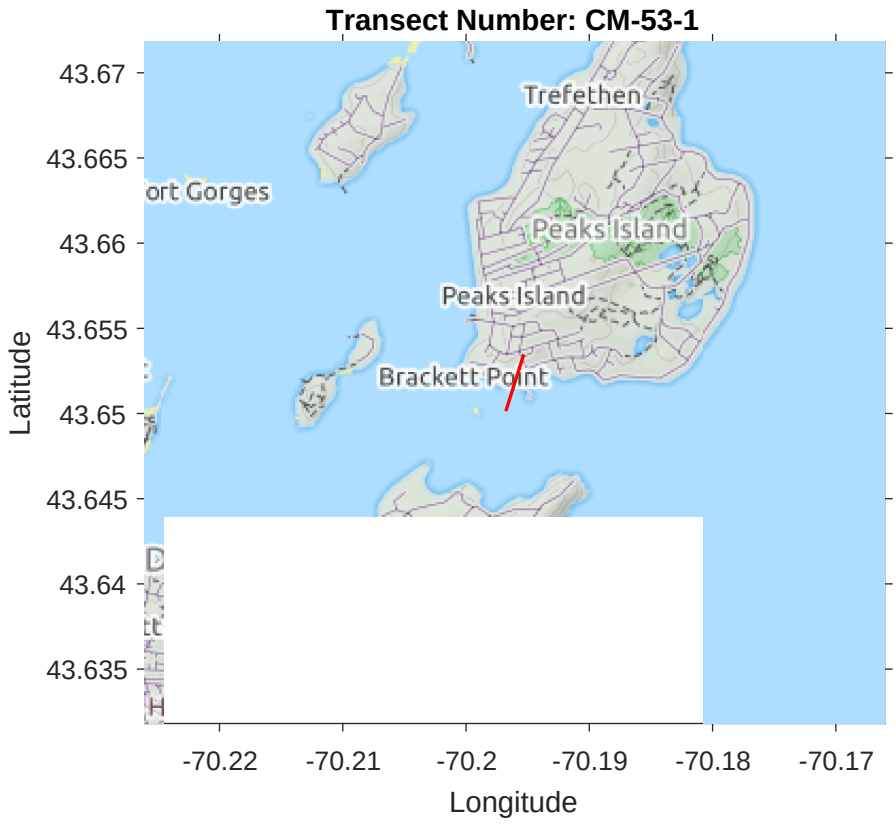
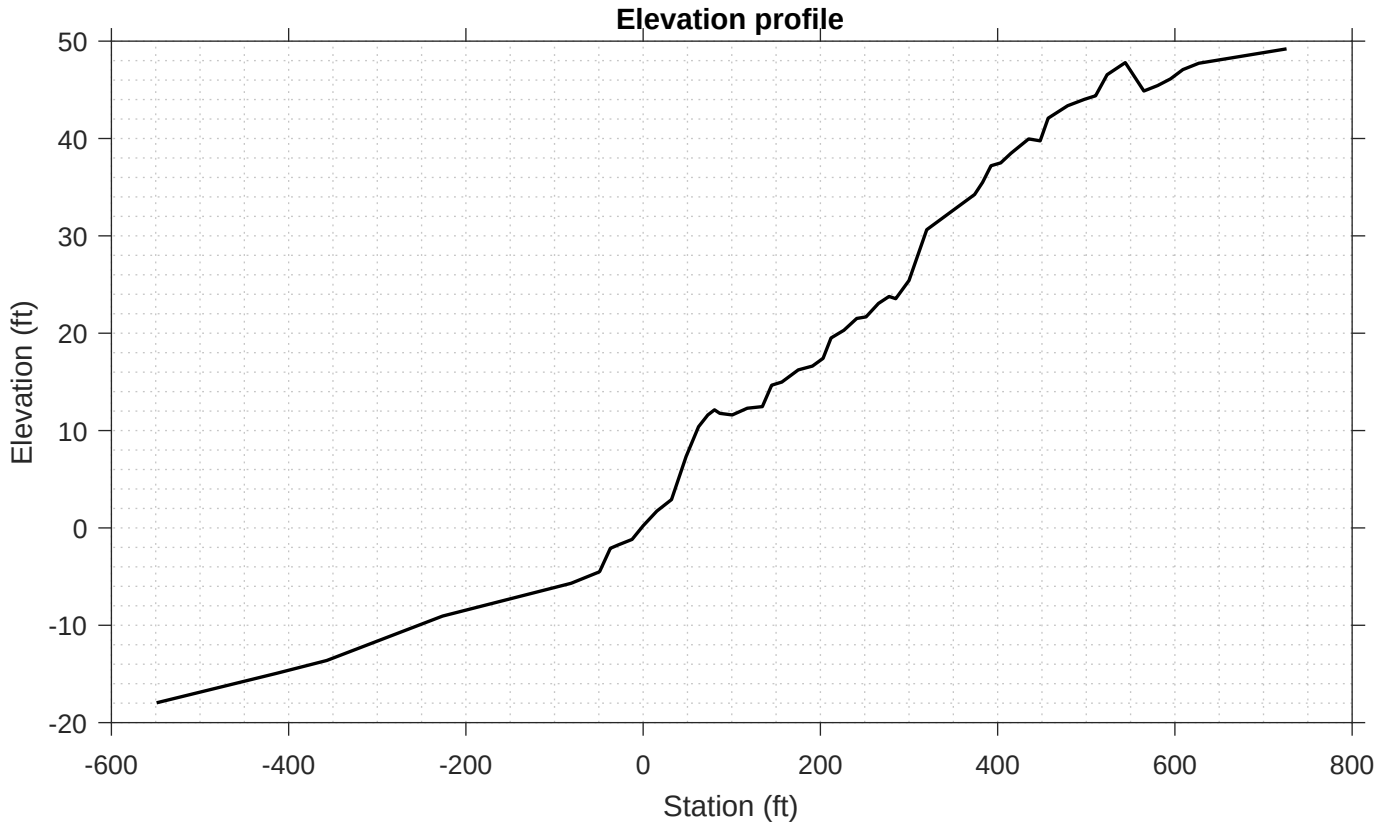

Transect Number: CM-53-1
Trefethen
ort Gorges
Peaks Island
Peaks Island
Brackett Point
Latitude
43.67
43.665
43.66
43.655
43.65
43.645
43.64
43.635
-70.22
-70.21
-70.2
-70.19
-70.18
-70.17
Longitude


Elevation profile
Elevation (ft)
50
40
30
20
10
0
-10
-20
-600
-400
-200
0
200
400
600
800
Station (ft)

DATA LOG FOR TRANSECT ID: CM-53-1

PART 1: USER INPUT

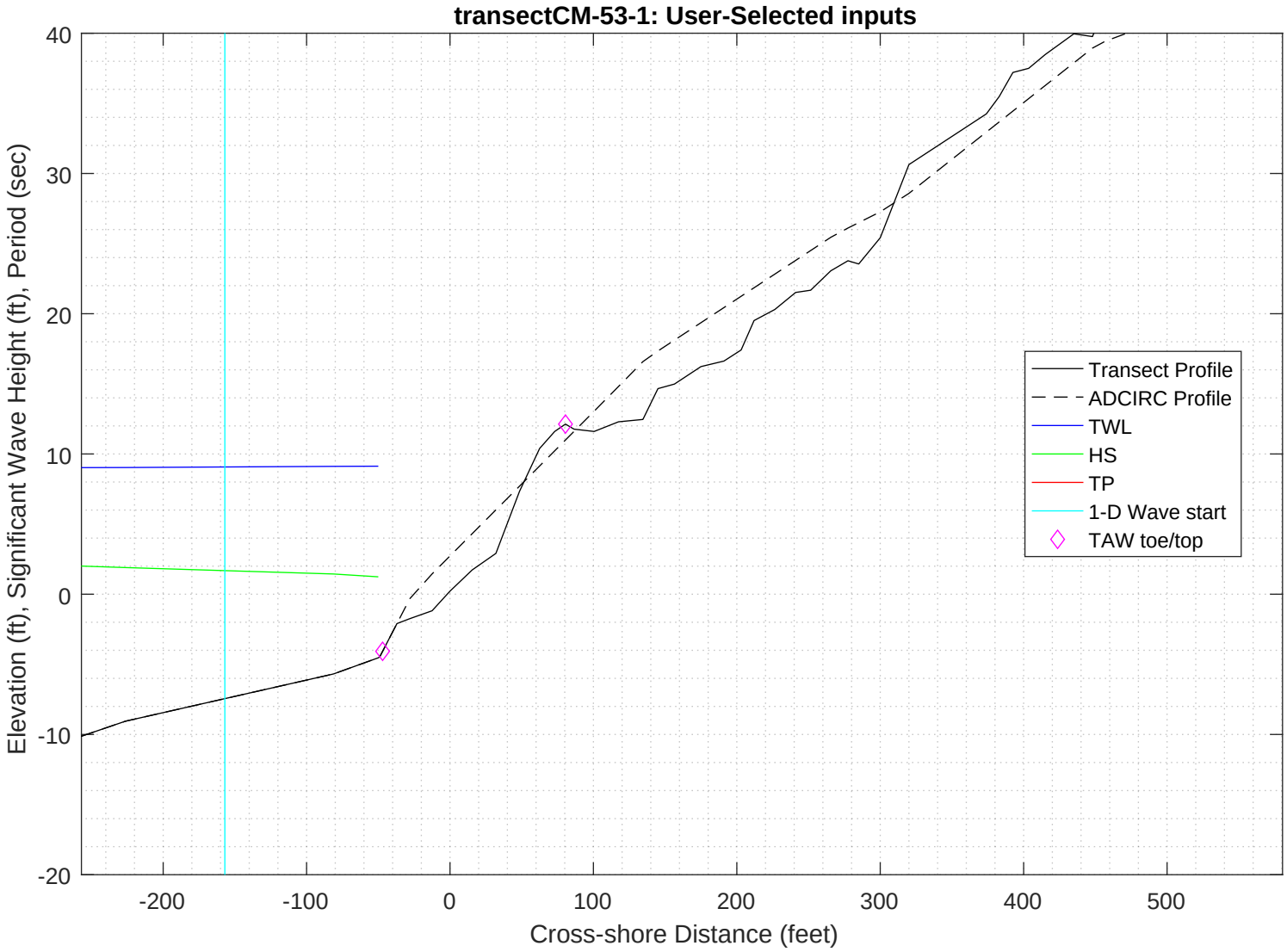
SWAN 1-D / WHAFIS input

station: -157 ft
LON: -70.1963 deg E
LAT: 43.6512 deg N
Bottom ELEV: -7.4456 ft-NAVD88
TWL: 9.0727 ft-NAVD88
HS: 1.6811 ft
TP: NaN sec
Wave Direction bin: 45 deg CCW from East (90 deg sector)
Transect Direction: 66.4488 deg CCW from East

TAW/RUNUP input

toe sta: -47 ft
toe elev: -4.0717 ft-NAVD88
top sta: 80.5 ft
top elev: 12.1293 ft-NAVD88
Wave and water level conditions at toe to be calculated in SWAN 1-D

PART 1 COMPLETE


transectCM-53-1: User-Selected inputs
Elevation (ft), Significant Wave Height (ft), Period (sec)
Cross-shore Distance (feet)
40
30
20
10
0
-10
-20
-200
-100
0
100
200
300
400
500
Transect Profile
ADCIRC Profile
TWL
HS
TP
1-D Wave start
TAW toe/top

PART 2: SWAN 1-D

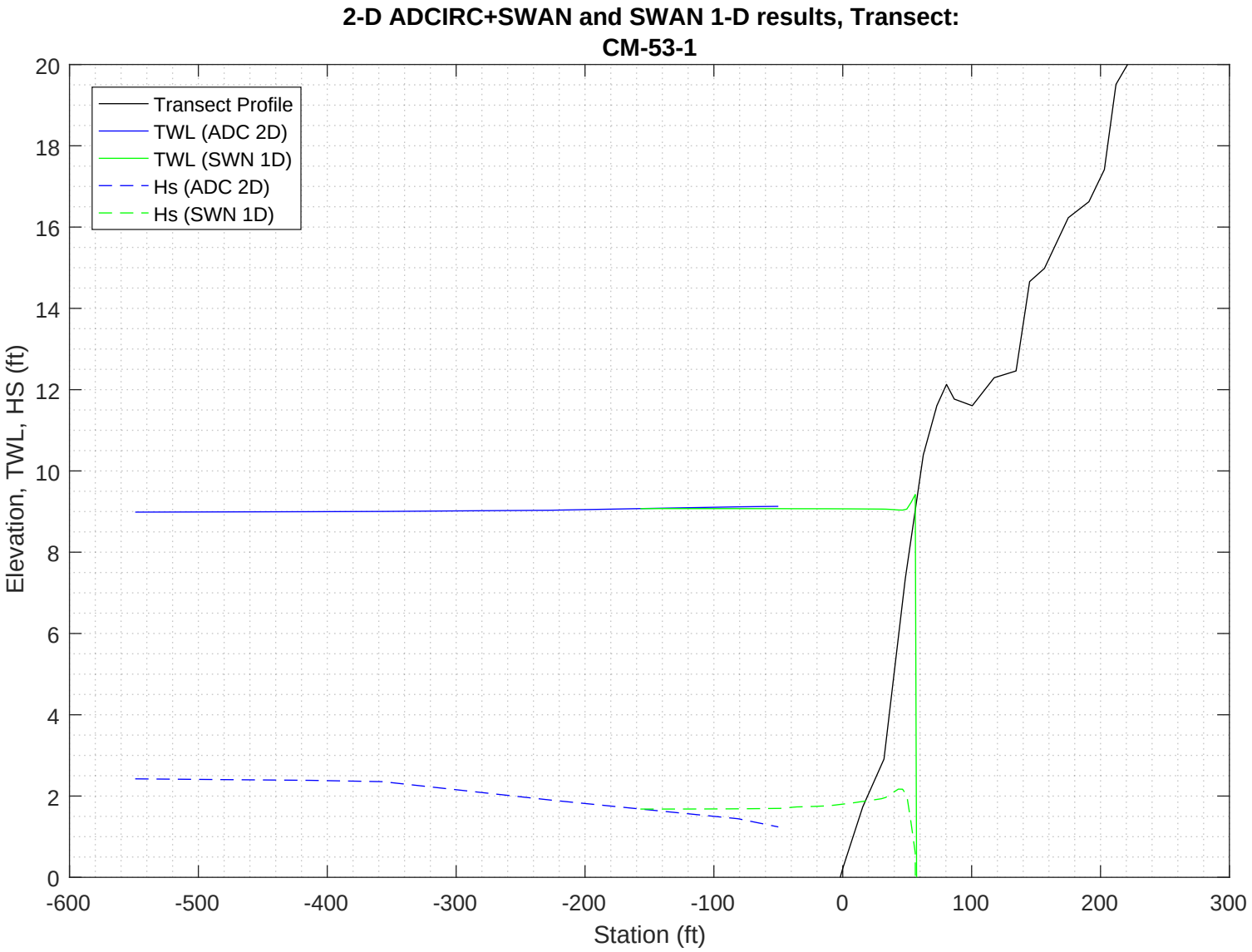
swan input grid name: 2_swan/gridfiles/CM-53-1zmeters_xmeters.grd
swan file name: 2_swan/swanfiles/CM-53-1.swn
swan output name: 2_swan/swanfiles/CM-53-1.dat

Boundary Conditions:
    TWL- 2.7654 meters
    HS- 0.51239 meters
    PER- 8.3 seconds

Batch File: 2_swan/swanfiles/runswan.dat

SWAN maximum additional wave setup: 0.3469 feet
SWAN output at toe:
    SETUP- -0.0015879 feet
    HS-   1.7049 feet
    PER-   8.0957 seconds

PART 2 COMPLETE


2-D ADCIRC+SWAN and SWAN 1-D results, Transect:
CM-53-1
Transect Profile
TWL (ADC 2D)
TWL (SWN 1D)
Hs (ADC 2D)
Hs (SWN 1D)
Elevation, TWL, HS (ft)
Station (ft)
20
18
16
14
12
10
8
6
4
2
0
-600
-500
-400
-300
-200
-100
0
100
200
300

1

Execution started at 20200416.132458

SWAN
SIMULATION OF WAVES IN NEAR SHORE AREAS
VERSION NUMBER 41.20A

```
PROJECT '2018FemaAppeal' '1'
   '100-year Wind and Wave conditions'
! -- SET commands ------------------------------------------------------
 SET DEPMIN=0.01 MAXMES=999 MAXERR=3 PWTAIL=4
 SET LEVEL 0
 SET CARTESIAN
! -- MODE commands -----------------------------------------------------
 MODE STATIONARY ONED
!-- COORDINATES commands-----------------------------------------------
COORDINATES CART
!
!  --  computational (CGRID) grid commands -------------------------------------
!                                  xlenc=length of grid in meters
!  mxc = number of mesh cells (one less than number of grid points)
!CGRID REGular [xpc]  [ypc]  [alpc]  [xlenc]   [ylenc]  [mxc]  [myc] &
!      [ CIRcle|SECtor[dir1] [dir2] ] [mdc] [flow] [fhigh] [msc]
 CGRID REGULAR   0      0       0      66       0.   66     0    &
       CIRCLE                          36    0.03    0.8     30
Resolution in sigma-space: df/f =  0.1157
! -- READgrid ---- not used in 1-D mode ----------------------------------
! -- INPgrid commands  -------------------------------------------------------
!INPgrid BOTtom REGular [xpinp] [ypinp] [alpinp] [mxinp] [myinp] [dxinp] [dyinp]
!
 INPGRID BOTTOM REGULAR    0       0        0      66   0      1       1
!READinp BOTtom [fac]  'fname1'  [idla]  [nhedf]  [FREe|FORmat[form]|UNFormatted]
 READ    BOTTOM   -1. '../gridfiles/CM-53-1zmeters_xmeters.grd'    1      0       FREE
!-------------------------------------------------------------------------
! -- WIND [vel] [dir]
WIND      25.1  0
! -- BOUnd SHAPespec
BOUND SHAPE JONSWAP 3.3  PEAK DSPR POWER
! -- BOUndspec
! BOU SIDE W CCW CON FILE 'swanspec.txt' 1
BOUN SIDE W CCW CONSTANT PAR   0.51239     8.3     0  2
!-- BOUndnest1  - optional for boundary from parent run
!-- BOUndnest2
!-- BOUndnest3
!-- INITial -- usest to specify initial values
!
```

```
!---------------- P H Y S I C S ------------------------
!-- GEN1 [cf10] [cf20] [cf30] [cf40] [edm1pm] [cdrag] [umin] [cfpm]
!-- GEN2 [cf10] [cf20] [cf30] [cf40] [cf50] [cf60] [edm1pm] [cdrag] [umin] [cfpm]
    GEN3 KOMEN
!   whitecapping ( on by default)
!-- WCAPping KOMen [cds2] [stpm] [powst] [delta] [powk]
    WCAP KOM
!   quadruplet wave interactions
!-- QUADrupl [iquad] [lambda] [Cn14] [Csh1] [Csh2]
! -- BREaking CONstant [alpha] [gamma]
     BREAK    CON       1.      0.73
!-- FRICtion JONswap CONstant [cfjon]
    FRIC     JONSWAP CON       0.038
!-- TRIad [itriad] [trfac] [cutfr]   [a]  [b]  [urcrit] [urslim]
! TRIAD        1      0.65    2.5    0.95 -0.75  0.2       0.01
  TRIAD
!-- VEGEtation [height] [diamtr] [nstems] [drag]
!-- MUD [layer] [rhom] [viscm]
!- LIMiter [ursell] [qb] deactivates quadruplets with Ursell number exceeds ursell
!-- OBSTacle -- not in 1-D
!-- SETUP [supcor]
   SETUP    0
!
! ----------------- N U M E R I C S -----------------------------
!
!-- PROP  can use BBST or GSE instead of default
! -- NUMeric -- lots of options
!     NUM ACCUR npnts=100. stat 30
     NUMeric STOPC
!
! -------------------O U T P U T ------------------------------
!
!OUTPut OPTIons "comment' (TABLE [field]) (BLOck [ndec] [len]) (SPEC [ndec])
 OUTPUT OPTIONS '%' TABLE 16
 $BLOCK 9 1000 SPEC 8
!CURve 'sname' [xp1] [yp1] <[int]   [xp]   [yp] >
 CURVE 'curve' 0     0      66  66    0
!TABLe 'sname' < HEADer|NOHEADer|INDexed > 'fname' <output parameters> (output time)
 Table 'curve'   HEADER 'CM-53-1.dat' XP YP HSIGN TPS RTP TMM10 DIR &
 DSPR DEPTH SETUP
!QUANTITY XP hexp=99999
!
!-----------------------------------------------
COMPUTE STATIONARY
------------------------------------------------------------------
                 COMPUTATIONAL PART OF SWAN
------------------------------------------------------------------
```

```
One-dimensional mode of SWAN is activated
Gridresolution       : MXC              67 MYC              1
                     : MCGRD            68
                     : MSC              31 MDC             36
                     : MTC               1
                     : NSTATC            0 ITERMX          50
Propagation flags    : ITFRE             1 IREFR            1
Source term flags    : IBOT              1 ISURF            1
                     : IWCAP             1 IWIND            3
                     : ITRIAD            1 IQUAD            2
                     : IVEG              0 ITURBV           0
                     : IMUD              0
Spatial step         : DX       0.1000E+01 DY      0.1000E+01
Spectral bin         : df/f     0.1157E+00 DDIR    0.1000E+02
Physical constants   : GRAV     0.9810E+01 RHO     0.1025E+04
Wind input           : WSPEED   0.2510E+02 DIR     0.0000E+00
Tail parameters      : E(f)     0.4000E+01 E(k)    0.2500E+01
                     : A(f)     0.5000E+01 A(k)    0.3000E+01
Accuracy parameters  : DREL     0.1000E-01 NPNTS   0.9950E+02
                     : DHABS    0.0000E+00 CURVAT  0.5000E-02
                     : GRWMX    0.1000E+00
Drying/flooding      : LEVEL    0.0000E+00 DEPMIN  0.1000E-01
The Cartesian convention for wind and wave directions is used
Scheme for geographic propagation is SORDUP
Scheme geogr. space  : PROPSC            2 ICMAX            7
Scheme spectral space: CSS      0.5000E+00 CDD     0.5000E+00
Current is off
Quadruplets          : IQUAD             2
                     : LAMBDA   0.2500E+00 CNL4    0.3000E+08
                     : CSH1     0.5500E+01 CSH2    0.8330E+00
                     : CSH3    -0.1250E+01
Maximum Ursell nr for Snl4 :    0.1000E+02
Triads               : ITRIAD            1 TRFAC   0.8000E+00
                     : CUTFR    0.2500E+01 URCRI   0.2000E+00
Minimum Ursell nr for Snl3 :    0.1000E-01
JONSWAP (‘73)        : GAMMA    0.3800E-01
Vegetation is off
Turbulence is off
Fluid mud is off
W-cap Komen (‘84)    : EMPCOF (CDS2):   0.2360E-04
W-cap Komen (‘84)    : APM (STPM)   :   0.3020E-02
W-cap Komen (‘84)    : POWST        :   0.2000E+01
W-cap Komen (‘84)    : DELTA        :   0.1000E+01
W-cap Komen (‘84)    : POWK         :   0.1000E+01
Wind drag is fit
Snyder/Komen wind input
Battjes&Janssen (‘78): ALPHA    0.1000E+01 GAMMA   0.7300E+00
Set-up               : SUPCOR   0.0000E+00
Diffraction is off
Janssen (‘89,‘90)    : ALPHA    0.1000E-01 KAPPA   0.4100E+00
Janssen (‘89,‘90)    : RHOA     0.1280E+01 RHOW    0.1025E+04

1st and 2nd gen. wind: CF10     0.1880E+03 CF20    0.5900E+00
                     : CF30     0.1200E+00 CF40    0.2500E+03
                     : CF50     0.2300E-02 CF60   -0.2230E+00
                     : CF70     0.0000E+00 CF80   -0.5600E+00
                     : RHOAW    0.1249E-02 EDMLPM  0.3600E-02
                     : CDRAG    0.1230E-02 UMIN    0.1000E+01
                     : LIM_PM   0.1300E+00

 ---------------------------------------------------------------
 First guess by 2nd generation model flags for first iteration:
 ITER       1 GRWMX      0.1000E+23 ALFA       0.0000E+00
 IWIND      2 IWCAP      0 IQUAD      0
 ITRIAD     1 IBOT       1 ISURF      1
 IVEG       0 ITURBV     0 IMUD       0
 ---------------------------------------------------------------
iteration    1; sweep 1
iteration    1; sweep 2
iteration    1; sweep 3
iteration    1; sweep 4
not possible to compute, first iteration

 ---------------------------------------------------------------
 Options given by user are activated for proceeding calculation:
 ITER       2 GRWMX      0.1000E+00 ALFA       0.0000E+00
 IWIND      3 IWCAP      1 IQUAD      2
 ITRIAD     1 IBOT       1 ISURF      1
 IVEG       0 ITURBV     0 IMUD       0
 ---------------------------------------------------------------
iteration    2; sweep 1
iteration    2; sweep 2
iteration    2; sweep 3
iteration    2; sweep 4
accuracy OK in  90.91 % of wet grid points ( 99.50 % required)

iteration    3; sweep 1
iteration    3; sweep 2
iteration    3; sweep 3
```

```
iteration    3; sweep 4
accuracy OK in   1.52 % of wet grid points ( 99.50 % required)

iteration    4; sweep 1
iteration    4; sweep 2
iteration    4; sweep 3
iteration    4; sweep 4
accuracy OK in  92.43 % of wet grid points ( 99.50 % required)

iteration    5; sweep 1
iteration    5; sweep 2
iteration    5; sweep 3
iteration    5; sweep 4
accuracy OK in  93.94 % of wet grid points ( 99.50 % required)

iteration    6; sweep 1
iteration    6; sweep 2
iteration    6; sweep 3
iteration    6; sweep 4
accuracy OK in  98.49 % of wet grid points ( 99.50 % required)

iteration    7; sweep 1
iteration    7; sweep 2
iteration    7; sweep 3
iteration    7; sweep 4
accuracy OK in  98.49 % of wet grid points ( 99.50 % required)

iteration    8; sweep 1
iteration    8; sweep 2
iteration    8; sweep 3
iteration    8; sweep 4
accuracy OK in 100.00 % of wet grid points ( 99.50 % required)


STOP
```

%
%
% Run:1 Table:curve SWAN version:41.20A
%
% Xp Yp Hsig TPsmoo RTpeak Tm_10 Dir Dspr Depth Setup
% [m] [m] [m] [sec] [sec] [sec] [degr] [degr] [m] [m]
%

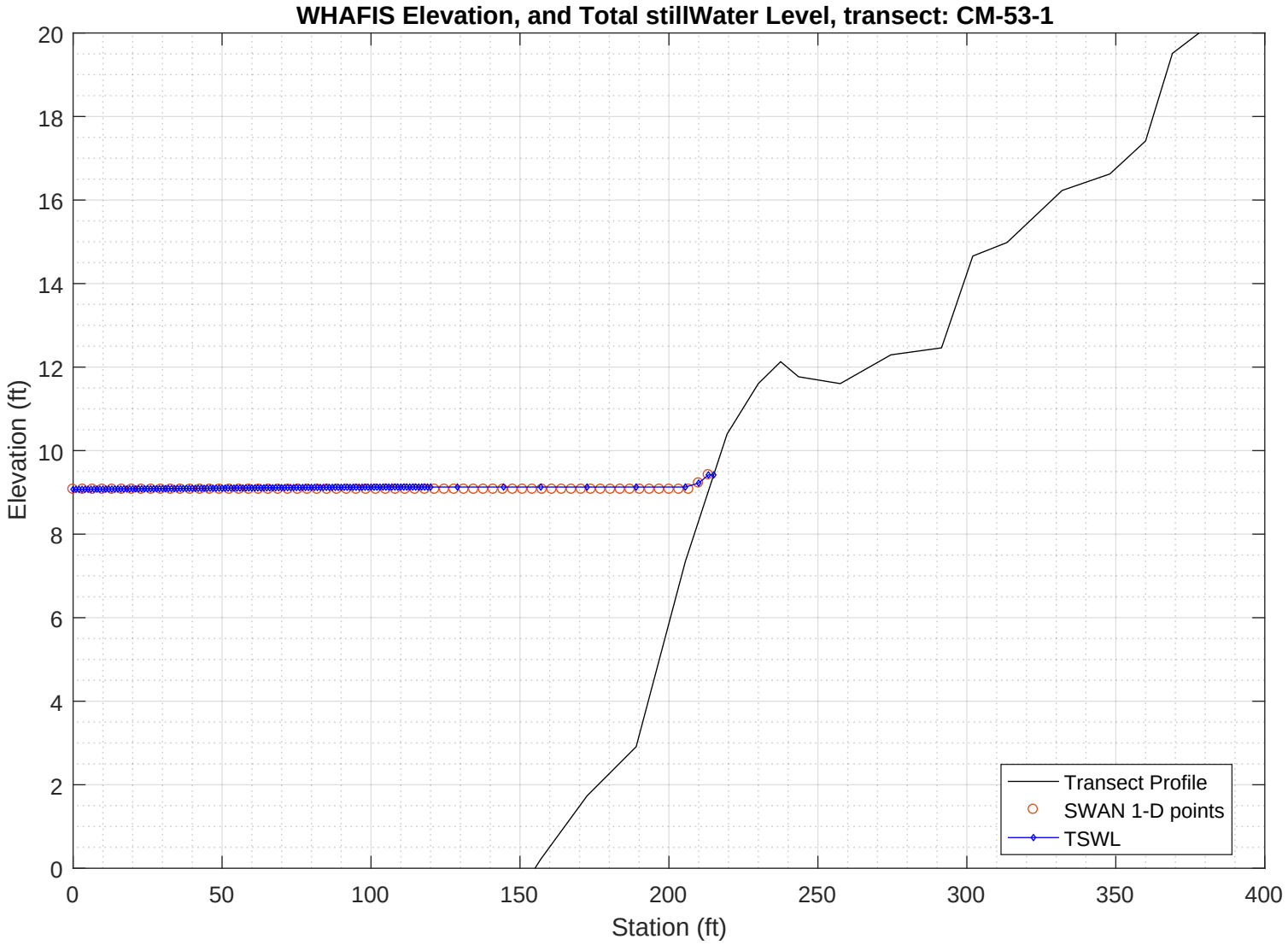
0.	0.	0.51206	8.0926	8.0345	7.4879	0.000	31.5057	5.0300	0.000000
1.	0.	0.51205	8.0926	8.0345	7.4876	0.000	31.3886	5.0100	-0.000006
2.	0.	0.51205	8.0926	8.0345	7.4873	0.000	31.2724	4.9900	-0.000013
3.	0.	0.51200	8.0927	8.0345	7.4869	0.000	31.1392	4.9700	-0.000019
4.	0.	0.51209	8.0927	8.0345	7.4870	0.000	31.0117	4.9400	-0.000028
5.	0.	0.51209	8.0928	8.0345	7.4866	0.000	30.9182	4.9200	-0.000034
6.	0.	0.51207	8.0928	8.0345	7.4863	0.000	30.8162	4.9000	-0.000040
7.	0.	0.51219	8.0929	8.0345	7.4863	0.000	30.7111	4.8700	-0.000050
8.	0.	0.51221	8.0929	8.0345	7.4859	0.000	30.6192	4.8499	-0.000056
9.	0.	0.51221	8.0930	8.0345	7.4855	0.000	30.5176	4.8299	-0.000062
10.	0.	0.51236	8.0931	8.0345	7.4856	0.000	30.4126	4.7999	-0.000072
11.	0.	0.51240	8.0931	8.0345	7.4851	0.000	30.3208	4.7799	-0.000079
12.	0.	0.51242	8.0932	8.0345	7.4847	0.000	30.2192	4.7599	-0.000086
13.	0.	0.51260	8.0932	8.0345	7.4847	0.000	30.1144	4.7299	-0.000096
14.	0.	0.51267	8.0933	8.0345	7.4842	360.000	30.0226	4.7099	-0.000104
15.	0.	0.51271	8.0933	8.0345	7.4837	0.000	29.9210	4.6899	-0.000111
16.	0.	0.51292	8.0934	8.0345	7.4837	360.000	29.8162	4.6599	-0.000122
17.	0.	0.51301	8.0935	8.0345	7.4831	0.000	29.7245	4.6399	-0.000129
18.	0.	0.51308	8.0935	8.0345	7.4826	0.000	29.6231	4.6199	-0.000137
19.	0.	0.51331	8.0936	8.0345	7.4825	0.000	29.5185	4.5899	-0.000149
20.	0.	0.51342	8.0936	8.0345	7.4819	360.000	29.4269	4.5698	-0.000157
21.	0.	0.51351	8.0937	8.0345	7.4812	360.000	29.3257	4.5498	-0.000165
22.	0.	0.51377	8.0938	8.0345	7.4810	0.000	29.2212	4.5198	-0.000177
23.	0.	0.51383	8.0938	8.0345	7.4803	0.000	29.1018	4.4998	-0.000186
24.	0.	0.51419	8.0940	8.0345	7.4804	360.000	28.9633	4.4598	-0.000203
25.	0.	0.51438	8.0940	8.0345	7.4800	360.000	28.8185	4.4298	-0.000216
26.	0.	0.51471	8.0942	8.0345	7.4799	0.000	28.6578	4.3898	-0.000234
27.	0.	0.51509	8.0943	8.0345	7.4799	0.000	28.5058	4.3497	-0.000252
28.	0.	0.51531	8.0944	8.0345	7.4792	360.000	28.3572	4.3197	-0.000267
29.	0.	0.51571	8.0945	8.0345	7.4790	360.000	28.2045	4.2797	-0.000286
30.	0.	0.51614	8.0946	8.0345	7.4787	0.000	28.0705	4.2397	-0.000305
31.	0.	0.51641	8.0947	8.0345	7.4778	0.000	27.9415	4.2097	-0.000320
32.	0.	0.51679	8.0949	8.0345	7.4772	0.000	27.7780	4.1697	-0.000340
33.	0.	0.51703	8.0950	8.0345	7.4772	0.000	27.4110	4.1096	-0.000371
34.	0.	0.51966	8.0957	8.0345	7.4830	0.000	26.8088	3.9095	-0.000484
35.	0.	0.52227	8.0963	8.0345	7.4875	360.000	26.1084	3.7194	-0.000607
36.	0.	0.52568	8.0970	8.0345	7.4909	360.000	25.4352	3.5192	-0.000755
37.	0.	0.52820	8.0975	8.0345	7.4894	359.999	24.9756	3.3891	-0.000864
38.	0.	0.52890	8.0978	8.0345	7.4824	359.999	24.7131	3.3491	-0.000900
39.	0.	0.52986	8.0980	8.0345	7.4728	360.000	24.5184	3.3091	-0.000938
40.	0.	0.53097	8.0983	8.0345	7.4619	360.000	24.3684	3.2690	-0.000976
41.	0.	0.53193	8.0985	8.0345	7.4483	360.000	24.2287	3.2390	-0.001006
42.	0.	0.53318	8.0988	8.0345	7.4346	360.000	24.0804	3.1990	-0.001046
43.	0.	0.53450	8.0991	8.0345	7.4203	359.999	23.9407	3.1589	-0.001088
44.	0.	0.53541	8.0994	8.0345	7.4036	359.999	23.7194	3.1289	-0.001121
45.	0.	0.53859	8.0999	8.0345	7.3893	359.999	23.3679	3.0188	-0.001245
46.	0.	0.54189	8.1005	8.0345	7.3728	359.999	22.9557	2.9086	-0.001380
47.	0.	0.54576	8.1012	8.0345	7.3541	359.999	22.5159	2.7885	-0.001544
48.	0.	0.54965	8.1020	8.0345	7.3315	359.999	22.0986	2.6783	-0.001711
49.	0.	0.55311	8.1027	8.0345	7.3044	359.999	21.6970	2.5881	-0.001862
50.	0.	0.55726	8.1036	8.0345	7.2735	359.998	21.2832	2.4880	-0.002046
51.	0.	0.56176	8.1045	8.0345	7.2376	359.998	20.8610	2.3877	-0.002250
52.	0.	0.56665	8.1056	8.0345	7.1974	359.998	20.4587	2.2875	-0.002478
53.	0.	0.57100	8.1067	8.0345	7.1515	359.998	20.1244	2.2073	-0.002678
54.	0.	0.57514	8.1078	8.0345	7.1014	359.998	19.8195	2.1371	-0.002869
55.	0.	0.58005	8.1091	8.0345	7.0485	359.998	19.5173	2.0569	-0.003106
56.	0.	0.58472	8.1104	8.0345	6.9911	359.998	19.2279	1.9867	-0.003335
57.	0.	0.58952	8.1118	8.0345	6.9284	359.997	18.8335	1.9164	-0.003587
58.	0.	0.59926	8.1136	8.0345	6.8623	359.997	18.1050	1.7658	-0.004202
59.	0.	0.61918	8.1165	8.0345	6.7808	359.997	17.0144	1.4943	-0.005687

60.	0.	0.64115	8.1201	8.0345	6.6563	359.989	15.7305	1.2323	-0.007720
61.	0.	0.66159	8.1252	8.0345	6.4630	359.917	14.3943	0.9598	-0.010224
62.	0.	0.66086	8.1311	8.0345	6.2437	359.828	12.8778	0.6889	-0.011086
63.	0.	0.61460	8.1379	8.0345	6.0960	359.717	11.5759	0.4462	-0.003800
64.	0.	0.41031	8.2635	8.0345	6.3772	358.033	12.1651	0.2756	0.045622
65.	0.	0.18321	10.6757	11.1572	7.5154	359.078	15.1803	0.1157	0.105736
66.	0.	-9.00000	-9.0000	-9.0000	-9.0000	-999.000	-9.0000	-99.0000	-9.000000

PART 3: WHAFIS

WHAFIS input: CM-53-1.dat
WHAFIS output: CM-53-1.out

PART 3 COMPLETE


WHAFIS Elevation, and Total stillWater Level, transect: CM-53-1
Elevation (ft)
Station (ft)
0
2
4
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Transect Profile
SWAN 1-D points
TSWL

WAVE HEIGHT COMPUTATIONS FOR FLOOD INSURANCE STUDIES (WHAFIS VERSION 4.0G, 08_2007)
Executed on: Thu Apr 16 13:27:11 2020
Input file: C:\FEMA-TransectAnalysis\LOMR-TransectAnalysis-Portland\3_whafis\whafis4\CM-53-1.dat
Output file: C:\FEMA-TransectAnalysis\LOMR-TransectAnalysis-Portland\3_whafis\whafis4\CM-53-1.out

header

THIS IS A 100-YEAR CASE
THE FOLLOWING NON-DEFAULT WIND SPEEDS ARE BEING USED
WINDIF 56.14 WINDOF 56.14 WINDVH 60.00

PART1 INPUT

IE	0.000	-7.446	1.000	1.000	9.073	2.690	8.300	56.140	0.023	0.000
OF	1.000	-7.422	0.000	9.073	0.000	0.000	0.000	0.000	0.023	0.000
OF	2.000	-7.399	0.000	9.074	0.000	0.000	0.000	0.000	0.023	0.000
OF	3.000	-7.376	0.000	9.074	0.000	0.000	0.000	0.000	0.023	0.000
OF	4.000	-7.353	0.000	9.075	0.000	0.000	0.000	0.000	0.023	0.000
OF	5.000	-7.330	0.000	9.076	0.000	0.000	0.000	0.000	0.023	0.000
OF	6.000	-7.306	0.000	9.076	0.000	0.000	0.000	0.000	0.023	0.000
OF	7.000	-7.283	0.000	9.077	0.000	0.000	0.000	0.000	0.023	0.000
OF	8.000	-7.260	0.000	9.077	0.000	0.000	0.000	0.000	0.023	0.000
OF	9.000	-7.237	0.000	9.078	0.000	0.000	0.000	0.000	0.023	0.000
OF	10.000	-7.213	0.000	9.078	0.000	0.000	0.000	0.000	0.023	0.000
OF	11.000	-7.190	0.000	9.079	0.000	0.000	0.000	0.000	0.023	0.000
OF	12.000	-7.167	0.000	9.080	0.000	0.000	0.000	0.000	0.023	0.000
OF	13.000	-7.144	0.000	9.080	0.000	0.000	0.000	0.000	0.023	0.000
OF	14.000	-7.121	0.000	9.081	0.000	0.000	0.000	0.000	0.023	0.000
OF	15.000	-7.097	0.000	9.081	0.000	0.000	0.000	0.000	0.023	0.000
OF	16.000	-7.074	0.000	9.082	0.000	0.000	0.000	0.000	0.023	0.000
OF	17.000	-7.051	0.000	9.082	0.000	0.000	0.000	0.000	0.023	0.000
OF	18.000	-7.028	0.000	9.083	0.000	0.000	0.000	0.000	0.023	0.000
OF	19.000	-7.004	0.000	9.084	0.000	0.000	0.000	0.000	0.023	0.000
OF	20.000	-6.981	0.000	9.084	0.000	0.000	0.000	0.000	0.023	0.000
OF	21.000	-6.958	0.000	9.085	0.000	0.000	0.000	0.000	0.023	0.000
OF	22.000	-6.935	0.000	9.085	0.000	0.000	0.000	0.000	0.023	0.000
OF	23.000	-6.911	0.000	9.086	0.000	0.000	0.000	0.000	0.023	0.000
OF	24.000	-6.888	0.000	9.086	0.000	0.000	0.000	0.000	0.023	0.000
OF	25.000	-6.865	0.000	9.087	0.000	0.000	0.000	0.000	0.023	0.000
OF	26.000	-6.842	0.000	9.088	0.000	0.000	0.000	0.000	0.023	0.000
OF	27.000	-6.819	0.000	9.088	0.000	0.000	0.000	0.000	0.023	0.000
OF	28.000	-6.795	0.000	9.089	0.000	0.000	0.000	0.000	0.023	0.000
OF	29.000	-6.772	0.000	9.089	0.000	0.000	0.000	0.000	0.023	0.000
OF	30.000	-6.749	0.000	9.090	0.000	0.000	0.000	0.000	0.023	0.000
OF	31.000	-6.726	0.000	9.090	0.000	0.000	0.000	0.000	0.023	0.000
OF	32.000	-6.703	0.000	9.091	0.000	0.000	0.000	0.000	0.023	0.000
OF	33.000	-6.679	0.000	9.092	0.000	0.000	0.000	0.000	0.023	0.000
OF	34.000	-6.656	0.000	9.092	0.000	0.000	0.000	0.000	0.023	0.000
OF	35.000	-6.633	0.000	9.093	0.000	0.000	0.000	0.000	0.023	0.000
OF	36.000	-6.610	0.000	9.093	0.000	0.000	0.000	0.000	0.023	0.000
OF	37.000	-6.586	0.000	9.094	0.000	0.000	0.000	0.000	0.023	0.000
OF	38.000	-6.563	0.000	9.094	0.000	0.000	0.000	0.000	0.023	0.000
OF	39.000	-6.540	0.000	9.095	0.000	0.000	0.000	0.000	0.023	0.000
OF	40.000	-6.517	0.000	9.096	0.000	0.000	0.000	0.000	0.023	0.000
OF	41.000	-6.494	0.000	9.096	0.000	0.000	0.000	0.000	0.023	0.000
OF	42.000	-6.470	0.000	9.097	0.000	0.000	0.000	0.000	0.023	0.000
OF	43.000	-6.447	0.000	9.097	0.000	0.000	0.000	0.000	0.023	0.000
OF	44.000	-6.424	0.000	9.098	0.000	0.000	0.000	0.000	0.023	0.000
OF	45.000	-6.401	0.000	9.099	0.000	0.000	0.000	0.000	0.023	0.000
OF	46.000	-6.377	0.000	9.099	0.000	0.000	0.000	0.000	0.023	0.000
OF	47.000	-6.354	0.000	9.100	0.000	0.000	0.000	0.000	0.023	0.000
OF	48.000	-6.331	0.000	9.100	0.000	0.000	0.000	0.000	0.023	0.000
OF	49.000	-6.308	0.000	9.101	0.000	0.000	0.000	0.000	0.023	0.000
OF	50.000	-6.285	0.000	9.101	0.000	0.000	0.000	0.000	0.023	0.000
OF	51.000	-6.261	0.000	9.102	0.000	0.000	0.000	0.000	0.023	0.000
OF	52.000	-6.238	0.000	9.102	0.000	0.000	0.000	0.000	0.023	0.000
OF	53.000	-6.215	0.000	9.103	0.000	0.000	0.000	0.000	0.023	0.000
OF	54.000	-6.192	0.000	9.104	0.000	0.000	0.000	0.000	0.023	0.000
OF	55.000	-6.168	0.000	9.104	0.000	0.000	0.000	0.000	0.023	0.000
OF	56.000	-6.145	0.000	9.105	0.000	0.000	0.000	0.000	0.023	0.000
OF	57.000	-6.122	0.000	9.105	0.000	0.000	0.000	0.000	0.023	0.000
OF	58.000	-6.099	0.000	9.106	0.000	0.000	0.000	0.000	0.023	0.000
OF	59.000	-6.076	0.000	9.106	0.000	0.000	0.000	0.000	0.023	0.000
OF	60.000	-6.052	0.000	9.107	0.000	0.000	0.000	0.000	0.023	0.000
OF	61.000	-6.029	0.000	9.108	0.000	0.000	0.000	0.000	0.023	0.000
OF	62.000	-6.006	0.000	9.108	0.000	0.000	0.000	0.000	0.023	0.000
OF	63.000	-5.983	0.000	9.109	0.000	0.000	0.000	0.000	0.023	0.000
OF	64.000	-5.959	0.000	9.109	0.000	0.000	0.000	0.000	0.023	0.000
OF	65.000	-5.936	0.000	9.110	0.000	0.000	0.000	0.000	0.023	0.000
OF	66.000	-5.913	0.000	9.111	0.000	0.000	0.000	0.000	0.023	0.000
OF	67.000	-5.890	0.000	9.111	0.000	0.000	0.000	0.000	0.023	0.000
OF	68.000	-5.867	0.000	9.112	0.000	0.000	0.000	0.000	0.023	0.000
OF	69.000	-5.843	0.000	9.112	0.000	0.000	0.000	0.000	0.023	0.000
OF	70.000	-5.820	0.000	9.113	0.000	0.000	0.000	0.000	0.023	0.000
OF	71.000	-5.797	0.000	9.113	0.000	0.000	0.000	0.000	0.023	0.000
OF	72.000	-5.774	0.000	9.114	0.000	0.000	0.000	0.000	0.023	0.000
OF	73.000	-5.751	0.000	9.115	0.000	0.000	0.000	0.000	0.023	0.000
OF	74.000	-5.727	0.000	9.115	0.000	0.000	0.000	0.000	0.023	0.000
OF	75.000	-5.704	0.000	9.116	0.000	0.000	0.000	0.000	0.025	0.000
OF	76.000	-5.677	0.000	9.116	0.000	0.000	0.000	0.000	0.032	0.000
OF	77.000	-5.640	0.000	9.117	0.000	0.000	0.000	0.000	0.037	0.000
OF	78.000	-5.603	0.000	9.117	0.000	0.000	0.000	0.000	0.037	0.000
OF	79.000	-5.566	0.000	9.117	0.000	0.000	0.000	0.000	0.037	0.000
OF	80.000	-5.529	0.000	9.118	0.000	0.000	0.000	0.000	0.037	0.000
OF	81.000	-5.492	0.000	9.118	0.000	0.000	0.000	0.000	0.037	0.000
OF	82.000	-5.456	0.000	9.118	0.000	0.000	0.000	0.000	0.037	0.000
OF	83.000	-5.419	0.000	9.119	0.000	0.000	0.000	0.000	0.037	0.000
OF	84.000	-5.382	0.000	9.119	0.000	0.000	0.000	0.000	0.037	0.000
OF	85.000	-5.345	0.000	9.120	0.000	0.000	0.000	0.000	0.037	0.000
OF	86.000	-5.308	0.000	9.120	0.000	0.000	0.000	0.000	0.037	0.000
OF	87.000	-5.272	0.000	9.120	0.000	0.000	0.000	0.000	0.037	0.000
OF	88.000	-5.235	0.000	9.121	0.000	0.000	0.000	0.000	0.037	0.000
OF	89.000	-5.198	0.000	9.121	0.000	0.000	0.000	0.000	0.037	0.000
OF	90.000	-5.161	0.000	9.122	0.000	0.000	0.000	0.000	0.037	0.000
OF	91.000	-5.124	0.000	9.122	0.000	0.000	0.000	0.000	0.037	0.000
OF	92.000	-5.087	0.000	9.122	0.000	0.000	0.000	0.000	0.037	0.000

OF	93.000	-5.050	0.000	9.123	0.000	0.000	0.000	0.000	0.037	0.000
OF	94.000	-5.014	0.000	9.123	0.000	0.000	0.000	0.000	0.037	0.000
OF	95.000	-4.977	0.000	9.123	0.000	0.000	0.000	0.000	0.037	0.000
OF	96.000	-4.940	0.000	9.124	0.000	0.000	0.000	0.000	0.037	0.000
OF	97.000	-4.903	0.000	9.124	0.000	0.000	0.000	0.000	0.037	0.000
OF	98.000	-4.866	0.000	9.125	0.000	0.000	0.000	0.000	0.037	0.000
OF	99.000	-4.829	0.000	9.125	0.000	0.000	0.000	0.000	0.037	0.000
OF	100.000	-4.792	0.000	9.125	0.000	0.000	0.000	0.000	0.037	0.000
OF	101.000	-4.756	0.000	9.126	0.000	0.000	0.000	0.000	0.037	0.000
OF	102.000	-4.719	0.000	9.126	0.000	0.000	0.000	0.000	0.037	0.000
OF	103.000	-4.682	0.000	9.126	0.000	0.000	0.000	0.000	0.037	0.000
OF	104.000	-4.645	0.000	9.127	0.000	0.000	0.000	0.000	0.037	0.000
OF	105.000	-4.608	0.000	9.127	0.000	0.000	0.000	0.000	0.037	0.000
OF	106.000	-4.571	0.000	9.128	0.000	0.000	0.000	0.000	0.037	0.000
OF	107.000	-4.535	0.000	9.128	0.000	0.000	0.000	0.000	0.052	0.000
OF	108.000	-4.467	0.000	9.128	0.000	0.000	0.000	0.000	0.132	0.000
OF	109.000	-4.270	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	110.000	-4.072	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	111.000	-3.874	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	112.000	-3.677	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	113.000	-3.478	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	114.000	-3.281	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	115.000	-3.083	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	116.000	-2.885	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	117.000	-2.688	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	118.000	-2.490	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	119.000	-2.293	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
OF	120.000	-2.095	0.000	9.128	0.000	0.000	0.000	0.000	0.055	0.000
OF	129.000	-1.742	0.000	9.128	0.000	0.000	0.000	0.000	0.037	0.000
OF	144.500	-1.181	0.000	9.128	0.000	0.000	0.000	0.000	0.070	0.000
IF	157.000	0.220	0.000	9.128	0.000	0.000	0.000	0.000	0.104	0.000
IF	172.500	1.732	0.000	9.128	0.000	0.000	0.000	0.000	0.084	0.000
IF	189.000	2.910	0.000	9.128	0.000	0.000	0.000	0.000	0.170	0.000
IF	205.500	7.343	0.000	9.128	0.000	0.000	0.000	0.000	0.257	0.000
IF	210.000	8.317	0.000	9.222	0.000	0.000	0.000	0.000	0.217	0.000
IF	213.300	9.033	0.000	9.420	0.000	0.000	0.000	0.000	0.220	0.000
IF	215.000	9.420	0.000	9.420	0.000	0.000	0.000	0.000	0.228	0.000
ET	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1

	END STATION	END ELEVATION	FETCH LENGTH	SURGE ELEV 10-YEAR	SURGE ELEV 100-YEAR	INITIAL WAVE HEIGHT	INITIAL W. PERIOD		BOTTOM SLOPE	AVERAGE A-ZONES
IE	0.000	-7.446	1.000	1.000	9.073	2.690	8.300	56.140	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	1.000	-7.422	0.000	9.073	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	2.000	-7.399	0.000	9.074	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	3.000	-7.376	0.000	9.074	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	4.000	-7.353	0.000	9.075	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	5.000	-7.330	0.000	9.076	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	6.000	-7.306	0.000	9.076	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	7.000	-7.283	0.000	9.077	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	8.000	-7.260	0.000	9.077	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	9.000	-7.237	0.000	9.078	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	10.000	-7.213	0.000	9.078	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	11.000	-7.190	0.000	9.079	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	12.000	-7.167	0.000	9.080	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	13.000	-7.144	0.000	9.080	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	14.000	-7.121	0.000	9.081	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	15.000	-7.097	0.000	9.081	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	16.000	-7.074	0.000	9.082	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	17.000	-7.051	0.000	9.082	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	18.000	-7.028	0.000	9.083	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	19.000	-7.004	0.000	9.084	0.000	0.000	0.000	0.000	0.023	0.000
	END	END	NEW SURGE	NEW SURGE					BOTTOM	AVERAGE
	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
OF	20.000	-6.981	0.000	9.084	0.000	0.000	0.000	0.000	0.023	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	21.000	-6.958	0.000	9.085	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	22.000	-6.935	0.000	9.085	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	23.000	-6.911	0.000	9.086	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	24.000	-6.888	0.000	9.086	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	25.000	-6.865	0.000	9.087	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	26.000	-6.842	0.000	9.088	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	27.000	-6.819	0.000	9.088	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	28.000	-6.795	0.000	9.089	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	29.000	-6.772	0.000	9.089	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	30.000	-6.749	0.000	9.090	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	31.000	-6.726	0.000	9.090	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	32.000	-6.703	0.000	9.091	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	33.000	-6.679	0.000	9.092	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	34.000	-6.656	0.000	9.092	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	35.000	-6.633	0.000	9.093	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	36.000	-6.610	0.000	9.093	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	37.000	-6.586	0.000	9.094	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	38.000	-6.563	0.000	9.094	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	39.000	-6.540	0.000	9.095	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	40.000	-6.517	0.000	9.096	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	41.000	-6.494	0.000	9.096	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	42.000	-6.470	0.000	9.097	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	43.000	-6.447	0.000	9.097	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	44.000	-6.424	0.000	9.098	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	45.000	-6.401	0.000	9.099	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	46.000	-6.377	0.000	9.099	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	47.000	-6.354	0.000	9.100	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	48.000	-6.331	0.000	9.100	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	49.000	-6.308	0.000	9.101	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	50.000	-6.285	0.000	9.101	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	51.000	-6.261	0.000	9.102	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	52.000	-6.238	0.000	9.102	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	53.000	-6.215	0.000	9.103	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	54.000	-6.192	0.000	9.104	0.000	0.000	0.000	0.000	0.023	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	55.000	-6.168	0.000	9.104	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	56.000	-6.145	0.000	9.105	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	57.000	-6.122	0.000	9.105	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	58.000	-6.099	0.000	9.106	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	59.000	-6.076	0.000	9.106	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	60.000	-6.052	0.000	9.107	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	61.000	-6.029	0.000	9.108	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	62.000	-6.006	0.000	9.108	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	63.000	-5.983	0.000	9.109	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	64.000	-5.959	0.000	9.109	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	65.000	-5.936	0.000	9.110	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	66.000	-5.913	0.000	9.111	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	67.000	-5.890	0.000	9.111	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	68.000	-5.867	0.000	9.112	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	69.000	-5.843	0.000	9.112	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	70.000	-5.820	0.000	9.113	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	71.000	-5.797	0.000	9.113	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	72.000	-5.774	0.000	9.114	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	73.000	-5.751	0.000	9.115	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	74.000	-5.727	0.000	9.115	0.000	0.000	0.000	0.000	0.023	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	75.000	-5.704	0.000	9.116	0.000	0.000	0.000	0.000	0.025	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	76.000	-5.677	0.000	9.116	0.000	0.000	0.000	0.000	0.032	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	77.000	-5.640	0.000	9.117	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	78.000	-5.603	0.000	9.117	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	79.000	-5.566	0.000	9.117	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	80.000	-5.529	0.000	9.118	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	81.000	-5.492	0.000	9.118	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	82.000	-5.456	0.000	9.118	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	83.000	-5.419	0.000	9.119	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	84.000	-5.382	0.000	9.119	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	85.000	-5.345	0.000	9.120	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	86.000	-5.308	0.000	9.120	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	87.000	-5.272	0.000	9.120	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	88.000	-5.235	0.000	9.121	0.000	0.000	0.000	0.000	0.037	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	89.000	-5.198	0.000	9.121	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	90.000	-5.161	0.000	9.122	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	91.000	-5.124	0.000	9.122	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	92.000	-5.087	0.000	9.122	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	93.000	-5.050	0.000	9.123	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	94.000	-5.014	0.000	9.123	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	95.000	-4.977	0.000	9.123	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	96.000	-4.940	0.000	9.124	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	97.000	-4.903	0.000	9.124	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	98.000	-4.866	0.000	9.125	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	99.000	-4.829	0.000	9.125	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	100.000	-4.792	0.000	9.125	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	101.000	-4.756	0.000	9.126	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	102.000	-4.719	0.000	9.126	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	103.000	-4.682	0.000	9.126	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	104.000	-4.645	0.000	9.127	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	105.000	-4.608	0.000	9.127	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	106.000	-4.571	0.000	9.128	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	107.000	-4.535	0.000	9.128	0.000	0.000	0.000	0.000	0.052	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	108.000	-4.467	0.000	9.128	0.000	0.000	0.000	0.000	0.132	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	109.000	-4.270	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	110.000	-4.072	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	111.000	-3.874	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	112.000	-3.677	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	113.000	-3.478	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	114.000	-3.281	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	115.000	-3.083	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	116.000	-2.885	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	117.000	-2.688	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	118.000	-2.490	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	119.000	-2.293	0.000	9.128	0.000	0.000	0.000	0.000	0.198	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	120.000	-2.095	0.000	9.128	0.000	0.000	0.000	0.000	0.055	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	129.000	-1.742	0.000	9.128	0.000	0.000	0.000	0.000	0.037	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
OF	144.500	-1.181	0.000	9.128	0.000	0.000	0.000	0.000	0.070	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	157.000	0.220	0.000	9.128	0.000	0.000	0.000	0.000	0.104	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	172.500	1.732	0.000	9.128	0.000	0.000	0.000	0.000	0.084	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	189.000	2.910	0.000	9.128	0.000	0.000	0.000	0.000	0.170	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	205.500	7.343	0.000	9.128	0.000	0.000	0.000	0.000	0.257	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	210.000	8.317	0.000	9.222	0.000	0.000	0.000	0.000	0.217	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	213.300	9.033	0.000	9.420	0.000	0.000	0.000	0.000	0.220	0.000
	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	215.000	9.420	0.000	9.420	0.000	0.000	0.000	0.000	0.228	0.000

----------END OF TRANSECT----------

NOTE:
SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

1

PART2: CONTROLLING WAVE HEIGHTS, SPECTRAL PEAK WAVE PERIOD, AND WAVE CREST ELEVATIONS

	LOCATION	CONTROLLING WAVE HEIGHT	SPECTRAL PEAK WAVE PERIOD	WAVE CREST ELEVATION
IE	0.00	2.69	8.30	10.96
OF	1.00	2.69	8.30	10.96
OF	2.00	2.69	8.30	10.96
OF	3.00	2.70	8.30	10.96
OF	4.00	2.70	8.30	10.96
OF	5.00	2.70	8.30	10.96
OF	6.00	2.70	8.30	10.97
OF	7.00	2.70	8.30	10.97
OF	8.00	2.70	8.30	10.97
OF	9.00	2.71	8.30	10.97
OF	10.00	2.71	8.30	10.97
OF	11.00	2.71	8.30	10.98
OF	12.00	2.71	8.30	10.98
OF	13.00	2.71	8.30	10.98
OF	14.00	2.71	8.30	10.98
OF	15.00	2.72	8.30	10.98
OF	16.00	2.72	8.30	10.98
OF	17.00	2.72	8.30	10.99
OF	18.00	2.72	8.30	10.99
OF	19.00	2.72	8.30	10.99
OF	20.00	2.72	8.30	10.99
OF	21.00	2.73	8.30	10.99
OF	22.00	2.73	8.30	10.99
OF	23.00	2.73	8.30	11.00
OF	24.00	2.73	8.30	11.00
OF	25.00	2.73	8.30	11.00
OF	26.00	2.73	8.30	11.00
OF	27.00	2.74	8.30	11.00
OF	28.00	2.74	8.30	11.01
OF	29.00	2.74	8.30	11.01
OF	30.00	2.74	8.30	11.01
OF	31.00	2.74	8.30	11.01
OF	32.00	2.74	8.30	11.01
OF	33.00	2.75	8.30	11.01
OF	34.00	2.75	8.30	11.02
OF	35.00	2.75	8.30	11.02
OF	36.00	2.75	8.30	11.02
OF	37.00	2.75	8.30	11.02
OF	38.00	2.76	8.30	11.02
OF	39.00	2.76	8.30	11.02
OF	40.00	2.76	8.30	11.03
OF	41.00	2.76	8.30	11.03
OF	42.00	2.76	8.30	11.03
OF	43.00	2.76	8.30	11.03
OF	44.00	2.77	8.30	11.03
OF	45.00	2.77	8.30	11.04
OF	46.00	2.77	8.30	11.04
OF	47.00	2.77	8.30	11.04
OF	48.00	2.77	8.30	11.04
OF	49.00	2.77	8.30	11.04
OF	50.00	2.78	8.30	11.04
OF	51.00	2.78	8.30	11.05
OF	52.00	2.78	8.30	11.05
OF	53.00	2.78	8.30	11.05
OF	54.00	2.78	8.30	11.05
OF	55.00	2.79	8.30	11.05
OF	56.00	2.79	8.30	11.06
OF	57.00	2.79	8.30	11.06
OF	58.00	2.79	8.30	11.06
OF	59.00	2.79	8.30	11.06
OF	60.00	2.79	8.30	11.06
OF	61.00	2.80	8.30	11.07
OF	62.00	2.80	8.30	11.07
OF	63.00	2.80	8.30	11.07
OF	64.00	2.80	8.30	11.07
OF	65.00	2.80	8.30	11.07
OF	66.00	2.81	8.30	11.08
OF	67.00	2.81	8.30	11.08
OF	68.00	2.81	8.30	11.08
OF	69.00	2.81	8.30	11.08
OF	70.00	2.81	8.30	11.08
OF	71.00	2.82	8.30	11.08
OF	72.00	2.82	8.30	11.09

OF	73.00	2.82	8.30	11.09
OF	74.00	2.82	8.30	11.09
OF	75.00	2.82	8.30	11.09
OF	76.00	2.82	8.30	11.09
OF	77.00	2.83	8.30	11.10
OF	78.00	2.83	8.30	11.10
OF	79.00	2.83	8.30	11.10
OF	80.00	2.84	8.30	11.10
OF	81.00	2.84	8.30	11.10
OF	82.00	2.84	8.30	11.11
OF	83.00	2.84	8.30	11.11
OF	84.00	2.85	8.30	11.11
OF	85.00	2.85	8.30	11.11
OF	86.00	2.85	8.30	11.12
OF	87.00	2.85	8.30	11.12
OF	88.00	2.86	8.30	11.12
OF	89.00	2.86	8.30	11.12
OF	90.00	2.86	8.30	11.13
OF	91.00	2.87	8.30	11.13
OF	92.00	2.87	8.30	11.13
OF	93.00	2.87	8.30	11.13
OF	94.00	2.87	8.30	11.13
OF	95.00	2.88	8.30	11.14
OF	96.00	2.88	8.30	11.14
OF	97.00	2.88	8.30	11.14
OF	98.00	2.89	8.30	11.14
OF	99.00	2.89	8.30	11.15
OF	100.00	2.89	8.30	11.15
OF	101.00	2.89	8.30	11.15
OF	102.00	2.90	8.30	11.15
OF	103.00	2.90	8.30	11.16
OF	104.00	2.90	8.30	11.16
OF	105.00	2.91	8.30	11.16
OF	106.00	2.91	8.30	11.16
OF	107.00	2.91	8.30	11.17
OF	108.00	2.92	8.30	11.17
OF	109.00	2.93	8.30	11.18
OF	110.00	2.94	8.30	11.19
OF	111.00	2.96	8.30	11.20
OF	112.00	2.97	8.30	11.21
OF	113.00	2.99	8.30	11.22
OF	114.00	3.00	8.30	11.23
OF	115.00	3.02	8.30	11.24
OF	116.00	3.04	8.30	11.25
OF	117.00	3.05	8.30	11.26
OF	118.00	3.07	8.30	11.28
OF	119.00	3.09	8.30	11.29
OF	120.00	3.11	8.30	11.30
OF	129.00	3.14	8.30	11.33
OF	144.50	3.21	8.30	11.37
IF	157.00	3.38	8.30	11.49
IF	172.50	3.63	8.30	11.67
IF	189.00	3.68	8.30	11.70
IF	205.50	1.38	8.30	10.09
IF	210.00	0.70	8.30	9.71
IF	213.30	0.30	8.30	9.63
IF	215.00	0.01	8.30	9.43

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

NO AREAS ABOVE 100-YEAR SURGE IN THIS TRANSECT

PART4 LOCATION OF SURGE CHANGES

STATION	10-YEAR SURGE	100-YEAR SURGE
2.00	1.00	9.07
4.00	1.00	9.07
5.00	1.00	9.08
7.00	1.00	9.08
9.00	1.00	9.08
11.00	1.00	9.08
12.00	1.00	9.08
14.00	1.00	9.08
16.00	1.00	9.08
18.00	1.00	9.08
19.00	1.00	9.08
21.00	1.00	9.09
23.00	1.00	9.09
25.00	1.00	9.09
26.00	1.00	9.09
28.00	1.00	9.09
30.00	1.00	9.09
32.00	1.00	9.09
33.00	1.00	9.09
35.00	1.00	9.09
37.00	1.00	9.09
39.00	1.00	9.10
40.00	1.00	9.10
42.00	1.00	9.10
44.00	1.00	9.10
45.00	1.00	9.10
47.00	1.00	9.10
49.00	1.00	9.10
51.00	1.00	9.10
53.00	1.00	9.10
54.00	1.00	9.10
56.00	1.00	9.10
58.00	1.00	9.11
60.00	1.00	9.11
61.00	1.00	9.11
63.00	1.00	9.11
65.00	1.00	9.11
66.00	1.00	9.11
68.00	1.00	9.11
70.00	1.00	9.11
72.00	1.00	9.11

73.00	1.00	9.11
75.00	1.00	9.12
77.00	1.00	9.12
80.00	1.00	9.12
83.00	1.00	9.12
85.00	1.00	9.12
88.00	1.00	9.12
90.00	1.00	9.12
93.00	1.00	9.12
96.00	1.00	9.12
98.00	1.00	9.12
101.00	1.00	9.13
104.00	1.00	9.13
106.00	1.00	9.13
210.00	1.00	9.22
213.30	1.00	9.42

PART5 LOCATION OF V ZONES

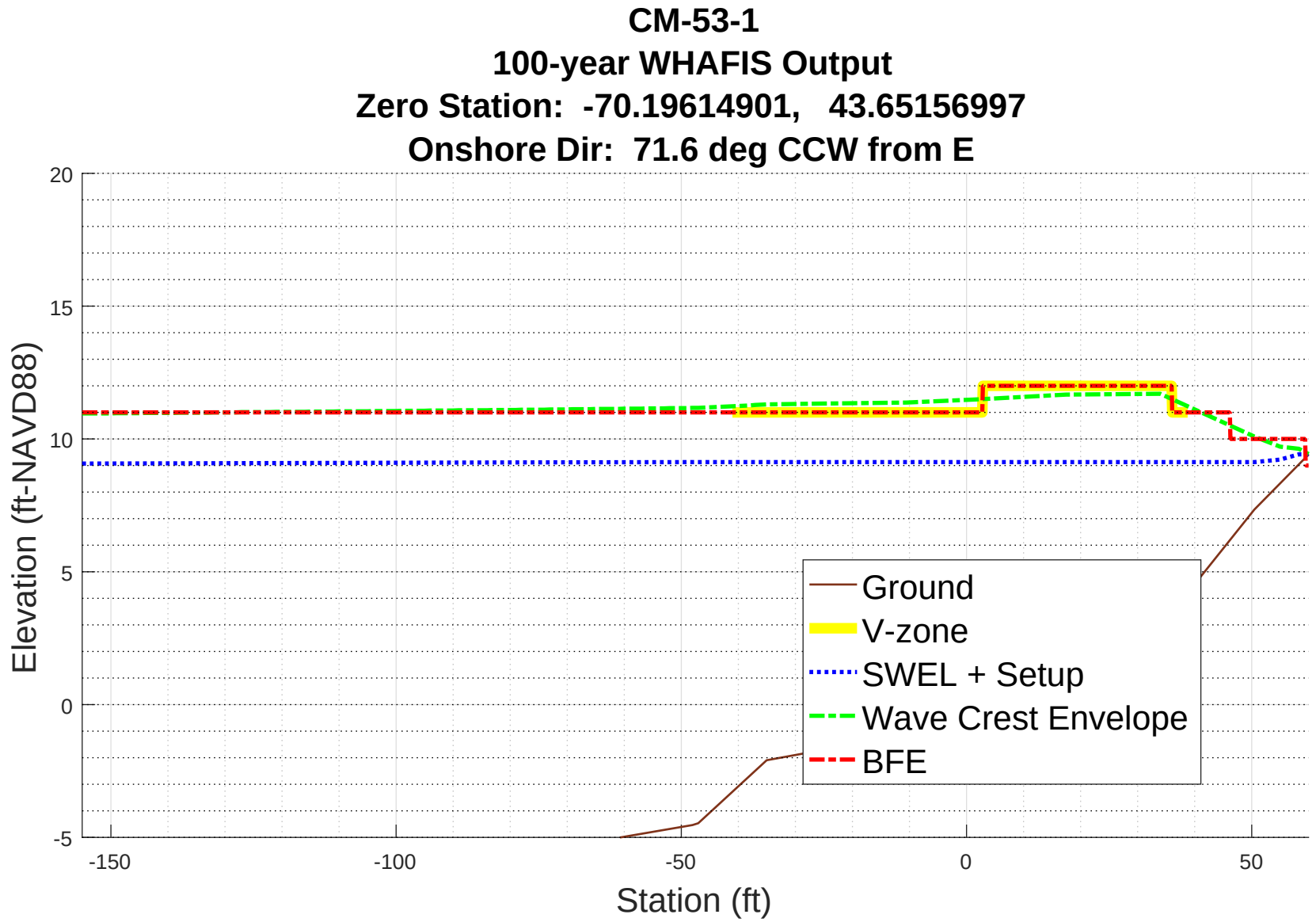
STATION OF GUTTER	LOCATION OF ZONE
113.78	LEEWARD
193.88	WINDWARD

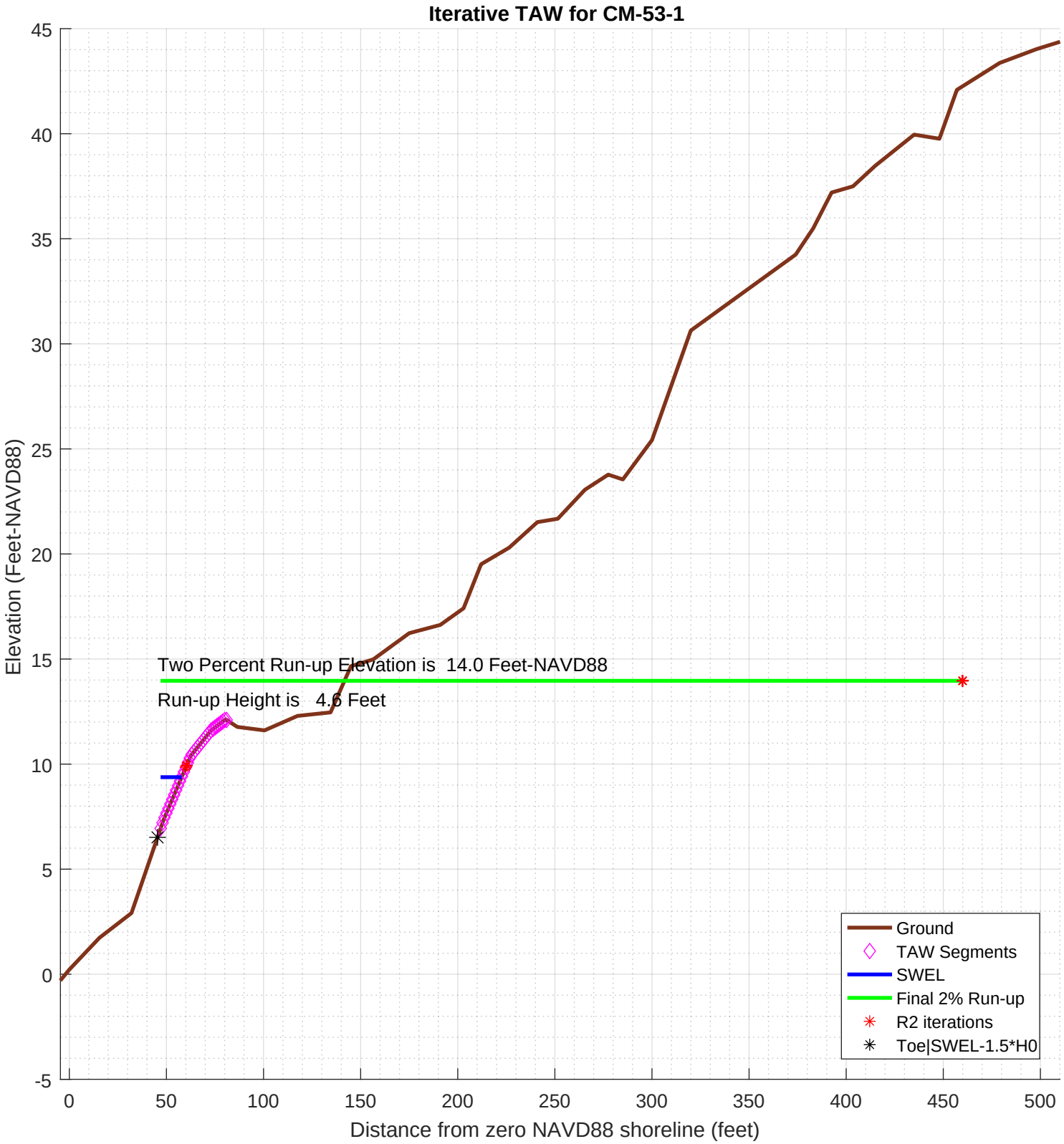
PART6 NUMBERED A ZONES AND V ZONES

STATION OF GUTTER	ELEVATION	ZONE DESIGNATION		FHF
0.00	10.96	A20	EL=11	100
1.00	10.96	A20	EL=11	100
2.00	10.96	A20	EL=11	100
3.00	10.96	A20	EL=11	100
4.00	10.96	A20	EL=11	100
5.00	10.96	A20	EL=11	100
6.00	10.97	A20	EL=11	100
7.00	10.97	A20	EL=11	100
8.00	10.97	A20	EL=11	100
9.00	10.97	A20	EL=11	100
10.00	10.97	A20	EL=11	100
11.00	10.98	A20	EL=11	100
12.00	10.98	A20	EL=11	100
13.00	10.98	A20	EL=11	100
14.00	10.98	A20	EL=11	100
15.00	10.98	A20	EL=11	100
16.00	10.98	A20	EL=11	100
17.00	10.99	A20	EL=11	100
18.00	10.99	A20	EL=11	100
19.00	10.99	A20	EL=11	100
20.00	10.99	A20	EL=11	100
21.00	10.99	A20	EL=11	100
22.00	10.99	A20	EL=11	100
23.00	11.00	A20	EL=11	100
24.00	11.00	A20	EL=11	100
25.00	11.00	A20	EL=11	100
26.00	11.00	A20	EL=11	100
27.00	11.00	A20	EL=11	100
28.00	11.01	A20	EL=11	100
29.00	11.01	A20	EL=11	100
30.00	11.01	A20	EL=11	100
31.00	11.01	A20	EL=11	100
32.00	11.01	A20	EL=11	100
33.00	11.01	A20	EL=11	100
34.00	11.02	A20	EL=11	100
35.00	11.02	A20	EL=11	100
36.00	11.02	A20	EL=11	100
37.00	11.02	A20	EL=11	100
38.00	11.02	A20	EL=11	100
39.00	11.02	A20	EL=11	100

40.00	11.03	A20	EL=11	100
41.00	11.03	A20	EL=11	100
42.00	11.03	A20	EL=11	100
43.00	11.03	A20	EL=11	100
44.00	11.03	A20	EL=11	100
45.00	11.04	A20	EL=11	100
46.00	11.04	A20	EL=11	100
47.00	11.04	A20	EL=11	100
48.00	11.04	A20	EL=11	100
49.00	11.04	A20	EL=11	100
50.00	11.04	A20	EL=11	100
51.00	11.05	A20	EL=11	100
52.00	11.05	A20	EL=11	100
53.00	11.05	A20	EL=11	100
54.00	11.05	A20	EL=11	100
55.00	11.05	A20	EL=11	100
56.00	11.06	A20	EL=11	100
57.00	11.06	A20	EL=11	100
58.00	11.06	A20	EL=11	100
59.00	11.06	A20	EL=11	100
60.00	11.06	A20	EL=11	100
61.00	11.07	A20	EL=11	100
62.00	11.07	A20	EL=11	100
63.00	11.07	A20	EL=11	100
64.00	11.07	A20	EL=11	100
65.00	11.07	A20	EL=11	100
66.00	11.08	A20	EL=11	100
67.00	11.08	A20	EL=11	100
68.00	11.08	A20	EL=11	100
69.00	11.08	A20	EL=11	100
70.00	11.08	A20	EL=11	100
71.00	11.08	A20	EL=11	100
72.00	11.09	A20	EL=11	100
73.00	11.09	A20	EL=11	100
74.00	11.09	A20	EL=11	100
75.00	11.09	A20	EL=11	100
76.00	11.09	A20	EL=11	100
77.00	11.10	A20	EL=11	100
79.00	11.10	A20	EL=11	100
80.00	11.10	A20	EL=11	100
82.00	11.11	A20	EL=11	100
83.00	11.11	A20	EL=11	100
84.00	11.11	A20	EL=11	100
85.00	11.11	A20	EL=11	100
87.00	11.12	A20	EL=11	100
88.00	11.12	A20	EL=11	100
89.00	11.12	A20	EL=11	100
90.00	11.13	A20	EL=11	100
92.00	11.13	A20	EL=11	100
93.00	11.13	A20	EL=11	100
95.00	11.14	A20	EL=11	100

```
                                96.00          11.14
                                                          A20  EL=11     100
                                97.00          11.14
                                                          A20  EL=11     100
                                98.00          11.14
                                                          A20  EL=11     100
                               100.00          11.15
                                                          A20  EL=11     100
                               101.00          11.15
                                                          A20  EL=11     100
                               103.00          11.16
                                                          A20  EL=11     100
                               104.00          11.16
                                                          A20  EL=11     100
                               105.00          11.16
                                                          A20  EL=11     100
                               106.00          11.16
                                                          A20  EL=11     100
                               113.78          11.23
                                                          V23  EL=11     130
                               157.46          11.50
                                                          V23  EL=12     130
                               191.08          11.50
                                                          V23  EL=11     130
                               193.88          11.23
                                                          A19  EL=11      95
                               201.34          10.50
                                                          A19  EL=10      95
                               205.50          10.09
                                                          A19  EL=10      95
                               210.00           9.71
                                                          A19  EL=10      95
                               213.30           9.63
                                                          A19  EL=10      95
                               214.38           9.50
                                                          A19  EL= 9      95
                               215.00           9.43
                                    ZONE TERMINATED AT END OF TRANSECT
                                    PART 7   POSTSCRIPT NOTES
                    PS#  1   START(403525.1288,4833824.8875)
                    PS#  2   END(403567.6267,4833952.7313)
-1.000000e+00
```


CM-53-1
100-year WHAFIS Output
Zero Station: -70.19614901, 43.65156997
Onshore Dir: 71.6 deg CCW from E
Elevation (ft-NAVD88)
Station (ft)
20
15
10
5
0
-5
-150
-100
-50
0
50
Ground
V-zone
SWEL + Setup
Wave Crest Envelope
BFE


Iterative TAW for CM-53-1
Two Percent Run-up Elevation is 14.0 Feet-NAVD88
Run-up Height is 4.6 Feet
Ground
TAW Segments
SWEL
Final 2% Run-up
R2 iterations
Toe|SWEL-1.5*H0
Elevation (Feet-NAVD88)
Distance from zero NAVD88 shoreline (feet)
45
40
35
30
25
20
15
10
5
0
-5
0
50
100
150
200
250
300
350
400
450
500

```
diary on         % begin recording

% FEMA appeal for The Town of Harpswell, Cumberland county, Maine
% TRANSECT ID: CM-53-1
% calculation by SJH, Ransom Consulting, Inc. 16-Apr-2020
% 100-year wave runup using TAW methodology
% including berm and weighted average with foreshore if necessary
%
% chk nld 20200220
%
% This script assumes that the incident wave conditions provided
% as input in the configuration section below are the
% appropriate values located at the end of the foreshore
% or toe of the slope on which the run-up is being calculated
% the script does not attempt to apply a depth limit or any other
% transformation to the incident wave conditions other than
% conversion of the peak wave period to the spectral mean wave
% as recommended in the references below
%
% references:
%
% Van der Meer, J.W., 2002. Technical Report Wave Run-up and
% Wave Overtopping at Dikes. TAW Technical Advisory Committee on
% Flood Defence, The Netherlands.
%
% FEMA. 2007,  Atlantic Ocean and Gulf of Mexico Coastal Guidelines Update
%
%
%

%-------------------------------------------------------------------------
% CONFIG
%-------------------------------------------------------------------------
fname='inpfiles/CM-53-1sta_ele_include.csv';   % file with station, elevation, include
                                    % third colunm is 0 for excluded points
imgname='logfiles/CM-53-1-runup';
SWEL=9.0727;  % 100-yr still water level including wave setup.
H0=1.7049;    % significant wave height at toe of structure
Tp=8.0957;    % peak period, 1/fma,
T0=Tp/1.1;

gamma_berm=1;   % this may get changed automatically below
gamma_rough=0.8;
gamma_beta=1;
gamma_perm=1;

setupAtToe=-0.0015879;
maxSetup=0.3469;   % only used in case of berm/shallow foreshore weighted average

plotTitle='Iterative TAW for CM-53-1'

plotTitle =

Iterative TAW for CM-53-1



% END CONFIG
%------------------------------

SWEL=SWEL+setupAtToe

SWEL =

                 9.0711121

SWEL_fore=SWEL+maxSetup

SWEL_fore =

                 9.4180121



% FIND WAVELENGTH USING DEEPWATER DISPERSION RELATION
% using English units
L0=32.15/(2*pi)*T0^2

L0 =

           277.15616993901


% Find Hb (Munk, 1949)
%Hb=H0/(3.3*(H0/L0)^(1/3))
%Db=-Hb/.78+SWEL;  % depth at breaking

% The toe elevation here is only used to determine the average
% structure slope, it is not used to depth limit the wave height.
% Any depth limiting or other modification of the wave height
```

```
% to make it consitent with TAW guidance should be performed
% prior to the input of the significant wave height given above.
Ztoe=SWEL-1.5*H0

Ztoe =

                 6.5137621


% read the transect
[sta,dep,inc] = textread(fname,'%n%n%n%*[^\n]','delimiter',',','headerlines',0);

% remove unselected points
k=find(inc==0);
sta(k)=[];
dep(k)=[];

sta_org=sta;  % used for plotting purposes
dep_org=dep;


% initial guess at maximum run-up elevation to estimate slope
Z2=SWEL+1.5*H0

Z2 =

               11.6284621


% determine station at the max runup and -1.5*H0 (i.e. the toe)
top_sta=-999;
toe_sta=-999;
for kk=1:length(sta)-1
    if ((Z2 > dep(kk)) & (Z2 <= dep(kk+1)))    % here is the intersection of z2 with profile
       top_sta=interp1(dep(kk:kk+1),sta(kk:kk+1),Z2)
    end
    if  ((Ztoe > dep(kk)) & (Ztoe <= dep(kk+1)))    % here is the intersection of Ztoe with profile
       toe_sta=interp1(dep(kk:kk+1),sta(kk:kk+1),Ztoe)
    end
end

toe_sta =

          45.4148854748707


top_sta =

          73.3447743281279

% check to make sure we got them, if not extend the end slopes outward
S=diff(dep)./diff(sta);
if toe_sta==-999
   dy=dep(1)-Ztoe;
   toe_sta=sta(1)-dy/S(1)
end
if top_sta==-999
   dy=Z2-dep(end);
   top_sta=sta(end)+dy/S(end)
end

% just so the reader can tell the values aren't -999 anymore
top_sta

top_sta =

          73.3447743281279

toe_sta

toe_sta =

          45.4148854748707




% check for case where the toe of slope is below SWL-1.5*H0
% in this case interpolate setup from the setupAtToe(really setup as first station), and the max setup
% also un-include points seaward of SWL-1.5*H0
if Ztoe > dep(1)
   dd=SWEL_fore-dep;
   k=find(dd<0,1); % k is index of first land point
   staAtSWL=interp1(dep(k-1:k),sta(k-1:k),SWEL_fore);
   dsta=staAtSWL-sta(1);
   dsetup=maxSetup-setupAtToe;
   dsetdsta=dsetup/dsta;
   setup=setupAtToe+dsetdsta*(toe_sta-sta(1));
   sprintf('-!!- Location of SWEL-1.5*H0 is %4.1f ft landward of toe of slope',dsta)
   sprintf('-!!- Setup is interpolated between setup at toe of slope and max setup')
```

```
   sprintf('-!!-       setup is adjusted to %4.2f feet',setup)
   SWEL=SWEL-setupAtToe+setup;
   sprintf('-!!-       SWEL is adjusted to %4.2f feet',SWEL)
   k=find(dep < SWEL-1.5*H0)
   sta(k)=[];
   dep(k)=[];
else
   sprintf('-!!- The User has selected a starting point that is %4.2f feet above the elevation of SWEL-1.5H0\n',dep(1
   sprintf('-!!- This may be reasonable for some cases.  However the user may want to consider:\n')
   sprintf('-!!-   1) Selecting a starting point that is at or below %4.2f feet elevation, or\n', Ztoe)
   sprintf('-!!-   2) Reducing the incident wave height to a depth limited condition.\n')
end

ans =

-!!- Location of SWEL-1.5*H0 is 105.0 ft landward of toe of slope


ans =

-!!- Setup is interpolated between setup at toe of slope and max setup


ans =

-!!-       setup is adjusted to 0.31 feet


ans =

-!!-       SWEL is adjusted to 9.38 feet


k =

     1
     2
     3
     4
     5
     6
     7
     8
     9
    10
    11
    12
    13
    14
    15
    16
    17
    18
    19
    20
    21
    22
    23
    24
    25
    26
    27
    28
    29
    30
    31
    32
    33
    34
    35
    36
    37
    38
    39
    40
    41
    42
    43
    44
    45
    46
    47
    48
    49
    50
    51
    52
    53
    54
    55
```

```
% now iterate converge on a runup elevation
tol=0.01;  % convergence criteria
R2del=999;
R2_new=3*H0; %initial guess
R2=R2_new;
iter=0;
R2_all=[];
topStaAll=[];
Berm_Segs=[];
TAW_ALWAYS_VALID=1;
while(abs(R2del) > tol && iter <= 25)
    iter=iter+1;
    sprintf ('!----------------- STARTING ITERATION %d -----------------!',iter)
    % elevation of toe of slope
    Ztoe
    % station of toe slope (relative to 0-NAVD88 shoreline
    toe_sta
    % station of top of slope/extent of 2% run-up
    top_sta
    % elevation of top of slope/extent of 2% run-up
    Z2
    % incident significant wave height
    H0
    % incident spectral peak wave period
    Tp
    % incident spectral mean wave period
    T0

    R2=R2_new
    Z2=R2+SWEL
    % determine slope for this iteration
    top_sta=-999;
    for kk=1:length(sta)-1
       if ((Z2 > dep(kk)) & (Z2 <= dep(kk+1)))    % here is the intersection of z2 with profile
          top_sta=interp1(dep(kk:kk+1),sta(kk:kk+1),Z2)
          break;
       end
    end
    if top_sta==-999
       dy=Z2-dep(end);
       top_sta=sta(end)+dy/S(end)
    end

    % get the length of the slope (not accounting for berm)
    Lslope=top_sta-toe_sta

    % loop over profile segments to determine berm factor
```

```
% re-calculate influence of depth of berm based on this run-up elevation
% check for berm, berm width, berm height
berm_width=0;
rdh_sum=0;
Berm_Segs=[];
Berm_Heights=[];
for kk=1:length(sta)-1
   ddep=dep(kk+1)-dep(kk);
   dsta=sta(kk+1)-sta(kk);
   s=ddep/dsta;
   if  (s < 1/15)     % count it as a berm if slope is flatter than 1:15 (see TAW manual)
      sprintf ('Berm Factor Calculation: Iteration %d, Profile Segment: %d',iter,kk)
      berm_width=berm_width+dsta;   % tally the width of all berm segments
      % compute the rdh for this segment and weight it by the segment length
      dh=SWEL-(dep(kk)+dep(kk+1))/2
      if  dh < 0
          chi=R2;
      else
          chi=2* H0;
      end
      if (dh <= R2 & dh >=-2*H0)
         rdh=(0.5-0.5*cos(3.14159*dh/chi)) ;
      else
         rdh=1;
      end
      rdh_sum=rdh_sum + rdh * dsta
      Berm_Segs=[Berm_Segs, kk];
      Berm_Heights=[Berm_Heights, (dep(kk)+dep(kk+1))/2];
   end
   if dep(kk) >= Z2  % jump out of loop if we reached limit of run-up for this iteration
      break
   end
end
sprintf ('!------- End Berm Factor Calculation, Iter: %d ---------!',iter)
berm_width
rB=berm_width/Lslope
if (berm_width > 0)
   rdh_mean=rdh_sum/berm_width
else
   rdh_mean=1
end
gamma_berm=1- rB * (1-rdh_mean)
if gamma_berm > 1
   gamma_berm=1
end
if gamma_berm < 0.6
   gamma_berm =0.6
end
% Iribarren number
slope=(Z2-Ztoe)/(Lslope-berm_width)
Irb=(slope/(sqrt(H0/L0)))
% runup height
gamma_berm
gamma_perm
gamma_beta
gamma_rough
gamma=gamma_berm*gamma_perm*gamma_beta*gamma_rough
% check validity
TAW_VALID=1;
if (Irb*gamma_berm < 0.5 | Irb*gamma_berm > 10 )
   sprintf('!!! - - Iribaren number: %6.2f is outside the valid range (0.5-10), TAW NOT VALID - - !!!\n', Irb*gam
   TAW_VALID=0;
else
   sprintf('!!! - - Iribaren number: %6.2f is in the valid range (0.5-10), TAW RECOMMENDED - - !!!\n', Irb*gamma_
end
islope=1/slope;
if (slope < 1/8 | slope > 1)
   sprintf('!!! - - slope: 1:%3.1f V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!\n', islope)
   TAW_VALID=0;
else
   sprintf('!!! - - slope: 1:%3.1f V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!\n', islope)
end
if TAW_VALID == 0
   TAW_ALWAYS_VALID=0;
end

if (Irb*gamma_berm < 1.8)
   R2_new=gamma*H0*1.77*Irb
else
   R2_new=gamma*H0*(4.3-(1.6/sqrt(Irb)))
end
% check to see if we need to evaluate a shallow foreshore
if berm_width > 0.25 * L0;
   disp ('!   Berm_width is greater than 1/4 wave length')
   disp ('!   Runup will be weighted average with foreshore calculation assuming depth limited wave height on ber
   % do the foreshore calculation
   fore_H0=0.78*(SWEL_fore-min(Berm_Heights))
   % get upper slope
   fore_toe_sta=-999;
   fore_toe_dep=-999;
```

```
       for kk=length(dep)-1:-1:1
          ddep=dep(kk+1)-dep(kk);
          dsta=sta(kk+1)-sta(kk);
          s=ddep/dsta;
          if s < 1/15
             break
          end
          fore_toe_sta=sta(kk);
          fore_toe_dep=dep(kk);
          upper_slope=(Z2-fore_toe_dep)/(top_sta-fore_toe_sta)
       end
       fore_Irb=upper_slope/(sqrt(fore_H0/L0));
       fore_gamma=gamma_perm*gamma_beta*gamma_rough;
       if (fore_Irb < 1.8)
          fore_R2=fore_gamma*fore_H0*1.77*fore_Irb;
       else
          fore_R2=fore_gamma*fore_H0*(4.3-(1.6/sqrt(fore_Irb)));
       end
       if berm_width >= L0
          R2_new=fore_R2
          disp ('berm is wider than one wavelength, use full shallow foreshore solution');
       else
          w2=(berm_width-0.25*L0)/(0.75*L0)
          w1=1-w2
          R2_new=w2*fore_R2 + w1*R2_new
       end
    end % end berm width check
    % convergence criterion
    R2del=abs(R2-R2_new)
    R2_all(iter)=R2_new;
    % get the new top station (for plot purposes)
    Z2=R2_new+SWEL
    top_sta=-999;
    for kk=1:length(sta)-1
       if ((Z2 > dep(kk)) & (Z2 <= dep(kk+1)))    % here is the intersection of z2 with profile
          top_sta=interp1(dep(kk:kk+1),sta(kk:kk+1),Z2)
          break;
       end
    end
    if top_sta==-999
       dy=Z2-dep(end);
       top_sta=sta(end)+dy/S(end);
    end
    topStaAll(iter)=top_sta;
end
ans =
!----------------- STARTING ITERATION 1 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          73.3447743281279
Z2 =
               11.6284621
H0 =
                   1.7049
Tp =
                   8.0957
T0 =
          7.35972727272727
R2 =
                   5.1147
Z2 =
          14.4924632098631
top_sta =
          567.338591721866
Lslope =
          521.923706246995
ans =
Berm Factor Calculation: Iteration 1, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
         0.549552760497199
ans =
!------- End Berm Factor Calculation, Iter: 1 ---------!
berm_width =
     1
rB =
       0.00191598884670466
rdh_mean =
          0.549552760497199
gamma_berm =
          0.999136948113084
slope =
        0.0153164484821506
Irb =
          0.195285903188763
gamma_berm =
```

```
         0.999136948113084
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
         0.799309558490467
ans =
!!! - - Iribaren number:   0.20 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:65.3 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
         0.471040314472975
R2del =
          4.64365968552702
Z2 =
          9.84880352433604
top_sta =
          59.9998005163601
ans =
!----------------- STARTING ITERATION 2 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          59.9998005163601
Z2 =
          9.84880352433604
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
         0.471040314472975
Z2 =
          9.84880352433604
top_sta =
          59.9998005163601
Lslope =
          14.5849150414894
ans =
!------- End Berm Factor Calculation, Iter: 2 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
         0.228663753943641
Irb =
          2.91548055461138
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
                       0.8
ans =
!!! - - Iribaren number:   2.92 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
           4.5867884572374
R2del =
          4.11574814276443
Z2 =
          13.9645516671005
ans =
!----------------- STARTING ITERATION 3 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          460.061301991597
Z2 =
          13.9645516671005
H0 =
```

```
                    1.7049
Tp =
                    8.0957
T0 =
           7.35972727272727
R2 =
            4.5867884572374
Z2 =
           13.9645516671005
top_sta =
           460.061301991597
Lslope =
           414.646416516726
ans =
Berm Factor Calculation: Iteration 3, Profile Segment: 34
dh =
          -2.71896729013694
rdh_sum =
           0.643686401932612
ans =
!------- End Berm Factor Calculation, Iter: 3 ---------!
berm_width =
     1
rB =
       0.00241169333718253
rdh_mean =
           0.643686401932612
gamma_berm =
           0.999140680869593
slope =
         0.0180124600857002
Irb =
           0.229660259725798
gamma_berm =
           0.999140680869593
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
           0.799312544695675
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
           0.553955218232992
R2del =
            4.03283323900441
Z2 =
            9.93171842809605
top_sta =
           60.3802453317674
ans =
!------------------ STARTING ITERATION 4 -----------------!
Ztoe =
                  6.5137621
toe_sta =
           45.4148854748707
top_sta =
           60.3802453317674
Z2 =
           9.93171842809605
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
           7.35972727272727
R2 =
          0.553955218232992
Z2 =
           9.93171842809605
top_sta =
           60.3802453317674
Lslope =
           14.9653598568967
ans =
!------- End Berm Factor Calculation, Iter: 4 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
```

```
         0.228391188770574
Irb =
          2.91200532756626
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
                       0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
          4.58602605297957
R2del =
          4.03207083474657
Z2 =
          13.9637892628426
ans =
!----------------- STARTING ITERATION 5 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          459.906373266168
Z2 =
          13.9637892628426
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
          4.58602605297957
Z2 =
          13.9637892628426
top_sta =
          459.906373266168
Lslope =
          414.491487791297
ans =
Berm Factor Calculation: Iteration 5, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
          0.643834662876749
ans =
!------- End Berm Factor Calculation, Iter: 5 ---------!
berm_width =
     1
rB =
        0.0024125947804832
rdh_mean =
          0.643834662876749
gamma_berm =
          0.999140717366667
slope =
        0.0180173652488897
Irb =
          0.229722800935979
gamma_berm =
          0.999140717366667
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
          0.799312573893334
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
          0.554106091868018
R2del =
           4.03191996111155
Z2 =
           9.93186930173108
top_sta =
           60.3809375968426
ans =
```

```
!----------------- STARTING ITERATION 6 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          60.3809375968426
Z2 =
          9.93186930173108
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
         0.554106091868018
Z2 =
          9.93186930173108
top_sta =
          60.3809375968426
Lslope =
          14.9660521219719
ans =
!------- End Berm Factor Calculation, Iter: 6 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
         0.228390705436132
Irb =
          2.91199916501473
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                      0.8
gamma =
                      0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
          4.58602469981103
R2del =
          4.03191860794301
Z2 =
          13.9637879096741
ans =
!----------------- STARTING ITERATION 7 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          459.906098287803
Z2 =
          13.9637879096741
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
          4.58602469981103
Z2 =
          13.9637879096741
top_sta =
          459.906098287803
Lslope =
          414.491212812932
ans =
Berm Factor Calculation: Iteration 7, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
         0.643834926052238
ans =
!------- End Berm Factor Calculation, Iter: 7 ---------!
berm_width =
```

```
     1
rB =
       0.00241259638102707
rdh_mean =
          0.643834926052238
gamma_berm =
          0.999140717431545
slope =
        0.0180173739581851
Irb =
          0.229722911980169
gamma_berm =
          0.999140717431545
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
          0.799312573945236
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
          0.554106359749687
R2del =
           4.03191834006134
Z2 =
           9.93186956961275
top_sta =
           60.3809388259846
ans =
!----------------- STARTING ITERATION 8 -----------------!
Ztoe =
                  6.5137621
toe_sta =
           45.4148854748707
top_sta =
           60.3809388259846
Z2 =
           9.93186956961275
H0 =
                     1.7049
Tp =
                     8.0957
T0 =
           7.35972727272727
R2 =
          0.554106359749687
Z2 =
           9.93186956961275
top_sta =
           60.3809388259846
Lslope =
           14.9660533511139
ans =
!------- End Berm Factor Calculation, Iter: 8 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
          0.228390704577994
Irb =
            2.9119991540734
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
                        0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
           4.58602469740854
R2del =
           4.03191833765885
Z2 =
```

```
          13.9637879072716
ans =
!----------------- STARTING ITERATION 9 -----------------!
Ztoe =
                  6.5137621
toe_sta =
          45.4148854748707
top_sta =
          459.906097799591
Z2 =
          13.9637879072716
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
          4.58602469740854
Z2 =
          13.9637879072716
top_sta =
          459.906097799591
Lslope =
           414.49121232472
ans =
Berm Factor Calculation: Iteration 9, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
          0.643834926519495
ans =
!------- End Berm Factor Calculation, Iter: 9 ---------!
berm_width =
     1
rB =
       0.00241259638386877
rdh_mean =
          0.643834926519495
gamma_berm =
          0.999140717431661
slope =
        0.0180173739736481
Irb =
          0.229722912177323
gamma_berm =
          0.999140717431661
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
          0.799312573945329
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
           0.5541063602253
R2del =
          4.03191833718324
Z2 =
          9.93186957008836
top_sta =
          60.3809388281669
ans =
!----------------- STARTING ITERATION 10 -----------------!
Ztoe =
                  6.5137621
toe_sta =
          45.4148854748707
top_sta =
          60.3809388281669
Z2 =
          9.93186957008836
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
           0.5541063602253
Z2 =
          9.93186957008836
top_sta =
          60.3809388281669
Lslope =
```

```
          14.9660533532962
ans =
!------- End Berm Factor Calculation, Iter: 10 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
          0.22839070457647
Irb =
          2.91199915405397
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
                        0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
          4.58602469740427
R2del =
          4.03191833717897
Z2 =
          13.9637879072673
ans =
!----------------- STARTING ITERATION 11 -----------------!
Ztoe =
                  6.5137621
toe_sta =
          45.4148854748707
top_sta =
          459.906097798724
Z2 =
          13.9637879072673
H0 =
                     1.7049
Tp =
                     8.0957
T0 =
          7.35972727272727
R2 =
          4.58602469740427
Z2 =
          13.9637879072673
top_sta =
          459.906097798724
Lslope =
          414.491212323853
ans =
Berm Factor Calculation: Iteration 11, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
         0.643834926520324
ans =
!------- End Berm Factor Calculation, Iter: 11 ---------!
berm_width =
     1
rB =
       0.00241259638387381
rdh_mean =
         0.643834926520324
gamma_berm =
         0.999140717431661
slope =
        0.0180173739736755
Irb =
          0.229722912177673
gamma_berm =
          0.999140717431661
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
          0.799312573945329
ans =
```

```
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
         0.554106360226144
R2del =
          4.03191833717813
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
ans =
!----------------- STARTING ITERATION 12 -----------------!
Ztoe =
                 6.5137621
toe_sta =
          45.4148854748707
top_sta =
          60.3809388281708
Z2 =
          9.93186957008921
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
         0.554106360226144
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
Lslope =
          14.9660533533001
ans =
!------- End Berm Factor Calculation, Iter: 12 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
         0.228390704576467
Irb =
          2.91199915405394
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                      0.8
gamma =
                      0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
          4.58602469740427
R2del =
          4.03191833717812
Z2 =
          13.9637879072673
ans =
!----------------- STARTING ITERATION 13 -----------------!
Ztoe =
                 6.5137621
toe_sta =
          45.4148854748707
top_sta =
          459.906097798722
Z2 =
          13.9637879072673
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
          4.58602469740427
Z2 =
          13.9637879072673
top_sta =
```

```
          459.906097798722
Lslope =
          414.491212323851
ans =
Berm Factor Calculation: Iteration 13, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
         0.643834926520326
ans =
!------- End Berm Factor Calculation, Iter: 13 ---------!
berm_width =
     1
rB =
       0.00241259638387382
rdh_mean =
         0.643834926520326
gamma_berm =
         0.999140717431661
slope =
        0.0180173739736756
Irb =
         0.229722912177674
gamma_berm =
         0.999140717431661
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
         0.799312573945329
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
         0.554106360226146
R2del =
          4.03191833717812
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
ans =
!----------------- STARTING ITERATION 14 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          60.3809388281708
Z2 =
          9.93186957008921
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
         0.554106360226146
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
Lslope =
          14.9660533533001
ans =
!------- End Berm Factor Calculation, Iter: 14 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
         0.228390704576467
Irb =
          2.91199915405394
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
```

```
                    0.8
gamma =
                    0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
         4.58602469740427
R2del =
         4.03191833717812
Z2 =
         13.9637879072673
ans =
!----------------- STARTING ITERATION 15 -----------------!
Ztoe =
               6.5137621
toe_sta =
         45.4148854748707
top_sta =
         459.906097798722
Z2 =
         13.9637879072673
H0 =
                  1.7049
Tp =
                  8.0957
T0 =
         7.35972727272727
R2 =
         4.58602469740427
Z2 =
         13.9637879072673
top_sta =
         459.906097798722
Lslope =
         414.491212323852
ans =
Berm Factor Calculation: Iteration 15, Profile Segment: 34
dh =
        -2.71896729013694
rdh_sum =
         0.643834926520326
ans =
!------- End Berm Factor Calculation, Iter: 15 ---------!
berm_width =
     1
rB =
       0.00241259638387382
rdh_mean =
         0.643834926520326
gamma_berm =
         0.999140717431661
slope =
        0.0180173739736756
Irb =
         0.229722912177674
gamma_berm =
         0.999140717431661
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                    0.8
gamma =
         0.799312573945329
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
         0.554106360226146
R2del =
          4.03191833717812
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
ans =
!----------------- STARTING ITERATION 16 -----------------!
Ztoe =
               6.5137621
toe_sta =
         45.4148854748707
top_sta =
         60.3809388281708
Z2 =
         9.93186957008921
H0 =
```

```
                    1.7049
Tp =
                    8.0957
T0 =
           7.35972727272727
R2 =
          0.554106360226146
Z2 =
           9.93186957008921
top_sta =
           60.3809388281708
Lslope =
           14.9660533533001
ans =
!------- End Berm Factor Calculation, Iter: 16 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
          0.228390704576467
Irb =
           2.91199915405394
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
                        0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
           4.58602469740427
R2del =
           4.03191833717812
Z2 =
           13.9637879072673
ans =
!----------------- STARTING ITERATION 17 -----------------!
Ztoe =
                  6.5137621
toe_sta =
           45.4148854748707
top_sta =
           459.906097798722
Z2 =
           13.9637879072673
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
           7.35972727272727
R2 =
           4.58602469740427
Z2 =
           13.9637879072673
top_sta =
           459.906097798722
Lslope =
           414.491212323851
ans =
Berm Factor Calculation: Iteration 17, Profile Segment: 34
dh =
          -2.71896729013694
rdh_sum =
          0.643834926520326
ans =
!------- End Berm Factor Calculation, Iter: 17 ---------!
berm_width =
     1
rB =
       0.00241259638387382
rdh_mean =
          0.643834926520326
gamma_berm =
          0.999140717431661
slope =
         0.0180173739736756
Irb =
```

```
         0.229722912177674
gamma_berm =
         0.999140717431661
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
         0.799312573945329
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
         0.554106360226146
R2del =
          4.03191833717812
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
ans =
!----------------- STARTING ITERATION 18 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          60.3809388281708
Z2 =
          9.93186957008921
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
         0.554106360226146
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
Lslope =
          14.9660533533001
ans =
!------- End Berm Factor Calculation, Iter: 18 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
         0.228390704576467
Irb =
          2.91199915405394
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
                       0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
          4.58602469740427
R2del =
          4.03191833717812
Z2 =
          13.9637879072673
ans =
!----------------- STARTING ITERATION 19 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          459.906097798722
Z2 =
```

```
          13.9637879072673
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
          4.58602469740427
Z2 =
          13.9637879072673
top_sta =
          459.906097798722
Lslope =
          414.491212323852
ans =
Berm Factor Calculation: Iteration 19, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
          0.643834926520326
ans =
!------- End Berm Factor Calculation, Iter: 19 ---------!
berm_width =
     1
rB =
       0.00241259638387382
rdh_mean =
          0.643834926520326
gamma_berm =
          0.999140717431661
slope =
        0.0180173739736756
Irb =
          0.229722912177674
gamma_berm =
          0.999140717431661
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
          0.799312573945329
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
          0.554106360226146
R2del =
           4.03191833717812
Z2 =
           9.93186957008921
top_sta =
          60.3809388281708
ans =
!----------------- STARTING ITERATION 20 -----------------!
Ztoe =
                  6.5137621
toe_sta =
          45.4148854748707
top_sta =
          60.3809388281708
Z2 =
          9.93186957008921
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
          0.554106360226146
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
Lslope =
          14.9660533533001
ans =
!------- End Berm Factor Calculation, Iter: 20 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
```

```
     1
slope =
         0.228390704576467
Irb =
          2.91199915405394
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
                       0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
          4.58602469740427
R2del =
          4.03191833717812
Z2 =
          13.9637879072673
ans =
!----------------- STARTING ITERATION 21 -----------------!
Ztoe =
                  6.5137621
toe_sta =
          45.4148854748707
top_sta =
          459.906097798722
Z2 =
          13.9637879072673
H0 =
                     1.7049
Tp =
                     8.0957
T0 =
          7.35972727272727
R2 =
          4.58602469740427
Z2 =
          13.9637879072673
top_sta =
          459.906097798722
Lslope =
          414.491212323851
ans =
Berm Factor Calculation: Iteration 21, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
         0.643834926520326
ans =
!------- End Berm Factor Calculation, Iter: 21 ---------!
berm_width =
     1
rB =
       0.00241259638387382
rdh_mean =
          0.643834926520326
gamma_berm =
          0.999140717431661
slope =
         0.0180173739736756
Irb =
          0.229722912177674
gamma_berm =
          0.999140717431661
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
          0.799312573945329
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
          0.554106360226146
R2del =
          4.03191833717812
Z2 =
          9.93186957008921
top_sta =
```

```
          60.3809388281708
ans =
!----------------- STARTING ITERATION 22 -----------------!
Ztoe =
                  6.5137621
toe_sta =
          45.4148854748707
top_sta =
          60.3809388281708
Z2 =
          9.93186957008921
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
         0.554106360226146
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
Lslope =
          14.9660533533001
ans =
!------- End Berm Factor Calculation, Iter: 22 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
         0.228390704576467
Irb =
          2.91199915405394
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
                        0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
          4.58602469740427
R2del =
          4.03191833717812
Z2 =
          13.9637879072673
ans =
!----------------- STARTING ITERATION 23 -----------------!
Ztoe =
                  6.5137621
toe_sta =
          45.4148854748707
top_sta =
          459.906097798722
Z2 =
          13.9637879072673
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
          4.58602469740427
Z2 =
          13.9637879072673
top_sta =
          459.906097798722
Lslope =
          414.491212323852
ans =
Berm Factor Calculation: Iteration 23, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
         0.643834926520326
ans =
```

```
!------- End Berm Factor Calculation, Iter: 23 ---------!
berm_width =
     1
rB =
       0.00241259638387382
rdh_mean =
         0.643834926520326
gamma_berm =
         0.999140717431661
slope =
        0.0180173739736756
Irb =
         0.229722912177674
gamma_berm =
         0.999140717431661
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
         0.799312573945329
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
         0.554106360226146
R2del =
          4.03191833717812
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
ans =
!----------------- STARTING ITERATION 24 -----------------!
Ztoe =
                6.5137621
toe_sta =
          45.4148854748707
top_sta =
          60.3809388281708
Z2 =
          9.93186957008921
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
         0.554106360226146
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
Lslope =
          14.9660533533001
ans =
!------- End Berm Factor Calculation, Iter: 24 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
         0.228390704576467
Irb =
          2.91199915405394
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
                       0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
          4.58602469740427
R2del =
```

```
          4.03191833717812
Z2 =
          13.9637879072673
ans =
!----------------- STARTING ITERATION 25 -----------------!
Ztoe =
                  6.5137621
toe_sta =
          45.4148854748707
top_sta =
          459.906097798722
Z2 =
          13.9637879072673
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
          4.58602469740427
Z2 =
          13.9637879072673
top_sta =
          459.906097798722
Lslope =
          414.491212323851
ans =
Berm Factor Calculation: Iteration 25, Profile Segment: 34
dh =
         -2.71896729013694
rdh_sum =
          0.643834926520326
ans =
!------- End Berm Factor Calculation, Iter: 25 ---------!
berm_width =
     1
rB =
       0.00241259638387382
rdh_mean =
          0.643834926520326
gamma_berm =
          0.999140717431661
slope =
        0.0180173739736756
Irb =
          0.229722912177674
gamma_berm =
          0.999140717431661
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                        0.8
gamma =
          0.799312573945329
ans =
!!! - - Iribaren number:   0.23 is outside the valid range (0.5-10), TAW NOT VALID - - !!!
ans =
!!! - - slope: 1:55.5 V:H is outside the valid range (1:8 - 1:1), TAW NOT VALID - - !!!
R2_new =
          0.554106360226146
R2del =
          4.03191833717812
Z2 =
          9.93186957008921
top_sta =
          60.3809388281708
ans =
!----------------- STARTING ITERATION 26 -----------------!
Ztoe =
                  6.5137621
toe_sta =
          45.4148854748707
top_sta =
          60.3809388281708
Z2 =
          9.93186957008921
H0 =
                    1.7049
Tp =
                    8.0957
T0 =
          7.35972727272727
R2 =
          0.554106360226146
Z2 =
          9.93186957008921
top_sta =
```

```
          60.3809388281708
Lslope =
          14.9660533533001
ans =
!------- End Berm Factor Calculation, Iter: 26 ---------!
berm_width =
     0
rB =
     0
rdh_mean =
     1
gamma_berm =
     1
slope =
         0.228390704576467
Irb =
          2.91199915405394
gamma_berm =
     1
gamma_perm =
     1
gamma_beta =
     1
gamma_rough =
                       0.8
gamma =
                       0.8
ans =
!!! - - Iribaren number:   2.91 is in the valid range (0.5-10), TAW RECOMMENDED - - !!!
ans =
!!! - - slope: 1:4.4 V:H is in the valid range (1:8 - 1:1), TAW RECOMMENDED - - !!!
R2_new =
          4.58602469740427
R2del =
          4.03191833717812
Z2 =
          13.9637879072673
% final 2% runup elevation
Z2=R2_new+SWEL
Z2 =
          13.9637879072673
diary off
-1.000000e+00
```

PART 5: RUNUP2

for transect: CM-53-1

Station locations shifted by: -1.96 feet from their
original location to set the shoreline to
elevation 0 for RUNUP2 input

RUNUP2 INPUT CONVERSIONS
for transect: CM-53-1

Incident significant wave height: 1.68 feet

Peak wave period: 8.30 seconds

Mean wave height: 1.05 feet

Local Depth below SWEL: 16.52 feet

Mean wave height deshoaled using Hunt approximation for
celerity assuming constant wave energy flux.
References: R.G. Dean and R.A. Dalrymple. 2000. Water

Wave Mechanics for Engineers and Scientists. World
Scientific Publishing Company, River Edge New Jersy

USACE (1985), Direct Methods for Calculating Wavelength, CETN-1-17
US Army Engineer Waterways Experiment Station Coastel Engineering
Research Center, Vicksburg, MS

also see Coastal Engineering Manual Part II-3
for discussion of shoaling coefficient

Depth, D = 16.52
Period, T = 7.06
Waveheight, H = 1.05
Deep water wavelength, L0 (ft)
L0 = g*T*T/twopi
L0 = 32.17*7.06*7.06/6.28 = 254.87
Deep water wave celerity, C0 (ft/s)
C0 = L0/T
C0 = 254.87/7.06 = 36.13
Angular frequency, sigma (rad/s)
sigma = twopi/T
sigma = 6.28/7.06 = 0.89
Hunts (1979) approximation for Celerity C1H (ft/s) at Depth D (ft)
y = sigma.*sigma.*D./g
y = 0.89*0.89*16.52/32.17 = 0.41
C1H = sqrt(g.*D./(y+1./(1 + 0.6522.*y + 0.4622.*y.^2 + 0.0864.*y.^4 +0.0675.*y.^5)))
C1H = 21.49
Shoaling Coefficient KsH
KsH = sqrt(C0/C1H)
KsH = sqrt(36.13/21.49) = 1.30
Deepwater Wave Height H0_H (ft)
H0_H = H/KsH
H0_H = 1.05/1.30 = 0.81

Deepwater mean wave height: 0.81 feet

END RUNUP2 CONVERSIONS

RUNUP2 RESULTS
for transect: CM-53-1

RUNUP2 SWEL:
9.10
9.10
9.10
9.10

9.10
9.10
9.10
9.10
9.10

RUNUP2 deepwater mean wave heights:
0.77
0.77
0.77
0.81
0.81
0.81
0.85
0.85
0.85

RUNUP2 mean wave periods:
6.70
7.06
7.41
6.70
7.06
7.41
6.70
7.06
7.41

RUNUP2 runup above SWEL:
1.86
1.91
1.95
1.93
1.98
2.02
2.00
2.05
2.09

RUNUP2 Mean runup height above SWEL: 1.98 feet

RUNUP2 2-percent runup height above SWEL: 4.35 feet

RUNUP2 2-percent runup elevation: 13.45 feet-NAVD88

RUNUP2 Messages:
No Messages

_____END RUNUP2 RESULTS_____

_____ACES BEACH RUNUP_____

Incident significant wave height: 1.68 feet

Significant wave height is mean wave height divided by 0.626
Reference: D.2.8.1.2.1 Atlanic and Gulf of Mexico G&S Feb. 2007

Deepwater significant wave height: 1.30 feet

Peak wave period: 8.30 seconds

Average beach Slope: 1:12.13 (H:V)

ACES IRREGULAR WAVE RUNUP ON BEACHES

Reference:
Leenknecht, David A., Andre Szuwaiski, and Ann Sherlock. 1992.
"Automated Coastal Engineering System Technical Reference",
Coastal Engineering Research Center, Department of the Army

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# Waterways Experiments Station, Corps of Eniggneers, 3909 Halls
# Ferry Road, Vicksburg, Mississippi 39180-6199.

INPUTS:

Acceleration Due to Gravity,        g  =   32.174
Deepwater Significant Wave height,  Hs =     1.30
Wave Period,                        T  =     8.30
Beach Slope,                        S  =    0.082

EQUATIONS:

Runup,           R   = Hs * a * Irb^b
Iribarren,       Irb = S/sqrt(Hs/L0)
Wavelength,      L0  = g * T^2 / 2 / pi

COEFFICIENTS:
(Mase, H. 1989, "Random Wave Runup Height on Gentle Slopes,"
j. Waterway, Port, Coastal and Ocean Engineering Division,
ASCE, Vol 115, No. 5, pp 649-661.)

               [Rmax,  R2%, R-1/3, R-1/10, R-mean]
          a = [2.32, 1.86,  1.70,   1.38,   0.88]
          b = [0.77, 0.71,  0.71,   0.70,   0.69]

RESULTS:

       RUNUP = [ 3.8,  3.0,   2.7,    2.2,    1.4]

ACES RUNUP CALCULATED USING 'Aces_Beach_Runup.m'

ACES Beach 2-percent runup height above SWEL: 3.00 feet

ACES Beach 2-percent runup elevation: 12.10 feet-NAVD88

ACES BEACH RUNUP is valid

_____________END ACES BEACH RESULTS_____________________

PART 5 COMPLETE_____________________________________________
```

```
  FEMA                                                  sjh           job 2
  RUNUP2 transect: CM-53-1                                              1
15.0
  -7.45 -155.0 0.8
  -6.84 -129.0 0.8
  -6.61 -119.0 0.8
  -6.17 -100.0 0.8
  -5.70 -80.0  0.8
  -5.68 -79.0  0.8
  -4.53 -48.0  0.8
  -4.47 -47.0  0.8
  -3.87 -44.0  0.8
  -2.89 -39.0  0.8
  -2.09 -35.0  0.8
  -1.74 -26.0  0.8
  -1.18 -10.5  0.8
  0.22  2.0    0.8
  1.73  17.5   0.8
  2.91  34.0   0.8
  7.34  50.5   0.8
  10.39 64.5   0.8
  11.60 75.0   0.8
1 12.13 82.5   0.8
 9.1   0.77  6.70
 9.1   0.77  7.06
 9.1   0.77  7.41
 9.1   0.81  6.70
 9.1   0.81  7.06
 9.1   0.81  7.41
 9.1   0.85  6.70
 9.1   0.85  7.06
 9.1   0.85  7.41
```

****

CROSS SECTION PROFILE

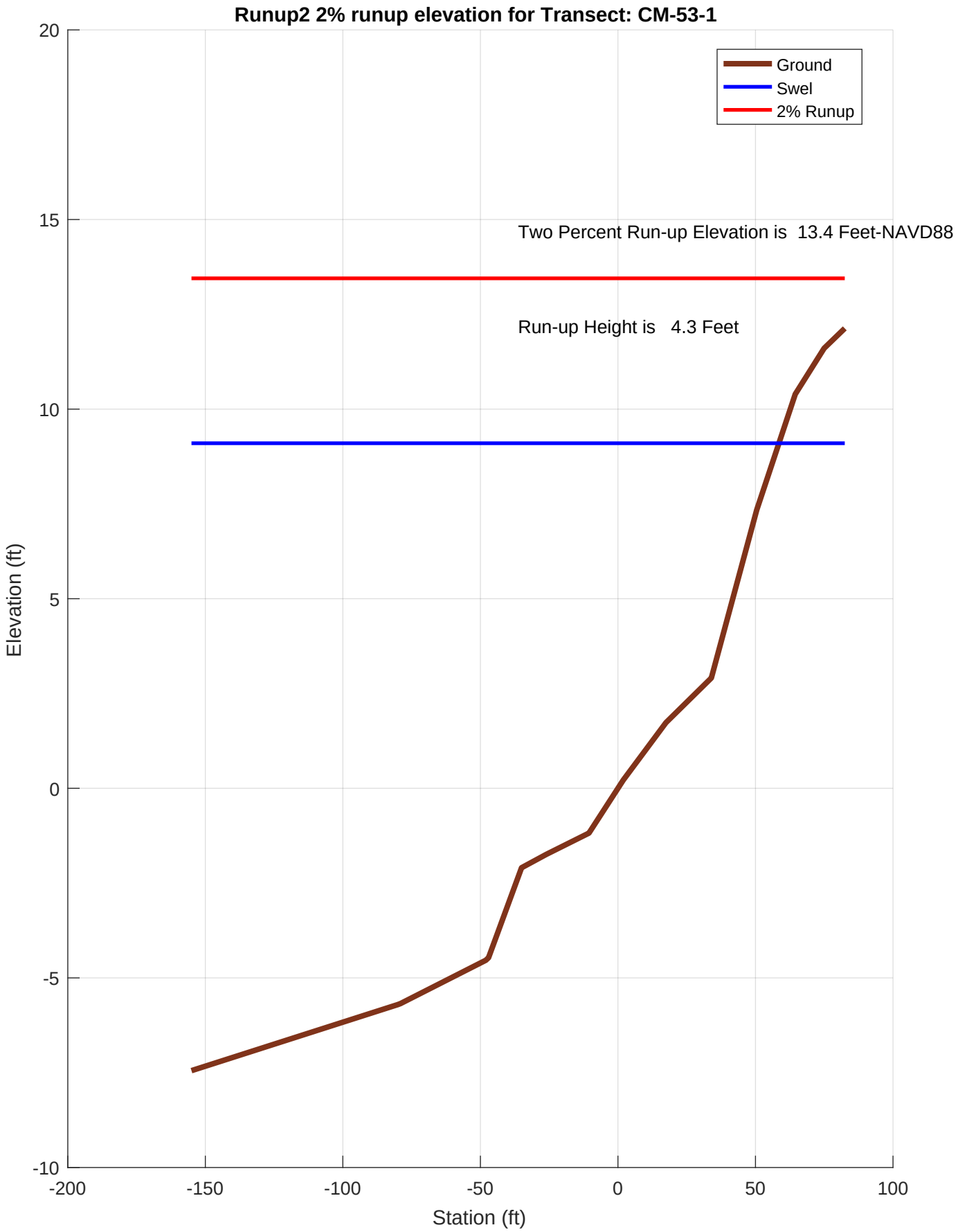
	LENGTH	ELEV.	SLOPE	ROUGHNESS
1	-155.0	-7.4		
			.00	.80
2	-129.0	-6.8		
			43.48	.80
3	-119.0	-6.6		
			43.18	.80
4	-100.0	-6.2		
			42.55	.80
5	-80.0	-5.7		
			50.00	.80
6	-79.0	-5.7		
			26.96	.80
7	-48.0	-4.5		
			16.67	.80
8	-47.0	-4.5		
			5.00	.80
9	-44.0	-3.9		
			5.10	.80
10	-39.0	-2.9		
			5.00	.80
11	-35.0	-2.1		
			25.71	.80
12	-26.0	-1.7		
			27.68	.80
13	-10.5	-1.2		
			8.93	.80
14	2.0	.2		
			10.26	.80
15	17.5	1.7		
			13.98	.80
16	34.0	2.9		
			3.72	.80
17	50.5	7.3		
			4.59	.80
18	64.5	10.4		
			8.68	.80
19	75.0	11.6		
			14.15	.80
20	82.5	12.1		

LAST SLOPE 15.00 LAST ROUGHNESS .80

****

OUTPUT TABLE

INPUT PARAMETERS			RUNUP RESULTS			
WATER LEVEL ABOVE DATUM (FT.)	DEEP WATER WAVE HEIGHT (FT.)	WAVE PERIOD (SEC.)	BREAKING SLOPE NUMBER	RUNUP SLOPE NUMBER	RUNUP ABOVE WATER LEVEL (FT.)	BREAKER DEPTH (FT.)
9.10	.77	6.70	11	18	1.86	1.41
9.10	.77	7.06	11	18	1.91	1.45
9.10	.77	7.41	11	18	1.95	1.49
9.10	.81	6.70	11	18	1.93	1.46
9.10	.81	7.06	11	18	1.98	1.50
9.10	.81	7.41	11	18	2.02	1.55
9.10	.85	6.70	11	18	2.00	1.51
9.10	.85	7.06	11	18	2.05	1.56
9.10	.85	7.41	11	18	2.09	1.60


Runup2 2% runup elevation for Transect: CM-53-1
Ground
Swel
2% Runup
Two Percent Run-up Elevation is 13.4 Feet-NAVD88
Run-up Height is 4.3 Feet
Elevation (ft)
Station (ft)
20
15
10
5
0
-5
-10
-200
-150
-100
-50
0
50
100