

Appendix 10

NRW Tidal Data based on JBA Report November 2011



This document is provided as part of requests for flood risk data in the vicinity of North Wales Coastline and is used under licence from Natural Resources Wales.

Current Flood Map

The attached flood map shows the current flood zones at this location. This represents the undefended fluvial and tidal flood extents derived from a combination of detailed and generalised modelled data.

The current tidal flood map in this area is derived from a mapping study undertaken by JBA (2011)¹. This study uses sea levels at discrete node locations around the North Wales coast, taken from the 'Coastal Flood Boundaries for the UK Mainland and Islands' project (2011)². The levels were projected inland over a digital terrain model to produce tidal mapped outlines for both the 0.5% (1 in 200) AEP (annual exceedance probability) and the 0.1% (1 in 1000) AEP.

The flood map can be viewed on our website at <http://naturalresources.wales/our-evidence-and-reports/maps/flood-risk-map/?lang=en>

The Coastal Flood Boundary levels were derived using a tidal model calibrated to UK tidal gauge data. The model output is provided for node locations spaced at approximately 2km. 95% confidence bounds for these values were also derived using the confidence intervals for each node location. The extreme sea levels comprise still water level including storm surge, however they do not account for local wave action. The baseline estimations are for the year 2008, so climate change has been calculated relative to this year.

Extreme sea levels for the node points closest to the site location are included in Table 1 for a range of return periods (events) e.g. T100 is the 1 in 100 year return period tide, which is equivalent to the 1% AEP (Annual Exceedance Probability). The node locations are shown in the enclosed map.

Table 1 - Extreme sea levels for adjacent nodes

Node	Easting	Northing	Extreme Event Sea Level (mAOD)					
			T25	T50	T75	T100	T200	T1000
1130	296434	379558	5.41	5.50	5.55	5.59	5.68	5.89
1132	298408	380525	5.43	5.52	5.58	5.62	5.71	5.92

¹ North Wales Tidal Mapping Study Final Report. JBA Consulting, November 2011.

² Coastal flood boundary conditions for UK mainland and islands. R&D Report SC060064/TRD: Practical guidance design sea levels. Environment Agency / Defra, 2011.

To provide the estimate of extreme sea levels for the site (Table 2), levels were interpolated from the adjacent nodes.

Table 2 - Extreme sea levels interpolated between adjacent nodes

Node	Easting	Northing	Extreme Event Sea Level (mAOD)					
			T25	T50	T75	T100	T200	T1000
Site	256970	337285	5.41	5.50	5.55	5.59	5.68	5.89
95% Confidence Bound (+/- m):			0.10	0.10	0.10	0.20	0.20	0.30

The current guidance on climate change from DEFRA (2006)³ is as follows:

Table 3 - Sea level rise (mm per year)

Assumed vertical land movement	1990-2025	2025-2055	2055-2085	2085-2115
-0.5	3.5	8.0	11.5	14.5

The calculated future extreme sea levels are shown in Table 4. Adopting a precautionary approach as advised by Agency guidance (2011)⁴, these levels include the upper level 95% confidence bound.

Table 4 - Extreme sea levels for the site (including 95% Confidence Bound)

Year	Sea level rise(m)	Extreme Event Sea Level (mAOD)					
		T25	T50	T75	T100	T200	T1000
2016	0.028	5.5	5.6	5.7	5.8	5.9	6.2
2066	0.426	5.9	6.0	6.1	6.2	6.3	6.6
2091	0.732	6.2	6.3	6.4	6.5	6.6	6.9
2116	1.094	6.6	6.7	6.7	6.9	7.0	7.3

Additional Information

The local authority may be able to provide information on issues such as localised flooding from sewers, drains and culverts.

Please also find enclosed the Surge Shape required to derive a design tidal-graph. For details on how to perform the necessary calculations please see the associated Technical Report (2011)².

³ Flood and Coastal Defence Appraisal Guidance: FCDPAG3 Economic Appraisal. Supplementary Note to Operating Authorities – Climate Change Impacts. Defra, October 2006

⁴ Using the national coastal flood boundary data for England and Wales (Operational Instruction 490_11). Environment Agency, February 2011.

Notes

Undefended scenarios are provided as being a possible worst case scenario in the event of defence failure. They are used as the basis of the Flood Map.

Extreme sea levels provided as part of this project are accurate to one decimal place (Table 4). Two decimal places have been provided to show the gradual change between nodes seen in the model; however, this does not imply greater accuracy

The scope of the model is the mapping of flood risk; it is not intended for detailed design. The model should be considered as the starting point for more detailed modelling, commensurate with the consequences of flooding at the site of interest.

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If the data is used in support of a Flood Consequence Assessment, please include the reference number.

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