Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix E
West Wight

June 2010

Overview

The West Wight RDA is comprised of the towns of Totland and Freshwater and is classified as a Smaller Regeneration Area. Totland lies on a raised area of land adjacent the coast, while Freshwater is built at a lower level, with a significant area of the town under 10 mAOD. Flood risk in the two centres is contrasting with minimal flood risk posed to sites in Totland, yet both tidal and fluvial flooding present a flood risk in Freshwater. The town of Freshwater has a history of flooding relating to the Western Yar. The Western Yar presents a fluvial risk and a tidal risk by acting as a conduit for tidal flood waters. A few of the potential development sites in Freshwater are consequently at high risk of flooding.

Please review this discussion in conjunction with the mapping provided in this Appendix.

Sustainability and Regeneration Objectives

Both settlements of Totland and Freshwater are areas of need in terms of regeneration and therefore the Isle of Wight Council will be receptive to development proposals. The West Wight SRA has been identified as having the potential to accommodate further development to meet the regeneration aims and needs of the local community, through improving local services and strengthening public transport. Development will be encouraged on brownfield sites in the first instance and tourism will be promoted.

Sites at Risk

West Wight has both fluvial and tidal flood risk. Freshwater has the most severe flood risk of the two towns, with historical flooding recorded in 1974 along the headwaters of the Western Yar towards Freshwater Bay. The Agency has also issued two flood reports for the town of Freshwater, both for fluvial flood events from the Western Yar as a result of high rainfall events prior to flooding which saturated the soil and consequently flooding occurred. The two flood events occurred on the 2 June 1999 and on the 9th of October 2000. The Isle of Wight Autumn 2000 Flood Investigation Study – (*Freshwater Parish Council Flood Report*) identified one site specific example of flooding. West Wight Printers, located on the small industrial estate adjacent to Afton Marsh was flooded by surface water and not from the Western Yar.

Fluvial flooding is therefore of concern in Freshwater due to the close proximity of properties to the main river. The sites identified in Figure 19 as being ‘Highly Likely’ are the product of a functional floodplain (Zone 3b) being defined for the Western Yar. This designation only permits water compatible land uses and essential infrastructure to be developed, providing they do not impede the conveyance of flood waters. Figure 20 illustrates that the functional floodplain is only narrow and it is only the parts of the potential sites nearest the river that are actually within the functional floodplain and Flood Zone 3a. Development should be steered to the areas of lowest risk.

In contrast, very few potential development sites have been identified as being within Flood Zones 2 or 3 in Totland. This is due to the absence of any main rivers running through the town, as well as the land quickly becoming elevated with increasing distance from the shoreline.

Climate Change

The impact of climate change on extreme tidal levels to Totland is not likely to have a significant impact. The predicted extent of future flood zones is close to that of the present zones. Only the two development sites already identified as being at risk of flooding marginally affected by the impact of climate change.

Figures 21 and 22 in Appendix A show the extent of the predicted change in extent of Flood Zones 2 and 3 over four even epochs up to the year 2115. Of the available potential development sites, severity of future tidal flooding is likely to increase particularly for sites about the Western Yar confluence. Fluvial areas potentially susceptible to climate change are predominantly confined to areas along the western reach of the Western Yar. The area south west of the Western Yar confluence is also a potentially susceptible area. Other than currently affected sites, no new sites are identified as being affected by fluvial climate change.

Potential Surface Water Flow Routes and Ponding Areas

Method

The potential surface water flow routes and ponding areas presented in the SFRA, illustrate areas of predicted flooding greater than $25m^2$ in spatial extent and only flooding which is more than 0.1m deep. This refinement of the TuFLOW model output is necessary so as to establish the primary areas of predicted flood risk. The modelling approach utilises a 5m resolution ground model grid. The TuFLOW model does not incorporate the Southern Water surface water drains or sewers, which during a storm event would provide storage capacity. Southern Water advised that the modelling should assume that the surface water sewer network could accommodate the 1 in 20 year storm. Therefore, the 1 in 20 year rainfall depths for the critical storm were subtracted from the 1 in 100 year (plus climate change) rain fall depths.

The 1 in 100 year (plus climate change) winter profile storm hyetographs (hyetograph refers to a graph presenting rainfall depth over time) were generated by deriving catchment descriptors from the Flood Estimation Handbook CD-ROM (FEH) and applying the FEH Rain Profile Method. The storm durations were determined by the critical drainage pathway lengths in each of the model areas. The model boundaries were determined by the topography, the local watersheds were traced to ensure that all contributing parts of the catchments were included in the model.

Results

The majority of the predicted flooding areas are either small isolated patches (which are most likely to be a result of small undulations in the LiDAR ground model), flow routes or areas of predicted ponding.

In West Wight there are well defined potential surface water flow routes, it is clear that the model has routed the rainfall along the roads and highways which are represented in the LiDAR ground model as local topographic low points. The roads are either following the bottom of natural depressions or, in places, they appear to be positioned in man-made cuttings.

The areas of predicted ponding are areas where water has accumulated during the simulated storm and due to the form of the topography it has not drained away over the surface. These areas do not however correspond to the reported incidents provided by Southern Water, this discrepancy may be the product of the actual Southern Water surface water drainage system not being represented in the model. It is possible that the piped drainage network has the potential to drain topographic low points, which cannot drain by overland surface flow routes.

The confinement of the flow routes to roads and topographic low points, results in there not being a significant surface water flood risk being predicted for any of the potential development sites in this Regeneration and Development Area.

Surface Drainage and Infiltration SuDS Potential

The Freshwater Flooding Feasibility Report (1999) assesses the surface drainage network of Freshwater, and many of the culverts in the river channel, to suffer from under capacity issues.

The soils map of the town shows consistent distribution of soils with an SPR of about 47%. This means that runoff potential in the area is likely to be high. This assumed consistent soil distribution is mirrored in the map of groundwater vulnerability which shows the site as lying predominantly over Secondary Aquifer with an intermediate leaching potential. Except for the area the south of Freshwater which has a few small areas of Unproductive Strata and Principal Aquifer associated with intermediate and high leaching potential soils. Infiltration potential in the area is therefore mostly low, except of the south part of Freshwater which is divided into areas of medium and high infiltration potential. The area immediately along the coast of Totland is also associated with an area of mass movement and consequently infiltration SuDS are considered to be unsuitable. Groundwater contamination reflects the infiltration potential classifications except for a small area to the far south of Freshwater which overlies a zone 1, 2 and 3 SPZ.

Due to the high runoff and a low soil leaching potentials in much of West Wight, infiltration SuDS techniques are considered to have a low suitability. This excludes a small area to the south of Freshwater which has high infiltration potential but is defined as lying over a SPZ, which makes contamination mitigation of any infiltrated water an important concern. Volumes of surface water can be discharged into the sea without restrictions. The presence of a SSSI to the east of Freshwater and a SAC south of Freshwater Bay require extra precaution be taken to prevent pollutants from entering the environment in these locations. Consideration should be given to the potential for tide locked surface water drainage outfalls. On site attenuation and storage will need to be provided to ensure that high tides do not result in sites flooding.

Wave Exposure Risk

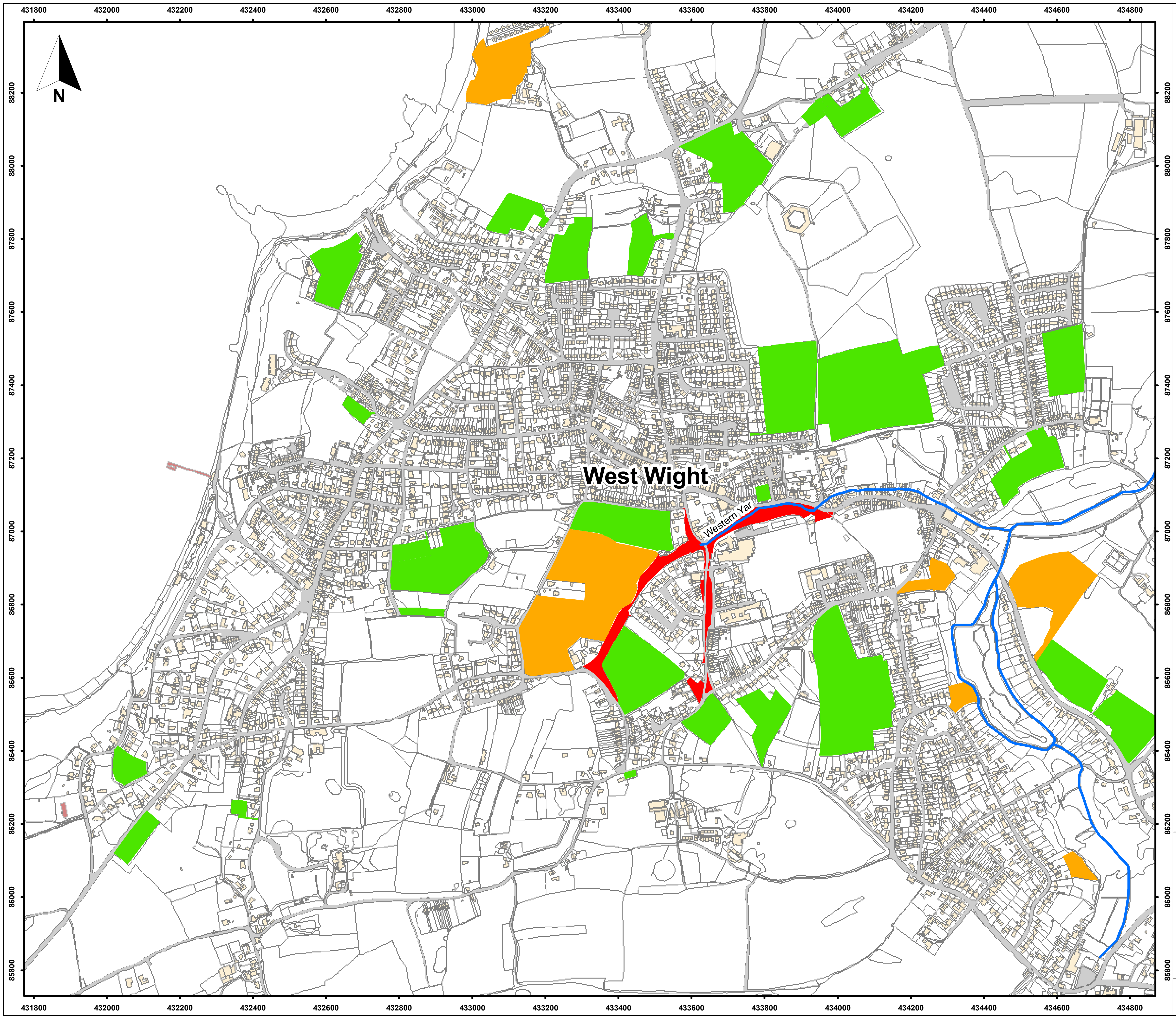
The coastline of West Wight has been classified as being at high risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 100m buffer, where ground levels are less or equal to the predicted peak 1 in 200 year tide in 2115 level plus a 4m allowance for wave height, building design should consider the impact of being potentially exposed to airborne beach material and the corrosive effects of sea spray.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Yarmouth. The development of any previously undeveloped site in Flood Zones 2 and 3 is considered by PPS25 as an increase in flood risk and should be avoided. The redevelopment of any previously developed sites within the Flood Zones will require the PPS25 Sequential test to be passed and the Exception Test satisfied where necessary.

Factors to be considered in safe development could include:

- Ensuring that the sequential approach to landuse planning is, where possible, applied on site. This approach would see more and highly vulnerable landuse types being placed in the lower risk zones.
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should be asked to confirm if the predicted tide levels in Figure 1 in Appendix B are still the most recent predictions. A freeboard allowance should be applied, again the Environment Agency should be consulted on this aspect of the design.
- Buildings should be designed so that safe access and egress can be facilitated in the event of the 1 in 100 year (plus climate change) and 1 in 200 year tidal event (plus climate change).
- Development should not increase the risk of flooding elsewhere. As such, the potential for displaced flood water to impact adjacent areas should be considered. This typically applies if an existing building footprint is being increased in fluvial floodplains and defended tidal floodplains. The displacement of water aspect of development along an undefended coastline is not necessarily a concern.
- Building design should account for the potential depths of water that might occur and appropriate flood resilient and or resistant design features should be incorporated.
- Surface water generated by development should be managed using sustainable techniques. The FRA or drainage assessment should explore the Environment Agency and CIRIA SuDS hierarchy. Discharge rates and volumes should not increase post development, in addition to this PPS25 requirement, the Council and the Environment Agency want to see developers seeking to reduce run-off rates and volumes.



Key:

Main Rivers

Probability of Flooding

Functional Floodplain

High Probability

Medium Probability

Low Probability

Notes:
Site is attributed with the flood probability associated with the highest probability flood zone the site intersects

The mapped extent of Flood Zone 3b has been used to identify Functional Floodplain The 1 in 100 year fluvial flood zone for the present day and the 1 in 200 year tidal extent predicted for the year 2115 has been used to identify sites at a High Probability. The 1 in 1000 year fluvial flood zone for the present day and the 1 in 1000 year tidal extent predicted for the year 2115 has been used to identify sites at a Medium Probability. Sites only in Flood Zone 1 have been assigned a Low Probability

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Isle of Wight SFRA MK2

Figure 19
Potential Development Sites
Qualitative Flood Risk
West Wight

November 2009
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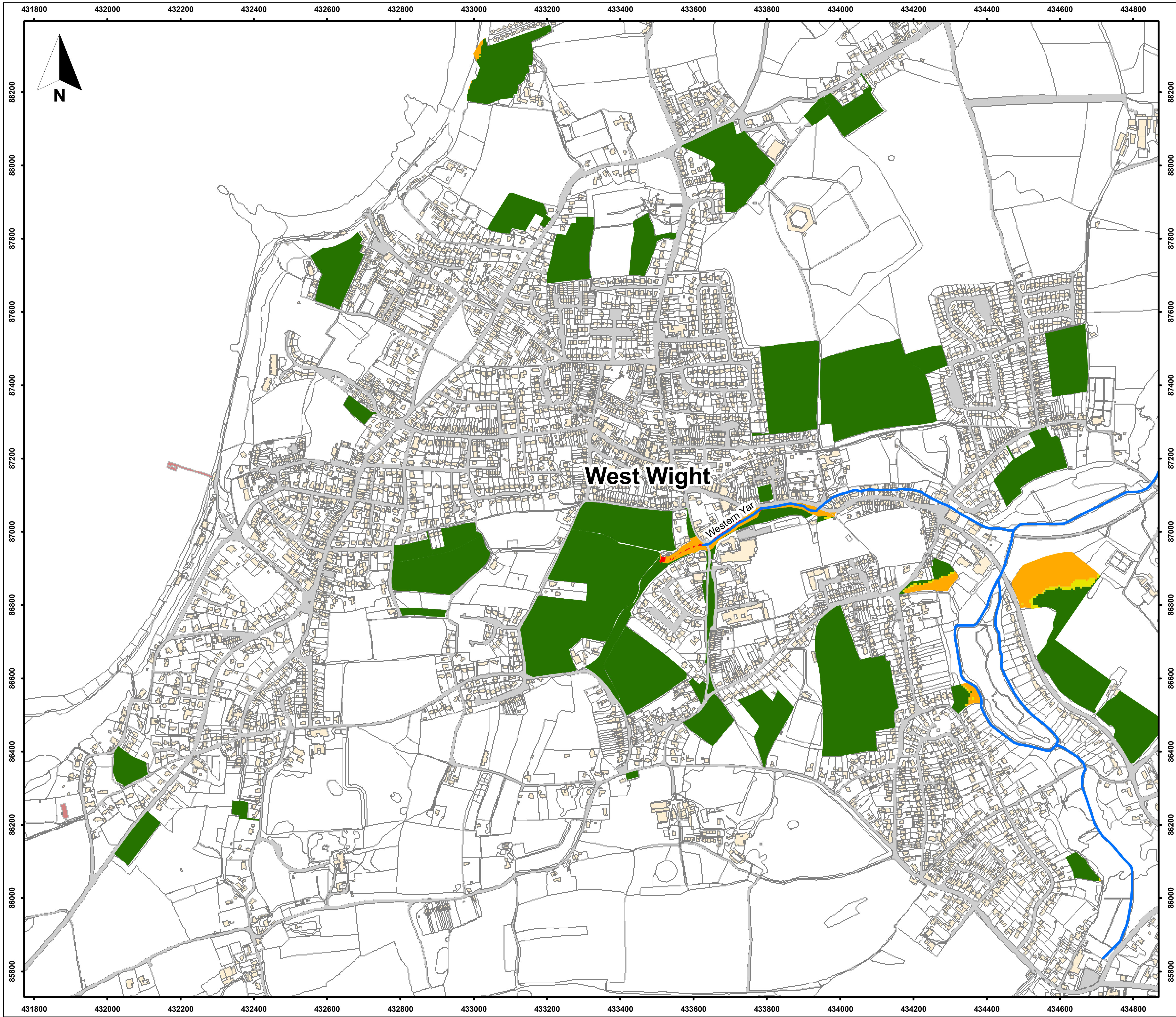

Key:

Main Rivers

Probability of Flooding

Functional Floodplain

High Probability

Medium Probability

Low Probability

0 200 400 Meters

Scale: 1:10,000 @ A3

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Isle of Wight SFRA MK2

Figure 20
Potential Development Sites
Site Specific Flood Risk Definition
West Wight

November 2009
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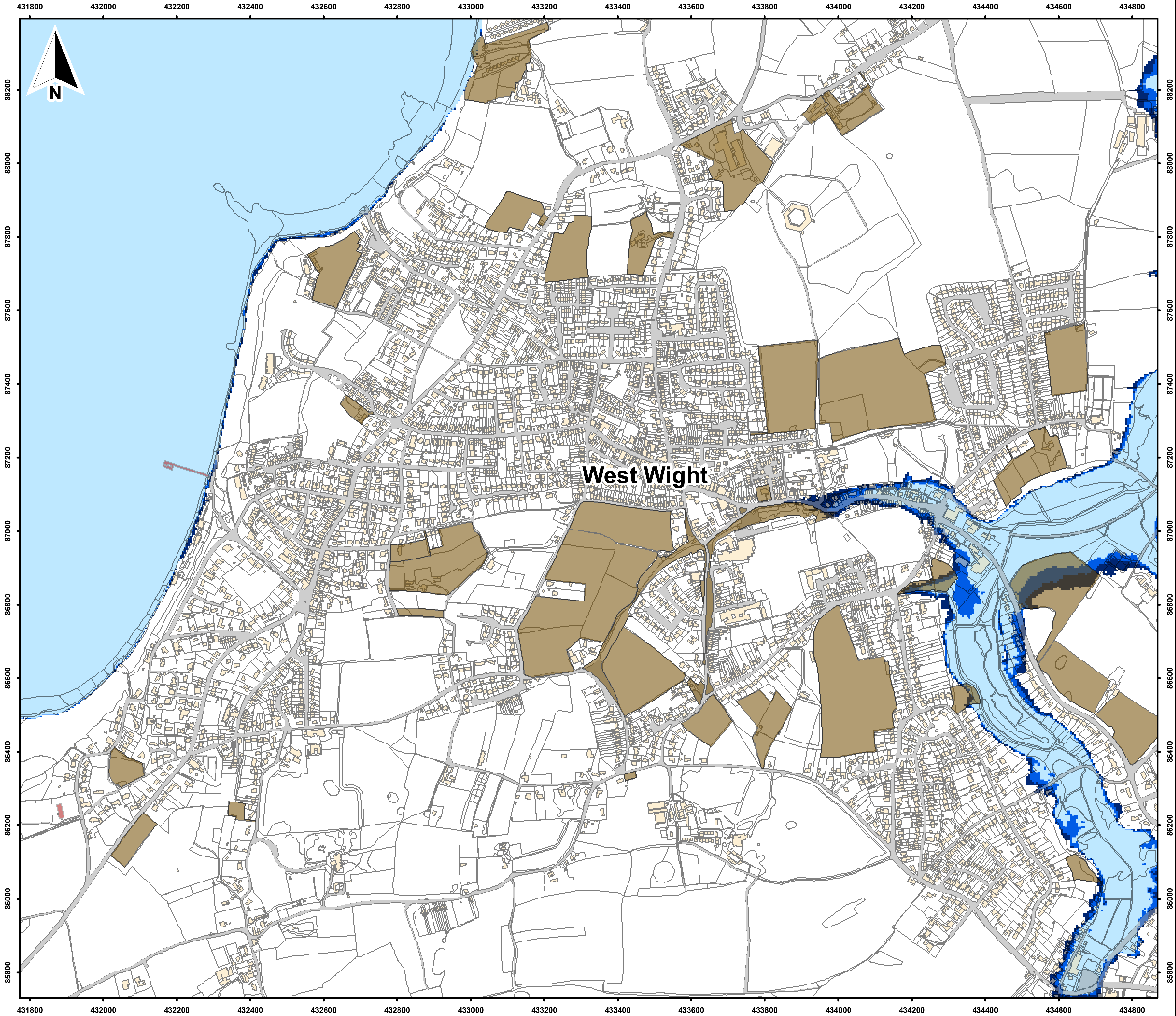

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Isle of Wight SFRA MK2

Figure 21
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
West Wight

November 2009
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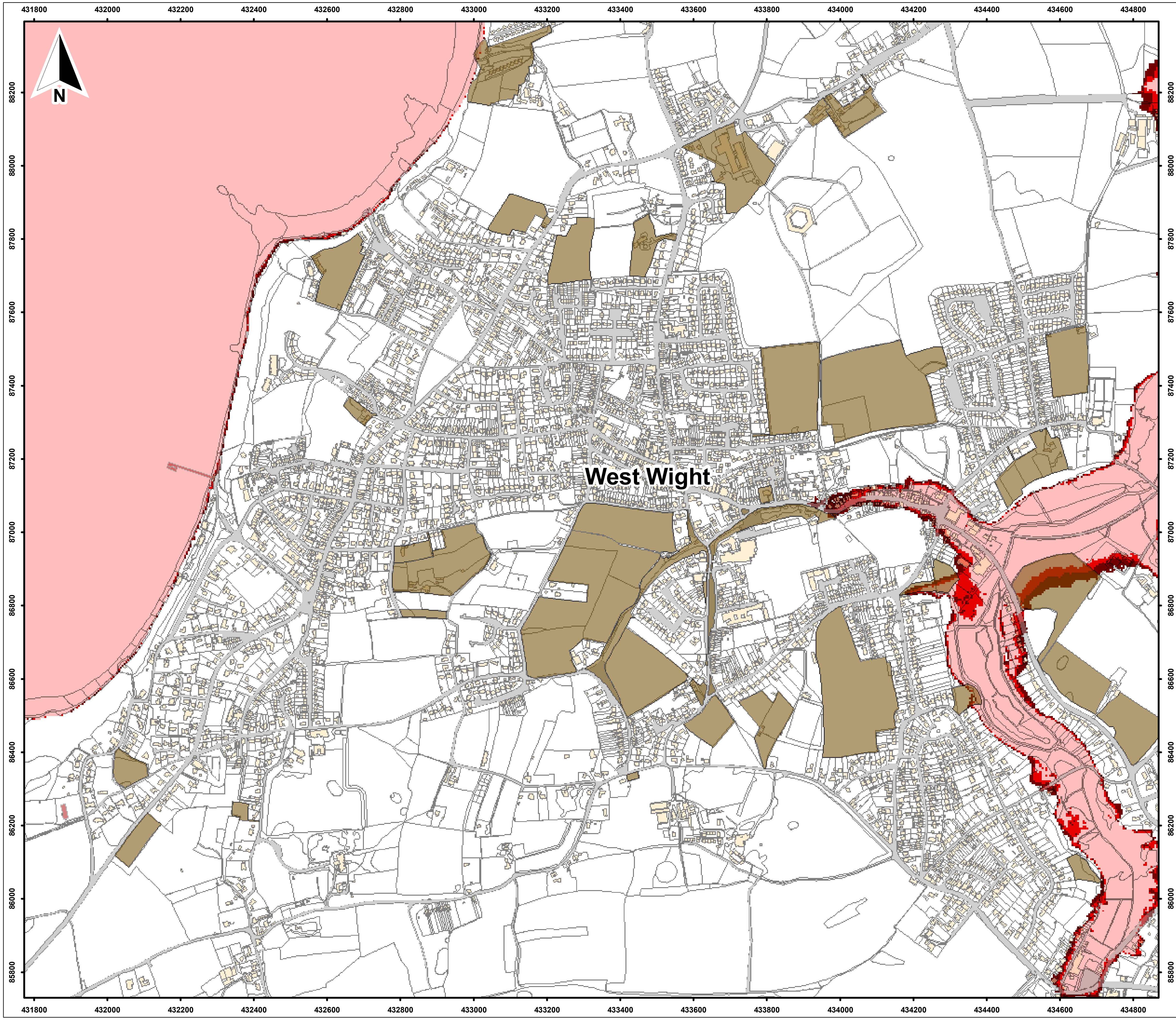

Key:

Predicted 1 in 200 year Tidal Extents

Year 2010

Year 2045

Year 2080

Year 2115

Potential Development Sites

0 200 400 Meters

Scale: 1:10,000 @ A3

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Isle of Wight SFRA MK2

Figure 22
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
West Wight

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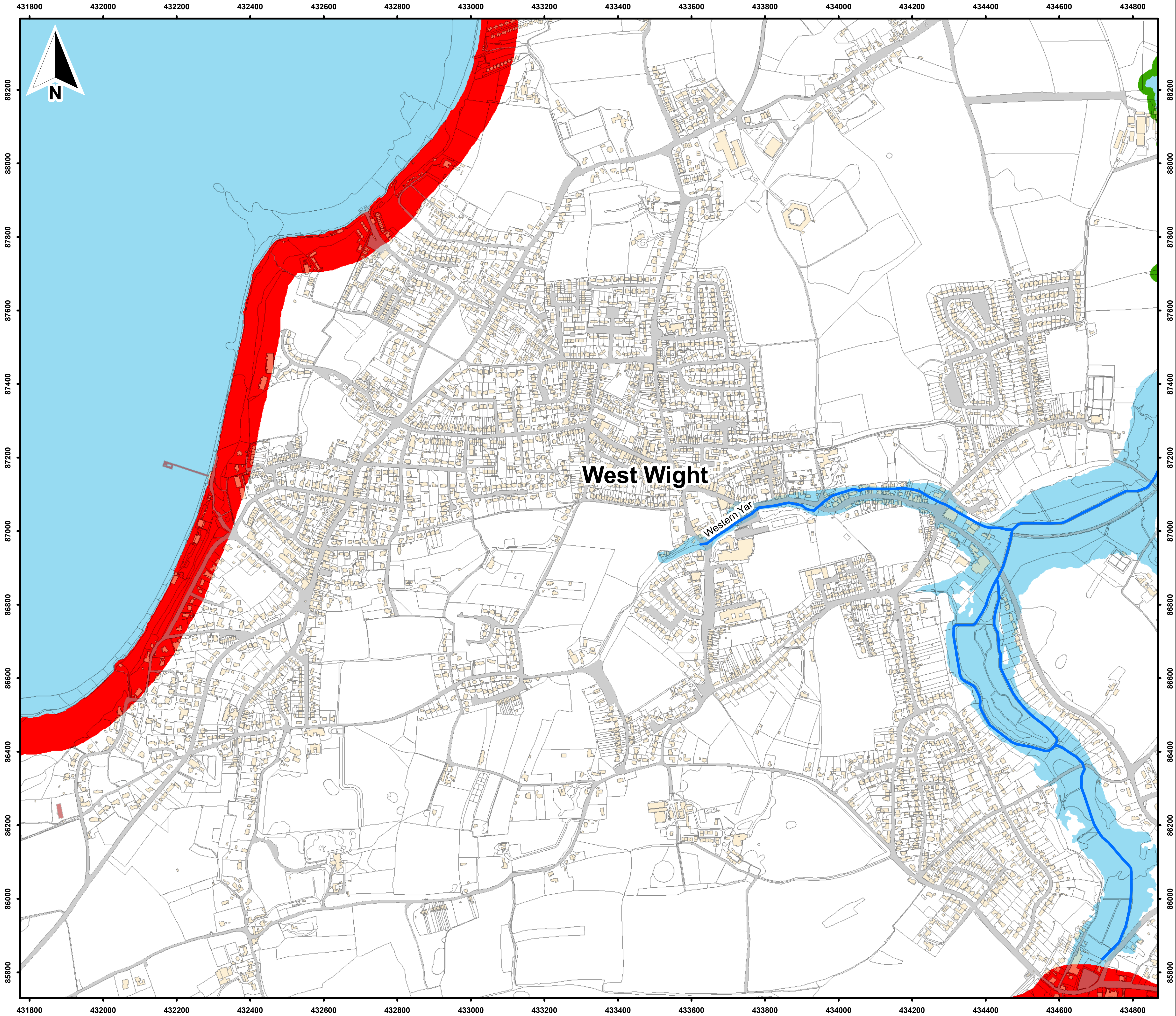

Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 Meters

Scale: 1:10,000 @ A3

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Isle of Wight SFRA MK2

Figure 23
Qualitative Wind and Wave Exposure Risk West Wight

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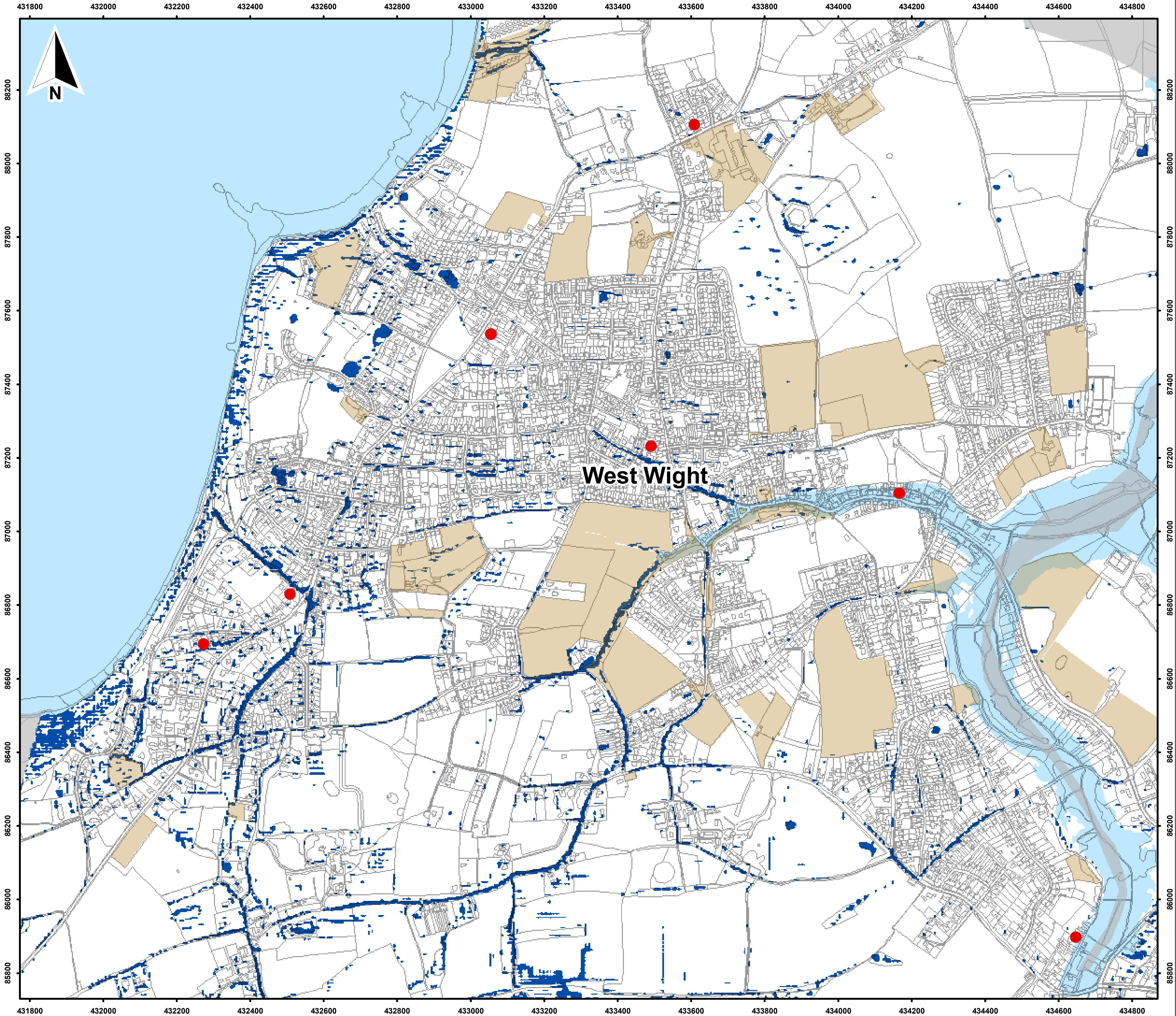

Key:

- Location of reported surface water flooding issues. Supplied by Southern Water for the period upto and including 2006.
- Environment Agency Flood Zone 2 (November 2009)
- Potential Surface Water Flow Routes and Ponding areas (1:100+cc) Over 0.2m deep
- Potential Development Sites
- Outside the Limits of the Surface Water Model

Notes:
Only predicted surface water flow routes and ponding areas, over 0.1m deep and greater than 25m2 in areas are shown

0 200 400 Meters

Scale: 1:10,000 @ A3

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Isle of Wight SFRA MK2

Figure 24
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) West Wight

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