Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix N
Ryde

June 2010

Overview

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

Ryde is a Key Regeneration Area, which is located on the north eastern coast of the Island and is a Georgian and Victorian resort town. Ryde as a Key Regeneration Area is the urban area with the largest population and is a Smaller retail and employment centre for the Island. It is a coastal town with traditional enclosed pasture land to the south, with pockets of landscape improvement areas. Critical to the character of Ryde is the sloping land from the foreshore to the ridge and the valley that divides the town. Importantly, the Environment Agency do not have Flood Zones for the Binstead Watercourse which flows through the western part of the town. The implications of this are discussed in the *Additional Information for Site Specific Flood Risk Assessment* section of this Ryde discussion.

Sustainability and Regeneration Objectives

A Public Realm, Strategy has been prepared for Ryde to establish a locally distinctive framework to guide future regeneration proposals in the area. A major new interchange has also been planned, offering enhanced transport facilities for ferry, rail, bus and taxi users. It is intended that Ryde builds on its role as a hub for high speed trans-Solent connections and an Island public transport interchange to strengthen its role as a residential community, centre for small business and as gateway for tourists.

Sites at Risk

Flood Risk in Ryde is dominated by the threat of tidal flooding and fluvial flooding from Monkton Mead Brook and has historically been a problem with the most significant recent events taking place in the winter of 1993, winter 1999 and autumn 2000. It was stated in the *Monkton Mead Brook Flood Risk Mapping Report* (2005) that the coincidence of high tidal events, failure of pumps, debris in the channel and inadequate surface drainage exacerbated the flooding in these recent events.

The town of Ryde is built along the coast and on the sides of the valley through which Monkton Mead Brook flows. The floodplain of the Monkton Mead brook is only partially developed. Several of the potential development sites are located in this floodplain and along the seafront. A detailed hydraulic model is held by the Environment Agency for the Monkton Mead Brook and this was used in the SFRA to define the functional floodplain (Flood Zone 3b – see Section 4.1). The existence of this model has enabled three flood risk zones to be defined through Ryde, these being Flood Zones 2, 3a and 3b. The sites identified as being at anything other than 'Low Probability' in Figure 67 are sites where FRAs would be required as they are partially within the extents of Flood Zone 2 and 3. To remain in line with the Sequential Test though, sites outside the flood risk zones 2 and 3 should be considered first. Sites over 1 hectare, which are located within Flood Zone 1 will require a FRA.

Figure 68 defines the flood risk across each of the potential development sites. This detailed flood risk classification reveals that although the flood risk close to the Monkton Mead Brook is high, it becomes very low with distance away from the river and up the valley sides. The two large potential large sites to the south of Ryde either side of Rosemary Lane in the Rosemary Vineyard are good examples of this zonation of flood risk). This shows that although parts of the potential sites are in either Flood Zone 2 or 3 the vast majority of the area is in Flood Zone 1. A risk based approach to landuse planning should be applied t steer development to the areas of lowest risk within the affected sites.

The Monkton Mead Flood Alleviation Study (2000) identified that the tunnelled section of railway under Ryde runs below sea level and has two pumps to drain it. These pumps exit to the sea near the hovercraft terminal. It took almost three days for the pumps to drain the tunnel following the event of 9th October 2000. Some of the flooding problems which arose on the 9th were the result of large amounts of debris in the channel. As the flows increased the debris was washed downstream and when an obstacle to flow was encountered (e.g. a culvert) a blockage was caused leading to flooding.

Climate Change

The extent to which Ryde is affected by Climate change is illustrated in Figures 69 and 70. The impact of climate change on the predicted extent of tidal Flood Zone outlines is an issue that should be considered if and when any of the potential sites currently identified as partially being at risk of flooding are released for planning. Climate change has the potential to increase the extents of the Flood Zones and as such plots of land, or parts of sites, currently outside the Flood Zone envelope may become included within the next 100 years. In line with the LPAs approach to managing the predicted climate change induced impacts of sea level rise, the 2115 climate change epoch has been used to assess tidal risk to the potential development sites.

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 topography of Ryde is entirely comprised of high resolution LiDAR data which includes the representation of small topographic features. In all urban areas the LiDAR has been edited to remove the buildings. This editing process results in a slightly un even surface profile, which can result in the production of small depressions that fill with water. It is likely that this has been the situation in the northern parts of Ryde where there are many small isolated areas of predicted flooding. The most significant potential flood flow route is predicted in the south of Ryde flowing from west to east towards Monkton Mead Brook and through one of the potential development sites. This potential risk should be reviewed further should this site be put forward for planning submission.

There does not appear to be a strong pattern to the distribution of the recoded incidents of surface water flooding and they do not correlate with the predicted flood flow routes or ponding areas. This might suggest that the recorded incidents are related to factors other than overland flows.

Surface Drainage and Infiltration SuDS Potential

Ryde has varied topography, with the central part of the settlement being located in the bottom of river valleys, whereas the northern and southern parts are on much higher ground.

Soils in Ryde have SPR values of between 15% and 50% with. The areas of Haylands and Elmfield are where the lower SPR and runoff potentials. These areas of lower runoff potential are characterised by Secondary Aquifer geology and soils with a high leaching potential. The remainder of the town is comprised of Secondary Aquifers with low leaching soils and areas of Unproductive Strata. SuDS infiltration potential is classified as medium for the areas with high leaching soils over a Secondary Aquifer. A SAP is located on the northern edge of town, adjacent the coast. The presence of this ecological designation means that care should be taken not to introduce pollutants into the environment. Around coastal areas, surface water could be discharged into the sea with out restriction, providing the surface water was not contaminated.

Wave Exposure Risk

The coastline near Ryde has been classified as being at medium risk of wave exposure (see Section 6 of the SFRA Report). It is recommended that for any site within the 50m 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. The inter tidal area has not been attributed with a Wave Exposure Risk because of its sheltered situation.

Flood Risk Management Guidance and Site Specific FRAs

The principal of avoidance should be applied when considering sites within Ryde. The development of any previously undeveloped site in Flood Zones 2, 3a or 3b 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.

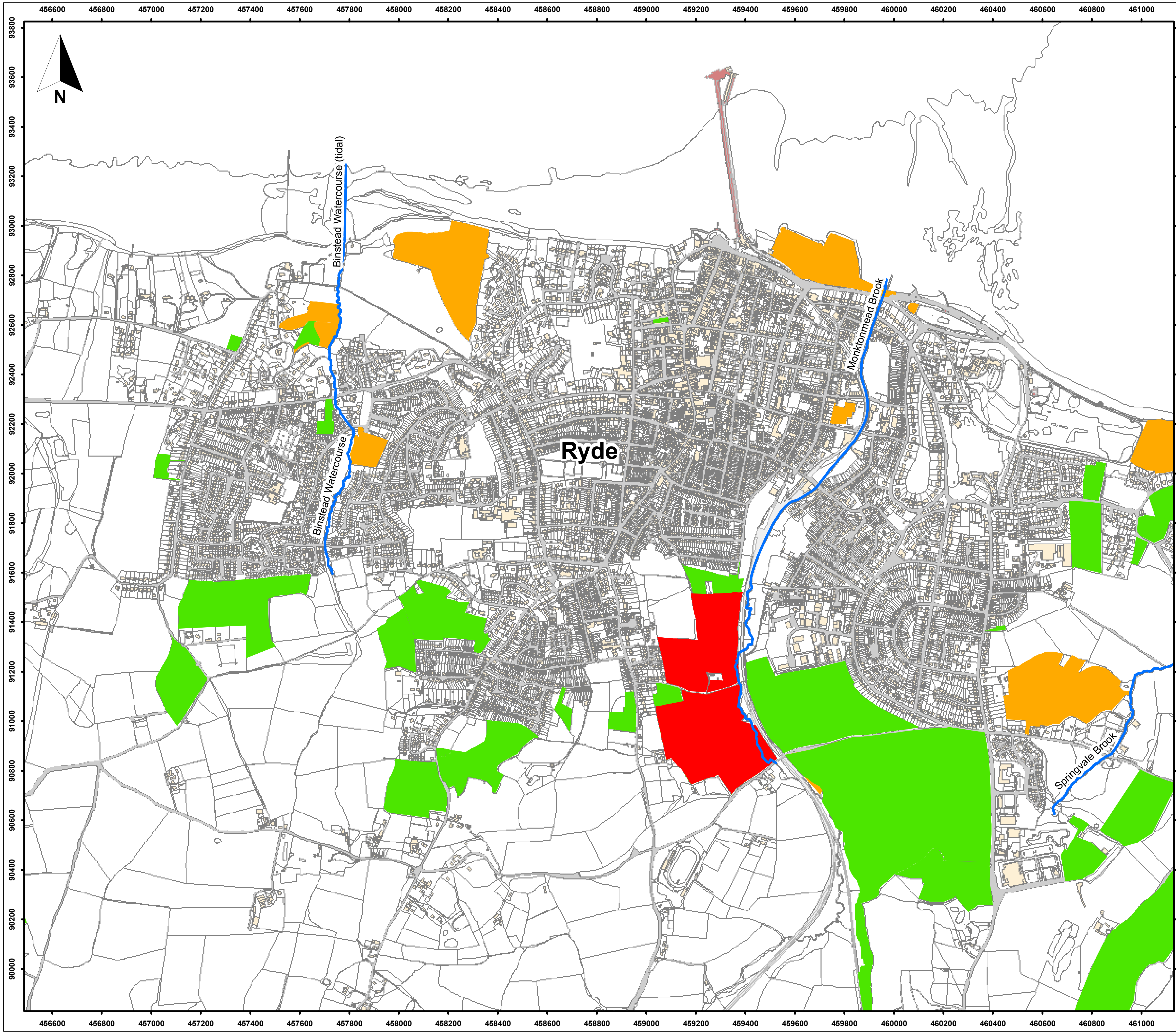
- Finished first floor levels should be set above the predicted 1 in 100 year fluvial flood levels, plus a climate change allowance and above the 1 in 200 year predicted tide levels for the year 2115. The Environment Agency should be consulted for fluvial flood levels and the Environment Agency should 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

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

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Isle of Wight SFRA MK2

Figure 67
Potential Development Sites
Qualitative Flood Risk
Ryde

November 2009
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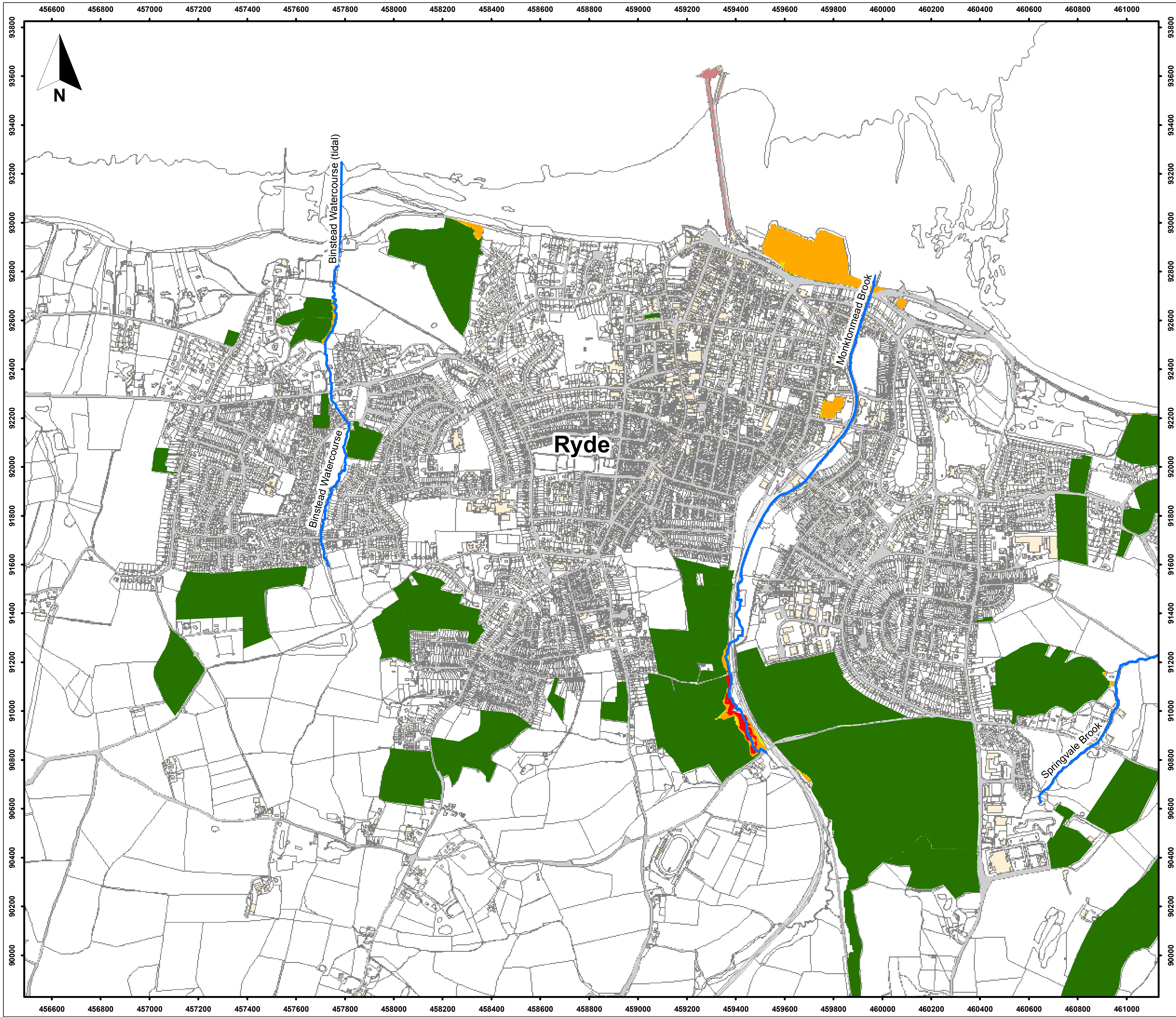

Key:

Main Rivers

Probability of Flooding

- Functional Floodplain
- High Probability
- Medium Probability
- Low Probability

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

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Isle of Wight SFRA MK2

Figure 68
Potential Development Sites
Site Specific Flood Risk Definition
Ryde

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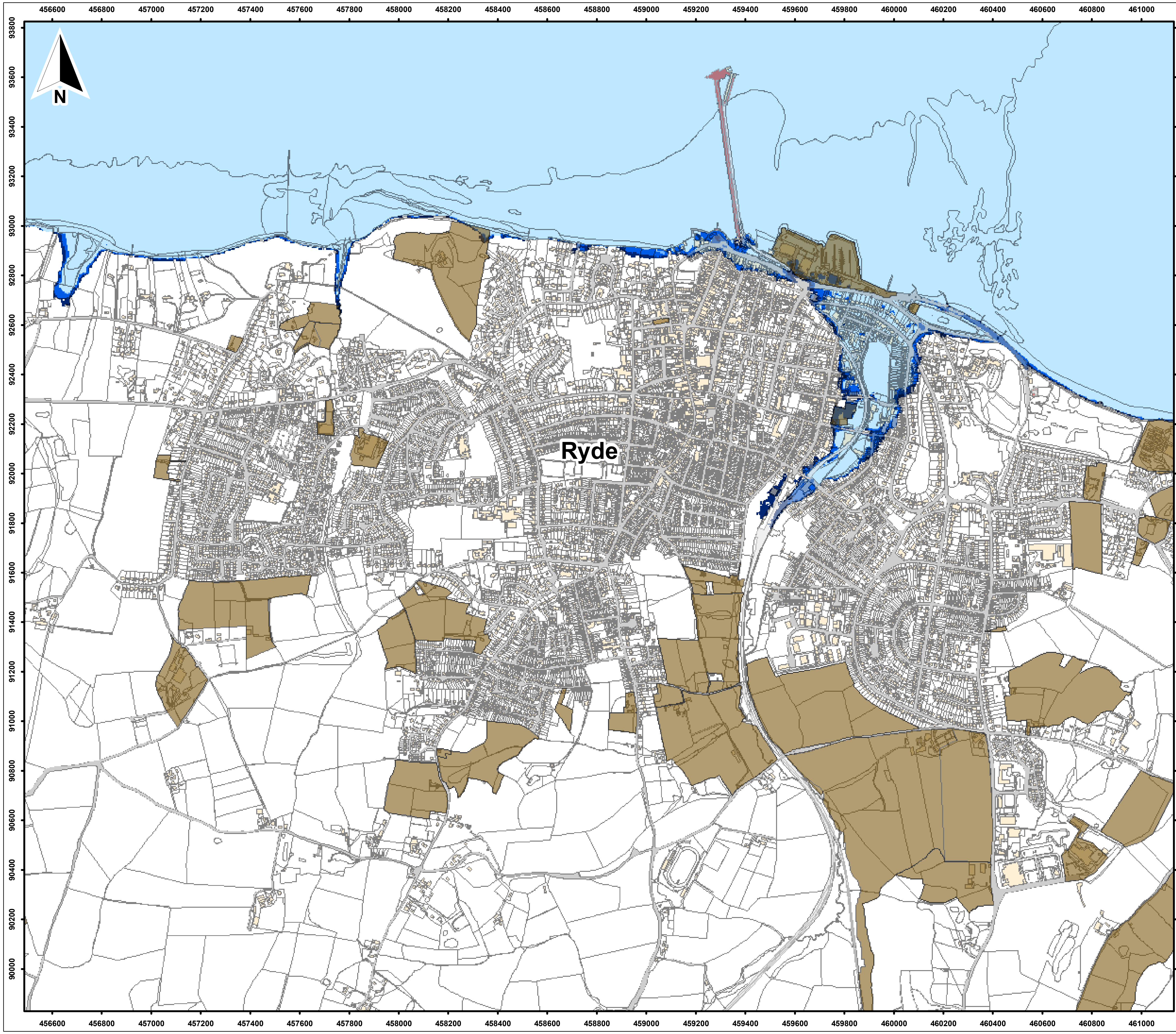

Key:

Predicted 1 in 1000 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115
- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

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Isle of Wight SFRA MK2

Figure 69
Potential Development Sites
Flood Zone 2
Climate Change Scenarios
Ryde

November 2009
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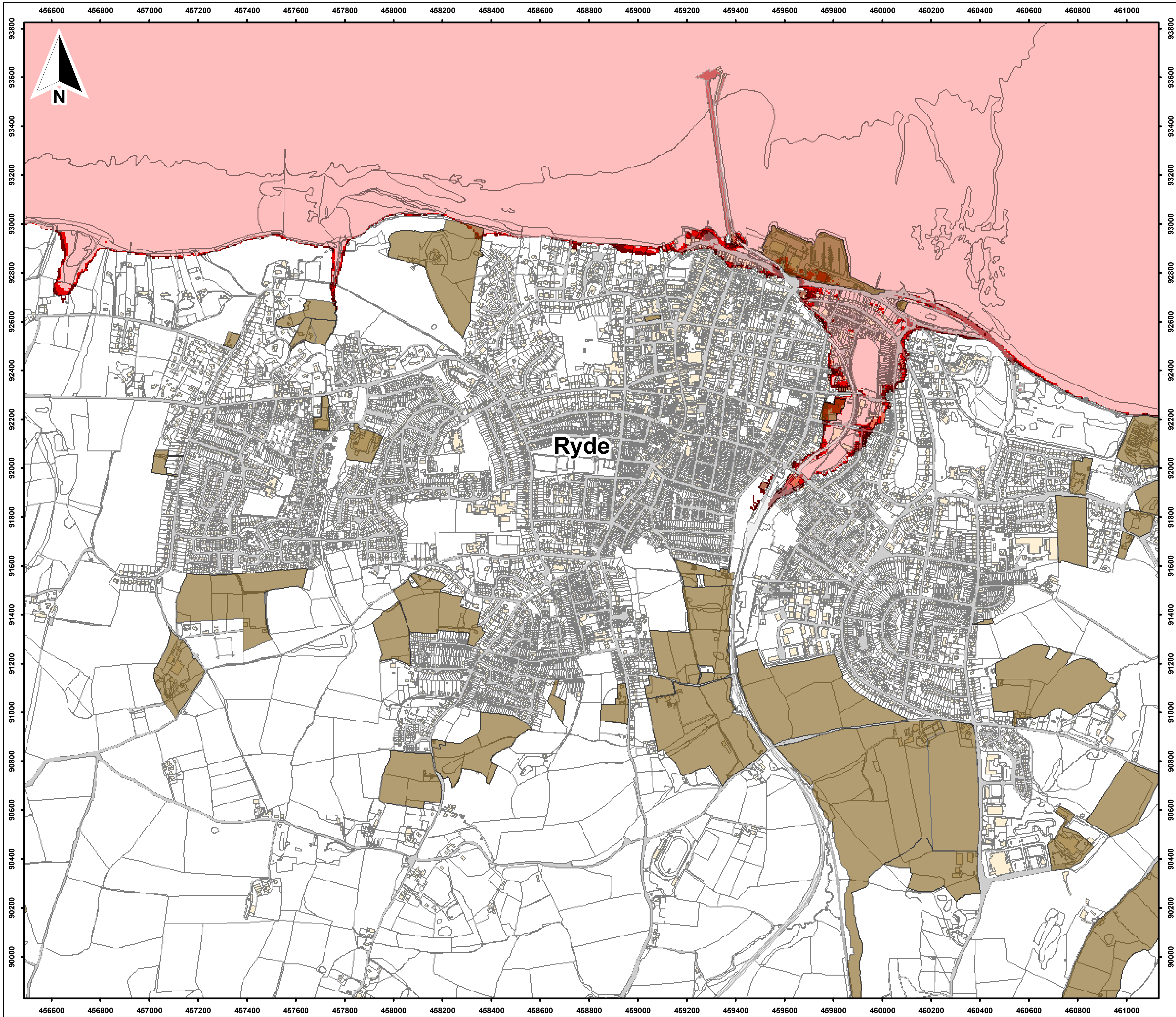

Key:

Predicted 1 in 200 year Tidal Extents

- Year 2010
- Year 2045
- Year 2080
- Year 2115

- Potential Development Sites

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

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Isle of Wight SFRA MK2

Figure 70
Potential Development Sites
Flood Zone 3
Climate Change Scenarios
Ryde

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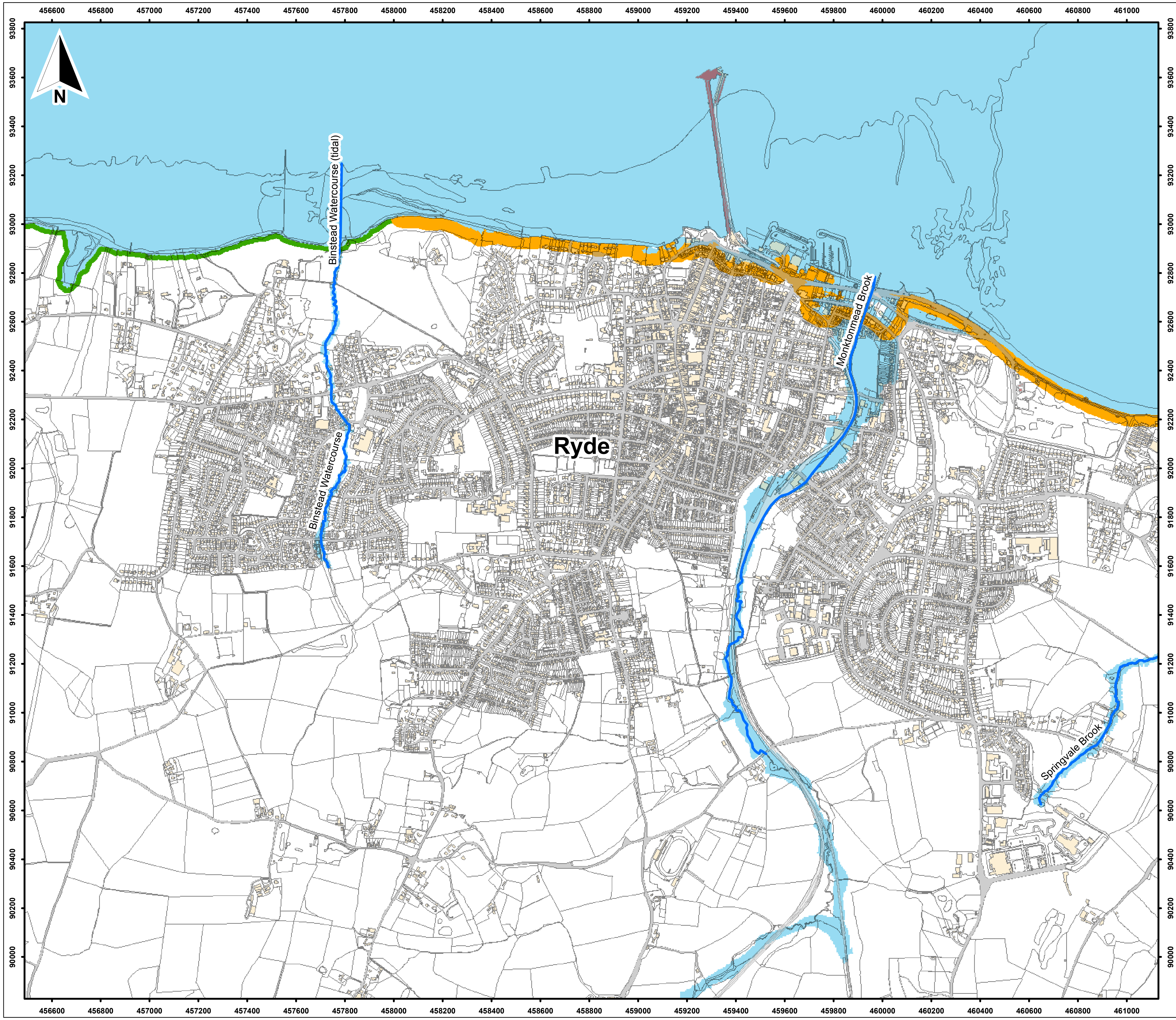

Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 800 Meters

Scale: 1:15,000 @ A3

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Isle of Wight SFRA MK2

Figure 71
Qualitative Wind and Wave Exposure Risk - Ryde

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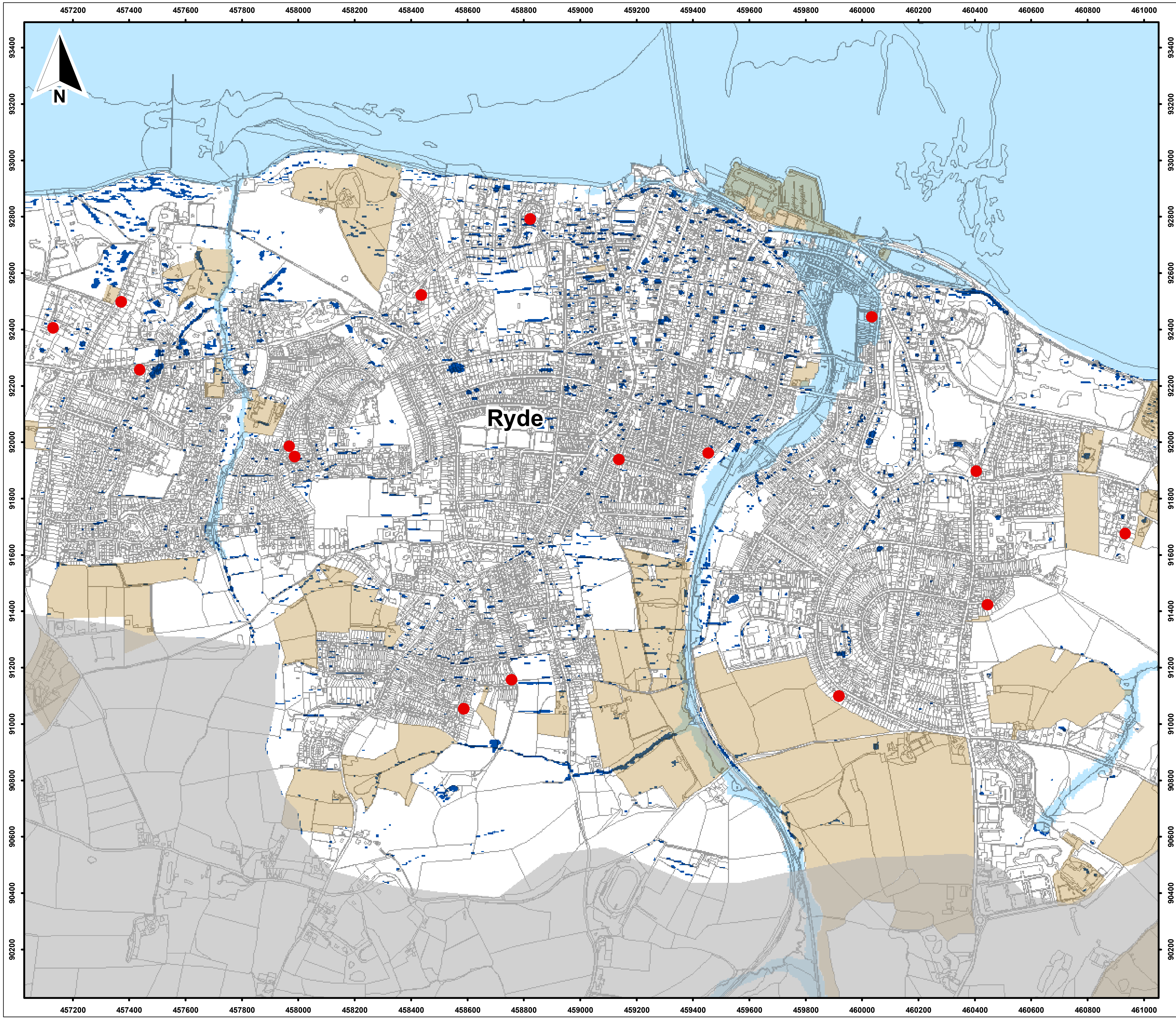

Key:

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

0 200 400 600 800 Meters

Scale: 1:13,000 @ A3

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Isle of Wight SFRA MK2

Figure 72
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Ryde

November 2009
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