

AMBIENTAL

ENVIRONMENTAL ASSESSMENT

Flood Risk Assessment

Nil Desperandum,
Alsager Avenue,
Queenborough,
Swale,
ME11 5LA

Document Issue Record

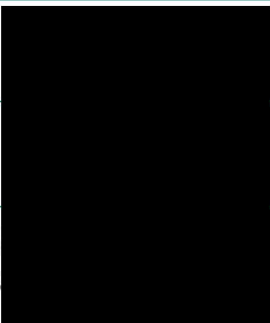
Project: Phase 1 Flood Risk Assessment

Prepared for: Oast Architecture

Reference: 5874_FRA

Site Location: Nil Desperandum, Alsager Avenue, Queenborough, Swale, ME11 5LA

Proposed Development: It is understood that the development is for the construction of 22 dwellings.

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1. Summary

- 1.1 Ambiental Environmental Assessment has been appointed by Oast Architecture on behalf of Alan Hill to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at Nil Desperandum, Alsager Avenue, Queenborough, Swale, ME11 5LA. The purpose of this assessment is to support an outline planning application.
- 1.2 This report comprises the Flood Risk Assessment. Ambiental have produced a separate Surface Water Drainage Strategy report (Ref 5874_SWDS).
- 1.3 The existing site is currently considered to be greenfield land. It is understood that the development is for the construction of 22 dwellings.
- 1.4 The total area of the redline site boundary is approximately 10,366m². With reference to the Environment Agency (EA) Flood Map for Planning, the majority of the redline application boundary is located within Flood Zone 1. Approximately 850m² of the site area is located in Flood Zone 2 (8.2%), whilst approximately 226.5m² of the site is located within Flood Zone 3 (2.2%). However, the EA Flood Map for Planning shows that the area defined as Flood Zone 3 is an area that benefits from the presence of flood defences, more specifically the 980m long embankment north-west of the site which has a Standard of Protection (SoP) of 1:1000 years. If this was not present, the 2.2% shown to be in Flood Zone 3 is predicted to be flooded during the 1 in 200 year tidal event. As such, the site is considered to be located in Flood Zones 1, 2 and 3.
- 1.5 The existing site currently consists of greenfield land and as such, under the National Planning Policy Framework (NPPF) vulnerability classification guidance, could be considered 'Less Vulnerable'. The proposed development is for an outline application for the construction of 23 residential dwellings on site. Given its residential use, the site could therefore be considered 'More Vulnerable' post-development.
- 1.6 The Swale, a tidal channel of the Thames Estuary, is located approximately 370m north-west of the site. This is classified an EA Main River.
- 1.7 The proposed development is for an outline application for the construction of 22 dwellings on site. As such, a Flood Risk Assessment is required to prove that the proposed residential units can be considered safe for their lifetime and that the proposed development will not increase flood risk elsewhere in adherence with the NPPF. The 'lifetime' of a residential development is defined to be 100 years whilst accounting for the influence of climate change.
- 1.8 Given that the site is located within Flood Zones 1, 2 and 3, Ambiental have requested site-specific flood levels from the EA. Ambiental were subsequently provided with data taken from the North Kent Coast Modelling and Mapping Study, completed in 2015. Floodplain (2D) model nodes for the defended still water, defended overtopping and undefended scenarios have been provided.
- 1.9 Following the review of 2m resolution LiDAR data on the site, topographic levels have been shown to vary between as low as 4.19mAOD in the north-east corner of the site to up to 12.21mAOD at the south-west corner of the site. As such, levels fall steeply towards the Swale.
- 1.10 Maximum flood levels of 5.27mAOD, 5.27mAOD and 5.87mAOD are predicted on site for the 0.5% AEP (2115) defended still water, 0.5% AEP (2115) defended overtopping and 0.5% AEP (2115) undefended scenarios respectively. As such, depths of up to 1.08m, 1.08m and 1.68m could be experienced on site during these events.

- 1.11 At present, the proposed block plan displays only one two-storey three-bedroom unit to be affected by depths of up to 110mm during the 0.5% AEP (2115) defended overtopping scenario. To mitigate against such risk, the proposed unit should be repositioned outside of the 0.5% AEP (2115) defended overtopping scenario modelled flood extent, or if this is not feasible, Finished Floor Levels (FFLs) are required to be set 300mm above the modelled flood level of 5.27mAOD. Floor levels will subsequently need to be raised 410mm to be set at no lower than 5.57mAOD.
- 1.12 Following the review of the EA Risk of Flooding from Surface Water dataset, the entire site is shown to remain unaffected for the 1:30 year, 1:100 year and 1:1000 year rainfall events. As such, the risk of surface water flooding to the site could be considered to be very low.
- 1.13 Reference should be made to the separate Surface Water Drainage Strategy report (Ref 5874_SWDS) with regards to managing surface water runoff discharge rates post-development.
- 1.14 Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Development Description	Existing	Proposed
Development Type:	Greenfield site	Construction of 22 residential dwellings
Number of Bedrooms:	0	66
EA Vulnerability Classification:	Less Vulnerable	More Vulnerable
Ground Floor Level:	Elevations on site vary between approximately 4.19mAOD and 12.21mAOD (2m LIDAR data).	FFLs are to be set no lower than 5.57mAOD. If ground floor sleeping is to be proposed within the housing units, FFLs are to be set no lower than 5.87mAOD.
Level of Sleeping Accommodation:	N/A ¹	Ground floor at bungalows. It is assumed that the level of sleeping accommodation will be set at first floor level in the proposed houses. Minimum 5.87mAOD
Impermeable Surface Area:	N/A ¹	Increase – see Surface Water Drainage Strategy report (Ref: 5874_SWDS).
Surface Water Drainage:	-	Reference should be made to the Surface Water Drainage Strategy report (Ref: 5874_SWDS).
Site Size:	Approx. 10,734m ²	No change
Risk to Development	Summary	Comment
EA Flood Zone:	Flood Zones 1, 2 and 3	
Flood Source:	Tidal	The Swale
1:200 Year (2012) Defended Wave Overtopping Flood Level	<Null>	
1:200 Year (2115) Defended Wave Overtopping Flood Level	5.27mAOD	North Kent Coast Modelling and Mapping Study (2015)
1:1000 Year (2012) Defended Wave Overtopping Flood Level	<Null>	
Recorded Flood Events in Area:	Yes	The EA have provided flood extents for historical overtopping events in Feb 1953 that affected the surrounding area.
Recorded Flood Events at Site:	No	The EA have not provided any evidence to suggest that the site has been previously affected by any sources of flooding.
SFRA Available:	Yes	Swale Borough Council SFRA (2020)
Management Measures	Summary	Comment
Ground floor level above extreme flood levels:	Yes	FFLs are to be set no lower than 5.57mAOD. If ground floor sleeping is to be proposed within the housing units, FFLs are to be set no lower than 5.87mAOD.
Safe Access/Egress Route:	Yes	See Section 7 of the report
Flood Resilient Design:	Yes	See Section 7 of the report
Site Drainage Plan:	N/A ¹	Reference should be made to the Surface Water Drainage Strategy report (Ref: 5874_SWDS).
Flood Warning & Evacuation Plan:	Yes	Site lies partly within the 'Isle of Sheppey and Coast from Kemsley to Seasalter' EA Flood Alert and Warning Service area. Flood Evacuation Plan reported in Section 7.
Offsite Impacts	Summary	Comment
Displacement of floodwater:	Negligible	Site lies largely in Flood Zone 1, and only at risk of tidal flooding, and therefore flood mitigation is not required.
Increase in surface run-off generation:	-	Reference should be made to the Surface Water Drainage Strategy report (Ref: 5874_SWDS).
Impact on hydraulic performance of channels:	None	Does not affect channel

Table 1 Summary of flood risks, impacts and proposed flood mitigation measures.

N/A¹ not required for this assessment; N/A² data not available.

2. Development Description and Site Area

Proposed Development and Location

- 2.1 The proposed development is located at Nil Desperandum, Alsager Avenue, Queenborough, Swale, ME11 5LA (Figure 1). The purpose of this assessment is to provide a National Planning Policy Framework (NPPF, 2019) compliant Flood Risk Assessment, to support an outline planning application.
- 2.2 The existing site is currently considered to be greenfield land. It is understood that the development is for an outline application for the construction of 22 dwellings on site.
- 2.3 Following the review of 2m resolution LiDAR data on the site, topographic levels have been shown to vary between as low as 4.19mAOD in the north-east corner of the site to up to 12.21mAOD at the south-west corner of the site. As such, levels fall steeply towards the Swale.



Figure 1 Location Map, identifying the location of the proposed development (Source: OS)

Vulnerability Classification

- 2.4 With reference to the Environment Agency (EA) Flood Map for Planning, the majority of the redline application boundary is located within Flood Zone 1 (Figure 2). Land within Flood Zone 1 is considered to have lower than an 0.1% annual probability of being flooded from seas or tidal estuaries in any year.
- 2.5 Approximately 850m² of the site area is located in Tidal Flood Zone 2 (8.2%). Areas within Tidal Flood Zone 2 are considered to have between a 0.1% and 0.5% annual probability of being flooded from seas or tidal estuaries in any year.
- 2.6 Additionally, approximately 226.5m² of the site is located within Tidal Flood Zone 3 (2.2%) (Figure 3). However, the EA Flood Map for Planning shows that the area defined as Tidal Flood Zone 3 is an area that benefits from the presence of flood defences. Land within Tidal Flood Zone 3 is considered to have greater

than a 0.5% annual probability of being flooded from seas or tidal estuaries in any year. As such, the site is considered to be located in Tidal Flood Zones 1, 2 and 3. All proposed dwellings are to be located in Flood Zone 1.



Figure 2 EA Flood Map for Planning (Source: EA)

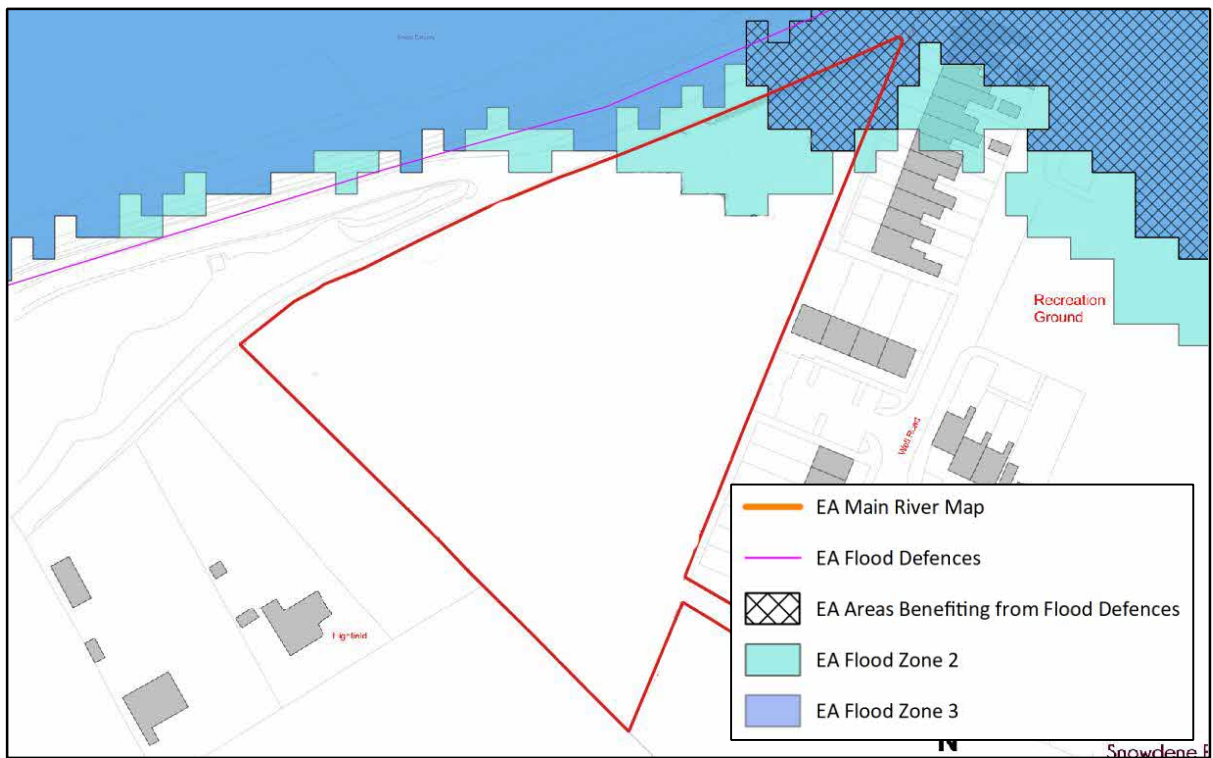


Figure 3 EA Flood Zone 2 and Flood Zone 3 (Areas Benefiting from Defences) is shown to partly intersect the lowest point of the redline site boundary.

2.7 The existing site currently consists of greenfield land and as such, under the National Planning Policy Framework (NPPF) vulnerability classification guidance, could be considered 'Less Vulnerable'. The proposed development is for an outline application for the construction of 22 residential dwellings on site. Given that the proposals are for residential use, the site would be considered 'More Vulnerable' post-development.

Geology

- 2.8 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the underlying bedrock at the site consists of the 'London Clay Formation' which is comprised of clay and silt.
- 2.9 The BGS Geology of Britain Web Viewer has indicated that there are no superficial deposits present beneath the site.

3. Sequential Test/Exception Test

- 3.1 Under the NPPF, all new planning applications should undergo a Sequential Test. This test should be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals, mobile homes etc.) outside of the floodplain.
- 3.2 The NPPF Sequential Test: Flood Risk Vulnerability and Flood Zone ‘Compatibility’ Table is reproduced below;

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1					
	Zone 2			Exception Test Required		
	Zone 3a	Exception Test Required		*	Exception Test Required	
	Zone 3b Functional Floodplain	Exception Test Required		*	*	*

Table 2 The Sequential Test: Flood Risk Vulnerability and Flood Zone ‘Compatibility’ Table as specified by NPPF.

Please note: means development is appropriate; * means the development should not be permitted.

- 3.3 Using the principles of the Sequential Test outlined above, the proposed development could be considered as ‘More Vulnerable’. With reference to the EA Flood Map for Planning, the proposed development is located within Tidal Flood Zones 1, 2 and 3.
- 3.4 The Swale Borough Council SFRA (2020) identifies the site to be located in Flood Zone 3a and outside of Flood Zone 3b (Figure 4).

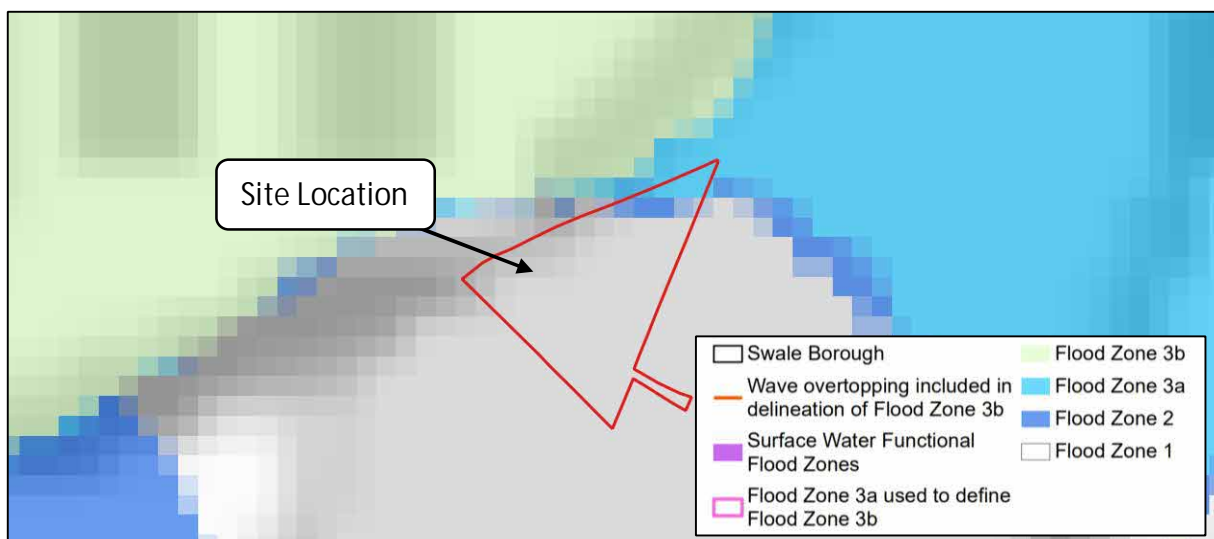


Figure 4 Swale Borough Council SFRA Tile A Flood Map (2020)

- 3.5 The Swale Borough Council SFRA (2020) identifies the site to be partially located in Flood Zone 3a and outside of Flood Zone 3b. It should be noted that the proposed built footprint has been sequentially located in Flood Zone 1.

- 3.6 The Swale Borough Council adopted local plan, interactive viewer¹, indicates that the site is Allocated (A21.6) for Housing (allocation ST4). According to the NPPF:

162. Where planning applications come forward on sites allocated in the development plan through the sequential test, applicants need not apply the sequential test again. However, the exception test may need to be reapplied if relevant aspects of the proposal had not been considered when the test was applied at the plan making stage, or if more recent information about existing or potential flood risk should be taken into account.

- 3.7 On the basis that the site has been allocated through the local plan process, the Sequential Test need not be re-applied.

- 3.8 The residential dwellings are proposed to be located outside of Flood Zones 2 and 3, and therefore should not need to apply the Exception Test. However, the NPPF is not clear if the Exception Test should be applied to all sites with elements of Flood Zone 2 or 3, or just for the areas which propose development within the medium and high risk flood zones:

Part of 159. ...The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in national planning guidance.

- 3.9 With regards to the Exception Test the NPPF states:

160. The application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. For the exception test to be passed it should be demonstrated that:

- a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
- b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

161. Both elements of the exception test should be satisfied for development to be allocated or permitted.

- 3.10 The proposed development is located within Tidal Flood Zones 1, 2 and 3. In compliance with the NPPF, the planning application is therefore required to be accompanied by an FRA which shows that the development can be achieved in a sustainable manner, with an overall reduction of flood risk to the site and surrounding area.

¹ <http://services.swale.gov.uk/maps/ishare5.6.WebSwaleLive/atMyCouncil.aspx>

4. Site Flood Hazards

Sources of Flooding

- 4.1 The proposed development is located within Tidal Flood Zones 1, 2 and 3 (low, medium and high risk of flooding) and is considered to be 'More Vulnerable' according to NPPF guidelines. Table 3 summarises the potential sources of flooding to the site:

Source	Description
Tidal	The Swale
Surface	Relatively low risk to the proposed development from surface water flooding
Groundwater	Relatively low risk to the proposed development from groundwater flooding
Sewer	Relatively low risk to the proposed development from sewer flooding

Table 3 Summary of flood sources.

Mechanisms and History of Flooding

- 4.2 The EA Flood Map for Planning demonstrates the site to be located within Tidal Flood Zones 1, 2 and 3 (low, medium and high risk of flooding). It is important to note that the EA Flood Map for Planning shows only the potential floodplain; the mitigating effects of any flood defences currently in place are not considered.

Tidal

- 4.3 The Swale, a tidal channel of the Thames Estuary, is located approximately 370m north-west of the site. This is classified an EA Main River.
- 4.4 The EA Flood Map for Planning demonstrates the site to be located within Tidal Flood Zones 1, 2 and 3 (low, medium and high risk of flooding). However, the EA Flood Map for Planning shows that the area defined as Flood Zone 3 is an area that benefits from the presence of flood defences, more specifically the 980m long embankment north-west of the site which has a Standard of Protection (SoP) of 1:1000 years.
- 4.5 The proposed development is for an outline application for the construction of 22 dwellings on site. As such, a Flood Risk Assessment is required to prove that the proposed residential units can be considered safe for their lifetime and that the proposed development will not increase flood risk elsewhere in adherence with the NPPF. The 'lifetime' of a residential development is defined to be 100 years whilst accounting for the influence of climate change.
- 4.6 Given that the site is located within Flood Zones 1, 2 and 3, Ambiental have requested site-specific flood levels from the EA. Ambiental were subsequently provided with data taken from the North Kent Coast Modelling and Mapping Study, completed in 2015. Floodplain (2D) model nodes for the defended still water, defended overtopping and undefended scenarios have been provided.
- 4.7 Following the review of 2m resolution LiDAR data on the site, topographic levels have been shown to vary between as low as 4.19mAOD in the north-east corner of the site to up to 12.21mAOD at the south-west corner of the site. As such, levels fall steeply towards the Swale.

Undefended Modelled Tidal Flood Levels

4.8 Following the review of Table 4, the development site is predicted to flood for the undefended 0.5% AEP (2012) event, the 0.5% AEP (2115) event and the 0.1% AEP (2012) event.

	0.5% AEP Present day (2012) (mAOD)	0.5% AEP Climate Change (2115) (mAOD)	0.1% AEP Present day (2012) (mAOD)
Undefended	5.19mAOD	5.87mAOD	5.12mAOD

Table 4 Undefended tidal flood levels for the 0.5% AEP (2012), 0.5% AEP (2115) and 0.1% AEP (2012) events

- 4.9 Depths of up to 1.68m are predicted at the site for the undefended 0.5% AEP climate change (2115) event.
- 4.10 The site, however, benefits from the presence of a 980m long embankment north-west of the site which has a Standard of Protection (SoP) of 1:1000 years.
- 4.11 The coastal defences which protect the site are incorporated into the Medway Estuary Shoreline Management Plan (SMP) (2010). Within the Medway Estuary and Swale SMP (2010), the management policy for Rushenden to Sheerness (Policy Unit E4 23) is 'Hold the Line' - maintain or upgrade the level of protection provided by defences. The management policy will continue to apply at present day and across the medium (2025 to 2055) to long term (2105).
- 4.12 It can therefore be assumed that the flood defences in the area will be maintained and upgraded in the future, to account for the predicted impacts of climate change.
- 4.13 As such, the undefended scenario can therefore be considered to be a theoretical event that is very unlikely to occur and would require the removal of all existing defences in place.

Defended Modelled Tidal Flood Levels

4.14 According to data provided by the Environment Agency, during the present-day defended 1 in 200 year (2012) and 1 in 1000 year design events, the site is not expected to flood for either a still-water or overtopping scenario (Table 5). However, when accounting for the predicted impacts of climate change, a flood level of 5.27mAOD is predicted to occur on the site for the 0.5% AEP (2115) defended still water and defended overtopping events.

	0.5% AEP Present day (2012) (mAOD)	0.5% AEP Climate Change (2115) (mAOD)	0.1% AEP Present day (2012) (mAOD)
Defended-Still water	<Null>	5.27mAOD	<Null>
Defended-Overtopping	<Null>	5.27mAOD	<Null>

Table 5 Tidal flood levels in defended still water and defended overtopping 1 in 200 year (2012/2115) (0.5%AEP) and 1 in 1000 year (2012) event (0.1%AEP)

- 4.15 Based on the 0.5% AEP 2115 overtopping flood level, maximum depths of up to 1.08m may be experienced on site. The Defended Scenario Wave Overtopping extents are displayed in Figure 5. As can be seen, one of the two-storey three-bed houses in the northeast of the site lies within the defended 0.5% AEP (2115) flood extent. Based on current ground levels, from LiDAR, ground levels in this area are currently 5.1m AOD, and therefore overtopping depths of less than 0.2m are predicted to occur.
- 4.16 As such, the proposed development remains unaffected for the 0.5% and 0.1% AEP (2012) defended wave overtopping scenarios. This assesses flood risk to the site whilst representing the existing flood defences with their present-day crest levels. However, the site is predicted to be affected during the 0.5% AEP wave

overtopping scenario when accounting for climate change (2115). It is necessary that the site can be proven to be safe for its lifetime (considered to be 100 years whilst accounting for the influence of climate change). It should be recognised that the 0.5% AEP (2115) simulation models the defence crest height as existing. As explained in paragraph 4.11, the management policy for Rushenden to Sheerness (Policy Unit E4 23) is 'Hold the Line' - maintain or upgrade the level of protection provided by defences. It is therefore anticipated that an approach will be applied to the defences in the future to maintain (or upgrade) the SoP of the defences to the site. Should this be case, the site would not expected to be affected by wave overtopping, as per the present day scenario.

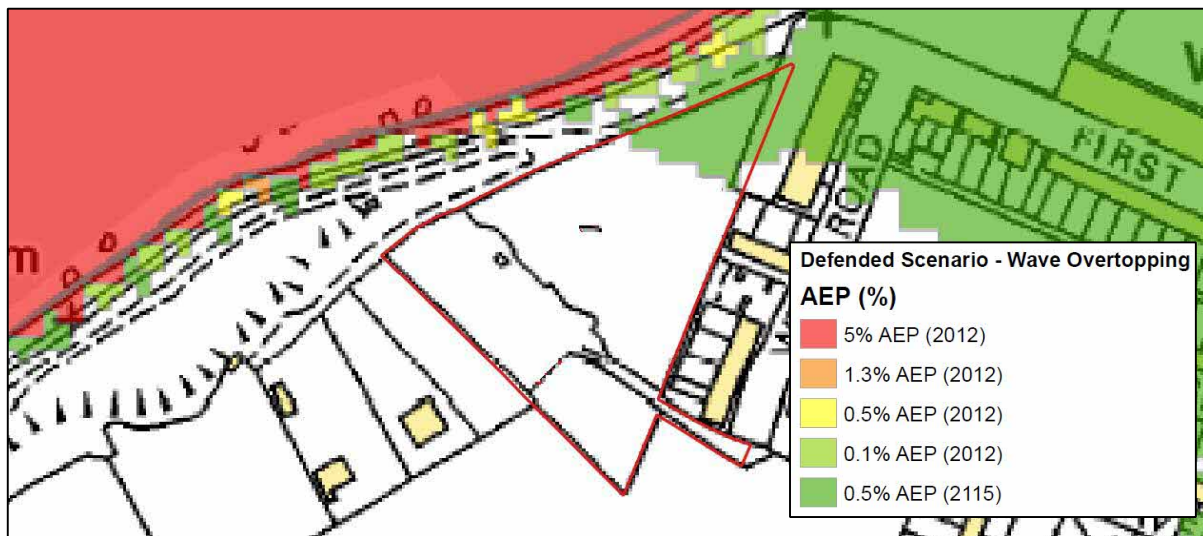


Figure 5 Defended Scenario – Wave Overtopping and overlaid plans (Source:EA)

4.17 However, the 0.5% AEP (2115) modelled flood levels do show the site to experience a flood level of 5.27mAOD. A single two-storey three-bedroom unit is predicted to be affected during this event. Adopting a conservative approach, it is first recommended that the building is sequentially relocated elsewhere on site that is not located within the 0.5% AEP (2115) flood extent. Alternatively, appropriate mitigation in accordance with the Planning Practice Guidance (PPG) should be adopted whereby:

FFLs of ground floor habitable rooms should be raised no lower than 300mm (5.57m AOD) above the modelled flood level of 5.27mAOD; or

FFLs of ground floor sleeping accommodation should be raised no lower than 600mm (5.87m AOD) above the modelled flood level of 5.27mAOD.

4.18 It should be noted that the long term flood defence plan for the area is Hold the Line, therefore the low risk of tidal flooding should be maintained and the mitigation measures outlined above should not be required. However, adopting a precautionary approach, raising the finished floor level of the ground floor for one of the dwellings by 200mm above existing would be beneficial.

4.19 Given that the site benefits from the presence of significant flood defence infrastructure, which will continue to protect and is expected to maintain the current level of protection, the site across the medium (2025 to 2055) to long term (2105), the risk of tidal flooding to the proposed development can be considered to be relatively low.

4.20 Provided that the appropriate mitigation measures are provided to the single unit that is currently proposed to be affected during the 0.5% AEP (2115) event, all 23 residential units can be considered safe for their lifetime without increasing flood risk elsewhere.

Surface Water (Pluvial)

- 4.21 The Environment Agency Flood Risk from Surface Water website shows the proposed development to be within an area of 'Very Low' risk of flooding from surface water (Figure 6). Areas identified to be at 'Very Low' risk have a less than 0.1% annual risk of flooding from this source.
- 4.22 The EA Risk of Flooding from Surface Water (RoFSW) sources dataset for the 1 in 30 year event indicates that the proposed development is not affected in this event (Figure 7). This is indicative of the High Risk Scenario on the EA Flood Risk from Surface Water website, however the RoFSW dataset provides more accurate depth bandings.



Figure 6 EA Surface Water Flood Risk Map. (Source: EA)



Figure 7 EA RoFSW 1 in 20 year rainfall event (Source: EA)

- 4.23 Ambiental have reviewed the EA Risk of Flooding from Surface Water (RoFSW) sources dataset for the 1 in 100 year event (Figure 8). This is indicative of the Medium Risk Scenario on the EA Flood Risk from Surface

Water website, however the RoFSW dataset provides more accurate depth bandings. As displayed in Figure 8, the entire redline site boundary remains completely unaffected during this event.



Figure 8 EA RoFSW 1 in 100 year rainfall event (Source: EA)

4.24 Furthermore, Ambiental have also reviewed the EA Risk of Flooding from Surface Water (RoFSW) sources dataset for the 1 in 1000 year event (Figure 9). This is indicative of the Low Risk Scenario on the EA Flood Risk from Surface Water website. Depths of up to 300mm are predicted to affect the north-eastern corner of the site where topographic levels are lowest. None of the proposed units are predicted to be affected during this event.



Figure 9 EA RoFSW 1 in 1000 year rainfall event (Source: EA)

- 4.25 The nearest surface water flooding recorded to the site has been identified to be located approximately 450m northeast of the site with reference to the Swale Surface Water Management Plan 'Historic Surface Water Flooding Records' map (Figure 10).

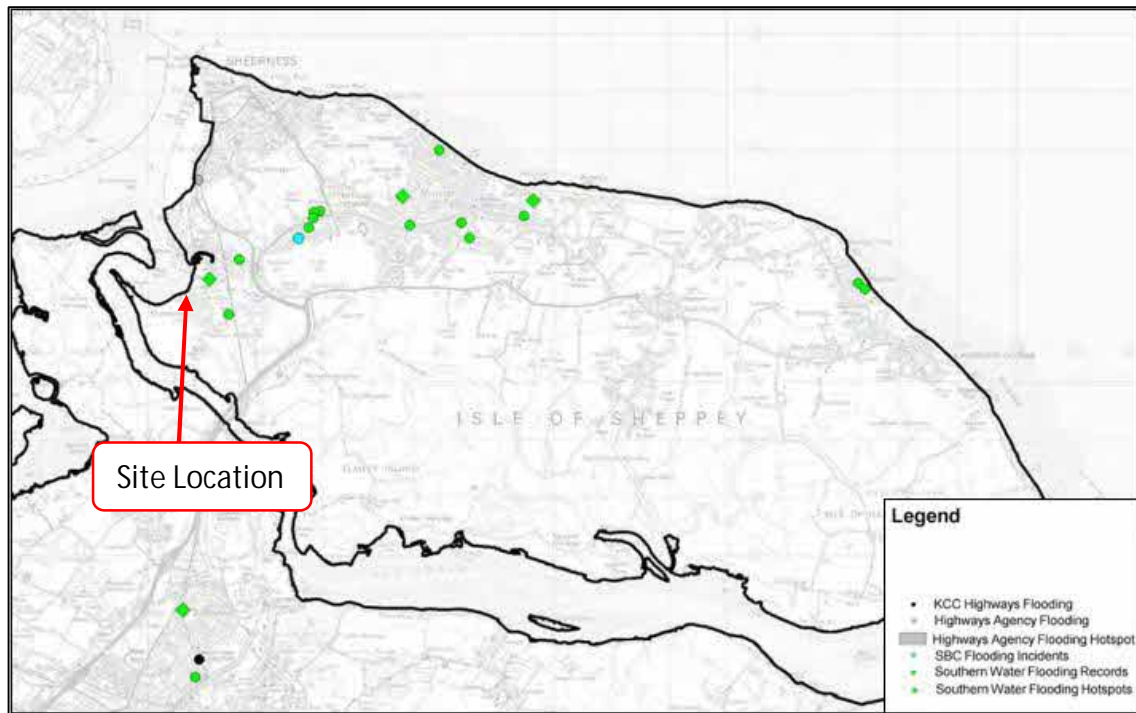


Figure 10 Historic Surface Water Flooding Records Map (Source: Swale Borough Council SWMP, 2012)

- 4.26 As such, the risk of surface water flooding to the site could subsequently be considered to be relatively low.

Groundwater

- 4.27 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the underlying bedrock at the site consists of the 'London Clay Formation' which is comprised of clay and silt.
- 4.28 The BGS Geology of Britain Web Viewer has indicated that there are no superficial deposits present beneath the site.
- 4.29 The site is not within an EA groundwater Source Protection Zone.
- 4.30 Furthermore, no principal or secondary aquifers have been identified as underlying the site that are of significant vulnerability.
- 4.31 Swale Borough Council SWMP (2012) demonstrates that the vicinity of the site is not considered to be susceptible to groundwater flooding (Figure 11).
- 4.32 Neither the Environment Agency nor the Swale Borough Council SFRA (2020) have provided any historic records of groundwater flooding at the site or in the surrounding area.
- 4.33 The risk of groundwater flooding to the proposed development may therefore be considered to be relatively low. As such, no mitigation measures are proposed.

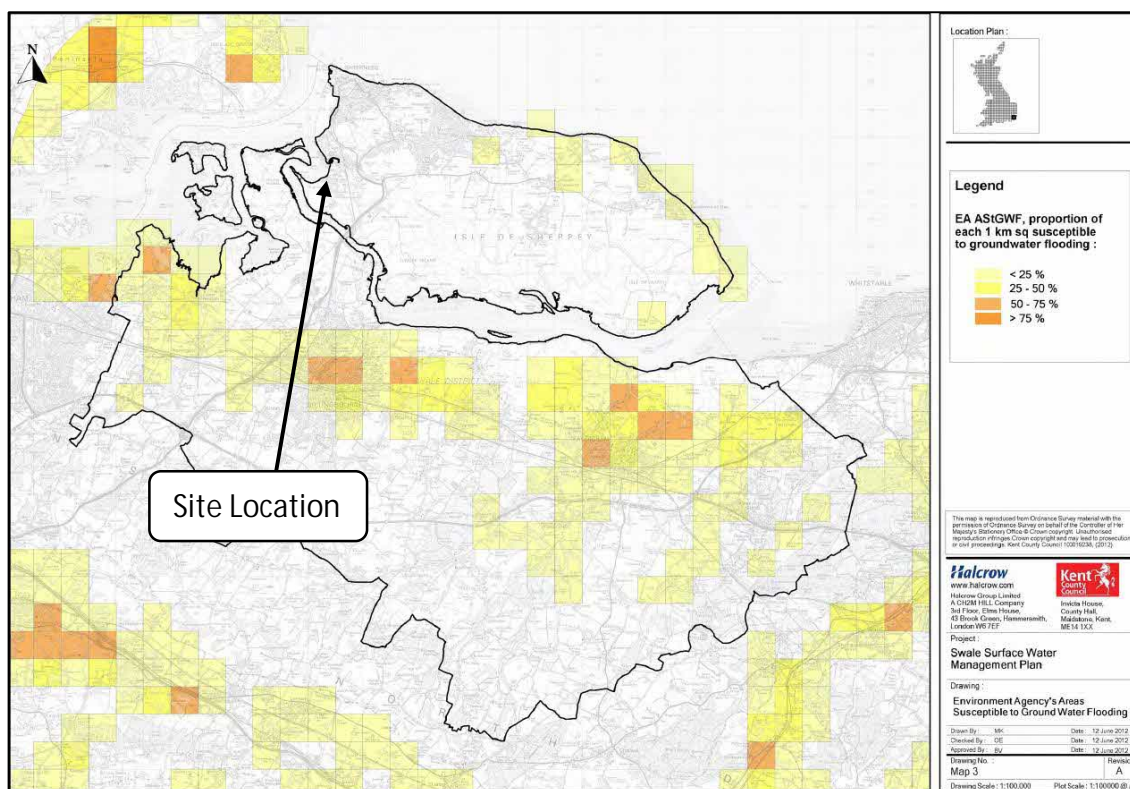


Figure 11 Areas Susceptible to Groundwater Flooding (Source: Swale Borough Council SWMP, 2012)

Sewer

4.34 Swale Borough Council SFRA (2020) Sewer Incident Report Form Database indicates that the site is located in a postcode area (ME11 5) where 3 sewer flooding incidents have been recorded (Figure 12).

Post code	Recorded flood incidents	Post code	Recorded flood incidents
ME9 7	12	ME11 5	3
ME9 8	2	ME12 1	6
ME9 9	6	ME12 2	7
ME10 1	10	ME12 3	22
ME10 2	17	ME12 4	10
ME10 3	2	ME13 7	12
ME10 4	3	ME13 8	8
ME10 5	5	ME13 9	1
Total recorded flood incidents: 126			

Figure 12 Sewer Flooding Incidents (Source: Swale Borough Council SWMP, 2012)

4.35 Where new sewer connections are to be proposed, liaison with the Southern Water will be required with regards to a sewer connection. Foul and surface water sewer systems should be kept separate and non-return valves or similar protection measures should be installed, to prevent the public sewers from surcharging into the lateral drains serving the property.

4.36 However, given the rural location of the proposed development, the risk of sewer flooding may be considered low.

Records of Historical Flooding

- 4.37 The EA hold historic records of tidal flooding for the district, which demonstrate that widespread tidal flooding occurred on site and within the wider vicinity in 1953. The site remained unaffected during this event. This event was due to overtopping and breaches of the old tidal defences at Sheerness and along the Western border of the Isle of Sheppey (Source: Swale Borough Council SFRA, 2020).
- 4.38 The nearest surface water flooding record to the site has been identified to be located approximately 450m northeast of the site with reference to the Swale Surface Water Management Plan 'Historic Surface Water Flooding Records' map (Figure 10). No records have been provided by either the EA or Swale Borough Council at the site itself, however.
- 4.39 Additionally, neither the Environment Agency nor the Swale Borough Council SFRA (2020) have provided any historic records of groundwater flooding at the site or in the surrounding area.
- 4.40 Swale Borough Council SFRA (2020) indicates that the site is located outside of a postcode area where sewer flooding incidents have been recorded (Figure 12).

5. Probability of Flooding

Flood Zones

- 5.1 According to the EA Flood Map for Planning, the site is located within Tidal Flood Zones 1, 2 and 3 (low, medium and high risk of flooding).
- 5.2 Tidal flooding is generally caused by low pressure weather systems creating storm-surges (or storm tides), chiefly via high speed winds. These winds (and to a certain extent, the low pressure) create a 'bulge' of water which, if it coincides with high tide, can generate very high, stormy, water levels. However, because this mechanism is well understood, it is very likely that an early warning will be issued before such an event strikes. As such, it is very unlikely that the site would be subject to tidal flooding without several hours of early warning.
- 5.3 The EA Flood Map for Planning has been produced in part using a relatively coarse, national scale flood modelling strategy, and in part by detailed modelling. It is important to note that only the potential floodplain is modelled; the mitigating effects of any flood defences currently in place are not considered. For reference, the definition of the NPPF flood risk zones is included below.

Zone	Description
1	Low Probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).
2	Medium Probability. This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.
3a	High Probability. This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
3b	The Functional Floodplain. This zone comprises land where water has to flow or be stored in times of flood. SFRA's should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the EA, including water conveyance routes).

Table 6 Definition of the NPPF Flood Zones. (Source: EA)

Climate Change on Site

- 5.4 The EA have recently updated the peak river flow allowances to use for different types of development. Communication with the EA, Flood and Coastal Risk Management Officer has confirmed that the changes are only focused to river flow and rainfall allowances. Tidal allowances are detailed in Table 3 of the new changes (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>). As a result of this dialogue it has been confirmed that the data provided in the TE2100 study is relevant for the purposes of this assessment given that the dominant source of flooding is tidal.
- 5.5 The EA has also stated that climate change will increase the peak rainfall intensity allowance in small and urban catchments. As such, the risk of surface water flooding could increase over the lifetime of the development.

6. Residual Risks

Identification of Residual Risks

6.1 Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;

failure of a reservoir; or,

a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

Defence Breach

6.2 The site benefits from the presence of significant coastal defence infrastructure which has a Standard of Protection (SoP) of 1:1000 years.

6.3 No modelled defence-breach data has been supplied by the EA at time of writing, therefore the residual risk from defence breach cannot be quantified at this time.

6.4 Defended overtopping flood levels are shown in Table 5. The site is not expected to flood in a present-day (2012) 1 in 200-year overtopping event. A flood level of 5.27mAOD is predicted to occur on the site for the 0.5% AEP (2115) which could result in maximum potential water depth of 1.08m based off the lowest topographic level on site being 4.19mAOD (2m LiDAR data).

6.5 The coastal defences which protect the site are incorporated into the Medway Estuary Shoreline Management Plan (SMP) (2010). Within the Medway Estuary and Swale SMP (2010), the management policy for Rushenden to Sheerness (Policy Unit E4 23) is 'Hold the Line' - maintain or upgrade the level of protection provided by defences. The management policy will continue to apply at present day and across the medium (2025 to 2055) to long term (2105).

6.6 It can therefore be assumed that the flood defences in the area will be maintained and upgraded in the future, to account for the predicted impacts of climate change.

6.7 The controlling residual flood risk mechanism on site is tidal. Tidal flooding is generally caused by low pressure weather systems creating storm-surges (or storm tides), chiefly via high speed winds. These winds (and to a certain extent, the low pressure) create a 'bulge' of water which, if it coincides with high tide, can generate very high, stormy, water levels. However, because this mechanism is well understood, it is very likely that an early warning will be issued before a tidal flood event occurs. As such, it is unlikely that the site would be subject to tidal flooding without several hours of early warning.

6.8 Given the nature of the tidal cycle, flood waters on site will likely recede as in-channel water levels fall.

Reservoir Failure

6.9 The EA Risk from Reservoir Flooding Map demonstrates that the site is outside flood extents in the event of reservoir flooding.

Drainage Exceedance

- 6.10 In the event of drainage system failure under extreme rainfall events or blockage, flooding may occur within the site. In the event of the development's drainage system failure, the runoff flow will be dictated by topography on site. Topographic levels suggest that runoff would be directed towards the north-east of the site.

7. Flood Risk Management Measures

Flood Risks

- 7.1 The existing site is currently considered to be greenfield land. It is understood that the development is for the construction of 22 dwellings.
- 7.2 The EA Flood Map for Planning demonstrates the site to be located within Tidal Flood Zones 1, 2 and 3 (low, medium and high risk of flooding). However, the EA Flood Map for Planning shows that the area defined as Flood Zone 3 is an area that benefits from the presence of flood defences, more specifically the 980m long embankment north-west of the site which has a Standard of Protection (SoP) of 1:1000 years.
- 7.3 EA data shows that the site is not expected to flood in a present-day (2012) 1 in 200-year overtopping event. A flood level of 5.27mAOD is predicted to occur on the site for the 0.5% AEP (2115) which could result in maximum potential depths of 1.08m on site. This is predicted to affect one unit in the initial plans and as such it is recommended at the first instance that this dwelling is sequentially located outside of the defended wave overtopping flood extent.
- 7.4 Otherwise, in accordance with PPG, FFLs should be set no lower than 5.57mAOD (300mm above the modelled flood level), provided that sleeping accommodation is set at first floor level. Otherwise, if sleeping accommodation is set at ground floor, FFLs should be set no lower than 5.87mAOD (600mm above the modelled flood level of 5.27mAOD).
- 7.5 It should be noted that, with reference to the Medway Estuary and Swale SMP (2010), the short, medium and long term management policy for Rushenden to Sheerness (Policy Unit E4 23) is 'Hold the Line' - maintain or upgrade the level of protection provided by defences.
- 7.6 The proposed development is within an EA Flood Alert and Warning area for 'the Isle of Sheppey and Coast from Kemsley to Seasalter' and for the 'Rivers on the Isle of Sheppey'. It is recommended that site users subscribe to this service.
- 7.7 The site is at low risk of surface water flooding, with potential water depths of up to 300mm predicted for the 1:1000 year rainfall event.
- 7.8 Where new sewer connections are to be proposed, liaison with the Southern Water will be required, with regards to a sewer connection. Foul and surface water sewer systems should be kept separate, and non-return valves or similar protection measures should be installed, to prevent the public sewers from surcharging into the lateral drains serving the property.

Flood Warning Service and Flood Evacuation Plan

- 7.9 The proposed development site is located within EA Tidal Flood Zones 1, 2 and 3 and as such is located partly within 'the Isle of Sheppey and Coast from Kemsley to Seasalter' Flood Alert and Warning Service Area (Figure 13). As such, it is recommended that site users sign up to this service.
- 7.10 The EA operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information. Further information can be found on www.environment-agency.gov.uk/floodline. Floodline Warnings Direct is a free service operated by the EA that provides flood warnings direct to occupants by telephone, mobile phone, fax or pager.



Figure 12 EA Flood Alert and Flood Warning Service Areas.

- 7.11 Upon receipt of a Flood Warning, site users are advised to seek refuge at higher ground on site, within Flood Zone 1, and await assistance from the emergency services if necessary. Given that the site is located upon Rushenden Hill, the site is already located largely in Flood Zone 1. The highest point of the site, located at its southernmost extent, is approximately 8m greater than the lowest point at the north-eastern corner.
- 7.12 If flooding has already occurred prior to evacuation, it is advised to remain on the upper floors of the property and await instruction from the emergency services or until it is deemed safe to evacuate. Residents should move via internal stairwells to the upper floors of the property so as to be located within an area of safe refuge. No evacuation should be sought if flood depths exceed 25cm, evacuation should only be sought with the assistance of the emergency services in these circumstances.
- 7.13 Tidal flooding is generally caused by low pressure weather systems creating storm-surges (or storm tides), chiefly via high speed winds. These winds (and to a certain extent, the low pressure) create a 'bulge' of water which, if it coincides with high tide, can generate very high, stormy, water levels. However, because this mechanism is well understood, it is very likely that early warning will be issued before such an event strikes.
- 7.14 As such, it is very unlikely that the site would be subject to flooding without several hours of early warning.

8. Off Site Impacts

Flood Water Displacement

- 8.1 The existing site is currently considered to be greenfield land. It is understood that the development is for an outline application for the construction of 22 dwellings on site.
- 8.2 The site is located in Flood Zones 1, 2 and 3, (tidal flood risk) and under the NPPF:
“unless the development is located in an area which is subject to tidal flooding and which serves no conveyance function, land raising must be accompanied by compensatory provision of flood storage either on- or off-site”
- 8.3 As such, there is no requirement for compensatory flood storage and there will likely be negligible change in floodwater displacement in the vicinity of the site as a result of the proposed development.

Generation of Runoff

- 8.4 The site is currently a residential dwelling. It is understood that the development is for the construction of an extension to an existing residential dwelling to provide greater habitable space.
- 8.5 It is recommended that the site developer discharges surface water via an appropriate drainage system. Design of this drainage system should seek to utilise the SuDS hierarchy, prioritising infiltration and open drainage features where possible. Therefore, reduction in the surface water runoff rate could be achieved through the use of small scale SuDS such as soakaways, permeable paving, water butts and/or rain gardens.
- 8.6 As such, there will likely be negligible change in the surface water runoff generated by the site as a result of the proposed development.

9. Conclusion

- 9.1 Ambiental Environmental Assessment has been appointed by Oast Architecture on behalf of Alan Hill to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at Nil Desperandum, Alsager Avenue, Queenborough, Swale, ME11 5LA. The purpose of this assessment is to support an outline planning application.
- 9.2 This report comprises the Flood Risk Assessment. Ambiental have produced a separate Surface Water Drainage Strategy report (Ref 5874_SWDS).
- 9.3 The existing site is currently considered to be greenfield land. It is understood that the development is for the construction of 22 dwellings.
- 9.4 The total area of the redline site boundary is approximately 10,366m². With reference to the Environment Agency (EA) Flood Map for Planning, the majority of the redline application boundary is located within Flood Zone 1. Approximately 850m² of the site area is located in Flood Zone 2 (8.2%), whilst approximately 226.5m² of the site is located within Flood Zone 3 (2.2%). However, the EA Flood Map for Planning shows that the area defined as Flood Zone 3 is an area that benefits from the presence of flood defences, more specifically the 980m long embankment north-west of the site which has a Standard of Protection (SoP) of 1:1000 years. If this was not present, the 2.2% shown to be in Flood Zone 3 is predicted to be flooded during the 1 in 200 year tidal event. As such, the site is considered to be located in Flood Zones 1, 2 and 3.
- 9.5 The existing site currently consists of greenfield land and as such, under the National Planning Policy Framework (NPPF) vulnerability classification guidance, could be considered 'Less Vulnerable'. The proposed development is for an outline application for the construction of 22 residential dwellings on site. Given its residential use, the site could therefore be considered 'More Vulnerable' post-development.
- 9.6 The Swale, a tidal channel of the Thames Estuary, is located approximately 370m north-west of the site. This is classified an EA Main River.
- 9.7 The proposed development is for an outline application for the construction of 22 dwellings on site. As such, a Flood Risk Assessment is required to prove that the proposed residential units can be considered safe for their lifetime and that the proposed development will not increase flood risk elsewhere. The 'lifetime' of a residential development is defined to be 100 years whilst accounting for the influence of climate change.
- 9.8 Given that the site is located within Flood Zones 1, 2 and 3, Ambiental have requested site-specific flood levels from the EA. Ambiental were subsequently provided with data taken from the North Kent Coast Modelling and Mapping Study, completed in 2015. Floodplain (2D) model nodes for the defended still water, defended overtopping and undefended scenarios have been provided.
- 9.9 Following the review of 2m resolution LiDAR data on the site, topographic levels have been shown to vary between as low as 4.19mAOD in the north-east corner of the site to up to 12.21mAOD at the south-west corner of the site. As such, levels fall steeply towards the Swale.
- 9.10 Maximum flood levels of 5.27mAOD, 5.27mAOD and 5.87mAOD are predicted on site for the 0.5% AEP (2115) defended still water, 0.5% AEP (2115) defended overtopping and 0.5% AEP (2115) undefended scenarios respectively. As such, depths of up to 1.08m, 1.08m and 1.68m could be experienced on site during these events.
- 9.11 At present, the proposed block plan displays only one two-storey three-bedroom unit to be affected by depths of up to 110mm during the 0.5% AEP (2115) defended overtopping scenario. To mitigate against such risk, the proposed unit should be repositioned outside of the 0.5% AEP (2115) defended overtopping

scenario modelled flood extent, or if this is not feasible, Finished Floor Levels (FFLs) are required to be set 300mm above the modelled flood level of 5.27mAOD. Floor levels will subsequently need to be raised 410mm to be set at no lower than 5.57mAOD.

- 9.12 Following review of the EA Risk of Flooding from Surface Water dataset, the entire site is shown to remain unaffected for the 1:30 year, 1:100 year and 1:1000 year rainfall events. As such, the risk of surface water flooding to the site could be considered to be very low.
- 9.13 Reference should be made to the separate Surface Water Drainage Strategy report (Ref 5874_SWDS) with regards to managing surface water runoff discharge rates post-development.
- 9.14 Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Appendix I - Site Plans

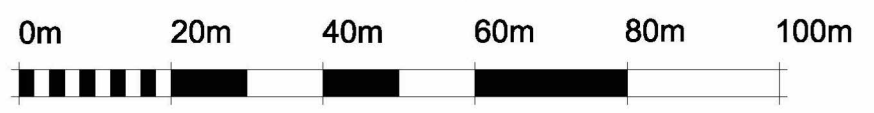
NOTE:
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ENSURE THAT THE COPY HAS BEEN PRINTED/PLOTTED ON THE STATED SHEET SIZE WITH THE PLOTTING/PRINTING SCALE SET TO A CORRECT RATIO.

Primary Access Routes



Proposed 5.5m access road with 2m Footway leading to speed control bend to Well Rd.

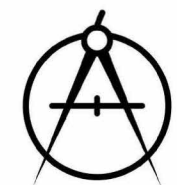
Proposed 2m Footway to tie back into Swale Ave footway



VISUAL SCALE 1:1000 @ A3

Client
Mr Alan Hill
Project
Nil Desperandum
Title
Site Layout Plan
Scale
As Indicated

Date



OAST ARCHITECTURE

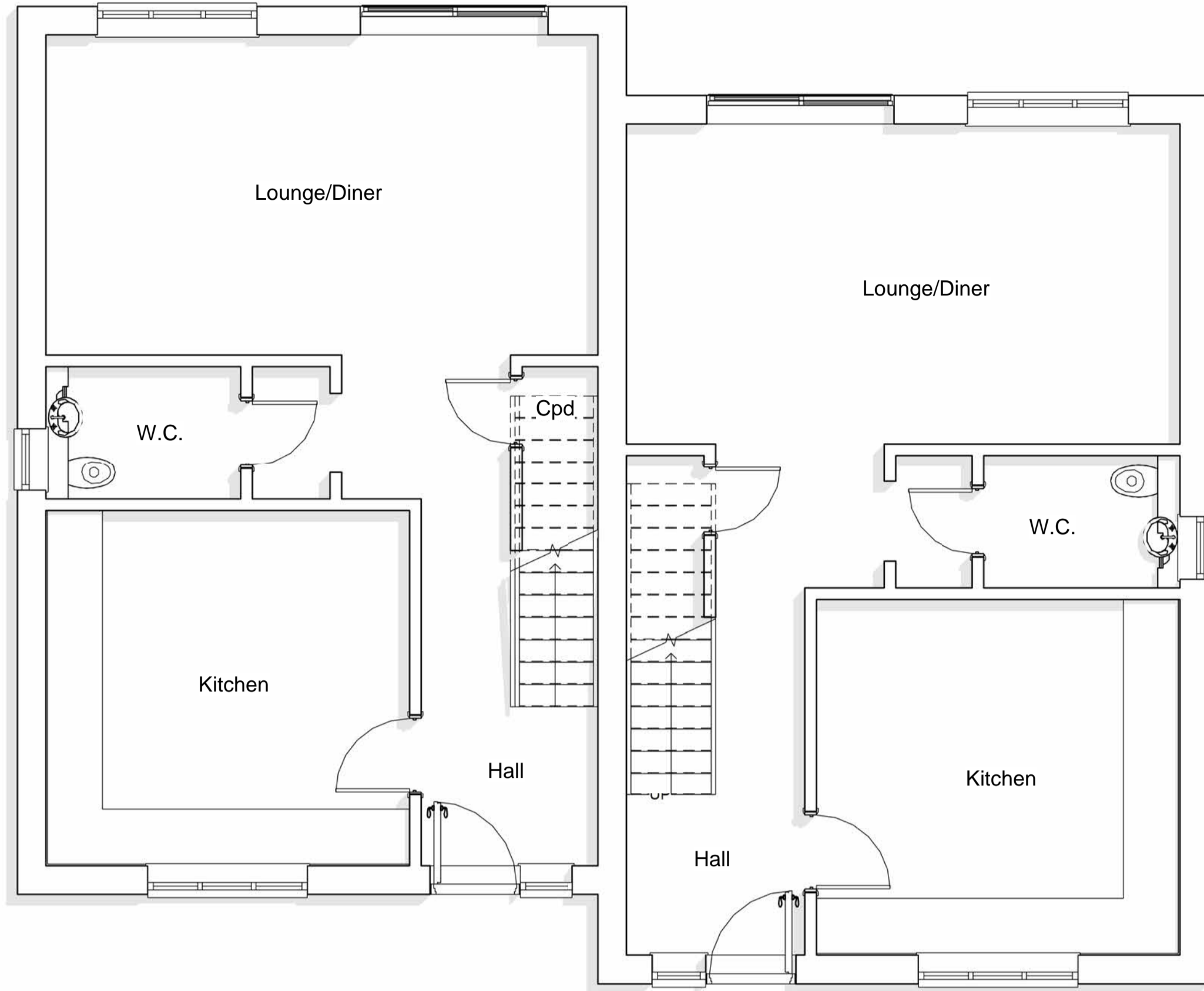
Drawn By
Oast

Checked By
DS

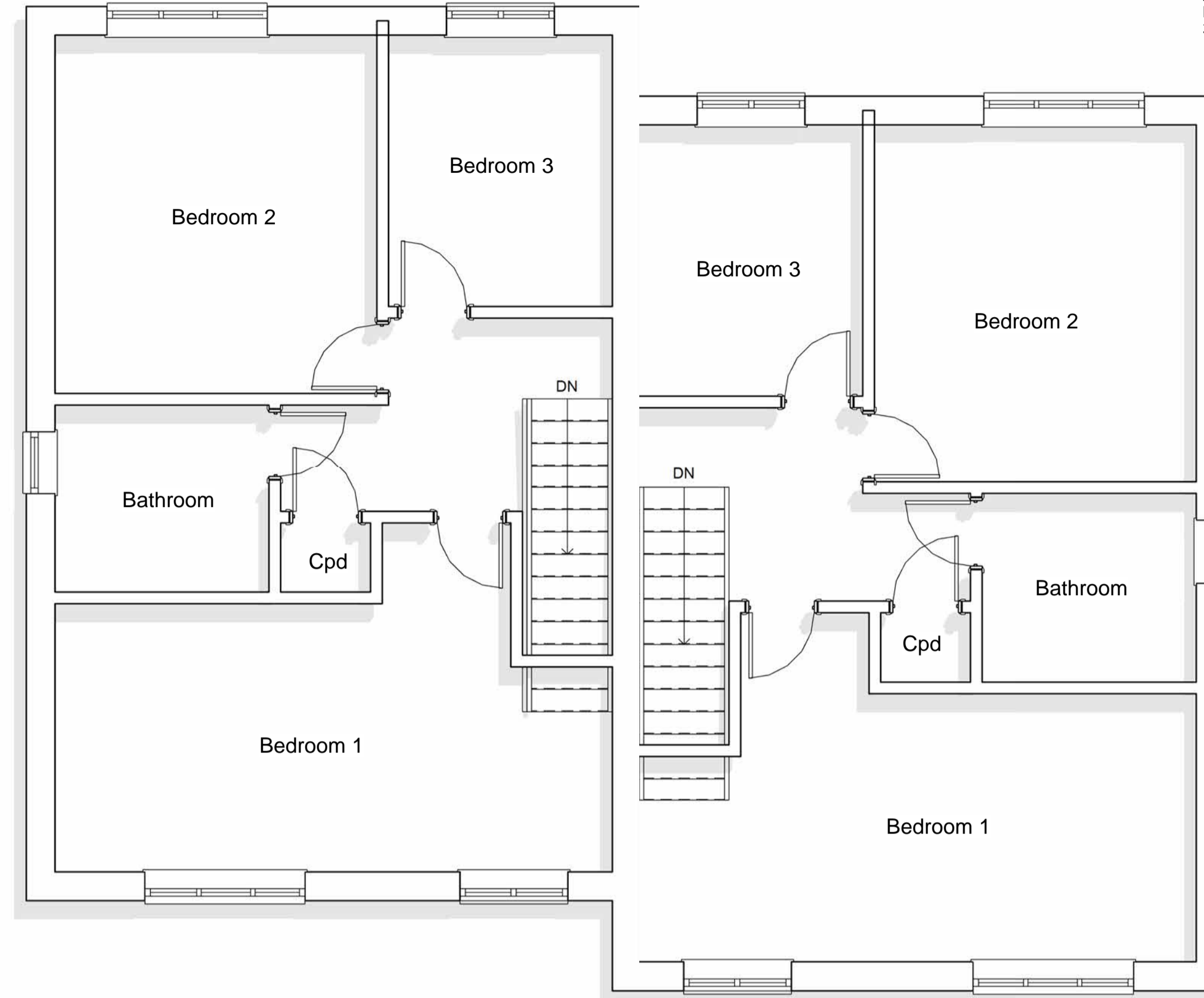
Drawing No:
A101

Revision

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 2. ENSURE THAT AN ADEQUATE ALLOWANCE (DEPENDANT ON THE STATED SCALE) IS MADE FOR THE INEVITABLE DISTORTIONS INTRODUCED BY PLOTTING/PRINTING AND COPYING PROCESSES.
 3. MARKED CRITICAL DIMENSIONS ARE TO BE REGARDED AS HAVING PRECEDENCE OVER THE SCALED VALUES.



1 Proposed Ground Floor
 1 : 50



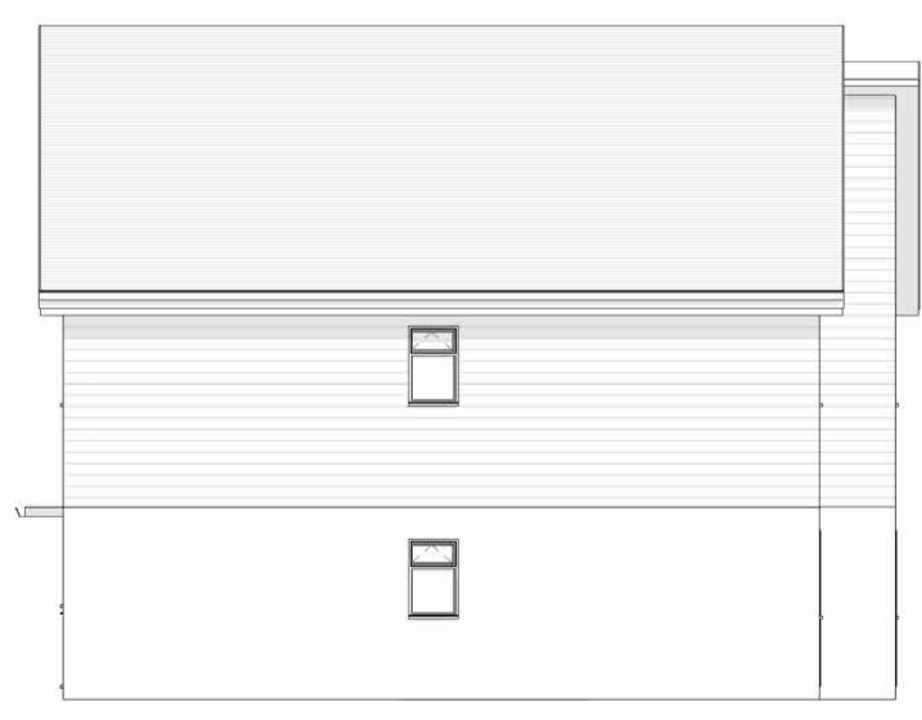
2 Proposed First Floor
 1 : 50



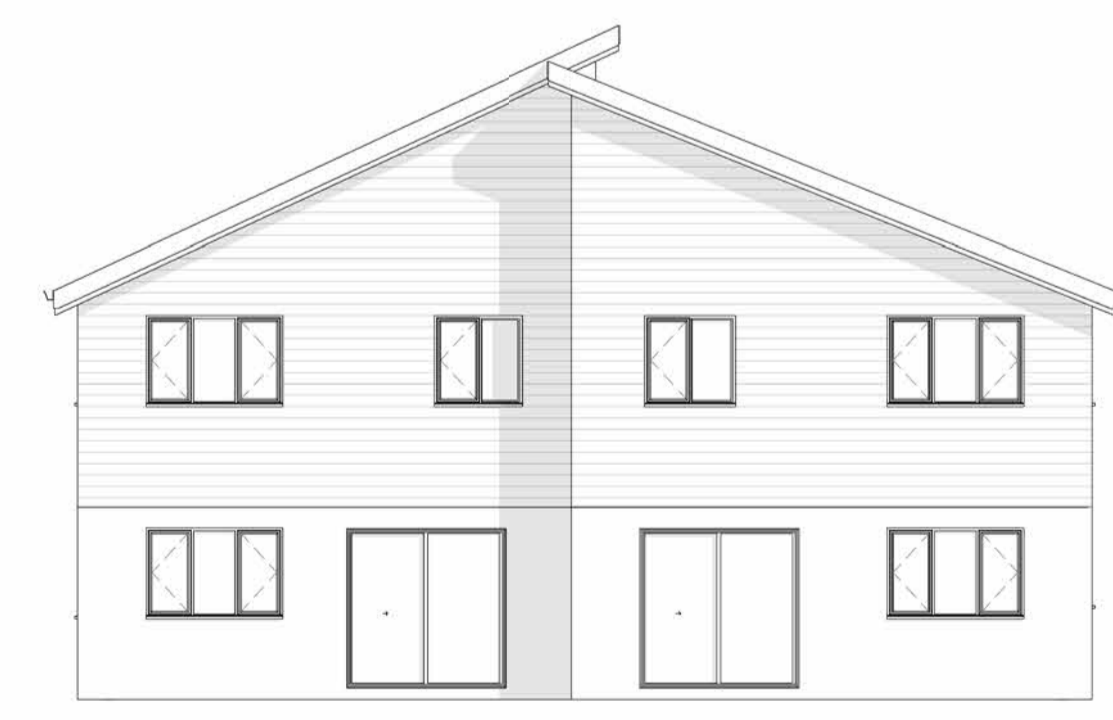
Marley Smooth grey interlocking roof tile
 Marley Cedral grey Cladding
 Off White Render
 Anthracite Grey Windows



3 Proposed Front
 1 : 100



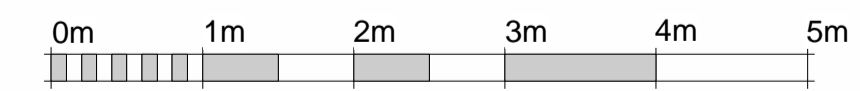
4 Proposed R/H Side
 1 : 100



5 Proposed Back
 1 : 100



6 Proposed L/H Side
 1 : 100



VISUAL SCALE 1:50 @ A1



VISUAL SCALE 1:100 @ A1

REV	DESCRIPTION	DATE	INIT	CHKD

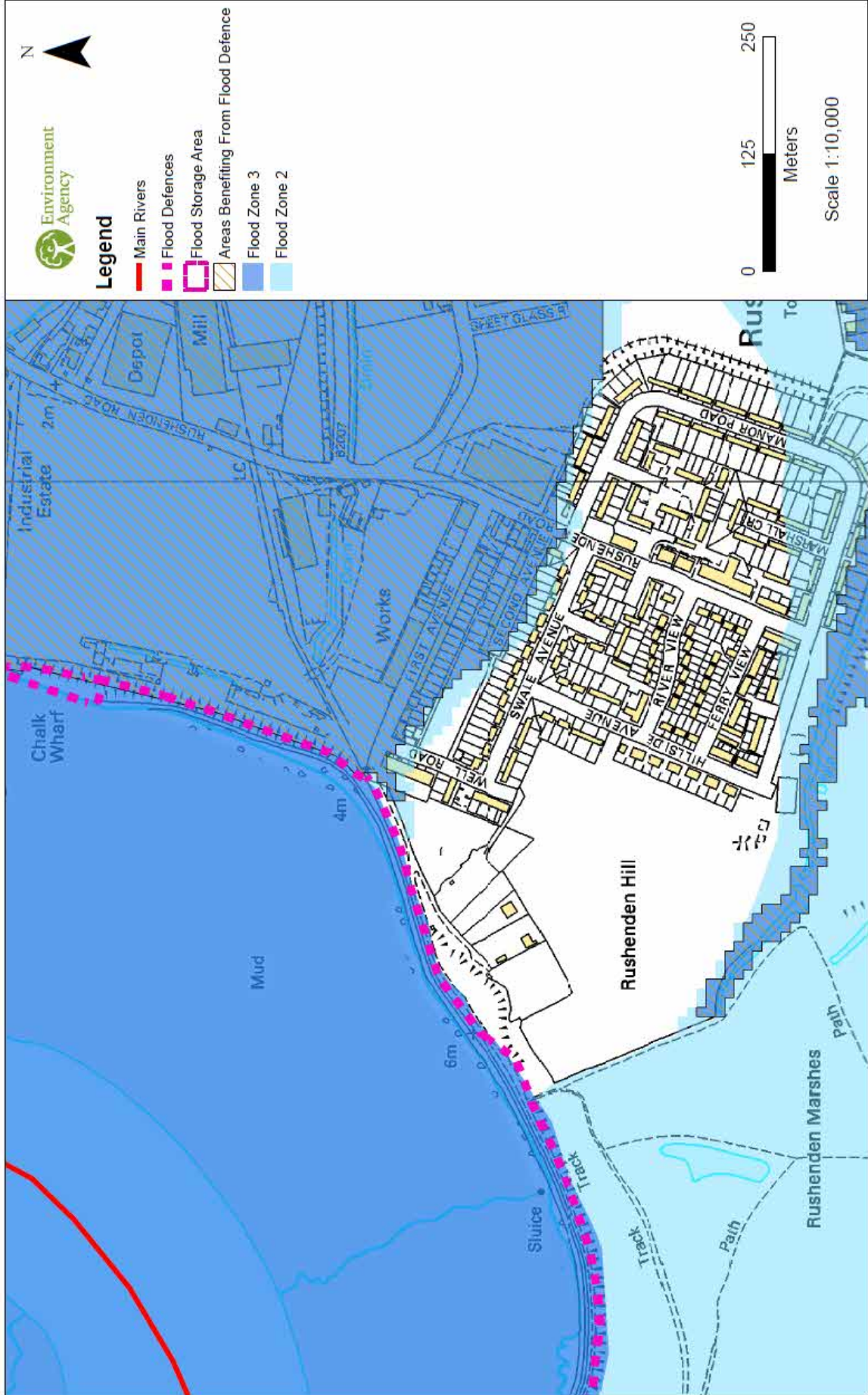
Client
 Owner
 Project
 Nil Desperandum
 Title
 Dwelling House Type GA 2
 Scale
 As Indicated

Drawn By
 Oast
 Checked By
 DS
 Drawing No:
 A103
 Revision



Appendix II - EA Data

**Flood Map centred on Nil Desperandum, Alsager Avenue, Queenborough, Swale, ME11 5LA.
Created 29/05/2019 (Ref KSL 128555 LB)**



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Model Output Data

You have requested flood levels for various return periods at this location.

The modelled flood levels for the closest most appropriate model grid cells, any additional information you may need to know about the modelling from which they are derived and/or any specific use or health warning for their use are set out below.

Using a 2D TuFLOW model the floodplain has been represented as a grid. The flood water levels have been calculated for each grid cell.

A map showing the location of the points from which the data is taken is enclosed. Please note you should read the notice enclosed for your specific use rights.

Table 1: Defended Modelled Tidal Flood levels for Annual Exceedance Probability shown in mAOD

Node Location ID	National Grid Ref		Defended - Still Water						Defended - Wave Overtopping												
	Northing		5% AEP 2012		1.33% AEP 2012		0.5% AEP 2070		0.5% AEP 2115		0.1% AEP (2012)		5% AEP 2012		1.33% AEP 2012		0.5% AEP 2115		0.1% AEP (2012)		
	Easting	Northing	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
1	590619	171475	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
2	590649	171475	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
3	590659	171475	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
4	590669	171475	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
5	590619	171485	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
6	590629	171485	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
7	590639	171485	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
8	590649	171485	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>

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34	590619	171525	4.30	4.57	4.75	5.25	5.81	5.18	4.30	4.57	4.75	5.81	5.18
35	590629	171525	4.30	4.57	4.75	5.25	5.81	5.18	4.30	4.57	4.75	5.81	5.18
36	590639	171525	<Null>	<Null>	<Null>	5.25	5.81	5.18	<Null>	<Null>	<Null>	5.81	5.18

Table 2: Undefended Modelled Tidal Flood levels for Annual Exceedance Probability shown in mAOD

Node Location ID	Modelled Tidal Flood levels for Annual Exceedance Probability shown in mAOD												
	National Grid Ref		Undefended										
	Easting	Northing	5% AEP 2012	0.5% AEP 2012	0.5% AEP 2070	0.5% AEP 2115	0.1% AEP (2012)						
1	590619	171475	<Null>	<Null>	<Null>	5.86	<Null>	<Null>					
2	590649	171475	<Null>	<Null>	<Null>	5.86	<Null>	<Null>					
3	590659	171475	<Null>	<Null>	<Null>	5.86	<Null>	<Null>					
4	590669	171475	<Null>	<Null>	<Null>	5.86	<Null>	<Null>					
5	590619	171485	<Null>	<Null>	<Null>	5.86	<Null>	<Null>					
6	590629	171485	<Null>	<Null>	<Null>	5.86	<Null>	<Null>					
7	590639	171485	<Null>	<Null>	5.20	5.86	<Null>	<Null>					
8	590649	171485	<Null>	<Null>	5.19	5.86	<Null>	<Null>					
9	590659	171485	<Null>	<Null>	<Null>	5.86	<Null>	<Null>					
10	590669	171485	<Null>	<Null>	<Null>	5.86	<Null>	<Null>					
11	590549	171495	4.17	4.68	5.19	5.87	5.12	5.81					
12	590599	171495	<Null>	<Null>	<Null>	5.87	<Null>	<Null>					
13	590619	171495	<Null>	<Null>	5.20	5.86	<Null>	<Null>					

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14	590629	171495	<Null>	<Null>	<Null>	5.20	5.86	<Null>
15	590639	171495	<Null>	<Null>	<Null>	<Null>	5.86	<Null>
16	590649	171495	<Null>	<Null>	<Null>	5.19	5.86	5.12
17	590659	171495	<Null>	<Null>	<Null>	5.19	5.86	5.12
18	590669	171495	<Null>	<Null>	<Null>	5.19	5.86	5.12
19	590569	171505	4.17	4.68	4.68	5.19	5.87	5.12
20	590579	171505	<Null>	<Null>	<Null>	5.19	5.87	5.12
21	590599	171505	<Null>	<Null>	<Null>	<Null>	5.87	<Null>
22	590649	171505	<Null>	<Null>	<Null>	<Null>	5.86	<Null>
23	590659	171505	<Null>	<Null>	<Null>	5.19	5.86	5.12
24	590669	171505	<Null>	4.52	4.52	5.19	5.86	5.12
25	590679	171505	<Null>	4.64	4.64	5.19	5.86	5.12
26	590589	171515	4.17	4.68	4.68	5.19	5.87	5.12
27	590599	171515	4.17	4.68	4.68	5.19	5.87	5.12
28	590609	171515	4.17	4.68	4.68	5.20	5.87	5.12
29	590619	171515	4.17	4.68	4.68	5.20	5.87	5.12
30	590659	171515	<Null>	<Null>	<Null>	5.19	5.86	5.12
31	590669	171515	<Null>	<Null>	<Null>	5.19	5.86	5.12
32	590679	171515	<Null>	4.65	4.65	5.19	5.86	5.12
33	590609	171525	4.17	4.68	4.68	5.19	5.87	5.12
34	590619	171525	4.17	4.68	4.68	5.19	5.87	5.12
35	590629	171525	4.17	4.68	4.68	5.19	5.87	5.12
36	590639	171525	<Null>	<Null>	<Null>	5.20	5.87	5.12

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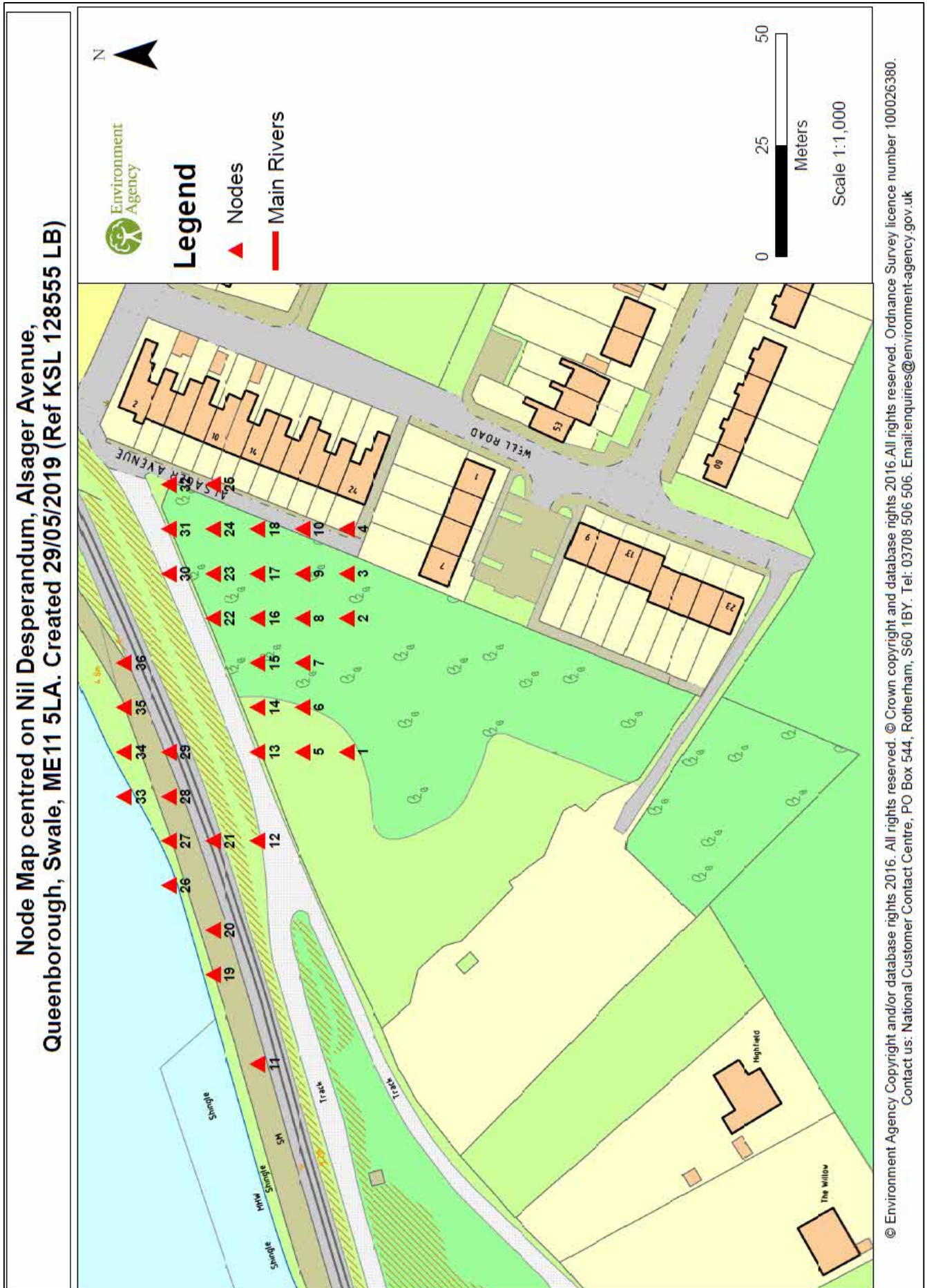


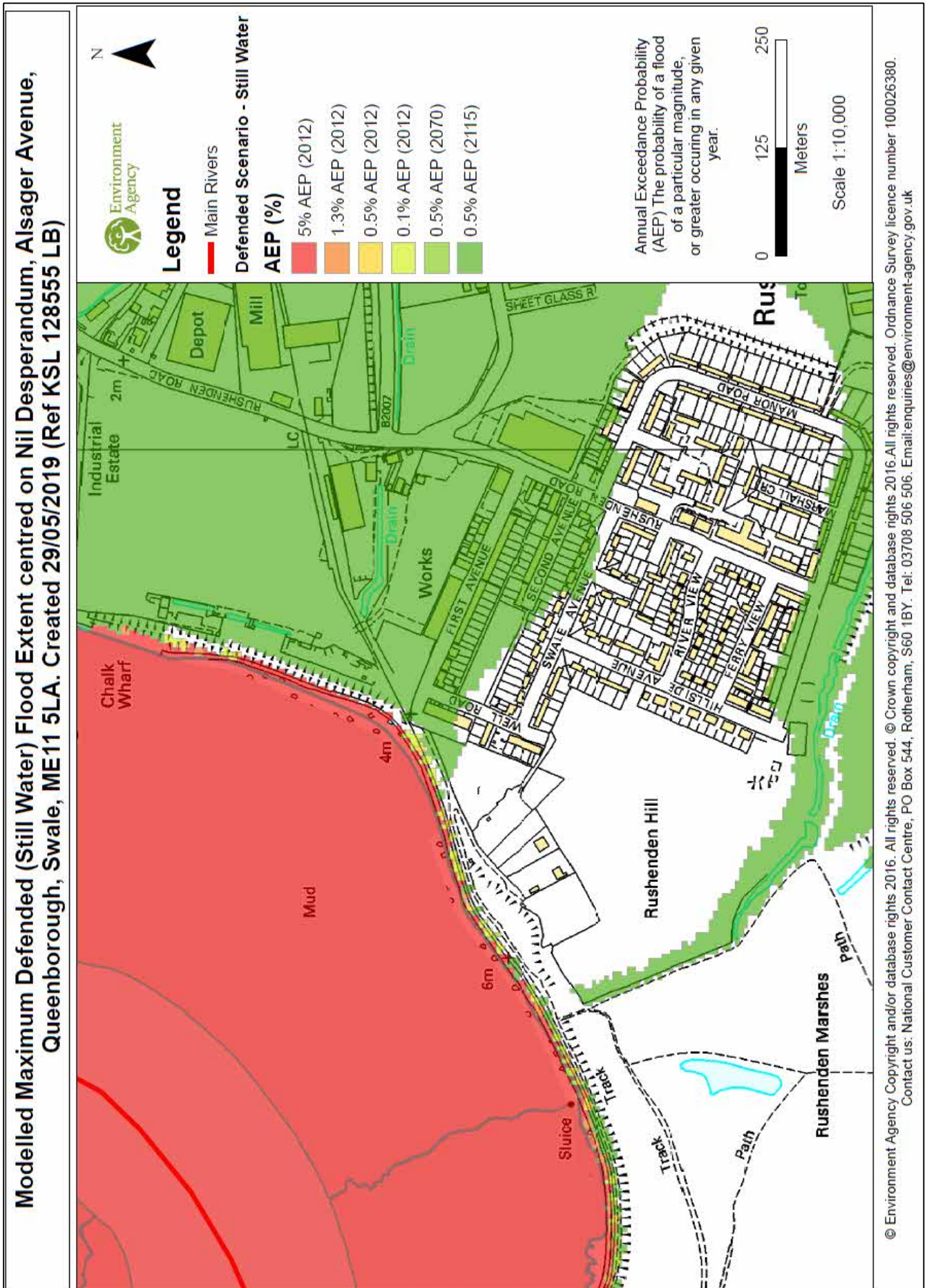
Values of <Null> indicate locations at which the selected points lie outside of a particular modelled flood extent.

Data taken from North Kent Coast Modelling and Mapping Study, completed by JBA Consulting, in August 2015.

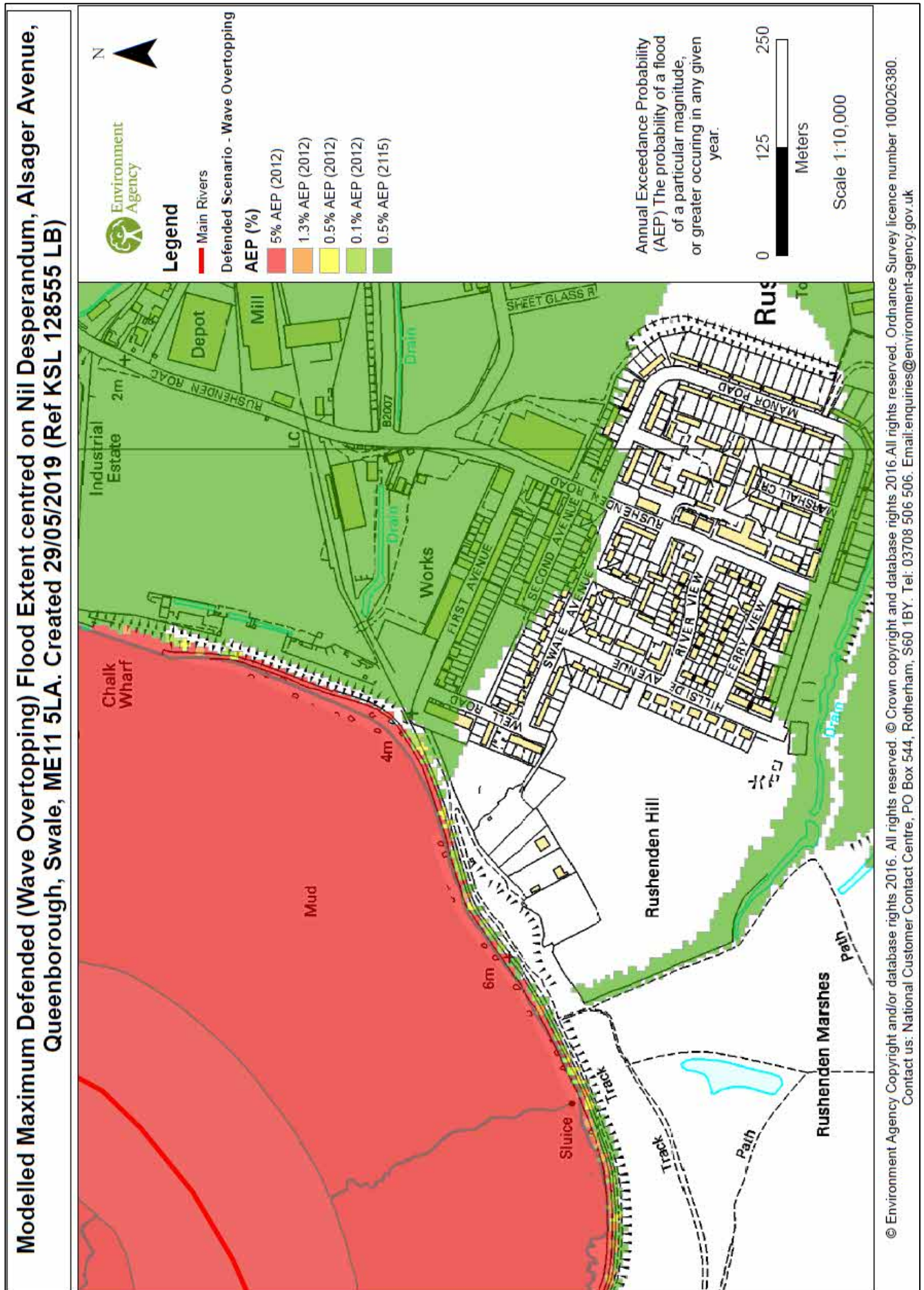
There are no health warnings or additional information for these levels or the model from which they were produced.

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Defence Details

Type and location – 980m of embankment north-west of site
Standard of protection – 1:1000 (0.1% AEP)
Asset Maintainer – Environment Agency

Areas Benefiting from Flood Defences

This site is within an area benefiting from flood defences, as shown on the enclosed extract of our Flood Map. Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

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Historic Flood Data

We hold records of historic flood events from rivers and the sea. Information on the floods that may have affected the area local to your site are provided below and in the enclosed map (if relevant).

Flood Event Data

Dates of historic flood events in this area – February 1953

Please note that our records are not comprehensive. We would therefore advise that you make further enquiries locally with specific reference to flooding at this location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

We map flooding to land, not individual properties. Our historic flood event record outlines are an indication of the geographical extent of an observed flood event. Our historic flood event outlines do not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea;
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system);
- overflowing or backing up of sewer or drainage systems which have been overwhelmed,
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding or drainage systems that have been overwhelmed.

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