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# WEXFORD AND BURROW COASTAL WAVE AND WATER LEVEL MODELLING STUDY 2020



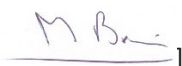
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30 April 2021

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## EXECUTIVE SUMMARY

This report presents the work undertaken and the findings of the Wexford and Burrow Coastal Wave and Water Level Modelling Study (CWWS) which mirrors the work undertaken for other locations during Phase 3 of the Irish Coastal Wave and Water Level Modelling Study (ICWWS) 2018. The findings of this study provide an improvement and update to the wave climate and water level combinations of known Annual Exceedance Probability (AEP) presented as output from Phase 2 of the ICWWS 2018 for the Wexford, Burrow and Ferrybank areas considered potentially vulnerable to wave overtopping.

Overtopping of defences and coastal structures (both manmade and natural) as a consequence of the interaction of waves and sea level conditions, including tide and surge, may contribute to coastal flooding in areas located behind these defences. Consequently, Wexford, the Burrow and Ferrybank were identified by Wexford County Council as requiring detailed estimation of wave climate and water levels to enable future wave overtopping analysis to be conducted. The outputs of this study will inform the evaluation of the risk associated with wave overtopping resulting in coastal flooding (both now and in the future) and the detailed design of measures to mitigate and manage any such identified coastal flood risk.

To derive overtopping volumes or rates, wave climate conditions at the shoreline or defence line are required for various water levels. For this study, a numerical model was used to simulate the local wave conditions at Wexford, the Burrow and Ferrybank using relevant offshore wind and wave data combined with present day water levels. A joint probability analysis was used to determine appropriate combinations of water levels and wind / wave parameters that were then used as input to the wave model. Wind data was used where areas were only exposed to locally generated wind seas, while the wave model was used to transform offshore combined waves paired with corresponding present day water levels, of known AEP to near the shoreline or defence line for more exposed areas. These combined waves describe both the locally generated wind wave and the longer period swell wave components, from the Irish Sea and beyond.

This study used the extreme water levels derived during Phase 1 of the ICWWS 2018 but provides an improvement and update to the wave data generated for Phase 2 of the ICWWS 2018 at Wexford, the Burrow and Ferrybank based on the inclusion of additional offshore wave data, bathymetric data and an alternative approach to the derivation of wind speeds. A review of the ICWWS 2018 Phase 1 extreme water levels was undertaken to confirm these levels were suitable for use in this study, given the additional bathymetric data available. The wave modelling simulations made use of a more detailed 'fully spectral formulation' in comparison to the 'directional decoupled parametric formulation' used in the ICWWS 2018 Phase 2 simulations. Assessments were also made on the impact of wave set-up and beach drawdown, concluding that these processes should not affect the final output water levels or wave heights at Wexford, the Burrow or Ferrybank.

Combinations of present day wave climate (heights, periods and directions) and water levels for AEPs of 50%, 20%, 10%, 5%, 2%, 1%, 0.5% and 0.1% were derived for the shoreline/defence line at Wexford, the Burrow and Ferrybank. A similar approach was undertaken to determine the corresponding wave climate and water levels for four future scenarios accounting for different projected sea level rise allowances. Spectral significant wave heights, peak spectral wave periods and mean wave directions for each AEP and water level at a series of shoreline/defence line locations form the output of this study.

# 1 INTRODUCTION

Overtopping of defences and coastal structures (both manmade and natural) as a consequence of the interaction of waves and tidal conditions, including surge, may contribute to coastal flooding in areas behind these defences. Consequently the Wexford, Ferrybank and Burrow coasts were identified as requiring a detailed assessment to provide wave climate and sea level estimations to enable future overtopping analysis to be conducted. The results of this assessment will subsequently inform the evaluation of the risk associated with wave overtopping, any resulting coastal flooding (both now and in the future) and the detailed design of measures to mitigate and manage any such identified coastal flood risk. This study mirrors the work undertaken for similar studies at other locations during Phase 3 of the ICWWS 2018.

This report focuses on the detailed modelling undertaken for Wexford Harbour and builds upon the more limited wave modelling undertaken for Phase 2 of the ICWWS 2018 (Reference 1), which provided a strategic indication of the variation in wave exposure at the Wexford and Burrow coastlines. The ICWWS 2018 Phase 2 study made use of UK Met Office and ECMWF offshore wave data in the Irish Sea, in conjunction with water levels derived under Phase 1 of the same study. The models used for the ICWWS Phase 2 study at Wexford and the Burrow lacked a recent detailed bathymetric survey of Wexford Harbour and made use of wave simulations based on a less detailed parametric formulation. Hence, the outputs were not considered sufficient to inform a detailed assessment of wave overtopping in Wexford Harbour and the present study incorporating a more detailed modelling approach was commissioned.

The primary aim of the Wexford and Burrow CWWS was to generate a series of wave climate conditions (heights, periods and directions) for various water levels at the shoreline or defence line, for a range of AEP events. The derived joint probability detailed wave climate and water level conditions were intended to inform subsequent wave overtopping analysis/modelling relating to scheme design and assessment of hydraulic performance of proposed flood defence measures within Wexford Harbour. Seven key areas of interest were identified for this study, four areas along the Wexford frontage (WexA, WexB, WexC and WexD), with a further area at Ferrybank (FB) and two areas at the Burrow (BurrA and BurrB).

To ensure that the output of the study was as robust as possible, it was vital that model input data was up-to-date. Consequently, bathymetric survey data that had become available for the Wexford Harbour area since the original ICWWS were reviewed and the models updated as necessary. This included a local hydrographic survey of the harbour area captured during 2019, which was useful in defining the recent bathymetry in an area which features a very dynamic seabed. The available survey coverage of the Wexford training walls was very limited and hence this detail was inferred from the available data for the main modelling study. Subsequent to the completion of the modelling study, a detailed survey of the training walls was completed and consequently a sensitivity analysis was undertaken to determine if any difference between the estimated and measured levels of the training walls affected the wave climate at the shoreline / defence line.

The offshore wave climate for Wexford Harbour was established using extreme value analysis and joint probability analysis of present day water levels with wave heights at offshore locations. Output from the extreme value analysis provided input conditions to the computational modelling which utilised the MIKE Spectral Wave (SW) Flexible Mesh module to transform the offshore combined waves into the nearshore area. The MIKE SW model was also used to generate local wind waves, following joint probability analysis of present day water levels with wind speeds.

Combinations of present day wave conditions and water levels corresponding to AEPs of 50%, 20%, 10%, 5%, 2%, 1%, 0.5% and 0.1% were derived at Wexford, the Burrow and Ferrybank. A similar approach was undertaken in order to determine the corresponding wave climate conditions and water levels for four future scenarios accounting for different projected sea level rise allowances. Spectral significant wave heights, peak spectral wave periods and mean wave directions for each AEP and water level at a series of inshore locations form the output of this study.

## 2 KEY INFORMATION ON STUDY OUTPUTS

The study outputs include combinations of wave climate and extreme sea level estimates for a series of shoreline/defence line locations within the study area. These outputs are based on analysis and modelling, including:

- Statistical extreme value analysis and joint probability analysis of offshore wave and wind data and inshore water levels at ICWWS 2018 coastal boundary estimation points in Wexford Harbour.
- Numerical Modelling to transform offshore combined waves to the shoreline/defence line and also simulate the formation of local wind waves.

The following key information should be taken into consideration in conjunction with the outputs/results.

- 1) Combinations of wave climate and water level estimates have been produced at each shoreline/defence line location. These combinations are joint probability occurrences, in which the two elements, wave climate and water level are likely to simultaneously occur for a given AEP. The AEP represents the probability of a combined wave climate and water level event of this or greater, severity occurring in any given year. For example a 0.5% AEP event has a 0.5% probability (or 1 in 200 chance) of occurring or being exceeded in any one year.
- 2) For each AEP from 50% to 0.1%, six combinations of waves and water levels were produced to represent the complete joint probability spectrum.
- 3) Wave climate and water level combinations were derived for present day sea levels, as well as the Mid-Range Future Scenario (MRFS), High End Future Scenario (HEFS), High+ End Future Scenario (H+EFS) and High++ End Future Scenario (H++EFS) which represent a 0.5m, 1.0m, 1.5m and 2.0m increase in sea level, respectively. These future scenario results do not account for any potential changes to the meteorological systems which may affect the offshore wave climate or wind speeds.
- 4) The wave climate and water level combinations output from the study are representative of a point situated at approximately half the shallow water wavelength seaward of the toe of the defence structure or shoreline.
- 5) Wave climate conditions are presented in terms of spectral significant wave height ( $H_{m0}$ ) in metres, spectral peak wave period ( $T_p$ ) in seconds, and mean wave direction (MWD) in degrees measured from North.  $H_{m0}$  is representative of the mean of the highest third of the waves, whilst  $T_p$  is associated with the most energetic wave in the spectrum.
- 6) The extreme water levels refer to total water levels, which include the effects of astronomic tides and storm surges. Astronomic tides are the daily change in sea levels due to the rotation of the earth and the gravitational forces of the sun and moon along with the hydrodynamic response to the bathymetry, whilst storm surges are the change in sea level caused by the effect of pressure variations and persistently strong winds.
- 7) The extreme water levels are also inclusive of local wind set-up or seiching, where abrupt changes in meteorological conditions, such as the passage of an intense depression, cause oscillations in sea level (or seiches).
- 8) An assessment of conditions within Wexford Harbour established that extreme water levels and wave conditions are unlikely to be influenced by the effects of wave setup or beach drawdown respectively due to the absence of long period waves at the site.
- 9) The extreme water levels are provided to Mean Sea Level (MSL) and Ordnance Datum Malin (OD Malin) OSGM02 and OSGM15. Mean Sea Level refers to the average sea surface level of all tides over a period of time, whilst OD Malin is the vertical land levelling datum currently used in Ireland, based on the mean sea level recorded between January 1960 and December 1969 at Malin Head tide gauge. This is propagated across the country via the spatial surfaces of the transformation models

OSGM02 and OSGM15 produced by the Ordnance Surveys of Great Britain (OS), Ireland (OSi) and Land & Property Services in Northern Ireland (LPSNI).

- 10) Although widely accepted methods have been used to derive the combinations of extreme wave climate and water levels, there are a number of limitations which should be considered when using this data for subsequent analysis. These include uncertainties in the derivation of the individual extreme values associated with uncertainties in topographic and other survey data, inaccuracy in meteorological data and offshore wave data, assumptions and / or approximations in the hydraulic / hydrodynamic models in representing physical reality, assumptions and / or approximations in the statistical analysis and uncertainties in datum conversions between MSL and OD Malin. Further uncertainty arises from the use of the FD2308 joint probability method in the absence of defined and agreed dependence values for waves and tidal levels around Ireland. Further detail on the uncertainties associated with the derivation of extreme tidal levels is given in the ICWWS 2018 Phase 1 report (Reference 2), with details on the limitations of the conversion between MSL and OD Malin discussed in the ICWWS 2018 Phase 4 report (Reference 3).

## 3 DATA SOURCES

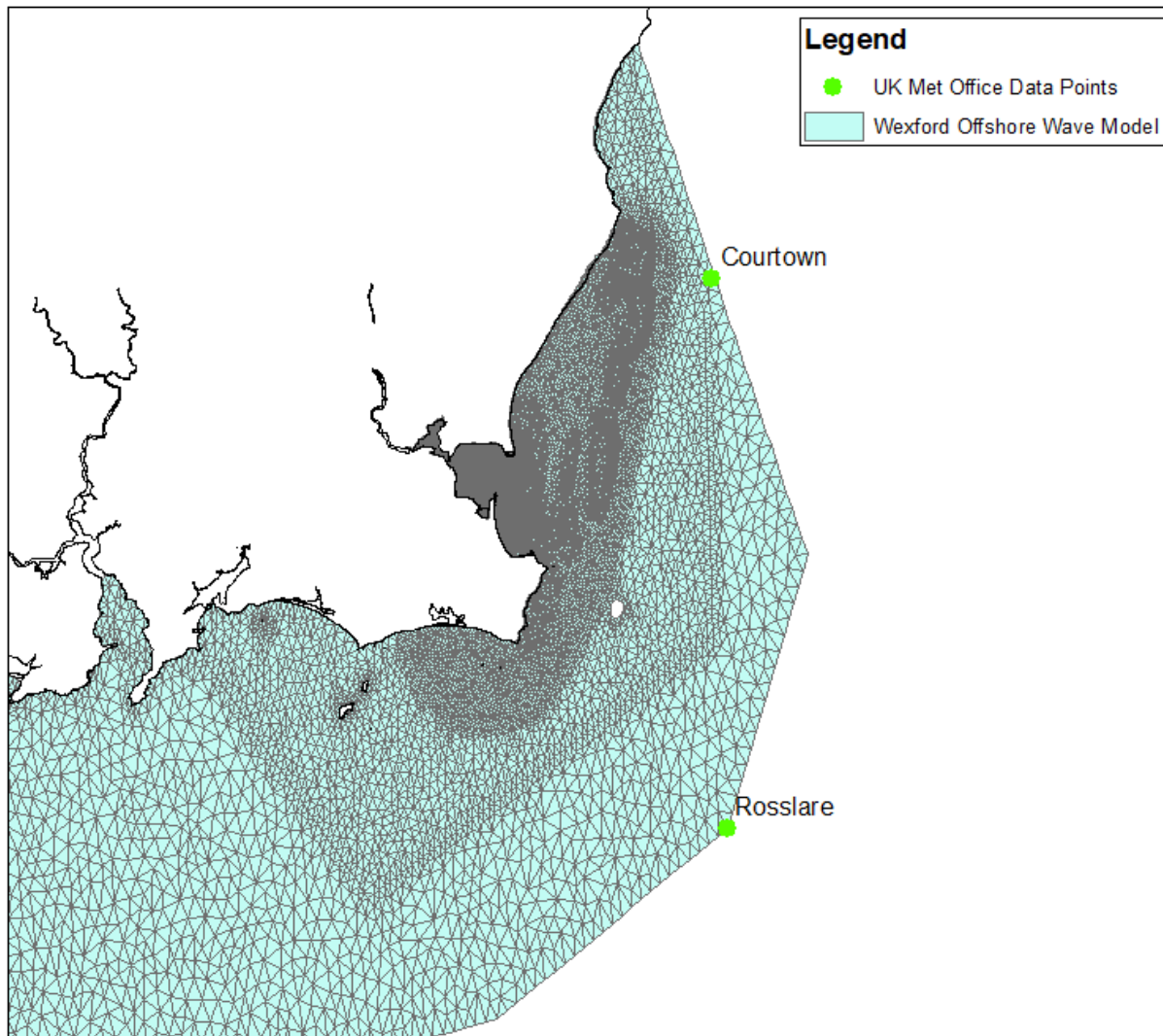
### 3.1 Wave and Wind Data

In order to determine appropriate wind and wave conditions for use in the offshore combined wave modelling for Wexford Harbour, RPS referred to several datasets for analysis.

The Irish Coastal Wave and Water level Study (ICWWS) 2013 (Reference 4) analysis for the Wexford Harbour area made use of 3 hourly wind and wave data from the UK Met Office's European and UK Waters Wave Model in the Irish Sea. This was updated as part of the ICWWS (2018) (Reference 1), with additional UK Met Office hindcast data sourced from the newer WAVEWATCH III model. However, when compared with the original data, and also records from the M2 Buoy in the Irish Sea, it was noted that the WAVEWATCH III dataset appeared to underestimate some of the peaks in the significant wave heights. As the original UK Met Office data was unavailable for the update period, RPS used the WAVEWATCH III model data to inform an assessment of the increase in storminess for each relevant directional sector at various locations in the Irish Sea. These storminess factors were then applied to the original UK Met Office data, to uplift the data where appropriate. This assessment was undertaken on wind and wave data from 2002 to 2016 for a representative point at **52.5°N, 6.06°W**, which informed the north eastern boundary of the Wexford Harbour offshore wave model.

Offshore wave data for 2004 to 2018 from the European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 global model for a second point (**52.0°N, 6.06°W**) situated outside of the complex Irish Sea basin was also used to inform the increase in storminess assessment. The derived storminess factors for this point were applied to the UK Met Office data for the same point, to represent the south eastern boundary of the Wexford Harbour offshore wave model.

Figure 3.1 shows the locations of the two UK Met Office points used to drive the boundary conditions for the Wexford Harbour offshore wave model. Table 3-1 shows the results of the increase in storminess assessment for the UK Met Office points for the relevant directional sectors. Note sectors marked '-' were not considered relevant directions to the study, and hence were not assessed.



**Figure 3.1: Location of UK Met Office Data Points relative to Wexford offshore wave model boundaries**

**Table 3-1: Increase in Storminess Assessment – Factors per Directional Sector at UK Met Points**

UK Met Point	0	45	90	135	180	225	270	315
52.5°N, 6.06°W	1	1	1	1.1	1.12	-	-	-
52.0°N, 6.06°W	-	1	1	1	-	-	-	-

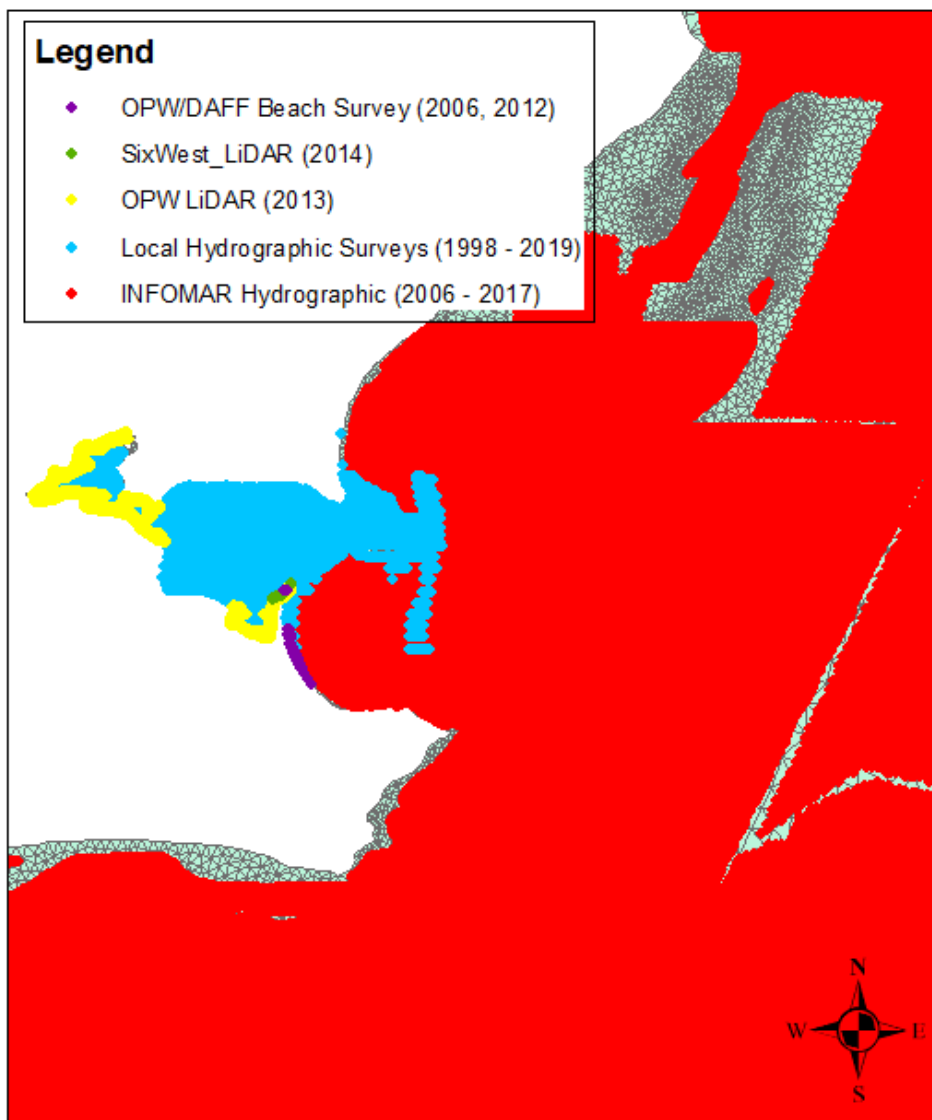
Representative wind speeds for the generation of local wind waves within Wexford Harbour were determined with reference to Eurocode, BS EN 1991-1-4:Annex 1 (Reference 5) and the Offshore Installations: Guidance on design, construction and certification (Reference 6). Adjustments were made to the wind speeds from selected directions based on whether overland or overwater wind speeds were required.

### 3.2 Bathymetric Data

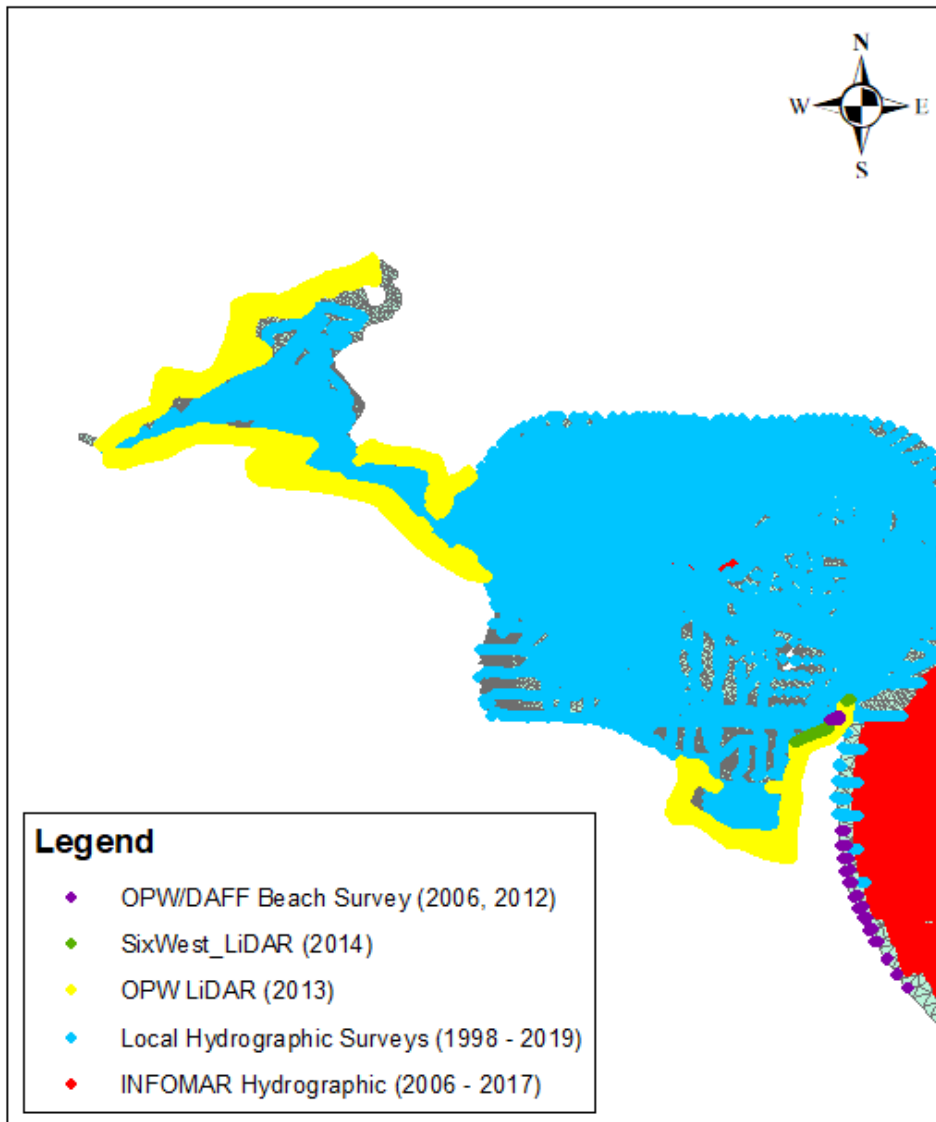
In order to facilitate the generation of local wind waves and the transformation of offshore wave data into inshore values relevant to the assessment of wave overtopping, detailed inshore bathymetric and topographic information was required, particularly in areas of rapidly varying bathymetry for example in the vicinity of the numerous banks and channels within Wexford Harbour.

Large areas of the bathymetric information used in the Wexford Harbour offshore wave model were obtained from INFOMAR survey data, a joint project between the Geological Survey Ireland (GSI) and the Marine Institute, as shown in Figure 3.2. The Wexford Harbour area is predominantly represented by a series of local hydrographic surveys, ensuring the most current data was used where possible to provide the optimum representation of the highly dynamic bathymetry within the Harbour area. Office of Public Works (OPW) and Six-West LiDAR data was also used to provide specific information for inshore areas, along with OPW and Department of Agriculture, Fisheries and Food (DAFF) beach surveys. Figure 3.3 details the bathymetric information included in the Wexford Harbour model.

Where no other data was available, the model bathymetry was supplemented with Admiralty Chart data, as digitally supplied by C-Map of Norway, to ensure coverage of the entire domain.



**Figure 3.2: Survey Coverage of Wexford offshore wave model**

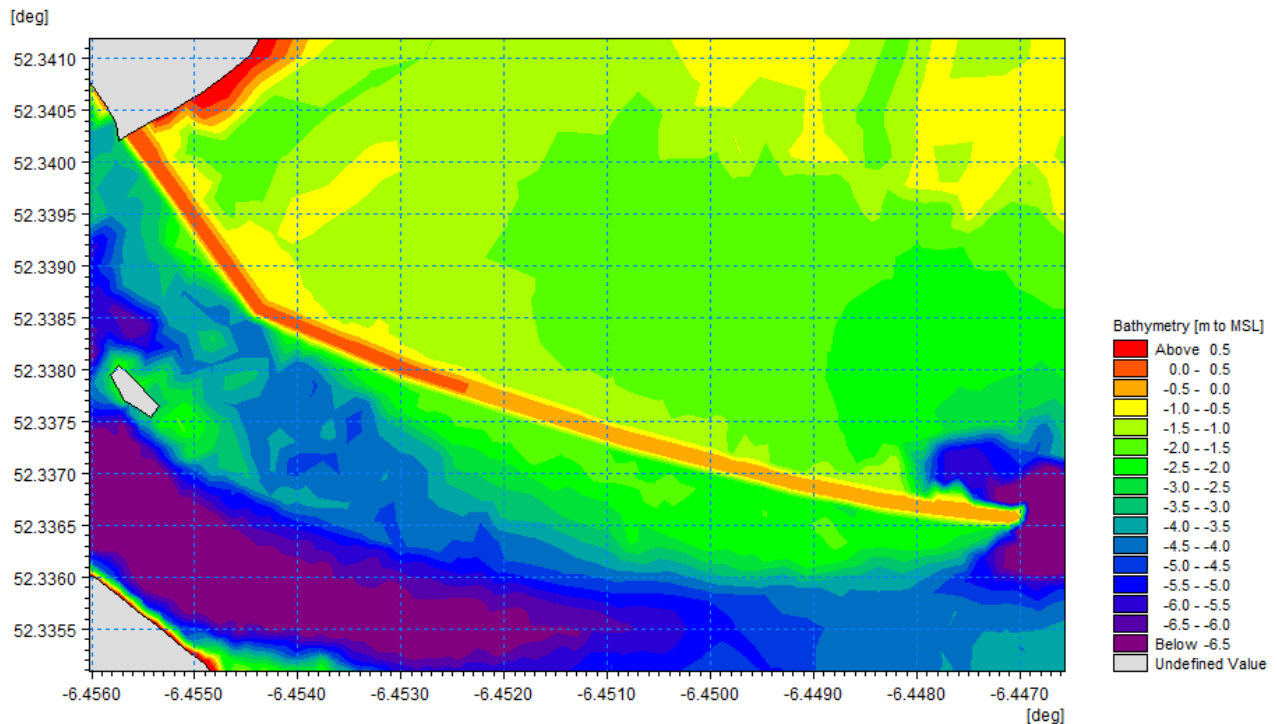


**Figure 3.3: Survey Coverage of Wexford Harbour wave model**

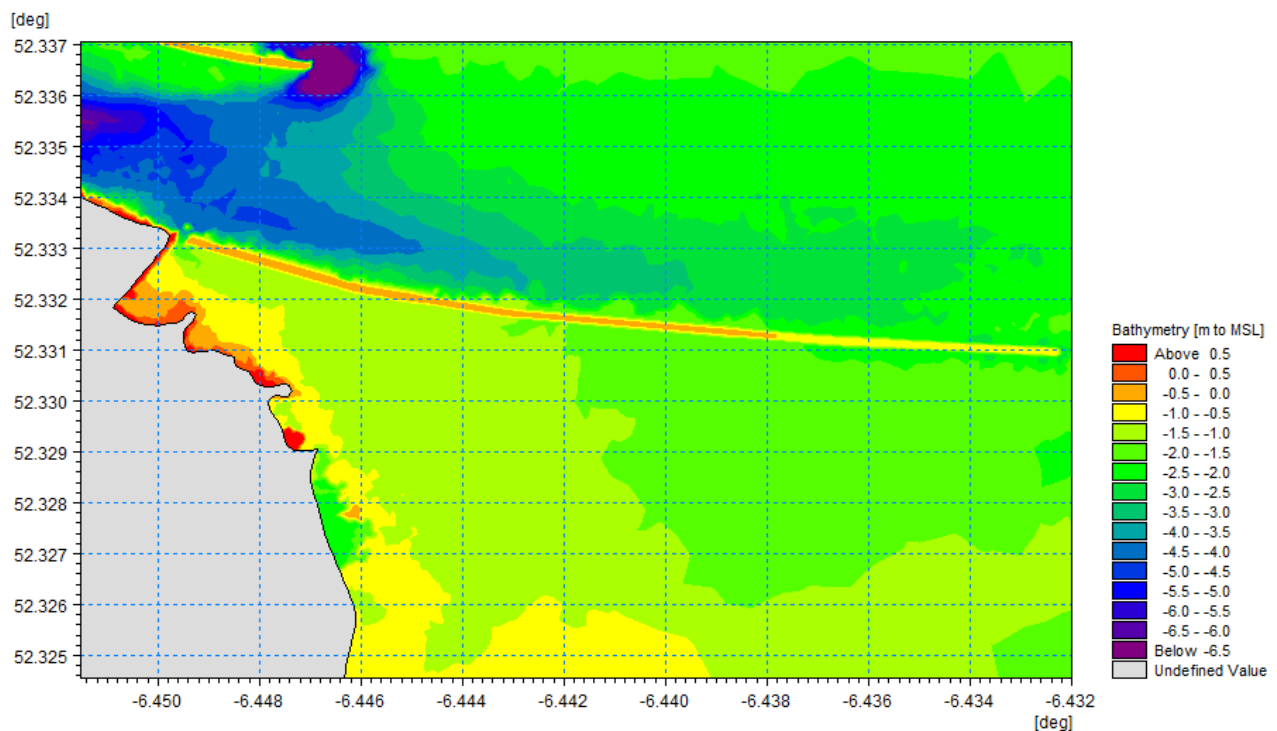
RPS processed and quality checked all bathymetric data to ensure its suitability for use within the Wexford Harbour modelling systems, consistently ensuring that any model interpolation processes produced valid meshes which were representative of the input data.

### 3.2.1 Wexford Training Walls

At the time of model construction, limited information was available on the levels of the North and South training walls located on the approach to Wexford Quays. Consequently OPW LiDAR data was used to derive levels for the north training wall within the harbour area, and indicated a gradual gradation from +0.4 to -0.12 metres to Mean Sea Level (MSL) from west to east, as shown in Figure 3.4. As the level of the south training wall is lower, this was not captured by the OPW LiDAR survey and thus an estimate of the top levels relative to the established levels of the north wall was made using historical imagery from Google Earth. As such the south wall levels were estimated to vary from -0.1 to -0.6 metres to MSL from west to east, as shown in Figure 3.5.



**Figure 3.4: North training wall as represented by the model**

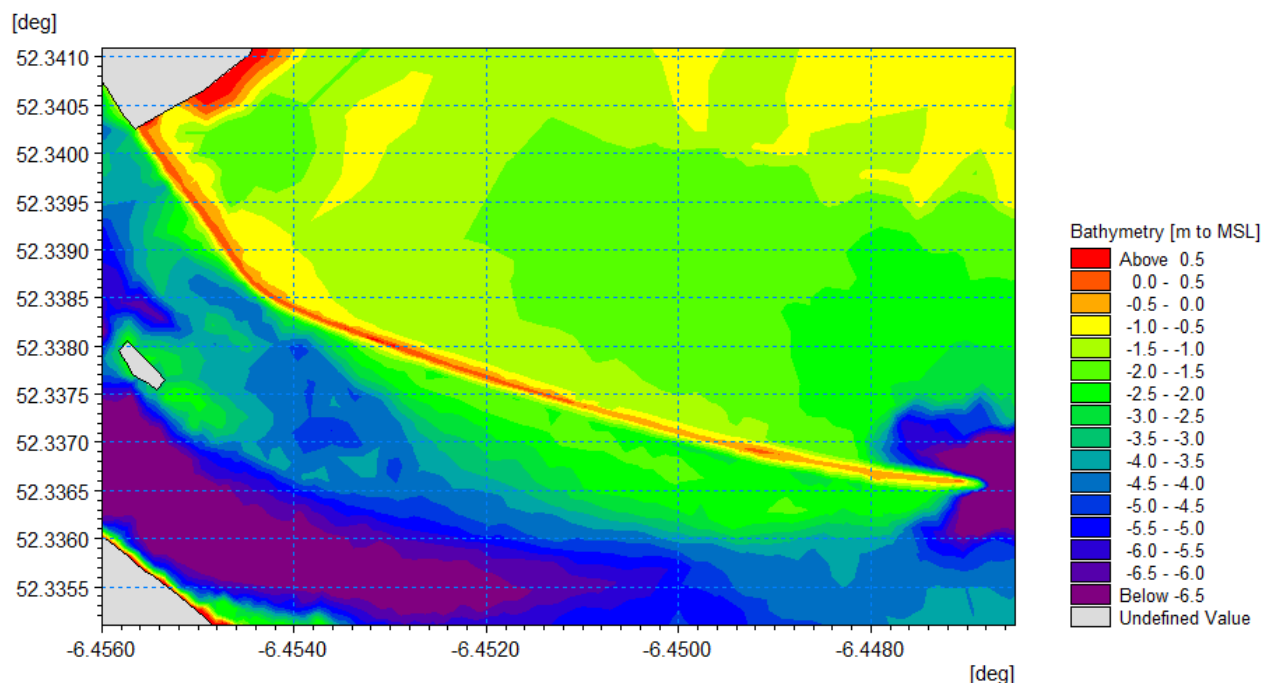


**Figure 3.5: South training wall as represented by the model**

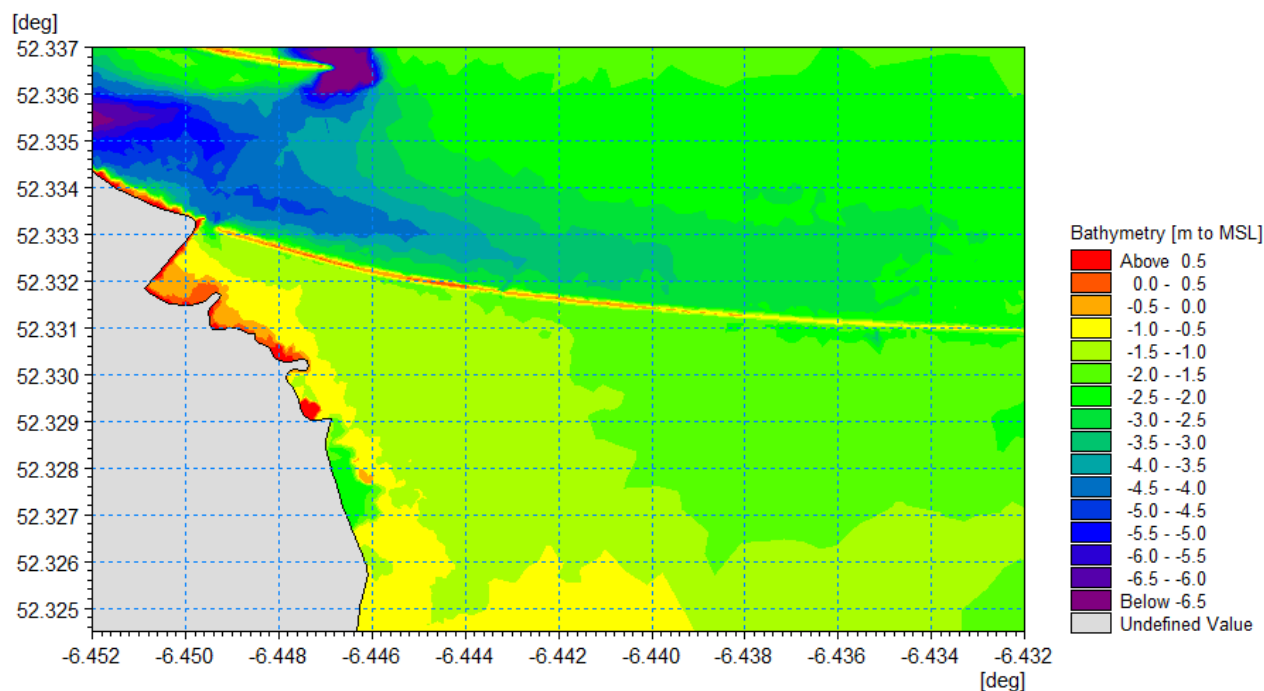
Following completion of the final modelling report, a query was raised in relation to the confidence that could be assigned to the levels of the south training wall and the effect any uncertainty might have on the results of the study in areas behind this structure. Consequently a detailed survey of the two training walls was commissioned and a comparison and sensitivity analysis undertaken.

The Wexford Harbour model was updated with the surveyed wall levels, as shown in Figure 3.6 and Figure 3.7 and the difference between the surveyed and estimated levels along the training walls examined. The

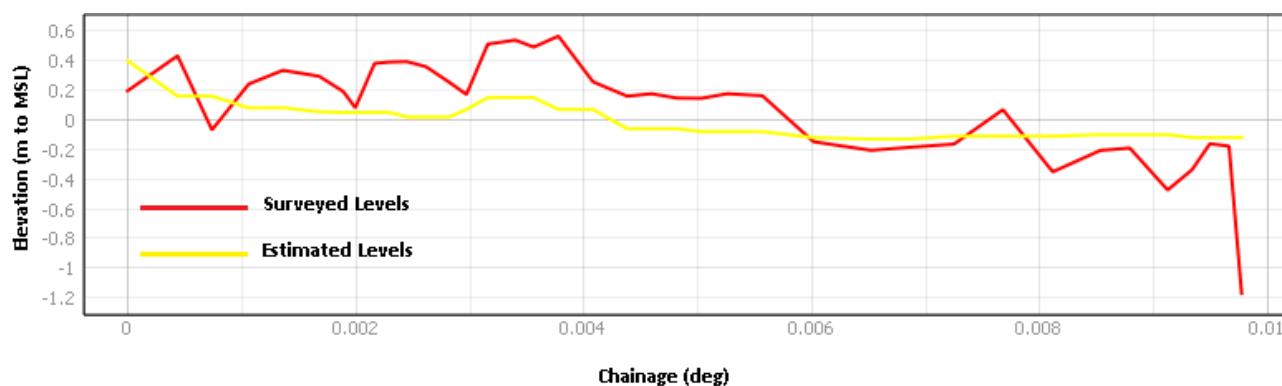
resulting differences along the North and South walls respectively are shown in Figure 3.8 and Figure 3.9. It can be seen that the estimated North wall levels were mostly lower than the surveyed levels and hence the wave climate at the coastline / defence line in any areas influenced by this structure, would if anything be reduced; thus the original results are a conservative estimate. However, along the South wall, there is a section where the estimated levels were higher than the surveyed levels, thus it was deemed necessary to undertake a sensitivity analysis, to ascertain the effect this may have at the shoreline / defence line as detailed in Section 9.1.



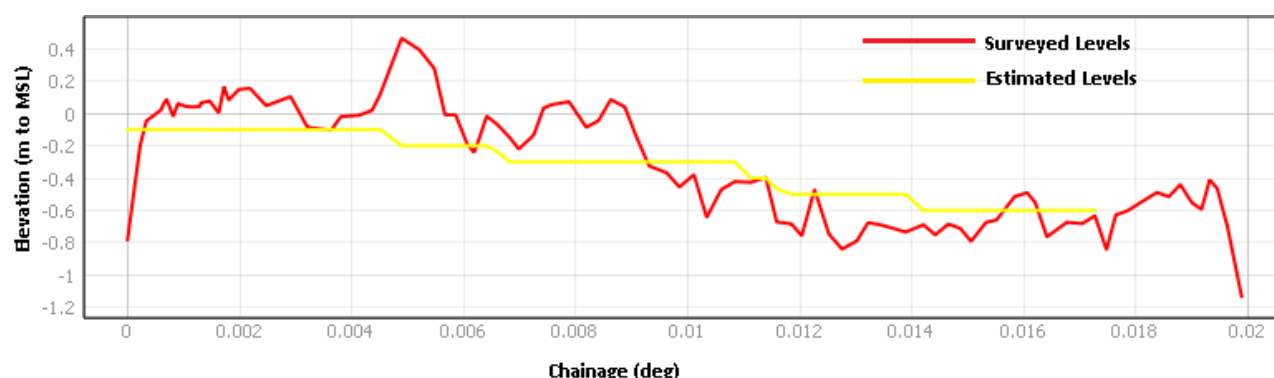
**Figure 3.6: North training wall represented by 2021 Survey data**



**Figure 3.7: South training wall represented by 2021 Survey data**



**Figure 3.8: Profile of North Training Wall using Surveyed and Estimated Levels**



**Figure 3.9: Profile of South Training Wall using Surveyed and Estimated Levels**

### 3.3 Water Level Data

The extreme water levels used to inform the joint probability analysis and subsequent Wexford Harbour wave modelling were taken from the ICWWS 2018 Phase 1 results. Figure 3.10 shows the locations of the Wexford, Ferrybank and Burrow Coastal Areas of Potential Overtopping (CAPO) relative to the ICWWS 2018 extreme water level estimation points. Due to spatially varying water levels within the harbour area, four estimation points were used to best represent the water levels at the relevant frontages, rather than using one estimation point for the entire harbour area. Estimation points SE32, SE33, SE34 and SE35 provided full coverage of the coastline and provided data for the full range of required AEPs. Details on the derivation of these extreme levels can be found in the ICWWS Phase 1 report (Reference 2).

Table 3-2 details the extreme water levels used for each section of coastline during the joint probability analysis. Thus for Wexford A and B (WexA, WexB) and Ferrybank (FB) water levels from the ICWWS 2018 SE32 estimation point were used, whilst Wexford C and D (WexC, WexD) used SE33. Burrow A (BurrA) and B (BurrB) used levels from SE34 and an average of SE34 and SE35 respectively.

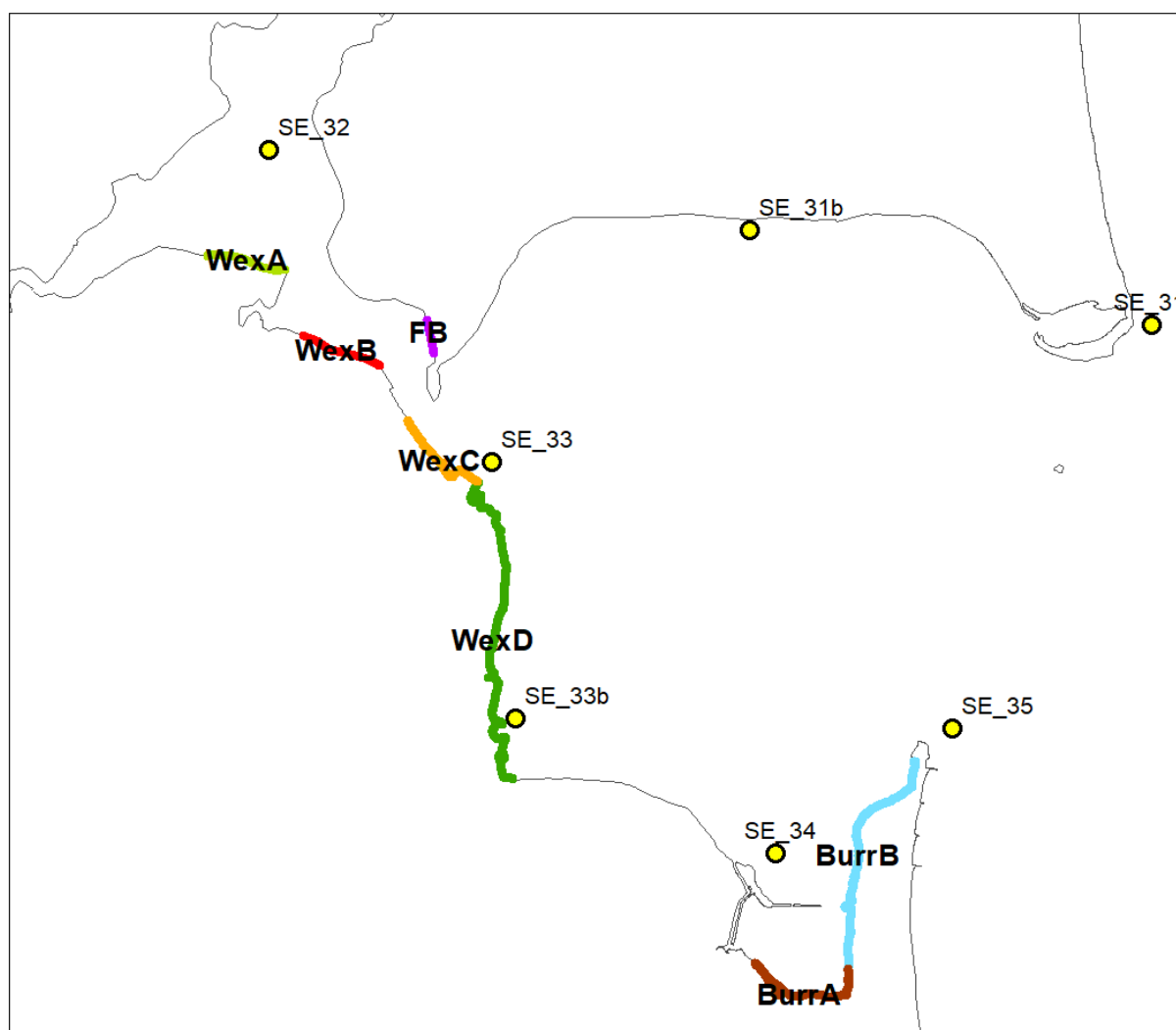


Figure 3.10: Study CAPO Locations relative to ICWWS 2018 Estimation points

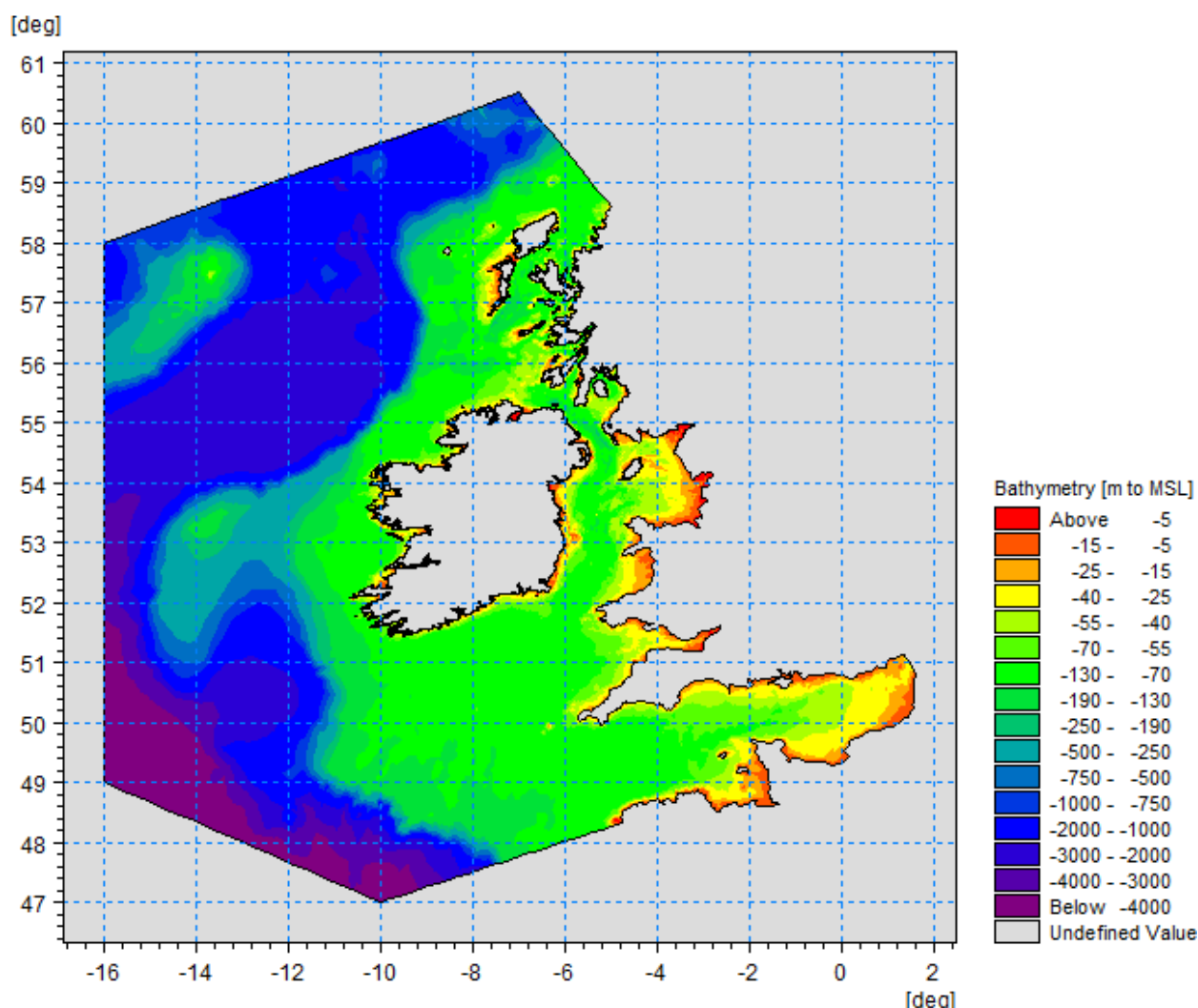
Table 3-2: ICWWS 2018 Extreme Water Levels used for various Wexford and Burrow CAPOs

	CAPO	WexA, WexB, FB	WexC, WexD	BurrA	BurrB
	ICWWS 2018 water levels (m to MSL)	SE32	SE33	SE34	SE34_35
AEP (%)	50	1.34	1.31	1.25	1.33
	20	1.48	1.43	1.37	1.44
	10	1.58	1.52	1.45	1.52
	5	1.67	1.60	1.53	1.59
	2	1.79	1.71	1.63	1.69
	1	1.88	1.79	1.71	1.77
	0.5	1.97	1.87	1.79	1.85
	0.1	2.18	2.06	1.97	2.03

The ICWWS 2018 Phase 1 study had not used the updated Wexford Harbour model developed for this study, thus to ensure these water levels were still valid for the most recent available bathymetry within and approaching Wexford Harbour, sensitivity testing of the water levels at each of the relevant estimation points within the harbour was undertaken.

The RPS Irish Seas Surge Model developed as part of the Irish Coastal Protection Strategy Study (ICPSS) (Figure 3.11) had been used for the water level modelling in Phase 1 of the ICWWS 2018. Further details on

this base model can be found in the ICWWS 2018 Phase 1 report (Reference 2). This model was updated with a more detailed mesh incorporating the most recent bathymetric information for Wexford Harbour and used to repeat a series of tidal simulations in line with Phase 1 of the ICWWS 2018. Three simulations were undertaken for some of the most extreme storm events that have occurred in recent years; October 2012, January 2014 and February 2014.



**Figure 3.11: Irish Seas Surge Model**

A comparison was made between the simulated peak water levels using the original ICPSS mesh and the Wexford CWWS updated mesh at each of the relevant points, as shown in Table 3-3. The differences ranged from 20mm to 110mm for estimation points SE33, SE34 and SE35, with the most significant differences noted for SE32 which is situated further up the estuary. In each case the updated mesh simulations suggested a decrease in water level compared to the ICPSS mesh, therefore the conservative ICWWS 2018 Phase 1 values (as derived using the ICPSS mesh) were deemed valid for use within the Wexford Harbour study.

Further to this, the AEP water levels were validated by reference to the results of an Extreme Value Analysis (EVA) of data from the Marine Institute tide gauge at Wexford Harbour. The results of the EVA are shown in Figure 3.12 and Table 3-4. Table 3-5 shows a comparison between the ICWWS 2018 Phase 1 extreme levels at SE33, which is sited closest to the gauge, and the extreme levels estimated using the Wexford Harbour tide gauge using the EVA, with the differences established to be well within the modelling tolerance of  $\pm 180$ mm.

Table 3-3: Comparison of Peak Water Levels simulated using ICPSS and Wexford CWWS meshes

Event Date	Mesh	Peak water levels (m to MSL)			
		SE32	SE33	SE34	SE35
17/10/2012	ICPSS	1.40	1.35	1.29	1.31
	Wexford CWWS	1.23	1.29	1.25	1.29
	Difference	0.17	0.07	0.04	0.02
03/01/2014	ICPSS	1.30	1.27	1.22	1.29
	Wexford CWWS	1.10	1.16	1.15	1.25
	Difference	0.20	0.11	0.08	0.05
04/02/2014	ICPSS	1.65	1.57	1.43	1.45
	Wexford CWWS	1.50	1.51	1.39	1.43
	Difference	0.15	0.06	0.04	0.03

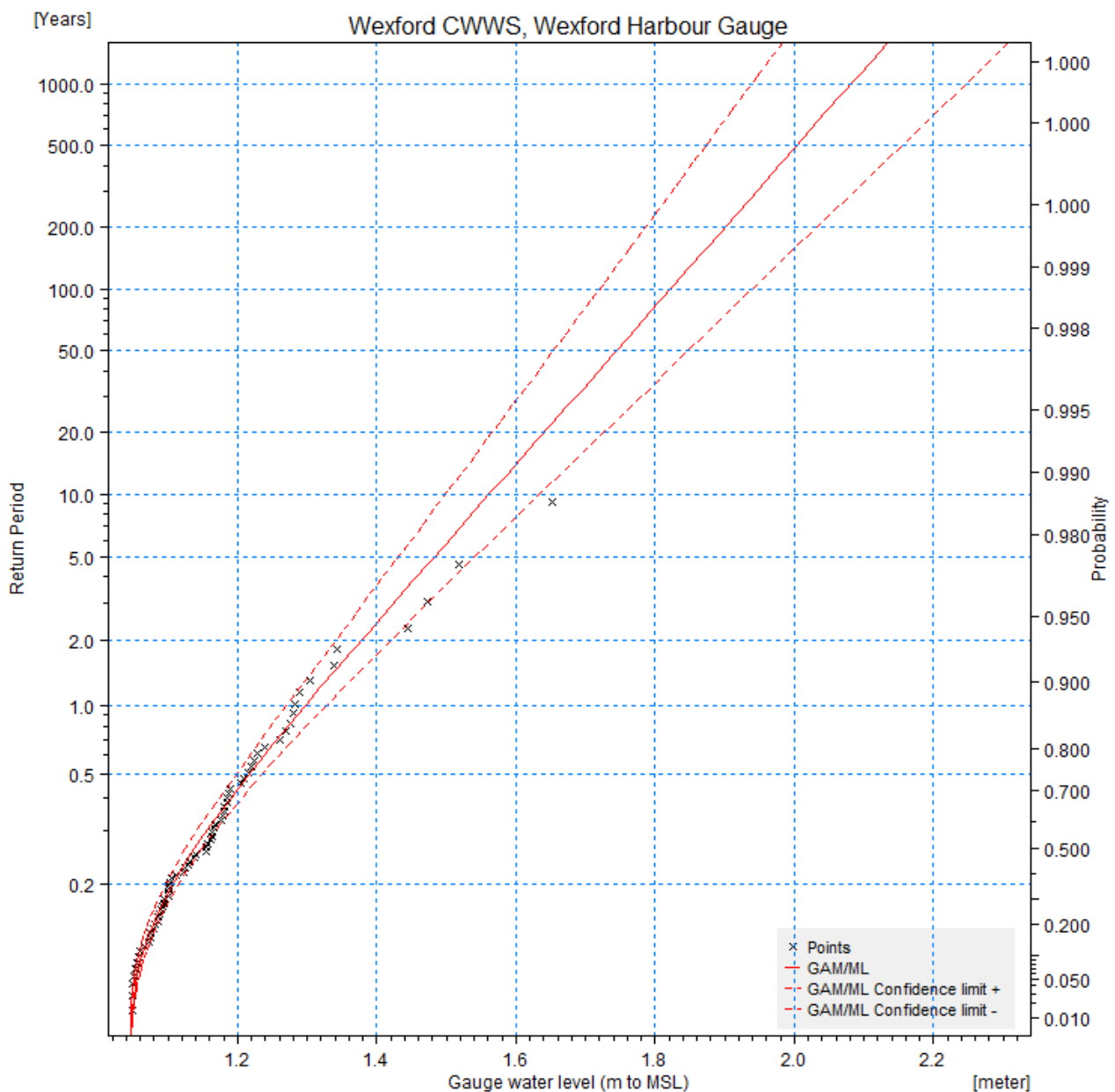


Figure 3.12: EVA plot for water level (m to MSL) at the Wexford Harbour gauge

**Table 3-4: EVA values and goodness of fit for water level (m to MSL) at the Wexford Harbour gauge**

	Return Period [years]	D/E Combination
		GAM/ML
Estimated quantile	2.00	1.378
	5.00	1.483
	10.00	1.562
	20.00	1.640
	50.00	1.744
	100.00	1.822
	200.00	1.901
	1000.00	2.082
Average quantile	2.00	1.380
	5.00	1.486
	10.00	1.566
	20.00	1.646
	50.00	1.751
	100.00	1.830
	200.00	1.909
	1000.00	2.093
Standard deviation	2.00	0.040
	5.00	0.055
	10.00	0.067
	20.00	0.080
	50.00	0.097
	100.00	0.110
	200.00	0.123
	1000.00	0.154
Goodness-of-fit statistics	SLSC	0.032
	PPCC1	0.991
	PPCC2	0.991

**Table 3-5: Comparison of ICWWS 2018 extreme water levels at SE33 with Wexford Harbour tide gauge extreme levels**

AEP	Wexford Harbour Gauge (m to MSL)	ICWWS 2018 SE33 (m to MSL)	Difference (m)
50%	1.38	1.31	0.07
20%	1.48	1.43	0.05
10%	1.56	1.52	0.04
5%	1.64	1.60	0.04
2%	1.74	1.71	0.03
1%	1.82	1.79	0.03
0.50%	1.90	1.87	0.03
0.10%	2.08	2.06	0.02

## 4 STATISTICAL ANALYSIS

The offshore combined wave data extracted from the UK Met Office and ECMWF models was directionally discretised to identify the critical wave directions relevant to the sections of the Wexford Harbour coastline considered in this study. The wave data was then used to provide boundary information for a series of computational wave models, used to transform this data from offshore to inshore in Wexford Harbour. Figure 4.1 and Figure 4.2 respectively show the wave rose plots for the offshore points relevant to the north eastern and south eastern boundaries of the Wexford Harbour offshore wave model, which were the key boundaries used for transforming offshore waves into Wexford Harbour.

Extreme Value Analysis (Section 4.1) and Joint Probability Analysis (Section 4.2) of waves/wind speeds and water levels were performed on the offshore data prior to undertaking the wave transformation simulations.

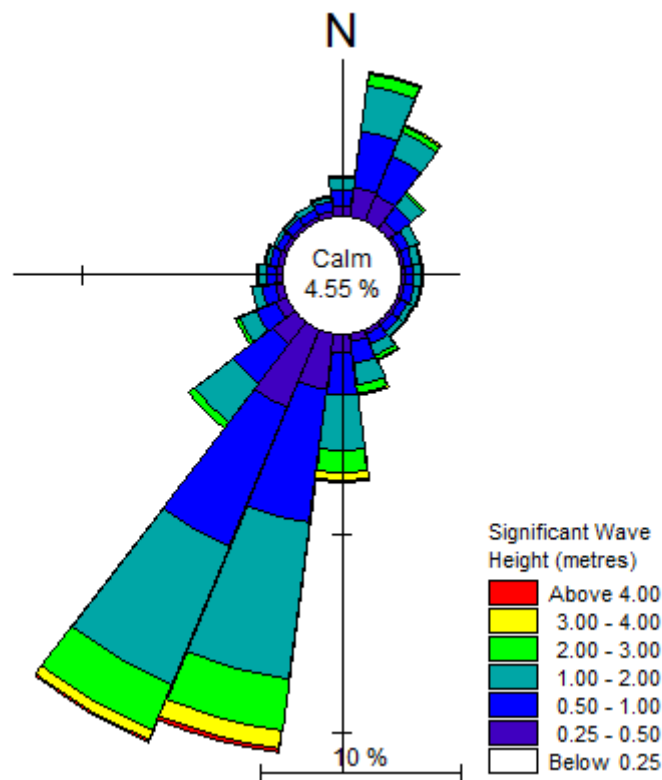
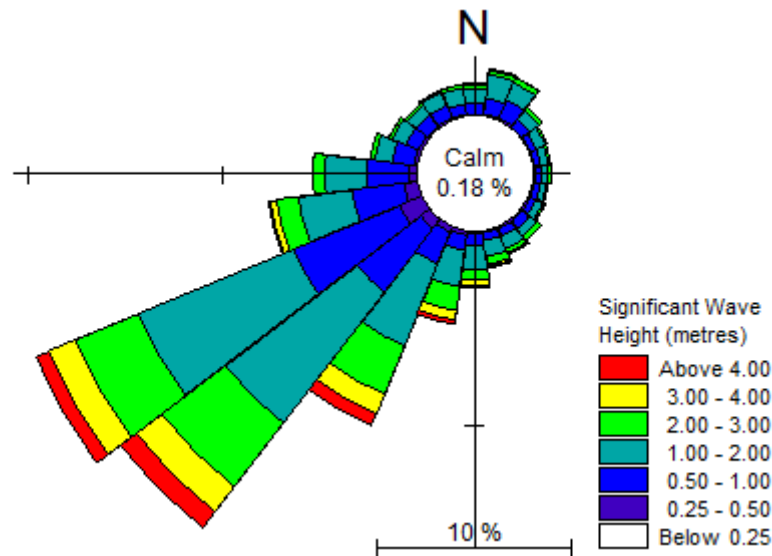


Figure 4.1: Wave Rose representing North East Boundary (2002 – 2016)



**Figure 4.2: Wave Rose representing South East Boundary (2004 – 2018)**

## 4.1 Extreme Value Analysis

For the Extreme Value Analysis (EVA) a partial duration series, also known as peak over threshold model, was used to select the largest events which occurred within the dataset of offshore wave heights. A theoretical probability distribution (Truncated Gumbel) was then fitted to the resultant extreme values and a Jackknife re-sampling technique used to derive a series of return period wave heights for the relevant directional sectors. Directional sectors analysed included a north easterly direction of 45° (ranging from 22.5° to 67.5°), an easterly direction of 90° (ranging from 67.5° to 112.5°) and a south easterly direction of 135° (ranging from 112.5° to 157.5°).

The results from the EVA are shown in Figure 4.3, Figure 4.4 and Figure 4.5 for directions of 45°, 90° and 135° respectively, with further details included in Appendix A.

Return Period	Wave height (metres)	
	52.5N, 6.06W	52.0N, 6.06W
2	3.58	3.64
5	4.12	4.20
10	4.53	4.63
20	4.95	5.05
50	5.49	5.61
100	5.90	6.04
200	6.31	6.46
1000	7.26	7.45

**Figure 4.3: Wave height EVA results for the 45° directional sector**

Return Period	Wave height (metres)	
	52.5N, 6.06W	52.0N, 6.06W
2	3.01	3.18
5	4.49	3.71
10	3.84	4.09
20	4.19	4.48
50	4.65	4.98
100	5.00	5.36
200	5.34	5.74
1000	6.15	6.62

**Figure 4.4: Wave height EVA results for the 90° directional sector**

Return Period	Wave height (metres)	
	52.5N, 6.06W	52.0N, 6.06W
2	6.08	4.07
5	6.62	4.75
10	7.02	5.25
20	7.41	5.75
50	7.93	6.42
100	8.33	6.92
200	8.72	7.42
1000	9.63	8.58

**Figure 4.5: Wave height EVA results for the 135° directional sector**

## 4.2 Joint Probability Analysis

The Joint Probability Analysis of wave heights/wind speeds and water levels was undertaken using the spreadsheet and simplified methodology described in Section 5.7 of the DEFRA/Environment Agency RSD Guidance on Joint Probability Analysis, FD2308 (Reference 7). This methodology involves selecting a correlation coefficient between each pair of variables. This is normally based on established relationships (e.g. wave height and water level) for a particular area, however there are no pre-determined correlation coefficients available for the coast of Ireland. Therefore RPS made use of the available wind, wave and tidal gauge data to derive joint event matrices between wave heights/wind speeds and water levels and subsequently determined appropriate correlation coefficients for Wexford.

Once an appropriate correlation coefficient was selected, the relevant set of AEP water levels and wave heights/wind speeds were input to the JOIN-SEA spreadsheet for analysis. Extreme water levels were taken from the ICWWS 2018 Phase 1 results at Wexford Harbour (Section 3.3), whilst the wave heights were derived during the EVA stage of this study (Section 4.1). As noted in Section 3.1, representative wind speeds for the generation of local wind waves within Wexford Harbour were determined with reference to Eurocode, BS EN 1991-1-4:Annex 1 (Reference 5) and the Offshore Installations: Guidance on design, construction and certification (Reference 6). Adjustments were made to the wind speeds from selected directions based on whether overland or overwater wind speeds were required.

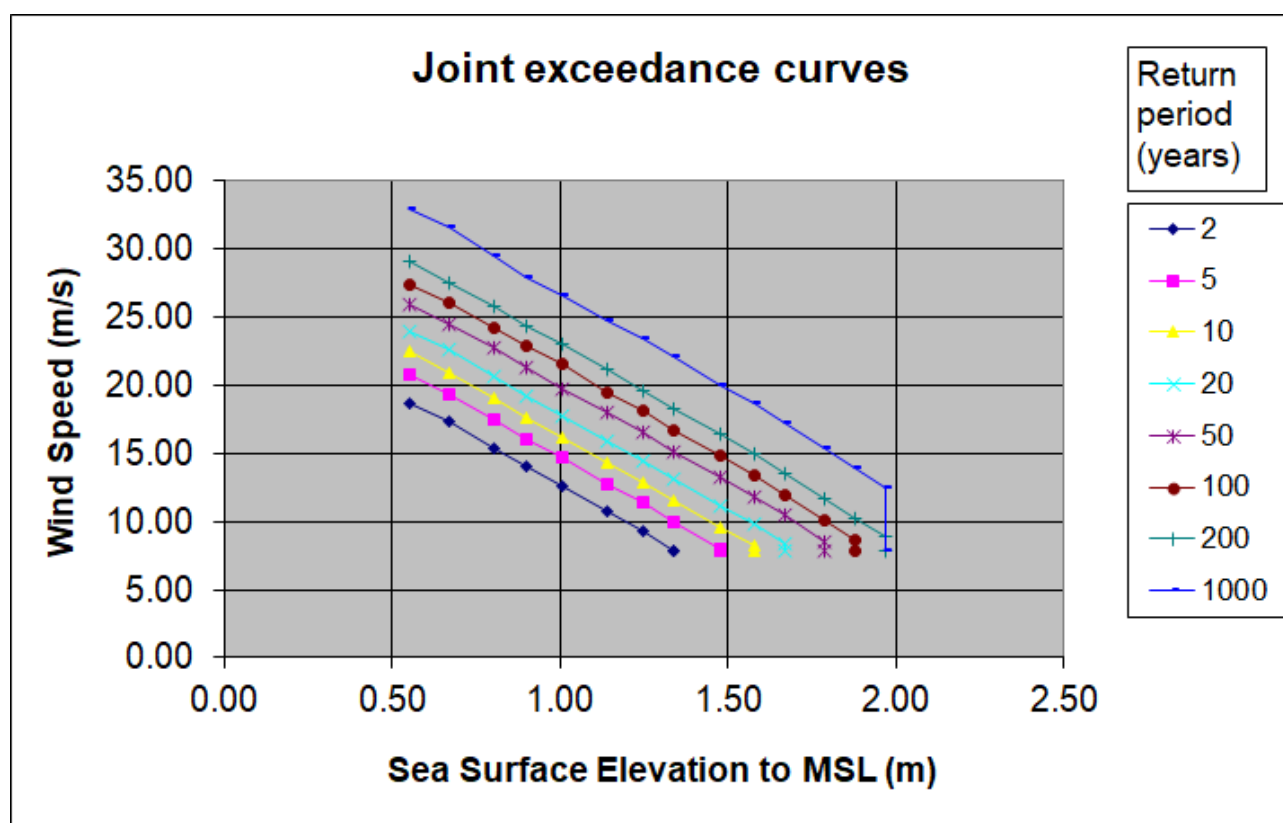
Combinations of wave heights/wind speeds and water levels for joint AEPs of 50%, 20%, 10%, 5%, 2%, 1%, 0.5% and 0.1% were derived for each sector relevant to Wexford. For each joint AEP and direction, six water levels with corresponding wave heights/wind speeds were generated from the joint probability analysis to illustrate the complete joint probability spectrum.

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Results from the joint probability analysis are included in Appendix B for the relevant directional sectors used in the final simulations; 120° sector for combined waves for CAPOs WC and WD, along with 340°, 270° and 280° sectors for wind wave simulations at CAPOs WexA, WexB, FB, BurrA and BurrB, as shown in Table 4-1. Refer to Figure 3.10 for the locations of each CAPO relative to the ICWWS 2018 water level estimation points used in the joint probability analysis. A sample plot of the offshore joint wind speed and water level exceedance curves at for the 340° sector is shown in Figure 4.6.

**Table 4-1: Summary of Joint Probability Inputs; water level estimation points and wave/wind directional sectors**

	Coastal Areas of Potential Overtopping (CAPO)						
	Wexford				Ferrybank	Burrow	
	WexA	WexB	WexC	WexD	FB	BurrA	BurrB
ICWWS 2018 Water Level Estimation Point	SE32	SE32	SE33	SE33	SE32	SE34	SE34 and SE35
Range of Assessment Directions (deg) - Combined Waves	N/A	N/A	30-150	30-150	N/A	N/A	N/A
Critical Directions (deg) - Combined Waves	N/A	N/A	120	120	N/A	N/A	N/A
Range of Assessment Directions (deg) - Wind Waves	260-40	260-40	0-40	0-40	260-40	320-20	270-0
Critical Directions (deg) - Wind Waves	340	340	N/A	N/A	270	340	280



**Figure 4.6: Joint wind speed and water level exceedance curve (340° sector) for Wexford WexA and WexB**

### 4.2.1 Correlation Coefficients

The correlation between wave heights/wind speeds and water levels varies with storm direction around the coast of Ireland. The Joint Probability analysis was therefore undertaken for a range of directional sectors with the correlation coefficients derived for each sector shown in Table 4-2 and Table 4-3 for wave heights and wind speeds with water level respectively.

For the Wexford Harbour area, there was a moderate correlation between offshore wave heights and water levels for events from the south east, with less correlation from the east and north east. There was also a moderate to strong correlation from the west and west-northwest between wind speeds and water levels, with the correlation becoming weaker with directions from north-northwest through to north-northeast.

**Table 4-2: Derived Correlation Coefficients between Offshore Wave Heights and Water Levels**

Direction (°)	Correlation Coefficient
45	0.10
90	0.20
135	0.28

**Table 4-3: Derived Correlation Coefficients between Wind Speeds and Water Levels**

Direction (°)	Correlation Coefficient
270	0.45
300	0.30
330	0.20
0	0.10
30	0.10

## 5 MODEL DEVELOPMENT

### 5.1 Modelling System

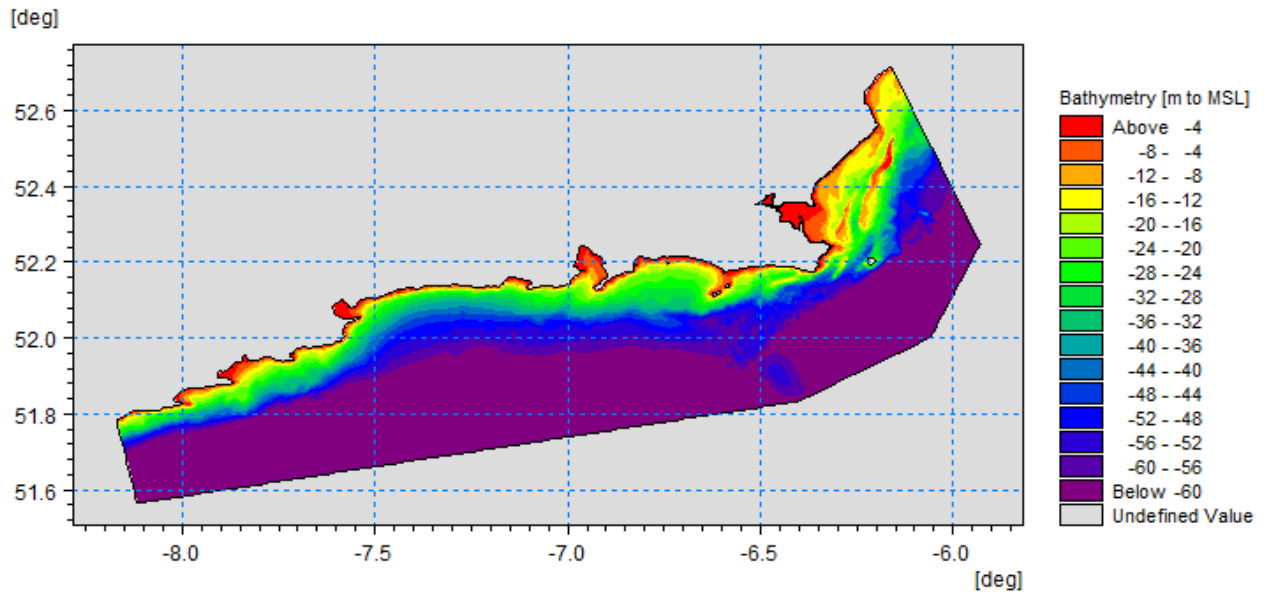
Following the statistical analysis, the offshore wave climate was transformed from offshore to inshore and the derived wind speeds were used to generate local wind waves using the MIKE21 Spectral Wave (SW) Flexible Mesh model. The SW model is a third generation spectral wind-wave model with two modes of operation, using either the directional decoupled parametric or fully spectral formulations. As this study was intended to provide detailed wave climate information, the fully spectral formulation was used. The SW module describes the propagation, growth and decay of waves in nearshore areas and can take into account the effects of refraction and shoaling due to varying depth, local wind generation and energy dissipation due to bottom friction, white capping and wave breaking. It may also include non-linear wave-wave interaction, wave-current interaction and the effect of time varying water depth and flooding and drying. The SW model has an optimal degree of flexibility in describing bathymetry and ambient flow conditions due to the use of a depth-adaptive and boundary-fitted unstructured mesh.

### 5.2 Model Bathymetry

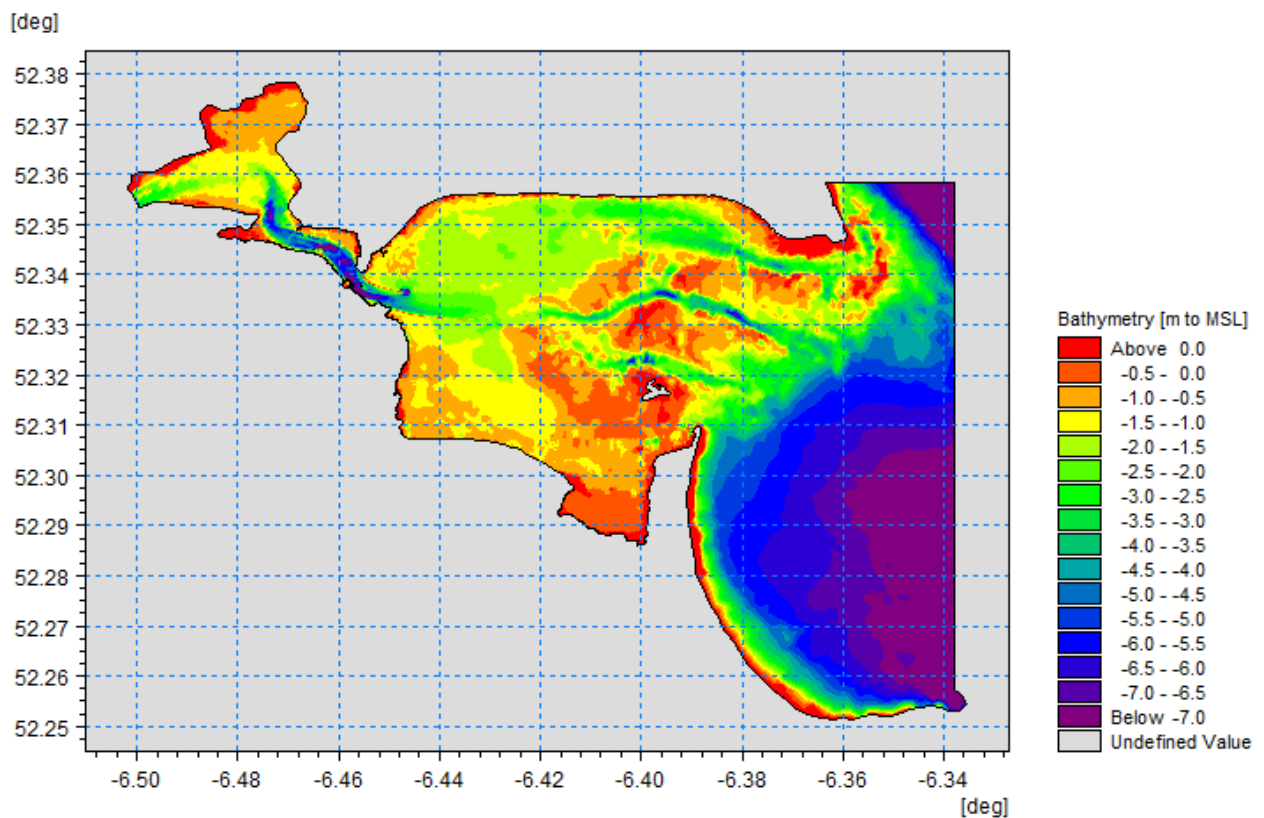
The Wexford Harbour offshore wave model was used to simulate the transformation of combined waves from the Irish Sea into Wexford Harbour, with a separate wave model used to simulate the generation of local wind waves within Wexford Harbour. The grid resolution of the models varied spatially depending on location and was selected to ensure that the variation and rate of change in the seabed topography due to banks, rocky shoals and particularly at the approaches to the shoreline/defence line were adequately resolved so that the changes in wave conditions due to shoaling, refraction and wave breaking were accurately modelled. This required fine grid resolution in places, down to circa 5-10m, particularly around banks and shoals and in the vicinity of areas of interest, with coarser grid resolution in deeper water and areas of more consistent bathymetry.

The Wexford Harbour offshore wave model boundaries were positioned to accurately represent the wave climate of the UK Met Office data extraction points (Section 3.1). The resulting model stretched from west of Ballycotton on the south coast to north of Courtown on the south east coast and was derived from a base model used in Phase 2 of the ICWWS 2018 to simulate combined wave propagation for a number of CAPOs along these coastlines. The extent and bathymetry, relative to Mean Sea Level (MSL), of the Wexford Harbour offshore wave model is shown in Figure 5.1. The Wexford Harbour wave model was derived from the Wexford Harbour offshore wave model, using the same bathymetric information and resolution but covering a smaller geographical extent for the purpose of local wind wave generation. The extent and bathymetry of this smaller model is shown in Figure 5.2. Figure 5.3 also shows an example of the detailed meshing in complex areas such as around the North training wall. The meshing in this area, particularly over the training wall itself was optimised to ensure that any effect this structure would have on an incident wave was represented. A similar level of detail was applied in the vicinity of the South training wall.

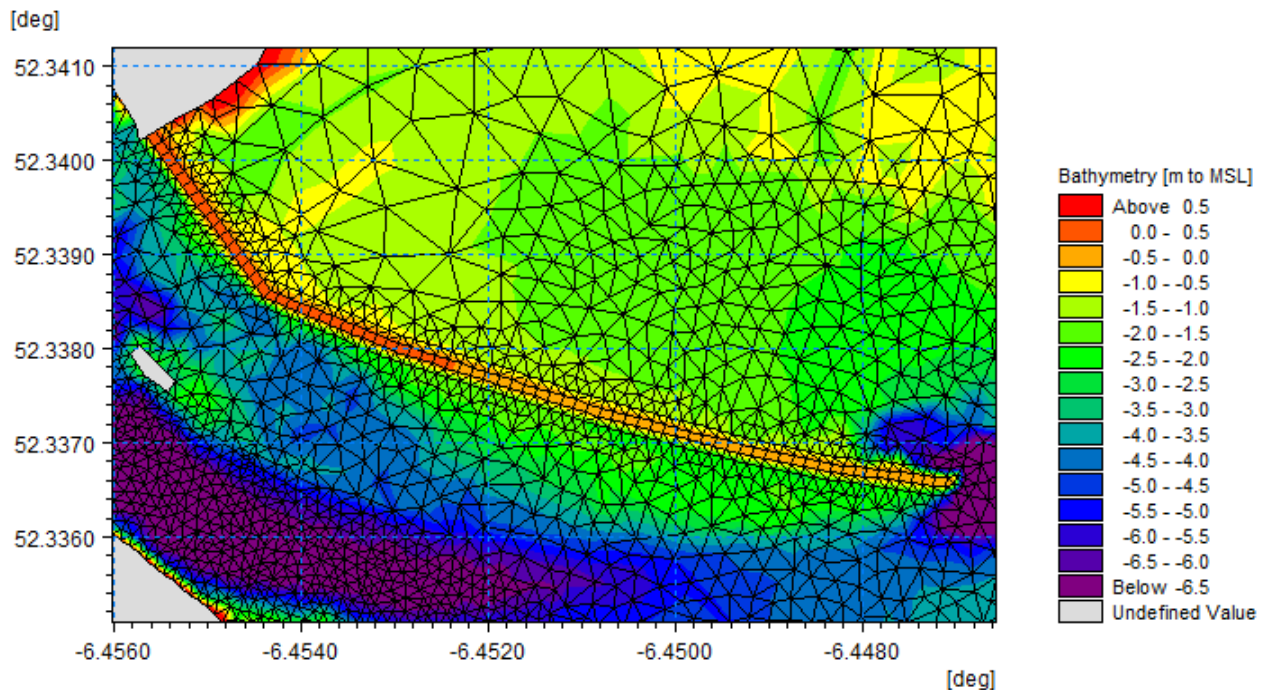
Note the following plots and simulations relate to the estimated and not surveyed levels for the training walls, as discussed under Section 3.2.1.



**Figure 5.1: Wexford Harbour Offshore Wave Model Extent and Bathymetry (to MSL), used for combined wave simulations**



**Figure 5.2: Wexford Harbour Wave Model Extent and Bathymetry (to MSL), used for wind wave simulations**



**Figure 5.3: Bathymetry and mesh detail in the vicinity of the North training wall in the Wexford models**

## 5.3 Model Simulations

There were seven key areas of interest for this study, each requiring the derivation of the wave climate parameters at the shoreline/defence line for the purpose of informing potential scheme design. Four areas were included along the Wexford frontage (WexA, WexB, WexC and WexD), with a further area at Ferrybank (FB) and two areas at the Burrow (BurrA and BurrB).

The Wexford frontage at WexC and WexD is exposed to offshore combined wave conditions, from a range of directions, consequently multiple wave transformation model simulations were undertaken to assess the variability in inshore wave climate with incident wave direction. The direction which resulted in the most arduous conditions along each particular section of coastline was used to determine the inshore wave climate presented as the output from this study. The critical storm direction along WexC and WexD was found to be 120°, although the wave heights and periods were variable, resulting in the need to output data for a number of estimation locations.

WexA, WexB, FB, BurrA and BurrB are not exposed to significant offshore swell wave conditions, with the most arduous conditions associated with locally generated wind waves approaching from 270° to 340° depending on the location. Due to the orientation of these coastlines and the associated variable wave climates, results have been provided for a number of estimation locations along each frontage.

Wind wave or combined wave simulations were undertaken for six combinations of wave heights or wind speeds and water levels for joint AEPs of 50%, 20%, 10%, 5%, 2%, 1%, 0.5% and 0.1% for each critical direction.

## 6 IMPACT OF SEA LEVEL RISE

Even without considering any increase in offshore wave heights due to the effect of climate change, the predicted increase in sea levels due to global warming has the potential to increase the wave climate at the shoreline/defence line due to greater water depths being available in the nearshore area. At present there is uncertainty about how global warming will actually affect the offshore wave climate or wind conditions in the future, thus the assessment of the effects of climate change in this study has considered four sea level rise scenarios.

For the purposes of flood risk assessment the current standard future scenario values adopted in Ireland for sea level rise are 0.5m for the Mid Range Future Scenario (MRFS) and 1.0m for the High End Future Scenario (HEFS), and thus these values were adopted for this study along with two additional climate change scenarios corresponding to sea level rise of 1.5m (H+EFS) and 2.0m (H++EFS).

Wave modelling scenarios undertaken for the present day (as outlined in Section 5.3) were re-run for these four climate change scenarios. The simulations were undertaken for the wave directions established as the critical directions for the study locations within Wexford Harbour during the present day simulations but with the water level increased by the relevant amount.

## 7 MEAN SEA LEVEL TO OD MALIN CONVERSION

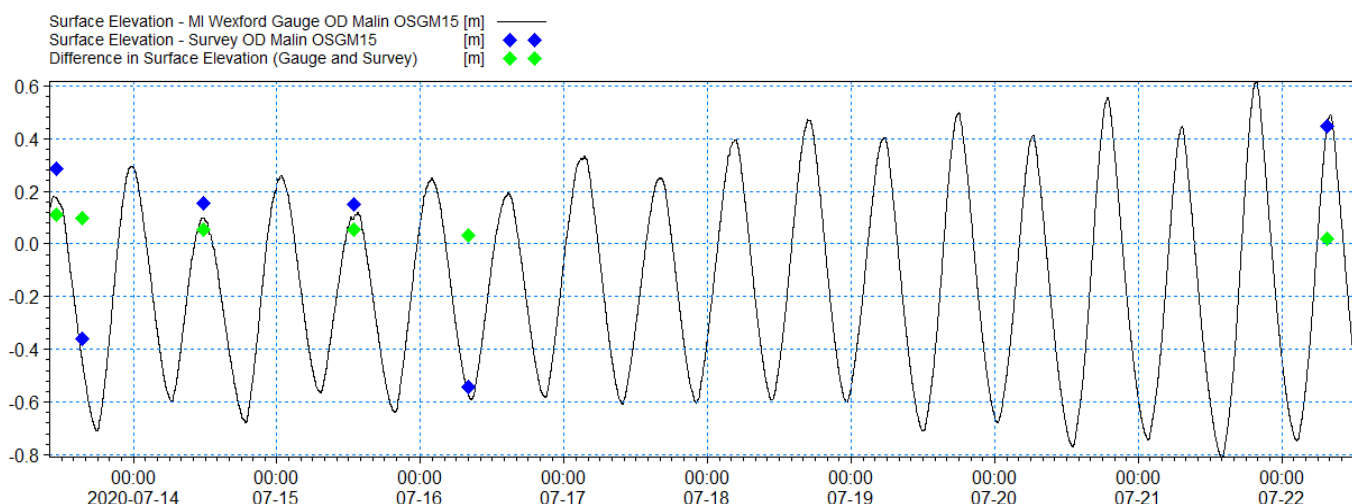
A review of the Mean Sea Level (MSL) to OD Malin datum relationship in the Wexford area was undertaken by analysing data from the Marine Institute (MI) tide gauge at Wexford Harbour. The data for this gauge is referenced to OD Malin OSGM15 datum, therefore by undertaking an analysis of the gauge records the mean water level relative to OD Malin could be obtained directly.

The Wexford Harbour tide gauge data analysed covered the period April 2007 to April 2020, although the removal of some rogue months of data was necessary due to an evident shift in the datum. Using the MIKE 21 toolbox 'Tide Analysis of Heights', the analyses yielded a set of harmonics including a Z0 value which is equivalent to the mean sea level. Estimations of the Z0 value at the Wexford Harbour gauge were made for the latest year and latest three years of suitable data. RPS considered a three year period to be the optimum length of data required, with a minimum of one year of data for a reasonable estimate of Z0 due to seasonal variations. Analysis of a longer period of records carries more risk of a shift in the datum and is affected to a greater degree by sea level rise and other trends. A harmonic analysis on a rolling basis was also undertaken, where Z0 was taken as the average of a rolling analysis of periods of one year at intervals of one month over a three year period.

Data from the OPW gauge at Ferrycarrig Bridge during a period of low fluvial flow in May – June 2020 was compared with the Marine Institute gauge at Wexford Harbour and identified a difference of circa 100mm in recorded water levels between the two datasets. To establish if this difference was due to a potential inaccuracy in one gauge or both gauges, or a realistic offset between two gauges situated in different parts of the estuary, a comparison with the nearby Marine Institute gauge at Rosslare, the datum of which had previously been verified by Wexford County Council was also undertaken. This comparison identified a good correlation in recorded levels between the Rosslare and Wexford Harbour gauges. When mean levels were considered these were also similar to Ferrycarrig Bridge over May and June 2020. Thus while the Ferrycarrig Bridge gauge data was useful in demonstrating the broad scale reliability of the Wexford Harbour gauge data, confirming the Wexford Harbour gauge levels within circa 100mm; due to some uncertainties in time stamps between the gauges and the potential for differences in the water levels between the gauge sites due to locality and fluvial influence, this comparison exercise did not materially change the confidence in the final estimation of Z0 at the Wexford Harbour gauge.

A tidal level survey was also undertaken as part of this study at a location close to the Wexford Harbour tide gauge, to facilitate comparison with data recorded by the gauge. Six readings were taken between 13<sup>th</sup> July and 22<sup>nd</sup> July 2020 for the purpose of confirming the performance of the tide gauge and the relationship of gauge datum to OD Malin (OSGM15). RPS reviewed the survey information and compared the survey data with the coincident gauge readings. Figure 7.1, shows the comparison after adjusting the survey readings to Coordinated Universal Time (UTC) to align with the gauge, with the Wexford Harbour gauge recording to OD Malin OSGM15 shown by the black trace, while the blue diamonds represent the time adjusted spot survey readings and the green diamonds show the difference between the two. The period assessed covered both neap and spring tides, with the readings taken close to high and low waters generally showing better correlation, as the significance of any timing differences due to clock settings are minimised during periods when the rate of change in levels is low. A geometric mean of the differences between the six spot readings and the gauge data was calculated as 0.051m. However, due to the range of the differences (0.109m to 0.018m), and the limited sample size it was not possible to confidently determine a single value on which to justify an adjustment of the recorded gauge levels. Consequently, the Wexford Harbour gauge data datum was not adjusted for this study and it is recommended that an independent assessment of the datum of the Wexford Harbour gauge should be undertaken and any necessary correction to the MSL to OD Malin relationship applied prior to commencing any detailed design of flood schemes in the area.

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**Figure 7.1: Comparison between Surface Elevation from Wexford Gauge and Study Survey**

Using the Grid Inquest II software provided by Ordnance Survey Ireland (OSi), the relationships between OD Malin OSGM15 and OD Malin OSGM02 at Wexford/Ferrybank and the Burrow were also derived. The resulting updated datum conversions for Wexford/Ferrybank and the Burrow as used to present the results of this study in terms of OD Malin OSGM02 and OSGM15 are presented in Table 7-1 and Table 7-2 respectively.

**Table 7-1: Estimated Conversion between MSL and OD Malin for Wexford and Ferrybank**

MSL to OD Malin	
MSL to Malin OSGM02	MSL to Malin OSGM15
-0.079m	-0.046m

Sign convention indicates OD Malin (OSGM02 and OSGM15) relative to MSL, with a positive value being above MSL and a negative value being below MSL

**Table 7-2: Estimated Conversion between MSL and OD Malin for Burrow**

MSL to OD Malin	
MSL to Malin OSGM02	MSL to Malin OSGM15
-0.034m	+0.023m

Sign convention indicates OD Malin (OSGM02 and OSGM15) relative to MSL, with a positive value being above MSL and a negative value being below MSL

## 8 ADDITIONAL CONSIDERATIONS

### 8.1 Beach Drawdown

Beach drawdown can be a significant issue on gradually sloping sandy beaches exposed to large ocean storm waves. Where this is the case the large storm waves, which form a series of breaking waves across the surf zone, can result in high undertow currents which in combination with the breaking waves lifting the bed sediment can result in sand being stripped off the beach and carried to an offshore bar. This lowering of the beach can result in larger reformed waves being able to attack shoreline structures at the back of the beach.

The potential for beach drawdown during storm events to affect the wave climate at Wexford Harbour was reviewed in the light of the storm wave climates identified through the preceding stages of this study. In the case of the frontages of Wexford, Ferrybank and the Burrow, these are dominated by low energy inshore wave climates, with no wide surf zone and thus a minimal undertow. The bathymetry of the approaches to the study frontages represents a sheltered estuary setting rather than an exposed ocean beach and this combined with the low energy storm wave climate means that there will be no significant undertow which could draw sediment offshore and result in a significant beach drawdown.

In summary, the low energy wave climate and the inshore bathymetry mean that beach drawdown is not a relevant issue along the frontages at Wexford, Ferrybank and the Burrow and hence no detailed morphological modelling was undertaken.

### 8.2 Wave Setup

On wide, relatively flat, beaches where large storm waves break and reform there is usually a significant gradient in the radiation stresses across the surf zone which results in a lowering of the mean sea level under the first line of breaking waves and a subsequent increase in the mean sea levels in towards the beach. This increase or setup of the mean water levels close to the beach means that reformed waves approaching a coastal structure at the back of the beach may be slightly larger due to the locally increased water depth at the toe of the structure.

In the case of Wexford Harbour however, the bathymetry of the approaches to the frontage is not a wide exposed beach and the predominance of locally generated wind waves in the area, with associated limited wave heights and periods, means a relatively low wave energy environment exists along the study frontages. Thus, wave set up was not considered a mechanism that would significantly increase the water levels at the Wexford, Ferrybank and Burrow frontages and hence no further consideration was given to this phenomena in the analysis of the storm waves approaching the frontage.

## 9 RESULTS AND STUDY OUTPUTS

Wexford Harbour is exposed to combined waves approaching from offshore through the north easterly to south easterly directions. Local wind wave conditions are also generated within the Harbour from all wind directions. For the 0.1% AEP, offshore wave conditions range from up to 6.39m significant height and 11.02s peak period from an easterly direction to up to 6.65m significant height and 11.25s peak period from a north easterly direction and up to 9.63m significant height and 13.54s peak period from a south westerly direction.

The Wexford Harbour offshore wave model was used to simulate the full range of joint probability return period events up to 0.1% AEP, with six combinations of waves and water levels modelled for each event for the critical 120° directional sector affecting the Wexford C and D frontages. At all other study frontages the locally generated wind wave conditions were found to be more onerous than the transformed combined wave conditions from offshore. Following the transformation of the offshore wave conditions into the nearshore, the inshore combined wave results were extracted for nine locations along the Wexford C and D frontage.

While the study area is also subject to locally generated waves approaching from a range of directions, the most critical directions were found to be 340° at Wexford A and B, along with Burrow A, 270° at Ferrybank, and 280° at Burrow B. The Wexford Harbour model was run for the full range of water level and wind speed combinations for each joint probability return period event up to 0.1% AEP, with six combinations of wind speeds and water levels modelled for each event for the relevant directional sectors. Following the creation of the inshore wave conditions, the inshore results were extracted for five locations along the Wexford A and B frontage, one location at Ferrybank, two locations at Burrow A and four locations at Burrow B.

For each AEP from 50% to 0.1%, the output of the study near the shoreline/defence line along the Wexford, Ferrybank and Burrow frontage in areas which are potentially liable to flooding from wave overtopping is presented in terms of spectral significant wave height ( $H_{m0}$ ) in metres, spectral peak wave period ( $T_p$ ) in seconds and mean wave direction (MWD) in degrees measured from north, for each water level (WL).

The output from this study is representative of a point situated at approximately half the shallow water wavelength seaward from the toe of the defence structure or shoreline. A note of the measured bed level at each estimation location and its source is also supplied.

Wave climate and water level combinations are provided for present day sea levels and for each of four future sea level rise scenarios (MRFS, HEFS, H+EFS, H++EFS).

Beach drawdown and wave setup were considered as part of this study, however the low energy wave climate with associated limited wave heights and periods, along with the inshore bathymetry along the Wexford, Ferrybank and Burrow frontages meant that beach drawdown was not considered an issue and potential wave setup was deemed negligible.

The two estimation locations identified for Wexford A, are shown in Figure 9.1 and Table 9-1. The recommended wave and tidal levels for standard AEPs at each of the five epochs investigated for each point are presented in Table 9-2 and Table 9-3. For the present day sea level at Wexford A, Location WexA.2 experienced the largest significant wave heights with a maximum of 0.41m to 0.69m for the 50% and 0.1% AEPs respectively. Corresponding peak wave periods were 2.38s and 2.81s. Location WexA.1 experienced smaller significant wave heights with a maximum of 0.37m to 0.64m for the 50% and 0.1% AEPs respectively, and corresponding peak wave periods of 2.33s and 2.68s. Water levels for present day conditions ranged from 0.63m OD Malin (OSGM15) to 1.92m OD Malin (OSGM15). Bed levels at which the output data at Location WexA.1 and WexA.2 were extracted are shown as -0.409m and -0.325m OD Malin (OSGM15) respectively.

The three estimation locations identified for Wexford B, are shown in Figure 9.2 and detailed in Table 9-4. The recommended wave and tidal levels for standard AEPs at each of the five epochs investigated for each point are presented in Table 9-5 to Table 9-7. In terms of wind waves, for the present day sea level at Wexford B, Location WexB.2 experienced the largest significant locally generated wave heights with a maximum of 0.43m to 0.74m for the 50% and 0.1% AEPs respectively. Corresponding peak wave periods were 2.33s and 2.78s. Water levels for present day conditions ranged from 0.63m OD Malin (OSGM15) to 1.92m OD Malin (OSGM15). The bed level at which the output data at Location WexB.2 was extracted is shown as -3.408m OD Malin (OSGM15).

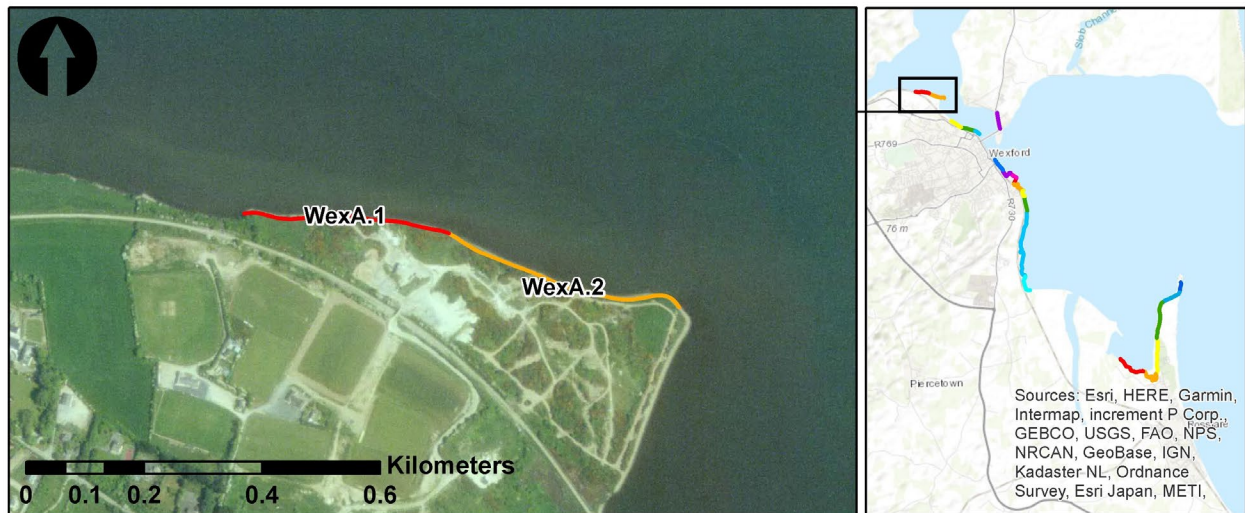
The three estimation locations identified for Wexford C, are shown in Figure 9.3 and detailed in Table 9-8. The recommended wave and tidal levels for standard AEPs at each of the five epochs investigated for each point are presented in Table 9-9 to Table 9-11. In terms of combined waves, for the present day sea level at Wexford C, Location WexC.3 experienced the largest significant wave heights with a maximum of 0.59m to 1.29m for the 50% and 0.1% AEPs respectively. Corresponding peak wave periods were 2.63s and 3.24s. Water levels for present day conditions ranged from 0.57m OD Malin (OSGM15) to 1.82m OD Malin (OSGM15). The bed level at which the output data at Location WexC.3 was extracted is shown as -3.779m OD Malin (OSGM15).

Six estimation locations were identified for Wexford D, as shown in Figure 9.4 and detailed in Table 9-12. The recommended wave and tidal levels for standard AEPs at each of the five epochs investigated for each point are presented in Table 9-13 to Table 9-18. In terms of combined waves, for the present day sea level at Wexford D, Location WexD.3 experienced the largest significant wave heights with a maximum of 0.61m to 0.95m for the 50% and 0.1% AEPs respectively. Corresponding peak wave periods were 2.53s and 3.20s. Water levels for present day conditions ranged from 0.55m OD Malin (OSGM15) to 1.80m OD Malin (OSGM15). The bed level at which the output data at Location WexD.3 was extracted is shown as -1.083m OD Malin (OSGM15).

One estimation location was identified for Ferrybank, as shown in Figure 9.5 and detailed in Table 9-19. The recommended wave and tidal levels for standard AEPs at each of the five epochs investigated for this point are presented in Table 9-20. In terms of wind waves, for the present day sea level at Ferrybank, Location FB experienced significant locally generated wave heights with a maximum of 0.42m to 0.78m for the 50% and 0.1% AEPs respectively. Corresponding peak wave periods were 2.05s and 2.73s. Water levels for present day conditions ranged from 0.63m OD Malin (OSGM15) to 1.92m OD Malin (OSGM15). The bed level at which the output data at Location FB was extracted is shown as -0.776m OD Malin (OSGM15).

Two estimation locations were identified for Burrow A, as shown in Figure 9.6 and detailed in Table 9-21. The recommended wave and tidal levels for standard AEPs at each of the five epochs investigated for each point are presented in Table 9-22 and Table 9-23. In terms of wind waves, for the present day sea level at Burrow A, Location BurrA.1 experienced the largest significant locally generated wave heights with a maximum of 0.24m to 0.46m for the 50% and 0.1% AEPs respectively. Corresponding peak wave periods were 1.46s and 1.88s. Water levels for present day conditions ranged from 0.72m OD Malin (OSGM15) to 1.81m OD Malin (OSGM15). The bed level at which the output data at Location BurrA.1 was extracted is shown as -0.187m OD Malin (OSGM15).

The four estimation locations identified for Burrow B, are shown in Figure 9.7 and detailed in Table 9-24. The recommended wave and tidal levels for standard AEPs at each of the five epochs investigated for each point are presented in Table 9-25 to Table 9-28. It is notable that the predicted wave heights for each combined AEP increase with water depth at Burrow B, which seems counterintuitive, however this is a direct consequence of the extensive shallow approach to the shoreline at Burrow B and hence the reduced bottom friction and energy loss experienced by the incoming waves as water depths over the beach increase. In terms of wind waves, for the present day sea level at Burrow B, Location BurrB.4 experienced the largest significant locally generated wave heights with a maximum of 0.43m to 0.79m for the 50% and 0.1% AEPs respectively. Corresponding peak wave periods were 2.02s and 2.41s. Water levels for present day conditions ranged from 0.83m OD Malin (OSGM15) to 1.87m OD Malin (OSGM15). The bed level at which the output data at Location BurrB.4 was extracted is shown as -1.869m OD Malin (OSGM15).



**Figure 9.1: Estimation Locations for Wexford A (WexA)**

**Table 9-1: Co-ordinates for Estimation Locations for Wexford A (WexA)**

Location	Co-ordinates	
	Latitude (°N)	Longitude (°W)
WexA.1	52.3539	-6.4850
WexA.2	52.3528	-6.4795

Location	Co-ordinates (ITM)	
	Eastings [m]	Northings [m]
WexA.1	703203	623560
WexA.2	703580	623445

Table 9-2: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexA.1

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Wexford Location A.1	
Bed Level (MSL): -0.363m	
Bed Level (OD Malin OSGM02): -0.442m	
Bed Level (OD Malin OSGM15): -0.409m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: OPW LiDAR data (2013)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.67	0.59	0.63	0.37	2.33	358
	0.90	0.82	0.85	0.30	1.88	357
	1.01	0.93	0.96	0.29	1.86	357
	1.14	1.06	1.10	0.23	1.65	358
	1.25	1.17	1.20	0.21	1.65	359
	1.34	1.26	1.29	0.17	1.44	356
20%	0.67	0.59	0.63	0.42	2.18	2
	0.90	0.82	0.85	0.36	2.05	0
	1.14	1.06	1.10	0.29	1.81	354
	1.25	1.17	1.20	0.26	1.79	357
	1.34	1.26	1.29	0.22	1.61	354
	1.48	1.40	1.43	0.19	1.59	357
10%	0.67	0.59	0.63	0.44	2.33	3
	0.90	0.82	0.85	0.41	2.12	0
	1.14	1.06	1.10	0.33	1.92	358
	1.34	1.26	1.29	0.26	1.74	354
	1.48	1.40	1.43	0.23	1.73	357
	1.58	1.50	1.53	0.20	1.66	358
5%	0.81	0.73	0.76	0.47	2.34	2
	1.01	0.93	0.96	0.44	2.26	0
	1.25	1.17	1.20	0.38	2.12	357
	1.48	1.40	1.43	0.26	1.74	352
	1.58	1.50	1.53	0.23	1.69	356
	1.67	1.59	1.62	0.20	1.56	353
2%	0.81	0.73	0.76	0.51	2.45	1
	1.01	0.93	0.96	0.50	2.40	0
	1.25	1.17	1.20	0.40	2.09	356
	1.48	1.40	1.43	0.31	1.87	352
	1.67	1.59	1.62	0.23	1.66	357
	1.79	1.71	1.74	0.19	1.56	354
1%	0.81	0.73	0.76	0.53	2.50	360
	1.01	0.93	0.96	0.54	2.44	1
	1.25	1.17	1.20	0.45	2.18	358
	1.48	1.40	1.43	0.36	2.02	356
	1.67	1.59	1.62	0.28	1.81	358
	1.88	1.80	1.83	0.19	1.57	359
0.5%	0.90	0.82	0.85	0.56	2.53	0
	1.14	1.06	1.10	0.56	2.45	0
	1.34	1.26	1.29	0.47	2.17	357
	1.58	1.50	1.53	0.40	2.13	357
	1.79	1.71	1.74	0.27	1.80	358
	1.97	1.89	1.92	0.19	1.58	359
0.1%	0.90	0.82	0.85	0.59	2.73	357
	1.14	1.06	1.10	0.64	2.68	1
	1.34	1.26	1.29	0.60	2.47	360
	1.58	1.50	1.53	0.49	2.27	357
	1.79	1.71	1.74	0.39	2.06	356
	1.97	1.89	1.92	0.30	1.83	358

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.17	1.09	1.13	0.43	2.28	354
	1.40	1.32	1.35	0.36	2.09	354
	1.51	1.43	1.46	0.30	1.84	352
	1.64	1.56	1.60	0.26	2.03	352
	1.75	1.67	1.70	0.23	2.22	352
	1.84	1.76	1.79	0.19	2.41	352
20%	1.17	1.09	1.13	0.49	2.35	354
	1.40	1.32	1.35	0.43	2.19	355
	1.64	1.56	1.60	0.35	2.08	354
	1.75	1.67	1.70	0.26	1.79	357
	1.84	1.76	1.79	0.22	1.63	358
	1.98	1.90	1.93	0.19	1.54	359
10%	1.17	1.09	1.13	0.54	2.40	354
	1.40	1.32	1.35	0.46	2.24	356
	1.64	1.56	1.60	0.39	2.13	355
	1.84	1.76	1.79	0.26	1.80	358
	1.98	1.90	1.93	0.23	1.65	352
	2.08	2.00	2.03	0.21	1.62	354
5%	1.31	1.23	1.26	0.55	2.40	353
	1.51	1.43	1.46	0.49	2.34	355
	1.75	1.67	1.70	0.40	2.15	354
	1.98	1.90	1.93	0.27	1.83	355
	2.08	2.00	2.03	0.26	1.81	355
	2.17	2.09	2.12	0.21	1.71	356
2%	1.31	1.23	1.26	0.62	2.49	359
	1.51	1.43	1.46	0.53	2.36	358
	1.75	1.67	1.70	0.43	2.10	356
	1.98	1.90	1.93	0.33	1.97	351
	2.17	2.09	2.12	0.28	1.87	355
	2.29	2.21	2.24	0.23	1.80	357
1%	1.31	1.23	1.26	0.66	2.61	360
	1.51	1.43	1.46	0.61	2.49	359
	1.75	1.67	1.70	0.48	2.22	356
	1.98	1.90	1.93	0.38	2.11	351
	2.17	2.09	2.12	0.31	1.98	355
	2.38	2.30	2.33	0.21	1.91	352
0.5%	1.40	1.32	1.35	0.68	2.65	360
	1.64	1.56	1.60	0.61	2.47	357
	1.84	1.76	1.79	0.49	2.26	355
	2.08	2.00	2.03	0.44	2.18	356
	2.29	2.21	2.24	0.29	1.86	356
	2.47	2.39	2.42	0.25	1.80	355
0.1%	1.40	1.32	1.35	0.75	2.85	0
	1.64	1.56	1.60	0.73	2.74	359
	1.84	1.76	1.79	0.65	2.49	356
	2.08	2.00	2.03	0.56	2.41	355
	2.29	2.21	2.24	0.45	2.25	354
	2.47	2.39	2.42	0.36	2.09	354

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.67	1.59	1.63	0.46	2.32	350
	1.90	1.82	1.85	0.38	2.12	353
	2.01	1.93	1.96	0.34	2.04	354
	2.14	2.06	2.10	0.28	1.86	355
	2.25	2.17	2.20	0.26	1.83	355
	2.34	2.26	2.29	0.19	2.40	352
20%	1.67	1.59	1.63	0.53	2.36	351
	1.90	1.82	1.85	0.43	2.08	356
	2.14	2.06	2.10	0.36	2.05	356
	2.25	2.17	2.20	0.32	2.00	355
	2.34	2.26	2.29	0.29	1.89	355
	2.48	2.40	2.43	0.19	1.63	355
10%	1.67	1.59	1.63	0.59	2.41	352
	1.90	1.82	1.85	0.50	2.34	354
	2.14	2.06	2.10	0.40	2.16	353
	2.34	2.26	2.29	0.32	2.00	354
	2.48	2.40	2.43	0.24	1.77	356
	2.58	2.50	2.53	0.23	1.74	355
5%	1.81	1.73	1.76	0.59	2.41	351
	2.01	1.93	1.96	0.52	2.37	353
	2.25	2.17	2.20	0.40	2.12	354
	2.48	2.40	2.43	0.32	2.02	354
	2.58	2.50	2.53	0.26	1.80	355
	2.67	2.59	2.62	0.23	1.78	355
2%	1.81	1.73	1.76	0.68	2.49	355
	2.01	1.93	1.96	0.60	2.46	355
	2.25	2.17	2.20	0.49	2.34	354
	2.48	2.40	2.43	0.39	2.13	354
	2.67	2.59	2.62	0.29	1.94	354
	2.79	2.71	2.74	0.25	1.85	354
1%	1.81	1.73	1.76	0.74	2.67	357
	2.01	1.93	1.96	0.66	2.58	356
	2.25	2.17	2.20	0.52	2.35	354
	2.48	2.40	2.43	0.44	2.20	354
	2.67	2.59	2.62	0.31	1.94	355
	2.88	2.80	2.83	0.26	1.84	355
0.5%	1.90	1.82	1.85	0.76	2.69	356
	2.14	2.06	2.10	0.66	2.58	355
	2.34	2.26	2.29	0.56	2.42	354
	2.58	2.50	2.53	0.45	2.24	354
	2.79	2.71	2.74	0.29	1.82	358
	2.97	2.89	2.92	0.25	1.81	358
0.1%	1.90	1.82	1.85	0.89	2.89	359
	2.14	2.06	2.10	0.79	2.76	357
	2.34	2.26	2.29	0.70	2.65	355
	2.58	2.50	2.53	0.58	2.45	354
	2.79	2.71	2.74	0.45	2.27	356
	2.97	2.89	2.92	0.36	2.09	356

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.17	2.09	2.13	0.48	2.33	350
	2.40	2.32	2.35	0.38	2.15	355
	2.51	2.43	2.46	0.35	2.08	356
	2.64	2.56	2.60	0.30	1.93	356
	2.75	2.67	2.70	0.26	1.86	359
	2.84	2.76	2.79	0.20	1.60	359
20%	2.17	2.09	2.13	0.55	2.37	353
	2.40	2.32	2.35	0.47	2.31	354
	2.64	2.56	2.60	0.37	2.11	354
	2.75	2.67	2.70	0.33	2.03	354
	2.84	2.76	2.79	0.29	1.90	354
	2.98	2.90	2.93	0.24	1.82	354
10%	2.17	2.09	2.13	0.62	2.43	353
	2.40	2.32	2.35	0.53	2.39	354
	2.64	2.56	2.60	0.42	2.19	354
	2.84	2.76	2.79	0.33	2.06	354
	2.98	2.90	2.93	0.28	1.91	354
	3.08	3.00	3.03	0.24	1.83	354
5%	2.31	2.23	2.26	0.61	2.42	353
	2.51	2.43	2.46	0.54	2.39	354
	2.75	2.67	2.70	0.41	2.10	355
	2.98	2.90	2.93	0.33	2.03	355
	3.08	3.00	3.03	0.29	1.92	355
	3.17	3.09	3.12	0.25	1.84	355
2%	2.31	2.23	2.26	0.71	2.54	354
	2.51	2.43	2.46	0.62	2.48	355
	2.75	2.67	2.70	0.50	2.35	354
	2.98	2.90	2.93	0.39	2.11	354
	3.17	3.09	3.12	0.30	1.98	354
	3.29	3.21	3.24	0.25	1.85	354
1%	2.31	2.23	2.26	0.78	2.71	355
	2.51	2.43	2.46	0.70	2.66	355
	2.75	2.67	2.70	0.56	2.41	354
	2.98	2.90	2.93	0.45	2.25	354
	3.17	3.09	3.12	0.35	2.08	354
	3.38	3.30	3.33	0.26	1.86	354
0.5%	2.40	2.32	2.35	0.79	2.72	355
	2.64	2.56	2.60	0.67	2.58	354
	2.84	2.76	2.79	0.57	2.43	354
	3.08	3.00	3.03	0.45	2.27	354
	3.29	3.21	3.24	0.34	2.07	354
	3.47	3.39	3.42	0.26	1.87	354
0.1%	2.40	2.32	2.35	0.97	2.93	357
	2.64	2.56	2.60	0.82	2.75	355
	2.84	2.76	2.79	0.71	2.65	354
	3.08	3.00	3.03	0.58	2.44	354
	3.29	3.21	3.24	0.47	2.30	354
	3.47	3.39	3.42	0.36	2.10	354

Table 9-3: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexA.2

<b>Wexford Coastal Wave &amp; Water Level Modelling Study (CWWS)</b>	
<b>Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)</b>	
<b>Output:</b> Shoreline Wave Climate and Water Level Combinations	
<b>Location:</b> Wexford Location A.2	
<b>Bed Level (MSL):</b> -0.279m	
<b>Bed Level (OD Malin OSGM02):</b> -0.358m	
<b>Bed Level (OD Malin OSGM15):</b> -0.325m	
<b>Dated:</b> October 2020	
<b>Joint Probability Event (AEP):</b> Varies from 50% to 0.1%	
<b>Prepared By:</b> ZM	<b>Checked By:</b> CN
<b>Table Reference:</b> CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: OPW LiDAR data (2013)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.67	0.59	0.63	0.41	2.38	355
	0.90	0.82	0.85	0.33	2.15	354
	1.01	0.93	0.96	0.31	2.04	354
	1.14	1.06	1.10	0.23	1.77	353
	1.25	1.17	1.20	0.22	1.77	354
	1.34	1.26	1.29	0.18	1.56	352
20%	0.67	0.59	0.63	0.44	2.34	1
	0.90	0.82	0.85	0.39	2.12	357
	1.14	1.06	1.10	0.30	1.95	352
	1.25	1.17	1.20	0.27	1.86	353
	1.34	1.26	1.29	0.24	1.90	352
	1.48	1.40	1.43	0.20	1.66	353
10%	0.67	0.59	0.63	0.47	2.44	2
	0.90	0.82	0.85	0.44	2.21	358
	1.14	1.06	1.10	0.34	2.05	355
	1.34	1.26	1.29	0.27	1.84	351
	1.48	1.40	1.43	0.24	1.81	353
	1.58	1.50	1.53	0.22	1.77	354
5%	0.81	0.73	0.76	0.51	2.44	360
	1.01	0.93	0.96	0.49	2.42	359
	1.25	1.17	1.20	0.41	2.30	356
	1.48	1.40	1.43	0.28	2.09	351
	1.58	1.50	1.53	0.24	1.80	352
	1.67	1.59	1.62	0.23	2.41	348
2%	0.81	0.73	0.76	0.55	2.54	0
	1.01	0.93	0.96	0.54	2.49	360
	1.25	1.17	1.20	0.42	2.16	353
	1.48	1.40	1.43	0.33	2.11	351
	1.67	1.59	1.62	0.24	1.78	352
	1.79	1.71	1.74	0.21	1.95	351
1%	0.81	0.73	0.76	0.56	2.69	1
	1.01	0.93	0.96	0.58	2.54	360
	1.25	1.17	1.20	0.48	2.34	356
	1.48	1.40	1.43	0.37	2.09	354
	1.67	1.59	1.62	0.29	1.85	353
	1.88	1.80	1.83	0.19	1.60	353
0.5%	0.90	0.82	0.85	0.60	2.74	1
	1.14	1.06	1.10	0.60	2.59	359
	1.34	1.26	1.29	0.49	2.17	354
	1.58	1.50	1.53	0.43	2.13	356
	1.79	1.71	1.74	0.28	1.80	353
	1.97	1.89	1.92	0.20	1.58	352
0.1%	0.90	0.82	0.85	0.63	2.85	360
	1.14	1.06	1.10	0.69	2.81	0
	1.34	1.26	1.29	0.65	2.64	358
	1.58	1.50	1.53	0.51	2.38	355
	1.79	1.71	1.74	0.40	2.11	353
	1.97	1.89	1.92	0.30	1.89	352

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.17	1.09	1.13	0.45	2.36	352
	1.40	1.32	1.35	0.38	2.18	354
	1.51	1.43	1.46	0.31	2.23	351
	1.64	1.56	1.60	0.28	2.29	351
	1.75	1.67	1.70	0.25	2.35	352
	1.84	1.76	1.79	0.21	2.41	352
20%	1.17	1.09	1.13	0.52	2.41	353
	1.40	1.32	1.35	0.45	2.37	355
	1.64	1.56	1.60	0.37	2.20	354
	1.75	1.67	1.70	0.27	1.83	353
	1.84	1.76	1.79	0.24	1.74	353
	1.98	1.90	1.93	0.20	1.58	353
10%	1.17	1.09	1.13	0.57	2.45	353
	1.40	1.32	1.35	0.49	2.41	355
	1.64	1.56	1.60	0.41	2.32	355
	1.84	1.76	1.79	0.27	1.83	353
	1.98	1.90	1.93	0.25	2.38	351
	2.08	2.00	2.03	0.23	1.81	351
5%	1.31	1.23	1.26	0.57	2.44	352
	1.51	1.43	1.46	0.52	2.44	354
	1.75	1.67	1.70	0.43	2.36	354
	1.98	1.90	1.93	0.28	1.92	352
	2.08	2.00	2.03	0.27	1.88	352
	2.17	2.09	2.12	0.23	1.82	352
2%	1.31	1.23	1.26	0.65	2.66	358
	1.51	1.43	1.46	0.56	2.44	357
	1.75	1.67	1.70	0.44	2.19	354
	1.98	1.90	1.93	0.35	2.26	350
	2.17	2.09	2.12	0.30	2.06	352
	2.29	2.21	2.24	0.25	1.92	353
1%	1.31	1.23	1.26	0.69	2.79	359
	1.51	1.43	1.46	0.64	2.70	358
	1.75	1.67	1.70	0.50	2.37	355
	1.98	1.90	1.93	0.39	2.26	350
	2.17	2.09	2.12	0.33	2.10	352
	2.38	2.30	2.33	0.24	2.40	350
0.5%	1.40	1.32	1.35	0.72	2.81	358
	1.64	1.56	1.60	0.64	2.69	357
	1.84	1.76	1.79	0.51	2.38	355
	2.08	2.00	2.03	0.45	2.20	353
	2.29	2.21	2.24	0.30	2.02	352
	2.47	2.39	2.42	0.26	1.91	352
0.1%	1.40	1.32	1.35	0.78	2.99	1
	1.64	1.56	1.60	0.77	2.84	359
	1.84	1.76	1.79	0.68	2.70	356
	2.08	2.00	2.03	0.59	2.60	355
	2.29	2.21	2.24	0.47	2.42	354
	2.47	2.39	2.42	0.38	2.24	352

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.67	1.59	1.63	0.48	2.38	349
	1.90	1.82	1.85	0.40	2.24	352
	2.01	1.93	1.96	0.35	2.13	352
	2.14	2.06	2.10	0.29	2.02	352
	2.25	2.17	2.20	0.27	1.95	352
	2.34	2.26	2.29	0.22	2.41	350
20%	1.67	1.59	1.63	0.55	2.42	350
	1.90	1.82	1.85	0.45	2.16	354
	2.14	2.06	2.10	0.37	2.14	354
	2.25	2.17	2.20	0.34	2.10	353
	2.34	2.26	2.29	0.30	2.05	353
	2.48	2.40	2.43	0.20	1.75	351
10%	1.67	1.59	1.63	0.61	2.46	351
	1.90	1.82	1.85	0.53	2.44	353
	2.14	2.06	2.10	0.42	2.35	351
	2.34	2.26	2.29	0.33	2.08	352
	2.48	2.40	2.43	0.25	1.87	351
	2.58	2.50	2.53	0.24	1.84	351
5%	1.81	1.73	1.76	0.61	2.45	350
	2.01	1.93	1.96	0.55	2.45	353
	2.25	2.17	2.20	0.43	2.28	352
	2.48	2.40	2.43	0.34	2.13	352
	2.58	2.50	2.53	0.27	1.89	351
	2.67	2.59	2.62	0.25	1.86	351
2%	1.81	1.73	1.76	0.71	2.65	354
	2.01	1.93	1.96	0.63	2.67	355
	2.25	2.17	2.20	0.51	2.47	354
	2.48	2.40	2.43	0.40	2.31	352
	2.67	2.59	2.62	0.31	2.09	351
	2.79	2.71	2.74	0.27	1.98	351
1%	1.81	1.73	1.76	0.78	2.81	356
	2.01	1.93	1.96	0.70	2.77	356
	2.25	2.17	2.20	0.54	2.47	353
	2.48	2.40	2.43	0.46	2.38	353
	2.67	2.59	2.62	0.33	2.07	351
	2.88	2.80	2.83	0.27	1.96	351
0.5%	1.90	1.82	1.85	0.79	2.82	355
	2.14	2.06	2.10	0.70	2.77	356
	2.34	2.26	2.29	0.58	2.63	354
	2.58	2.50	2.53	0.47	2.41	353
	2.79	2.71	2.74	0.30	1.86	352
	2.97	2.89	2.92	0.27	1.86	353
0.1%	1.90	1.82	1.85	0.93	3.09	359
	2.14	2.06	2.10	0.83	2.89	356
	2.34	2.26	2.29	0.73	2.79	355
	2.58	2.50	2.53	0.61	2.67	354
	2.79	2.71	2.74	0.47	2.42	351
	2.97	2.89	2.92	0.38	2.14	352

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.17	2.09	2.13	0.49	2.39	348
	2.40	2.32	2.35	0.41	2.30	351
	2.51	2.43	2.46	0.36	2.18	352
	2.64	2.56	2.60	0.31	2.05	352
	2.75	2.67	2.70	0.28	2.00	352
	2.84	2.76	2.79	0.23	2.00	352
20%	2.17	2.09	2.13	0.57	2.44	351
	2.40	2.32	2.35	0.49	2.42	353
	2.64	2.56	2.60	0.39	2.29	352
	2.75	2.67	2.70	0.34	2.15	352
	2.84	2.76	2.79	0.30	2.05	351
	2.98	2.90	2.93	0.25	1.93	351
10%	2.17	2.09	2.13	0.64	2.50	352
	2.40	2.32	2.35	0.56	2.49	353
	2.64	2.56	2.60	0.44	2.38	352
	2.84	2.76	2.79	0.35	2.17	352
	2.98	2.90	2.93	0.30	2.06	351
	3.08	3.00	3.03	0.26	1.96	351
5%	2.31	2.23	2.26	0.63	2.48	351
	2.51	2.43	2.46	0.57	2.48	353
	2.75	2.67	2.70	0.43	2.22	351
	2.98	2.90	2.93	0.34	2.12	351
	3.08	3.00	3.03	0.30	2.06	351
	3.17	3.09	3.12	0.26	1.99	351
2%	2.31	2.23	2.26	0.74	2.72	353
	2.51	2.43	2.46	0.65	2.70	354
	2.75	2.67	2.70	0.53	2.49	353
	2.98	2.90	2.93	0.40	2.24	351
	3.17	3.09	3.12	0.32	2.10	351
	3.29	3.21	3.24	0.27	2.00	351
1%	2.31	2.23	2.26	0.81	2.82	354
	2.51	2.43	2.46	0.73	2.79	355
	2.75	2.67	2.70	0.58	2.61	353
	2.98	2.90	2.93	0.47	2.40	352
	3.17	3.09	3.12	0.37	2.20	351
	3.38	3.30	3.33	0.27	2.01	351
0.5%	2.40	2.32	2.35	0.82	2.82	354
	2.64	2.56	2.60	0.70	2.76	354
	2.84	2.76	2.79	0.60	2.63	353
	3.08	3.00	3.03	0.47	2.41	352
	3.29	3.21	3.24	0.35	2.18	351
	3.47	3.39	3.42	0.27	2.02	351
0.1%	2.40	2.32	2.35	1.01	3.12	357
	2.64	2.56	2.60	0.85	2.88	354
	2.84	2.76	2.79	0.74	2.78	353
	3.08	3.00	3.03	0.61	2.64	352
	3.29	3.21	3.24	0.48	2.42	351
	3.47	3.39	3.42	0.38	2.23	351



**Figure 9.2: Estimation Locations for Wexford B (WexB)**

**Table 9-4: Co-ordinates for Estimation Locations for Wexford B (WexB)**

Location	Extraction Point	
	Latitude (°N)	Longitude (°W)
WexB.1	52.3463	-6.4717
WexB.2	52.3451	-6.4677
WexB.3	52.3443	-6.4638

Location	Extraction Point (ITM)	
	Eastings [m]	Northings [m]
WexB.1	704127	622733
WexB.2	704402	622606
WexB.3	704670	622522

Table 9-5: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexB.1

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Wexford Location B.1	
Bed Level (MSL): -0.676m	
Bed Level (OD Malin OSGM02): -0.755m	
Bed Level (OD Malin OSGM15): -0.722m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: INFOMAR survey data (2011)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.67	0.59	0.63	0.39	2.30	355
	0.90	0.82	0.85	0.31	2.09	352
	1.01	0.93	0.96	0.29	2.08	352
	1.14	1.06	1.10	0.23	1.83	351
	1.25	1.17	1.20	0.21	1.82	351
	1.34	1.26	1.29	0.16	1.63	348
20%	0.67	0.59	0.63	0.45	2.37	356
	0.90	0.82	0.85	0.37	2.14	354
	1.14	1.06	1.10	0.28	2.06	351
	1.25	1.17	1.20	0.26	1.99	350
	1.34	1.26	1.29	0.21	1.84	349
	1.48	1.40	1.43	0.19	1.79	349
10%	0.67	0.59	0.63	0.50	2.42	357
	0.90	0.82	0.85	0.41	2.31	354
	1.14	1.06	1.10	0.33	2.09	353
	1.34	1.26	1.29	0.25	1.99	349
	1.48	1.40	1.43	0.23	1.88	349
	1.58	1.50	1.53	0.20	1.83	349
5%	0.81	0.73	0.76	0.50	2.42	356
	1.01	0.93	0.96	0.44	2.39	355
	1.25	1.17	1.20	0.36	2.28	353
	1.48	1.40	1.43	0.25	2.07	349
	1.58	1.50	1.53	0.22	1.89	348
	1.67	1.59	1.62	0.19	1.87	348
2%	0.81	0.73	0.76	0.57	2.53	357
	1.01	0.93	0.96	0.50	2.43	355
	1.25	1.17	1.20	0.40	2.29	352
	1.48	1.40	1.43	0.31	2.11	349
	1.67	1.59	1.62	0.23	1.84	349
	1.79	1.71	1.74	0.19	1.79	348
1%	0.81	0.73	0.76	0.61	2.67	358
	1.01	0.93	0.96	0.55	2.48	356
	1.25	1.17	1.20	0.45	2.38	353
	1.48	1.40	1.43	0.35	2.13	352
	1.67	1.59	1.62	0.27	2.00	350
	1.88	1.80	1.83	0.19	1.73	350
0.5%	0.90	0.82	0.85	0.63	2.69	357
	1.14	1.06	1.10	0.55	2.49	355
	1.34	1.26	1.29	0.46	2.39	353
	1.58	1.50	1.53	0.38	2.33	351
	1.79	1.71	1.74	0.26	1.95	350
	1.97	1.89	1.92	0.19	1.75	350
0.1%	0.90	0.82	0.85	0.72	2.80	359
	1.14	1.06	1.10	0.67	2.73	356
	1.34	1.26	1.29	0.59	2.60	354
	1.58	1.50	1.53	0.48	2.41	353
	1.79	1.71	1.74	0.37	2.19	351
	1.97	1.89	1.92	0.29	2.06	350

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.17	1.09	1.13	0.40	2.35	354
	1.40	1.32	1.35	0.33	2.21	353
	1.51	1.43	1.46	0.29	2.11	351
	1.64	1.56	1.60	0.24	2.14	350
	1.75	1.67	1.70	0.21	2.17	350
	1.84	1.76	1.79	0.18	2.20	350
20%	1.17	1.09	1.13	0.47	2.40	355
	1.40	1.32	1.35	0.40	2.38	354
	1.64	1.56	1.60	0.32	2.21	352
	1.75	1.67	1.70	0.28	2.05	351
	1.84	1.76	1.79	0.23	1.84	351
	1.98	1.90	1.93	0.19	1.79	351
10%	1.17	1.09	1.13	0.52	2.43	355
	1.40	1.32	1.35	0.43	2.39	354
	1.64	1.56	1.60	0.36	2.34	353
	1.84	1.76	1.79	0.26	1.91	351
	1.98	1.90	1.93	0.23	2.11	349
	2.08	2.00	2.03	0.20	1.85	349
5%	1.31	1.23	1.26	0.51	2.43	355
	1.51	1.43	1.46	0.45	2.43	354
	1.75	1.67	1.70	0.37	2.36	352
	1.98	1.90	1.93	0.26	2.03	350
	2.08	2.00	2.03	0.24	2.00	350
	2.17	2.09	2.12	0.21	1.86	350
2%	1.31	1.23	1.26	0.59	2.69	356
	1.51	1.43	1.46	0.50	2.44	355
	1.75	1.67	1.70	0.40	2.34	352
	1.98	1.90	1.93	0.31	2.17	350
	2.17	2.09	2.12	0.27	2.10	349
	2.29	2.21	2.24	0.22	2.02	349
1%	1.31	1.23	1.26	0.64	2.75	357
	1.51	1.43	1.46	0.56	2.64	355
	1.75	1.67	1.70	0.46	2.40	353
	1.98	1.90	1.93	0.36	2.28	350
	2.17	2.09	2.12	0.30	2.12	350
	2.38	2.30	2.33	0.20	2.35	349
0.5%	1.40	1.32	1.35	0.65	2.76	357
	1.64	1.56	1.60	0.56	2.64	355
	1.84	1.76	1.79	0.47	2.41	353
	2.08	2.00	2.03	0.38	2.17	351
	2.29	2.21	2.24	0.28	2.08	351
	2.47	2.39	2.42	0.24	2.03	350
0.1%	1.40	1.32	1.35	0.76	2.87	358
	1.64	1.56	1.60	0.68	2.77	356
	1.84	1.76	1.79	0.60	2.70	354
	2.08	2.00	2.03	0.51	2.56	353
	2.29	2.21	2.24	0.41	2.41	351
	2.47	2.39	2.42	0.33	2.32	350

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.67	1.59	1.63	0.42	2.38	352
	1.90	1.82	1.85	0.35	2.34	351
	2.01	1.93	1.96	0.32	2.17	350
	2.14	2.06	2.10	0.26	2.08	350
	2.25	2.17	2.20	0.24	2.05	350
	2.34	2.26	2.29	0.19	2.37	349
20%	1.67	1.59	1.63	0.49	2.42	353
	1.90	1.82	1.85	0.40	2.31	352
	2.14	2.06	2.10	0.33	2.21	352
	2.25	2.17	2.20	0.30	2.13	351
	2.34	2.26	2.29	0.27	2.09	351
	2.48	2.40	2.43	0.19	1.83	349
10%	1.67	1.59	1.63	0.54	2.49	353
	1.90	1.82	1.85	0.46	2.44	352
	2.14	2.06	2.10	0.36	2.13	351
	2.34	2.26	2.29	0.30	2.12	351
	2.48	2.40	2.43	0.23	1.95	350
	2.58	2.50	2.53	0.22	1.90	350
5%	1.81	1.73	1.76	0.54	2.47	353
	2.01	1.93	1.96	0.48	2.47	352
	2.25	2.17	2.20	0.37	2.34	350
	2.48	2.40	2.43	0.30	2.17	350
	2.58	2.50	2.53	0.24	2.01	349
	2.67	2.59	2.62	0.23	1.96	349
2%	1.81	1.73	1.76	0.63	2.74	354
	2.01	1.93	1.96	0.55	2.69	353
	2.25	2.17	2.20	0.45	2.44	352
	2.48	2.40	2.43	0.36	2.36	351
	2.67	2.59	2.62	0.27	2.13	350
	2.79	2.71	2.74	0.23	2.07	349
1%	1.81	1.73	1.76	0.68	2.78	355
	2.01	1.93	1.96	0.60	2.73	354
	2.25	2.17	2.20	0.48	2.45	351
	2.48	2.40	2.43	0.41	2.40	351
	2.67	2.59	2.62	0.30	2.12	350
	2.88	2.80	2.83	0.24	2.07	349
0.5%	1.90	1.82	1.85	0.70	2.78	354
	2.14	2.06	2.10	0.60	2.73	353
	2.34	2.26	2.29	0.51	2.58	352
	2.58	2.50	2.53	0.41	2.42	351
	2.79	2.71	2.74	0.28	2.03	350
	2.97	2.89	2.92	0.24	2.02	350
0.1%	1.90	1.82	1.85	0.83	3.03	356
	2.14	2.06	2.10	0.72	2.80	354
	2.34	2.26	2.29	0.64	2.76	353
	2.58	2.50	2.53	0.53	2.67	351
	2.79	2.71	2.74	0.42	2.43	351
	2.97	2.89	2.92	0.34	2.30	350

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.17	2.09	2.13	0.44	2.40	350
	2.40	2.32	2.35	0.35	2.16	350
	2.51	2.43	2.46	0.32	2.12	350
	2.64	2.56	2.60	0.29	2.11	350
	2.75	2.67	2.70	0.24	2.05	350
	2.84	2.76	2.79	0.20	1.81	350
20%	2.17	2.09	2.13	0.52	2.47	351
	2.40	2.32	2.35	0.44	2.44	351
	2.64	2.56	2.60	0.34	2.34	350
	2.75	2.67	2.70	0.31	2.20	350
	2.84	2.76	2.79	0.27	2.11	349
	2.98	2.90	2.93	0.22	2.05	349
10%	2.17	2.09	2.13	0.58	2.68	352
	2.40	2.32	2.35	0.49	2.54	351
	2.64	2.56	2.60	0.39	2.40	351
	2.84	2.76	2.79	0.31	2.25	350
	2.98	2.90	2.93	0.26	2.12	349
	3.08	3.00	3.03	0.23	2.06	349
5%	2.31	2.23	2.26	0.57	2.67	351
	2.51	2.43	2.46	0.50	2.57	351
	2.75	2.67	2.70	0.37	2.33	350
	2.98	2.90	2.93	0.30	2.18	350
	3.08	3.00	3.03	0.27	2.12	349
	3.17	3.09	3.12	0.23	2.07	349
2%	2.31	2.23	2.26	0.66	2.77	352
	2.51	2.43	2.46	0.57	2.72	352
	2.75	2.67	2.70	0.46	2.49	351
	2.98	2.90	2.93	0.36	2.34	350
	3.17	3.09	3.12	0.28	2.15	349
	3.29	3.21	3.24	0.24	2.08	349
1%	2.31	2.23	2.26	0.72	2.80	353
	2.51	2.43	2.46	0.64	2.77	352
	2.75	2.67	2.70	0.51	2.62	351
	2.98	2.90	2.93	0.41	2.43	350
	3.17	3.09	3.12	0.32	2.31	349
	3.38	3.30	3.33	0.24	2.09	348
0.5%	2.40	2.32	2.35	0.73	2.81	353
	2.64	2.56	2.60	0.62	2.75	352
	2.84	2.76	2.79	0.53	2.67	351
	3.08	3.00	3.03	0.42	2.43	350
	3.29	3.21	3.24	0.31	2.29	349
	3.47	3.39	3.42	0.24	2.09	348
0.1%	2.40	2.32	2.35	0.88	3.11	354
	2.64	2.56	2.60	0.75	2.84	352
	2.84	2.76	2.79	0.66	2.77	352
	3.08	3.00	3.03	0.54	2.69	351
	3.29	3.21	3.24	0.43	2.45	350
	3.47	3.39	3.42	0.34	2.35	349

Table 9-6: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexB.2

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Wexford Location B.2	
Bed Level (MSL): -3.362m	
Bed Level (OD Malin OSGM02): -3.441m	
Bed Level (OD Malin OSGM15): -3.408m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: INFOMAR survey (2011) & Local Hydrographic Survey (2006)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.67	0.59	0.63	0.43	2.33	340
	0.90	0.82	0.85	0.33	2.13	338
	1.01	0.93	0.96	0.32	2.10	337
	1.14	1.06	1.10	0.24	1.84	336
	1.25	1.17	1.20	0.21	1.83	336
	1.34	1.26	1.29	0.18	1.68	335
20%	0.67	0.59	0.63	0.49	2.36	339
	0.90	0.82	0.85	0.39	2.14	338
	1.14	1.06	1.10	0.30	2.10	337
	1.25	1.17	1.20	0.27	2.03	336
	1.34	1.26	1.29	0.23	1.95	336
	1.48	1.40	1.43	0.20	1.82	335
10%	0.67	0.59	0.63	0.54	2.40	339
	0.90	0.82	0.85	0.44	2.29	338
	1.14	1.06	1.10	0.34	2.09	337
	1.34	1.26	1.29	0.27	2.05	336
	1.48	1.40	1.43	0.24	1.93	336
	1.58	1.50	1.53	0.21	1.85	335
5%	0.81	0.73	0.76	0.54	2.41	339
	1.01	0.93	0.96	0.47	2.38	339
	1.25	1.17	1.20	0.38	2.31	338
	1.48	1.40	1.43	0.27	2.19	337
	1.58	1.50	1.53	0.24	1.97	335
	1.67	1.59	1.62	0.21	2.36	337
2%	0.81	0.73	0.76	0.62	2.52	339
	1.01	0.93	0.96	0.53	2.43	339
	1.25	1.17	1.20	0.42	2.31	337
	1.48	1.40	1.43	0.33	2.17	337
	1.67	1.59	1.62	0.23	1.85	336
	1.79	1.71	1.74	0.21	2.33	335
1%	0.81	0.73	0.76	0.68	2.66	340
	1.01	0.93	0.96	0.58	2.48	339
	1.25	1.17	1.20	0.47	2.37	338
	1.48	1.40	1.43	0.36	2.12	337
	1.67	1.59	1.62	0.27	1.97	337
	1.88	1.80	1.83	0.19	1.69	336
0.5%	0.90	0.82	0.85	0.69	2.68	340
	1.14	1.06	1.10	0.58	2.50	339
	1.34	1.26	1.29	0.48	2.39	337
	1.58	1.50	1.53	0.40	2.35	337
	1.79	1.71	1.74	0.27	1.92	337
	1.97	1.89	1.92	0.19	1.72	336
0.1%	0.90	0.82	0.85	0.84	2.78	341
	1.14	1.06	1.10	0.72	2.72	340
	1.34	1.26	1.29	0.62	2.60	339
	1.58	1.50	1.53	0.49	2.40	338
	1.79	1.71	1.74	0.38	2.18	337
	1.97	1.89	1.92	0.29	2.04	337

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.17	1.09	1.13	0.44	2.36	339
	1.40	1.32	1.35	0.37	2.31	338
	1.51	1.43	1.46	0.32	2.19	337
	1.64	1.56	1.60	0.27	2.25	337
	1.75	1.67	1.70	0.24	2.31	337
	1.84	1.76	1.79	0.20	2.37	337
20%	1.17	1.09	1.13	0.51	2.39	340
	1.40	1.32	1.35	0.43	2.38	338
	1.64	1.56	1.60	0.35	2.31	337
	1.75	1.67	1.70	0.28	2.08	337
	1.84	1.76	1.79	0.25	2.00	337
	1.98	1.90	1.93	0.20	2.00	336
10%	1.17	1.09	1.13	0.56	2.42	341
	1.40	1.32	1.35	0.47	2.40	338
	1.64	1.56	1.60	0.39	2.36	338
	1.84	1.76	1.79	0.27	1.90	337
	1.98	1.90	1.93	0.24	2.35	337
	2.08	2.00	2.03	0.22	2.24	335
5%	1.31	1.23	1.26	0.56	2.42	340
	1.51	1.43	1.46	0.49	2.43	338
	1.75	1.67	1.70	0.40	2.38	338
	1.98	1.90	1.93	0.27	2.06	337
	2.08	2.00	2.03	0.26	2.04	337
	2.17	2.09	2.12	0.21	1.89	336
2%	1.31	1.23	1.26	0.64	2.66	340
	1.51	1.43	1.46	0.53	2.43	338
	1.75	1.67	1.70	0.42	2.32	338
	1.98	1.90	1.93	0.34	2.31	337
	2.17	2.09	2.12	0.29	2.16	336
	2.29	2.21	2.24	0.24	2.07	335
1%	1.31	1.23	1.26	0.70	2.72	340
	1.51	1.43	1.46	0.61	2.63	339
	1.75	1.67	1.70	0.48	2.39	338
	1.98	1.90	1.93	0.39	2.34	338
	2.17	2.09	2.12	0.32	2.18	336
	2.38	2.30	2.33	0.23	2.37	336
0.5%	1.40	1.32	1.35	0.71	2.73	340
	1.64	1.56	1.60	0.60	2.63	339
	1.84	1.76	1.79	0.49	2.40	338
	2.08	2.00	2.03	0.40	2.17	337
	2.29	2.21	2.24	0.29	2.08	337
	2.47	2.39	2.42	0.24	2.03	336
0.1%	1.40	1.32	1.35	0.86	2.85	341
	1.64	1.56	1.60	0.74	2.75	340
	1.84	1.76	1.79	0.64	2.68	339
	2.08	2.00	2.03	0.54	2.57	338
	2.29	2.21	2.24	0.44	2.42	338
	2.47	2.39	2.42	0.35	2.34	337

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.67	1.59	1.63	0.46	2.39	339
	1.90	1.82	1.85	0.38	2.37	337
	2.01	1.93	1.96	0.34	2.27	337
	2.14	2.06	2.10	0.28	2.11	336
	2.25	2.17	2.20	0.26	2.08	336
	2.34	2.26	2.29	0.21	2.38	336
20%	1.67	1.59	1.63	0.53	2.42	339
	1.90	1.82	1.85	0.43	2.29	337
	2.14	2.06	2.10	0.35	2.21	337
	2.25	2.17	2.20	0.31	2.15	337
	2.34	2.26	2.29	0.28	2.11	337
	2.48	2.40	2.43	0.20	1.84	336
10%	1.67	1.59	1.63	0.58	2.47	339
	1.90	1.82	1.85	0.49	2.46	338
	2.14	2.06	2.10	0.39	2.14	337
	2.34	2.26	2.29	0.31	2.13	337
	2.48	2.40	2.43	0.24	1.98	336
	2.58	2.50	2.53	0.23	1.92	336
5%	1.81	1.73	1.76	0.57	2.46	339
	2.01	1.93	1.96	0.51	2.49	338
	2.25	2.17	2.20	0.40	2.37	337
	2.48	2.40	2.43	0.32	2.22	336
	2.58	2.50	2.53	0.26	2.03	336
	2.67	2.59	2.62	0.24	2.01	336
2%	1.81	1.73	1.76	0.67	2.72	339
	2.01	1.93	1.96	0.58	2.68	338
	2.25	2.17	2.20	0.47	2.47	338
	2.48	2.40	2.43	0.38	2.38	337
	2.67	2.59	2.62	0.29	2.17	336
	2.79	2.71	2.74	0.25	2.10	336
1%	1.81	1.73	1.76	0.73	2.76	339
	2.01	1.93	1.96	0.64	2.73	339
	2.25	2.17	2.20	0.51	2.47	338
	2.48	2.40	2.43	0.42	2.41	337
	2.67	2.59	2.62	0.32	2.14	336
	2.88	2.80	2.83	0.25	2.09	336
0.5%	1.90	1.82	1.85	0.74	2.77	339
	2.14	2.06	2.10	0.64	2.73	339
	2.34	2.26	2.29	0.54	2.62	338
	2.58	2.50	2.53	0.43	2.43	337
	2.79	2.71	2.74	0.29	2.01	336
	2.97	2.89	2.92	0.25	2.00	336
0.1%	1.90	1.82	1.85	0.89	2.99	340
	2.14	2.06	2.10	0.76	2.80	339
	2.34	2.26	2.29	0.67	2.75	338
	2.58	2.50	2.53	0.56	2.68	338
	2.79	2.71	2.74	0.44	2.44	336
	2.97	2.89	2.92	0.35	2.26	336

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.17	2.09	2.13	0.47	2.41	338
	2.40	2.32	2.35	0.38	2.22	336
	2.51	2.43	2.46	0.34	2.14	336
	2.64	2.56	2.60	0.30	2.12	336
	2.75	2.67	2.70	0.26	2.10	336
	2.84	2.76	2.79	0.21	1.79	336
20%	2.17	2.09	2.13	0.54	2.48	337
	2.40	2.32	2.35	0.46	2.45	337
	2.64	2.56	2.60	0.36	2.37	337
	2.75	2.67	2.70	0.32	2.26	336
	2.84	2.76	2.79	0.28	2.14	336
	2.98	2.90	2.93	0.24	2.07	336
10%	2.17	2.09	2.13	0.60	2.66	338
	2.40	2.32	2.35	0.52	2.57	337
	2.64	2.56	2.60	0.41	2.42	337
	2.84	2.76	2.79	0.33	2.31	336
	2.98	2.90	2.93	0.28	2.15	336
	3.08	3.00	3.03	0.24	2.09	336
5%	2.31	2.23	2.26	0.59	2.65	338
	2.51	2.43	2.46	0.52	2.59	337
	2.75	2.67	2.70	0.40	2.35	337
	2.98	2.90	2.93	0.32	2.21	336
	3.08	3.00	3.03	0.28	2.14	336
	3.17	3.09	3.12	0.24	2.09	336
2%	2.31	2.23	2.26	0.69	2.75	338
	2.51	2.43	2.46	0.60	2.72	338
	2.75	2.67	2.70	0.49	2.52	337
	2.98	2.90	2.93	0.38	2.36	337
	3.17	3.09	3.12	0.30	2.19	336
	3.29	3.21	3.24	0.25	2.11	336
1%	2.31	2.23	2.26	0.75	2.79	338
	2.51	2.43	2.46	0.67	2.77	338
	2.75	2.67	2.70	0.54	2.65	337
	2.98	2.90	2.93	0.43	2.45	337
	3.17	3.09	3.12	0.34	2.34	337
	3.38	3.30	3.33	0.25	2.12	336
0.5%	2.40	2.32	2.35	0.76	2.80	338
	2.64	2.56	2.60	0.65	2.75	338
	2.84	2.76	2.79	0.55	2.68	337
	3.08	3.00	3.03	0.44	2.45	337
	3.29	3.21	3.24	0.33	2.33	337
	3.47	3.39	3.42	0.25	2.12	336
0.1%	2.40	2.32	2.35	0.92	3.09	339
	2.64	2.56	2.60	0.78	2.84	338
	2.84	2.76	2.79	0.68	2.77	338
	3.08	3.00	3.03	0.56	2.69	337
	3.29	3.21	3.24	0.45	2.47	337
	3.47	3.39	3.42	0.35	2.37	337

Table 9-7: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexB.3

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
<b>Output:</b> Shoreline Wave Climate and Water Level Combinations	
<b>Location:</b> Wexford Location B.3	
<b>Bed Level (MSL):</b> - 0.989m	
<b>Bed Level (OD Malin OSGM02):</b> -1.068m	
<b>Bed Level (OD Malin OSGM15):</b> -1.035m	
<b>Dated:</b> October 2020	
<b>Joint Probability Event (AEP):</b> Varies from 50% to 0.1%	
<b>Prepared By:</b> ZM	<b>Checked By:</b> CN
<b>Table Reference:</b> CWWS_CAPO_SE_Wexford	

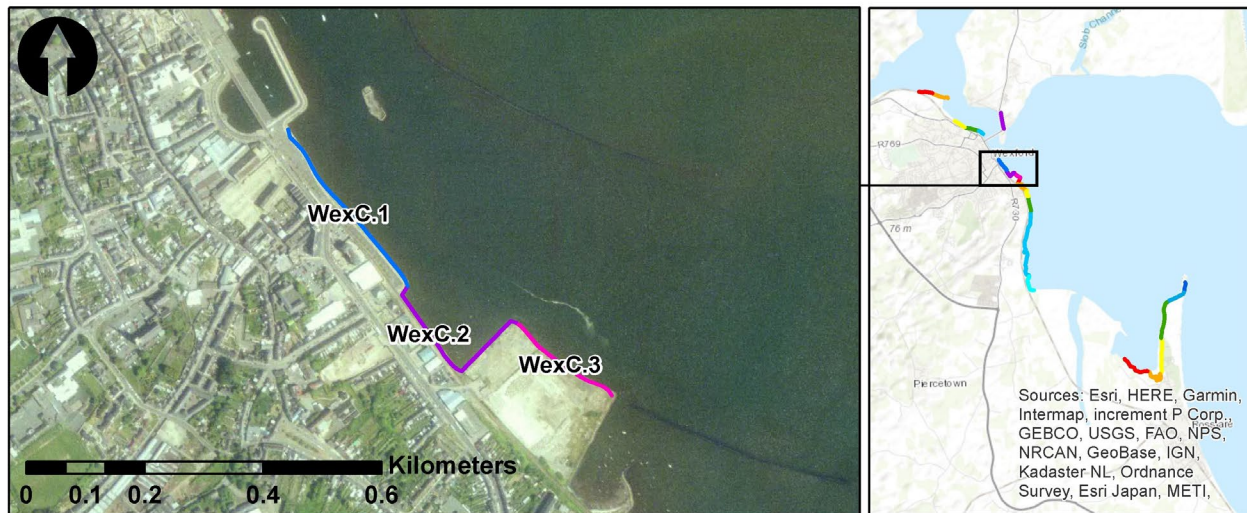
Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2006)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.67	0.59	0.63	0.39	2.38	336
	0.90	0.82	0.85	0.30	2.32	332
	1.01	0.93	0.96	0.29	2.09	331
	1.14	1.06	1.10	0.21	1.77	328
	1.25	1.17	1.20	0.19	1.77	327
	1.34	1.26	1.29	0.16	2.37	326
20%	0.67	0.59	0.63	0.45	2.25	333
	0.90	0.82	0.85	0.35	2.04	331
	1.14	1.06	1.10	0.27	2.31	331
	1.25	1.17	1.20	0.25	1.91	328
	1.34	1.26	1.29	0.21	2.38	328
	1.48	1.40	1.43	0.18	1.81	326
10%	0.67	0.59	0.63	0.50	2.33	333
	0.90	0.82	0.85	0.40	2.12	332
	1.14	1.06	1.10	0.30	1.93	330
	1.34	1.26	1.29	0.24	2.32	329
	1.48	1.40	1.43	0.22	1.87	327
	1.58	1.50	1.53	0.19	1.84	326
5%	0.81	0.73	0.76	0.50	2.34	333
	1.01	0.93	0.96	0.45	2.33	332
	1.25	1.17	1.20	0.37	2.26	331
	1.48	1.40	1.43	0.25	2.38	329
	1.58	1.50	1.53	0.22	2.21	327
	1.67	1.59	1.62	0.18	2.40	327
2%	0.81	0.73	0.76	0.57	2.43	334
	1.01	0.93	0.96	0.51	2.40	333
	1.25	1.17	1.20	0.38	2.17	331
	1.48	1.40	1.43	0.29	2.34	330
	1.67	1.59	1.62	0.21	1.78	327
	1.79	1.71	1.74	0.19	2.39	326
1%	0.81	0.73	0.76	0.63	2.51	334
	1.01	0.93	0.96	0.55	2.43	333
	1.25	1.17	1.20	0.43	2.22	331
	1.48	1.40	1.43	0.33	2.02	329
	1.67	1.59	1.62	0.25	1.80	328
	1.88	1.80	1.83	0.17	1.57	326
0.5%	0.90	0.82	0.85	0.64	2.54	334
	1.14	1.06	1.10	0.55	2.47	333
	1.34	1.26	1.29	0.44	2.30	331
	1.58	1.50	1.53	0.38	2.30	329
	1.79	1.71	1.74	0.24	1.79	328
	1.97	1.89	1.92	0.17	1.58	326
0.1%	0.90	0.82	0.85	0.77	2.73	335
	1.14	1.06	1.10	0.68	2.68	334
	1.34	1.26	1.29	0.58	2.48	333
	1.58	1.50	1.53	0.45	2.25	330
	1.79	1.71	1.74	0.34	2.05	329
	1.97	1.89	1.92	0.26	1.82	328

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.17	1.09	1.13	0.39	2.36	338
	1.40	1.32	1.35	0.33	2.25	334
	1.51	1.43	1.46	0.29	2.36	333
	1.64	1.56	1.60	0.24	2.37	332
	1.75	1.67	1.70	0.21	2.39	330
	1.84	1.76	1.79	0.18	2.40	329
20%	1.17	1.09	1.13	0.45	2.36	338
	1.40	1.32	1.35	0.39	2.31	335
	1.64	1.56	1.60	0.32	2.26	332
	1.75	1.67	1.70	0.27	2.00	330
	1.84	1.76	1.79	0.22	2.00	329
	1.98	1.90	1.93	0.18	1.85	327
10%	1.17	1.09	1.13	0.50	2.37	339
	1.40	1.32	1.35	0.41	2.31	335
	1.64	1.56	1.60	0.35	2.27	333
	1.84	1.76	1.79	0.24	1.78	329
	1.98	1.90	1.93	0.22	2.40	330
	2.08	2.00	2.03	0.20	2.37	328
5%	1.31	1.23	1.26	0.50	2.37	339
	1.51	1.43	1.46	0.45	2.33	335
	1.75	1.67	1.70	0.37	2.31	333
	1.98	1.90	1.93	0.25	2.03	330
	2.08	2.00	2.03	0.24	1.99	329
	2.17	2.09	2.12	0.20	1.87	328
2%	1.31	1.23	1.26	0.57	2.43	336
	1.51	1.43	1.46	0.51	2.28	335
	1.75	1.67	1.70	0.38	2.05	332
	1.98	1.90	1.93	0.30	2.37	332
	2.17	2.09	2.12	0.26	2.27	329
	2.29	2.21	2.24	0.22	2.13	327
1%	1.31	1.23	1.26	0.63	2.51	337
	1.51	1.43	1.46	0.55	2.48	336
	1.75	1.67	1.70	0.43	2.17	333
	1.98	1.90	1.93	0.34	2.35	333
	2.17	2.09	2.12	0.29	2.21	329
	2.38	2.30	2.33	0.21	2.40	328
0.5%	1.40	1.32	1.35	0.64	2.53	337
	1.64	1.56	1.60	0.55	2.47	335
	1.84	1.76	1.79	0.44	2.19	333
	2.08	2.00	2.03	0.38	2.02	331
	2.29	2.21	2.24	0.26	2.01	329
	2.47	2.39	2.42	0.23	1.96	328
0.1%	1.40	1.32	1.35	0.77	2.75	337
	1.64	1.56	1.60	0.68	2.64	336
	1.84	1.76	1.79	0.58	2.47	335
	2.08	2.00	2.03	0.49	2.40	333
	2.29	2.21	2.24	0.40	2.33	331
	2.47	2.39	2.42	0.33	2.28	330

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.67	1.59	1.63	0.40	2.37	337
	1.90	1.82	1.85	0.34	2.32	332
	2.01	1.93	1.96	0.31	2.25	330
	2.14	2.06	2.10	0.26	2.10	329
	2.25	2.17	2.20	0.24	2.07	329
	2.34	2.26	2.29	0.19	2.41	328
20%	1.67	1.59	1.63	0.46	2.35	337
	1.90	1.82	1.85	0.39	2.04	332
	2.14	2.06	2.10	0.32	2.06	330
	2.25	2.17	2.20	0.29	2.06	330
	2.34	2.26	2.29	0.26	2.05	329
	2.48	2.40	2.43	0.18	1.88	328
10%	1.67	1.59	1.63	0.51	2.37	338
	1.90	1.82	1.85	0.44	2.34	333
	2.14	2.06	2.10	0.36	2.30	330
	2.34	2.26	2.29	0.29	2.05	329
	2.48	2.40	2.43	0.22	1.98	328
	2.58	2.50	2.53	0.21	1.92	328
5%	1.81	1.73	1.76	0.50	2.37	337
	2.01	1.93	1.96	0.45	2.35	333
	2.25	2.17	2.20	0.37	2.30	331
	2.48	2.40	2.43	0.30	2.19	329
	2.58	2.50	2.53	0.24	2.06	328
	2.67	2.59	2.62	0.22	2.04	328
2%	1.81	1.73	1.76	0.58	2.41	336
	2.01	1.93	1.96	0.52	2.46	334
	2.25	2.17	2.20	0.43	2.37	332
	2.48	2.40	2.43	0.35	2.32	330
	2.67	2.59	2.62	0.27	2.19	329
	2.79	2.71	2.74	0.24	2.12	328
1%	1.81	1.73	1.76	0.64	2.52	335
	2.01	1.93	1.96	0.58	2.60	334
	2.25	2.17	2.20	0.46	2.34	332
	2.48	2.40	2.43	0.39	2.32	331
	2.67	2.59	2.62	0.29	2.13	329
	2.88	2.80	2.83	0.24	2.08	328
0.5%	1.90	1.82	1.85	0.65	2.52	335
	2.14	2.06	2.10	0.58	2.61	334
	2.34	2.26	2.29	0.49	2.46	332
	2.58	2.50	2.53	0.40	2.36	331
	2.79	2.71	2.74	0.26	1.84	328
	2.97	2.89	2.92	0.23	1.84	327
0.1%	1.90	1.82	1.85	0.80	2.77	336
	2.14	2.06	2.10	0.69	2.67	335
	2.34	2.26	2.29	0.61	2.63	333
	2.58	2.50	2.53	0.51	2.53	332
	2.79	2.71	2.74	0.41	2.36	329
	2.97	2.89	2.92	0.33	2.09	328

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.17	2.09	2.13	0.41	2.37	335
	2.40	2.32	2.35	0.34	2.18	329
	2.51	2.43	2.46	0.31	2.08	329
	2.64	2.56	2.60	0.28	2.07	328
	2.75	2.67	2.70	0.25	2.15	327
	2.84	2.76	2.79	0.20	1.67	327
20%	2.17	2.09	2.13	0.48	2.34	333
	2.40	2.32	2.35	0.42	2.35	331
	2.64	2.56	2.60	0.34	2.33	329
	2.75	2.67	2.70	0.30	2.27	329
	2.84	2.76	2.79	0.26	2.15	328
	2.98	2.90	2.93	0.23	2.10	327
10%	2.17	2.09	2.13	0.53	2.37	334
	2.40	2.32	2.35	0.47	2.38	332
	2.64	2.56	2.60	0.38	2.36	330
	2.84	2.76	2.79	0.31	2.30	329
	2.98	2.90	2.93	0.26	2.18	328
	3.08	3.00	3.03	0.23	2.12	328
5%	2.31	2.23	2.26	0.52	2.37	333
	2.51	2.43	2.46	0.47	2.38	331
	2.75	2.67	2.70	0.38	2.29	330
	2.98	2.90	2.93	0.30	2.16	328
	3.08	3.00	3.03	0.27	2.12	328
	3.17	3.09	3.12	0.23	2.10	327
2%	2.31	2.23	2.26	0.60	2.44	334
	2.51	2.43	2.46	0.54	2.53	332
	2.75	2.67	2.70	0.45	2.41	331
	2.98	2.90	2.93	0.35	2.34	329
	3.17	3.09	3.12	0.28	2.23	328
	3.29	3.21	3.24	0.24	2.14	327
1%	2.31	2.23	2.26	0.66	2.57	334
	2.51	2.43	2.46	0.61	2.63	332
	2.75	2.67	2.70	0.49	2.50	331
	2.98	2.90	2.93	0.40	2.38	330
	3.17	3.09	3.12	0.32	2.34	329
	3.38	3.30	3.33	0.24	2.18	327
0.5%	2.40	2.32	2.35	0.67	2.60	333
	2.64	2.56	2.60	0.59	2.62	332
	2.84	2.76	2.79	0.51	2.51	331
	3.08	3.00	3.03	0.41	2.39	330
	3.29	3.21	3.24	0.31	2.34	329
	3.47	3.39	3.42	0.25	2.19	327
0.1%	2.40	2.32	2.35	0.82	2.80	334
	2.64	2.56	2.60	0.71	2.68	333
	2.84	2.76	2.79	0.62	2.64	332
	3.08	3.00	3.03	0.51	2.54	331
	3.29	3.21	3.24	0.42	2.40	330
	3.47	3.39	3.42	0.34	2.36	329



**Figure 9.3: Estimation Locations for Wexford C (WexC)**

**Table 9-8: Co-ordinates for Estimation Locations for Wexford C (WexC)**

Location	Extraction Point	
	Latitude (°N)	Longitude (°W)
WexC.1	52.3364	-6.4564
WexC.2	52.3344	-6.4535
WexC.3	52.3337	-6.4500

Location	Extraction Point (ITM)	
	Eastings [m]	Northings [m]
WexC.1	705193	621654
WexC.2	705395	621436
WexC.3	705635	621363

Table 9-9: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexC.1

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
<b>Output:</b> Shoreline Wave Climate and Water Level Combinations	
<b>Location:</b> Wexford Location C.1	
<b>Bed Level (MSL):</b> -3.564m	
<b>Bed Level (OD Malin OSGM02):</b> -3.643m	
<b>Bed Level (OD Malin OSGM15):</b> -3.610m	
<b>Dated:</b> October 2020	
<b>Joint Probability Event (AEP):</b> Varies from 50% to 0.1%	
<b>Prepared By:</b> ZM	<b>Checked By:</b> CN
<b>Table Reference:</b> CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2004)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Combined Wave Component describes the combination of wind waves and swell waves
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.62	0.54	0.57	0.55	2.70	94
	0.72	0.64	0.67	0.50	2.48	94
	0.84	0.76	0.79	0.41	2.37	95
	0.92	0.84	0.87	0.35	2.18	97
	1.01	0.93	0.96	0.29	2.10	98
	1.22	1.14	1.17	0.21	1.92	97
20%	0.62	0.54	0.57	0.65	2.79	95
	0.84	0.76	0.79	0.52	2.52	94
	1.01	0.93	0.96	0.38	2.32	97
	1.13	1.05	1.08	0.31	2.13	98
	1.22	1.14	1.17	0.27	2.11	97
	1.31	1.23	1.26	0.24	2.05	97
10%	0.62	0.54	0.57	0.72	2.83	95
	0.84	0.76	0.79	0.60	2.77	94
	1.01	0.93	0.96	0.47	2.44	96
	1.22	1.14	1.17	0.33	2.16	98
	1.31	1.23	1.26	0.28	2.14	97
	1.43	1.35	1.38	0.24	2.05	97
5%	0.62	0.54	0.57	0.79	2.94	96
	0.84	0.76	0.79	0.69	2.83	94
	1.01	0.93	0.96	0.55	2.64	95
	1.22	1.14	1.17	0.38	2.35	98
	1.43	1.35	1.38	0.28	2.14	98
	1.52	1.44	1.47	0.25	2.05	95
2%	0.62	0.54	0.57	0.89	3.11	96
	0.84	0.76	0.79	0.79	3.07	95
	1.01	0.93	0.96	0.67	2.81	95
	1.22	1.14	1.17	0.50	2.52	97
	1.43	1.35	1.38	0.34	2.27	99
	1.60	1.52	1.55	0.28	2.15	97
1%	0.62	0.54	0.57	0.96	3.15	96
	0.84	0.76	0.79	0.88	3.14	96
	1.01	0.93	0.96	0.76	3.04	94
	1.22	1.14	1.17	0.59	2.72	96
	1.43	1.35	1.38	0.42	2.42	99
	1.71	1.63	1.66	0.27	2.14	96
0.5%	0.62	0.54	0.57	1.03	3.19	96
	0.84	0.76	0.79	0.97	3.18	96
	1.01	0.93	0.96	0.84	3.15	95
	1.22	1.14	1.17	0.68	2.82	95
	1.52	1.44	1.47	0.43	2.42	100
	1.79	1.71	1.74	0.29	2.17	97
0.1%	0.72	0.64	0.67	1.22	3.34	96
	0.92	0.84	0.87	1.11	3.25	96
	1.13	1.05	1.08	0.97	3.21	95
	1.31	1.23	1.26	0.83	3.15	95
	1.60	1.52	1.55	0.56	2.71	98
	1.87	1.79	1.82	0.32	2.28	101

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.12	1.04	1.07	0.59	2.72	95
	1.22	1.14	1.17	0.51	2.56	97
	1.34	1.26	1.29	0.42	2.41	99
	1.42	1.34	1.37	0.35	2.32	99
	1.51	1.43	1.46	0.31	2.16	99
	1.72	1.64	1.67	0.24	2.08	95
20%	1.12	1.04	1.07	0.71	2.86	94
	1.34	1.26	1.29	0.53	2.67	97
	1.51	1.43	1.46	0.39	2.39	100
	1.63	1.55	1.58	0.33	2.20	99
	1.72	1.64	1.67	0.29	2.13	93
	1.81	1.73	1.76	0.26	2.11	94
10%	1.12	1.04	1.07	0.78	3.10	94
	1.34	1.26	1.29	0.63	2.76	96
	1.51	1.43	1.46	0.48	2.49	99
	1.72	1.64	1.67	0.35	2.28	98
	1.81	1.73	1.76	0.31	2.15	93
	1.93	1.85	1.88	0.26	2.12	94
5%	1.12	1.04	1.07	0.86	3.17	95
	1.34	1.26	1.29	0.72	2.87	95
	1.51	1.43	1.46	0.56	2.70	98
	1.72	1.64	1.67	0.39	2.38	102
	1.93	1.85	1.88	0.30	2.16	95
	2.02	1.94	1.97	0.27	2.15	94
2%	1.12	1.04	1.07	0.96	3.21	95
	1.34	1.26	1.29	0.85	3.16	95
	1.51	1.43	1.46	0.69	2.83	96
	1.72	1.64	1.67	0.51	2.63	99
	1.93	1.85	1.88	0.35	2.36	101
	2.10	2.02	2.05	0.29	2.17	94
1%	1.12	1.04	1.07	1.03	3.24	96
	1.34	1.26	1.29	0.95	3.22	95
	1.51	1.43	1.46	0.79	3.07	95
	1.72	1.64	1.67	0.60	2.75	98
	1.93	1.85	1.88	0.42	2.43	101
	2.21	2.13	2.16	0.29	2.20	94
0.5%	1.12	1.04	1.07	1.11	3.29	96
	1.34	1.26	1.29	1.04	3.28	95
	1.51	1.43	1.46	0.90	3.19	95
	1.72	1.64	1.67	0.71	2.89	96
	2.02	1.94	1.97	0.43	2.44	103
	2.29	2.21	2.24	0.30	2.29	95
0.1%	1.22	1.14	1.17	1.32	3.55	97
	1.42	1.34	1.37	1.19	3.51	96
	1.63	1.55	1.58	1.03	3.30	95
	1.81	1.73	1.76	0.86	3.14	96
	2.10	2.02	2.05	0.58	2.75	100
	2.37	2.29	2.32	0.27	7.57	93

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.62	1.54	1.57	0.61	2.75	97
	1.72	1.64	1.67	0.52	2.63	99
	1.84	1.76	1.79	0.43	2.44	101
	1.92	1.84	1.87	0.37	2.39	101
	2.01	1.93	1.96	0.32	2.14	95
	2.22	2.14	2.17	0.27	6.46	93
20%	1.62	1.54	1.57	0.73	2.93	95
	1.84	1.76	1.79	0.54	2.71	99
	2.01	1.93	1.96	0.39	2.36	103
	2.13	2.05	2.08	0.34	2.16	93
	2.22	2.14	2.17	0.31	2.19	94
	2.31	2.23	2.26	0.29	6.54	93
10%	1.62	1.54	1.57	0.82	3.12	95
	1.84	1.76	1.79	0.64	2.79	98
	2.01	1.93	1.96	0.48	2.57	101
	2.22	2.14	2.17	0.36	2.32	96
	2.31	2.23	2.26	0.32	5.87	94
	2.43	2.35	2.38	0.29	6.55	93
5%	1.62	1.54	1.57	0.91	3.20	95
	1.84	1.76	1.79	0.75	3.04	97
	2.01	1.93	1.96	0.57	2.73	100
	2.22	2.14	2.17	0.39	4.34	103
	2.43	2.35	2.38	0.32	7.37	93
	2.52	2.44	2.47	0.31	6.55	92
2%	1.62	1.54	1.57	1.03	3.31	95
	1.84	1.76	1.79	0.89	3.16	96
	2.01	1.93	1.96	0.71	2.92	98
	2.22	2.14	2.17	0.51	2.62	102
	2.43	2.35	2.38	0.30	7.72	95
	2.60	2.52	2.55	0.32	7.07	93
1%	1.62	1.54	1.57	1.11	3.50	95
	1.84	1.76	1.79	1.00	3.26	95
	2.01	1.93	1.96	0.83	3.13	96
	2.22	2.14	2.17	0.61	2.76	100
	2.43	2.35	2.38	0.41	6.30	102
	2.71	2.63	2.66	0.33	6.77	92
0.5%	1.62	1.54	1.57	1.19	3.58	96
	1.84	1.76	1.79	1.10	3.49	96
	2.01	1.93	1.96	0.93	3.20	96
	2.22	2.14	2.17	0.72	2.97	99
	2.52	2.44	2.47	0.37	8.59	103
	2.79	2.71	2.74	0.34	7.11	92
0.1%	1.72	1.64	1.67	1.40	3.66	97
	1.92	1.84	1.87	1.27	3.64	96
	2.13	2.05	2.08	1.07	3.40	96
	2.31	2.23	2.26	0.90	3.20	97
	2.60	2.52	2.55	0.57	2.75	103
	2.87	2.79	2.82	0.33	7.57	91

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.12	2.04	2.07	0.62	2.79	99
	2.22	2.14	2.17	0.53	2.70	101
	2.34	2.26	2.29	0.43	2.57	102
	2.42	2.34	2.37	0.28	8.18	93
	2.51	2.43	2.46	0.34	7.47	93
	2.72	2.64	2.67	0.32	6.46	92
20%	2.12	2.04	2.07	0.76	3.09	97
	2.34	2.26	2.29	0.54	2.70	102
	2.51	2.43	2.46	0.35	8.53	100
	2.63	2.55	2.58	0.37	7.50	93
	2.72	2.64	2.67	0.34	7.36	93
	2.81	2.73	2.76	0.34	6.53	92
10%	2.12	2.04	2.07	0.85	3.15	96
	2.34	2.26	2.29	0.65	2.83	100
	2.51	2.43	2.46	0.48	2.68	102
	2.72	2.64	2.67	0.39	7.53	93
	2.81	2.73	2.76	0.35	7.40	92
	2.93	2.85	2.88	0.34	6.53	92
5%	2.12	2.04	2.07	0.94	3.22	96
	2.34	2.26	2.29	0.76	3.08	98
	2.51	2.43	2.46	0.57	2.70	103
	2.72	2.64	2.67	0.24	8.54	86
	2.93	2.85	2.88	0.36	7.37	92
	3.02	2.94	2.97	0.36	6.57	92
2%	2.12	2.04	2.07	1.07	3.39	96
	2.34	2.26	2.29	0.92	3.22	97
	2.51	2.43	2.46	0.73	3.00	99
	2.72	2.64	2.67	0.48	6.40	103
	2.93	2.85	2.88	0.35	7.73	91
	3.10	3.02	3.05	0.38	7.07	92
1%	2.12	2.04	2.07	1.17	3.60	96
	2.34	2.26	2.29	1.03	3.37	97
	2.51	2.43	2.46	0.85	3.15	98
	2.72	2.64	2.67	0.61	2.81	102
	2.93	2.85	2.88	0.28	8.58	88
	3.21	3.13	3.16	0.39	6.77	92
0.5%	2.12	2.04	2.07	1.26	3.66	96
	2.34	2.26	2.29	1.15	3.57	96
	2.51	2.43	2.46	0.96	3.29	97
	2.72	2.64	2.67	0.73	3.01	100
	3.02	2.94	2.97	0.36	8.59	84
	3.29	3.21	3.24	0.40	7.11	91
0.1%	2.22	2.14	2.17	1.48	3.74	96
	2.42	2.34	2.37	1.33	3.69	96
	2.63	2.55	2.58	1.11	3.55	97
	2.81	2.73	2.76	0.91	3.22	98
	3.10	3.02	3.05	0.55	9.70	102
	3.37	3.29	3.32	0.40	7.57	91

Table 9-10: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexC.2

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Wexford Location C.2	
Bed Level (MSL): -0.721m	
Bed Level (OD Malin OSGM02): -0.800m	
Bed Level (OD Malin OSGM15): -0.767m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2019)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Combined Wave Component describes the combination of wind waves and swell waves
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.62	0.54	0.57	0.37	2.80	66
	0.72	0.64	0.67	0.31	2.48	66
	0.84	0.76	0.79	0.24	2.15	67
	0.92	0.84	0.87	0.19	1.93	67
	1.01	0.93	0.96	0.15	6.21	68
	1.22	1.14	1.17	0.11	6.48	71
20%	0.62	0.54	0.57	0.47	2.92	73
	0.84	0.76	0.79	0.32	2.49	66
	1.01	0.93	0.96	0.21	1.94	67
	1.13	1.05	1.08	0.16	7.15	68
	1.22	1.14	1.17	0.14	7.38	68
	1.31	1.23	1.26	0.13	6.56	71
10%	0.62	0.54	0.57	0.53	3.06	74
	0.84	0.76	0.79	0.41	2.83	74
	1.01	0.93	0.96	0.27	2.25	66
	1.22	1.14	1.17	0.17	7.18	68
	1.31	1.23	1.26	0.15	7.42	68
	1.43	1.35	1.38	0.13	6.53	71
5%	0.62	0.54	0.57	0.58	3.22	74
	0.84	0.76	0.79	0.50	2.94	75
	1.01	0.93	0.96	0.34	2.47	69
	1.22	1.14	1.17	0.21	7.34	67
	1.43	1.35	1.38	0.15	7.39	69
	1.52	1.44	1.47	0.14	6.57	71
2%	0.62	0.54	0.57	0.64	3.33	74
	0.84	0.76	0.79	0.59	3.26	75
	1.01	0.93	0.96	0.46	2.84	77
	1.22	1.14	1.17	0.29	2.22	68
	1.43	1.35	1.38	0.18	7.76	69
	1.60	1.52	1.55	0.15	7.11	71
1%	0.62	0.54	0.57	0.67	3.38	75
	0.84	0.76	0.79	0.65	3.34	76
	1.01	0.93	0.96	0.56	3.19	76
	1.22	1.14	1.17	0.38	2.48	77
	1.43	1.35	1.38	0.22	8.59	68
	1.71	1.63	1.66	0.16	6.82	70
0.5%	0.62	0.54	0.57	0.70	3.43	74
	0.84	0.76	0.79	0.71	3.39	76
	1.01	0.93	0.96	0.62	3.30	77
	1.22	1.14	1.17	0.45	2.79	77
	1.52	1.44	1.47	0.23	8.60	68
	1.79	1.71	1.74	0.17	7.15	70
0.1%	0.72	0.64	0.67	0.80	3.66	76
	0.92	0.84	0.87	0.81	3.56	77
	1.13	1.05	1.08	0.72	3.39	78
	1.31	1.23	1.26	0.59	3.20	77
	1.60	1.52	1.55	0.32	3.67	68
	1.87	1.79	1.82	0.15	7.60	65

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.12	1.04	1.07	0.37	2.53	67
	1.22	1.14	1.17	0.31	2.26	68
	1.34	1.26	1.29	0.23	8.15	68
	1.42	1.34	1.37	0.19	8.21	68
	1.51	1.43	1.46	0.16	7.49	69
	1.72	1.64	1.67	0.14	6.48	70
20%	1.12	1.04	1.07	0.49	2.89	76
	1.34	1.26	1.29	0.33	2.29	76
	1.51	1.43	1.46	0.20	8.55	69
	1.63	1.55	1.58	0.17	7.52	70
	1.72	1.64	1.67	0.18	7.38	70
	1.81	1.73	1.76	0.16	6.57	70
10%	1.12	1.04	1.07	0.57	3.22	76
	1.34	1.26	1.29	0.40	2.51	78
	1.51	1.43	1.46	0.28	8.41	80
	1.72	1.64	1.67	0.18	7.55	70
	1.81	1.73	1.76	0.19	7.43	70
	1.93	1.85	1.88	0.16	6.54	69
5%	1.12	1.04	1.07	0.63	3.31	77
	1.34	1.26	1.29	0.49	2.81	78
	1.51	1.43	1.46	0.35	2.24	82
	1.72	1.64	1.67	0.18	8.55	69
	1.93	1.85	1.88	0.19	7.39	70
	2.02	1.94	1.97	0.18	6.57	69
2%	1.12	1.04	1.07	0.72	3.38	78
	1.34	1.26	1.29	0.60	3.19	78
	1.51	1.43	1.46	0.45	2.62	79
	1.72	1.64	1.67	0.28	8.71	69
	1.93	1.85	1.88	0.17	7.77	67
	2.10	2.02	2.05	0.19	7.13	69
1%	1.12	1.04	1.07	0.78	3.49	78
	1.34	1.26	1.29	0.70	3.34	78
	1.51	1.43	1.46	0.54	2.89	78
	1.72	1.64	1.67	0.37	9.56	80
	1.93	1.85	1.88	0.20	8.59	69
	2.21	2.13	2.16	0.19	6.85	69
0.5%	1.12	1.04	1.07	0.83	3.61	78
	1.34	1.26	1.29	0.78	3.52	78
	1.51	1.43	1.46	0.63	3.22	78
	1.72	1.64	1.67	0.45	2.57	77
	2.02	1.94	1.97	0.20	8.61	67
	2.29	2.21	2.24	0.20	7.17	68
0.1%	1.22	1.14	1.17	0.97	3.80	79
	1.42	1.34	1.37	0.90	3.76	79
	1.63	1.55	1.58	0.75	3.40	78
	1.81	1.73	1.76	0.59	2.91	79
	2.10	2.02	2.05	0.31	9.72	70
	2.37	2.29	2.32	0.19	7.60	63

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.62	1.54	1.57	0.37	2.41	74
	1.72	1.64	1.67	0.28	8.80	69
	1.84	1.76	1.79	0.21	8.59	70
	1.92	1.84	1.87	0.17	8.23	68
	2.01	1.93	1.96	0.19	7.50	69
	2.22	2.14	2.17	0.19	6.48	69
20%	1.62	1.54	1.57	0.49	2.78	77
	1.84	1.76	1.79	0.30	9.20	69
	2.01	1.93	1.96	0.20	8.55	61
	2.13	2.05	2.08	0.22	7.53	69
	2.22	2.14	2.17	0.21	7.38	69
	2.31	2.23	2.26	0.20	6.58	69
10%	1.62	1.54	1.57	0.56	2.94	78
	1.84	1.76	1.79	0.41	9.60	85
	2.01	1.93	1.96	0.25	8.65	70
	2.22	2.14	2.17	0.22	7.56	69
	2.31	2.23	2.26	0.22	7.43	69
	2.43	2.35	2.38	0.20	6.62	68
5%	1.62	1.54	1.57	0.63	3.21	78
	1.84	1.76	1.79	0.49	2.69	80
	2.01	1.93	1.96	0.31	9.73	70
	2.22	2.14	2.17	0.17	8.56	61
	2.43	2.35	2.38	0.22	7.39	69
	2.52	2.44	2.47	0.22	6.60	68
2%	1.62	1.54	1.57	0.75	3.44	77
	1.84	1.76	1.79	0.60	2.96	79
	2.01	1.93	1.96	0.46	9.63	84
	2.22	2.14	2.17	0.28	8.72	69
	2.43	2.35	2.38	0.20	7.78	64
	2.60	2.52	2.55	0.23	7.15	68
1%	1.62	1.54	1.57	0.83	3.70	78
	1.84	1.76	1.79	0.70	3.25	79
	2.01	1.93	1.96	0.53	2.83	74
	2.22	2.14	2.17	0.33	9.83	70
	2.43	2.35	2.38	0.20	8.60	63
	2.71	2.63	2.66	0.24	6.88	68
0.5%	1.62	1.54	1.57	0.90	3.78	78
	1.84	1.76	1.79	0.80	3.53	79
	2.01	1.93	1.96	0.63	3.02	80
	2.22	2.14	2.17	0.46	9.90	85
	2.52	2.44	2.47	0.20	8.61	60
	2.79	2.71	2.74	0.25	7.18	68
0.1%	1.72	1.64	1.67	1.07	3.86	80
	1.92	1.84	1.87	0.94	3.78	80
	2.13	2.05	2.08	0.75	3.29	79
	2.31	2.23	2.26	0.60	2.89	83
	2.60	2.52	2.55	0.25	9.72	67
	2.87	2.79	2.82	0.25	7.60	65

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.12	2.04	2.07	0.34	9.83	69
	2.22	2.14	2.17	0.27	8.81	71
	2.34	2.26	2.29	0.20	8.60	64
	2.42	2.34	2.37	0.20	8.24	64
	2.51	2.43	2.46	0.23	7.50	68
	2.72	2.64	2.67	0.23	6.49	68
20%	2.12	2.04	2.07	0.49	9.43	80
	2.34	2.26	2.29	0.26	9.23	70
	2.51	2.43	2.46	0.20	8.55	61
	2.63	2.55	2.58	0.26	7.53	69
	2.72	2.64	2.67	0.24	7.39	68
	2.81	2.73	2.76	0.25	6.58	68
10%	2.12	2.04	2.07	0.56	2.86	78
	2.34	2.26	2.29	0.40	9.87	85
	2.51	2.43	2.46	0.25	8.65	65
	2.72	2.64	2.67	0.27	7.56	69
	2.81	2.73	2.76	0.26	7.43	68
	2.93	2.85	2.88	0.25	6.59	68
5%	2.12	2.04	2.07	0.64	3.03	79
	2.34	2.26	2.29	0.49	9.92	83
	2.51	2.43	2.46	0.24	9.73	67
	2.72	2.64	2.67	0.22	8.56	61
	2.93	2.85	2.88	0.27	7.39	68
	3.02	2.94	2.97	0.27	6.65	68
2%	2.12	2.04	2.07	0.75	3.30	79
	2.34	2.26	2.29	0.62	2.93	85
	2.51	2.43	2.46	0.41	9.90	70
	2.72	2.64	2.67	0.28	8.72	63
	2.93	2.85	2.88	0.26	7.80	66
	3.10	3.02	3.05	0.28	7.16	68
1%	2.12	2.04	2.07	0.83	3.66	79
	2.34	2.26	2.29	0.71	3.19	81
	2.51	2.43	2.46	0.54	10.03	80
	2.72	2.64	2.67	0.31	9.84	67
	2.93	2.85	2.88	0.25	8.60	62
	3.21	3.13	3.16	0.29	6.91	68
0.5%	2.12	2.04	2.07	0.93	3.78	79
	2.34	2.26	2.29	0.80	3.45	80
	2.51	2.43	2.46	0.64	10.73	83
	2.72	2.64	2.67	0.40	9.91	71
	3.02	2.94	2.97	0.25	8.61	61
	3.29	3.21	3.24	0.30	7.19	68
0.1%	2.22	2.14	2.17	1.13	3.96	80
	2.42	2.34	2.37	0.97	3.76	80
	2.63	2.55	2.58	0.76	3.29	81
	2.81	2.73	2.76	0.61	10.97	87
	3.10	3.02	3.05	0.28	9.73	64
	3.37	3.29	3.32	0.31	7.61	67

Table 9-11: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexC.3

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Wexford Location C.3	
Bed Level (MSL): -3.733m	
Bed Level (OD Malin OSGM02): -3.812m	
Bed Level (OD Malin OSGM15): -3.779m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2016)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Combined Wave Component describes the combination of wind waves and swell waves
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.62	0.54	0.57	0.59	2.63	92
	0.72	0.64	0.67	0.52	2.45	97
	0.84	0.76	0.79	0.42	2.34	104
	0.92	0.84	0.87	0.36	2.17	109
	1.01	0.93	0.96	0.32	2.11	112
	1.22	1.14	1.17	0.23	1.87	107
20%	0.62	0.54	0.57	0.69	2.82	92
	0.84	0.76	0.79	0.54	2.47	99
	1.01	0.93	0.96	0.40	2.35	109
	1.13	1.05	1.08	0.34	2.14	112
	1.22	1.14	1.17	0.30	2.09	111
	1.31	1.23	1.26	0.27	1.93	108
10%	0.62	0.54	0.57	0.77	2.85	92
	0.84	0.76	0.79	0.63	2.76	95
	1.01	0.93	0.96	0.49	2.43	105
	1.22	1.14	1.17	0.36	2.17	112
	1.31	1.23	1.26	0.32	2.12	111
	1.43	1.35	1.38	0.27	1.93	107
5%	0.62	0.54	0.57	0.84	2.89	93
	0.84	0.76	0.79	0.73	2.84	94
	1.01	0.93	0.96	0.57	2.55	102
	1.22	1.14	1.17	0.42	2.40	112
	1.43	1.35	1.38	0.32	2.12	111
	1.52	1.44	1.47	0.26	1.93	101
2%	0.62	0.54	0.57	0.93	3.02	94
	0.84	0.76	0.79	0.85	3.00	93
	1.01	0.93	0.96	0.70	2.80	97
	1.22	1.14	1.17	0.53	2.55	108
	1.43	1.35	1.38	0.39	2.36	114
	1.60	1.52	1.55	0.31	2.10	106
1%	0.62	0.54	0.57	1.01	3.11	95
	0.84	0.76	0.79	0.93	3.13	94
	1.01	0.93	0.96	0.82	2.95	94
	1.22	1.14	1.17	0.62	2.73	105
	1.43	1.35	1.38	0.47	2.46	113
	1.71	1.63	1.66	0.30	2.07	104
0.5%	0.62	0.54	0.57	1.09	3.15	95
	0.84	0.76	0.79	1.01	3.17	95
	1.01	0.93	0.96	0.90	3.15	94
	1.22	1.14	1.17	0.71	2.80	101
	1.52	1.44	1.47	0.48	2.48	114
	1.79	1.71	1.74	0.32	2.12	104
0.1%	0.72	0.64	0.67	1.29	3.24	96
	0.92	0.84	0.87	1.17	3.22	96
	1.13	1.05	1.08	1.02	3.22	95
	1.31	1.23	1.26	0.88	3.11	97
	1.60	1.52	1.55	0.63	2.79	111
	1.87	1.79	1.82	0.38	2.36	115

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.12	1.04	1.07	0.59	2.69	102
	1.22	1.14	1.17	0.52	2.60	108
	1.34	1.26	1.29	0.46	2.45	112
	1.42	1.34	1.37	0.40	2.38	114
	1.51	1.43	1.46	0.35	2.16	113
	1.72	1.64	1.67	0.26	6.47	101
20%	1.12	1.04	1.07	0.75	2.84	97
	1.34	1.26	1.29	0.58	2.72	108
	1.51	1.43	1.46	0.44	2.44	115
	1.63	1.55	1.58	0.38	2.21	112
	1.72	1.64	1.67	0.30	7.37	97
	1.81	1.73	1.76	0.27	6.55	98
10%	1.12	1.04	1.07	0.84	3.04	95
	1.34	1.26	1.29	0.66	2.78	106
	1.51	1.43	1.46	0.53	2.64	112
	1.72	1.64	1.67	0.40	2.32	112
	1.81	1.73	1.76	0.32	7.42	97
	1.93	1.85	1.88	0.27	6.53	96
5%	1.12	1.04	1.07	0.91	3.18	94
	1.34	1.26	1.29	0.76	2.86	102
	1.51	1.43	1.46	0.62	2.77	110
	1.72	1.64	1.67	0.45	2.43	116
	1.93	1.85	1.88	0.32	7.38	100
	2.02	1.94	1.97	0.29	6.56	96
2%	1.12	1.04	1.07	1.01	3.22	95
	1.34	1.26	1.29	0.89	3.11	98
	1.51	1.43	1.46	0.74	2.89	106
	1.72	1.64	1.67	0.58	2.76	113
	1.93	1.85	1.88	0.41	2.40	114
	2.10	2.02	2.05	0.31	7.10	96
1%	1.12	1.04	1.07	1.09	3.23	96
	1.34	1.26	1.29	1.00	3.23	97
	1.51	1.43	1.46	0.84	3.06	102
	1.72	1.64	1.67	0.67	2.83	111
	1.93	1.85	1.88	0.48	2.48	115
	2.21	2.13	2.16	0.32	6.81	97
0.5%	1.12	1.04	1.07	1.17	3.25	96
	1.34	1.26	1.29	1.11	3.26	96
	1.51	1.43	1.46	0.95	3.18	99
	1.72	1.64	1.67	0.77	3.08	108
	2.02	1.94	1.97	0.50	2.58	116
	2.29	2.21	2.24	0.34	7.14	99
0.1%	1.22	1.14	1.17	1.38	3.37	97
	1.42	1.34	1.37	1.26	3.35	97
	1.63	1.55	1.58	1.10	3.27	98
	1.81	1.73	1.76	0.93	3.18	105
	2.10	2.02	2.05	0.67	2.83	114
	2.37	2.29	2.32	0.28	7.58	91

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.62	1.54	1.57	0.67	2.81	110
	1.72	1.64	1.67	0.59	2.76	113
	1.84	1.76	1.79	0.49	2.50	115
	1.92	1.84	1.87	0.43	2.42	114
	2.01	1.93	1.96	0.31	7.49	100
	2.22	2.14	2.17	0.30	6.47	96
20%	1.62	1.54	1.57	0.75	3.05	105
	1.84	1.76	1.79	0.62	2.79	113
	2.01	1.93	1.96	0.44	2.45	117
	2.13	2.05	2.08	0.32	7.52	94
	2.22	2.14	2.17	0.33	7.37	95
	2.31	2.23	2.26	0.32	6.57	95
10%	1.62	1.54	1.57	0.88	3.11	102
	1.84	1.76	1.79	0.72	2.93	111
	2.01	1.93	1.96	0.56	2.72	115
	2.22	2.14	2.17	0.39	7.54	104
	2.31	2.23	2.26	0.34	7.42	95
	2.43	2.35	2.38	0.32	6.62	94
5%	1.62	1.54	1.57	0.96	3.19	100
	1.84	1.76	1.79	0.82	3.16	108
	2.01	1.93	1.96	0.66	2.82	114
	2.22	2.14	2.17	0.45	8.55	115
	2.43	2.35	2.38	0.35	7.38	95
	2.52	2.44	2.47	0.34	6.59	94
2%	1.62	1.54	1.57	1.10	3.28	97
	1.84	1.76	1.79	0.95	3.19	104
	2.01	1.93	1.96	0.80	3.15	111
	2.22	2.14	2.17	0.59	2.77	116
	2.43	2.35	2.38	0.30	7.75	94
	2.60	2.52	2.55	0.36	7.11	94
1%	1.62	1.54	1.57	1.19	3.37	97
	1.84	1.76	1.79	1.06	3.26	101
	2.01	1.93	1.96	0.91	3.21	108
	2.22	2.14	2.17	0.70	2.90	114
	2.43	2.35	2.38	0.50	8.59	114
	2.71	2.63	2.66	0.37	6.82	94
0.5%	1.62	1.54	1.57	1.26	3.49	97
	1.84	1.76	1.79	1.17	3.35	99
	2.01	1.93	1.96	1.01	3.29	106
	2.22	2.14	2.17	0.83	3.18	112
	2.52	2.44	2.47	0.47	8.60	115
	2.79	2.71	2.74	0.39	7.14	94
0.1%	1.72	1.64	1.67	1.47	3.63	99
	1.92	1.84	1.87	1.33	3.60	99
	2.13	2.05	2.08	1.15	3.47	103
	2.31	2.23	2.26	1.00	3.41	109
	2.60	2.52	2.55	0.67	2.95	115
	2.87	2.79	2.82	0.36	7.59	91

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.12	2.04	2.07	0.71	2.95	113
	2.22	2.14	2.17	0.62	2.79	115
	2.34	2.26	2.29	0.51	3.84	114
	2.42	2.34	2.37	0.29	8.21	90
	2.51	2.43	2.46	0.35	7.49	93
	2.72	2.64	2.67	0.35	6.47	94
20%	2.12	2.04	2.07	0.86	3.20	110
	2.34	2.26	2.29	0.63	2.80	115
	2.51	2.43	2.46	0.41	8.54	111
	2.63	2.55	2.58	0.39	7.52	93
	2.72	2.64	2.67	0.38	7.37	94
	2.81	2.73	2.76	0.38	6.56	94
10%	2.12	2.04	2.07	0.95	3.25	108
	2.34	2.26	2.29	0.75	3.09	114
	2.51	2.43	2.46	0.57	2.79	114
	2.72	2.64	2.67	0.41	7.55	94
	2.81	2.73	2.76	0.39	7.42	94
	2.93	2.85	2.88	0.38	6.59	93
5%	2.12	2.04	2.07	1.03	3.35	106
	2.34	2.26	2.29	0.88	3.21	112
	2.51	2.43	2.46	0.66	2.85	115
	2.72	2.64	2.67	0.30	8.55	87
	2.93	2.85	2.88	0.40	7.38	93
	3.02	2.94	2.97	0.40	6.64	93
2%	2.12	2.04	2.07	1.15	3.45	102
	2.34	2.26	2.29	1.03	3.51	109
	2.51	2.43	2.46	0.84	3.18	113
	2.72	2.64	2.67	0.58	7.73	115
	2.93	2.85	2.88	0.38	7.76	91
	3.10	3.02	3.05	0.43	7.12	93
1%	2.12	2.04	2.07	1.25	3.57	101
	2.34	2.26	2.29	1.13	3.60	107
	2.51	2.43	2.46	0.97	3.30	111
	2.72	2.64	2.67	0.71	3.12	115
	2.93	2.85	2.88	0.34	8.59	86
	3.21	3.13	3.16	0.44	6.83	93
0.5%	2.12	2.04	2.07	1.34	3.66	100
	2.34	2.26	2.29	1.24	3.61	104
	2.51	2.43	2.46	1.09	3.61	109
	2.72	2.64	2.67	0.85	3.19	114
	3.02	2.94	2.97	0.33	8.60	86
	3.29	3.21	3.24	0.46	7.15	93
0.1%	2.22	2.14	2.17	1.57	3.72	100
	2.42	2.34	2.37	1.42	3.68	102
	2.63	2.55	2.58	1.24	3.68	107
	2.81	2.73	2.76	1.07	3.57	112
	3.10	3.02	3.05	0.66	9.71	113
	3.37	3.29	3.32	0.45	7.59	91



**Figure 9.4: Estimation Locations for Wexford D (WexD)**

**Table 9-12: Co-ordinates for Estimation Locations for Wexford D (WexD)**

Location	Extraction Point	
	Latitude (°N)	Longitude (°W)
WexD.1	52.3326	-6.4496
WexD.2	52.3312	-6.4485
WexD.3	52.3304	-6.4470
WexD.4	52.3276	-6.4464
WexD.5	52.3254	-6.4457
WexD.6	52.3098	-6.4468

Location	Extraction Point (ITM)	
	Eastings [m]	Northings [m]
WexD.1	705665	621241
WexD.2	705743	621087
WexD.3	705848	621000
WexD.4	705895	620690
WexD.5	705948	620446
WexD.6	705910	618709

Table 9-13: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexD.1

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
<b>Output:</b> Shoreline Wave Climate and Water Level Combinations	
<b>Location:</b> Wexford Location D.1	
<b>Bed Level (MSL):</b> -0.972m	
<b>Bed Level (OD Malin OSGM02):</b> -1.051m	
<b>Bed Level (OD Malin OSGM15):</b> -1.018m	
<b>Dated:</b> October 2020	
<b>Joint Probability Event (AEP):</b> Varies from 50% to 0.1%	
<b>Prepared By:</b> ZM	<b>Checked By:</b> CN
<b>Table Reference:</b> CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2016)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Combined Wave Component describes the combination of wind waves and swell waves
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.62	0.54	0.57	0.53	2.56	100
	0.72	0.64	0.67	0.50	2.47	102
	0.84	0.76	0.79	0.43	2.40	104
	0.92	0.84	0.87	0.37	2.21	107
	1.01	0.93	0.96	0.32	2.12	109
	1.22	1.14	1.17	0.23	1.85	105
20%	0.62	0.54	0.57	0.60	2.79	100
	0.84	0.76	0.79	0.53	2.53	102
	1.01	0.93	0.96	0.42	2.39	107
	1.13	1.05	1.08	0.35	2.15	109
	1.22	1.14	1.17	0.30	2.09	108
	1.31	1.23	1.26	0.26	1.91	106
10%	0.62	0.54	0.57	0.64	2.80	100
	0.84	0.76	0.79	0.61	2.78	100
	1.01	0.93	0.96	0.50	2.48	104
	1.22	1.14	1.17	0.37	2.19	109
	1.31	1.23	1.26	0.32	2.12	108
	1.43	1.35	1.38	0.26	1.91	104
5%	0.62	0.54	0.57	0.67	2.79	100
	0.84	0.76	0.79	0.67	2.84	99
	1.01	0.93	0.96	0.58	2.73	103
	1.22	1.14	1.17	0.44	2.43	109
	1.43	1.35	1.38	0.32	2.11	108
	1.52	1.44	1.47	0.25	5.29	98
2%	0.62	0.54	0.57	0.71	2.77	101
	0.84	0.76	0.79	0.73	2.90	99
	1.01	0.93	0.96	0.69	2.84	101
	1.22	1.14	1.17	0.56	2.70	106
	1.43	1.35	1.38	0.40	2.37	110
	1.60	1.52	1.55	0.31	2.09	103
1%	0.62	0.54	0.57	0.74	2.73	102
	0.84	0.76	0.79	0.77	2.95	99
	1.01	0.93	0.96	0.76	2.97	98
	1.22	1.14	1.17	0.65	2.82	104
	1.43	1.35	1.38	0.49	2.49	109
	1.71	1.63	1.66	0.30	4.31	101
0.5%	0.62	0.54	0.57	0.76	2.66	103
	0.84	0.76	0.79	0.81	2.96	100
	1.01	0.93	0.96	0.81	3.12	98
	1.22	1.14	1.17	0.73	2.91	103
	1.52	1.44	1.47	0.50	2.52	110
	1.79	1.71	1.74	0.31	2.10	100
0.1%	0.72	0.64	0.67	0.85	2.56	103
	0.92	0.84	0.87	0.89	3.04	101
	1.13	1.05	1.08	0.89	3.20	99
	1.31	1.23	1.26	0.86	3.19	100
	1.60	1.52	1.55	0.66	2.84	108
	1.87	1.79	1.82	0.37	7.57	110

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.12	1.04	1.07	0.53	2.79	103
	1.22	1.14	1.17	0.50	2.73	106
	1.34	1.26	1.29	0.48	2.47	109
	1.42	1.34	1.37	0.41	2.40	110
	1.51	1.43	1.46	0.36	2.17	109
	1.72	1.64	1.67	0.25	6.47	97
20%	1.12	1.04	1.07	0.74	2.91	101
	1.34	1.26	1.29	0.61	2.79	106
	1.51	1.43	1.46	0.46	2.46	111
	1.63	1.55	1.58	0.38	2.22	109
	1.72	1.64	1.67	0.29	7.35	93
	1.81	1.73	1.76	0.26	6.55	94
10%	1.12	1.04	1.07	0.79	3.10	98
	1.34	1.26	1.29	0.70	2.87	105
	1.51	1.43	1.46	0.55	2.70	108
	1.72	1.64	1.67	0.40	2.33	108
	1.81	1.73	1.76	0.31	7.41	93
	1.93	1.85	1.88	0.27	6.52	92
5%	1.12	1.04	1.07	0.84	3.18	98
	1.34	1.26	1.29	0.78	3.11	103
	1.51	1.43	1.46	0.65	2.83	107
	1.72	1.64	1.67	0.46	2.44	112
	1.93	1.85	1.88	0.31	7.36	96
	2.02	1.94	1.97	0.29	6.55	92
2%	1.12	1.04	1.07	0.89	3.20	98
	1.34	1.26	1.29	0.88	3.21	100
	1.51	1.43	1.46	0.78	3.13	105
	1.72	1.64	1.67	0.60	2.79	109
	1.93	1.85	1.88	0.41	2.41	110
	2.10	2.02	2.05	0.31	6.98	92
1%	1.12	1.04	1.07	0.92	3.19	99
	1.34	1.26	1.29	0.94	3.25	99
	1.51	1.43	1.46	0.88	3.22	103
	1.72	1.64	1.67	0.71	2.90	108
	1.93	1.85	1.88	0.49	2.50	111
	2.21	2.13	2.16	0.32	6.73	92
0.5%	1.12	1.04	1.07	0.96	3.18	100
	1.34	1.26	1.29	0.99	3.25	99
	1.51	1.43	1.46	0.95	3.26	100
	1.72	1.64	1.67	0.83	3.20	106
	2.02	1.94	1.97	0.51	5.52	111
	2.29	2.21	2.24	0.34	7.03	95
0.1%	1.22	1.14	1.17	1.06	3.17	101
	1.42	1.34	1.37	1.07	3.28	99
	1.63	1.55	1.58	1.06	3.36	99
	1.81	1.73	1.76	0.98	3.33	104
	2.10	2.02	2.05	0.70	2.88	109
	2.37	2.29	2.32	0.38	7.57	86

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.62	1.54	1.57	0.71	2.89	107
	1.72	1.64	1.67	0.62	2.80	109
	1.84	1.76	1.79	0.51	2.52	110
	1.92	1.84	1.87	0.43	2.43	109
	2.01	1.93	1.96	0.30	7.49	95
	2.22	2.14	2.17	0.30	6.47	92
20%	1.62	1.54	1.57	0.77	3.20	104
	1.84	1.76	1.79	0.65	2.83	109
	2.01	1.93	1.96	0.43	8.54	112
	2.13	2.05	2.08	0.32	7.51	90
	2.22	2.14	2.17	0.33	7.35	92
	2.31	2.23	2.26	0.32	6.55	91
10%	1.62	1.54	1.57	0.92	3.24	103
	1.84	1.76	1.79	0.76	3.08	107
	2.01	1.93	1.96	0.58	2.75	110
	2.22	2.14	2.17	0.39	7.54	99
	2.31	2.23	2.26	0.35	7.41	92
	2.43	2.35	2.38	0.33	6.57	90
5%	1.62	1.54	1.57	0.98	3.29	101
	1.84	1.76	1.79	0.89	3.25	106
	2.01	1.93	1.96	0.69	2.86	109
	2.22	2.14	2.17	0.45	8.54	110
	2.43	2.35	2.38	0.36	7.36	91
	2.52	2.44	2.47	0.35	6.56	90
2%	1.62	1.54	1.57	1.05	3.36	99
	1.84	1.76	1.79	1.01	3.38	104
	2.01	1.93	1.96	0.85	3.22	107
	2.22	2.14	2.17	0.61	2.79	111
	2.43	2.35	2.38	0.31	7.70	87
	2.60	2.52	2.55	0.37	6.98	90
1%	1.62	1.54	1.57	1.10	3.41	99
	1.84	1.76	1.79	1.08	3.53	102
	2.01	1.93	1.96	0.98	3.33	106
	2.22	2.14	2.17	0.74	2.98	110
	2.43	2.35	2.38	0.49	8.59	108
	2.71	2.63	2.66	0.39	6.74	90
0.5%	1.62	1.54	1.57	1.13	3.45	99
	1.84	1.76	1.79	1.14	3.58	100
	2.01	1.93	1.96	1.07	3.59	105
	2.22	2.14	2.17	0.88	3.23	108
	2.52	2.44	2.47	0.47	8.60	109
	2.79	2.71	2.74	0.40	7.04	90
0.1%	1.72	1.64	1.67	1.25	3.55	100
	1.92	1.84	1.87	1.24	3.65	100
	2.13	2.05	2.08	1.20	3.68	103
	2.31	2.23	2.26	1.09	3.61	106
	2.60	2.52	2.55	0.69	9.68	109
	2.87	2.79	2.82	0.39	7.57	87

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.12	2.04	2.07	0.75	3.07	109
	2.22	2.14	2.17	0.64	2.81	110
	2.34	2.26	2.29	0.51	8.59	109
	2.42	2.34	2.37	0.31	8.10	86
	2.51	2.43	2.46	0.37	7.49	89
	2.72	2.64	2.67	0.37	6.47	90

Table 9-14: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexD.2

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Wexford Location D.2	
Bed Level (MSL): -0.590m	
Bed Level (OD Malin OSGM02): -0.669m	
Bed Level (OD Malin OSGM15): -0.636m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2016) and OPW LiDAR (2013)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Combined Wave Component describes the combination of wind waves and swell waves
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.62	0.54	0.57	0.48	2.58	92
	0.72	0.64	0.67	0.46	2.49	94
	0.84	0.76	0.79	0.40	2.41	97
	0.92	0.84	0.87	0.34	2.20	99
	1.01	0.93	0.96	0.29	2.11	102
	1.22	1.14	1.17	0.22	1.85	98
20%	0.62	0.54	0.57	0.52	2.80	92
	0.84	0.76	0.79	0.50	2.55	94
	1.01	0.93	0.96	0.38	2.38	100
	1.13	1.05	1.08	0.31	2.14	102
	1.22	1.14	1.17	0.27	2.06	101
	1.31	1.23	1.26	0.25	1.90	99
10%	0.62	0.54	0.57	0.54	2.82	93
	0.84	0.76	0.79	0.56	2.79	93
	1.01	0.93	0.96	0.47	2.49	98
	1.22	1.14	1.17	0.33	2.17	102
	1.31	1.23	1.26	0.29	2.11	101
	1.43	1.35	1.38	0.25	6.39	98
5%	0.62	0.54	0.57	0.56	2.83	93
	0.84	0.76	0.79	0.60	2.85	93
	1.01	0.93	0.96	0.55	2.75	96
	1.22	1.14	1.17	0.39	2.42	102
	1.43	1.35	1.38	0.29	3.44	101
	1.52	1.44	1.47	0.25	6.55	94
2%	0.62	0.54	0.57	0.58	2.82	95
	0.84	0.76	0.79	0.64	2.92	93
	1.01	0.93	0.96	0.64	2.86	95
	1.22	1.14	1.17	0.52	2.68	99
	1.43	1.35	1.38	0.36	2.35	103
	1.60	1.52	1.55	0.29	5.24	97
1%	0.62	0.54	0.57	0.59	2.80	97
	0.84	0.76	0.79	0.66	2.98	94
	1.01	0.93	0.96	0.68	2.98	93
	1.22	1.14	1.17	0.61	2.83	98
	1.43	1.35	1.38	0.44	2.48	103
	1.71	1.63	1.66	0.29	6.71	96
0.5%	0.62	0.54	0.57	0.61	2.76	99
	0.84	0.76	0.79	0.68	3.01	96
	1.01	0.93	0.96	0.70	3.13	93
	1.22	1.14	1.17	0.69	2.93	96
	1.52	1.44	1.47	0.45	2.51	103
	1.79	1.71	1.74	0.30	7.00	96
0.1%	0.72	0.64	0.67	0.68	2.70	102
	0.92	0.84	0.87	0.74	3.07	98
	1.13	1.05	1.08	0.78	3.22	95
	1.31	1.23	1.26	0.79	3.21	95
	1.60	1.52	1.55	0.60	2.83	102
	1.87	1.79	1.82	0.33	7.57	103

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.12	1.04	1.07	0.48	2.81	97
	1.22	1.14	1.17	0.51	2.71	99
	1.34	1.26	1.29	0.43	2.47	102
	1.42	1.34	1.37	0.37	2.38	103
	1.51	1.43	1.46	0.33	4.41	103
	1.72	1.64	1.67	0.25	6.47	93
20%	1.12	1.04	1.07	0.68	2.93	95
	1.34	1.26	1.29	0.56	2.78	100
	1.51	1.43	1.46	0.41	2.45	104
	1.63	1.55	1.58	0.35	7.22	102
	1.72	1.64	1.67	0.28	7.35	90
	1.81	1.73	1.76	0.27	6.55	91
10%	1.12	1.04	1.07	0.72	3.11	94
	1.34	1.26	1.29	0.65	2.87	99
	1.51	1.43	1.46	0.50	2.66	102
	1.72	1.64	1.67	0.37	7.54	101
	1.81	1.73	1.76	0.31	7.41	91
	1.93	1.85	1.88	0.28	6.52	90
5%	1.12	1.04	1.07	0.74	3.19	94
	1.34	1.26	1.29	0.73	3.11	97
	1.51	1.43	1.46	0.59	2.82	101
	1.72	1.64	1.67	0.40	8.21	105
	1.93	1.85	1.88	0.31	7.36	92
	2.02	1.94	1.97	0.30	6.55	91
2%	1.12	1.04	1.07	0.77	3.21	95
	1.34	1.26	1.29	0.81	3.23	96
	1.51	1.43	1.46	0.73	3.12	99
	1.72	1.64	1.67	0.55	2.78	103
	1.93	1.85	1.88	0.36	7.69	103
	2.10	2.02	2.05	0.32	6.93	91
1%	1.12	1.04	1.07	0.79	3.21	96
	1.34	1.26	1.29	0.84	3.26	96
	1.51	1.43	1.46	0.82	3.23	98
	1.72	1.64	1.67	0.65	2.88	102
	1.93	1.85	1.88	0.44	8.59	104
	2.21	2.13	2.16	0.33	6.72	91
0.5%	1.12	1.04	1.07	0.81	3.20	97
	1.34	1.26	1.29	0.87	3.27	96
	1.51	1.43	1.46	0.88	3.28	96
	1.72	1.64	1.67	0.77	3.18	100
	2.02	1.94	1.97	0.45	8.60	105
	2.29	2.21	2.24	0.35	7.00	92
0.1%	1.22	1.14	1.17	0.89	3.18	100
	1.42	1.34	1.37	0.94	3.29	97
	1.63	1.55	1.58	0.96	3.39	96
	1.81	1.73	1.76	0.92	3.33	99
	2.10	2.02	2.05	0.63	2.86	104
	2.37	2.29	2.32	0.32	7.57	87

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.62	1.54	1.57	0.65	2.88	101
	1.72	1.64	1.67	0.55	2.78	103
	1.84	1.76	1.79	0.45	8.25	104
	1.92	1.84	1.87	0.39	7.77	103
	2.01	1.93	1.96	0.30	7.49	91
	2.22	2.14	2.17	0.32	6.47	90
20%	1.62	1.54	1.57	0.69	3.20	99
	1.84	1.76	1.79	0.59	2.82	103
	2.01	1.93	1.96	0.37	8.54	105
	2.13	2.05	2.08	0.32	7.51	88
	2.22	2.14	2.17	0.35	7.35	90
	2.31	2.23	2.26	0.34	6.55	90
10%	1.62	1.54	1.57	0.86	3.26	98
	1.84	1.76	1.79	0.70	3.01	102
	2.01	1.93	1.96	0.52	8.32	104
	2.22	2.14	2.17	0.39	7.54	96
	2.31	2.23	2.26	0.37	7.41	90
	2.43	2.35	2.38	0.35	6.56	89
5%	1.62	1.54	1.57	0.91	3.30	97
	1.84	1.76	1.79	0.82	3.25	100
	2.01	1.93	1.96	0.62	2.85	104
	2.22	2.14	2.17	0.41	8.54	103
	2.43	2.35	2.38	0.37	7.36	90
	2.52	2.44	2.47	0.37	6.56	90
2%	1.62	1.54	1.57	0.95	3.38	96
	1.84	1.76	1.79	0.94	3.37	99
	2.01	1.93	1.96	0.78	3.20	102
	2.22	2.14	2.17	0.54	8.70	105
	2.43	2.35	2.38	0.34	7.69	87
	2.60	2.52	2.55	0.40	6.94	90
1%	1.62	1.54	1.57	0.98	3.44	96
	1.84	1.76	1.79	1.00	3.55	98
	2.01	1.93	1.96	0.92	3.32	100
	2.22	2.14	2.17	0.66	8.55	104
	2.43	2.35	2.38	0.45	8.59	102
	2.71	2.63	2.66	0.41	6.72	90
0.5%	1.62	1.54	1.57	1.00	3.48	97
	1.84	1.76	1.79	1.04	3.61	97
	2.01	1.93	1.96	1.00	3.57	100
	2.22	2.14	2.17	0.80	3.22	103
	2.52	2.44	2.47	0.45	8.60	102
	2.79	2.71	2.74	0.43	7.01	90
0.1%	1.72	1.64	1.67	1.09	3.56	99
	1.92	1.84	1.87	1.12	3.68	98
	2.13	2.05	2.08	1.11	3.70	99
	2.31	2.23	2.26	1.01	3.58	101
	2.60	2.52	2.55	0.60	9.67	104
	2.87	2.79	2.82	0.43	7.57	88

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.12	2.04	2.07	0.68	3.01	103
	2.22	2.14	2.17	0.58	7.84	104
	2.34	2.26	2.29	0.46	8.59	102
	2.42	2.34	2.37	0.34	8.07	87
	2.51	2.43	2.46	0.38	7.49	89
	2.72	2.64	2.67	0.39	6.47	90
20%	2.12	2.04	2.07	0.85	3.27	101

Table 9-15: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexD.3

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Wexford Location D.3	
Bed Level (MSL): -1.037m	
Bed Level (OD Malin OSGM02): -1.116m	
Bed Level (OD Malin OSGM15): -1.083m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2016)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Combined Wave Component describes the combination of wind waves and swell waves
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.62	0.54	0.57	0.61	2.53	110
	0.72	0.64	0.67	0.57	2.47	112
	0.84	0.76	0.79	0.49	2.40	115
	0.92	0.84	0.87	0.42	2.19	119
	1.01	0.93	0.96	0.36	2.12	122
	1.22	1.14	1.17	0.25	1.85	110
20%	0.62	0.54	0.57	0.67	2.77	109
	0.84	0.76	0.79	0.61	2.52	112
	1.01	0.93	0.96	0.46	2.37	120
	1.13	1.05	1.08	0.38	2.15	122
	1.22	1.14	1.17	0.33	2.07	119
	1.31	1.23	1.26	0.28	1.90	112
10%	0.62	0.54	0.57	0.70	2.80	109
	0.84	0.76	0.79	0.69	2.76	111
	1.01	0.93	0.96	0.57	2.48	116
	1.22	1.14	1.17	0.41	2.18	121
	1.31	1.23	1.26	0.35	2.11	118
	1.43	1.35	1.38	0.28	2.22	109
5%	0.62	0.54	0.57	0.73	2.81	109
	0.84	0.76	0.79	0.75	2.83	110
	1.01	0.93	0.96	0.66	2.73	114
	1.22	1.14	1.17	0.48	2.42	122
	1.43	1.35	1.38	0.34	2.10	116
	1.52	1.44	1.47	0.27	6.54	101
2%	0.62	0.54	0.57	0.75	2.80	110
	0.84	0.76	0.79	0.80	2.88	109
	1.01	0.93	0.96	0.78	2.85	111
	1.22	1.14	1.17	0.63	2.66	117
	1.43	1.35	1.38	0.44	2.35	123
	1.60	1.52	1.55	0.33	2.05	107
1%	0.62	0.54	0.57	0.77	2.78	110
	0.84	0.76	0.79	0.83	2.92	109
	1.01	0.93	0.96	0.83	2.92	109
	1.22	1.14	1.17	0.73	2.82	116
	1.43	1.35	1.38	0.54	2.48	123
	1.71	1.63	1.66	0.32	6.69	105
0.5%	0.62	0.54	0.57	0.79	2.76	111
	0.84	0.76	0.79	0.85	2.93	110
	1.01	0.93	0.96	0.87	3.07	109
	1.22	1.14	1.17	0.83	2.91	113
	1.52	1.44	1.47	0.56	2.51	124
	1.79	1.71	1.74	0.34	6.93	105
0.1%	0.72	0.64	0.67	0.87	2.73	113
	0.92	0.84	0.87	0.92	3.03	111
	1.13	1.05	1.08	0.95	3.19	109
	1.31	1.23	1.26	0.95	3.20	111
	1.60	1.52	1.55	0.73	2.83	121
	1.87	1.79	1.82	0.40	7.57	119

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.12	1.04	1.07	0.37	2.80	114
	1.22	1.14	1.17	0.31	2.70	118
	1.34	1.26	1.29	0.53	2.47	122
	1.42	1.34	1.37	0.45	2.39	123
	1.51	1.43	1.46	0.39	2.16	119
	1.72	1.64	1.67	0.27	6.46	100
20%	1.12	1.04	1.07	0.82	2.90	111
	1.34	1.26	1.29	0.68	2.78	118
	1.51	1.43	1.46	0.50	2.45	124
	1.63	1.55	1.58	0.41	2.20	118
	1.72	1.64	1.67	0.29	7.34	94
	1.81	1.73	1.76	0.28	6.54	96
10%	1.12	1.04	1.07	0.87	3.06	110
	1.34	1.26	1.29	0.79	2.87	116
	1.51	1.43	1.46	0.61	2.66	122
	1.72	1.64	1.67	0.43	5.58	116
	1.81	1.73	1.76	0.32	7.41	94
	1.93	1.85	1.88	0.29	6.52	94
5%	1.12	1.04	1.07	0.90	3.15	109
	1.34	1.26	1.29	0.88	3.09	114
	1.51	1.43	1.46	0.72	2.82	121
	1.72	1.64	1.67	0.50	2.44	125
	1.93	1.85	1.88	0.34	7.35	98
	2.02	1.94	1.97	0.31	6.54	95
2%	1.12	1.04	1.07	0.94	3.19	109
	1.34	1.26	1.29	0.97	3.22	111
	1.51	1.43	1.46	0.88	3.10	116
	1.72	1.64	1.67	0.66	2.78	122
	1.93	1.85	1.88	0.43	7.68	118
	2.10	2.02	2.05	0.34	6.89	94
1%	1.12	1.04	1.07	0.96	3.19	110
	1.34	1.26	1.29	1.01	3.25	110
	1.51	1.43	1.46	0.97	3.22	114
	1.72	1.64	1.67	0.79	2.88	122
	1.93	1.85	1.88	0.53	8.59	122
	2.21	2.13	2.16	0.35	6.70	95
0.5%	1.12	1.04	1.07	0.99	3.18	110
	1.34	1.26	1.29	1.04	3.25	110
	1.51	1.43	1.46	1.04	3.27	111
	1.72	1.64	1.67	0.92	3.18	118
	2.02	1.94	1.97	0.54	8.60	122
	2.29	2.21	2.24	0.38	6.95	98
0.1%	1.22	1.14	1.17	1.08	3.16	112
	1.42	1.34	1.37	1.11	3.27	110
	1.63	1.55	1.58	1.13	3.35	110
	1.81	1.73	1.76	1.09	3.32	115
	2.10	2.02	2.05	0.77	2.86	123
	2.37	2.29	2.32	0.34	7.57	91

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.62	1.54	1.57	0.79	2.87	119
	1.72	1.64	1.67	0.68	2.79	123
	1.84	1.76	1.79	0.55	2.51	122
	1.92	1.84	1.87	0.46	2.44	118
	2.01	1.93	1.96	0.31	7.48	96
	2.22	2.14	2.17	0.34	6.46	94
20%	1.62	1.54	1.57	0.49	3.19	116
	1.84	1.76	1.79	0.72	2.82	123
	2.01	1.93	1.96	0.46	8.54	122
	2.13	2.05	2.08	0.33	7.51	92
	2.22	2.14	2.17	0.36	7.34	94
	2.31	2.23	2.26	0.36	6.54	93
10%	1.62	1.54	1.57	1.02	3.25	114
	1.84	1.76	1.79	0.85	3.03	121
	2.01	1.93	1.96	0.62	2.74	123
	2.22	2.14	2.17	0.43	7.54	105
	2.31	2.23	2.26	0.38	7.41	94
	2.43	2.35	2.38	0.37	6.56	93
5%	1.62	1.54	1.57	1.07	3.29	112
	1.84	1.76	1.79	0.98	3.24	118
	2.01	1.93	1.96	0.76	2.85	124
	2.22	2.14	2.17	0.49	8.54	119
	2.43	2.35	2.38	0.39	7.35	93
	2.52	2.44	2.47	0.40	6.55	93
2%	1.62	1.54	1.57	1.13	3.35	110
	1.84	1.76	1.79	1.12	3.35	115
	2.01	1.93	1.96	0.94	3.20	121
	2.22	2.14	2.17	0.64	2.79	123
	2.43	2.35	2.38	0.36	7.68	92
	2.60	2.52	2.55	0.42	6.90	93
1%	1.62	1.54	1.57	1.15	3.38	110
	1.84	1.76	1.79	1.18	3.52	112
	2.01	1.93	1.96	1.09	3.31	117
	2.22	2.14	2.17	0.81	2.94	123
	2.43	2.35	2.38	0.54	8.59	117
	2.71	2.63	2.66	0.44	6.71	93
0.5%	1.62	1.54	1.57	1.18	3.40	110
	1.84	1.76	1.79	1.22	3.59	111
	2.01	1.93	1.96	1.19	3.55	115
	2.22	2.14	2.17	0.96	3.22	122
	2.52	2.44	2.47	0.54	8.60	117
	2.79	2.71	2.74	0.46	6.97	93
0.1%	1.72	1.64	1.67	1.28	3.51	111
	1.92	1.84	1.87	1.30	3.66	111
	2.13	2.05	2.08	1.30	3.69	114
	2.31	2.23	2.26	1.20	3.56	118
	2.60	2.52	2.55	0.71	9.67	119
	2.87	2.79	2.82	0.46	7.57	92

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.12	2.04	2.07	0.82	3.01	122
	2.22	2.14	2.17	0.69	2.81	121
	2.34	2.26	2.29	0.54	8.59	117
	2.42	2.34	2.37	0.36	8.03	91
	2.51	2.43	2.46	0.40	7.48	92
	2.72	2.64	2.67	0.41	6.47	93
20%	2.12	2.04	2.07	1.01	3.26	119
	2.34	2.26	2.29	0.72	2.84	122
	2.51	2.43	2.46	0.47	8.54	111
	2.63	2.55	2.58	0.44	7.51	92
	2.72	2.64	2.67	0.44	7.34	93
	2.81	2.73	2.76	0.45	6.54	93
10%	2.12	2.04	2.07	1.13	3.36	117
	2.34	2.26	2.29	0.86	3.12	122
	2.51	2.43	2.46	0.60	8.64	117
	2.72	2.64	2.67	0.47	7.54	93
	2.81	2.73	2.76	0.47	7.40	93
	2.93	2.85	2.88	0.46	6.55	92
5%	2.12	2.04	2.07	1.21	3.59	116
	2.34	2.26	2.29	1.03	3.26	122
	2.51	2.43	2.46	0.69	9.68	121
	2.72	2.64	2.67	0.41	8.54	91
	2.93	2.85	2.88	0.49	7.35	93
	3.02	2.94	2.97	0.49	6.58	92
2%	2.12	2.04	2.07	1.29	3.68	113
	2.34	2.26	2.29	1.23	3.62	118
	2.51	2.43	2.46	0.96	3.22	122
	2.72	2.64	2.67	0.64	8.70	117
	2.93	2.85	2.88	0.48	7.68	92
	3.10	3.02	3.05	0.52	6.92	92
1%	2.12	2.04	2.07	1.33	3.71	112
	2.34	2.26	2.29	1.33	3.73	116
	2.51	2.43	2.46	1.14	3.39	121
	2.72	2.64	2.67	0.76	9.83	119
	2.93	2.85	2.88	0.46	8.59	91
	3.21	3.13	3.16	0.54	6.71	92
0.5%	2.12	2.04	2.07	1.37	3.72	111
	2.34	2.26	2.29	1.39	3.75	114
	2.51	2.43	2.46	1.30	3.70	118
	2.72	2.64	2.67	0.95	3.23	121
	3.02	2.94	2.97	0.47	8.60	91
	3.29	3.21	3.24	0.56	6.99	92
0.1%	2.22	2.14	2.17	1.48	3.73	111
	2.42	2.34	2.37	1.50	3.79	112
	2.63	2.55	2.58	1.45	3.80	116
	2.81	2.73	2.76	1.24	3.63	120
	3.10	3.02	3.05	0.75	9.67	115
	3.37	3.29	3.32	0.58	7.57	92

Table 9-16: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexD.4

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Wexford Location D.4	
Bed Level (MSL): -1.978m	
Bed Level (OD Malin OSGM02): -2.057m	
Bed Level (OD Malin OSGM15): -2.024m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2003)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Combined Wave Component describes the combination of wind waves and swell waves
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.62	0.54	0.57	0.57	2.48	114
	0.72	0.64	0.67	0.55	2.45	115
	0.84	0.76	0.79	0.48	2.36	118
	0.92	0.84	0.87	0.41	2.17	122
	1.01	0.93	0.96	0.35	2.11	124
	1.22	1.14	1.17	0.24	2.64	109
20%	0.62	0.54	0.57	0.62	2.64	114
	0.84	0.76	0.79	0.59	2.49	116
	1.01	0.93	0.96	0.45	2.35	123
	1.13	1.05	1.08	0.38	2.14	124
	1.22	1.14	1.17	0.32	2.04	119
	1.31	1.23	1.26	0.28	2.33	110
10%	0.62	0.54	0.57	0.65	2.71	115
	0.84	0.76	0.79	0.65	2.69	114
	1.01	0.93	0.96	0.55	2.46	120
	1.22	1.14	1.17	0.40	2.16	123
	1.31	1.23	1.26	0.34	2.09	118
	1.43	1.35	1.38	0.27	4.10	107
5%	0.62	0.54	0.57	0.68	2.71	117
	0.84	0.76	0.79	0.69	2.79	114
	1.01	0.93	0.96	0.64	2.67	117
	1.22	1.14	1.17	0.47	2.41	125
	1.43	1.35	1.38	0.33	3.01	116
	1.52	1.44	1.47	0.26	6.54	98
2%	0.62	0.54	0.57	0.72	2.66	119
	0.84	0.76	0.79	0.75	2.81	115
	1.01	0.93	0.96	0.73	2.81	115
	1.22	1.14	1.17	0.61	2.60	121
	1.43	1.35	1.38	0.43	2.33	124
	1.60	1.52	1.55	0.31	4.71	104
1%	0.62	0.54	0.57	0.76	2.54	120
	0.84	0.76	0.79	0.78	2.80	116
	1.01	0.93	0.96	0.78	2.85	114
	1.22	1.14	1.17	0.71	2.80	119
	1.43	1.35	1.38	0.53	2.46	125
	1.71	1.63	1.66	0.31	6.70	102
0.5%	0.62	0.54	0.57	0.79	2.44	122
	0.84	0.76	0.79	0.82	2.76	118
	1.01	0.93	0.96	0.82	2.89	114
	1.22	1.14	1.17	0.79	2.86	117
	1.52	1.44	1.47	0.55	2.49	126
	1.79	1.71	1.74	0.33	6.96	102
0.1%	0.72	0.64	0.67	0.91	2.44	123
	0.92	0.84	0.87	0.91	2.74	120
	1.13	1.05	1.08	0.91	3.07	115
	1.31	1.23	1.26	0.90	3.13	115
	1.60	1.52	1.55	0.71	2.81	124
	1.87	1.79	1.82	0.39	7.57	118

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.12	1.04	1.07	0.57	2.77	118
	1.22	1.14	1.17	0.55	2.64	121
	1.34	1.26	1.29	0.52	2.45	125
	1.42	1.34	1.37	0.45	2.37	124
	1.51	1.43	1.46	0.38	3.08	120
	1.72	1.64	1.67	0.27	6.46	96
20%	1.12	1.04	1.07	0.78	2.86	115
	1.34	1.26	1.29	0.66	2.75	121
	1.51	1.43	1.46	0.50	2.44	126
	1.63	1.55	1.58	0.40	3.53	118
	1.72	1.64	1.67	0.28	7.34	89
	1.81	1.73	1.76	0.28	6.54	92
10%	1.12	1.04	1.07	0.82	2.91	114
	1.34	1.26	1.29	0.76	2.84	120
	1.51	1.43	1.46	0.60	2.63	124
	1.72	1.64	1.67	0.41	4.81	117
	1.81	1.73	1.76	0.31	7.41	90
	1.93	1.85	1.88	0.29	6.52	91
5%	1.12	1.04	1.07	0.86	3.00	114
	1.34	1.26	1.29	0.84	2.98	117
	1.51	1.43	1.46	0.70	2.80	124
	1.72	1.64	1.67	0.49	3.50	125
	1.93	1.85	1.88	0.33	7.36	93
	2.02	1.94	1.97	0.31	6.54	91
2%	1.12	1.04	1.07	0.90	3.06	115
	1.34	1.26	1.29	0.91	3.16	115
	1.51	1.43	1.46	0.85	3.04	120
	1.72	1.64	1.67	0.65	2.76	125
	1.93	1.85	1.88	0.42	6.62	118
	2.10	2.02	2.05	0.33	6.91	91
1%	1.12	1.04	1.07	0.93	3.04	117
	1.34	1.26	1.29	0.96	3.19	115
	1.51	1.43	1.46	0.93	3.18	117
	1.72	1.64	1.67	0.77	2.86	125
	1.93	1.85	1.88	0.51	7.03	123
	2.21	2.13	2.16	0.35	6.71	91
0.5%	1.12	1.04	1.07	0.97	2.96	118
	1.34	1.26	1.29	1.00	3.19	116
	1.51	1.43	1.46	0.99	3.23	115
	1.72	1.64	1.67	0.89	3.14	121
	2.02	1.94	1.97	0.52	8.60	122
	2.29	2.21	2.24	0.38	6.98	94
0.1%	1.22	1.14	1.17	1.09	2.90	120
	1.42	1.34	1.37	1.09	3.18	117
	1.63	1.55	1.58	1.08	3.28	115
	1.81	1.73	1.76	1.04	3.28	119
	2.10	2.02	2.05	0.75	2.85	125
	2.37	2.29	2.32	0.34	7.57	87

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.62	1.54	1.57	0.77	2.85	123
	1.72	1.64	1.67	0.66	2.77	125
	1.84	1.76	1.79	0.53	4.03	123
	1.92	1.84	1.87	0.44	3.86	118
	2.01	1.93	1.96	0.29	7.48	89
	2.22	2.14	2.17	0.33	6.46	90
20%	1.62	1.54	1.57	0.79	3.16	119
	1.84	1.76	1.79	0.70	2.81	125
	2.01	1.93	1.96	0.45	8.54	121
	2.13	2.05	2.08	0.32	7.51	88
	2.22	2.14	2.17	0.36	7.35	90
	2.31	2.23	2.26	0.36	6.55	90
10%	1.62	1.54	1.57	0.97	3.22	118
	1.84	1.76	1.79	0.82	2.99	124
	2.01	1.93	1.96	0.61	3.77	123
	2.22	2.14	2.17	0.40	7.54	99
	2.31	2.23	2.26	0.38	7.41	90
	2.43	2.35	2.38	0.37	6.57	89
5%	1.62	1.54	1.57	1.02	3.25	116
	1.84	1.76	1.79	0.95	3.22	121
	2.01	1.93	1.96	0.74	2.84	126
	2.22	2.14	2.17	0.49	8.54	117
	2.43	2.35	2.38	0.39	7.36	89
	2.52	2.44	2.47	0.39	6.56	89
2%	1.62	1.54	1.57	1.08	3.28	115
	1.84	1.76	1.79	1.06	3.31	119
	2.01	1.93	1.96	0.91	3.18	124
	2.22	2.14	2.17	0.62	4.28	123
	2.43	2.35	2.38	0.36	7.69	87
	2.60	2.52	2.55	0.42	6.93	90
1%	1.62	1.54	1.57	1.11	3.28	115
	1.84	1.76	1.79	1.13	3.38	116
	2.01	1.93	1.96	1.05	3.28	121
	2.22	2.14	2.17	0.78	4.12	125
	2.43	2.35	2.38	0.53	8.59	115
	2.71	2.63	2.66	0.44	6.72	89
0.5%	1.62	1.54	1.57	1.15	3.27	116
	1.84	1.76	1.79	1.18	3.44	115
	2.01	1.93	1.96	1.13	3.45	119
	2.22	2.14	2.17	0.94	3.21	124
	2.52	2.44	2.47	0.54	8.60	116
	2.79	2.71	2.74	0.46	7.01	89
0.1%	1.72	1.64	1.67	1.27	3.26	118
	1.92	1.84	1.87	1.27	3.55	116
	2.13	2.05	2.08	1.24	3.64	117
	2.31	2.23	2.26	1.16	3.52	121
	2.60	2.52	2.55	0.69	9.67	119
	2.87	2.79	2.82	0.46	7.57	88

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.12	2.04	2.07	0.80	2.96	124
	2.22	2.14	2.17	0.66	3.85	123
	2.34	2.26	2.29	0.53	8.59	117
	2.42	2.34	2.37	0.35	8.06	87
	2.51	2.43	2.46	0.40	7.48	88
	2.72	2.64	2.67	0.41	6.47	89
20%	2.12	2.04	2.07	0.98	3.24	122
	2.34	2.26	2.29	0.66	4.39	123
	2.51	2.43	2.46	0.44	8.54	103
	2.63	2.55	2.58	0.43	7.51	89
	2.72	2.64	2.67	0.44	7.35	89
	2.81	2.73	2.76	0.45	6.54	89
10%	2.12	2.04	2.07	1.09	3.33	121
	2.34	2.26	2.29	0.84	4.29	124
	2.51	2.43	2.46	0.58	8.64	117
	2.72	2.64	2.67	0.46	7.54	89
	2.81	2.73	2.76	0.47	7.41	89
	2.93	2.85	2.88	0.46	6.55	89
5%	2.12	2.04	2.07	1.16	3.53	119
	2.34	2.26	2.29	1.00	3.24	124
	2.51	2.43	2.46	0.67	9.68	121
	2.72	2.64	2.67	0.40	8.54	87
	2.93	2.85	2.88	0.49	7.36	89
	3.02	2.94	2.97	0.49	6.59	89
2%	2.12	2.04	2.07	1.24	3.63	117
	2.34	2.26	2.29	1.18	3.58	121
	2.51	2.43	2.46	0.94	3.21	124
	2.72	2.64	2.67	0.63	8.70	116
	2.93	2.85	2.88	0.47	7.69	88
	3.10	3.02	3.05	0.52	6.96	89
1%	2.12	2.04	2.07	1.29	3.65	116
	2.34	2.26	2.29	1.28	3.69	119
	2.51	2.43	2.46	1.11	3.36	123
	2.72	2.64	2.67	0.73	9.83	119
	2.93	2.85	2.88	0.46	8.59	87
	3.21	3.13	3.16	0.54	6.73	89
0.5%	2.12	2.04	2.07	1.33	3.66	116
	2.34	2.26	2.29	1.34	3.71	118
	2.51	2.43	2.46	1.25	3.67	121
	2.72	2.64	2.67	0.91	4.91	122
	3.02	2.94	2.97	0.47	8.60	87
	3.29	3.21	3.24	0.56	7.03	89
0.1%	2.22	2.14	2.17	1.45	3.67	117
	2.42	2.34	2.37	1.45	3.74	116
	2.63	2.55	2.58	1.39	3.76	119
	2.81	2.73	2.76	1.20	3.62	122
	3.10	3.02	3.05	0.74	9.67	114
	3.37	3.29	3.32	0.58	7.57	89

Table 9-17: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexD.5

<b>Wexford Coastal Wave &amp; Water Level Modelling Study (CWWS)</b>	
<b>Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)</b>	
<b>Output:</b> Shoreline Wave Climate and Water Level Combinations	
<b>Location:</b> Wexford Location D.5	
<b>Bed Level (MSL):</b> -0.662m	
<b>Bed Level (OD Malin OSGM02):</b> -0.741m	
<b>Bed Level (OD Malin OSGM15):</b> -0.708m	
<b>Dated:</b> October 2020	
<b>Joint Probability Event (AEP):</b> Varies from 50% to 0.1%	
<b>Prepared By:</b> ZM	<b>Checked By:</b> CN
<b>Table Reference:</b> CWWS_CAPO_SE_Wexford	

<b>Notes:</b>	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2002)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Combined Wave Component describes the combination of wind waves and swell waves
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.62	0.54	0.57	0.54	2.48	107
	0.72	0.64	0.67	0.53	2.45	110
	0.84	0.76	0.79	0.46	2.36	115
	0.92	0.84	0.87	0.40	2.17	119
	1.01	0.93	0.96	0.34	2.10	121
	1.22	1.14	1.17	0.23	6.46	105
20%	0.62	0.54	0.57	0.57	2.57	106
	0.84	0.76	0.79	0.57	2.50	111
	1.01	0.93	0.96	0.44	2.34	119
	1.13	1.05	1.08	0.37	2.13	120
	1.22	1.14	1.17	0.32	2.00	116
	1.31	1.23	1.26	0.27	2.32	105
10%	0.62	0.54	0.57	0.59	2.61	107
	0.84	0.76	0.79	0.62	2.69	109
	1.01	0.93	0.96	0.54	2.46	116
	1.22	1.14	1.17	0.39	2.16	120
	1.31	1.23	1.26	0.34	2.07	115
	1.43	1.35	1.38	0.26	6.52	101
5%	0.62	0.54	0.57	0.60	2.57	108
	0.84	0.76	0.79	0.65	2.77	108
	1.01	0.93	0.96	0.62	2.69	113
	1.22	1.14	1.17	0.46	2.40	121
	1.43	1.35	1.38	0.32	7.35	112
	1.52	1.44	1.47	0.26	6.54	93
2%	0.62	0.54	0.57	0.62	2.49	110
	0.84	0.76	0.79	0.69	2.78	108
	1.01	0.93	0.96	0.70	2.81	110
	1.22	1.14	1.17	0.60	2.61	117
	1.43	1.35	1.38	0.43	2.31	121
	1.60	1.52	1.55	0.30	6.87	99
1%	0.62	0.54	0.57	0.63	2.44	111
	0.84	0.76	0.79	0.70	2.75	109
	1.01	0.93	0.96	0.73	2.85	108
	1.22	1.14	1.17	0.70	2.81	115
	1.43	1.35	1.38	0.52	2.47	121
	1.71	1.63	1.66	0.31	6.69	97
0.5%	0.62	0.54	0.57	0.65	2.40	112
	0.84	0.76	0.79	0.72	2.70	110
	1.01	0.93	0.96	0.76	2.86	108
	1.22	1.14	1.17	0.76	2.88	112
	1.52	1.44	1.47	0.54	2.49	122
	1.79	1.71	1.74	0.34	6.92	98
0.1%	0.72	0.64	0.67	0.72	2.40	114
	0.92	0.84	0.87	0.78	2.67	112
	1.13	1.05	1.08	0.83	2.95	109
	1.31	1.23	1.26	0.85	3.12	110
	1.60	1.52	1.55	0.71	2.82	120
	1.87	1.79	1.82	0.39	7.57	111

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.12	1.04	1.07	0.57	2.78	114
	1.22	1.14	1.17	0.61	2.65	117
	1.34	1.26	1.29	0.52	2.46	121
	1.42	1.34	1.37	0.44	2.36	121
	1.51	1.43	1.46	0.37	5.97	116
	1.72	1.64	1.67	0.27	6.46	91
20%	1.12	1.04	1.07	0.75	2.86	110
	1.34	1.26	1.29	0.65	2.75	118
	1.51	1.43	1.46	0.49	2.44	122
	1.63	1.55	1.58	0.38	7.51	113
	1.72	1.64	1.67	0.27	7.34	85
	1.81	1.73	1.76	0.28	6.54	88
10%	1.12	1.04	1.07	0.78	2.91	109
	1.34	1.26	1.29	0.75	2.85	116
	1.51	1.43	1.46	0.59	2.62	121
	1.72	1.64	1.67	0.39	7.54	111
	1.81	1.73	1.76	0.31	7.41	86
	1.93	1.85	1.88	0.29	6.52	87
5%	1.12	1.04	1.07	0.80	2.94	109
	1.34	1.26	1.29	0.82	3.03	113
	1.51	1.43	1.46	0.70	2.81	120
	1.72	1.64	1.67	0.48	3.03	121
	1.93	1.85	1.88	0.32	7.35	87
	2.02	1.94	1.97	0.31	6.55	87
2%	1.12	1.04	1.07	0.82	2.93	109
	1.34	1.26	1.29	0.87	3.15	110
	1.51	1.43	1.46	0.84	3.07	116
	1.72	1.64	1.67	0.65	2.76	121
	1.93	1.85	1.88	0.42	7.68	111
	2.10	2.02	2.05	0.34	6.88	87
1%	1.12	1.04	1.07	0.84	2.89	110
	1.34	1.26	1.29	0.90	3.17	110
	1.51	1.43	1.46	0.90	3.19	113
	1.72	1.64	1.67	0.76	2.87	120
	1.93	1.85	1.88	0.49	8.59	117
	2.21	2.13	2.16	0.35	6.70	87
0.5%	1.12	1.04	1.07	0.86	2.85	111
	1.34	1.26	1.29	0.92	3.15	110
	1.51	1.43	1.46	0.94	3.22	111
	1.72	1.64	1.67	0.88	3.16	117
	2.02	1.94	1.97	0.51	8.60	115
	2.29	2.21	2.24	0.39	6.94	89
0.1%	1.22	1.14	1.17	0.94	2.83	113
	1.42	1.34	1.37	0.99	3.14	112
	1.63	1.55	1.58	1.02	3.27	111
	1.81	1.73	1.76	1.02	3.30	115
	2.10	2.02	2.05	0.75	2.86	121
	2.37	2.29	2.32	0.36	7.57	84

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.62	1.54	1.57	0.76	2.86	119
	1.72	1.64	1.67	0.66	2.78	121
	1.84	1.76	1.79	0.52	8.59	118
	1.92	1.84	1.87	0.43	8.02	111
	2.01	1.93	1.96	0.30	7.49	84
	2.22	2.14	2.17	0.34	6.47	86
20%	1.62	1.54	1.57	0.79	3.17	115
	1.84	1.76	1.79	0.70	2.81	121
	2.01	1.93	1.96	0.45	8.54	113
	2.13	2.05	2.08	0.38	7.51	84
	2.22	2.14	2.17	0.36	7.34	86
	2.31	2.23	2.26	0.36	6.55	86
10%	1.62	1.54	1.57	0.94	3.23	114
	1.84	1.76	1.79	0.82	3.01	120
	2.01	1.93	1.96	0.60	8.64	118
	2.22	2.14	2.17	0.39	7.54	90
	2.31	2.23	2.26	0.39	7.41	86
	2.43	2.35	2.38	0.38	6.58	85
5%	1.62	1.54	1.57	0.98	3.26	112
	1.84	1.76	1.79	0.94	3.23	117
	2.01	1.93	1.96	0.74	2.85	122
	2.22	2.14	2.17	0.50	8.54	110
	2.43	2.35	2.38	0.40	7.35	86
	2.52	2.44	2.47	0.40	6.56	86
2%	1.62	1.54	1.57	1.02	3.27	111
	1.84	1.76	1.79	1.04	3.32	114
	2.01	1.93	1.96	0.91	3.19	120
	2.22	2.14	2.17	0.61	8.70	116
	2.43	2.35	2.38	0.38	7.68	84
	2.60	2.52	2.55	0.43	6.90	86
1%	1.62	1.54	1.57	1.04	3.26	111
	1.84	1.76	1.79	1.08	3.39	112
	2.01	1.93	1.96	1.04	3.30	116
	2.22	2.14	2.17	0.78	3.59	121
	2.43	2.35	2.38	0.54	8.59	108
	2.71	2.63	2.66	0.45	6.71	86
0.5%	1.62	1.54	1.57	1.06	3.24	111
	1.84	1.76	1.79	1.12	3.42	111
	2.01	1.93	1.96	1.11	3.49	114
	2.22	2.14	2.17	0.94	3.22	120
	2.52	2.44	2.47	0.55	8.60	108
	2.79	2.71	2.74	0.47	6.96	86
0.1%	1.72	1.64	1.67	1.15	3.22	113
	1.92	1.84	1.87	1.19	3.49	112
	2.13	2.05	2.08	1.20	3.64	113
	2.31	2.23	2.26	1.15	3.54	116
	2.60	2.52	2.55	0.69	9.67	112
	2.87	2.79	2.82	0.48	7.57	85

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.12	2.04	2.07	0.81	2.97	120
	2.22	2.14	2.17	0.64	8.76	117
	2.34	2.26	2.29	0.54	8.59	109
	2.42	2.34	2.37	0.38	8.02	84
	2.51	2.43	2.46	0.41	7.49	85
	2.72	2.64	2.67	0.42	6.47	86
20%	2.12	2.04	2.07	0.98	3.25	118
	2.34	2.26	2.29	0.65	8.99	116
	2.51	2.43	2.46	0.41	8.54	89
	2.63	2.55	2.58	0.45	7.51	85
	2.72	2.64	2.67	0.46	7.34	86
	2.81	2.73	2.76	0.46	6.55	85
10%	2.12	2.04	2.07	1.08	3.34	116
	2.34	2.26	2.29	0.84	4.85	120
	2.51	2.43	2.46	0.59	8.65	109
	2.72	2.64	2.67	0.48	7.54	86
	2.81	2.73	2.76	0.48	7.41	86
	2.93	2.85	2.88	0.47	6.57	85
5%	2.12	2.04	2.07	1.14	3.55	115
	2.34	2.26	2.29	1.00	3.25	120
	2.51	2.43	2.46	0.66	9.68	114
	2.72	2.64	2.67	0.44	8.54	84
	2.93	2.85	2.88	0.50	7.35	86
	3.02	2.94	2.97	0.50	6.60	85
2%	2.12	2.04	2.07	1.20	3.64	113
	2.34	2.26	2.29	1.17	3.59	116
	2.51	2.43	2.46	0.94	3.22	120
	2.72	2.64	2.67	0.65	8.70	108
	2.93	2.85	2.88	0.50	7.68	85
	3.10	3.02	3.05	0.54	6.92	86
1%	2.12	2.04	2.07	1.23	3.65	112
	2.34	2.26	2.29	1.25	3.70	115
	2.51	2.43	2.46	1.11	3.38	119
	2.72	2.64	2.67	0.74	9.83	112
	2.93	2.85	2.88	0.49	8.59	84
	3.21	3.13	3.16	0.55	6.72	85
0.5%	2.12	2.04	2.07	1.26	3.65	112
	2.34	2.26	2.29	1.30	3.72	114
	2.51	2.43	2.46	1.24	3.68	116
	2.72	2.64	2.67	0.90	9.90	117
	3.02	2.94	2.97	0.51	8.60	84
	3.29	3.21	3.24	0.58	6.99	86
0.1%	2.22	2.14	2.17	1.35	3.64	113
	2.42	2.34	2.37	1.39	3.74	113
	2.63	2.55	2.58	1.37	3.78	115
	2.81	2.73	2.76	1.21	3.63	118
	3.10	3.02	3.05	0.77	9.66	108
	3.37	3.29	3.32	0.61	7.57	86

Table 9-18: Shoreline Wave Climate and Water Level Combinations – Wexford Location WexD.6

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
<b>Output:</b> Shoreline Wave Climate and Water Level Combinations	
<b>Location:</b> Wexford Location D.6	
<b>Bed Level (MSL):</b> -1.529m	
<b>Bed Level (OD Malin OSGM02):</b> -1.608m	
<b>Bed Level (OD Malin OSGM15):</b> -1.575m	
<b>Dated:</b> October 2020	
<b>Joint Probability Event (AEP):</b> Varies from 50% to 0.1%	
<b>Prepared By:</b> ZM	<b>Checked By:</b> CN
<b>Table Reference:</b> CWWS_CAPO_SE_Wexford	

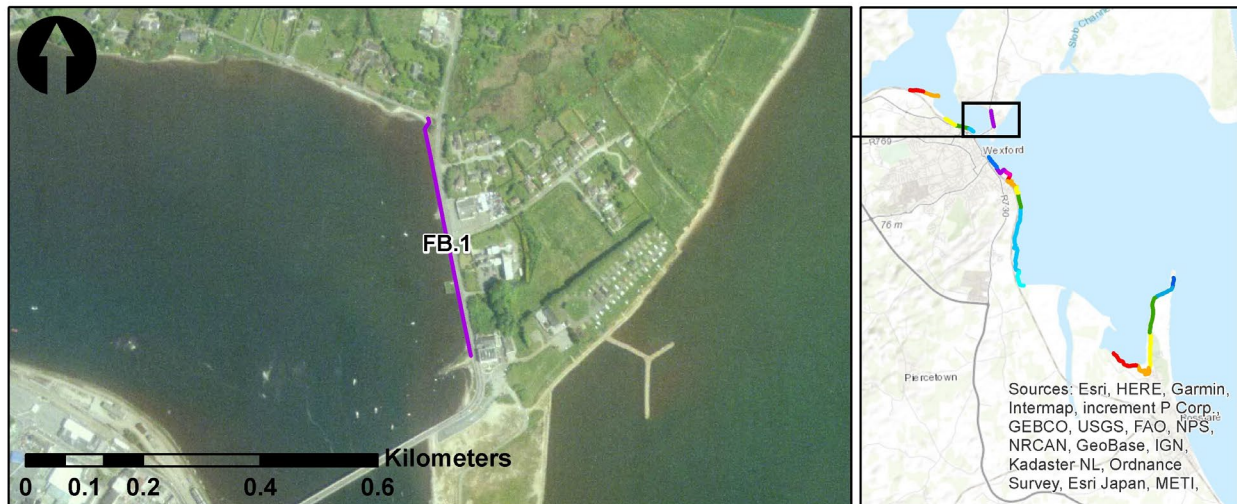
Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2002)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Combined Wave Component describes the combination of wind waves and swell waves
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.62	0.54	0.57	0.49	2.25	100
	0.72	0.64	0.67	0.45	2.17	98
	0.84	0.76	0.79	0.38	2.10	96
	0.92	0.84	0.87	0.33	2.01	95
	1.01	0.93	0.96	0.28	1.87	94
	1.22	1.14	1.17	0.17	6.46	84
20%	0.62	0.54	0.57	0.57	2.33	104
	0.84	0.76	0.79	0.48	2.31	98
	1.01	0.93	0.96	0.37	2.10	96
	1.13	1.05	1.08	0.30	1.93	94
	1.22	1.14	1.17	0.24	1.84	90
	1.31	1.23	1.26	0.20	6.53	83
10%	0.62	0.54	0.57	0.61	2.31	106
	0.84	0.76	0.79	0.55	2.41	99
	1.01	0.93	0.96	0.44	2.21	96
	1.22	1.14	1.17	0.31	2.01	93
	1.31	1.23	1.26	0.25	1.86	90
	1.43	1.35	1.38	0.20	6.51	80
5%	0.62	0.54	0.57	0.65	2.27	108
	0.84	0.76	0.79	0.62	2.45	101
	1.01	0.93	0.96	0.52	2.41	97
	1.22	1.14	1.17	0.39	2.13	95
	1.43	1.35	1.38	0.24	7.34	88
	1.52	1.44	1.47	0.22	6.54	75
2%	0.62	0.54	0.57	0.71	2.23	111
	0.84	0.76	0.79	0.69	2.46	105
	1.01	0.93	0.96	0.63	2.53	99
	1.22	1.14	1.17	0.49	2.38	96
	1.43	1.35	1.38	0.35	2.09	92
	1.60	1.52	1.55	0.22	6.82	78
1%	0.62	0.54	0.57	0.75	2.22	113
	0.84	0.76	0.79	0.74	2.43	107
	1.01	0.93	0.96	0.70	2.65	101
	1.22	1.14	1.17	0.58	2.48	96
	1.43	1.35	1.38	0.43	2.21	94
	1.71	1.63	1.66	0.23	6.67	74
0.5%	0.62	0.54	0.57	0.80	2.22	115
	0.84	0.76	0.79	0.79	2.42	110
	1.01	0.93	0.96	0.75	2.65	104
	1.22	1.14	1.17	0.67	2.70	98
	1.52	1.44	1.47	0.45	2.29	93
	1.79	1.71	1.74	0.26	6.87	74
0.1%	0.72	0.64	0.67	0.93	2.39	117
	0.92	0.84	0.87	0.90	2.45	112
	1.13	1.05	1.08	0.85	2.70	105
	1.31	1.23	1.26	0.80	2.80	99
	1.60	1.52	1.55	0.59	2.50	95
	1.87	1.79	1.82	0.31	7.57	83

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.12	1.04	1.07	0.50	2.46	96
	1.22	1.14	1.17	0.51	2.39	96
	1.34	1.26	1.29	0.42	2.19	95
	1.42	1.34	1.37	0.36	2.11	93
	1.51	1.43	1.46	0.28	7.48	88
	1.72	1.64	1.67	0.20	6.46	74
20%	1.12	1.04	1.07	0.67	2.68	99
	1.34	1.26	1.29	0.54	2.43	96
	1.51	1.43	1.46	0.40	2.16	93
	1.63	1.55	1.58	0.30	7.51	87
	1.72	1.64	1.67	0.18	7.33	70
	1.81	1.73	1.76	0.23	6.54	74
10%	1.12	1.04	1.07	0.73	2.72	101
	1.34	1.26	1.29	0.62	2.61	96
	1.51	1.43	1.46	0.49	2.38	94
	1.72	1.64	1.67	0.31	7.54	87
	1.81	1.73	1.76	0.20	7.40	70
	1.93	1.85	1.88	0.23	6.51	72
5%	1.12	1.04	1.07	0.78	2.72	103
	1.34	1.26	1.29	0.72	2.77	97
	1.51	1.43	1.46	0.58	2.48	95
	1.72	1.64	1.67	0.38	8.54	90
	1.93	1.85	1.88	0.24	7.35	70
	2.02	1.94	1.97	0.25	6.54	72
2%	1.12	1.04	1.07	0.84	2.70	105
	1.34	1.26	1.29	0.82	2.82	100
	1.51	1.43	1.46	0.71	2.77	96
	1.72	1.64	1.67	0.53	2.44	94
	1.93	1.85	1.88	0.33	7.66	84
	2.10	2.02	2.05	0.27	6.84	72
1%	1.12	1.04	1.07	0.89	2.66	107
	1.34	1.26	1.29	0.88	2.82	102
	1.51	1.43	1.46	0.80	2.85	97
	1.72	1.64	1.67	0.63	2.64	94
	1.93	1.85	1.88	0.40	8.59	88
	2.21	2.13	2.16	0.28	6.68	71
0.5%	1.12	1.04	1.07	0.94	2.61	109
	1.34	1.26	1.29	0.93	2.80	105
	1.51	1.43	1.46	0.88	2.95	99
	1.72	1.64	1.67	0.74	2.81	95
	2.02	1.94	1.97	0.41	8.60	88
	2.29	2.21	2.24	0.31	6.89	72
0.1%	1.22	1.14	1.17	1.08	2.67	112
	1.42	1.34	1.37	1.04	2.81	107
	1.63	1.55	1.58	0.98	3.10	101
	1.81	1.73	1.76	0.89	3.12	96
	2.10	2.02	2.05	0.61	2.58	91
	2.37	2.29	2.32	0.33	7.57	69

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.62	1.54	1.57	0.62	2.59	95
	1.72	1.64	1.67	0.55	2.45	94
	1.84	1.76	1.79	0.40	8.59	89
	1.92	1.84	1.87	0.34	7.96	84
	2.01	1.93	1.96	0.21	7.49	69
	2.22	2.14	2.17	0.26	6.46	71
20%	1.62	1.54	1.57	0.69	2.81	96
	1.84	1.76	1.79	0.58	2.49	93
	2.01	1.93	1.96	0.36	8.54	83
	2.13	2.05	2.08	0.24	7.51	69
	2.22	2.14	2.17	0.27	7.34	70
	2.31	2.23	2.26	0.29	6.54	71
10%	1.62	1.54	1.57	0.84	2.92	97
	1.84	1.76	1.79	0.67	2.74	94
	2.01	1.93	1.96	0.45	8.64	90
	2.22	2.14	2.17	0.31	7.54	70
	2.31	2.23	2.26	0.29	7.40	70
	2.43	2.35	2.38	0.30	6.55	71
5%	1.62	1.54	1.57	0.90	3.07	99
	1.84	1.76	1.79	0.79	2.86	94
	2.01	1.93	1.96	0.61	2.58	92
	2.22	2.14	2.17	0.34	8.54	76
	2.43	2.35	2.38	0.31	7.35	71
	2.52	2.44	2.47	0.32	6.55	71
2%	1.62	1.54	1.57	0.98	3.09	101
	1.84	1.76	1.79	0.92	3.14	96
	2.01	1.93	1.96	0.76	2.81	94
	2.22	2.14	2.17	0.47	8.70	88
	2.43	2.35	2.38	0.29	7.67	69
	2.60	2.52	2.55	0.34	6.86	71
1%	1.62	1.54	1.57	1.03	3.07	103
	1.84	1.76	1.79	1.00	3.18	98
	2.01	1.93	1.96	0.87	3.05	95
	2.22	2.14	2.17	0.62	6.28	91
	2.43	2.35	2.38	0.39	8.59	76
	2.71	2.63	2.66	0.36	6.69	71
0.5%	1.62	1.54	1.57	1.08	3.02	105
	1.84	1.76	1.79	1.07	3.18	101
	2.01	1.93	1.96	0.98	3.20	96
	2.22	2.14	2.17	0.77	2.84	93
	2.52	2.44	2.47	0.40	8.60	72
	2.79	2.71	2.74	0.38	6.93	71
0.1%	1.72	1.64	1.67	1.22	2.98	108
	1.92	1.84	1.87	1.18	3.18	103
	2.13	2.05	2.08	1.11	3.28	98
	2.31	2.23	2.26	0.97	3.21	93
	2.60	2.52	2.55	0.56	9.66	86
	2.87	2.79	2.82	0.38	7.57	70

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Combined Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.12	2.04	2.07	0.65	2.72	92
	2.22	2.14	2.17	0.49	8.76	88
	2.34	2.26	2.29	0.41	8.59	80
	2.42	2.34	2.37	0.29	7.97	69
	2.51	2.43	2.46	0.31	7.49	70
	2.72	2.64	2.67	0.33	6.47	70
20%	2.12	2.04	2.07	0.81	2.87	93



**Figure 9.5: Estimation Location for Ferrybank (FB)**

**Table 9-19: Co-ordinates for Estimation Locations for Ferrybank (FB)**

Location	Extraction Point	
	Latitude (°N)	Longitude (°W)
FB	52.3463	-6.4564

Location	Extraction Point (ITM)	
	Eastings [m]	Northings [m]
FB	705169	622756

Table 9-20: Shoreline Wave Climate and Water Level Combinations – Ferrybank Location FB

<b>Wexford Coastal Wave &amp; Water Level Modelling Study (CWWS)</b>	
<b>Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)</b>	
<b>Output:</b> Shoreline Wave Climate and Water Level Combinations	
<b>Location:</b> Ferrybank Location FB.1	
<b>Bed Level (MSL):</b> -0.730m MSL	
<b>Bed Level (OD Malin OSGM02):</b> -0.809m	
<b>Bed Level (OD Malin OSGM15):</b> -0.776m	
<b>Dated:</b> October 2020	
<b>Joint Probability Event (AEP):</b> Varies from 50% to 0.1%	
<b>Prepared By:</b> ZM	<b>Checked By:</b> CN
<b>Table Reference:</b> CWWS_CAPO_SE_Wexford	

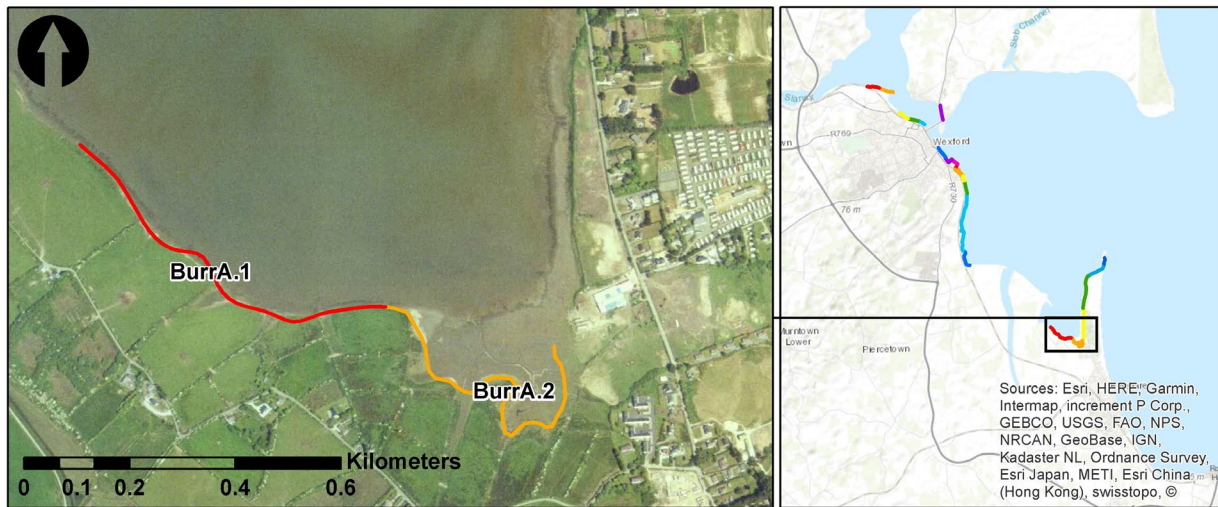
Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2006)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.67	0.59	0.63	0.42	2.05	270
	0.90	0.82	0.85	0.34	1.86	272
	1.01	0.93	0.96	0.32	1.85	272
	1.14	1.06	1.10	0.29	1.83	273
	1.25	1.17	1.20	0.22	1.61	272
	1.34	1.26	1.29	0.21	1.60	274
20%	0.67	0.59	0.63	0.49	2.14	270
	0.90	0.82	0.85	0.42	2.06	272
	1.14	1.06	1.10	0.33	1.85	272
	1.25	1.17	1.20	0.29	1.81	273
	1.34	1.26	1.29	0.26	1.69	271
	1.48	1.40	1.43	0.21	1.59	276
10%	0.67	0.59	0.63	0.52	2.21	269
	0.90	0.82	0.85	0.49	2.14	271
	1.14	1.06	1.10	0.39	1.98	273
	1.34	1.26	1.29	0.34	1.92	273
	1.48	1.40	1.43	0.25	1.70	275
	1.58	1.50	1.53	0.22	1.61	275
5%	0.81	0.73	0.76	0.58	2.37	269
	1.01	0.93	0.96	0.53	2.31	269
	1.25	1.17	1.20	0.42	2.10	271
	1.48	1.40	1.43	0.31	1.84	275
	1.58	1.50	1.53	0.27	1.77	275
	1.67	1.59	1.62	0.23	1.63	275
2%	0.81	0.73	0.76	0.62	2.43	268
	1.01	0.93	0.96	0.59	2.37	270
	1.25	1.17	1.20	0.49	2.14	272
	1.48	1.40	1.43	0.41	2.10	272
	1.67	1.59	1.62	0.30	1.83	275
	1.79	1.71	1.74	0.25	1.68	275
1%	0.81	0.73	0.76	0.64	2.46	267
	1.01	0.93	0.96	0.65	2.45	269
	1.25	1.17	1.20	0.57	2.37	270
	1.48	1.40	1.43	0.47	2.18	271
	1.67	1.59	1.62	0.36	1.92	274
	1.88	1.80	1.83	0.26	1.76	275
0.5%	0.90	0.82	0.85	0.69	2.55	267
	1.14	1.06	1.10	0.67	2.45	270
	1.34	1.26	1.29	0.60	2.41	270
	1.58	1.50	1.53	0.46	2.13	273
	1.79	1.71	1.74	0.36	1.93	275
	1.97	1.89	1.92	0.30	1.88	274
0.1%	0.90	0.82	0.85	0.73	2.72	265
	1.14	1.06	1.10	0.78	2.73	268
	1.34	1.26	1.29	0.75	2.65	269
	1.58	1.50	1.53	0.63	2.42	272
	1.79	1.71	1.74	0.54	2.36	272
	1.97	1.89	1.92	0.44	2.16	273

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.17	1.09	1.13	0.44	2.10	272
	1.40	1.32	1.35	0.39	2.06	273
	1.51	1.43	1.46	0.34	1.97	273
	1.64	1.56	1.60	0.29	1.80	274
	1.75	1.67	1.70	0.23	1.64	276
	1.84	1.76	1.79	0.21	1.57	276
20%	1.17	1.09	1.13	0.52	2.18	272
	1.40	1.32	1.35	0.45	2.12	272
	1.64	1.56	1.60	0.34	1.88	275
	1.75	1.67	1.70	0.30	1.83	275
	1.84	1.76	1.79	0.26	1.74	275
	1.98	1.90	1.93	0.23	1.68	275
10%	1.17	1.09	1.13	0.57	2.32	271
	1.40	1.32	1.35	0.53	2.29	272
	1.64	1.56	1.60	0.40	2.05	274
	1.84	1.76	1.79	0.34	1.85	275
	1.98	1.90	1.93	0.28	1.83	275
	2.08	2.00	2.03	0.25	1.81	275
5%	1.31	1.23	1.26	0.63	2.41	271
	1.51	1.43	1.46	0.56	2.37	271
	1.75	1.67	1.70	0.42	2.08	274
	1.98	1.90	1.93	0.34	2.00	274
	2.08	2.00	2.03	0.31	1.91	274
	2.17	2.09	2.12	0.25	1.77	274
2%	1.31	1.23	1.26	0.70	2.48	271
	1.51	1.43	1.46	0.65	2.45	271
	1.75	1.67	1.70	0.52	2.27	272
	1.98	1.90	1.93	0.42	2.13	273
	2.17	2.09	2.12	0.31	1.86	274
	2.29	2.21	2.24	0.29	1.85	274
1%	1.31	1.23	1.26	0.75	2.56	270
	1.51	1.43	1.46	0.72	2.53	270
	1.75	1.67	1.70	0.60	2.40	271
	1.98	1.90	1.93	0.48	2.25	272
	2.17	2.09	2.12	0.40	2.10	273
	2.38	2.30	2.33	0.27	1.82	274
0.5%	1.40	1.32	1.35	0.81	2.73	270
	1.64	1.56	1.60	0.71	2.49	271
	1.84	1.76	1.79	0.62	2.43	272
	2.08	2.00	2.03	0.50	2.31	272
	2.29	2.21	2.24	0.39	2.09	273
	2.47	2.39	2.42	0.30	1.87	274
0.1%	1.40	1.32	1.35	0.90	2.83	268
	1.64	1.56	1.60	0.90	2.81	269
	1.84	1.76	1.79	0.78	2.67	271
	2.08	2.00	2.03	0.67	2.49	272
	2.29	2.21	2.24	0.54	2.33	273
	2.47	2.39	2.42	0.45	2.19	273

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.67	1.59	1.63	0.46	2.16	270
	1.90	1.82	1.85	0.39	2.06	273
	2.01	1.93	1.96	0.36	2.04	273
	2.14	2.06	2.10	0.29	1.84	274
	2.25	2.17	2.20	0.26	1.82	274
	2.34	2.26	2.29	0.22	1.72	275
20%	1.67	1.59	1.63	0.54	2.25	270
	1.90	1.82	1.85	0.46	2.14	273
	2.14	2.06	2.10	0.35	1.93	274
	2.25	2.17	2.20	0.33	1.92	274
	2.34	2.26	2.29	0.30	1.88	275
	2.48	2.40	2.43	0.24	1.78	275
10%	1.67	1.59	1.63	0.59	2.36	270
	1.90	1.82	1.85	0.54	2.32	272
	2.14	2.06	2.10	0.44	2.15	273
	2.34	2.26	2.29	0.35	2.04	274
	2.48	2.40	2.43	0.30	1.91	274
	2.58	2.50	2.53	0.25	1.67	275
5%	1.81	1.73	1.76	0.65	2.41	270
	2.01	1.93	1.96	0.57	2.38	272
	2.25	2.17	2.20	0.43	2.11	274
	2.48	2.40	2.43	0.35	2.06	274
	2.58	2.50	2.53	0.31	1.86	275
	2.67	2.59	2.62	0.27	1.84	275
2%	1.81	1.73	1.76	0.73	2.51	272
	2.01	1.93	1.96	0.67	2.48	272
	2.25	2.17	2.20	0.55	2.38	273
	2.48	2.40	2.43	0.43	2.15	273
	2.67	2.59	2.62	0.32	1.92	274
	2.79	2.71	2.74	0.29	1.86	275
1%	1.81	1.73	1.76	0.79	2.65	272
	2.01	1.93	1.96	0.72	2.53	272
	2.25	2.17	2.20	0.62	2.45	272
	2.48	2.40	2.43	0.49	2.30	273
	2.67	2.59	2.62	0.40	2.11	274
	2.88	2.80	2.83	0.27	1.82	275
0.5%	1.90	1.82	1.85	0.86	2.76	271
	2.14	2.06	2.10	0.73	2.58	272
	2.34	2.26	2.29	0.64	2.47	272
	2.58	2.50	2.53	0.51	2.34	273
	2.79	2.71	2.74	0.39	2.07	274
	2.97	2.89	2.92	0.32	1.98	275
0.1%	1.90	1.82	1.85	1.02	2.91	270
	2.14	2.06	2.10	0.95	2.83	271
	2.34	2.26	2.29	0.80	2.72	272
	2.58	2.50	2.53	0.68	2.51	273
	2.79	2.71	2.74	0.56	2.40	273
	2.97	2.89	2.92	0.45	2.15	274

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.17	2.09	2.13	0.47	2.19	271
	2.40	2.32	2.35	0.41	2.11	272
	2.51	2.43	2.46	0.36	2.06	274
	2.64	2.56	2.60	0.31	1.93	274
	2.75	2.67	2.70	0.26	1.81	275
	2.84	2.76	2.79	0.22	1.74	275
20%	2.17	2.09	2.13	0.55	2.33	271
	2.40	2.32	2.35	0.49	2.24	272
	2.64	2.56	2.60	0.36	2.04	274
	2.75	2.67	2.70	0.34	2.02	274
	2.84	2.76	2.79	0.30	1.90	275
	2.98	2.90	2.93	0.24	1.61	276
10%	2.17	2.09	2.13	0.60	2.39	270
	2.40	2.32	2.35	0.55	2.37	272
	2.64	2.56	2.60	0.44	2.11	274
	2.84	2.76	2.79	0.35	2.05	275
	2.98	2.90	2.93	0.30	1.86	275
	3.08	3.00	3.03	0.25	1.63	276
5%	2.31	2.23	2.26	0.66	2.45	273
	2.51	2.43	2.46	0.57	2.40	273
	2.75	2.67	2.70	0.46	2.23	274
	2.98	2.90	2.93	0.35	2.05	274
	3.08	3.00	3.03	0.31	1.81	276
	3.17	3.09	3.12	0.27	1.66	276
2%	2.31	2.23	2.26	0.74	2.56	273
	2.51	2.43	2.46	0.68	2.51	273
	2.75	2.67	2.70	0.55	2.39	273
	2.98	2.90	2.93	0.43	2.12	274
	3.17	3.09	3.12	0.32	1.86	276
	3.29	3.21	3.24	0.29	1.74	276
1%	2.31	2.23	2.26	0.80	2.70	272
	2.51	2.43	2.46	0.74	2.62	273
	2.75	2.67	2.70	0.63	2.47	273
	2.98	2.90	2.93	0.49	2.20	274
	3.17	3.09	3.12	0.41	2.13	275
	3.38	3.30	3.33	0.28	1.79	276
0.5%	2.40	2.32	2.35	0.89	2.78	272
	2.64	2.56	2.60	0.75	2.67	273
	2.84	2.76	2.79	0.64	2.48	273
	3.08	3.00	3.03	0.51	2.26	274
	3.29	3.21	3.24	0.40	2.03	276
	3.47	3.39	3.42	0.32	1.82	276
0.1%	2.40	2.32	2.35	1.07	2.98	271
	2.64	2.56	2.60	0.96	2.85	272
	2.84	2.76	2.79	0.81	2.74	273
	3.08	3.00	3.03	0.68	2.50	274
	3.29	3.21	3.24	0.56	2.41	274
	3.47	3.39	3.42	0.45	2.12	276



**Figure 9.6: Estimation Locations for Burrow A (BurrA)**

**Table 9-21: Co-ordinates for Estimation Locations for Burrow A (BurrA)**

Location	Extraction Point	
	Latitude (°N)	Longitude (°W)
BurrA.1	52.2927	-6.4140
BurrA.2	52.2889	-6.4040

Location	Extraction Point (ITM)	
	Eastings [m]	Northings [m]
BurrA.1	708189	616855
BurrA.2	708880	616448

Table 9-22: Shoreline Wave Climate and Water Level Combinations – Burrow Location BurrA.1

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Burrow Location A.1	
Bed Level (MSL): -0.210m	
Bed Level (OD Malin OSGM02): -0.244m	
Bed Level (OD Malin OSGM15): -0.187m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: Local Hydrographic Survey (2003)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.69	0.66	0.72	0.24	1.46	360
	0.88	0.85	0.91	0.20	1.42	2
	0.97	0.94	0.99	0.17	1.36	6
	1.09	1.05	1.11	0.15	1.30	10
	1.17	1.14	1.19	0.13	1.22	16
	1.25	1.22	1.27	0.10	1.10	21
20%	0.69	0.66	0.72	0.28	1.58	359
	0.88	0.85	0.91	0.23	1.45	68
	1.09	1.05	1.11	0.19	1.40	20
	1.17	1.14	1.19	0.16	1.32	21
	1.25	1.22	1.27	0.14	1.24	281
	1.37	1.34	1.39	0.11	1.18	309
10%	0.69	0.66	0.72	0.31	1.62	358
	0.88	0.85	0.91	0.27	1.56	2
	1.09	1.05	1.11	0.21	1.44	8
	1.25	1.22	1.27	0.17	1.36	13
	1.37	1.34	1.39	0.14	1.26	18
	1.45	1.42	1.47	0.12	1.20	20
5%	0.80	0.77	0.82	0.32	1.63	360
	0.97	0.94	0.99	0.28	1.59	2
	1.17	1.14	1.19	0.21	1.42	8
	1.37	1.34	1.39	0.18	1.33	13
	1.45	1.42	1.47	0.14	1.25	17
	1.53	1.50	1.55	0.13	1.26	19
2%	0.80	0.77	0.82	0.36	1.77	359
	0.97	0.94	0.99	0.33	1.70	360
	1.17	1.14	1.19	0.27	1.61	3
	1.37	1.34	1.39	0.21	1.48	9
	1.53	1.50	1.55	0.18	1.44	13
	1.63	1.60	1.65	0.13	1.44	18
1%	0.80	0.77	0.82	0.38	1.78	356
	0.97	0.94	0.99	0.36	1.79	359
	1.17	1.14	1.19	0.30	1.63	5
	1.37	1.34	1.39	0.24	1.55	11
	1.53	1.50	1.55	0.19	1.42	15
	1.71	1.68	1.73	0.13	1.90	21
0.5%	0.88	0.85	0.91	0.41	1.84	358
	1.09	1.05	1.11	0.36	1.77	2
	1.25	1.22	1.27	0.31	1.65	6
	1.45	1.42	1.47	0.25	1.57	11
	1.63	1.60	1.65	0.19	1.42	16
	1.79	1.76	1.81	0.14	1.94	19
0.1%	0.88	0.85	0.91	0.46	1.88	354
	1.09	1.05	1.11	0.45	1.89	359
	1.25	1.22	1.27	0.40	1.85	2
	1.45	1.42	1.47	0.33	1.74	8
	1.63	1.60	1.65	0.26	1.60	13
	1.79	1.76	1.81	0.21	1.50	16

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.19	1.16	1.22	0.29	1.63	6
	1.38	1.35	1.41	0.23	1.56	10
	1.47	1.44	1.49	0.21	1.49	12
	1.59	1.55	1.61	0.18	1.41	15
	1.67	1.64	1.69	0.15	1.88	16
	1.75	1.72	1.77	0.13	2.37	17
20%	1.19	1.16	1.22	0.32	1.63	2
	1.38	1.35	1.41	0.26	1.59	8
	1.59	1.55	1.61	0.20	1.46	14
	1.67	1.64	1.69	0.18	1.42	16
	1.75	1.72	1.77	0.16	2.04	18
	1.87	1.84	1.89	0.13	1.89	20
10%	1.19	1.16	1.22	0.36	1.75	3
	1.38	1.35	1.41	0.31	1.72	7
	1.59	1.55	1.61	0.24	1.58	11
	1.75	1.72	1.77	0.21	1.53	14
	1.87	1.84	1.89	0.18	2.34	16
	1.95	1.92	1.97	0.16	2.30	17
5%	1.30	1.27	1.32	0.37	1.80	6
	1.47	1.44	1.49	0.31	1.68	9
	1.67	1.64	1.69	0.25	1.58	14
	1.87	1.84	1.89	0.21	2.26	16
	1.95	1.92	1.97	0.19	2.33	17
	2.03	2.00	2.05	0.17	2.30	18
2%	1.30	1.27	1.32	0.42	1.87	4
	1.47	1.44	1.49	0.36	1.80	8
	1.67	1.64	1.69	0.30	1.66	12
	1.87	1.84	1.89	0.25	1.63	14
	2.03	2.00	2.05	0.21	2.41	16
	2.13	2.10	2.15	0.18	2.38	18
1%	1.30	1.27	1.32	0.46	1.93	3
	1.47	1.44	1.49	0.41	1.86	6
	1.67	1.64	1.69	0.33	1.76	11
	1.87	1.84	1.89	0.29	1.70	12
	2.03	2.00	2.05	0.24	2.45	15
	2.21	2.18	2.23	0.19	2.42	18
0.5%	1.38	1.35	1.41	0.47	1.95	3
	1.59	1.55	1.61	0.41	1.86	8
	1.75	1.72	1.77	0.35	1.82	9
	1.95	1.92	1.97	0.29	1.73	12
	2.13	2.10	2.15	0.24	2.53	16
	2.29	2.26	2.31	0.19	2.44	19
0.1%	1.38	1.35	1.41	0.57	2.12	1
	1.59	1.55	1.61	0.50	2.05	5
	1.75	1.72	1.77	0.45	1.95	7
	1.95	1.92	1.97	0.38	1.87	10
	2.13	2.10	2.15	0.31	2.75	13
	2.29	2.26	2.31	0.26	2.68	16

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.69	1.66	1.72	0.32	1.70	7
	1.88	1.85	1.91	0.28	1.68	11
	1.97	1.94	1.99	0.25	2.40	13
	2.09	2.05	2.11	0.23	2.40	15
	2.17	2.14	2.19	0.21	2.38	15
	2.25	2.22	2.27	0.16	2.20	17
20%	1.69	1.66	1.72	0.35	1.74	5
	1.88	1.85	1.91	0.31	1.71	12
	2.09	2.05	2.11	0.26	2.59	15
	2.17	2.14	2.19	0.23	2.49	17
	2.25	2.22	2.27	0.21	2.46	18
	2.37	2.34	2.39	0.18	2.40	20
10%	1.69	1.66	1.72	0.40	1.83	6
	1.88	1.85	1.91	0.35	1.82	11
	2.09	2.05	2.11	0.29	2.71	14
	2.25	2.22	2.27	0.24	2.58	17
	2.37	2.34	2.39	0.21	2.47	19
	2.45	2.42	2.47	0.19	2.42	20
5%	1.80	1.77	1.82	0.39	1.82	5
	1.97	1.94	1.99	0.36	1.82	11
	2.17	2.14	2.19	0.30	2.73	14
	2.37	2.34	2.39	0.23	2.56	18
	2.45	2.42	2.47	0.22	2.49	19
	2.53	2.50	2.55	0.19	2.44	20
2%	1.80	1.77	1.82	0.46	1.95	7
	1.97	1.94	1.99	0.41	1.91	10
	2.17	2.14	2.19	0.35	2.05	13
	2.37	2.34	2.39	0.28	2.74	16
	2.53	2.50	2.55	0.23	2.59	18
	2.63	2.60	2.65	0.20	2.07	19
1%	1.80	1.77	1.82	0.51	2.06	7
	1.97	1.94	1.99	0.46	2.01	9
	2.17	2.14	2.19	0.38	1.86	12
	2.37	2.34	2.39	0.33	2.77	15
	2.53	2.50	2.55	0.27	2.70	17
	2.71	2.68	2.73	0.17	2.08	19
0.5%	1.88	1.85	1.91	0.52	2.07	7
	2.09	2.05	2.11	0.46	2.01	9
	2.25	2.22	2.27	0.40	1.91	12
	2.45	2.42	2.47	0.33	2.81	15
	2.63	2.60	2.65	0.23	2.30	18
	2.79	2.76	2.81	0.17	2.09	19
0.1%	1.88	1.85	1.91	0.63	2.20	5
	2.09	2.05	2.11	0.55	2.13	8
	2.25	2.22	2.27	0.50	2.09	10
	2.45	2.42	2.47	0.41	3.05	13
	2.63	2.60	2.65	0.32	2.51	17
	2.79	2.76	2.81	0.25	2.39	19

High+ End Future Scenario (H+EFS)						
	Water Level (m)			Wind Wave Component		
AEP	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.19	2.16	2.22	0.36	2.41	8
	2.38	2.35	2.41	0.31	2.66	13
	2.47	2.44	2.49	0.27	2.50	15
	2.59	2.55	2.61	0.22	2.15	15
	2.67	2.64	2.69	0.19	2.10	16
	2.75	2.72	2.77	0.16	2.01	16
20%	2.19	2.16	2.22	0.40	1.88	12
	2.38	2.35	2.41	0.36	2.80	14
	2.59	2.55	2.61	0.29	2.77	18
	2.67	2.64	2.69	0.26	2.72	19
	2.75	2.72	2.77	0.23	2.19	20
	2.87	2.84	2.89	0.19	2.18	21
10%	2.19	2.16	2.22	0.44	1.93	9
	2.38	2.35	2.41	0.39	2.82	13
	2.59	2.55	2.61	0.29	2.44	17
	2.75	2.72	2.77	0.24	2.30	19
	2.87	2.84	2.89	0.21	2.13	18
	2.95	2.92	2.97	0.19	2.07	19
5%	2.30	2.27	2.32	0.43	1.93	7
	2.47	2.44	2.49	0.37	2.50	9
	2.67	2.64	2.69	0.30	2.46	17
	2.87	2.84	2.89	0.24	2.27	19
	2.95	2.92	2.97	0.23	2.14	19
	3.03	3.00	3.05	0.20	2.08	19
2%	2.30	2.27	2.32	0.52	2.08	10
	2.47	2.44	2.49	0.46	3.10	13
	2.67	2.64	2.69	0.36	2.71	16
	2.87	2.84	2.89	0.28	2.43	18
	3.03	3.00	3.05	0.24	2.19	19
	3.13	3.10	3.15	0.21	2.10	19
1%	2.30	2.27	2.32	0.56	2.13	10
	2.47	2.44	2.49	0.51	2.71	12
	2.67	2.64	2.69	0.40	2.78	16
	2.87	2.84	2.89	0.32	2.51	17
	3.03	3.00	3.05	0.29	2.38	19
	3.21	3.18	3.23	0.19	2.11	18
0.5%	2.38	2.35	2.41	0.57	2.15	10
	2.59	2.55	2.61	0.49	3.04	14
	2.75	2.72	2.77	0.41	2.79	16
	2.95	2.92	2.97	0.33	2.54	17
	3.13	3.10	3.15	0.24	2.37	19
	3.29	3.26	3.31	0.19	2.12	19
0.1%	2.38	2.35	2.41	0.69	2.34	8
	2.59	2.55	2.61	0.61	2.26	12
	2.75	2.72	2.77	0.53	3.15	14
	2.95	2.92	2.97	0.44	2.82	17
	3.13	3.10	3.15	0.34	2.66	19
	3.29	3.26	3.31	0.27	2.42	19

Table 9-23: Shoreline Wave Climate and Water Level Combinations – Burrow Location BurrA.2

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Burrow Location A.2	
Bed Level (MSL): 0.366m	
Bed Level (OD Malin OSGM02): 0.332m	
Bed Level (OD Malin OSGM15): 0.389m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

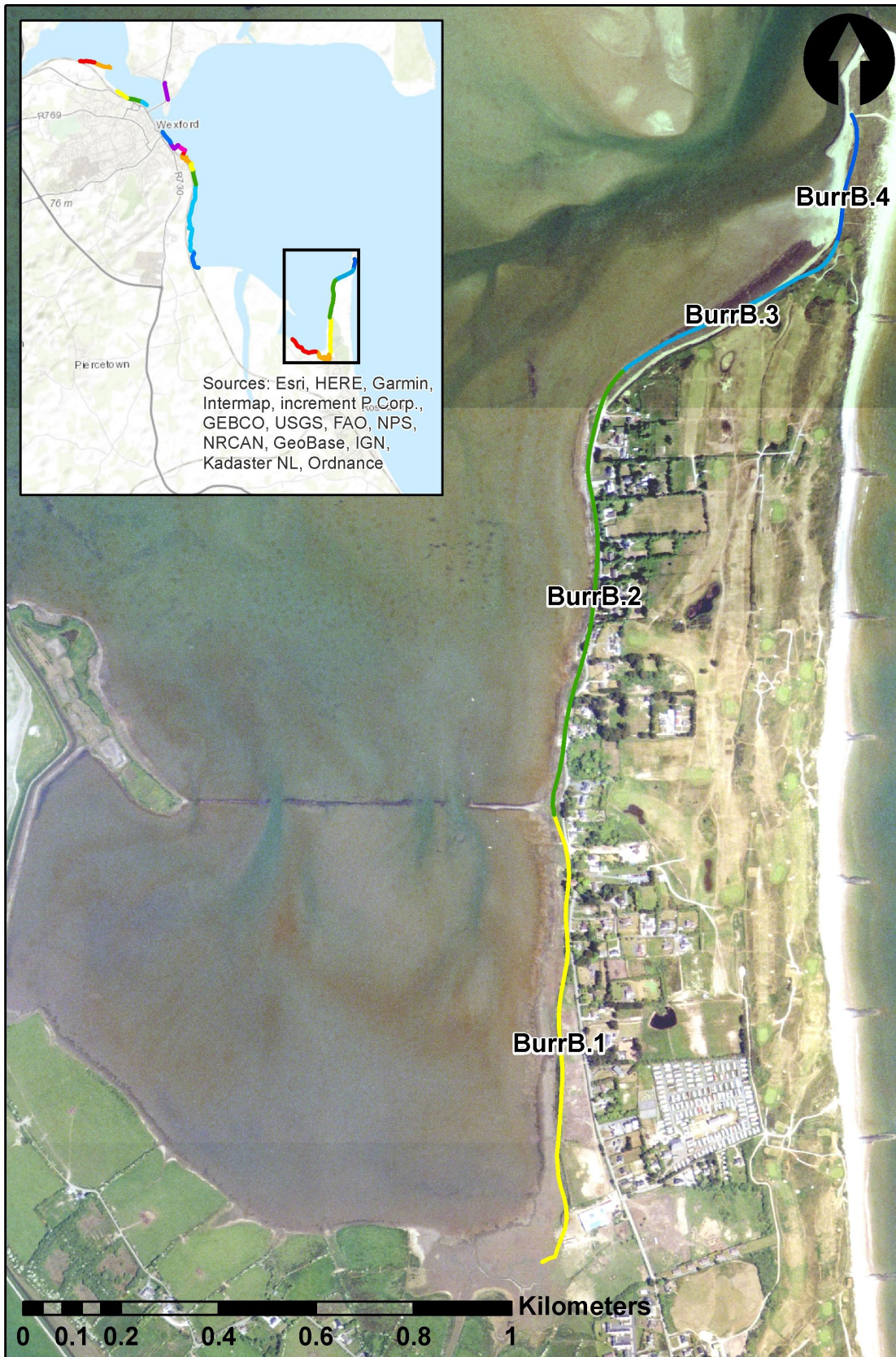
Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: OPW LiDAR data (2013)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.69	0.66	0.72	0.18	1.87	359
	0.88	0.85	0.91	0.22	1.91	356
	0.97	0.94	0.99	0.22	1.88	354
	1.09	1.05	1.11	0.21	1.89	353
	1.17	1.14	1.19	0.19	1.83	353
	1.25	1.22	1.27	0.17	1.83	352
20%	0.69	0.66	0.72	0.15	1.92	7
	0.88	0.85	0.91	0.21	2.01	312
	1.09	1.05	1.11	0.24	2.04	75
	1.17	1.14	1.19	0.23	1.98	13
	1.25	1.22	1.27	0.21	1.90	345
	1.37	1.34	1.39	0.19	1.85	360
10%	0.69	0.66	0.72	0.19	1.90	357
	0.88	0.85	0.91	0.26	2.07	356
	1.09	1.05	1.11	0.28	2.06	354
	1.25	1.22	1.27	0.25	2.04	353
	1.37	1.34	1.39	0.22	1.97	352
	1.45	1.42	1.47	0.20	1.87	353
5%	0.80	0.77	0.82	0.24	2.06	356
	0.97	0.94	0.99	0.29	2.14	355
	1.17	1.14	1.19	0.30	2.20	352
	1.37	1.34	1.39	0.26	2.21	351
	1.45	1.42	1.47	0.23	2.21	351
	1.53	1.50	1.55	0.22	2.12	351
2%	0.80	0.77	0.82	0.25	2.06	355
	0.97	0.94	0.99	0.31	2.18	354
	1.17	1.14	1.19	0.34	2.29	353
	1.37	1.34	1.39	0.31	2.30	352
	1.53	1.50	1.55	0.28	2.26	351
	1.63	1.60	1.65	0.22	2.02	352
1%	0.80	0.77	0.82	0.25	2.12	354
	0.97	0.94	0.99	0.32	2.19	354
	1.17	1.14	1.19	0.36	2.35	354
	1.37	1.34	1.39	0.34	2.28	352
	1.53	1.50	1.55	0.29	2.13	352
	1.71	1.68	1.73	0.22	2.06	352
0.5%	0.88	0.85	0.91	0.29	2.14	354
	1.09	1.05	1.11	0.37	2.35	354
	1.25	1.22	1.27	0.39	2.39	354
	1.45	1.42	1.47	0.36	2.34	352
	1.63	1.60	1.65	0.29	2.14	352
	1.79	1.76	1.81	0.23	2.08	352
0.1%	0.88	0.85	0.91	0.30	2.11	352
	1.09	1.05	1.11	0.39	2.33	353
	1.25	1.22	1.27	0.44	2.48	353
	1.45	1.42	1.47	0.45	2.48	353
	1.63	1.60	1.65	0.39	2.41	352
	1.79	1.76	1.81	0.32	2.32	352

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.19	1.16	1.22	0.28	2.35	6
	1.38	1.35	1.41	0.30	2.20	1
	1.47	1.44	1.49	0.29	2.14	359
	1.59	1.55	1.61	0.26	2.11	357
	1.67	1.64	1.69	0.24	2.08	356
	1.75	1.72	1.77	0.22	2.35	354
20%	1.19	1.16	1.22	0.36	2.39	354
	1.38	1.35	1.41	0.36	2.36	353
	1.59	1.55	1.61	0.31	2.20	352
	1.67	1.64	1.69	0.28	2.13	352
	1.75	1.72	1.77	0.26	2.11	352
	1.87	1.84	1.89	0.22	2.05	352
10%	1.19	1.16	1.22	0.41	2.42	353
	1.38	1.35	1.41	0.42	2.46	352
	1.59	1.55	1.61	0.36	2.41	351
	1.75	1.72	1.77	0.32	2.40	351
	1.87	1.84	1.89	0.29	2.38	351
	1.95	1.92	1.97	0.27	2.36	351
5%	1.30	1.27	1.32	0.44	2.51	353
	1.47	1.44	1.49	0.43	2.44	353
	1.67	1.64	1.69	0.37	2.39	352
	1.87	1.84	1.89	0.32	2.40	352
	1.95	1.92	1.97	0.30	2.39	352
	2.03	2.00	2.05	0.27	2.37	352
2%	1.30	1.27	1.32	0.47	2.61	353
	1.47	1.44	1.49	0.48	2.64	353
	1.67	1.64	1.69	0.43	2.45	352
	1.87	1.84	1.89	0.38	2.46	352
	2.03	2.00	2.05	0.32	2.44	352
	2.13	2.10	2.15	0.28	2.42	352
1%	1.30	1.27	1.32	0.48	2.60	353
	1.47	1.44	1.49	0.51	2.72	353
	1.67	1.64	1.69	0.48	2.63	352
	1.87	1.84	1.89	0.42	2.64	352
	2.03	2.00	2.05	0.36	2.53	351
	2.21	2.18	2.23	0.29	2.45	351
0.5%	1.38	1.35	1.41	0.52	2.69	352
	1.59	1.55	1.61	0.54	2.75	353
	1.75	1.72	1.77	0.51	2.75	352
	1.95	1.92	1.97	0.44	2.73	351
	2.13	2.10	2.15	0.36	2.62	351
	2.29	2.26	2.31	0.30	2.47	351
0.1%	1.38	1.35	1.41	0.54	2.59	351
	1.59	1.55	1.61	0.60	2.81	352
	1.75	1.72	1.77	0.60	2.85	352
	1.95	1.92	1.97	0.55	2.83	351
	2.13	2.10	2.15	0.46	2.78	351
	2.29	2.26	2.31	0.39	2.73	351

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.69	1.66	1.72	0.44	2.46	356
	1.88	1.85	1.91	0.40	2.53	355
	1.97	1.94	1.99	0.37	2.50	355
	2.09	2.05	2.11	0.33	2.46	354
	2.17	2.14	2.19	0.31	2.44	354
	2.25	2.22	2.27	0.25	2.35	354
20%	1.69	1.66	1.72	0.50	2.55	350
	1.88	1.85	1.91	0.45	2.72	351
	2.09	2.05	2.11	0.38	2.65	351
	2.17	2.14	2.19	0.35	2.53	351
	2.25	2.22	2.27	0.32	2.47	351
	2.37	2.34	2.39	0.28	2.42	351
10%	1.69	1.66	1.72	0.56	2.71	351
	1.88	1.85	1.91	0.51	2.78	351
	2.09	2.05	2.11	0.43	2.75	351
	2.25	2.22	2.27	0.36	2.67	351
	2.37	2.34	2.39	0.33	2.52	351
	2.45	2.42	2.47	0.29	2.46	351
5%	1.80	1.77	1.82	0.57	2.68	350
	1.97	1.94	1.99	0.52	2.79	351
	2.17	2.14	2.19	0.44	2.77	351
	2.37	2.34	2.39	0.36	2.66	351
	2.45	2.42	2.47	0.34	2.56	351
	2.53	2.50	2.55	0.30	2.48	351
2%	1.80	1.77	1.82	0.64	2.84	352
	1.97	1.94	1.99	0.59	2.88	351
	2.17	2.14	2.19	0.51	2.83	351
	2.37	2.34	2.39	0.42	2.77	351
	2.53	2.50	2.55	0.35	2.68	351
	2.63	2.60	2.65	0.26	2.13	351
1%	1.80	1.77	1.82	0.66	2.97	352
	1.97	1.94	1.99	0.64	3.06	351
	2.17	2.14	2.19	0.55	2.85	351
	2.37	2.34	2.39	0.47	2.80	351
	2.53	2.50	2.55	0.40	2.75	351
	2.71	2.68	2.73	0.26	2.14	351
0.5%	1.88	1.85	1.91	0.69	3.00	351
	2.09	2.05	2.11	0.65	3.10	351
	2.25	2.22	2.27	0.58	3.04	351
	2.45	2.42	2.47	0.48	2.84	351
	2.63	2.60	2.65	0.36	2.42	351
	2.79	2.76	2.81	0.32	2.15	351
0.1%	1.88	1.85	1.91	0.74	3.11	351
	2.09	2.05	2.11	0.76	3.18	351
	2.25	2.22	2.27	0.71	3.18	351
	2.45	2.42	2.47	0.60	3.11	351
	2.63	2.60	2.65	0.47	2.72	351
	2.79	2.76	2.81	0.39	2.45	351

High+ End Future Scenario (H+EFS)						
	Water Level (m)			Wind Wave Component		
AEP	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.19	2.16	2.22	0.51	2.63	352
	2.38	2.35	2.41	0.46	2.77	353
	2.47	2.44	2.49	0.39	2.70	353
	2.59	2.55	2.61	0.34	2.36	353
	2.67	2.64	2.69	0.31	2.17	352
	2.75	2.72	2.77	0.27	2.11	352
20%	2.19	2.16	2.22	0.59	2.83	351
	2.38	2.35	2.41	0.52	2.82	351
	2.59	2.55	2.61	0.42	2.78	351
	2.67	2.64	2.69	0.38	2.73	351
	2.75	2.72	2.77	0.34	2.34	351
	2.87	2.84	2.89	0.29	2.33	351
10%	2.19	2.16	2.22	0.65	2.84	350
	2.38	2.35	2.41	0.57	2.90	351
	2.59	2.55	2.61	0.43	2.55	351
	2.75	2.72	2.77	0.36	2.42	351
	2.87	2.84	2.89	0.33	2.22	351
	2.95	2.92	2.97	0.29	2.13	351
5%	2.30	2.27	2.32	0.64	2.81	349
	2.47	2.44	2.49	0.55	2.72	349
	2.67	2.64	2.69	0.44	2.63	351
	2.87	2.84	2.89	0.37	2.41	351
	2.95	2.92	2.97	0.35	2.28	351
	3.03	3.00	3.05	0.32	2.13	351
2%	2.30	2.27	2.32	0.74	3.13	351
	2.47	2.44	2.49	0.66	3.17	351
	2.67	2.64	2.69	0.52	2.79	351
	2.87	2.84	2.89	0.42	2.49	351
	3.03	3.00	3.05	0.37	2.38	351
	3.13	3.10	3.15	0.27	2.14	350
1%	2.30	2.27	2.32	0.80	3.19	351
	2.47	2.44	2.49	0.73	3.22	351
	2.67	2.64	2.69	0.59	2.84	351
	2.87	2.84	2.89	0.47	2.72	351
	3.03	3.00	3.05	0.42	2.45	351
	3.21	3.18	3.23	0.27	2.15	350
0.5%	2.38	2.35	2.41	0.82	3.21	351
	2.59	2.55	2.61	0.71	3.15	351
	2.75	2.72	2.77	0.60	2.85	351
	2.95	2.92	2.97	0.48	2.74	351
	3.13	3.10	3.15	0.37	2.44	351
	3.29	3.26	3.31	0.34	2.17	350
0.1%	2.38	2.35	2.41	0.91	3.36	351
	2.59	2.55	2.61	0.86	3.29	351
	2.75	2.72	2.77	0.76	3.21	351
	2.95	2.92	2.97	0.62	2.92	351
	3.13	3.10	3.15	0.50	2.77	351
	3.29	3.26	3.31	0.40	2.48	351



**Figure 9.7: Estimation Locations for Burrow B (BurrB)**

**Table 9-24: Co-ordinates for Estimation Locations for Burrow B (BurrB)**

Location	Extraction Point	
	Latitude (°N)	Longitude (°W)
BurrB.1	52.2910	-6.3994
BurrB.2	52.2997	-6.3981
BurrB.3	52.3057	-6.3923
BurrB.4	52.3083	-6.3901

Location	Extraction Point (ITM)	
	Eastings [m]	Northings [m]
BurrB.1	709189	616688
BurrB.2	709256	617658
BurrB.3	709637	618334
BurrB.4	709780	618627

Table 9-25: Shoreline Wave Climate and Water Level Combinations – Burrow Location BurrB.1

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Burrow Location B.1	
Bed Level (MSL): 0.446m	
Bed Level (OD Malin OSGM02): 0.412m	
Bed Level (OD Malin OSGM15): 0.469m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: OPW LiDAR data (2013)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.80	0.77	0.83	0.23	1.94	277
	0.98	0.95	1.01	0.29	1.96	281
	1.06	1.03	1.09	0.30	1.95	282
	1.17	1.14	1.19	0.29	1.89	285
	1.25	1.22	1.27	0.27	1.85	288
	1.33	1.29	1.35	0.23	1.76	293
20%	0.80	0.77	0.83	0.22	1.98	276
	0.98	0.95	1.01	0.30	2.10	278
	1.17	1.14	1.19	0.33	2.08	282
	1.25	1.22	1.27	0.32	2.01	285
	1.33	1.29	1.35	0.30	1.94	287
	1.44	1.41	1.46	0.25	1.78	294
10%	0.80	0.77	0.83	0.22	1.97	275
	0.98	0.95	1.01	0.30	2.12	277
	1.17	1.14	1.19	0.36	2.14	281
	1.33	1.29	1.35	0.35	2.08	286
	1.44	1.41	1.46	0.31	1.97	290
	1.52	1.48	1.54	0.28	1.90	293
5%	0.90	0.87	0.92	0.27	2.09	276
	1.06	1.03	1.09	0.34	2.16	278
	1.25	1.22	1.27	0.39	2.17	282
	1.44	1.41	1.46	0.37	2.11	288
	1.52	1.48	1.54	0.34	2.03	291
	1.60	1.56	1.62	0.29	1.96	297
2%	0.90	0.87	0.92	0.28	2.09	275
	1.06	1.03	1.09	0.35	2.16	277
	1.25	1.22	1.27	0.42	2.31	280
	1.44	1.41	1.46	0.43	2.22	286
	1.60	1.56	1.62	0.38	2.14	291
	1.69	1.66	1.71	0.33	2.08	294
1%	0.90	0.87	0.92	0.28	2.08	275
	1.06	1.03	1.09	0.36	2.16	276
	1.25	1.22	1.27	0.43	2.35	279
	1.44	1.41	1.46	0.46	2.35	285
	1.60	1.56	1.62	0.43	2.24	289
	1.77	1.74	1.79	0.34	2.09	296
0.5%	0.98	0.95	1.01	0.33	2.11	276
	1.17	1.14	1.19	0.41	2.30	277
	1.33	1.29	1.35	0.46	2.41	280
	1.52	1.48	1.54	0.49	2.39	286
	1.69	1.66	1.71	0.44	2.23	292
	1.85	1.82	1.87	0.37	2.21	297
0.1%	0.98	0.95	1.01	0.34	2.01	276
	1.17	1.14	1.19	0.43	2.19	276
	1.33	1.29	1.35	0.49	2.41	278
	1.52	1.48	1.54	0.55	2.47	282
	1.69	1.66	1.71	0.56	2.47	288
	1.85	1.82	1.87	0.52	2.45	292

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.30	1.27	1.33	0.43	2.23	284
	1.48	1.45	1.51	0.42	2.22	288
	1.56	1.53	1.59	0.38	2.14	293
	1.67	1.64	1.69	0.34	2.05	297
	1.75	1.72	1.77	0.30	2.04	300
	1.83	1.79	1.85	0.27	2.05	304
20%	1.30	1.27	1.33	0.44	2.37	281
	1.48	1.45	1.51	0.47	2.37	285
	1.67	1.64	1.69	0.42	2.19	292
	1.75	1.72	1.77	0.39	2.18	295
	1.83	1.79	1.85	0.37	2.20	296
	1.94	1.91	1.96	0.29	2.06	303
10%	1.30	1.27	1.33	0.45	2.40	280
	1.48	1.45	1.51	0.51	2.43	284
	1.67	1.64	1.69	0.47	2.33	290
	1.83	1.79	1.85	0.42	2.25	294
	1.94	1.91	1.96	0.37	2.26	297
	2.02	1.98	2.04	0.32	2.25	301
5%	1.40	1.37	1.42	0.50	2.44	280
	1.56	1.53	1.59	0.54	2.45	285
	1.75	1.72	1.77	0.51	2.41	290
	1.94	1.91	1.96	0.42	2.28	296
	2.02	1.98	2.04	0.39	2.28	298
	2.10	2.06	2.12	0.35	2.33	301
2%	1.40	1.37	1.42	0.52	2.45	279
	1.56	1.53	1.59	0.57	2.49	283
	1.75	1.72	1.77	0.57	2.49	288
	1.94	1.91	1.96	0.51	2.46	294
	2.10	2.06	2.12	0.42	2.32	299
	2.19	2.16	2.21	0.38	2.36	302
1%	1.40	1.37	1.42	0.53	2.45	278
	1.56	1.53	1.59	0.58	2.51	281
	1.75	1.72	1.77	0.61	2.54	287
	1.94	1.91	1.96	0.57	2.51	292
	2.10	2.06	2.12	0.50	2.52	296
	2.27	2.24	2.29	0.37	2.34	304
0.5%	1.48	1.45	1.51	0.57	2.48	278
	1.67	1.64	1.69	0.63	2.61	282
	1.83	1.79	1.85	0.64	2.62	287
	2.02	1.98	2.04	0.60	2.57	293
	2.19	2.16	2.21	0.51	2.57	298
	2.35	2.32	2.37	0.39	2.36	304
0.1%	1.48	1.45	1.51	0.59	2.46	277
	1.67	1.64	1.69	0.66	2.65	279
	1.83	1.79	1.85	0.70	2.75	283
	2.02	1.98	2.04	0.72	2.76	289
	2.19	2.16	2.21	0.67	2.71	294
	2.35	2.32	2.37	0.56	2.64	300

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.80	1.77	1.83	0.55	2.40	291
	1.98	1.95	2.01	0.50	2.52	297
	2.06	2.03	2.09	0.47	2.57	299
	2.17	2.14	2.19	0.41	2.55	302
	2.25	2.22	2.27	0.37	2.45	305
	2.33	2.29	2.35	0.32	2.40	307
20%	1.80	1.77	1.83	0.61	2.51	288
	1.98	1.95	2.01	0.58	2.55	293
	2.17	2.14	2.19	0.48	2.54	298
	2.25	2.22	2.27	0.45	2.50	300
	2.33	2.29	2.35	0.40	2.43	302
	2.44	2.41	2.46	0.33	2.36	307
10%	1.80	1.77	1.83	0.63	2.58	287
	1.98	1.95	2.01	0.64	2.61	291
	2.17	2.14	2.19	0.53	2.52	298
	2.33	2.29	2.35	0.47	2.60	301
	2.44	2.41	2.46	0.39	2.43	304
	2.52	2.48	2.54	0.35	2.39	307
5%	1.90	1.87	1.92	0.69	2.71	287
	2.06	2.03	2.09	0.68	2.71	292
	2.25	2.22	2.27	0.57	2.60	297
	2.44	2.41	2.46	0.47	2.65	302
	2.52	2.48	2.54	0.42	2.52	304
	2.60	2.56	2.62	0.37	2.41	307
2%	1.90	1.87	1.92	0.71	2.76	285
	2.06	2.03	2.09	0.73	2.79	289
	2.25	2.22	2.27	0.67	2.73	295
	2.44	2.41	2.46	0.55	2.66	301
	2.60	2.56	2.62	0.48	2.70	303
	2.69	2.66	2.71	0.40	2.54	307
1%	1.90	1.87	1.92	0.73	2.78	283
	2.06	2.03	2.09	0.77	2.81	287
	2.25	2.22	2.27	0.74	2.81	294
	2.44	2.41	2.46	0.62	2.69	300
	2.60	2.56	2.62	0.55	2.73	302
	2.77	2.74	2.79	0.40	2.40	309
0.5%	1.98	1.95	2.01	0.79	2.81	283
	2.17	2.14	2.19	0.80	2.84	289
	2.33	2.29	2.35	0.77	2.87	294
	2.52	2.48	2.54	0.66	2.82	299
	2.69	2.66	2.71	0.54	2.73	303
	2.85	2.82	2.87	0.42	2.42	309
0.1%	1.98	1.95	2.01	0.82	2.81	281
	2.17	2.14	2.19	0.87	2.88	284
	2.33	2.29	2.35	0.88	2.92	289
	2.52	2.48	2.54	0.84	2.98	296
	2.69	2.66	2.71	0.72	2.99	300
	2.85	2.82	2.87	0.63	2.94	303

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.30	2.27	2.33	0.61	2.44	295
	2.48	2.45	2.51	0.54	2.72	302
	2.56	2.53	2.59	0.51	2.72	304
	2.67	2.64	2.69	0.41	2.41	308
	2.75	2.72	2.77	0.37	2.37	311
	2.83	2.79	2.85	0.32	2.20	313

Table 9-26: Shoreline Wave Climate and Water Level Combinations – Burrow Location BurrB.2

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Burrow Location B.2	
Bed Level (MSL): 0.065m	
Bed Level (OD Malin OSGM02): 0.031m	
Bed Level (OD Malin OSGM15): 0.088m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: OPW LiDAR data (2013)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.80	0.77	0.83	0.38	2.44	294
	0.98	0.95	1.01	0.42	2.41	295
	1.06	1.03	1.09	0.42	2.40	295
	1.17	1.14	1.19	0.39	2.37	294
	1.25	1.22	1.27	0.35	2.28	293
	1.33	1.29	1.35	0.31	2.12	295
20%	0.80	0.77	0.83	0.38	2.47	292
	0.98	0.95	1.01	0.45	2.53	294
	1.17	1.14	1.19	0.47	2.52	294
	1.25	1.22	1.27	0.44	2.47	294
	1.33	1.29	1.35	0.42	2.43	294
	1.44	1.41	1.46	0.34	2.33	294
10%	0.80	0.77	0.83	0.39	2.46	291
	0.98	0.95	1.01	0.46	2.57	292
	1.17	1.14	1.19	0.50	2.66	294
	1.33	1.29	1.35	0.48	2.56	294
	1.44	1.41	1.46	0.43	2.46	294
	1.52	1.48	1.54	0.38	2.40	295
5%	0.90	0.87	0.92	0.44	2.53	290
	1.06	1.03	1.09	0.50	2.68	292
	1.25	1.22	1.27	0.53	2.72	294
	1.44	1.41	1.46	0.50	2.66	294
	1.52	1.48	1.54	0.45	2.50	294
	1.60	1.56	1.62	0.37	2.16	296
2%	0.90	0.87	0.92	0.45	2.49	288
	1.06	1.03	1.09	0.51	2.69	291
	1.25	1.22	1.27	0.57	2.77	293
	1.44	1.41	1.46	0.57	2.77	294
	1.60	1.56	1.62	0.51	2.71	294
	1.69	1.66	1.71	0.45	2.54	295
1%	0.90	0.87	0.92	0.45	2.47	287
	1.06	1.03	1.09	0.52	2.68	289
	1.25	1.22	1.27	0.58	2.79	292
	1.44	1.41	1.46	0.61	2.81	294
	1.60	1.56	1.62	0.57	2.77	294
	1.77	1.74	1.79	0.45	2.53	295
0.5%	0.98	0.95	1.01	0.50	2.51	287
	1.17	1.14	1.19	0.57	2.77	290
	1.33	1.29	1.35	0.62	2.84	292
	1.52	1.48	1.54	0.64	2.83	294
	1.69	1.66	1.71	0.57	2.77	294
	1.85	1.82	1.87	0.48	2.58	296
0.1%	0.98	0.95	1.01	0.51	2.42	285
	1.17	1.14	1.19	0.59	2.67	287
	1.33	1.29	1.35	0.64	2.82	289
	1.52	1.48	1.54	0.70	3.01	293
	1.69	1.66	1.71	0.71	2.98	294
	1.85	1.82	1.87	0.67	2.88	294

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.30	1.27	1.33	0.57	2.73	295
	1.48	1.45	1.51	0.55	2.70	294
	1.56	1.53	1.59	0.49	2.43	294
	1.67	1.64	1.69	0.42	2.37	296
	1.75	1.72	1.77	0.37	2.19	297
	1.83	1.79	1.85	0.33	2.12	299
20%	1.30	1.27	1.33	0.60	2.80	294
	1.48	1.45	1.51	0.62	2.80	294
	1.67	1.64	1.69	0.55	2.74	294
	1.75	1.72	1.77	0.50	2.62	295
	1.83	1.79	1.85	0.48	2.53	295
	1.94	1.91	1.96	0.36	2.16	299
10%	1.30	1.27	1.33	0.61	2.82	293
	1.48	1.45	1.51	0.66	2.84	294
	1.67	1.64	1.69	0.62	2.81	294
	1.83	1.79	1.85	0.54	2.76	295
	1.94	1.91	1.96	0.49	2.69	296
	2.02	1.98	2.04	0.41	2.46	298
5%	1.40	1.37	1.42	0.66	2.87	292
	1.56	1.53	1.59	0.69	2.93	294
	1.75	1.72	1.77	0.66	2.86	294
	1.94	1.91	1.96	0.55	2.78	295
	2.02	1.98	2.04	0.51	2.72	296
	2.10	2.06	2.12	0.45	2.55	297
2%	1.40	1.37	1.42	0.67	2.88	291
	1.56	1.53	1.59	0.72	3.06	293
	1.75	1.72	1.77	0.73	3.04	294
	1.94	1.91	1.96	0.66	2.89	295
	2.10	2.06	2.12	0.54	2.76	296
	2.19	2.16	2.21	0.48	2.66	298
1%	1.40	1.37	1.42	0.68	2.88	290
	1.56	1.53	1.59	0.74	3.05	292
	1.75	1.72	1.77	0.77	3.12	294
	1.94	1.91	1.96	0.72	3.04	295
	2.10	2.06	2.12	0.64	2.87	295
	2.27	2.24	2.29	0.46	2.45	299
0.5%	1.48	1.45	1.51	0.73	2.92	289
	1.67	1.64	1.69	0.78	3.14	292
	1.83	1.79	1.85	0.80	3.16	294
	2.02	1.98	2.04	0.76	3.12	295
	2.19	2.16	2.21	0.65	2.92	296
	2.35	2.32	2.37	0.48	2.50	299
0.1%	1.48	1.45	1.51	0.75	2.85	287
	1.67	1.64	1.69	0.82	3.08	289
	1.83	1.79	1.85	0.86	3.20	292
	2.02	1.98	2.04	0.88	3.22	294
	2.19	2.16	2.21	0.84	3.20	295
	2.35	2.32	2.37	0.68	2.82	297

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.80	1.77	1.83	0.69	2.80	294
	1.98	1.95	2.01	0.62	2.80	295
	2.06	2.03	2.09	0.57	2.77	296
	2.17	2.14	2.19	0.50	2.71	297
	2.25	2.22	2.27	0.44	2.53	299
	2.33	2.29	2.35	0.39	2.44	301
20%	1.80	1.77	1.83	0.76	2.85	294
	1.98	1.95	2.01	0.73	2.91	295
	2.17	2.14	2.19	0.62	2.84	296
	2.25	2.22	2.27	0.57	2.80	297
	2.33	2.29	2.35	0.51	2.75	298
	2.44	2.41	2.46	0.41	2.47	300
10%	1.80	1.77	1.83	0.79	3.04	294
	1.98	1.95	2.01	0.80	3.11	295
	2.17	2.14	2.19	0.66	2.80	296
	2.33	2.29	2.35	0.59	2.79	297
	2.44	2.41	2.46	0.49	2.69	299
	2.52	2.48	2.54	0.44	2.50	300
5%	1.90	1.87	1.92	0.85	3.13	294
	2.06	2.03	2.09	0.84	3.18	295
	2.25	2.22	2.27	0.72	3.09	296
	2.44	2.41	2.46	0.59	2.83	298
	2.52	2.48	2.54	0.53	2.76	299
	2.60	2.56	2.62	0.46	2.58	300
2%	1.90	1.87	1.92	0.87	3.19	293
	2.06	2.03	2.09	0.90	3.23	294
	2.25	2.22	2.27	0.84	3.20	295
	2.44	2.41	2.46	0.68	2.90	297
	2.60	2.56	2.62	0.60	2.83	298
	2.69	2.66	2.71	0.50	2.73	300
1%	1.90	1.87	1.92	0.89	3.20	292
	2.06	2.03	2.09	0.93	3.25	293
	2.25	2.22	2.27	0.91	3.24	295
	2.44	2.41	2.46	0.75	2.93	297
	2.60	2.56	2.62	0.68	2.88	298
	2.77	2.74	2.79	0.47	2.46	302
0.5%	1.98	1.95	2.01	0.94	3.23	291
	2.17	2.14	2.19	0.97	3.30	293
	2.33	2.29	2.35	0.94	3.27	295
	2.52	2.48	2.54	0.83	3.21	296
	2.69	2.66	2.71	0.68	3.05	298
	2.85	2.82	2.87	0.49	2.49	302
0.1%	1.98	1.95	2.01	0.97	3.22	289
	2.17	2.14	2.19	1.03	3.35	291
	2.33	2.29	2.35	1.04	3.49	293
	2.52	2.48	2.54	1.01	3.37	295
	2.69	2.66	2.71	0.89	3.24	297
	2.85	2.82	2.87	0.78	3.19	298

High+ End Future Scenario (H+EFS)						
	Water Level (m)			Wind Wave Component		
AEP	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.30	2.27	2.33	0.74	2.82	294
	2.48	2.45	2.51	0.64	2.82	298
	2.56	2.53	2.59	0.61	2.81	298
	2.67	2.64	2.69	0.50	2.46	301
	2.75	2.72	2.77	0.44	2.41	303
	2.83	2.79	2.85	0.39	2.25	304
20%	2.30	2.27	2.33	0.86	3.14	296
	2.48	2.45	2.51	0.80	3.15	297
	2.67	2.64	2.69	0.66	2.99	298
	2.75	2.72	2.77	0.60	2.86	299
	2.83	2.79	2.85	0.51	2.75	303
	2.94	2.91	2.96	0.46	2.46	303
10%	2.30	2.27	2.33	0.92	3.19	296
	2.48	2.45	2.51	0.89	3.21	296
	2.67	2.64	2.69	0.73	3.12	298
	2.83	2.79	2.85	0.63	2.90	299
	2.94	2.91	2.96	0.51	2.74	301
	3.02	2.98	3.04	0.48	2.67	302
5%	2.40	2.37	2.42	0.99	3.22	295
	2.56	2.53	2.59	0.93	3.25	296
	2.75	2.72	2.77	0.77	3.19	298
	2.94	2.91	2.96	0.60	2.83	300
	3.02	2.98	3.04	0.56	2.80	301
	3.10	3.06	3.12	0.50	2.73	302
2%	2.40	2.37	2.42	1.04	3.29	294
	2.56	2.53	2.59	1.02	3.36	295
	2.75	2.72	2.77	0.90	3.25	297
	2.94	2.91	2.96	0.75	3.17	299
	3.10	3.06	3.12	0.61	2.88	300
	3.19	3.16	3.21	0.50	2.73	302
1%	2.40	2.37	2.42	1.07	3.38	293
	2.56	2.53	2.59	1.09	3.53	295
	2.75	2.72	2.77	0.99	3.33	297
	2.94	2.91	2.96	0.83	3.22	298
	3.10	3.06	3.12	0.72	3.13	299
	3.27	3.24	3.29	0.51	2.71	303
0.5%	2.48	2.45	2.51	1.13	3.55	293
	2.67	2.64	2.69	1.11	3.59	295
	2.83	2.79	2.85	1.02	3.38	297
	3.02	2.98	3.04	0.86	3.24	298
	3.19	3.16	3.21	0.68	3.00	300
	3.35	3.32	3.37	0.56	2.81	302
0.1%	2.48	2.45	2.51	1.18	3.57	290
	2.67	2.64	2.69	1.22	3.66	293
	2.83	2.79	2.85	1.20	3.67	295
	3.02	2.98	3.04	1.09	3.56	297
	3.19	3.16	3.21	0.93	3.29	298
	3.35	3.32	3.37	0.78	3.16	300

Table 9-27: Shoreline Wave Climate and Water Level Combinations – Burrow Location BurrB.3

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Burrow Location B.3	
Bed Level (MSL): 0.354m	
Bed Level (OD Malin OSGM02): 0.320m	
Bed Level (OD Malin OSGM15): 0.377m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: OPW LiDAR data (2013)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.80	0.77	0.83	0.22	2.05	309
	0.98	0.95	1.01	0.28	2.26	309
	1.06	1.03	1.09	0.30	2.29	307
	1.17	1.14	1.19	0.32	2.32	305
	1.25	1.22	1.27	0.32	2.25	303
	1.33	1.29	1.35	0.29	2.12	301
20%	0.80	0.77	0.83	0.24	1.92	305
	0.98	0.95	1.01	0.30	2.20	306
	1.17	1.14	1.19	0.35	2.39	304
	1.25	1.22	1.27	0.36	2.39	302
	1.33	1.29	1.35	0.36	2.37	301
	1.44	1.41	1.46	0.32	2.27	297
10%	0.80	0.77	0.83	0.24	1.84	305
	0.98	0.95	1.01	0.31	2.17	305
	1.17	1.14	1.19	0.36	2.43	304
	1.33	1.29	1.35	0.39	2.44	302
	1.44	1.41	1.46	0.38	2.40	300
	1.52	1.48	1.54	0.35	2.34	299
5%	0.90	0.87	0.92	0.29	2.08	304
	1.06	1.03	1.09	0.35	2.30	304
	1.25	1.22	1.27	0.40	2.50	303
	1.44	1.41	1.46	0.42	2.50	300
	1.52	1.48	1.54	0.41	2.44	299
	1.60	1.56	1.62	0.36	2.17	299
2%	0.90	0.87	0.92	0.31	2.02	303
	1.06	1.03	1.09	0.36	2.27	303
	1.25	1.22	1.27	0.42	2.49	303
	1.44	1.41	1.46	0.46	2.67	301
	1.60	1.56	1.62	0.45	2.58	300
	1.69	1.66	1.71	0.42	2.47	299
1%	0.90	0.87	0.92	0.31	1.97	303
	1.06	1.03	1.09	0.38	2.23	302
	1.25	1.22	1.27	0.44	2.45	302
	1.44	1.41	1.46	0.48	2.71	302
	1.60	1.56	1.62	0.50	2.72	300
	1.77	1.74	1.79	0.43	2.46	299
0.5%	0.98	0.95	1.01	0.36	2.03	302
	1.17	1.14	1.19	0.42	2.36	301
	1.33	1.29	1.35	0.47	2.56	302
	1.52	1.48	1.54	0.52	2.76	301
	1.69	1.66	1.71	0.52	2.73	300
	1.85	1.82	1.87	0.46	2.51	299
0.1%	0.98	0.95	1.01	0.38	2.04	300
	1.17	1.14	1.19	0.45	2.29	300
	1.33	1.29	1.35	0.50	2.46	300
	1.52	1.48	1.54	0.56	2.77	300
	1.69	1.66	1.71	0.59	2.85	301
	1.85	1.82	1.87	0.60	2.84	300

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.30	1.27	1.33	0.43	2.59	304
	1.48	1.45	1.51	0.47	2.67	303
	1.56	1.53	1.59	0.46	2.45	302
	1.67	1.64	1.69	0.42	2.38	301
	1.75	1.72	1.77	0.38	2.21	300
	1.83	1.79	1.85	0.33	2.13	301
20%	1.30	1.27	1.33	0.45	2.62	302
	1.48	1.45	1.51	0.50	2.72	301
	1.67	1.64	1.69	0.50	2.69	300
	1.75	1.72	1.77	0.47	2.53	299
	1.83	1.79	1.85	0.45	2.50	299
	1.94	1.91	1.96	0.36	2.17	300
10%	1.30	1.27	1.33	0.46	2.60	302
	1.48	1.45	1.51	0.52	2.73	301
	1.67	1.64	1.69	0.54	2.77	301
	1.83	1.79	1.85	0.51	2.72	300
	1.94	1.91	1.96	0.46	2.60	299
	2.02	1.98	2.04	0.40	2.44	299
5%	1.40	1.37	1.42	0.51	2.69	301
	1.56	1.53	1.59	0.56	2.80	301
	1.75	1.72	1.77	0.57	2.81	300
	1.94	1.91	1.96	0.52	2.74	299
	2.02	1.98	2.04	0.49	2.66	299
	2.10	2.06	2.12	0.44	2.50	300
2%	1.40	1.37	1.42	0.53	2.65	300
	1.56	1.53	1.59	0.58	2.80	300
	1.75	1.72	1.77	0.61	2.88	300
	1.94	1.91	1.96	0.61	2.84	300
	2.10	2.06	2.12	0.52	2.72	299
	2.19	2.16	2.21	0.47	2.59	300
1%	1.40	1.37	1.42	0.54	2.60	300
	1.56	1.53	1.59	0.59	2.77	299
	1.75	1.72	1.77	0.64	2.94	300
	1.94	1.91	1.96	0.65	2.93	300
	2.10	2.06	2.12	0.61	2.84	300
	2.27	2.24	2.29	0.46	2.45	300
0.5%	1.48	1.45	1.51	0.59	2.67	299
	1.67	1.64	1.69	0.64	2.86	299
	1.83	1.79	1.85	0.67	3.05	300
	2.02	1.98	2.04	0.68	3.06	300
	2.19	2.16	2.21	0.62	2.87	300
	2.35	2.32	2.37	0.48	2.49	299
0.1%	1.48	1.45	1.51	0.61	2.56	298
	1.67	1.64	1.69	0.68	2.77	298
	1.83	1.79	1.85	0.72	3.01	298
	2.02	1.98	2.04	0.76	3.17	299
	2.19	2.16	2.21	0.76	3.18	300
	2.35	2.32	2.37	0.68	2.83	300

High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.80	1.77	1.83	0.62	2.83	300
	1.98	1.95	2.01	0.61	2.83	301
	2.06	2.03	2.09	0.57	2.81	301
	2.17	2.14	2.19	0.52	2.76	301
	2.25	2.22	2.27	0.46	2.64	301
	2.33	2.29	2.35	0.40	2.48	301
20%	1.80	1.77	1.83	0.65	2.87	300
	1.98	1.95	2.01	0.66	2.91	300
	2.17	2.14	2.19	0.59	2.82	300
	2.25	2.22	2.27	0.55	2.78	300
	2.33	2.29	2.35	0.50	2.72	300
	2.44	2.41	2.46	0.41	2.45	300
10%	1.80	1.77	1.83	0.66	2.94	300
	1.98	1.95	2.01	0.70	3.07	300
	2.17	2.14	2.19	0.65	2.81	300
	2.33	2.29	2.35	0.58	2.80	300
	2.44	2.41	2.46	0.48	2.65	300
	2.52	2.48	2.54	0.43	2.48	300
5%	1.90	1.87	1.92	0.72	3.07	299
	2.06	2.03	2.09	0.74	3.16	300
	2.25	2.22	2.27	0.69	3.02	300
	2.44	2.41	2.46	0.58	2.81	300
	2.52	2.48	2.54	0.52	2.74	300
	2.60	2.56	2.62	0.46	2.53	300
2%	1.90	1.87	1.92	0.74	3.10	298
	2.06	2.03	2.09	0.78	3.18	299
	2.25	2.22	2.27	0.77	3.19	300
	2.44	2.41	2.46	0.67	2.87	299
	2.60	2.56	2.62	0.59	2.82	300
	2.69	2.66	2.71	0.49	2.70	300
1%	1.90	1.87	1.92	0.75	3.08	298
	2.06	2.03	2.09	0.80	3.18	298
	2.25	2.22	2.27	0.82	3.22	300
	2.44	2.41	2.46	0.75	2.96	300
	2.60	2.56	2.62	0.67	2.90	300
	2.77	2.74	2.79	0.48	2.47	300
0.5%	1.98	1.95	2.01	0.80	3.12	297
	2.17	2.14	2.19	0.84	3.23	298
	2.33	2.29	2.35	0.85	3.24	299
	2.52	2.48	2.54	0.80	3.20	300
	2.69	2.66	2.71	0.66	2.96	300
	2.85	2.82	2.87	0.50	2.49	300
0.1%	1.98	1.95	2.01	0.84	3.04	296
	2.17	2.14	2.19	0.89	3.21	296
	2.33	2.29	2.35	0.92	3.31	298
	2.52	2.48	2.54	0.93	3.32	299
	2.69	2.66	2.71	0.87	3.24	300
	2.85	2.82	2.87	0.77	3.18	300

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.30	2.27	2.33	0.76	2.87	296
	2.48	2.45	2.51	0.67	2.86	301
	2.56	2.53	2.59	0.63	2.85	301
	2.67	2.64	2.69	0.52	2.47	301
	2.75	2.72	2.77	0.46	2.42	301
	2.83	2.79	2.85	0.40	2.26	301

Table 9-28: Shoreline Wave Climate and Water Level Combinations – Burrow Location BurrB.4

Wexford Coastal Wave & Water Level Modelling Study (CWWS)	
Coastal Areas Potentially Vulnerable to Wave Overtopping (CAPO)	
Output: Shoreline Wave Climate and Water Level Combinations	
Location: Burrow Location B.4	
Bed Level (MSL): -1.892m	
Bed Level (OD Malin OSGM02): -1.926m	
Bed Level (OD Malin OSGM15): -1.869m	
Dated: October 2020	
Joint Probability Event (AEP): Varies from 50% to 0.1%	
Prepared By: ZM	Checked By: CN
Table Reference: CWWS_CAPO_SE_Wexford	

Notes:	
1	Users of this information should refer to the CWWS Wexford Technical Report for a detailed description of the derivation of the data and it's applicability
2	Bed Level taken at approximately half the shallow water wavelength from structure / shoreline
3	Bed level source: OPW LiDAR data (2013)
4	AEP denotes the combined wave and water level joint Annual Exceedance Probability
5	Wind Wave Component refers to waves generated by the immediate local wind
6	Hm0 denotes the spectral significant wave height in metres
7	Tp denotes the spectral peak wave period in seconds
8	MWD denotes the mean wave direction in degrees north

Present Day Scenario Water Level						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	0.80	0.77	0.83	0.43	2.02	282
	0.98	0.95	1.01	0.42	2.16	282
	1.06	1.03	1.09	0.42	2.20	282
	1.17	1.14	1.19	0.39	2.26	282
	1.25	1.22	1.27	0.36	2.20	282
	1.33	1.29	1.35	0.32	2.11	283
20%	0.80	0.77	0.83	0.50	2.05	280
	0.98	0.95	1.01	0.50	2.15	280
	1.17	1.14	1.19	0.46	2.33	280
	1.25	1.22	1.27	0.44	2.36	281
	1.33	1.29	1.35	0.41	2.35	282
	1.44	1.41	1.46	0.35	2.22	282
10%	0.80	0.77	0.83	0.52	2.07	280
	0.98	0.95	1.01	0.54	2.16	280
	1.17	1.14	1.19	0.51	2.35	280
	1.33	1.29	1.35	0.46	2.41	281
	1.44	1.41	1.46	0.42	2.38	282
	1.52	1.48	1.54	0.38	2.32	282
5%	0.90	0.87	0.92	0.58	2.13	280
	1.06	1.03	1.09	0.58	2.22	279
	1.25	1.22	1.27	0.54	2.42	280
	1.44	1.41	1.46	0.48	2.46	281
	1.52	1.48	1.54	0.45	2.42	282
	1.60	1.56	1.62	0.39	2.16	285
2%	0.90	0.87	0.92	0.62	2.14	279
	1.06	1.03	1.09	0.62	2.24	279
	1.25	1.22	1.27	0.60	2.42	280
	1.44	1.41	1.46	0.56	2.60	281
	1.60	1.56	1.62	0.50	2.54	282
	1.69	1.66	1.71	0.44	2.44	282
1%	0.90	0.87	0.92	0.65	2.15	279
	1.06	1.03	1.09	0.66	2.26	279
	1.25	1.22	1.27	0.65	2.41	279
	1.44	1.41	1.46	0.61	2.65	280
	1.60	1.56	1.62	0.56	2.69	281
	1.77	1.74	1.79	0.45	2.44	283
0.5%	0.98	0.95	1.01	0.71	2.22	279
	1.17	1.14	1.19	0.69	2.38	279
	1.33	1.29	1.35	0.67	2.47	280
	1.52	1.48	1.54	0.64	2.71	280
	1.69	1.66	1.71	0.57	2.71	282
	1.85	1.82	1.87	0.48	2.48	283
0.1%	0.98	0.95	1.01	0.78	2.30	279
	1.17	1.14	1.19	0.79	2.41	279
	1.33	1.29	1.35	0.77	2.46	279
	1.52	1.48	1.54	0.75	2.69	280
	1.69	1.66	1.71	0.71	2.80	281
	1.85	1.82	1.87	0.66	2.81	282

Mid-Range Future Scenario (MRFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.30	1.27	1.33	0.57	2.50	281
	1.48	1.45	1.51	0.55	2.64	282
	1.56	1.53	1.59	0.50	2.43	284
	1.67	1.64	1.69	0.44	2.36	286
	1.75	1.72	1.77	0.39	2.19	287
	1.83	1.79	1.85	0.34	2.12	289
20%	1.30	1.27	1.33	0.63	2.49	280
	1.48	1.45	1.51	0.62	2.68	280
	1.67	1.64	1.69	0.55	2.66	282
	1.75	1.72	1.77	0.51	2.50	283
	1.83	1.79	1.85	0.48	2.47	283
	1.94	1.91	1.96	0.38	2.16	288
10%	1.30	1.27	1.33	0.66	2.48	280
	1.48	1.45	1.51	0.68	2.66	280
	1.67	1.64	1.69	0.61	2.75	281
	1.83	1.79	1.85	0.54	2.70	283
	1.94	1.91	1.96	0.49	2.55	283
	2.02	1.98	2.04	0.42	2.42	285
5%	1.40	1.37	1.42	0.72	2.56	279
	1.56	1.53	1.59	0.70	2.74	280
	1.75	1.72	1.77	0.65	2.79	281
	1.94	1.91	1.96	0.55	2.73	283
	2.02	1.98	2.04	0.51	2.63	284
	2.10	2.06	2.12	0.46	2.47	285
2%	1.40	1.37	1.42	0.76	2.54	279
	1.56	1.53	1.59	0.76	2.73	280
	1.75	1.72	1.77	0.72	2.83	281
	1.94	1.91	1.96	0.66	2.82	282
	2.10	2.06	2.12	0.54	2.70	284
	2.19	2.16	2.21	0.49	2.54	285
1%	1.40	1.37	1.42	0.79	2.52	279
	1.56	1.53	1.59	0.80	2.71	279
	1.75	1.72	1.77	0.78	2.86	280
	1.94	1.91	1.96	0.72	2.89	282
	2.10	2.06	2.12	0.64	2.82	283
	2.27	2.24	2.29	0.48	2.44	288
0.5%	1.48	1.45	1.51	0.86	2.62	279
	1.67	1.64	1.69	0.83	2.79	280
	1.83	1.79	1.85	0.81	2.95	280
	2.02	1.98	2.04	0.75	3.02	282
	2.19	2.16	2.21	0.65	2.84	284
	2.35	2.32	2.37	0.50	2.47	288
0.1%	1.48	1.45	1.51	0.94	2.61	279
	1.67	1.64	1.69	0.94	2.76	279
	1.83	1.79	1.85	0.92	2.87	279
	2.02	1.98	2.04	0.89	3.13	281
	2.19	2.16	2.21	0.83	3.16	283
	2.35	2.32	2.37	0.71	2.82	286

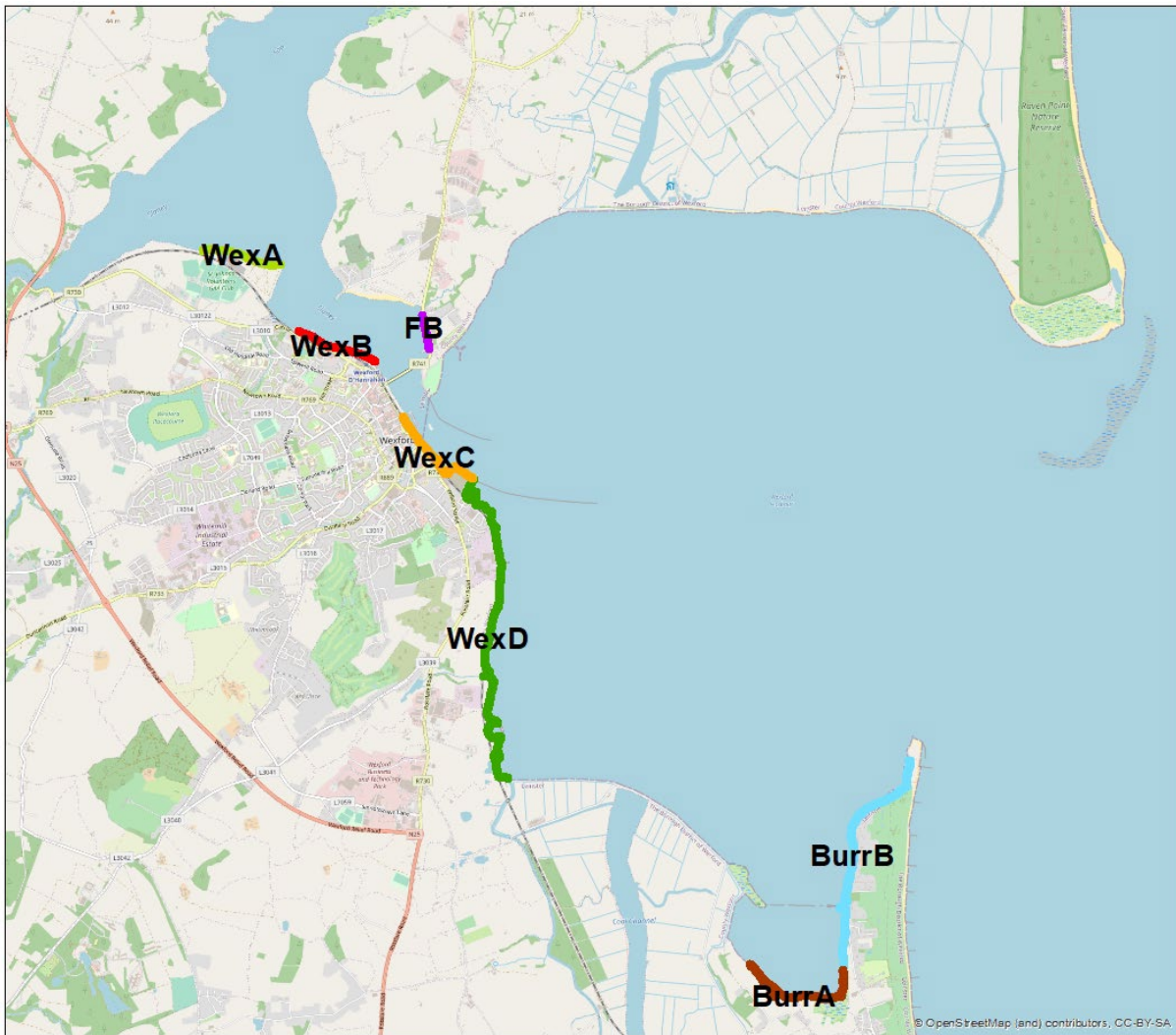
High End Future Scenario (HEFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	1.80	1.77	1.83	0.71	2.81	283
	1.98	1.95	2.01	0.64	2.82	284
	2.06	2.03	2.09	0.60	2.79	285
	2.17	2.14	2.19	0.53	2.74	286
	2.25	2.22	2.27	0.47	2.57	287
	2.33	2.29	2.35	0.41	2.45	288
20%	1.80	1.77	1.83	0.77	2.84	281
	1.98	1.95	2.01	0.73	2.88	282
	2.17	2.14	2.19	0.62	2.80	284
	2.25	2.22	2.27	0.58	2.77	285
	2.33	2.29	2.35	0.52	2.69	286
	2.44	2.41	2.46	0.42	2.43	288
10%	1.80	1.77	1.83	0.80	2.87	280
	1.98	1.95	2.01	0.80	3.03	281
	2.17	2.14	2.19	0.68	2.80	285
	2.33	2.29	2.35	0.60	2.78	286
	2.44	2.41	2.46	0.50	2.59	287
	2.52	2.48	2.54	0.45	2.46	288
5%	1.90	1.87	1.92	0.86	2.99	280
	2.06	2.03	2.09	0.84	3.13	281
	2.25	2.22	2.27	0.73	2.97	284
	2.44	2.41	2.46	0.60	2.79	286
	2.52	2.48	2.54	0.54	2.71	287
	2.60	2.56	2.62	0.47	2.50	288
2%	1.90	1.87	1.92	0.91	3.01	280
	2.06	2.03	2.09	0.90	3.14	281
	2.25	2.22	2.27	0.84	3.17	283
	2.44	2.41	2.46	0.70	2.84	285
	2.60	2.56	2.62	0.61	2.80	287
	2.69	2.66	2.71	0.50	2.66	288
1%	1.90	1.87	1.92	0.94	2.96	279
	2.06	2.03	2.09	0.95	3.13	280
	2.25	2.22	2.27	0.91	3.20	282
	2.44	2.41	2.46	0.78	2.92	286
	2.60	2.56	2.62	0.70	2.87	286
	2.77	2.74	2.79	0.49	2.45	290
0.5%	1.98	1.95	2.01	1.01	3.04	279
	2.17	2.14	2.19	0.98	3.18	281
	2.33	2.29	2.35	0.94	3.22	282
	2.52	2.48	2.54	0.83	3.18	284
	2.69	2.66	2.71	0.69	2.90	286
	2.85	2.82	2.87	0.52	2.48	290
0.1%	1.98	1.95	2.01	1.10	2.93	279
	2.17	2.14	2.19	1.10	3.15	279
	2.33	2.29	2.35	1.06	3.25	281
	2.52	2.48	2.54	1.02	3.28	283
	2.69	2.66	2.71	0.91	3.22	285
	2.85	2.82	2.87	0.79	3.15	286

High+ End Future Scenario (H+EFS)						
AEP	Water Level (m)			Wind Wave Component		
	MSL	OD Malin OSGM02	OD Malin OSGM15	Hm0 (m)	Tp (s)	MWD (°)
50%	2.30	2.27	2.33	0.80	2.87	284
	2.48	2.45	2.51	0.68	2.85	287
	2.56	2.53	2.59	0.65	2.83	287
	2.67	2.64	2.69	0.53	2.46	290
	2.75	2.72	2.77	0.47	2.40	291
	2.83	2.79	2.85	0.41	2.22	292

## 9.1 Sensitivity Analysis – Wexford Training Walls

As discussed under Section 3.2.1, information on the levels of the North and South Wexford Training walls at the time of completion of the Wexford Harbour Model and subsequent wave modelling simulations, the results of which are outlined in Section 9 was limited. Consequently following a review of the study outputs it was decided to undertake a detailed survey of the two training walls to verify the estimated levels used within the modelling. This comparison indicated that the height of part of the southern training wall had been over estimated and therefore it was deemed necessary to undertake a sensitivity assessment to determine the implications of the lower measured wall levels on the wave climate at relevant sections of coastline / defence line at Wexford.

Initially, a screening exercise was undertaken to identify which Wexford CAPO wave climates could potentially be influenced by a change in elevation of the training walls. Due to their location, Wexford A/B and Ferrybank, are exposed to waves from the west through north sector, as shown in Figure 9.8, thus the training walls would have no effect on their wave climate. Similarly, Burrow A is predominantly affected by waves from 340°, and again would not be impacted by the training walls. The critical wave direction for Burrow B is 280° which again would eliminate any potential influence of the training walls, however Burrow B is also exposed to the north west and a reduction in training wall levels could influence the Burrow B wave climate from this direction, which could potentially make north west a more critical direction than the 280° sector. A review of the critical direction screening simulations for all estimation points along Burrow B, showed a steady decrease in significant wave height from 280° through 350°, thus indicating that the wave climate was unaffected by the presence of the training walls. Consequently the sensitivity simulations focussed on establishing any impact at the Wexford C and D CAPOs.



**Figure 9.8: Study CAPO Locations**

For the sensitivity assessment, the model was updated with surveyed wall data and the simulations for the 0.1% AEP present day events re-run. Combined waves from 30°-150° and wind waves from 40° were included, with the 120° sector again resulting in the most arduous conditions at all estimation points along the Wexford C and D CAPOs. Thus the change in wall levels was established to have no impact on the critical direction.

Following this, a further two sensitivity simulations were undertaken, for the 10% and 0.5% AEP present day events. The comparison of simulation results using the estimated and surveyed wall levels, in terms of significant wave height, peak wave period and mean wave direction, can be viewed in Table 9-29, Table 9-30 and Table 9-31 respectively.

Only negligible differences in significant wave height were determined at the shoreline / defence line of Wexford C and D due to the inclusion of the surveyed levels, as shown in Table 9-29. The maximum difference at WexC.1 and WexD.1 was 0.03m, with estimation points further south along the Wexford D CAPO largely unaffected. Similarly, as shown in Table 9-30, wave periods were largely unchanged, with the only notable difference occurring between WexD.2 and WexD.4 for the 10% AEP combination with the lowest wave height and highest water levels, where the dominant period within the combined wave has transitioned from the shorter wind wave component to the longer swell wave component. At WexD.1, a small increase in wave period during the 0.5% AEP, was accompanied by a slight rise in significant wave height. Changes in mean wave direction at all points were less than 8 degrees, as shown in Table 9-31.

**Table 9-29: Comparison of Significant Wave Height (m) between Simulations with Estimated and Surveyed North and South Training Wall Levels**

		Significant Wave Height (m)								
		WexC.1	WexC.2	WexC.3	WexD.1	WexD.2	WexD.3	WexD.4	WexD.5	WexD.6
Simulations with Estimated Wall Levels	10%	0.72	0.53	0.77	0.64	0.54	0.70	0.65	0.59	0.61
		0.60	0.41	0.63	0.61	0.56	0.69	0.65	0.62	0.55
		0.47	0.27	0.49	0.50	0.47	0.57	0.55	0.54	0.44
		0.33	0.17	0.36	0.37	0.33	0.41	0.40	0.39	0.31
		0.28	0.15	0.32	0.32	0.29	0.35	0.34	0.34	0.25
		0.24	0.13	0.27	0.26	0.25	0.28	0.27	0.26	0.20
	0.5%	1.03	0.70	1.09	0.76	0.61	0.79	0.79	0.65	0.80
		0.97	0.71	1.01	0.81	0.68	0.85	0.82	0.72	0.79
		0.84	0.62	0.90	0.81	0.70	0.87	0.82	0.76	0.75
		0.68	0.45	0.71	0.73	0.69	0.83	0.79	0.76	0.67
		0.43	0.23	0.48	0.50	0.45	0.56	0.55	0.54	0.45
		0.29	0.17	0.32	0.31	0.30	0.34	0.33	0.34	0.26
Simulations with Surveyed Wall Levels	10%	0.73	0.53	0.78	0.67	0.56	0.70	0.65	0.59	0.60
		0.61	0.39	0.64	0.63	0.57	0.68	0.64	0.62	0.55
		0.47	0.27	0.48	0.51	0.47	0.57	0.55	0.54	0.44
		0.33	0.17	0.35	0.37	0.33	0.41	0.40	0.39	0.31
		0.28	0.15	0.31	0.32	0.29	0.35	0.34	0.33	0.25
		0.24	0.13	0.26	0.25	0.24	0.27	0.25	0.25	0.19
	0.5%	1.06	0.70	1.10	0.78	0.62	0.79	0.79	0.65	0.80
		0.99	0.71	1.02	0.84	0.69	0.85	0.82	0.72	0.79
		0.86	0.63	0.90	0.83	0.72	0.87	0.81	0.76	0.75
		0.69	0.46	0.71	0.76	0.69	0.83	0.79	0.77	0.66
		0.44	0.23	0.47	0.51	0.45	0.56	0.55	0.54	0.44
		0.28	0.16	0.31	0.31	0.30	0.33	0.32	0.33	0.26
Difference (Surveyed - Estimated)	10%	0.01	0.00	0.01	0.03	0.02	0.00	-0.01	0.00	-0.01
		0.01	-0.02	0.00	0.03	0.01	0.00	0.00	0.00	0.00
		0.00	0.00	-0.01	0.01	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	-0.01	-0.01	0.00	-0.01	-0.02	-0.01	-0.01
	0.5%	0.03	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.00
		0.02	0.00	0.01	0.03	0.02	0.00	0.00	0.00	-0.01
		0.02	0.00	0.00	0.03	0.01	0.00	-0.01	0.00	-0.01
		0.01	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00
		0.01	0.00	-0.01	0.01	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	0.00

**Table 9-30: Comparison of Peak Wave Period (s) between Simulations with Estimated and Surveyed North and South Training Wall Levels**

		Peak Wave Period (s)								
		WexC.1	WexC.2	WexC.3	WexD.1	WexD.2	WexD.3	WexD.4	WexD.5	WexD.6
Simulations with Estimated Wall Levels	10%	2.83	3.06	2.85	2.80	2.82	2.80	2.71	2.61	2.31
		2.77	2.83	2.76	2.78	2.79	2.76	2.69	2.69	2.41
		2.44	2.25	2.43	2.48	2.49	2.48	2.46	2.46	2.21
		2.16	7.18	2.17	2.19	2.17	2.18	2.16	2.16	2.01
		2.14	7.42	2.12	2.12	2.11	2.11	2.09	2.07	1.86
		2.05	6.53	1.93	1.91	6.39	2.22	4.10	6.52	6.51
	0.5%	3.19	3.43	3.15	2.66	2.76	2.76	2.44	2.40	2.22
		3.18	3.39	3.17	2.96	3.01	2.93	2.76	2.70	2.42
		3.15	3.30	3.15	3.12	3.13	3.07	2.89	2.86	2.65
		2.82	2.79	2.80	2.91	2.93	2.91	2.86	2.88	2.70
		2.42	8.60	2.48	2.52	2.51	2.51	2.49	2.49	2.29
		2.17	7.15	2.12	2.10	7.00	6.93	6.96	6.92	6.87
Simulations with Surveyed Wall Levels	10%	2.84	3.05	2.85	2.82	2.83	2.80	2.69	2.60	2.30
		2.77	2.83	2.76	2.79	2.79	2.76	2.69	2.69	2.40
		2.43	2.22	2.41	2.49	2.49	2.48	2.46	2.47	2.22
		2.16	7.18	2.16	2.20	2.17	2.18	2.16	2.15	1.99
		2.14	7.42	2.11	2.12	2.10	2.10	2.08	2.06	1.86
		2.03	6.53	1.90	1.88	6.52	6.51	6.51	6.52	6.51
	0.5%	3.19	3.43	3.17	2.78	2.78	2.75	2.42	2.40	2.22
		3.18	3.38	3.18	3.06	3.04	2.93	2.75	2.70	2.41
		3.15	3.30	3.15	3.14	3.14	3.07	2.87	2.85	2.64
		2.82	2.79	2.79	2.94	2.93	2.91	2.86	2.88	2.70
		2.42	8.60	2.46	2.53	2.51	2.51	2.49	2.49	2.27
		2.17	7.15	2.11	2.08	6.99	6.93	6.94	6.92	6.87
Difference (Surveyed - Estimated)	10%	0.00	-0.01	0.00	0.02	0.00	0.00	-0.02	-0.01	-0.01
		0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
		0.00	-0.03	-0.01	0.01	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	-0.01
		0.00	0.00	-0.01	0.00	-0.01	-0.01	-0.01	-0.02	0.00
		-0.02	0.00	-0.03	-0.04	0.13	4.29	2.41	0.00	0.00
	0.5%	0.00	-0.01	0.02	0.12	0.02	0.00	-0.02	0.00	0.00
		0.00	-0.01	0.01	0.10	0.03	-0.01	-0.02	0.00	-0.01
		0.00	-0.01	0.00	0.02	0.01	0.00	-0.01	0.00	-0.01
		0.00	0.00	-0.01	0.02	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	-0.02	0.01	0.00	0.00	0.00	0.00	-0.02
		0.00	0.00	-0.01	-0.02	0.00	-0.01	-0.02	-0.01	0.00

**Table 9-31: Comparison of Mean Wave Direction (°) between Simulations with Estimated and Surveyed North and South Training Wall Levels**

		Mean Wave Direction (°)								
		WexC.1	WexC.2	WexC.3	WexD.1	WexD.2	WexD.3	WexD.4	WexD.5	WexD.6
Simulations with Estimated Wall Levels	10%	95.23	74.23	92.29	100.05	92.73	109.05	115.41	107.07	106.00
		94.26	73.58	94.89	100.09	93.29	110.65	113.71	108.55	98.66
		95.53	66.22	105.31	104.50	97.53	116.05	119.62	116.10	96.27
		97.65	67.86	111.82	108.79	101.70	121.43	123.29	120.07	92.91
		97.44	68.30	110.79	107.99	100.95	117.74	118.33	115.13	89.94
		97.04	70.96	107.13	104.23	98.06	108.83	106.80	101.25	79.61
	0.5%	96.13	74.26	95.40	102.59	98.70	111.11	121.58	111.80	114.71
		96.01	76.47	95.17	100.12	95.73	109.69	117.87	110.06	109.69
		95.10	76.63	93.79	98.35	93.35	108.66	114.16	108.35	103.75
		94.90	77.25	101.01	102.65	96.20	113.08	117.02	112.45	97.54
		99.60	68.14	113.98	109.74	103.24	123.74	125.97	121.92	93.40
		96.52	70.22	104.16	100.29	95.54	105.31	102.34	97.54	74.48
Simulations with Surveyed Wall Levels	10%	96.15	73.37	92.54	94.28	93.94	109.40	114.95	107.36	106.31
		94.96	66.18	94.67	97.31	94.05	110.97	113.04	108.63	98.81
		96.39	67.13	104.38	103.84	98.53	115.63	118.58	115.78	96.14
		97.80	67.79	110.42	108.28	101.92	120.70	122.98	120.13	92.76
		97.23	68.29	109.10	107.15	100.92	117.07	118.04	115.03	89.48
		96.14	71.30	103.50	101.03	96.32	104.99	101.97	96.39	74.45
	0.5%	96.37	73.92	95.12	95.47	99.18	110.99	120.56	111.97	114.90
		96.21	76.30	95.01	94.71	96.11	109.63	117.25	110.27	109.97
		95.42	76.54	93.77	94.20	93.82	108.81	113.70	108.52	104.02
		95.19	77.17	100.27	100.76	96.68	112.67	115.91	112.26	97.62
		99.58	67.86	112.31	109.19	103.29	122.76	125.25	121.81	93.29
		96.84	70.35	103.36	99.24	95.65	104.31	101.08	96.09	73.53
Difference (Surveyed - Estimated)	10%	0.92	-0.86	0.25	-5.77	1.21	0.35	-0.46	0.30	0.31
		0.70	-7.40	-0.22	-2.78	0.77	0.32	-0.66	0.07	0.15
		0.86	0.91	-0.93	-0.66	1.00	-0.42	-1.04	-0.32	-0.13
		0.15	-0.06	-1.40	-0.51	0.22	-0.73	-0.31	0.06	-0.15
		-0.21	0.00	-1.69	-0.84	-0.02	-0.67	-0.29	-0.10	-0.46
		-0.90	0.34	-3.63	-3.20	-1.74	-3.84	-4.83	-4.87	-5.16
	0.5%	0.23	-0.33	-0.27	-7.12	0.48	-0.12	-1.01	0.17	0.19
		0.20	-0.17	-0.15	-5.41	0.38	-0.06	-0.62	0.20	0.28
		0.32	-0.09	-0.02	-4.15	0.46	0.15	-0.46	0.17	0.27
		0.30	-0.09	-0.73	-1.89	0.48	-0.41	-1.11	-0.19	0.08
		-0.02	-0.28	-1.67	-0.55	0.05	-0.98	-0.72	-0.11	-0.12
		0.32	0.13	-0.80	-1.05	0.11	-1.00	-1.27	-1.45	-0.96

In conclusion, the sensitivity simulations, indicated only minor differences in wave climate at the shoreline / defence line of Wexford C and D due to the inclusion of the surveyed training wall data. Many of these differences may be a result of the iterative solution technique employed within the modelling itself, as it converges to the best solution for each model simulation. On this basis it is considered that the results outlined in Section 9 remain appropriate for use in wave overtopping analysis/modelling to inform scheme design and assessment of hydraulic performance of any proposed flood defence measures within Wexford Harbour.

While analysing the results from the sensitivity runs, the wave climate along the gap between CAPO's B and C (from the train station to Crescent Quay) was also reviewed. For the 120° sector, the significant wave heights from the updated model were slightly smaller at point WexB.3, for the critical direction 340° wind waves, thus confirming that the critical wave climate at Wexford B is unaffected by the adjustment in the levels of the training walls. However, it was noted that the significant wave height along the frontage in the gap between CAPO's B and C reached up to circa 0.9m for the 0.5% AEP from 120°. Thus there is potential for a notable wave climate in this area, which was not included for assessment as part of this study that would warrant consideration for any scheme design in this area.

## 10 REFERENCES

**Reference 1:** RPS, October 2020, “Irish Coastal Wave and Water Level Modelling Study 2018 – Phase 2 – Coastal Areas Potentially Vulnerable to Wave Overtopping”

**Reference 2:** RPS, September 2020, “Irish Coastal Wave and Water Level Modelling Study 2018 – Phase 1 – Extreme Water Levels”

**Reference 3:** RPS, October 2020, “Irish Coastal Wave and Water Level Modelling Study 2018 – Phase 4 – Review of Mean Sea Level and OD Malin Head Relationship at Irish Gauge Locations”

**Reference 4:** RPS, November 2013, Technical Report, “Irish Coastal Wave & Water Level Modelling Study – Coastal Areas Potentially Vulnerable to Wave Overtopping”

**Reference 5:** Eurocode, BS EN 1991-1-4:2005+A1:2010, “Actions on structures – Part 1-4: General actions – Wind actions”

**Reference 6:** Department of Energy, January 1990, “Offshore Installations: Guidance on design, construction and certification, Fourth Edition, Section 11, Environmental considerations”

**Reference 7:** DEFRA / Environment Agency, March 2005, R&D Technical Report FD2308/TR2, “Use of Joint Probability Methods in Flood Management: A Guide to Best Practice”

## Appendix A

### Extreme Value Analysis of Offshore Wave data

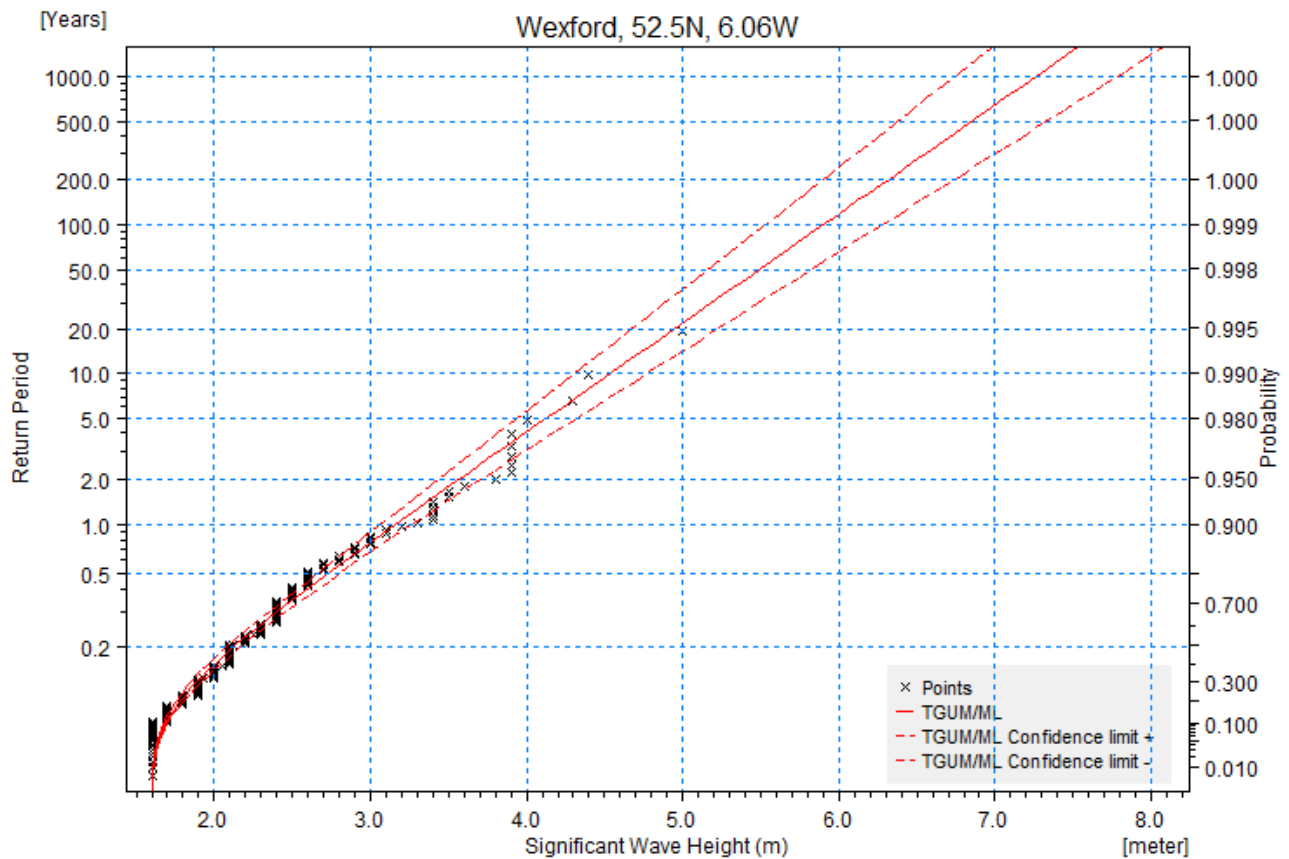


Figure A1: EVA plot for wave height at 52.5N, 6.06W for the 45° directional sector

**Table A1: EVA values and goodness of fit for wave height at 52.5N, 6.06W for the 45° directional sector**

Wexford		
52.5N, 6.06W		
		D/E Combination
	Return Period [years]	TGUM/ML
Estimated quantile	2.00	3.575
	5.00	4.123
	10.00	4.534
	20.00	4.946
	50.00	5.488
	100.00	5.899
	200.00	6.309
	1000.00	7.262
Average quantile	2.00	3.579
	5.00	4.126
	10.00	4.538
	20.00	4.949
	50.00	5.491
	100.00	5.901
	200.00	6.311
	1000.00	7.262
Standard deviation	2.00	0.137
	5.00	0.190
	10.00	0.232
	20.00	0.274
	50.00	0.331
	100.00	0.374
	200.00	0.418
	1000.00	0.519
Goodness-of-fit statistics	SLSC	0.023
	PPCC1	0.995
	PPCC2	0.995

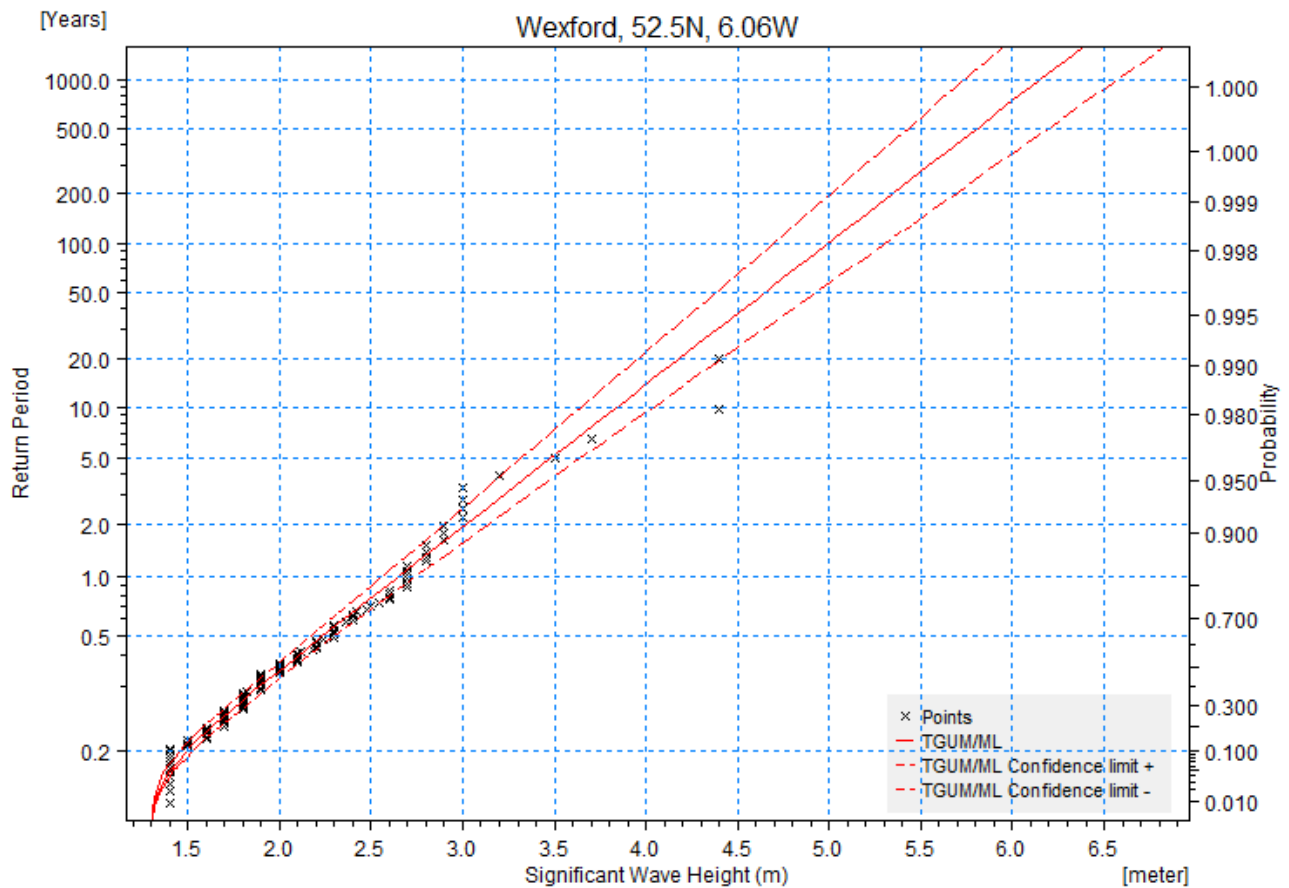


Figure A2: EVA plot for wave height at 52.5N, 6.06W for the 90° directional sector

**Table A2: EVA values and goodness of fit for wave height at 52.5N, 6.06W for the 90° directional sector**

Wexford		
52.5N, 6.06W		
		D/E Combination
	Return Period [years]	TGUM/ML
Estimated quantile	2.00	3.013
	5.00	3.486
	10.00	3.837
	20.00	4.187
	50.00	4.648
	100.00	4.995
	200.00	5.343
	1000.00	6.150
Average quantile	2.00	3.016
	5.00	3.489
	10.00	3.841
	20.00	4.191
	50.00	4.652
	100.00	5.001
	200.00	5.349
	1000.00	6.157
Standard deviation	2.00	0.120
	5.00	0.162
	10.00	0.195
	20.00	0.228
	50.00	0.272
	100.00	0.305
	200.00	0.339
	1000.00	0.417
Goodness-of-fit statistics	SLSC	0.030
	PPCC1	0.991
	PPCC2	0.991

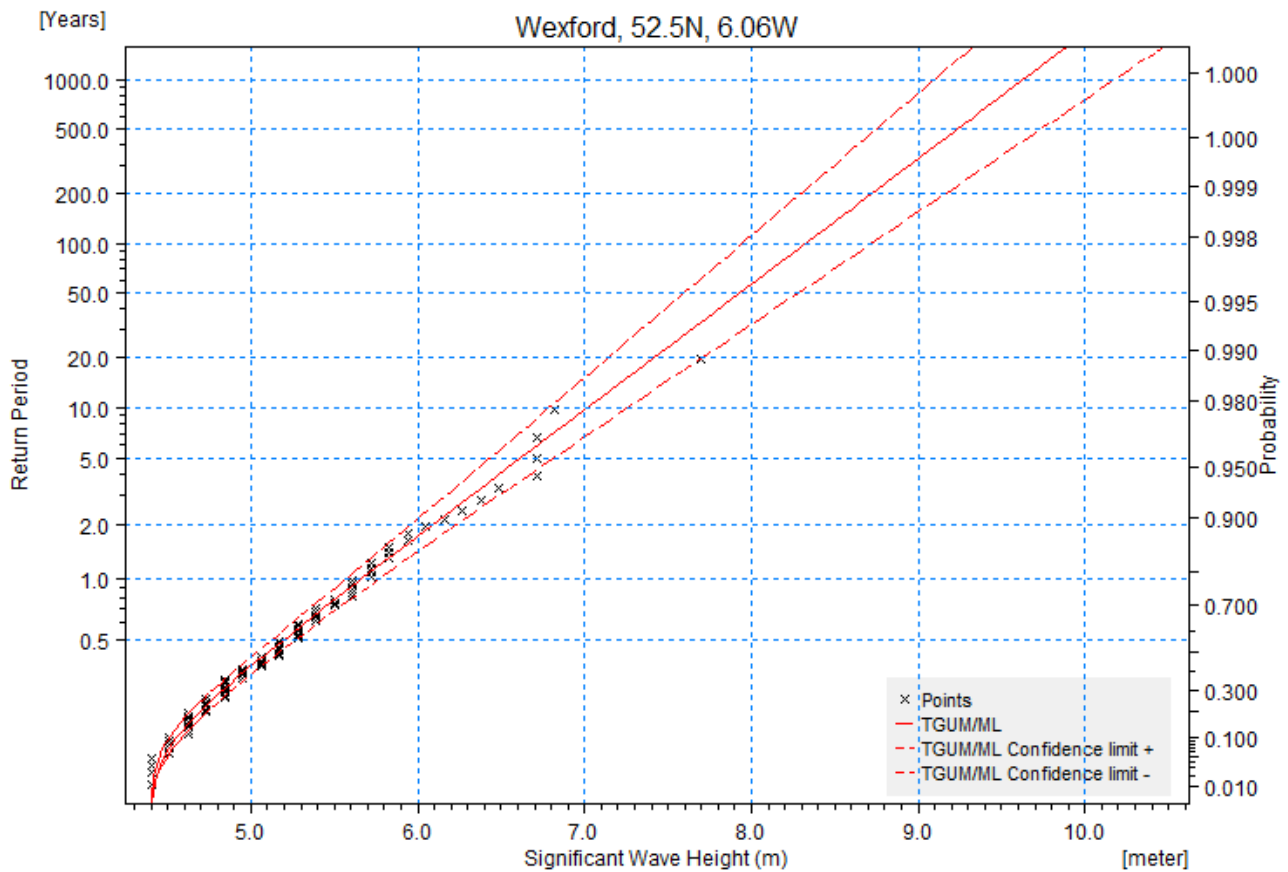


Figure A3: EVA plot for wave height at 52.5N, 6.06W for the 135° directional sector

**Table A3: EVA values and goodness of fit for wave height at 52.5N, 6.06W for the 135° directional sector**

Wexford		
52.5N, 6.06W		
		D/E Combination
	Return Period [years]	TGUM/ML
Estimated quantile	2.00	6.081
	5.00	6.617
	10.00	7.015
	20.00	7.411
	50.00	7.931
	100.00	8.325
	200.00	8.718
	1000.00	9.629
Average quantile	2.00	6.087
	5.00	6.623
	10.00	7.022
	20.00	7.418
	50.00	7.939
	100.00	8.332
	200.00	8.726
	1000.00	9.638
Standard deviation	2.00	0.136
	5.00	0.192
	10.00	0.236
	20.00	0.281
	50.00	0.341
	100.00	0.387
	200.00	0.434
	1000.00	0.542
Goodness-of-fit statistics	SLSC	0.021
	PPCC1	0.996
	PPCC2	0.996

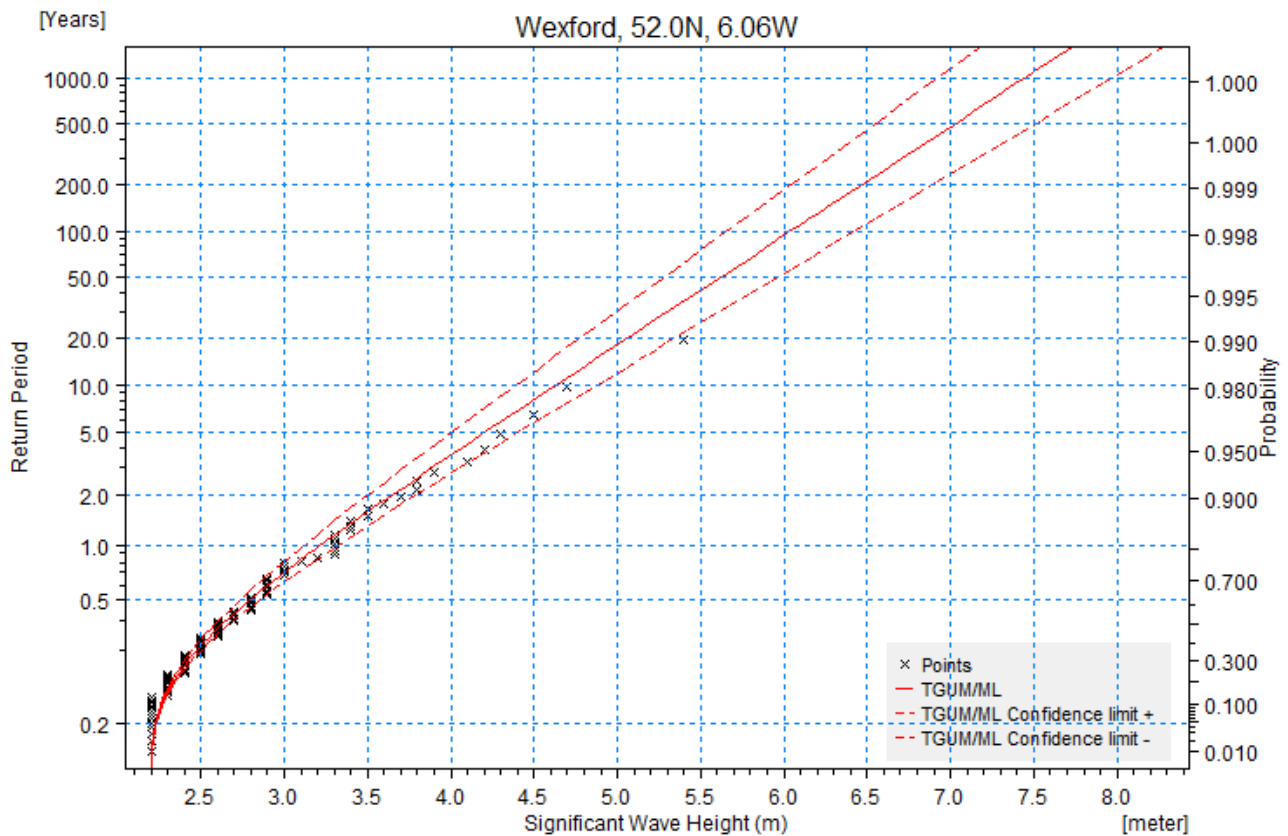


Figure A4: EVA plot for wave height at 52.0N, 6.06W for the 45° directional sector

**Table A4: EVA values and goodness of fit for wave height at 52.0N, 6.06W for the 45° directional sector**

Wexford		
52.0N, 6.06W		
		D/E Combination
	Return Period [years]	TGUM/ML
Estimated quantile	2.00	3.641
	5.00	4.203
	10.00	4.627
	20.00	5.052
	50.00	5.613
	100.00	6.038
	200.00	6.463
	1000.00	7.449
Average quantile	2.00	3.641
	5.00	4.203
	10.00	4.627
	20.00	5.052
	50.00	5.613
	100.00	6.038
	200.00	6.463
	1000.00	7.448
Standard deviation	2.00	0.143
	5.00	0.199
	10.00	0.241
	20.00	0.284
	50.00	0.339
	100.00	0.382
	200.00	0.424
	1000.00	0.522
Goodness-of-fit statistics	SLSC	0.022
	PPCC1	0.998
	PPCC2	0.998

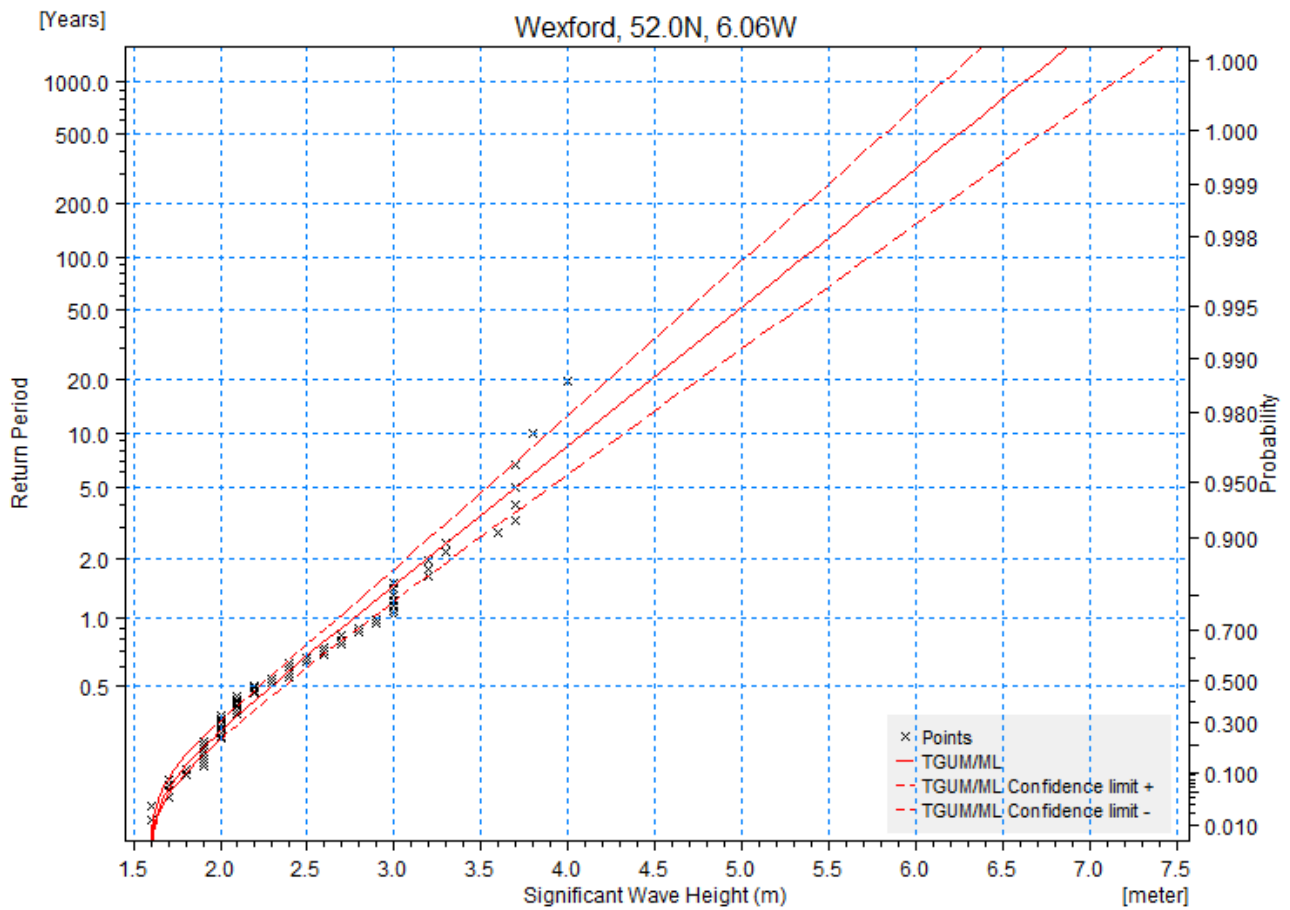


Figure A5: EVA plot for wave height at 52.0N, 6.06W for the 90° directional sector

**Table A5: EVA values and goodness of fit for wave height at 52.0N, 6.06W for the 90° directional sector**

Wexford		
52.0N, 6.06W		
		D/E Combination
	Return Period [years]	TGUM/ML
Estimated quantile	2.00	3.184
	5.00	3.706
	10.00	4.092
	20.00	4.475
	50.00	4.979
	100.00	5.359
	200.00	5.739
	1000.00	6.621
Average quantile	2.00	3.191
	5.00	3.717
	10.00	4.105
	20.00	4.490
	50.00	4.997
	100.00	5.380
	200.00	5.762
	1000.00	6.649
Standard deviation	2.00	0.130
	5.00	0.180
	10.00	0.219
	20.00	0.260
	50.00	0.314
	100.00	0.355
	200.00	0.397
	1000.00	0.495
Goodness-of-fit statistics	SLSC	0.035
	PPCC1	0.985
	PPCC2	0.985

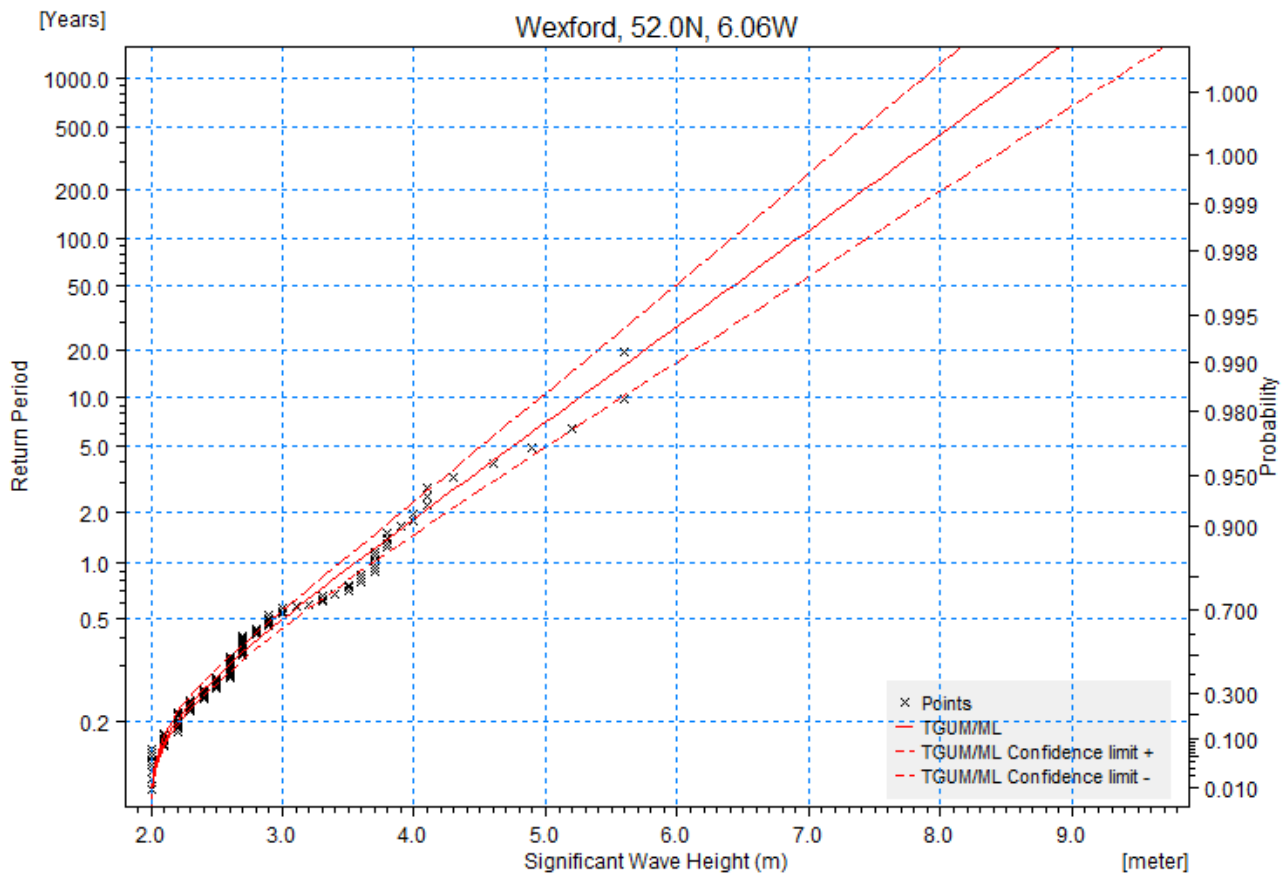


Figure A6: EVA plot for wave height at 52.0N, 6.06W for the 135° directional sector

**Table A6: EVA values and goodness of fit for wave height at 52.0N, 6.06W for the 135° directional sector**

Wexford		
52.0N, 6.06W		
		D/E Combination
	Return Period [years]	TGUM/ML
Estimated quantile	2.00	4.073
	5.00	4.746
	10.00	5.250
	20.00	5.753
	50.00	6.416
	100.00	6.917
	200.00	7.418
	1000.00	8.581
Average quantile	2.00	4.081
	5.00	4.755
	10.00	5.260
	20.00	5.763
	50.00	6.427
	100.00	6.928
	200.00	7.429
	1000.00	8.592
Standard deviation	2.00	0.173
	5.00	0.248
	10.00	0.308
	20.00	0.370
	50.00	0.453
	100.00	0.516
	200.00	0.580
	1000.00	0.729
Goodness-of-fit statistics	SLSC	0.027
	PPCC1	0.993
	PPCC2	0.993

## Appendix B

### Joint Probability Analysis of Offshore Wave/Wind data and Inshore Water Level

**Table B1: Joint probability table showing probability of wind speed with water level (340° sector) for Wexford WA and WB**

		Joint exceedance return period (years)							
		2	5	10	20	50	100	200	1000
		Marginal return period (years) for				Wind Speed 340°MWD (m/s)			
Marginal return period (years) for Present-day sea level SE32 (m to MSL)	0.01	1.126	3.099	6.666	14.336	39.457	84.866	182.532	1000.000
	0.02	0.563	1.550	3.333	7.168	19.729	42.433	91.266	540.257
	0.05	0.225	0.620	1.333	2.867	7.891	16.973	36.506	216.103
	0.1	0.113	0.310	0.667	1.434	3.946	8.487	18.253	108.051
	0.2	0.056	0.155	0.333	0.717	1.973	4.243	9.127	54.026
	0.5	0.023	0.062	0.133	0.287	0.789	1.697	3.651	21.610
	1	0.011	0.031	0.067	0.143	0.395	0.849	1.825	10.805
	2	0.006	0.015	0.033	0.072	0.197	0.424	0.913	5.403
	5	#N/A	0.006	0.013	0.029	0.079	0.170	0.365	2.161
	10	#N/A	#N/A	0.007	0.014	0.039	0.085	0.183	1.081
	20	#N/A	#N/A	#N/A	0.007	0.020	0.042	0.091	0.540
	50	#N/A	#N/A	#N/A	#N/A	0.008	0.017	0.037	0.216
	100	#N/A	#N/A	#N/A	#N/A	#N/A	0.008	0.018	0.108
	200	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.009	0.054
	1000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.011

**Table B2: Joint probability table showing wind speed and water level (340° sector) for Wexford WA and WB**

		Joint exceedance return period (years)							
Value of first variable:		2	5	10	20	50	100	200	1000
Present-day sea level SE32 (m to MSL)		Value of second variable:				Wind Speed 340°MWD (m/s)			
	0.55	18.69	20.78	22.43	23.88	25.89	27.37	29.05	32.94
	0.67	17.29	19.29	20.95	22.57	24.49	26.03	27.51	31.53
	0.81	15.41	17.49	19.01	20.60	22.75	24.21	25.73	29.44
	0.90	13.99	16.07	17.63	19.14	21.34	22.89	24.34	27.86
	1.01	12.57	14.65	16.22	17.78	19.75	21.50	23.03	26.51
	1.14	10.69	12.77	14.34	15.91	17.98	19.46	21.16	24.67
	1.25	9.27	11.34	12.92	14.49	16.56	18.13	19.60	23.35
	1.34	7.85	9.92	11.49	13.07	15.14	16.71	18.28	22.03
	1.48	#N/A	8.04	9.61	11.19	13.26	14.83	16.40	19.95
	1.58	#N/A	#N/A	8.19	9.76	11.84	13.41	14.98	18.61
	1.67	#N/A	#N/A	#N/A	8.34	10.42	11.99	13.56	17.20
	1.79	#N/A	#N/A	#N/A	#N/A	8.54	10.11	11.68	15.33
	1.88	#N/A	#N/A	#N/A	#N/A	#N/A	8.69	10.26	13.91
	1.97	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	8.84	12.49
	2.18	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.00

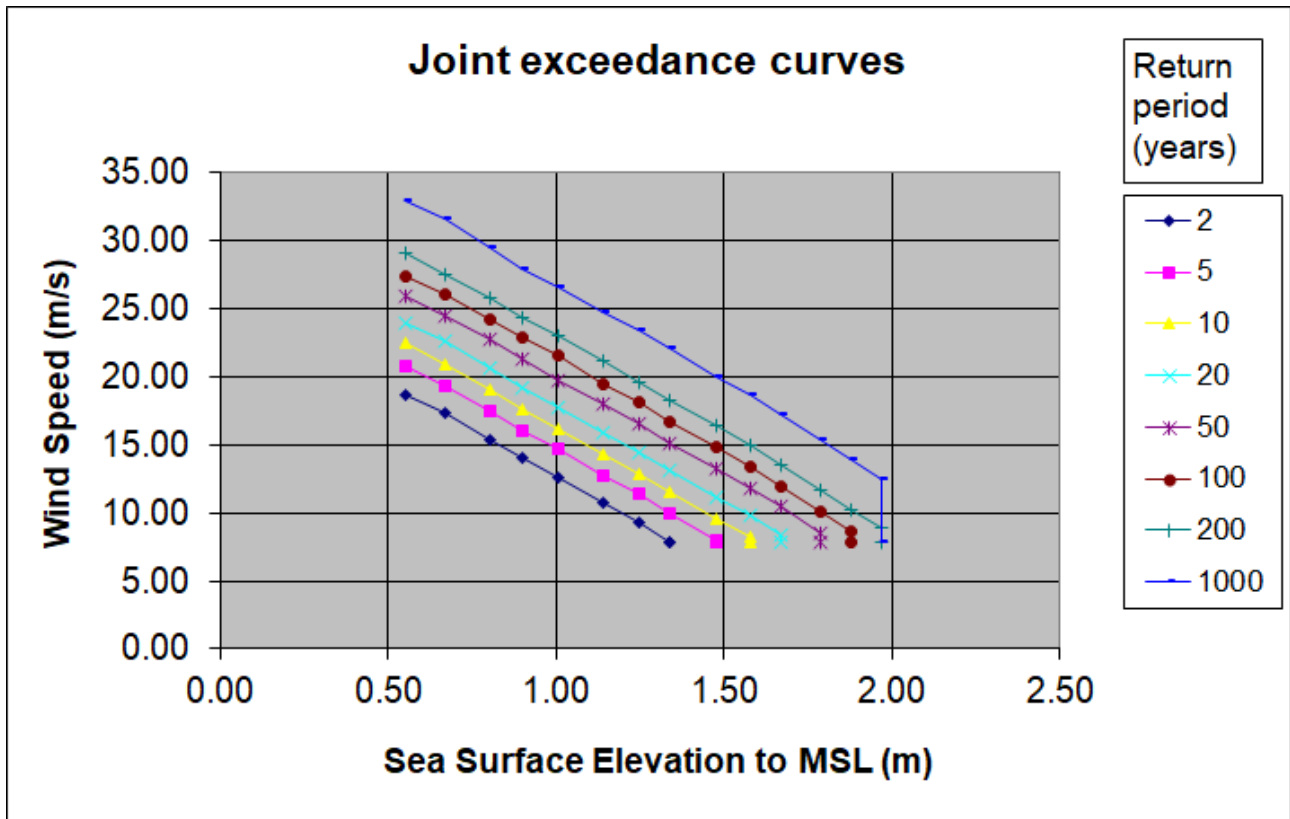


Figure B1: Joint wind speed and water level exceedance curve (340° sector) for Wexford WA and WB

**Table B3: Joint probability table showing probability of wave height with water level at 52.5N, 6.06W (120° sector) for Wexford WC and WD**

		Joint exceedance return period (years)							
		2	5	10	20	50	100	200	1000
		Marginal return period (years) for Significant Wave Height (m) 52.5N, 6.06W 120°							
Marginal return period (years) for Present-day sea level SE33 (m to MSL)	0.01	1.774	5.000	10.000	20.000	50.000	100.000	200.000	1000.000
	0.02	0.887	2.602	5.872	13.250	38.860	87.694	197.900	1000.000
	0.05	0.355	1.041	2.349	5.300	15.544	35.078	79.160	523.897
	0.1	0.177	0.520	1.174	2.650	7.772	17.539	39.580	261.949
	0.2	0.089	0.260	0.587	1.325	3.886	8.769	19.790	130.974
	0.5	0.035	0.104	0.235	0.530	1.554	3.508	7.916	52.390
	1	0.018	0.052	0.117	0.265	0.777	1.754	3.958	26.195
	2	0.009	0.026	0.059	0.133	0.389	0.877	1.979	13.097
	5	#N/A	0.010	0.023	0.053	0.155	0.351	0.792	5.239
	10	#N/A	#N/A	0.012	0.027	0.078	0.175	0.396	2.619
	20	#N/A	#N/A	#N/A	0.013	0.039	0.088	0.198	1.310
	50	#N/A	#N/A	#N/A	#N/A	0.016	0.035	0.079	0.524
	100	#N/A	#N/A	#N/A	#N/A	#N/A	0.018	0.040	0.262
	200	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.020	0.131
	1000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.026

**Table B4: Joint probability table showing wave height and water level at 52.5N, 6.06W (120° sector) for Wexford WC and WD**

		Joint exceedance return period (years)							
Value of first variable:		2	5	10	20	50	100	200	1000
Present-day sea level SE33 (m to MSL)									
	Value of second variable:	Significant Wave Height (m) 52.5N, 6.06W 120°							
	0.62	6.01	6.62	7.02	7.41	7.93	8.32	8.72	9.63
	0.72	5.62	6.24	6.71	7.18	7.79	8.25	8.71	9.63
	0.84	5.08	5.71	6.18	6.65	7.27	7.73	8.19	9.26
	0.92	4.68	5.31	5.78	6.25	6.87	7.34	7.80	8.87
	1.01	4.27	4.90	5.38	5.85	6.47	6.94	7.40	8.48
	1.13	3.74	4.37	4.84	5.32	5.94	6.41	6.88	7.96
	1.22	3.33	3.96	4.44	4.91	5.54	6.01	6.48	7.56
	1.31	2.93	3.56	4.03	4.51	5.14	5.61	6.08	7.17
	1.43	#N/A	3.02	3.50	3.97	4.60	5.08	5.55	6.64
	1.52	#N/A	#N/A	3.09	3.57	4.20	4.67	5.15	6.24
	1.60	#N/A	#N/A	#N/A	3.16	3.79	4.27	4.74	5.84
	1.71	#N/A	#N/A	#N/A	#N/A	3.25	3.73	4.21	5.31
	1.79	#N/A	#N/A	#N/A	#N/A	#N/A	3.33	3.80	4.91
	1.87	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	3.40	4.50
	2.06	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.00

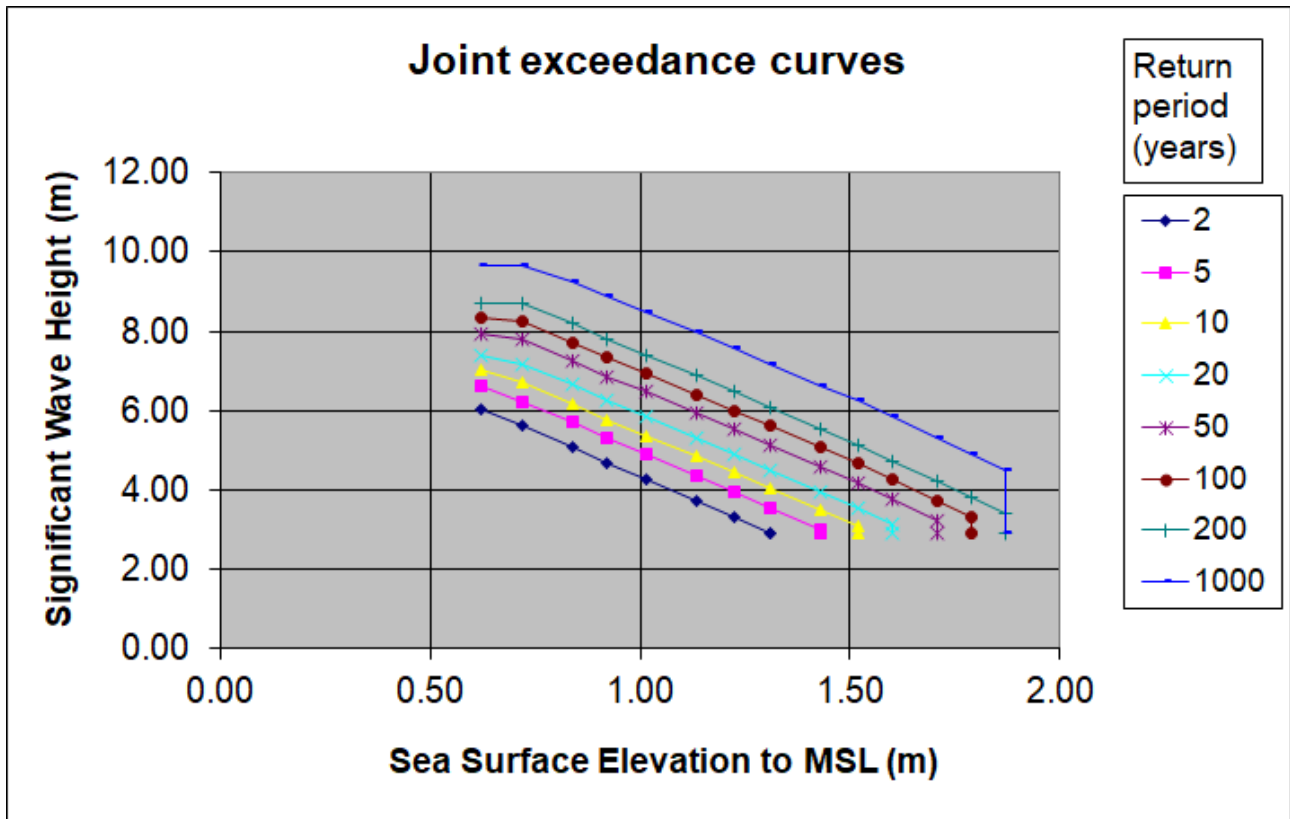


Figure B2: Offshore joint wave and water level exceedance curve at 52.5N, 6.06W (120° sector) for Wexford WC and WD

**Table B5: Joint probability table showing probability of wave height with water level at 52.0N, 6.06W (120° sector) for Wexford WC and WD**

		Joint exceedance return period (years)							
		2	5	10	20	50	100	200	1000
		Marginal return period (years) for Significant Wave Height (m) 52.0N, 6.06W 120°							
Marginal return period (years) for Present-day sea level SE33 (m to MSL)	0.01	1.774	5.000	10.000	20.000	50.000	100.000	200.000	1000.000
	0.02	0.887	2.602	5.872	13.250	38.860	87.694	197.900	1000.000
	0.05	0.355	1.041	2.349	5.300	15.544	35.078	79.160	523.897
	0.1	0.177	0.520	1.174	2.650	7.772	17.539	39.580	261.949
	0.2	0.089	0.260	0.587	1.325	3.886	8.769	19.790	130.974
	0.5	0.035	0.104	0.235	0.530	1.554	3.508	7.916	52.390
	1	0.018	0.052	0.117	0.265	0.777	1.754	3.958	26.195
	2	0.009	0.026	0.059	0.133	0.389	0.877	1.979	13.097
	5	#N/A	0.010	0.023	0.053	0.155	0.351	0.792	5.239
	10	#N/A	#N/A	0.012	0.027	0.078	0.175	0.396	2.619
	20	#N/A	#N/A	#N/A	0.013	0.039	0.088	0.198	1.310
	50	#N/A	#N/A	#N/A	#N/A	0.016	0.035	0.079	0.524
	100	#N/A	#N/A	#N/A	#N/A	#N/A	0.018	0.040	0.262
	200	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.020	0.131
	1000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.026

**Table B6: Joint probability table showing wave height and water level at 52.0N, 6.06W (120° sector) for Wexford WC and WD**

		Joint exceedance return period (years)							
Value of first variable:		2	5	10	20	50	100	200	1000
Present-day sea level SE33 (m to MSL)	Value of second variable:	Significant Wave Height (m) 52.0N, 6.06W 120°							
	0.62	3.99	4.75	5.25	5.75	6.42	6.92	7.42	8.58
	0.72	3.48	4.27	4.86	5.45	6.23	6.82	7.41	8.58
	0.84	2.81	3.60	4.19	4.79	5.57	6.16	6.75	8.11
	0.92	2.30	3.09	3.69	4.28	5.07	5.66	6.25	7.61
	1.01	1.79	2.58	3.18	3.77	4.56	5.15	5.75	7.11
	1.13	1.12	1.91	2.51	3.10	3.89	4.49	5.08	6.45
	1.22	0.61	1.40	2.00	2.60	3.38	3.98	4.57	5.95
	1.31	0.10	0.89	1.49	2.09	2.88	3.47	4.07	5.45
	1.43	#N/A	0.22	0.82	1.41	2.20	2.80	3.40	4.78
	1.52	#N/A	#N/A	0.31	0.90	1.70	2.29	2.89	4.27
	1.60	#N/A	#N/A	#N/A	0.40	1.19	1.78	2.38	3.77
	1.71	#N/A	#N/A	#N/A	#N/A	0.51	1.11	1.71	3.10
	1.79	#N/A	#N/A	#N/A	#N/A	#N/A	0.60	1.20	2.59
	1.87	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.69	2.08
	2.06	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.00

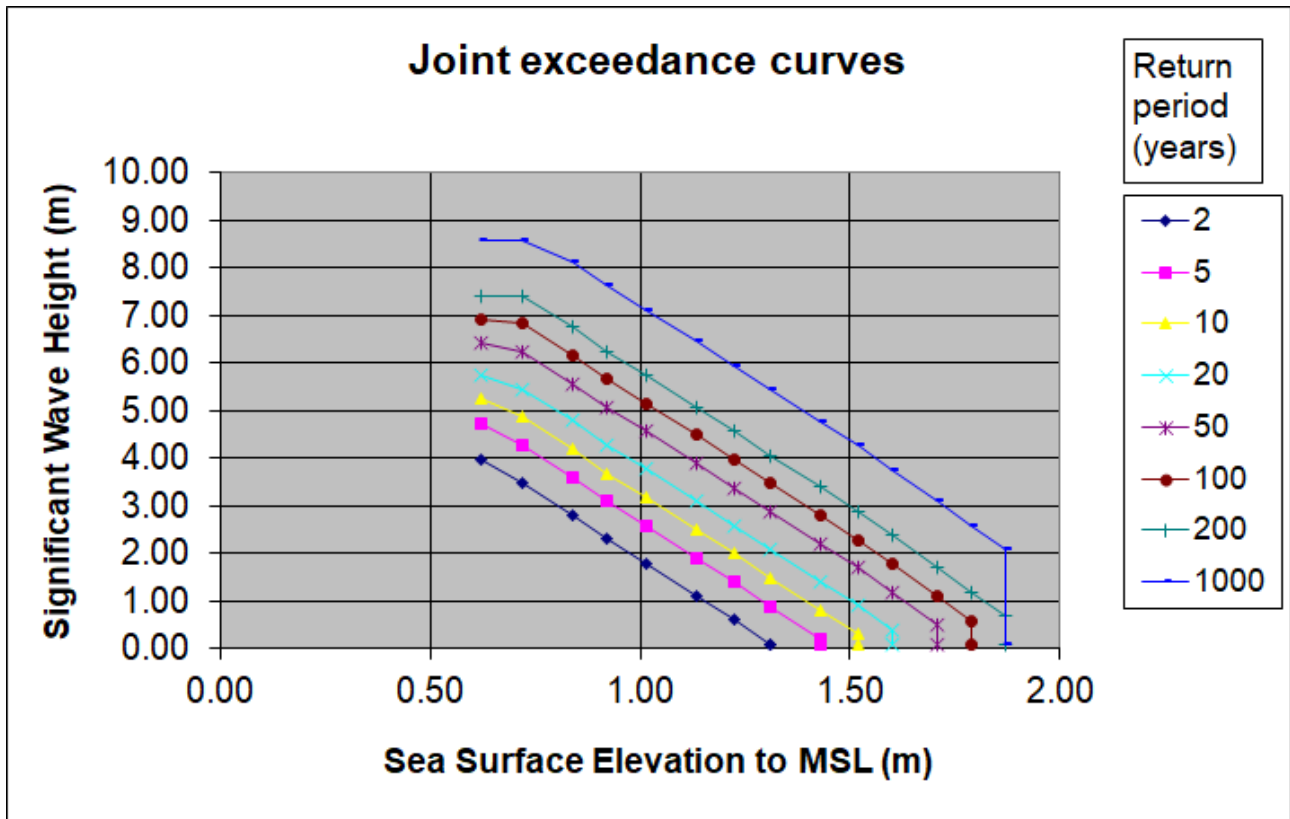


Figure B3: Offshore joint wave and water level exceedance curve at 52.0N, 6.06W (120° sector) for Wexford WC and WD

**Table B7: Joint probability table showing probability of wind speed with water level (270° sector) for Ferrybank FA**

		Joint exceedance return period (years)							
		2	5	10	20	50	100	200	1000
		Marginal return period (years) for				Wind Speed 270°MWD (m/s)			
Marginal return period (years) for Present-day sea level SE32 (m to MSL)	0.01	2.000	5.000	10.000	20.000	50.000	100.000	200.000	1000.000
	0.02	2.000	5.000	10.000	20.000	50.000	100.000	200.000	1000.000
	0.05	0.948	3.189	7.983	19.986	50.000	100.000	200.000	1000.000
	0.1	0.474	1.594	3.992	9.993	33.616	84.158	200.000	1000.000
	0.2	0.237	0.797	1.996	4.996	16.808	42.079	105.346	887.208
	0.5	0.095	0.319	0.798	1.999	6.723	16.832	42.138	354.883
	1	0.047	0.159	0.399	0.999	3.362	8.416	21.069	177.442
	2	0.024	0.080	0.200	0.500	1.681	4.208	10.535	88.721
	5	#N/A	0.032	0.080	0.200	0.672	1.683	4.214	35.488
	10	#N/A	#N/A	0.040	0.100	0.336	0.842	2.107	17.744
	20	#N/A	#N/A	#N/A	0.050	0.168	0.421	1.053	8.872
	50	#N/A	#N/A	#N/A	#N/A	0.067	0.168	0.421	3.549
	100	#N/A	#N/A	#N/A	#N/A	#N/A	0.084	0.211	1.774
	200	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.105	0.887
	1000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.177

**Table B8: Joint probability table showing wind speed and water level (270° sector) for Ferrybank FA**

		Joint exceedance return period (years)							
Value of first variable:		2	5	10	20	50	100	200	1000
Present-day sea level SE32 (m to MSL)		Value of second variable:				Wind Speed 270°MWD (m/s)			
	0.55	19.31	21.37	22.66	23.95	25.75	27.04	28.58	32.17
	0.67	19.31	21.37	22.66	23.95	25.75	27.04	28.58	32.17
	0.81	17.93	20.36	22.24	23.95	25.75	27.04	28.58	32.17
	0.90	16.54	18.89	20.87	22.66	24.97	26.72	28.58	32.17
	1.01	15.16	17.58	19.31	21.37	23.62	25.41	27.15	31.90
	1.14	13.32	15.75	17.58	19.31	21.92	23.63	25.41	29.86
	1.25	11.93	14.36	16.20	18.03	20.48	22.34	24.05	28.32
	1.34	10.54	12.97	14.81	16.65	18.99	20.98	22.76	26.82
	1.48	#N/A	11.14	12.98	14.82	17.24	18.99	20.99	25.08
	1.58	#N/A	#N/A	11.59	13.43	15.86	17.69	19.43	23.73
	1.67	#N/A	#N/A	#N/A	12.04	14.47	16.31	18.13	22.44
	1.79	#N/A	#N/A	#N/A	#N/A	12.63	14.47	16.31	20.60
	1.88	#N/A	#N/A	#N/A	#N/A	#N/A	13.08	14.92	19.09
	1.97	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	13.53	17.79
	2.18	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.00

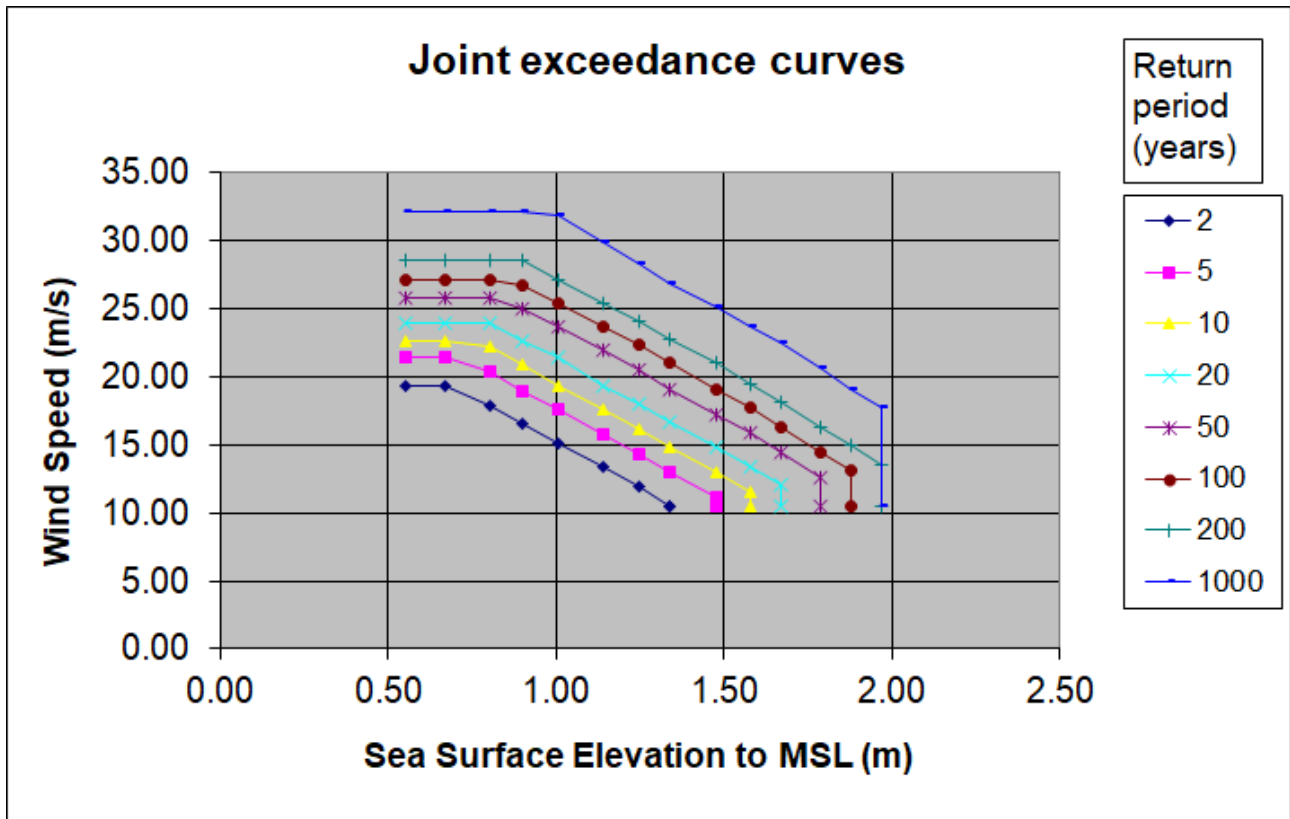


Figure B4: Joint wind speed and water level exceedance curve (270° sector) for Ferrybank FA

**Table B9: Joint probability table showing probability of wind speed with water level (340° sector) for Burrow BA**

		2	5	10	20	50	100	200	1000
		Marginal return period (years) for			Wind Speed 340°MWD (m/s)				
Marginal return period (years) for Present-day sea level SE34 (m to MSL)	0.01	1.126	3.099	6.666	14.336	39.457	84.866	182.532	1000.000
	0.02	0.563	1.550	3.333	7.168	19.729	42.433	91.266	540.257
	0.05	0.225	0.620	1.333	2.867	7.891	16.973	36.506	216.103
	0.1	0.113	0.310	0.667	1.434	3.946	8.487	18.253	108.051
	0.2	0.056	0.155	0.333	0.717	1.973	4.243	9.127	54.026
	0.5	0.023	0.062	0.133	0.287	0.789	1.697	3.651	21.610
	1	0.011	0.031	0.067	0.143	0.395	0.849	1.825	10.805
	2	0.006	0.015	0.033	0.072	0.197	0.424	0.913	5.403
	5	#N/A	0.006	0.013	0.029	0.079	0.170	0.365	2.161
	10	#N/A	#N/A	0.007	0.014	0.039	0.085	0.183	1.081
	20	#N/A	#N/A	#N/A	0.007	0.020	0.042	0.091	0.540
	50	#N/A	#N/A	#N/A	#N/A	0.008	0.017	0.037	0.216
	100	#N/A	#N/A	#N/A	#N/A	#N/A	0.008	0.018	0.108
	200	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.009	0.054
	1000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.011

**Table B10: Joint probability table showing wind speed and water level (340° sector) for Burrow BA**

		Joint exceedance return period (years)							
Value of first variable:		2	5	10	20	50	100	200	1000
Present-day sea level SE34 (m to MSL)									
	Value of second variable:	Wind Speed 340°MWD (m/s)							
	0.60	18.06	20.09	21.68	23.09	25.02	26.46	28.08	31.84
	0.69	16.71	18.65	20.25	21.81	23.67	25.16	26.59	30.48
	0.80	14.90	16.90	18.37	19.91	21.99	23.40	24.87	28.46
	0.88	13.52	15.53	17.05	18.50	20.62	22.12	23.53	26.93
	0.97	12.15	14.16	15.67	17.19	19.09	20.79	22.26	25.62
	1.09	10.33	12.34	13.86	15.38	17.38	18.81	20.45	23.85
	1.17	8.96	10.97	12.49	14.00	16.01	17.52	18.95	22.57
	1.25	7.58	9.59	11.11	12.63	14.64	16.15	17.67	21.29
	1.37	#N/A	7.77	9.29	10.81	12.82	14.34	15.86	19.28
	1.45	#N/A	#N/A	7.92	9.44	11.45	12.96	14.48	17.99
	1.53	#N/A	#N/A	#N/A	8.06	10.07	11.59	13.11	16.63
	1.63	#N/A	#N/A	#N/A	#N/A	8.25	9.77	11.29	14.82
	1.71	#N/A	#N/A	#N/A	#N/A	#N/A	8.40	9.92	13.44
	1.79	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	8.54	12.07
	1.97	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.00

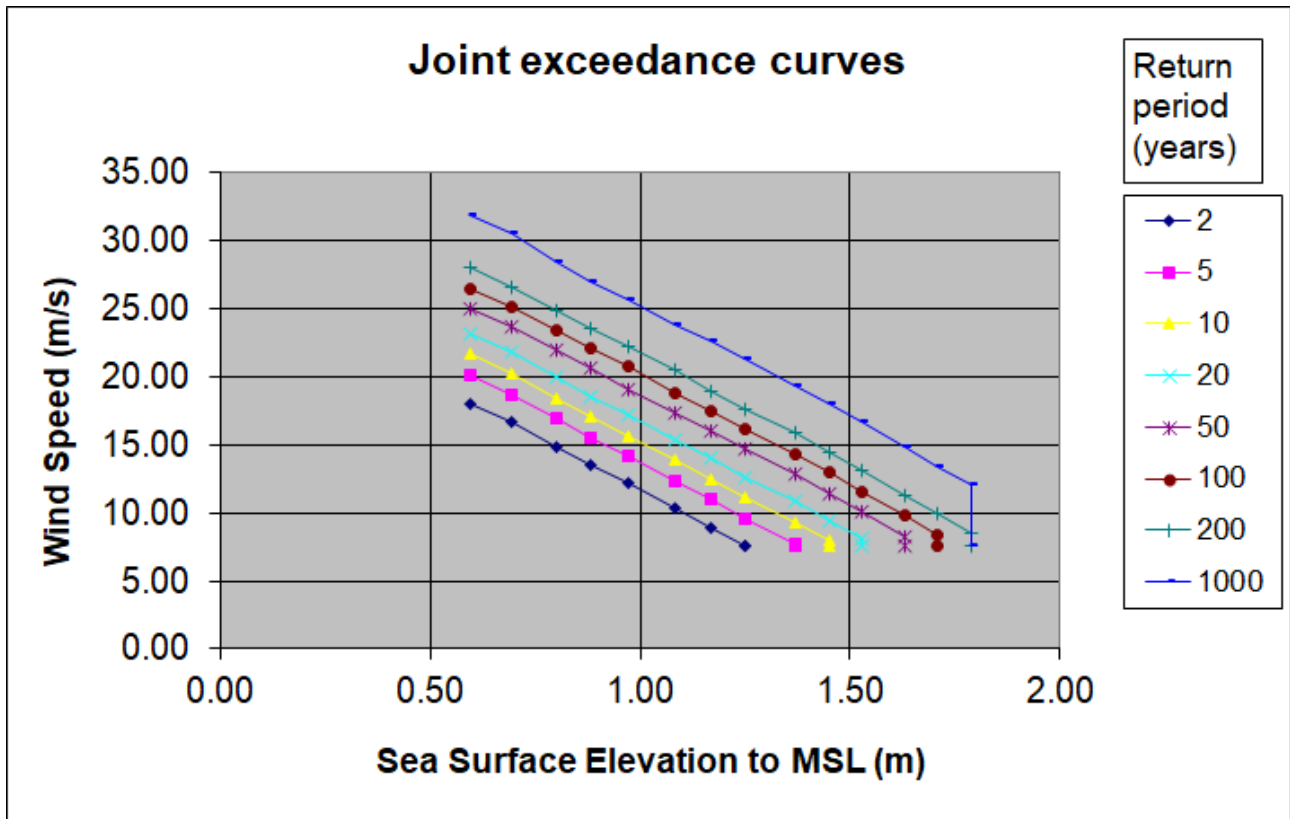


Figure B5: Joint wind speed and water level exceedance curve (340° sector) for Burrow BA

**Table B11: Joint probability table showing probability of wind speed with water level (280° sector) for Burrow BB**

		Joint exceedance return period (years)							
		2	5	10	20	50	100	200	1000
		Marginal return period (years) for				Wind Speed 280°MWD (m/s)			
Marginal return period (years) for Present-day sea level SE34_35 (m to MSL)	0.01	2.000	5.000	10.000	20.000	50.000	100.000	200.000	1000.000
	0.02	2.000	5.000	10.000	20.000	50.000	100.000	200.000	1000.000
	0.05	0.948	3.189	7.983	19.986	50.000	100.000	200.000	1000.000
	0.1	0.474	1.594	3.992	9.993	33.616	84.158	200.000	1000.000
	0.2	0.237	0.797	1.996	4.996	16.808	42.079	105.346	887.208
	0.5	0.095	0.319	0.798	1.999	6.723	16.832	42.138	354.883
	1	0.047	0.159	0.399	0.999	3.362	8.416	21.069	177.442
	2	0.024	0.080	0.200	0.500	1.681	4.208	10.535	88.721
	5	#N/A	0.032	0.080	0.200	0.672	1.683	4.214	35.488
	10	#N/A	#N/A	0.040	0.100	0.336	0.842	2.107	17.744
	20	#N/A	#N/A	#N/A	0.050	0.168	0.421	1.053	8.872
	50	#N/A	#N/A	#N/A	#N/A	0.067	0.168	0.421	3.549
	100	#N/A	#N/A	#N/A	#N/A	#N/A	0.084	0.211	1.774
	200	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.105	0.887
	1000	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.177

**Table B12: Joint probability table showing wind speed and water level (280° sector) for Burrow BB**

		Joint exceedance return period (years)							
Value of first variable:		2	5	10	20	50	100	200	1000
Present-day sea level SE34_35 (m to MSL)		Value of second variable:				Wind Speed 280°MWD (m/s)			
	0.72	21.97	24.31	25.78	27.24	29.29	30.76	32.51	36.59
	0.80	21.97	24.31	25.78	27.24	29.29	30.76	32.51	36.59
	0.90	20.39	23.16	25.30	27.24	29.29	30.76	32.51	36.59
	0.98	18.82	21.49	23.74	25.77	28.40	30.39	32.51	36.59
	1.06	17.24	20.00	21.96	24.31	26.87	28.90	30.89	36.29
	1.17	15.15	17.92	20.00	21.97	24.94	26.88	28.91	33.97
	1.25	13.57	16.34	18.43	20.51	23.30	25.41	27.36	32.21
	1.33	11.99	14.76	16.85	18.94	21.60	23.87	25.89	30.50
	1.44	#N/A	12.67	14.76	16.85	19.61	21.61	23.87	28.52
	1.52	#N/A	#N/A	13.18	15.27	18.04	20.12	22.10	26.99
	1.60	#N/A	#N/A	#N/A	13.69	16.46	18.55	20.62	25.52
	1.69	#N/A	#N/A	#N/A	#N/A	14.37	16.46	18.55	23.43
	1.77	#N/A	#N/A	#N/A	#N/A	#N/A	14.88	16.97	21.72
	1.85	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	15.39	20.24
	2.03	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	0.00

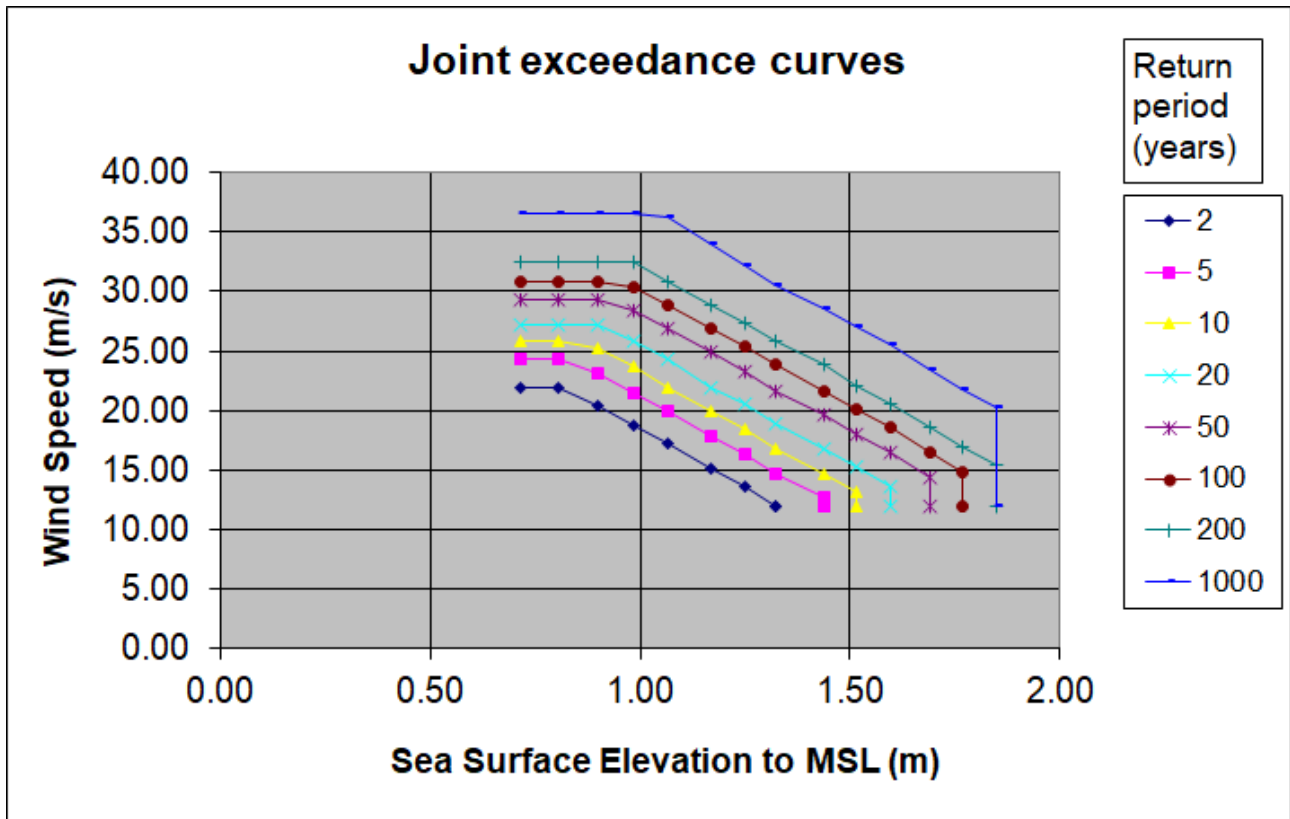


Figure B6: Joint wind speed and water level exceedance curve (280° sector) for Burrow BB