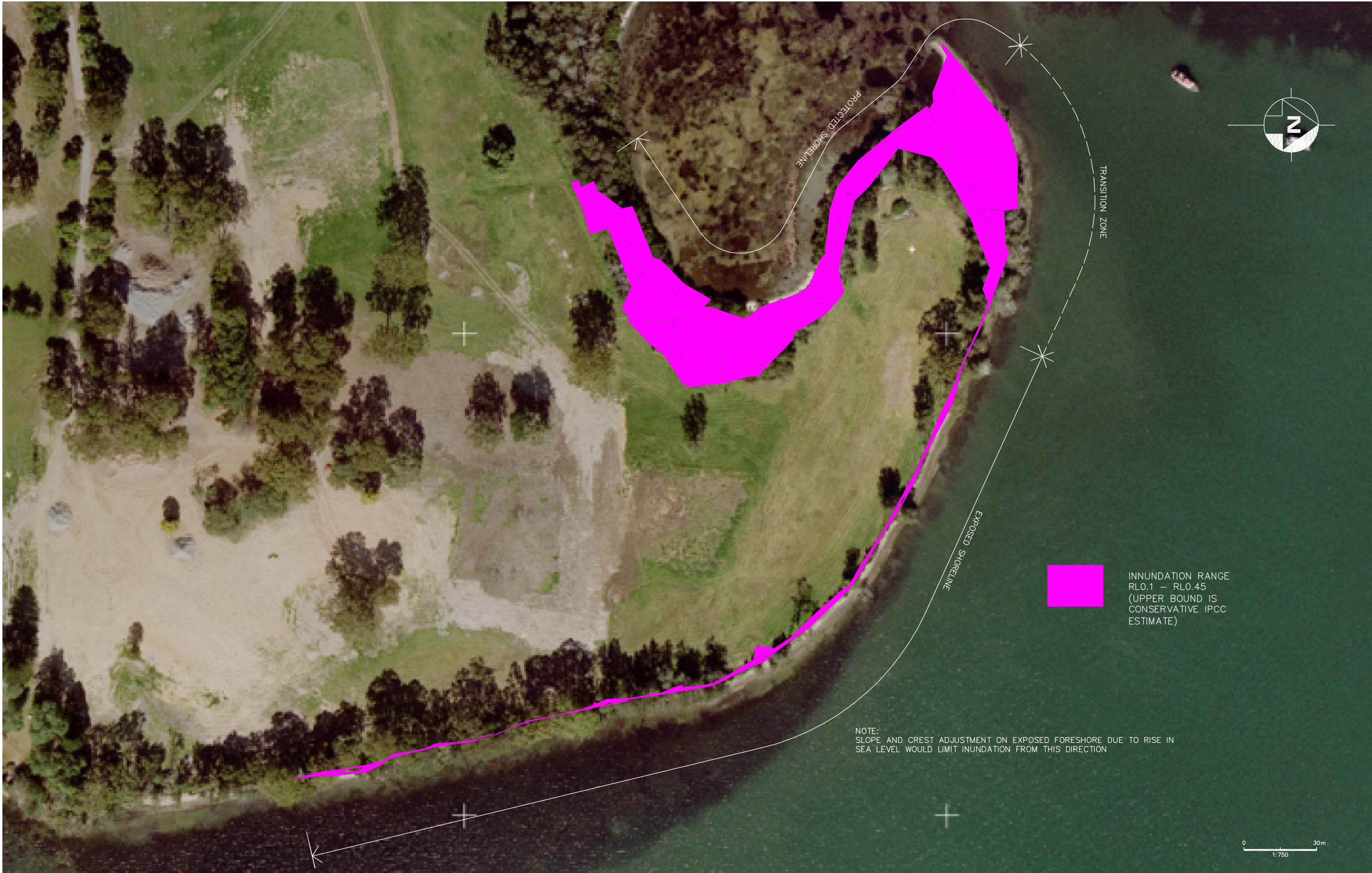


FIGURE 19

FIGURE 20



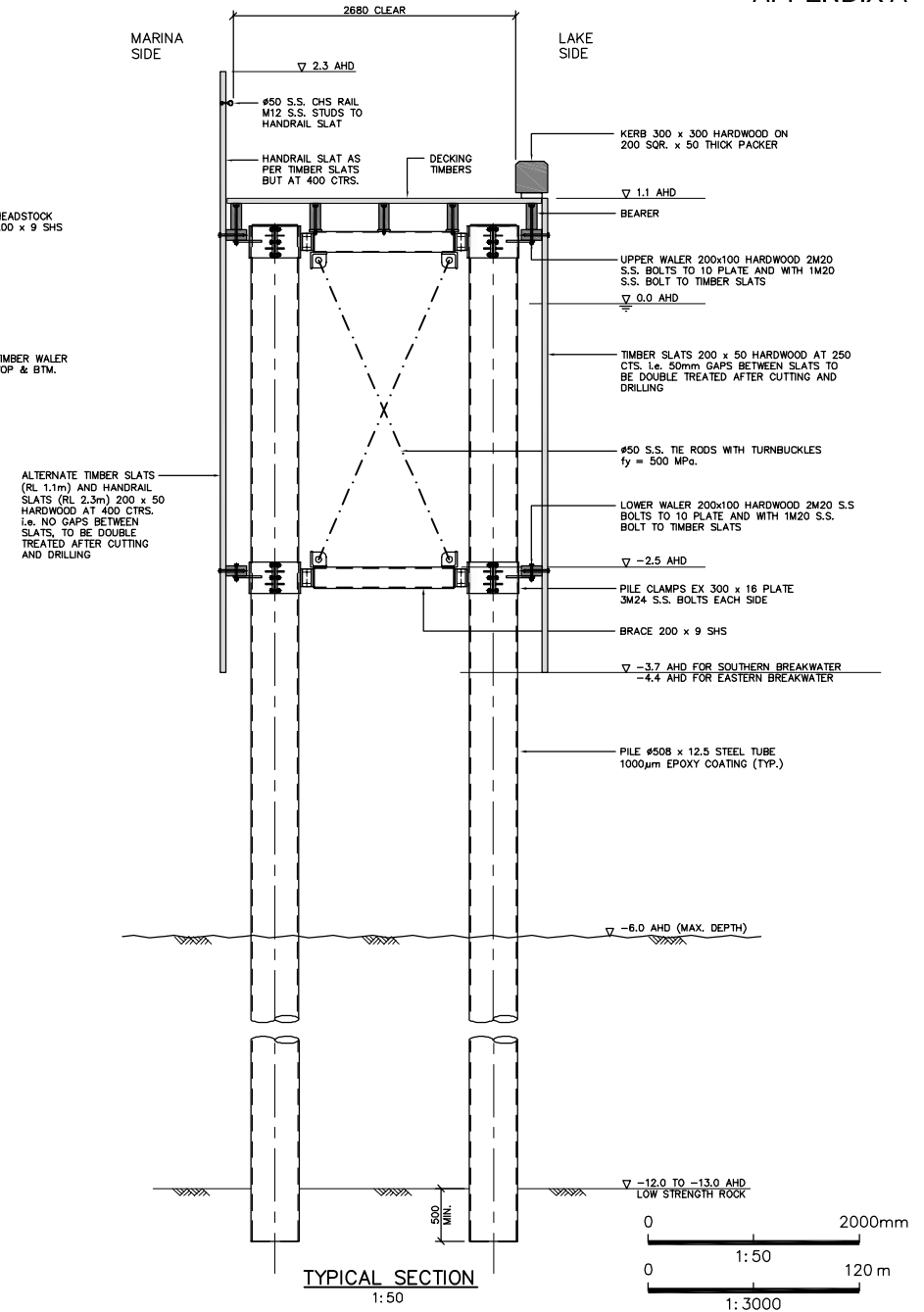
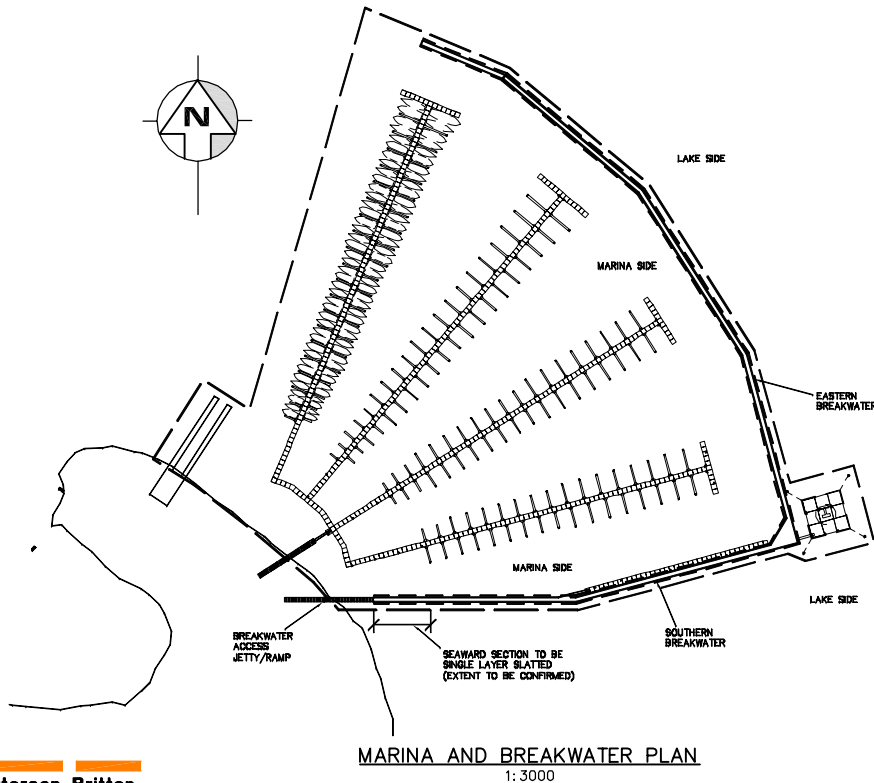
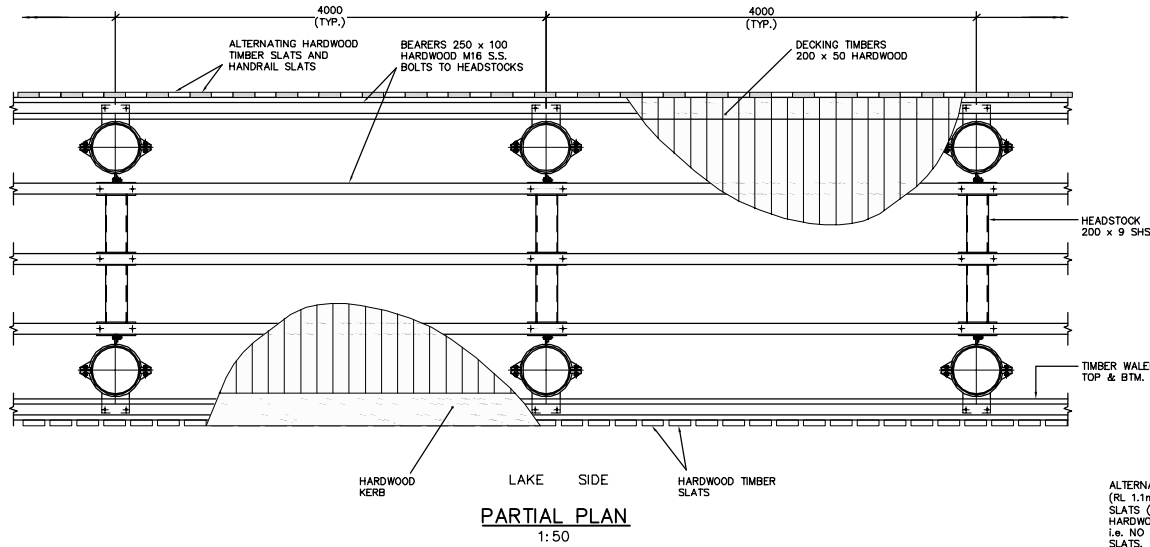
"GREENHOUSE EFFECT"
INNUNDATION FOR EXISTING LEVELS
50 YEAR SCENARIO
MEAN LAKE LEVEL RANGE

FIGURE 21



"GREENHOUSE EFFECT"
INNUNDATION FOR EXISTING LEVELS
100 YEAR SCENARIO
MEAN LAKE LEVEL RANGE

APPENDIX A - BREAKWATER CONCEPT DESIGN



APPENDIX B - EXAMPLE WAVE HEIGHT/DIRECTION JOINT PROBABILITY MATRIX

Point 2

[illegible]

APPENDIX C – MARINA FLUSHING RATE CALCULATIONS

Marina Flushing Assessment
Low Diffusion

harbour volume 400000 m3
Tracer Conc start 10 mg/L
Tracer Conc (Harbour) 1 mg/L

Timestep Increment 1 hr

Diffusion Parameters

	width (m)	Length (m)	Coeff (m2/s)
Breakwater	665	30	0.005
Open Water	250	150	0.1

Estimated Daily Flushing Rate

5.3 %

time	mass of tracer	conc of tracer	Breakwater	Flux Open Water	Total Flux
hr	g	mg/l	g/TS	g/TS	g/TS
0	4000.0	10.00	3.6	5.4	9.0
1	3991.0	9.98	3.6	5.4	9.0
2	3982.0	9.96	3.6	5.4	8.9
3	3973.1	9.93	3.6	5.4	8.9
4	3964.2	9.91	3.6	5.3	8.9
5	3955.3	9.89	3.5	5.3	8.9
6	3946.4	9.87	3.5	5.3	8.9
7	3937.5	9.84	3.5	5.3	8.8
8	3928.7	9.82	3.5	5.3	8.8
9	3919.9	9.80	3.5	5.3	8.8
10	3911.1	9.78	3.5	5.3	8.8
11	3902.3	9.76	3.5	5.3	8.7
12	3893.6	9.73	3.5	5.2	8.7
13	3884.9	9.71	3.5	5.2	8.7
14	3876.1	9.69	3.5	5.2	8.7
15	3867.5	9.67	3.5	5.2	8.7
16	3858.8	9.65	3.5	5.2	8.6
17	3850.2	9.63	3.4	5.2	8.6
18	3841.6	9.60	3.4	5.2	8.6
19	3833.0	9.58	3.4	5.1	8.6
20	3824.4	9.56	3.4	5.1	8.6
21	3815.8	9.54	3.4	5.1	8.5
22	3807.3	9.52	3.4	5.1	8.5
23	3798.8	9.50	3.4	5.1	8.5
24	3790.3	9.48	3.4	5.1	8.5

Marina Flushing Assessment
Medium Diffusion

harbour volume 400000 m³
Tracer Conc start 10 mg/L
Tracer Conc (Harbour) 1 mg/L

Timestep Increment 1 hr

Diffusion Parameters

	width (m)	Length (m)	Coeff (m ² /s)
Breakwater	665	30	0.01
Open Water	250	150	0.1

Estimated Daily Flushing Rate

7.4 %

time hr	mass of tracer g	conc of tracer mg/l	Breakwater g/TS	Flux	Total Flux g/TS
				Open Water g/TS	
0	4000.0	10.00	7.2	5.4	12.6
1	3987.4	9.97	7.2	5.4	12.5
2	3974.9	9.94	7.1	5.4	12.5
3	3962.4	9.91	7.1	5.3	12.5
4	3949.9	9.87	7.1	5.3	12.4
5	3937.5	9.84	7.1	5.3	12.4
6	3925.2	9.81	7.0	5.3	12.3
7	3912.8	9.78	7.0	5.3	12.3
8	3900.6	9.75	7.0	5.3	12.2
9	3888.3	9.72	7.0	5.2	12.2
10	3876.1	9.69	6.9	5.2	12.1
11	3864.0	9.66	6.9	5.2	12.1
12	3851.9	9.63	6.9	5.2	12.1
13	3839.8	9.60	6.9	5.2	12.0
14	3827.8	9.57	6.8	5.1	12.0
15	3815.8	9.54	6.8	5.1	11.9
16	3803.9	9.51	6.8	5.1	11.9
17	3792.0	9.48	6.8	5.1	11.9
18	3780.1	9.45	6.7	5.1	11.8
19	3768.3	9.42	6.7	5.1	11.8
20	3756.5	9.39	6.7	5.0	11.7
21	3744.8	9.36	6.7	5.0	11.7
22	3733.1	9.33	6.6	5.0	11.6
23	3721.5	9.30	6.6	5.0	11.6
24	3709.9	9.27	6.6	5.0	11.6

Marina Flushing Assessment High Diffusion

harbour volume 400000 m3
Tracer Conc start 10 mg/L
Tracer Conc (Harbour) 1 mg/L

Timestep Increment 1 hr

Diffusion Parameters

	width (m)	Length (m)	Coeff (m2/s)
Breakwater	665	30	0.02
Open Water	250	150	0.1

Estimated Daily Flushing Rate

11.6 %

time hr	mass of tracer g	conc of tracer mg/l	Breakwater g/TS	Flux	Total Flux g/TS
				Open Water g/TS	
0	4000.0	10.00	14.4	5.4	19.8
1	3980.2	9.95	14.3	5.4	19.7
2	3960.6	9.90	14.2	5.3	19.5
3	3941.0	9.85	14.1	5.3	19.4
4	3921.6	9.80	14.1	5.3	19.3
5	3902.3	9.76	14.0	5.3	19.2
6	3883.0	9.71	13.9	5.2	19.1
7	3863.9	9.66	13.8	5.2	19.0
8	3844.9	9.61	13.7	5.2	18.9
9	3826.0	9.56	13.7	5.1	18.8
10	3807.2	9.52	13.6	5.1	18.7
11	3788.5	9.47	13.5	5.1	18.6
12	3769.9	9.42	13.4	5.1	18.5
13	3751.4	9.38	13.4	5.0	18.4
14	3733.0	9.33	13.3	5.0	18.3
15	3714.7	9.29	13.2	5.0	18.2
16	3696.5	9.24	13.2	4.9	18.1
17	3678.4	9.20	13.1	4.9	18.0
18	3660.4	9.15	13.0	4.9	17.9
19	3642.5	9.11	12.9	4.9	17.8
20	3624.7	9.06	12.9	4.8	17.7
21	3607.0	9.02	12.8	4.8	17.6
22	3589.4	8.97	12.7	4.8	17.5
23	3571.9	8.93	12.7	4.8	17.4
24	3554.4	8.89	12.6	4.7	17.3