



RACTON BOOSTER STATION

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Client signoff

Client	Trant Engineering Ltd.
Project	Racton Booster Station
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Glossary of terms

Term	Description
AEP	Annual Exceedance Probability
Flood Zone 1	Area with a low probability of flooding from either rivers or the sea (< 1 in 1,000 annual chance of flooding).
Flood Zone 2	Area with a medium probability of flooding from either rivers (1 in 100 – 1 in 1,000 annual chance of flooding) or the sea (1 in 200 – 1 in 1000 annual chance of flooding).
Flood Zone 3	Area with a high probability of flooding from either rivers (> 1 in 100 annual chance of flooding) or the sea (> 1 in 200 annual chance of flooding).
FRA	Flood Risk Assessment
Ha	Hectare
NGR	National Grid Reference
NPPF	National Planning Policy Framework
PFRA	Preliminary Flood Risk Assessment
SFRA	Strategic Flood Risk Assessment
SWMP	Surface Water Management Plan
RoFSW	Risk of Flooding from Surface Water



Executive Summary

Site Name and Address	Racton Booster Station New Road, Havant		
Grid Ref	SU 71151 06832	Size	81.65 m ²
Current Use	Public open space Area of public open space, amenity grassland.	Proposed use	Water Booster Station The construction of a booster station.
Flood Zone	1		
Vulnerability class	Water Compatible		
Is it compatible?	Yes		
Application of the Sequential test.	Sequential Test passed as the development is situated in Flood Zone 1.		
Exception test?	Not required	Exception Test is not required as the development is situated in Flood Zone 1.	

Overview Statement

The purpose of this Flood Risk Assessment (FRA) is to support the planning application for the Racton Booster Station building and associated hardstanding areas. This report is intended for submission with the planning application. This FRA provides a qualitative assessment of the flood risks to the site and any increase or decrease in flood risk arising from the Scheme.

The Scheme lies wholly within Environment Agency Flood Zone 1 and the development is considered at an acceptable level of fluvial and tidal flood risk. This remains true over the lifetime of the development (assumed to be 60 years) taking climate change into account.

There are no other known sources of flooding that pose a significant risk to the site, or that would alter as a result of the Scheme. This remains true both under present day conditions and taking climate change into account over the lifetime of the development.



1. Introduction

1.1 Background

AtkinsRéalis has prepared an updated Flood Risk Assessment (FRA) on behalf of Trant Engineering Limited for a proposed new Water Booster Station Building to be located on land off New Road, Havant (henceforth referred to as 'the Scheme'). This FRA report has been prepared in support of the planning process.

The Scheme will comprise of a Water Pumping Station Building with associated concrete and grasscrete hard standing. Scheme drawings are provided in Appendix A.

The original proposed design location for the new Water Pumping Station was found to be in Flood Zone 3, but as part of the overall design of the new Water Pumping Station, the proposed location of the pumping station was adjusted and moved 50m east, to now be located within Flood Zone 1, as set out in this report.

1.2 Site Location

The general Scheme area (Appendix A) is an area of public open space in the town of Havant, approximately 630m northwest of Havant Railway Station. The approximate Ordnance Survey National Grid Reference at the centre of the site is SU 71151 06832. The site is an approximate rectangular area of land of 0.1 hectares, with New Road in the south, Stockheath Lane in the west and Brookfield Close to the east. The site comprises grassed areas, trees, and vegetated hedgerows. See Appendix A.1 for the site location map.

A wider site was defined to enable identification of the precautionary assessment of constraints in close proximity within the scope of this report and to inform the designers of the best location for the new building in order to account for such constraints. Throughout this report, the site is defined as the wider area, and not just the Pumping Station building.

1.2.1 Ground Conditions

The geology underlying the site area is based on available British Geological Survey (BGS) mapping information¹. No Made Ground is indicated to be present at the site; however, considering the developments adjacent to the site there is a potential for Made Ground to be present.

Superficial deposits underlying the site comprise Head Deposits, described as variable deposits of sandy silty clay, locally gravelly; chalky and flinty in dry valleys.

The underlying bedrock beneath the site comprises the London Clay Formation, described as 'silty clay and sand'.

1.2.2 Watercourses

In accordance with the Environment Agency Main Rivers Map² and Ordnance Survey mapping³, watercourses in proximity to the Scheme are as follows:

¹ British Geological Survey Onshore Geoindex. Available: <https://www.bgs.ac.uk/GeoIndex/> [Accessed: March 2024]

² Environment Agency Main Rivers Consultation Map. Available: <http://apps.environment-agency.gov.uk/wiyby/151293.aspx> [Accessed: July 2019]

- The Hermitage Stream is a statutory Main River and is located approximately 50m west from the Scheme, flowing north to south;
- The Rivers Lane Stream is a statutory Main River and is located approximately 300m north from the Scheme, flowing north to south; and
- The Lavant stream is a statutory Main River and is located approximately 850m east of the Scheme, flowing north to south.

1.2.3 Existing Site Drainage Systems

The site area does not have any formal existing drainage systems.

As shown on the drawings in Appendix A, there are a number of existing buried services (power cables, communication cables, Portsmouth Water water mains etc.) in the vicinity of the site.

There is a nearby Southern Water foul sewer network serving the local houses.

Details of the existing road drainage system are not currently known but will be ascertained as part of the detailed design process.

The Scheme will involve the installation of new water mains to and from the Water Pumping Station, and the detailed design and construction works of these new pipelines will mean that the existing drainage systems are not affected by the new construction works.

1.3 Proposed Development

The proposed Water Pumping Station and associated access track footprint areas are as follows:

- Pumping Station building (81.65m²); and
- Pumping Station hard standing (formed of permeable Grasscrete with a total area of 143.7m²).

Construction of the development is anticipated to be undertaken over a duration of 48 weeks. During this construction period, the following additional temporary units will be installed on the site:

- Site Storage Area (5m x 5m, 25m²); and
- Two site welfare units, double stacked with an approximate height of 5m when stacked (total area: 60.46m²).

All temporary site areas will be returned to their natural state post-construction.

Some Scheme details can be found in Appendix A. A full description of the proposals can also be found in the Planning Statement submitted with the planning application.

³ Ordnance Survey Mapping. Available: <https://osmaps.ordnancesurvey.co.uk/> [Accessed: March 2024]

1.4 Previous Studies

A previous FRA was undertaken in 2019 in which the original proposed design location for the new Water Pumping Station was found to be in Flood Zone 3. As a result, the proposed location of the Scheme was adjusted and moved 50m east and is now located within Flood Zone 1, as set out in this report.

1.5 Scope and data

This FRA has been completed in line with current national policy in relation to flood risk and development, namely the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2023) and the associated technical guidance. The level of detail provided in this FRA is considered suitable in line with the scale and nature of the development and the identified flood risk. This FRA makes use of readily available and requested information comprising:

- Publicly available information on the Environment Agency website (accessed July 2024)⁴;
- Strategic FRA for Wiltshire Council (Havant Borough Council, 2018).

⁴ <https://environment.data.gov.uk/>

2. Planning policy

2.1 Background

The NPPF is the overarching planning policy document in relation to development and flood risk and sets out the Government's policy on development relating to flood risk. The aim of the NPPF is to ensure that development is not at an unacceptable risk of flooding. Where development is unavoidable in areas at risk from flooding, the NPPF aims to ensure that the development is safe without increasing flood risk elsewhere and where possible reducing flood risk overall.

In accordance with the NPPF, a site-specific FRA should be provided for all development in Flood Zones 2 (medium fluvial risk) and 3 (high fluvial risk) (the definitions of Flood Zones are provided in Section 3). In the first instance, the location of the site within Flood Zones is identified through the use of the Environment Agency flood maps.

A site-specific FRA is also required for development in Flood Zone 1 (low fluvial risk), where:

1. proposals involve sites of 1 hectare or more;
2. land which has been identified as having critical drainage problems. This is identified through reviewing flood risk documents, including the strategic flood risk assessment (SFRA), the surface water management plan (SWMP) and the Local Flood Risk Management Strategy (LFRMS);
3. land identified in a SFRA as being at increased flood risk in future; or
4. land that may be subject to other sources of flooding (as determined through the sources listed in bullet 2, informed by the client or local knowledge of the area), where its development would introduce a more vulnerable use.

2.2 Flood risk vulnerability classification

The NPPF assigns vulnerability type to land use in terms of vulnerability to the impact of flooding. The vulnerability types range from water-compatible to essential infrastructure.

More vulnerable development, for example residential, would be unsuitable for construction in areas at risk from flooding, however water-compatible development types such as water-based recreation might be considered acceptable (if the development does not increase flood risk elsewhere).

The definitions for vulnerability type, and Flood Zone compatibility, is available on the UK Government website.⁵

The Scheme subject of this FRA is classed as 'Water Compatible' which infers the development might be acceptable in Flood Zones 1, 2, and 3a, and potentially in Flood Zone 3b after applying the Exception Test.

⁵ <https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risktables>

Table 2-1 Flood risk vulnerability classification

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓ This development
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓ *

Key:

✓ Exception test is not required

X Development should not be permitted

† In Flood Zone 3a, essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain), essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- Remain operational and safe in times of flood,
- Result in no net loss of floodplain storage,
- Not impede water flows and not increase flood risk elsewhere.

2.3 Sequential Test

The purpose of the Sequential Test is to promote development within areas at lowest flood risk. Therefore, areas for development in Flood Zone 1 should be sought in the first instance. If there are no practicable areas for the development in Flood Zone 1, then areas in Flood Zone 2 should be sought, and so on.

According to the Strategic Flood Risk Assessment (Havant Borough Council, 2022), the Sequential Test is passed when the development is allocated in Flood Zone 1.

2.4 Exception Test

A passed Exception Test is required when there is a need to demonstrate wider benefits that outweigh flood risk, and that the development will be safe from flooding without increasing risk elsewhere.

The Scheme is situated in Flood Zone 1 and thus an Exception Test is not required.



2.5 Other planning policy

In addition to the NPPF, the following local plans/policies and regulations have been reviewed and considered:

- Flood Risk Sequential Test & Exception Test, May 2022 (Havant Borough Council, 2022).
- Strategic Flood Risk Assessment (Local Plan Sites), November 2018 (Havant Borough Council, 2018).
- Havant Borough Core Strategy. Local Development Framework, March 2011 (Havant Borough Council, 2011)⁶.

⁶ Most recently adopted Local Plan. The Havant Borough Local Plan 2036 was withdrawn, and the 'Building a Better Future Plan' is still emerging and in the midst of consultation.

3. Assessment of Flood Risk

As outlined within the NPPF, flood risk from all sources must be addressed within the FRA so that potential flood risk has been considered during the development design and proposed works. Therefore, this section outlines all the potential sources of flood risk to the site, a quantification of the risk and the implications these risks have on the development. It is also necessary to outline any records of previous flooding events as these may identify areas vulnerable to flooding.

3.1 Historical flooding

The identification of past flood events can often indicate areas that are vulnerable to flooding and thus areas that have the potential to flood in the future.

The Environment Agency's historic flood outline indicates that no historical flooding has been recorded at this site. There has been no additional information found in the Strategic FRA for Havant Borough Council (Havant Borough Council, 2018) to state that flooding has occurred at this location.

3.2 Flooding from rivers

Flooding from rivers (fluvial flooding) occurs following exceedance of the flow capacity of river channels, leading to overtopping of the riverbanks and inundation of the surrounding land.

The Environment Agency publish mapping showing Flood Zones. Flood Zone 1 represents areas at a low risk (flooding less frequently than the 1 in 1000 annual probability); Flood Zone 2 represents medium risk (flooding between the 1 in 100 and 1 in 1000 annual probability) and Flood Zone 3 represents high risk (flooding more frequently than 1 in 100 annual probability).

The Scheme is situated in Flood Zone 1 meaning there is a low risk from fluvial flooding. Figure 3-1 shows the flood extent from fluvial flooding. The Hermitage Stream is located approximately 50m west of the site, and there is medium risk of overtopping in the areas near the river.

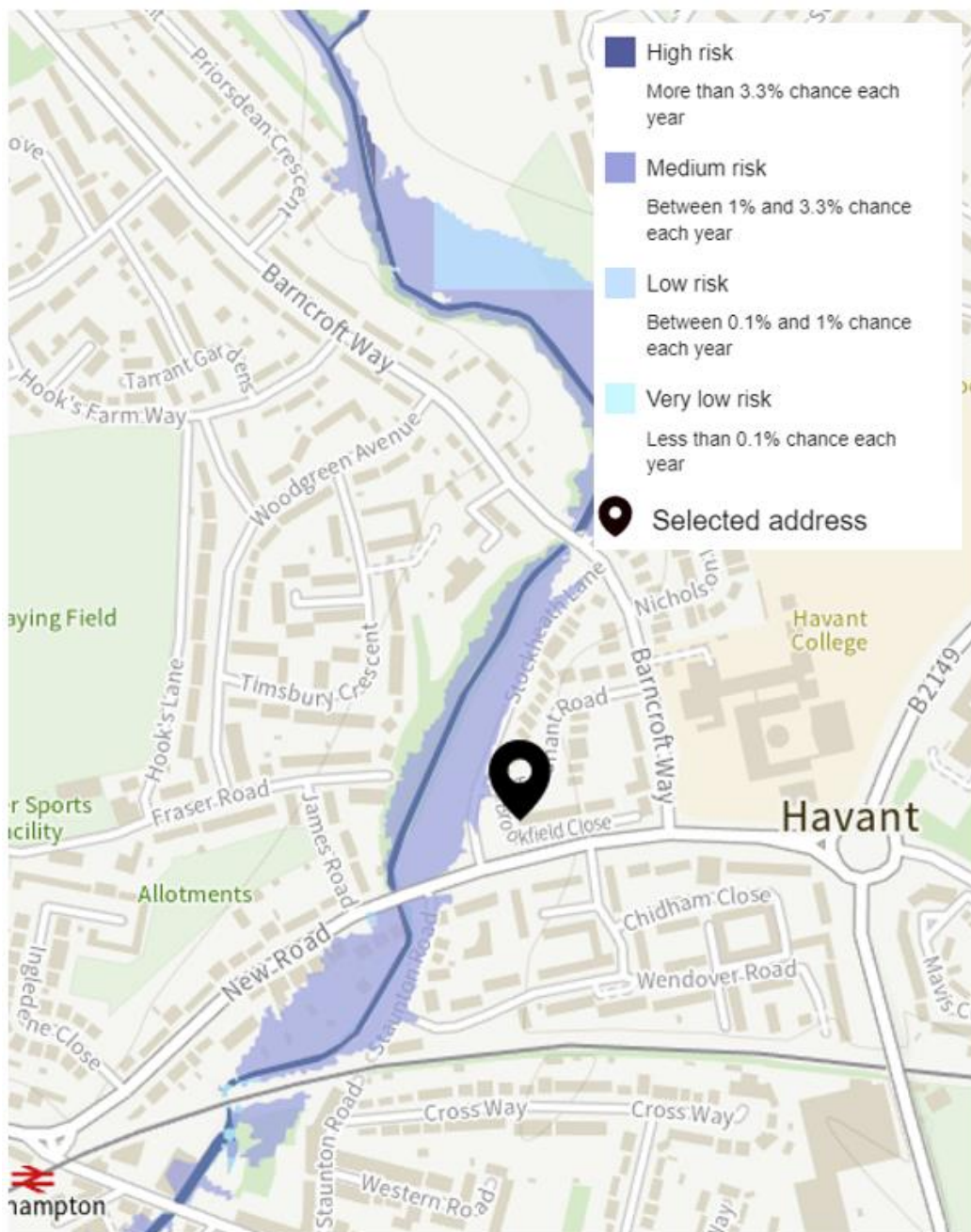


Figure 3-1 – Extent of flooding from rivers and the sea

3.3 Flooding from the sea

Inundation by high tides, storm surges and waves along coastal regions is described as coastal flooding. The propagation of high tides and storm surges up estuarine channels can lead to overtopping of the riverbanks and inundation of the surrounding land. This is referred to as tidal flooding. The site is inland and not at risk from tidal sources (as shown in Figure 3-1).

3.4 Surface water flood risk

Surface water flooding occurs when rainfall intensities exceed the infiltration capacity such that water collects on the ground surface. Therefore, there is a greater risk of flooding from this source within urbanised areas where there is a higher proportion of impermeable surface.

The surface water mapping flood extent from the Environment Agency's website is shown in Figure 3-2 below. The map indicates that the site is at very low risk of surface water flooding with less than a 0.1% (1 in 1000) annual exceedance probability (AEP) event.

To reduce residual risk relating to surface water runoff or failure of the drainage system, any proposed development will incorporate features that mitigate this residual risk by providing flow paths which divert water away from buildings or critical infrastructure. This will be achieved through general landscaping to make sure that any surface water runs away from the proposed building. The proposed designs for the development site should also incorporate, where possible, the natural flow paths of the site.

The proposed surface water Drainage Strategy is to:

- Connect the drainage to the surface water sewer network (with following discussions needed with Southern Water); and
- The pumping station hard standing area will be formed of permeable Grasscrete.

The Drainage Strategy for the Scheme will be refined and further developed as part of the detailed design stage.

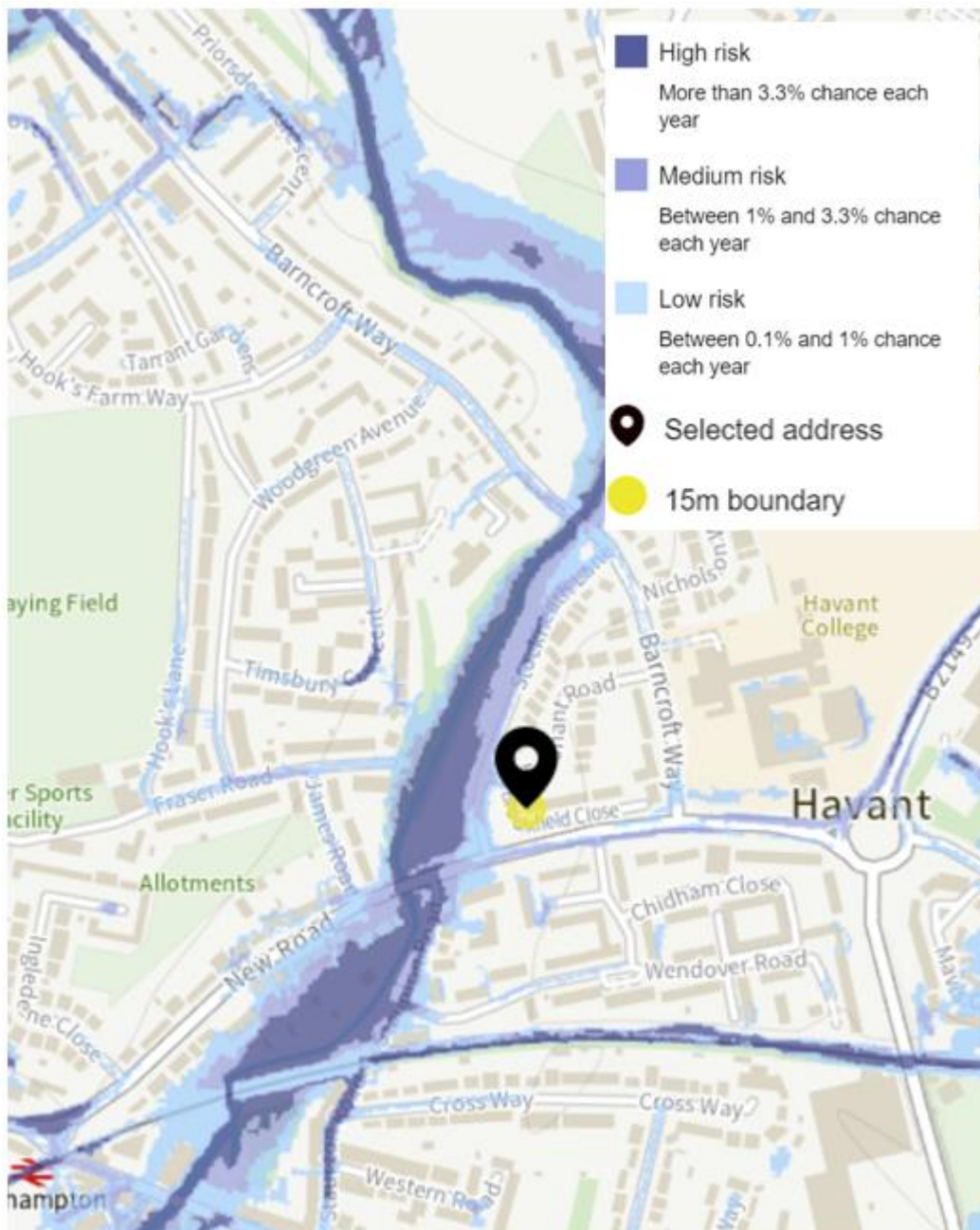


Figure 3-2 – Environment Agency surface water flood extent mapping

3.5 Flooding from groundwater

Groundwater flooding normally occurs where the water table meets the ground surface in low lying areas which are underlain by permeable rock known as an aquifer. Groundwater flooding tends to follow long periods of sustained rainfall but can also be caused by local obstructions to groundwater flow (e.g., following the placement of engineering structures or buildings with foundations) or by the rebound of groundwater levels after a decrease in abstraction or dewatering.

It is important to recognise that the risk of groundwater flooding is typically highly variable and heavily dependent on local geological, topographical, weather conditions and climate change. Groundwater flooding is hard to predict and challenging to mitigate. Longer periods of dry weather may reduce risk, but higher intensity and more frequent storms may increase risk.

There is no record of any groundwater flooding within close proximity of the Scheme site. Any development of the Scheme site above the ground level (and mitigated for surface water / fluvial flood risk reasons) would be at an acceptable level of groundwater flood risk. The Scheme will not involve deep or linear foundations that would impact on groundwater movements. Hence, the Scheme would not cause an increase in risk from this source to third party receptors.

As described in Section 1.2.1, the underlying bedrock beneath the Scheme comprises of 'silty clay and sand'. A ground inspection would be needed to further ascertain the ground conditions at the site. Overall, there is low risk of groundwater flooding to the Scheme, but ground conditions should be taken into consideration during construction.

3.6 Other sources of flood risk

3.6.1 Flooding from reservoirs

The Environment Agency reservoir inundation mapping⁷ indicates that the site and areas within 1km of the site boundary are not at risk of inundation following reservoir failure. Therefore, the risk of flooding from this source is low.

3.6.2 Flooding from water transmission infrastructure

The water and sewerage network has the potential to cause a flood risk to the site. Water companies are required to maintain records of internal property flooding which has occurred as a result of hydraulic overloading of sewers. These records are known as the Director General 5 (DG5) register.

The nearby existing Southern Water sewerage system may present a risk of flooding if the capacity of the system is exceeded, or if the system suffers structural or operational failure. Blockages and structural failure incidents tend to be isolated and unpredictable. However, the site area topography is such that the proposed Water Pumping Station is unlikely to be at risk from sewer flooding.

3.6.3 Flooding from canals

The site is not at risk of flooding from canals.

3.6.4 Summary

There are no other known sources of flood risk that pose a flood risk to the site, or that would be impacted as a result of the Scheme.

3.7 Climate Change

Climate change over the lifetime of the development is expected to increase rainfall intensity leading to higher fluvial flows and surface water runoff rates, which could increase flood risk to and from the site.

⁷ [Learn more about flood risk - Check your long term flood risk - GOV.UK \(check-long-term-flood-risk.service.gov.uk\)](https://www.gov.uk/check-long-term-flood-risk)

As the development is considered 'Water Compatible' and is within Flood Zone 1, the allowance for climate change implications on fluvial flood risk is the central factor. For the 2080s scenario, the allowance is 37% (for the East Hampshire Management Catchment area). For pluvial (rainfall) and surface water management purposes, the design criteria for central and upper end allowance for rainfall is 25% and 45% respectively. Hydraulic modelling of climate allowances has not been completed for this assessment as the site is wholly within Flood Zone 1 and modelling is not required.

The impact on groundwater flood risk as a result of climate change is challenging to predict. Longer periods of dry weather will reduce risk, but higher intensity storms may increase risk. Nevertheless, any development above the ground level (and mitigated for surface water / fluvial flood risk reasons) would be at an acceptable level of groundwater flood risk.

3.8 Summary of flood risk

Table 3-1 below provides a summary of flood risk at the site and result from the Scheme.

Table 3-1 Summary of flood risk

Flood Risk	Baseline risk	Post development risk	Mitigation required	Commentary
Fluvial	Low	Low	No	The Scheme is within Flood Zone 1 and does not involve any works within present day Flood Zone 2 or 3 and therefore the Scheme will not increase flood risk from this source.
Tidal	No risk	No risk	No	No risk to the site as it is inland and not tidally influenced. The Scheme will not impact on this source of flood risk.
Surface Water	Low	Low	No	The Scheme is at low risk of surface water flooding and the proposed works would not cause an increase in risk from this source. The Scheme incorporates permeable grasscrete for the pumping station access track and drainage connected to the surface water sewer network to mitigate risk of surface water flooding.
Groundwater	Low	Low	No	The Scheme is at low risk of groundwater flooding and the proposed works would not cause an increase in risk from this source.
Other sources	Low	Low	No	The Scheme is not at risk from reservoir inundation, canal failure or any other known sources of flood risk. Furthermore, the Scheme will not cause an increase in flood risk from any other known source.
Climate Change	Low	Low	No	Climate change has the potential to increase surface water flooding and therefore suitable allowances for climate change should be incorporated into the drainage design. The Scheme is either at low or no risk from all other known sources of flooding. Therefore, it is considered that the Scheme will be at an acceptable



			level of risk over the lifetime of the development taking climate change into account.
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4. Conclusions & Recommendations

4.1 Conclusions

The conclusions that have been made from this FRA are:

- The Scheme, Racton Water Pumping Station, is classified as 'Water Compatible'.
- The Scheme is situated wholly outside Flood Zone 2 and 3. The Scheme does not involve building within Flood Zone 2 or 3 and therefore will be no impact on this source of flood risk.
- The site is at low risk of surface water flooding and groundwater flooding.
- Climate change has the potential to increase surface water flooding and therefore suitable allowances for climate change have been incorporated into the drainage design.
- There are no other known sources of flood risk to the site or would be increased as a result of the proposed use.

4.2 Recommendations

The recommendations for the Scheme based on this FRA are:

- This FRA is revisited should any alterations be made to the development red line boundary or proposed drainage works / surface water drainage strategy.



5. Reference List

Havant Borough Council. (2011). *Havant Borough Core Strategy. Local Development Framework*. Retrieved from: <https://www.havant.gov.uk/media/7437/download?inline>

Havant Borough Council. (2018). *Strategic Flood Risk Assessment (Local Plan Sites). November 2018*. Retrieved from: [https://cdn.havant.gov.uk/public/documents/Strategic%20Flood%20Risk%20Assessment%20\(Havant%20Local%20Plan%20Sites\)_0.pdf](https://cdn.havant.gov.uk/public/documents/Strategic%20Flood%20Risk%20Assessment%20(Havant%20Local%20Plan%20Sites)_0.pdf).

Havant Borough Council. (2022). *Flood Risk Sequential Test & Exception Test. Policy Guidance for Applicants & Planning Officers. May 2022*. Retrieved from: <https://www.havant.gov.uk/media/8544/download?inline=>

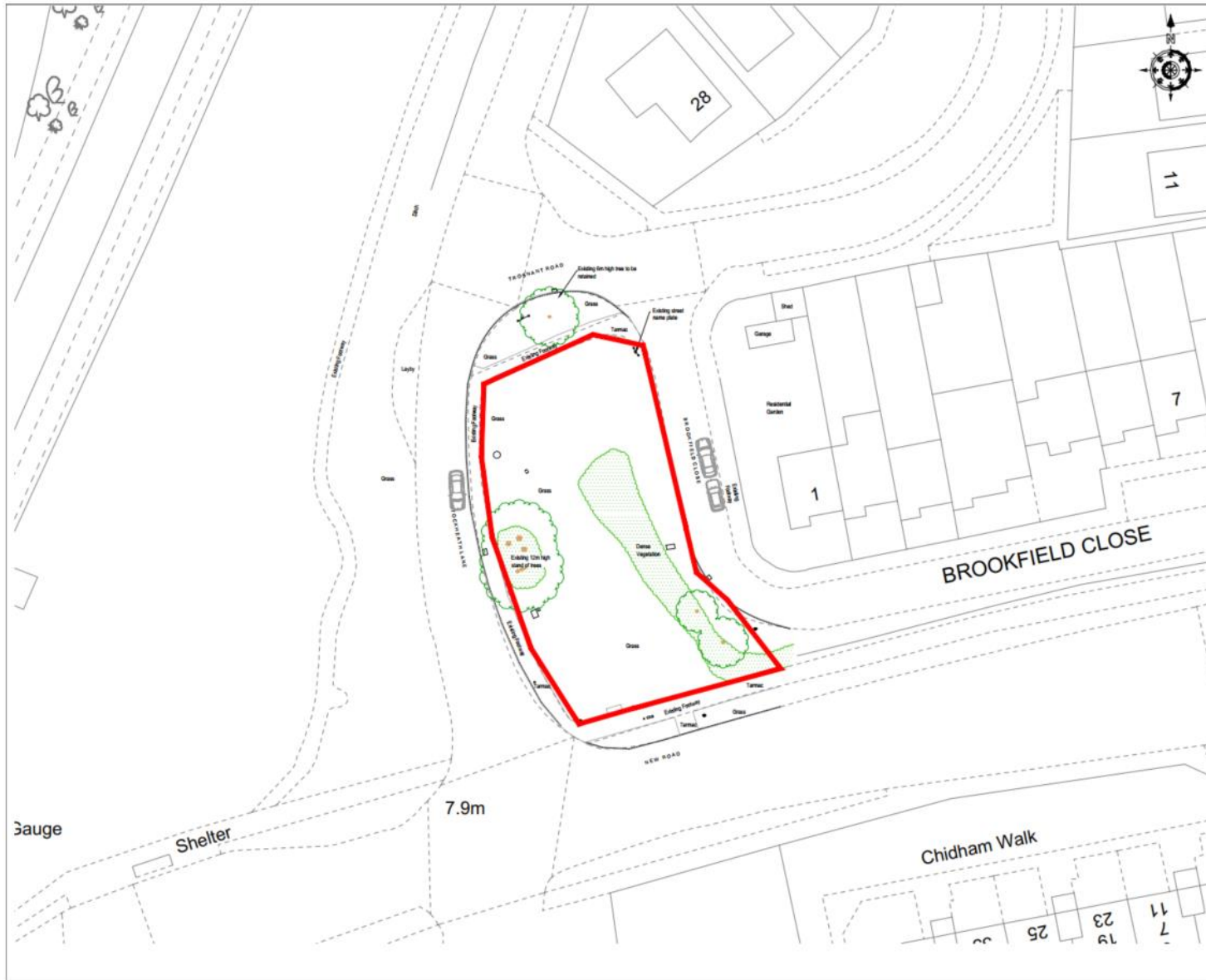
APPENDICES

Appendix A. Proposed Drawings

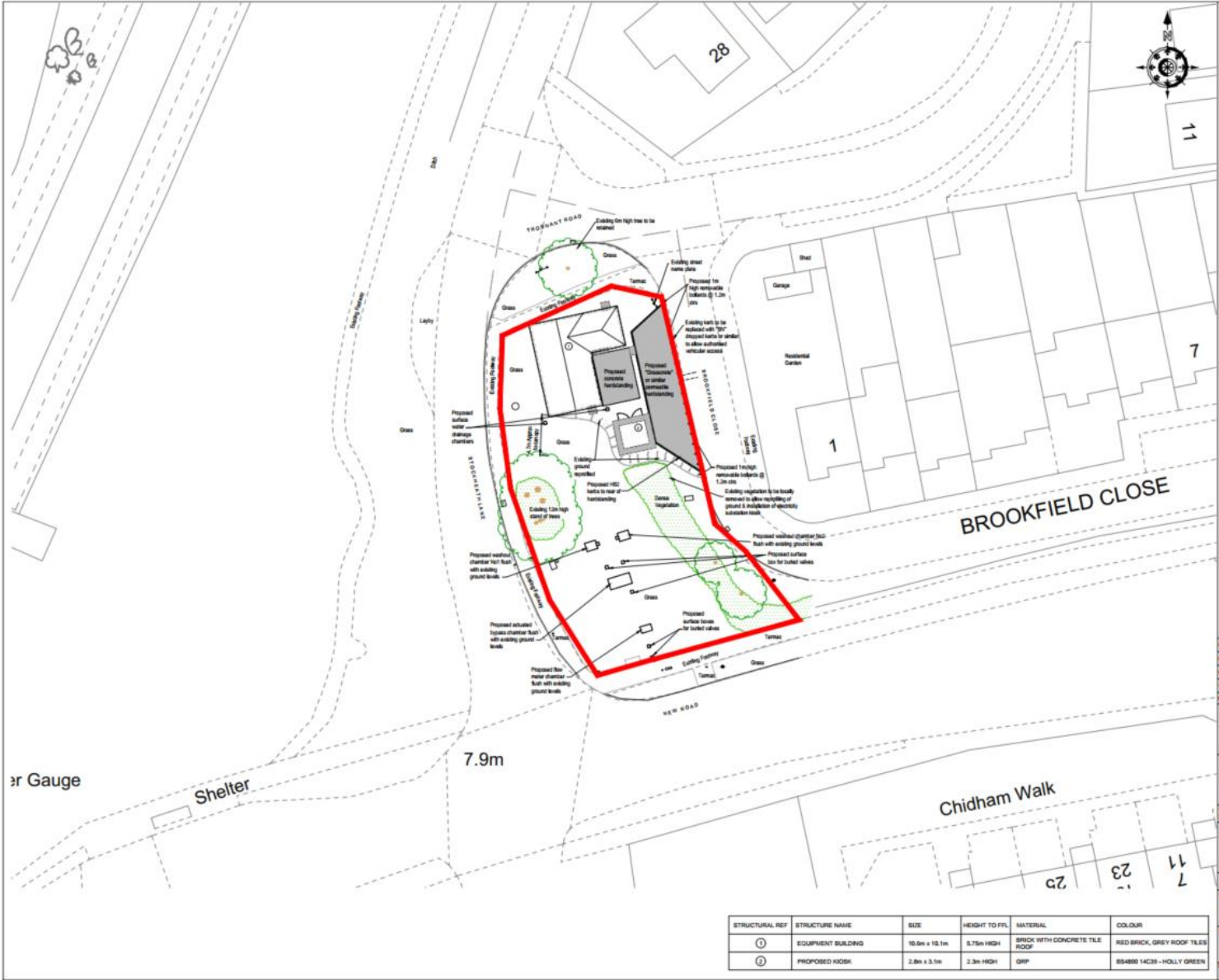
A.1 Site Location Map



A.2 Existing Site Plan



A.3 Proposed Site Plan



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