Appendix 2 Matter 11 ID: 7 / 3542 Land at Vearse Farm, Bridport

Technical Note : Infrastructure

4th November 2014

1 Introduction

Brookbanks Consulting is commissioned by Hallam Land Management to provide advice on planning promotion for a development at Bridport, specifically in relation to the following areas:

- Flood Risk
- Drainage
- Utilities
- Ground Conditions

As part of this assessment, BCL has carried out an initial review of the infrastructure networks across Bridport to identify any potential constraint to the delivery of development on the Vearse Farm site.

The purpose of this note is to highlight the findings of this study, highlighting that there are no infrastructure barriers for the delivery of a mixed-use development at Vearse Farm.

2 Background

Introduction

The proposed development at Vearse Farm lies to the west of the urban fringe of the town of Bridport in Dorset. The site is bound by the following roads: the A35 West Road to the west, Broad Lane to the south and the B3162 Foundry Knapp West Road to the north. Grove Works (Bridport Foundry and Plastow Traction Engines), West Road Garage and Bridport Medical Centre are all situated adjacent to the sites northern boundary, along West Road. Residential development is shown to the east of the site and beyond West Road to the north-east.

The majority of the site is currently undeveloped, apart from the area surrounding Vearse Farm, and the land is not thought to have been historically subject to any significant built development. The site location and boundary is shown indicatively on Figure 2a, below.

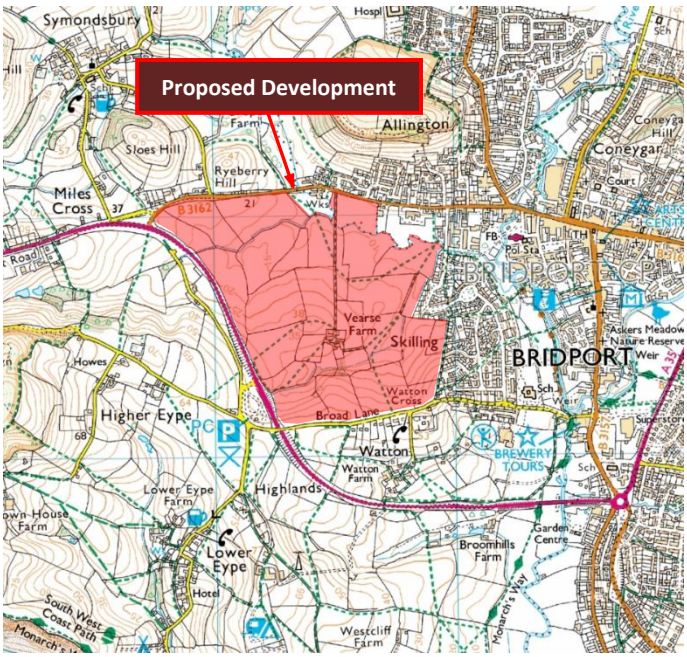

Figure 2a: Site location

The proposal involves the provision of a mixed-use development of up to 760 dwellings on the site and incorporates some 4.0ha of land designated for employment use.

3 Flood Risk & Drainage

Flood Risk

Fluvial

The Environment Agency's (EA) National Generalised Modelling (NGM) Flood Zones Plan indicates predicted flood envelopes of Main Rivers across the UK. In many circumstances, the NGM is based on basic catchment characteristic data and modelling techniques.

For the River Simene, the Flood Zone mapping is based upon a detailed SFRM model for the 1 in 100 year (1% AEP) and 1 in 1,000 year (0.1% AEP) event storms, being a robust assessment of fluvial flooding in this area.

The Flood Zone mapping identifies flooding on the River Simene with flows being seen to come out of bank at certain locations during the 1 in 100 (1% AEP) and 1 in 1,000 year (0.1% AEP) events.

The mapping shows the majority of the proposed site to lie within Flood Zone 1, being an area of Low Probability of flooding, outside both the 1 in 100 (1% AEP) and 1 in 1,000 (0.1% AEP) year flood events. An extract of the EA Flood Zone plan is shown in Figure 3a.

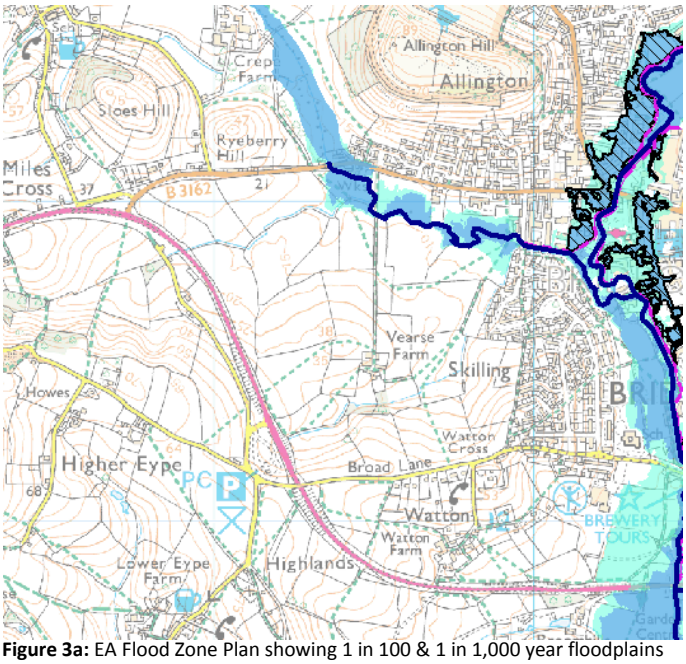

Figure 3a: EA Flood Zone Plan showing 1 in 100 & 1 in 1,000 year floodplains

Flooding from rivers without defences – 1 in 100 year (1%) event (Zone 3)

Extent of extreme flood – 1 in 1,000 year (0.1%) event (Zone 2)

Flood defences

Areas benefiting from flood defences'

Coastal

The site lies a significant distance from the nearest tidal watercourse and the coast. As such there is no measureable risk of tidal or coastal flooding at this location.

Surface Water

Surface water flooding mechanisms result from the inability of unpaved ground to infiltrate rainfall or due to inadequacies of drainage systems in paved areas to accommodate flow directed to gullies, drainage downpipes or similar. In minor cases, local ponding may occur. In more extreme events, flows accumulate and may be conveyed across land following the topography.

The Environment Agency has recently produced a series of predicted surface water flooding maps for many parts of the UK. The plan containing the proposed site is reprinted as Figure 3b below:

Figure 3b: Environment Agency Surface Water Mapping.

High Risk
Medium Risk
Low Risk

The mapping provided by the EA identifies a number of linear areas of surface water flooding within the site boundary, primarily associated with the reach of the River Simene and associated tributaries.

Recognising the risk of overland flow mechanisms, published guidance in the form of Sewers for Adoption 7th Edition and the Environment Agency document *Improving the Flood Performance of New Buildings: Flood Resilient Construction* et al advocate the design of developments that implement infrastructure routes through the development that will safely convey flood waters resulting from sewer flooding or overland flows away from buildings and along defined corridors. Further to protect the proposed development, current good practice measures defined by guidance should be incorporated.

Given the baseline site characteristics and further potential mitigating measures to be implemented residual flood risk from an overland flow mechanism is considered to be of a low probability and not a significant constraint to development at this location.

Ground Water

Ground water related flooding is fortunately quite rare, although where flooding is present, persistent issues can arise that are problematic to resolve. Such mechanisms often develop due to construction activities that may have an unforeseen effect on the local geology or hydrogeology.

Whilst no site specific investigations have been completed, information from the SFRA has confirmed that no incidents of groundwater related flooding have been recorded within the site boundary. Furthermore, published boreholes adjacent to the site show the ground water to lie a significant distance below the ground level. As such the risk of ground water flooding in the present day conditions is considered to be a low probability.

Positive drainage systems incorporated into the proposed development will further reduce the risk as a result of permeable pipe bedding materials and filter drains incorporated within elements of the built development.

Given the baseline site characteristics and further mitigating measures to be implemented, residual flood risk from a ground water mechanism is considered to be of a low probability.

Sewerage Systems

Positive drainage measures incorporated on site, coupled with sustainable drainage systems (SuDS) will ensure that no increase in surface water will result from the site. Flood risk associated with sewer flooding is therefore considered to be a low probability.

Artificial Water Bodies - Reservoirs & Canals

No artificial sources are identified within an influencing distance of the site boundary.

It may therefore be concluded that there is a low risk of flooding associated with artificial water bodies at the proposed development.

Storm Drainage

Current guidance[1] requires that new developments implement means of storm water control, known as SuDS (Sustainable Drainage Systems), to maintain flow rates discharged to the surface water receptor at the pre-development 'baseline conditions' and improve the quality of water discharged from the land.

When appraising suitable storm water discharge options for a development site, Part H of the Building Regulations 2002 (and associated guidance) provides the following search sequence for identification of the most appropriate drainage methodology.

"Rainwater from a system provided pursuant to sub-paragraphs (1) or (2) shall discharge to one of the following, listed in order of priority -

(a) an adequate soakaway or some other adequate infiltration system; or where that is not reasonably practicable,

(b) a watercourse; or where that is not reasonably practicable,

(b) a sewer. "

Dealing with the search order in sequence:

(a) Source control systems treat water close to the point of collection, in features such as soakaways, porous pavements, infiltration trenches and basins. The use of same can have the benefit of discharging surface water back to ground rather than just temporarily attenuating peak flows before discharging it to a receiving watercourse or sewer.

As source control measures generally rely upon the infiltration of surface water to ground, it is a prerequisite that the ground conditions are appropriate for such. Site ground investigations have been completed which confirm the underlying geology is relatively impermeable and as such, not suitable for a wholesale infiltration based drainage strategy.

(b) Next in the search sequence, defined by Part H, is discharge to a watercourse or suitable receiving water body. Where coupled with appropriate upstream attenuation measures, this means of discharge can provide a sustainable drainage scheme that ensures that peak discharges and flood risk in the receiving water body are not increased.

The River Simene, passing through the site currently receive stormwater discharges from the site and as such, have the potential to receive flows from the proposed development once restricted to the pre-existing 'greenfield' rates of run-off.

[1] NPPF, CIRIA C522, C609, C697 et al.

(c) Last in the search sequence is discharge to a sewer. In the context of SuDS this is the least preferable scheme as it relies on 'engineered' methods to convey large volumes of water from development areas, has a higher likelihood of flooding due to blockage and provides less intrinsic treatment to the water.

Wessex Water records have been obtained which confirm the presence of adopted sewers within the vicinity of the site should the need arise

The search sequence outlined above indicates that the watercourses within the site boundary are the most appropriate receptors of storm water from the proposed development, having the potential to employ source control measures and detention features to control peak discharges to no greater than the baseline conditions.

Given the site characteristics it is likely that the development could utilise a standard SuDS strategy with a number of detention basins at the low points of the site, linked by open channels and discharging to the on-site drains.

Coupled with the storm water control benefits, the use of SuDS can also provide a betterment on water quality. National guidance in the form of CIRIA 609 outlines that by implementing SuDS, storm water from the site can be polished to an improved standard thus ensuring the development proposals have no adverse effects on the wider hydrology.

Foul Drainage

The existing drainage network surrounding the site is owned and operated by Wessex Water. The nearest sewage treatment works is the Bridport Sewage Treatment Works, which is approximately 1.5km south east of the site. This is shown on Figure 3c below

The Bridport STW discharges its effluent to the River Brit

In 2013 a £5.5 million scheme commenced at the Bridport Sewage Treatment works to provide further capacity for dealing with foul effluent from future growth in the catchment.

It is therefore likely that capacity within the Bridport Sewage Treatment Works to accommodate the proposed site at Verse Farm will not be a constraint to development.

Figure 3c: Bridport Sewage Treatment Works

Discussions are ongoing with Wessex Water who have confirmed that the company holds little information regarding the network and its ability to accommodate additional foul flows from the proposed development. With this in mind, further investigations will be required in the form of hydraulic modelling to confirm whether sufficient capacity exists. However, prior to the further

investigations, Wessex Water have identified the three potential outcomes from the results of the further investigations which will be implemented to accommodate the entire development:

1. Upon completion of the further investigations it may be determined that no reinforcement/upgrading will be required to accommodate the additional flows and as such no additional works will be required.

2. Should further investigations determine that the network has insufficient capacity to accommodate additional flows; reinforcements to the network will take place to provide sufficient capacity.

3. Should further investigations determine that the network has insufficient capacity to accommodate additional flows and reinforcements are not viable, attenuation storage will be provided in the form of on-site storage. This would be determined at detailed design.

Once the further investigations have been finalised and any necessary improvements or provision of additional storage completed as set out above, the network will have the ability to accept the total site flows from the proposed development. The development can be serviced by foul networks in a viable manner, although the final scheme needs to be confirmed.

Summary

Flood Risk

In terms of fluvial and tidal flood risk, the majority of the proposed development can be seen to lie within Flood Zone 1 and hence has a low probability of flooding from this mechanism.

Assessment of other potential flooding mechanisms shows the land to have a low probability of flooding from overland flow, ground water and sewer flooding.

Accordingly, the proposed development land is in a preferable location for development when appraised in accordance with the NPPF Sequential Test and local policy. The site should be considered preferable to other potential developments that may lie wholly or within Flood Zone 2 or Flood Zone 3.

As such, the site is not considered constrained from a flood risk viewpoint

Storm Drainage

Drainage to the River Simene within the site coupled with detention storage appears to be the most appropriate mechanism to discharge storm water drainage from any development at this location.

A number of potential options are available for attenuation and disposal of stormwater from the site utilising SuDS to control peak discharges to no greater than the baseline rate.

Storm Drainage is therefore not considered a constraint to development at this location and indeed, the proposals could ultimately deliver a benefit in flood risk terms to the wider area by reducing the run-off from the site

Foul Drainage

Whilst further discussions will need to be held with Wessex Water to identify the capacity of the foul drainage network in the immediate vicinity of the site and determine what upgrading works are required to accommodate the foul flows from the development proposals, the development has the potential to work in conjunction with Wessex Water to ensure that any upgrading that may be required is delivered in a timely fashion.

Foul drainage is therefore not considered a constraint to development at this location.

4 Ground Conditions

Geology

Reference to the British Geological Survey map, the site is shown to be underlain by chalk bedrock geology belonging to the Seaford Chalk Formation. A thin band of superficial Head deposits are identified along the northern boundary of the site and comprises clay, silt, sand and gravel. The published geology is shown below in Figure 4a.

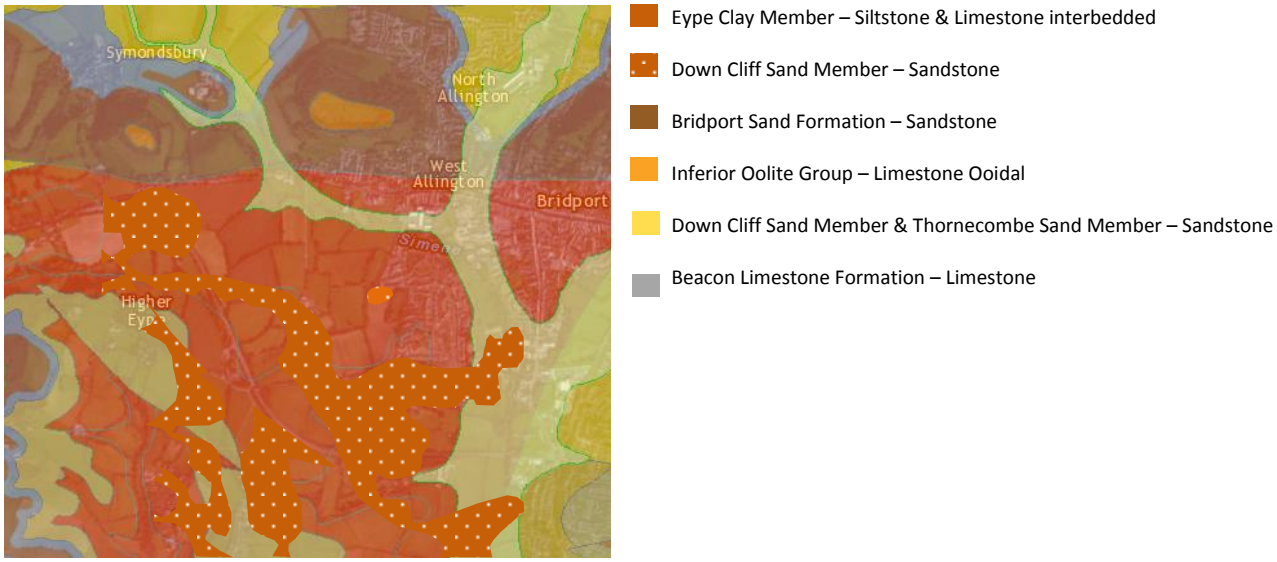

Figure 4a: BGS Published Geology

Site History

Reference to the historic mapping for the site suggests that the area has remained free of significant built development and as such, no large sources of contamination are believed to be present within the site boundary.

Mining

The site is not reported to be in an area affected by coal mining.

Sensitive Land Uses

Reference to the site sensitivity mapping for the area confirms that the site lies within an Area of outstanding Natural Beauty (AoNB)

Summary

Initial assessments have not identified the presence of any significant sources of contamination that could cause a risk to the site workers or end users. Additionally, there are no land uses on-site or in the surrounding area that the proposals would likely detrimentally impact upon and as such, no significant constraints to development have been identified.

5 Utilities

Water Supply

Wessex Water has been consulted regarding the location and capacity of their existing network within the vicinity of the Site.

A public water main is identified within the proposed development land, passing along the access track to Verse Farm. Additional water supply mains are situated on the northern and eastern boundaries of the site within the existing residential areas od Bridport.

Discussions with Wessex Water have confirmed that the existing water supply main passing through the site can be connected to in order to provide a supply to the site.

Non prohibitive reinforcements have been identified in the form of upgrading the boosters at the Hooke Water Treatment Works along with the construction of a booster station near to the site.

Electricity Supply

Western Power Distribution have been consulted regarding the location of their existing apparatus within Bridport

Network searches identify the presence of a number of 11kV overhead cables within the site boundary along with a Low Voltage supply network in the surrounding residential areas.

With regards to supply, WPD have confirmed that the site can be served from the existing network and at present, have not identified the need for any off-site upgrading works.

Gas Supply

SGN have provided their apparatus location plans for the site and surrounding area which confirms the presence of a number of Low Pressure mains to the north and east of the site.

SGN confirm that the site can take a connection from a Low Pressure main in West Road on the northern site boundary and that only minor upgrading works are required to reinforce the existing network..

Telecommunications Supply

The primary routes for Virgin Media and BT's overhead and underground telecommunication cables are found within the residential areas to the north and east of the proposed development.

BT has network infrastructure running within the existing highways adjacent to the Site, it will therefore be a straightforward task of providing on-site communication ducts distributing services into the development from the existing infrastructure. Other operators may wish to provide network services although they are likely to connect to a nearby alternative point of presence (POP). An initial investigation of the local network suggests ADSL Max is available with a 7.5Mbps speed for connection.

Diversions

All incumbent providers have indicated that diversion/protection works are likely for existing services running within the site or surrounding road network subject to final site design and access proposals however these are not considered to be prohibitive

Summary

This Services Statement has demonstrated that the proposed development can be supplied with normal network service supplies without prohibitive reinforcements to the existing networks.

Some localised, non-prohibitive reinforcements may be necessary together with protections or diversions where existing plant is affected by the proposals.

6 Summary

This note summarises the findings of the initial review of the site in support of a potential planning application for a mixed development on Vearse Farm.

Following the completion of the study, it is concluded that there are no infrastructure barriers to scheme delivery.