

Furthermore, provided that surface water run-off generated from the proposed development will be managed on-site in a sustainable manner, then no detrimental off-site impact is anticipated.

5.6. Safe Access and Egress

Safe (dry) access and egress is maintained at the site for well beyond the 1% (1:100 year) fluvial event + climate change + creep allowances, and therefore the associated requirements of the NPPF and PPG are satisfied.

5.7. Local Plan Requirements

In addition to the requirements set out within the NPPF (Dec 2023) and the PPGs, the Eastleigh Borough Council Local Plan review (2001 – 2011) contains saved policies relevant to this assessment:

- Policy 41.ES – Development affecting water courses.
Limits development as required by PPSs 25 and 9 and PPG20
- Policy 42.ES – Development in a catchment of a water course.
Limits development in areas at risk of flooding as required by PPS25
- Policy 43.ES – Areas at risk of flooding.
Limits development in areas at risk of flooding as required by PPS25
- Policy 44.ES – Development in areas at risk of flooding
Limits development in areas at risk of flooding as required by PPS25
- Policy 45.ES – Sustainable Drainage.
Controls development giving rise to risk of flooding as required by PPS25

The Eastleigh Borough Local Plan 2016 – 2036 was Adopted in April 2022. The following policies in the Adopted Local Plan are relevant to this assessment:

Eastleigh Borough Local Plan 2016-2036, Chapter 5: Development Management Policies, provides:

- Policy DM3 – Adaptation to climate change.
- Policy DM5 – Managing flood risk.
- Policy DM6 – Sustainable surface water management and watercourse management.
- Policy DM10 – Water and Waste Water.
- Policy DM11 – Nature conservation.

5.8. Compliance Summary

In order to comply with Eastleigh Borough Local Plan, the following steps will be taken:

- The areas where proposed residential or commercial development are planned are within Flood Zone 1. However, there are areas within the vicinity of watercourse, that are categorised within Flood zone 3. Within these areas, there is a proposed footway that runs along the river. Hydraulic modelling has been commissioned to confirm the effect of this causeway on the river flooding in this area. No other developments are planned within flood zone 3 area and therefore a Sequential Test is not required.
- Incorporating thorough SuDS features as a method of alleviating and storing surface water run off.
- Installing swales and ponds for surface water storage, if required
- Complying with Building Regulations and all relevant legislation
- Maintaining the water quality through the use of swales, ponds, catchpits, sumps and gullies to intercept any contaminants before they reach infiltration systems or discharge into the watercourse.
- Ensuring the future proofing of the design by allowing for climate change and creep when calculating required storage volumes

SECTION 06

PROPOSED FLOOD MITIGATION AND MANAGEMENT MEASURES

6. PROPOSED FLOOD MITIGATION AND MANAGEMENT MEASURES

6.1. Siting of the Built Development

As the proposed residential developments are to be located within Flood Zone 1 only, except for the watercourse crossing points and footpath causeway, hence there is no need to consider alternative locations.

6.2. External Ground Levels

It is considered that no significant criteria need be adopted for the setting of external ground levels, assuming these will not be significantly reduced or increased from existing, as above. The causeway will be 300mm modelled above 100yr +105%cc event. The proposed level is 16.75m

6.3. Fluvial Flood Storage Compensation

As the proposed site is categorised as being at medium risk of Fluvial Flooding. This is subject to flood modelling. The causeway may require compensation.

6.4. Overland Flow Routes

Pluvial Flooding (or surface runoff flooding) is caused by rainfall and is that flooding which occurs due to water ponding on or flowing over the surface before it reaches a drain or watercourse or SuDS system.

Any surface water run-off, including exceedance flows, can be appropriately conveyed to a new surface water SUDS drainage system whilst avoiding the road and proposed built development and key infrastructure (i.e., substations).

All proposed highways and associated drainage will be designed in accordance with current Highways Act and Building Regulations criteria, and SuDS adopting overland flow routes for the conveyance of excess floodwater toward areas of low vulnerability and water compatible end use (such as open space and soft landscaping), where water may be temporarily detained, if required.

6.5. Ground water Mitigation

Excavation for ponds will need to be pumped out. Pond liners should be suitably anchored and weighed down to prevent flotation.

SECTION 07

SURFACE WATER DRAINAGE

7. SURFACE WATER DRAINAGE

7.1. Context

Without mitigation and consideration, the proposed redevelopment of the site could lead to an unacceptable increase in the rate and volume of surface water generated from the site.

To comply with current guidance and best practice, sustainable drainage systems (SuDS) will be required, to be implemented in order to manage the volume, rate and quality of surface water discharged off-site.

In terms of volume control, where reasonably practicable, for greenfield development, the runoff volume in the 1 in 100-year, 6-hour rainfall event should never exceed the greenfield runoff volume for the same event. Where reasonably practicable, for developments which have been previously developed this runoff volume must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume but should never exceed the runoff volume prior to redevelopment for that event. Where it is not reasonably practicable to constrain the volume of runoff as described it must be discharged at a rate that does not adversely affect flood risk. A separate modelling study demonstrates through evidenced based facts that the design will not be affected by flooding and flooding will not be exacerbated elsewhere.

Guidance on the design and construction of SuDS is provided in the 'Interim Code of Practice for Sustainable Drainage Systems', published by the National SUDS Working Group in July 2004 and in other CIRIA documents including The SuDS Manual 2015 (CIRIA C753), in the Environment Agency's document entitled 'Sustainable Drainage Systems (SUDS) An introduction', as well as in the Design and Construction Guidance (DCG) published by Water UK.

A sustainable drainage strategy, involving the implementation of SuDS, is proposed for managing surface water on the site wherever feasible. A full range of SuDS techniques has been considered for use on the site. Through early discussions with the Lead Local Flood Authority and other stakeholders it was agreed that the Strategic SuDS features on the site should include above ground storage features, ponds and swales, within the green corridors that follow the onsite watercourses.

Additional source control measures should be utilised within the upstream development parcels. This approach provides flexibility for the detailed design of individual development parcels whilst maximising the water quality, water quantity, amenity and biodiversity benefits of the overall SuDS strategy.

The SuDS Manual 2015, and CIRIA C687 'Planning for SuDs - making it happen', promote the use of a SuDS 'management train', which seeks to address the quality and quantity of runoff at all stages of a drainage system. It uses a hierarchy of techniques, namely: i) prevention, ii) source control, iii) site control and iv) regional control. The drainage strategy for the proposed green infrastructure area and associated development seeks to follow the concept of a SuDS management train.

A SuDS 'management train' approach is proposed to be implemented on the site. In terms of the SuDS 'management train', the surface water management strategy for the proposed green infrastructure area and development seeks to address the quality and quantity of runoff as follows:-

i) Prevention

Prevention is the use of good site design and housekeeping measures to prevent pollution. Good site design and housekeeping measures that should be considered include:

- Minimising the impermeable areas created on the site by providing permeable road surfaces and soft landscaping and planting wherever possible.

- Good site wide housekeeping and maintenance to minimise blockages and prevent pollution arising.
- Provision of water butts for rear gardens.
- The use of green roofs for public / commercial buildings where appropriate.
- The use of rainwater harvesting / reuse systems for public / commercial buildings and irrigation where appropriate.
- Installation of separators and other proprietary pollution control systems where land use requires or specific risks necessitate their use.
- Silt traps and trapped gullies to retain sediment.
- Planting within landscaped areas to encourage nutrient / pollutant uptake and evapotranspiration.
- The implementation of a SuDS Maintenance Strategy. Advice on what should be included within a maintenance strategy for the Strategic SuDS Features is included with this report. The SuDS Maintenance Strategy should become a living document that is continuously reviewed.

ii) Source Control

Source control is defined in The SuDS Manual 2015 (CIRIA C753) as the control of runoff at or near its source, so that it does not enter the drainage system or is delayed and attenuated before it enters the drainage system. Source Control techniques that should be used within road and development parcels include the following:

- Pervious Paving: Pervious paving intercepts rainfall that lands on its surface before it can run overland into the downstream drainage system. This provides a degree of interception, particularly in the most polluted first-flush events, as well as filtration through the various layers of construction and through the stone sub-base. Pervious paving will be used for the road design and would typically be used for parking areas such as driveways, parking courts and car parks. Through the inclusion of a suitable flow control device, the stone sub-base in the pervious paving structure can be utilised to provide additional attenuation storage.
- Bioretention Areas / Rain Gardens / Swales / Ponds: Bioretention areas utilise planting and constructed soils to intercept rainfall from their contributing catchment areas and contribute to interception storage, evapotranspiration and pollution removal. They can also be incorporated into traffic calming infrastructure such as build outs and into roadside planting and tree pits. Bioretention Swales can be installed adjacent to larger areas of highway to provide water quality treatment and attenuation storage along their length. Ponds serve as attenuation and storage and provide a wide range of biodiversity benefits.
- Other filtration techniques: Filter Trenches and French Drains can be used to intercept runoff from larger parking areas and highway areas, if required. These will provide interception storage and filtration through the stone fill within the trenches.

iii) Site Control

Site control is the management of water from roads and sub-catchments within a development parcels. Through close consultation with the layout designers flow conveyance measures such as swales, ponds and filter trenches can be incorporated into the development parcels to provide additional attenuation, treatment, amenity and opportunities for habitat creation.

iv) Regional Control

Regional control is the strategic management of runoff across the wider site. The Strategic SuDS Features will provide the attenuation volume and flow control required to reduce post-development flow rates to below greenfield runoff rates.

The proper implementation of a SuDS management / treatment train using a combination of upstream source control and strategic SuDS features will create greater resilience and allow the system to collect silt at various points which can then be removed as part of periodic maintenance.

Detailed design of the road and individual development parcels should, where possible, create a diverse SuDS scheme that encourages sedimentation, filtration and biological uptake throughout the site; ensuring that effective maintenance and management procedures are followed and will be the key to ensuring the overall effectiveness of the SuDS scheme.

Detailed design of the road and individual development parcels should, where possible, create a diverse SuDS scheme that incorporates the principles of the SuDS 'management train'.

7.2. SuDS Constraints

Geology

A site investigation is reported to have been undertaken by Hydrock in April 2019. With regards to the use of soakaways / infiltration drainage on the site, the Ground Investigation Report concluded the following: -

"Soakaway drainage is considered unsuitable for this site, subject to further BRE365 compliant testing."

With regards to groundwater the Ground Investigation Report states the following: -

"Groundwater was not encountered during the investigation."

"Water levels recorded post-fieldwork range from 0.93m bgl to 2.77m bgl (15.86m OD to 29.66m OD)."

Based on the foregoing it is considered that the use of soakaways would not provide a suitable means of draining surface water runoff from the roads or the development on the majority of the site. However, in line with the recommendations of the Ground Investigation Report, it is recommended that localised infiltration testing is undertaken within the individual development parcels to identify any localised areas of the site where infiltration drainage may be feasible.

Groundwater monitoring is on-going in the locations of the proposed Strategic SuDS features to establish the highest annual groundwater levels to inform the detailed design of these features; it is noted that the winter Groundwater monitoring report is available.

Topography

The site predominantly slopes towards north from south and the site falls from east to west.

Trees

The siting and location of proposed SuDS features may be constrained by any proposal to retain established trees and to plant new trees, although requiring new drainage and SuDS features to be positioned outside of any root protection zones.

Public Safety and Maintenance

It is intended to fully utilise SUDS train management systems and the existing watercourses, it is unlikely that below ground geocellular drainage units for surface water will be required. It is intended to work with nature and enhance biodiversity opportunities.

Consideration must also be given to the access and future maintenance of these features, which lend themselves to significant landscaped areas remaining under private ownership.

Additional biodiversity and SuDS benefits could be achieved via the incorporation of 'above ground' systems such as swales, ponds, rainwater harvesting and water butts, within the development proposals.

SECTION 08

FOUL WATER DRAINAGE

8. FOUL WATER DRAINAGE

The existing development site area is not crossed by any public foul sewers. Where appropriate it should be proposed to connect to an existing Public Foul Sewer network operated by Southern Water supplying foul and surface water sewerage systems.

The Foul sewers built as part of any new development must be constructed in accordance with Building Regulations Part H and where offered for adoption, to the local water company, in accordance with the latest technical guidance for the Design And Construction Guidance (DCG) April 2020.

SECTION 09

CONCLUSION

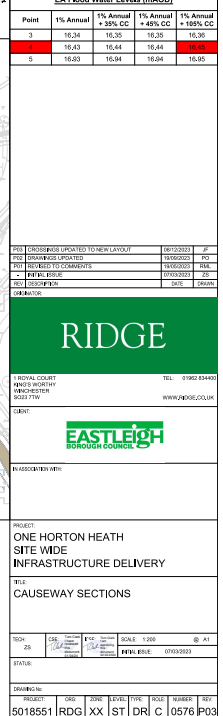
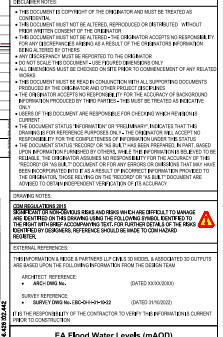
9. CONCLUSION

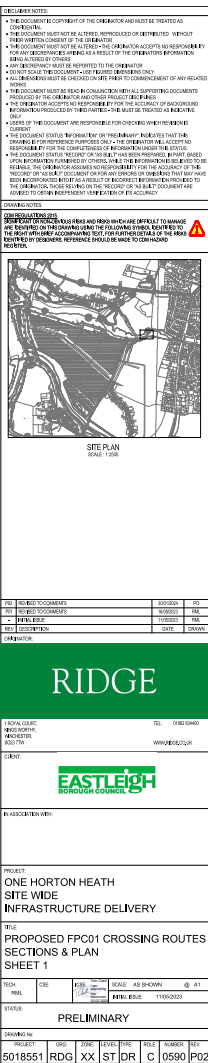
- Ridge & Partners prepared this Flood Risk Assessment on behalf of Eastleigh Borough Council. The proposed development has been designed in full accordance with the Development Plan and Outline Planning Application (OPA) O/20/89498, which has a resolution to grant consent subject to S106 negotiations relating to education. The application is for full planning consent due to the time for these negotiations to complete. Submitting details of the Green Infrastructure Landscaping (GI) as a full planning application will deliver the GI in accordance with, and as part of the OPA, but enable commencement more quickly than waiting for the resolution of the OPA S106 and the determination of an application for reserved Matters Approval of details of the GI.
- Flood risk has been assessed in line with NPPF (2021), BS 8533 (2017), BS BS 8582 (2013), CIRIA C624 (2004) and SuDS Manual (C753) (2015), taking into account national and local planning policy and guidance to consider all potential sources of flooding to the site.
- Apart from the watercourse causing local bank-full and local overland flooding the remaining site area is in Flood Zone 1, although there are two additional tributary watercourses that will need to be crossed. However, apart from the watercourses there is no recorded flooding from any other sources, neither historical flooding nor specific event records, apart from the watercourses.
- Flood risk to the site from other potential sources such as surface water, sewers and infrastructure are also all considered low, with no significant flood risks identified. Soil Investigations and winter period borehole monitoring have been completed as referenced in Section 2.2. However, ground water vulnerability is considered to be medium.
- Based upon current information provided by the EA, the carefully selected site areas for the residential development within the site area are demonstrated to be at low probability of flooding (Flood Zone 1) from fluvial sources. However, there are areas within the site which comes under Flood zone 3. There are no plans for residential and commercial development within these areas other than a proposed raised footpath causeway which is proposed to be built along the riverbank.
- Hydraulic modelling has been commissioned to confirm the effect of this causeway on the river flooding in this area and to confirm if any mitigation is required. Therefore, no sequential testing and Exception Test is required.
- Based upon our initial appraisal of flood risk, mitigation measures should be utilised to manage residual flood risks to the site. However, it is felt that the recommended measures are readily deliverable and would not unduly hinder or prevent the redevelopment of the site.
- Surface water generated from the proposed development could be managed in a sustainable manner and at source by employing a wide variety of SuDS as far as possible with the support of enhanced biodiversity.
- Foul sewage from all new development should be connected to an existing public foul sewer system, subject to permission to connect or alternatively to new sewerage provisions with appropriate management and maintenance.
- The technical assessment of flood risk presented within this document demonstrates that the immediate and residual flood risks over the lifetime of the development are readily manageable and

the redevelopment proposals are deemed acceptable in terms of flood risk throughout their lifetime, without increasing flood risk elsewhere.

APPENDIX A

CAUSEWAY SECTIONS







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