Isle of Wight
Strategic Flood Risk Assessment MK2

Appendix G
Brighstone

June 2010

Overview

Brighstone is classified as a Rural Service Centre and is located on the confluence of Brighstone Brook and Shorewell Stream, both of which are Environment Agency Main Rivers. The main issue in this town is that the Flood Zones do not extend the full length of the watercourses. As such potential developments which may be in a flood plain are attributed in the Sites Database as being in Flood Zone 1 and thus appropriate for all development types. Therefore the Main River 20m buffer dataset is very important and it is recommended that this dataset be consulted should any of the potential sites be released for development. If a site is within 20m of a main river then it will be stated in the Sites Database.

Please review this discussion along side the mapping provided in this Appendix.

Sustainability and Regeneration Objectives

Development within the wider countryside will be focused on the Rural Service Centres such as Brighstone and should support their role as wider centres for outlying villages, hamlets and surrounding countryside. For the rural service centres development will be expected to ensure their future viability. Within the rural service centres and outlying rural areas, development will be expected, in the first instance, to meet a rural need and maintain or enhance the viability of local communities and will be subject to local considerations.

Brighstone RSC 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

Fluvial flood zones associated with Brighstone Brook extend through the length of the settlement, which results in at least 50% of the potential development site on the south bank of Brighstone Brook being in flood zone 3a. At the eastern end of the settlement Brighstone Brook has its confluence with Shorewell Stream. The flood zones in the location of the confluence impact on three potential development sites, with two of them being completely within Flood Zone 3a.

Climate Change

The fluvial climate change assessment outlined in Section 5.2 indicates that sites (ID Brighstone1334 and Brighstone1203) are potentially susceptible to the impacts of climate change as there is a significant difference between the extents of Flood Zone 2 and 3. It is therefore recommended that, should either of these sites be put forward for planning, the impact of climate change on the extent of Flood Zone 3 be assessed as part of a site specific FRA.

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 Brighstone can be characterised two narrow valleys, one running from the north west and the other from the north east. These two valleys converge in the village to form another valley which leads southwards towards the English Channel. The hillside above the town is a steep south facing slope with no significant defined drainage pathways. This results in the model simulating unconfined broad extents of shallow flooding. Through the village, and where drainage routes are better defined, the predicted flooding becomes confined to drainage pathways. The difference between the northerly parts and southern parts of the model are also a product of the fact that the topography of the northern portion is defined by SAR (Synthetic Aperture Radar) data which is significantly less detailed than the LiDAR data which is present in the southern part of the modelled area.

The model predicts several potential flow routes that are not currently covered by the flood zones; these exist outside the main built area and are not predicted to impact any of the potential development sites. These flow routes should however be considered in the production of any site specific flood risk assessments that may come forward.

Surface Drainage and Infiltration SuDS Potential

Soils on the site have a low to very high runoff potential with SPR values between 15% and 60%. The steeper parts of the Brighstone, in the north east, have been classified as having a low runoff potential, while the flatter areas in the south west is underlain by soils with a very high runoff generation potential. Groundwater

vulnerability in Brighstone is characterised by a Principal Aquifer in the north east and an Unproductive Strata in the south west. An area of Secondary Aquifer is identified in the area around Brighstone Brook and Shorewell Stream. Infiltration potential is classified as medium in the north east and low in the south west.

The application of infiltration SuDS techniques in Brighstone are only constrained by the low infiltration potential classification assigned to the south western part of the settlement.

Wave Exposure Risk

The coastline to the south of Brighstone is 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 Brighstone. 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.

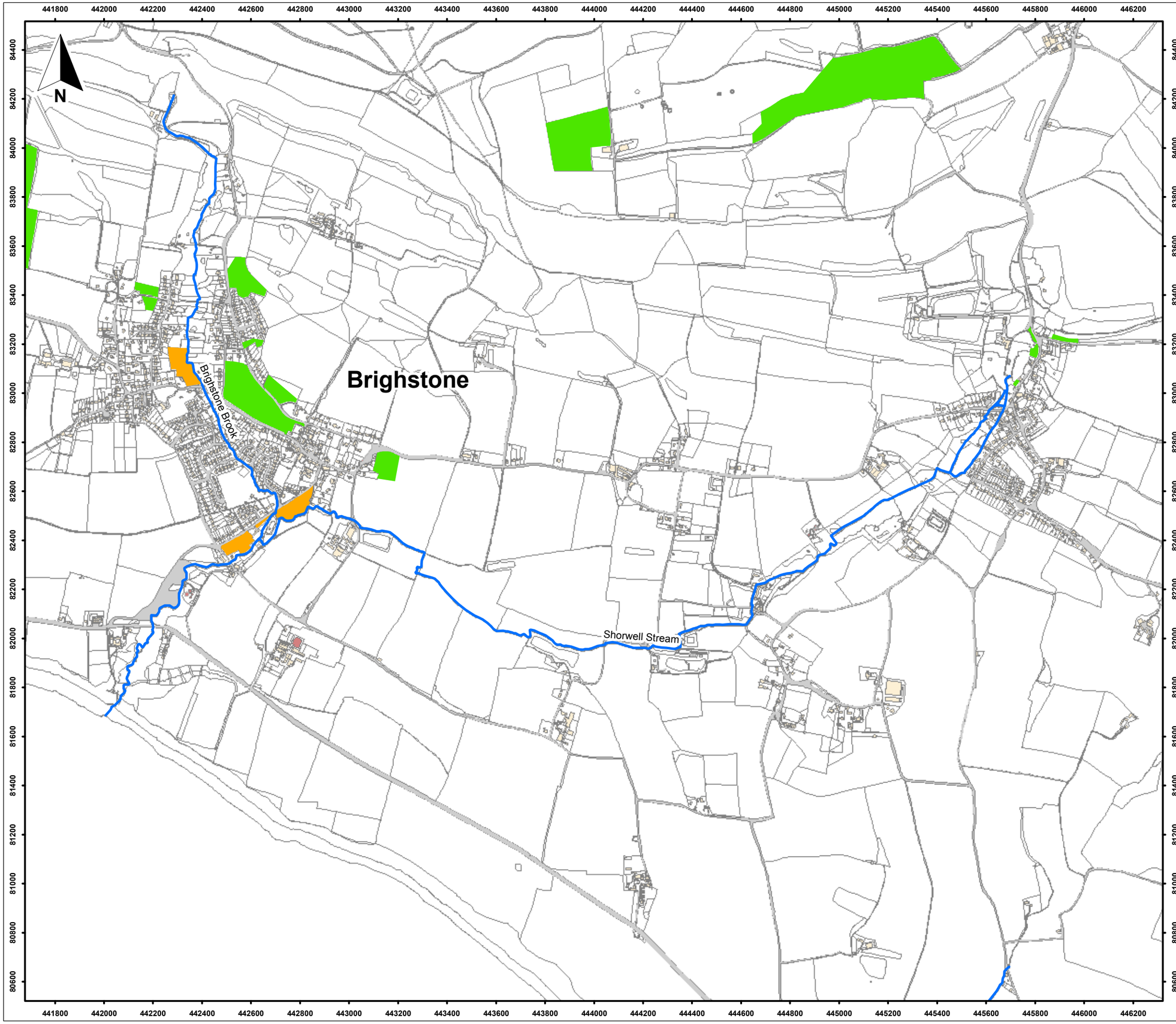
Factors to be considered in safe development could include:

- 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.

A site specific FRA is required for all those potential sites which are within the extent of either Flood Zone 2 or 3. If the Sites Database states that the site is within 20m of a Main river (in field *'Riv_20_Buf'*) then the Environment Agency should be consulted.



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 Meters

Scale: 1:15,000 @ A3

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Isle of Wight SFRA MK2

Figure 31
Potential Development Sites
Qualitative Flood Risk
Brighstone

November 2009
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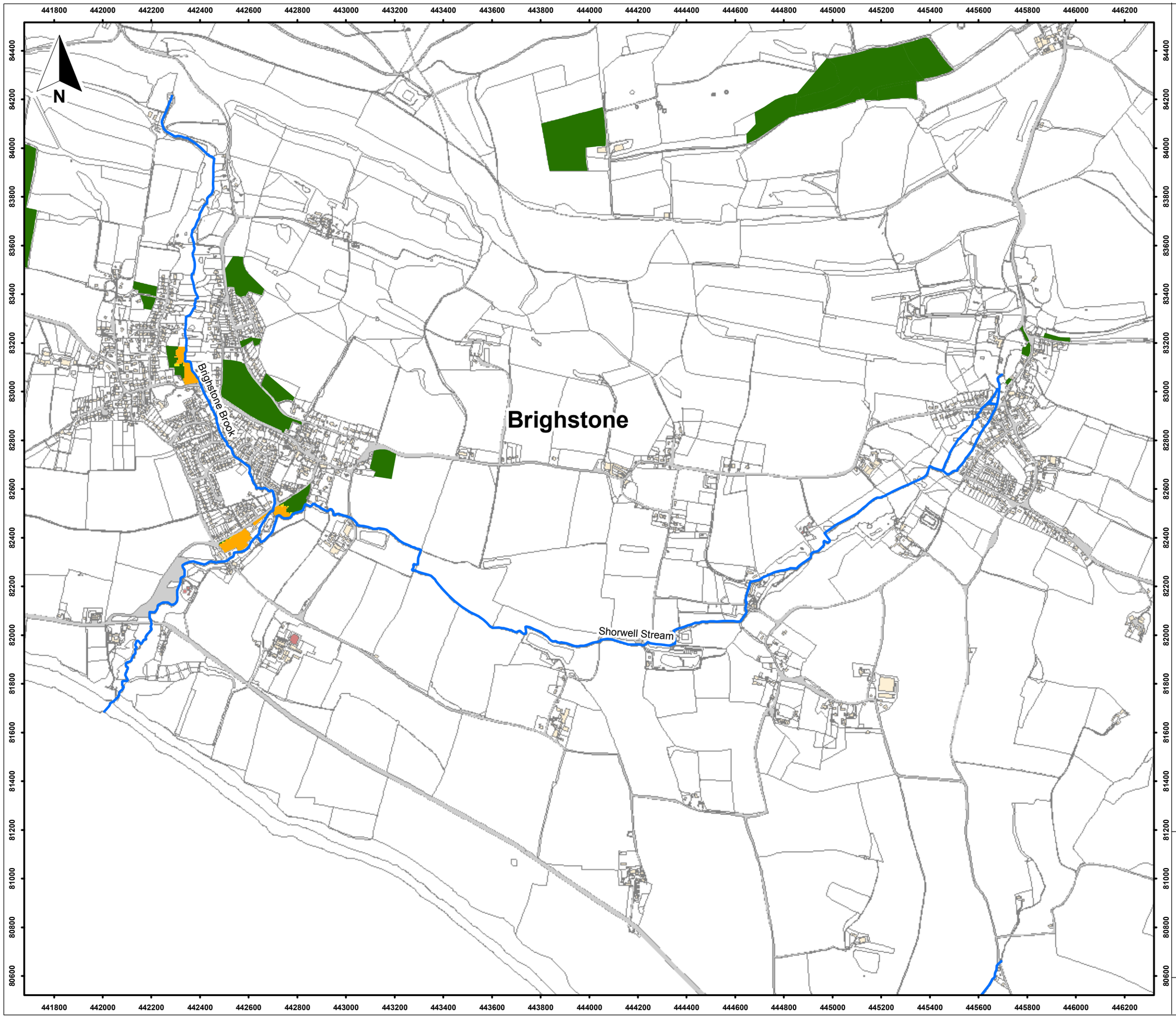

Key:

Main Rivers

Probability of Flooding

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

0 200 400 600 Meters

Scale: 1:15,000 @ A3

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Figure 32
Potential Development Sites
Site Specific Flood Risk Definition
Brighstone

November 2009
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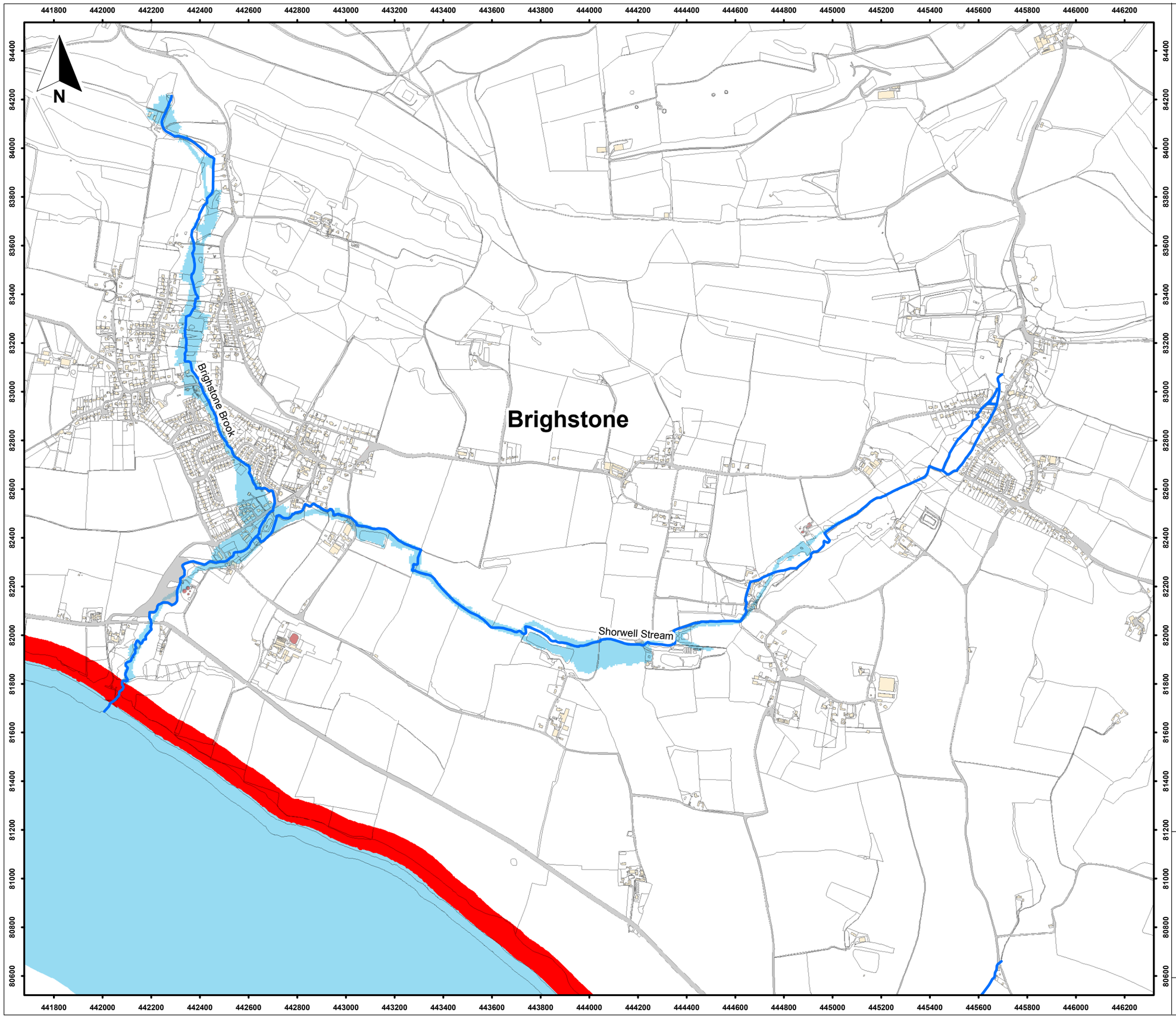

Key:

Main Rivers

Potential Exposure Risk

High

Medium

Low

Environment Agency Flood Zone 2 (November 2009)

0 200 400 600 Meters

Scale: 1:15,000 @ A3

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Figure 33
Qualitative Wind and Wave Exposure Risk - Brighstone

November 2009
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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 Meters

Scale: 1:12,000 @ A3

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Figure 34
Potential Surface Water Flow Routes and Ponding Areas (1 in 100 year storm + climate change) - Brighstone

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