

Langstone Technology Park

Phase 1

Flood Risk Assessment & Outline Drainage Strategy Report

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Client

XLB Property Ltd

Baynham Meikle
Partnership Limited



8 Meadow Road

Edgbaston

Birmingham

B17 8 BU

Tel: +44 (0)121 434 4100

Fax: +44(0)121 434 4073

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1 Introduction

Baynham Meikle Partnership Limited has been commissioned on behalf of XLB Property Ltd to prepare a Flood Risk Assessment and Drainage Strategy for the proposed amendments to planning permission (Ref APP/19/00703) on land within Langstone Technology Park. Whilst the red line site area includes land to the north, this report focuses predominantly on land within the south-western corner of the site-wide development, referred to as 'Phase 1'. The proposed Phase 1 works will consist of a series of warehouse units with associated service yard, car parking and soft landscaping areas, whilst retaining a number of existing car parking spaces also. Phase 1 consists of three development areas as shown in Figure 1 below.

The Flood Risk and Drainage Strategy Report will be part of a Section 73 Application made to Havant Borough Council (HBC) and should be read in line with the previously approved Clancy Flood Risk Assessment (FRA) and SUDS Strategy, dated 02/07/2019 (Report Reference No. 8/1982). The Section 73 Application is a modification of the extant consent.

It is important to note that, despite alterations to the car parking layout within the northern end of the site (around existing building units 1000 and 4000) there has been no change to the approved drainage strategy within this area.

The site is located in HBC and can be accessed either via Langstone Road (east of the site) or via Brookside Road (west of the site). Although the entire park (site-wide development area) occupies a total area of approximately 16 hectares, Phase 1 (areas 1-3) is approximately 3.11 hectares in total.

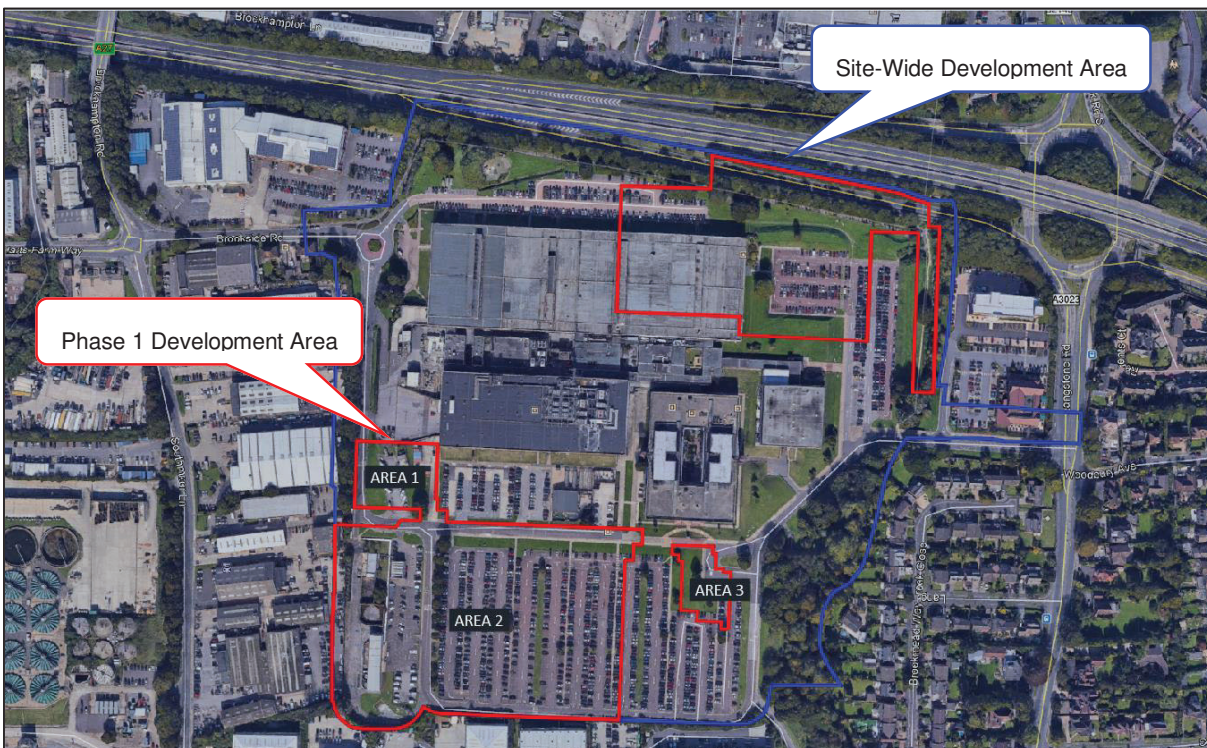


Figure 1. Proposed Development Area

2 Existing Site

2.1 Site Location

The development site is situated off Langstone Road and Brookside Road, with the nearest postcode PO9 1SA. The Ordnance Survey National Grid reference to the centre of the site is E471279, N105702. A site location plan can be found in Appendix A. Phase 1 development area is generally rectangular in shape and occupies an approximate area of 3.11 ha. The neighbouring land use is as follows:

North	The site is bound to the north by an unnamed access road located within Langstone Technology Park.
East	The site is bound to the east by existing car parking, The Mill Stream and Langstone Road.
South	The site is bound to the south by Endeavour Business Park comprising commercial office and distribution units.
West	The site is bound to the west by commercial office, distribution and light manufacturing units which is accessed via Southmoor Lane.

2.2 Topography

Development area 2 (shown in Figure 1) currently falls from north to south. Levels along the northern boundary, currently where the existing access road is located, range from 4.80-5.00m AOD and on the southern boundary from 4.25-4.50m AOD.

Development area 3 also falls from north to south, whilst area 1 generally falls from west to east.

The existing site currently consists primarily of hard paved areas including car parking spaces, access roads and building units, such as a gym which is to be demolished prior to the development of Phase 1.

A topographical survey can be found in Appendix A.

2.3 Existing Drainage

From Southern Water drainage maps it is evident that there are adopted public drainage systems located across the entire park.

Southern Water's map indicates a small stretch of surface water sewer that enters the site-wide development from the A27 at the north west corner which continues to travel south before leaving the western end of the site (along the western boundary of area 1). The existing surface water sewers diameter ranges from 600-750mm.

A public foul 600mm diameter sewer (Southern Water), runs from east to west through the centre of the site-wide development and is thought to pick up the majority of the private foul drainage on route. This sewer enters the site-wide development (opposite Langstone Road) and roughly runs parallel to the unnamed access road before exiting the site along the site-wide western boundary and continues towards the nearby sewerage treatment plant. A 300mm diameter public foul water sewer from Langbrook Close (to the east) connects to the 600mm diameter foul sewer running through the centre of the site-wide development and at the northern boundary, additional public sewers enter the site-wide development and run around the perimeter heading towards the same sewer treatment works to the west.

Existing surface water drainage located within the southern car parking area of the site-wide development (proposed area 2) currently exits the site via 375mm diameter pipes heading south towards Penner Road, possibly connecting back into the public sewer downstream. Further investigation is required to fully understand the existing surface water drainage system. In addition, there are multiple other private surface water sewers which exist throughout the site-wide development, in particular, an existing surface water sewer which runs through the unnamed access road, directly north of Area 3.

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Southern Water drainage maps can be found in Appendix A.

2.4 Existing Ground Conditions

A Phase 1 Environmental Assessment has been carried out by Delta Simons and issued in November 2020 (Report Reference No.15-0754.07).

From the Delta Simons Phase 1 Environmental Assessment Report and through published geological data from the British Geological Survey (BGS), the site is indicated as being predominantly underlain by superficial deposits of Alluvium comprising clay, silt, sand and gravel. River Terrace Deposits comprising sand, silt and clay are shown within the south-western corner of the site and a small area of Head Deposits, comprising clay and gravel is shown in the south-west of the site. This can be seen in Figure 2.

Figure 2 shows the superficial deposits are underlain with bedrock which comprises the Lewes Nodular, Seaford, Newhaven, Culver and Portsdown chalk formations.

In accordance with the Geo-Environmental Appraisal Report by Clancy Consulting, dated October 2019 (Report Reference No. 10/1425/001) ground conditions identified within the phase 1 area of the site comprised:

- Tarmac and sub-base, or grass and topsoil, underlain by Made Ground to 3.1m bgl;
- Superficial River Terrace/Brickearth comprising silty, sandy gravelly clay with silty peat and sandy gravel to 5.5m bgl;
- Weathered chalk bedrock comprising sandy gravelly clay or clayey sandy gravel with gravel comprising chalk and flints to 6.0m bgl; over
- Chalk to a maximum depth of 24.9m bgl.

The Geo-Environmental Appraisal Report by Clancy Consulting states that soakaway testing had been carried out in 2 locations, one within the northern end of the site-wide area and the other within the southern end of the site-wide area (SA2 and SA1 respectively). It is important to note that the soakaway testing was not carried out within the Phase 1 development area.

The recorded infiltration rates suggest that the superficial deposits exhibit marginal to good drainage characteristics and initially suggest that soakaway drainage may be suitable. However, these good infiltration rates had been recorded within the made ground. It should be noted that soakaway drainage in made ground is generally not considered acceptable. In addition, due to the presence of chalk there is a risk of ground dissolution features caused by traditional soakaway structures that concentrate infiltration to a localised area.

With the above said, since soakaway testing had not been carried out within the Phase 1 area further site investigation works will need to be carried out within this area in order to determine specific infiltration rates.

The Clancy Geo-Environmental Appraisal Report also concluded that, within BH3 (located within the phase 1 site area) groundwater was encountered at a depth of 2.0m bgl. In addition, Figure 4. indicates the site as having a medium to high groundwater vulnerability and is located in an area susceptible to soluble rocks which could potentially result in sink holes forming. This poses a significant constraint in the design of soakaways since the SuDS Manual, section 25.2.2. states 'the base of the proposed infiltration component is to be at least 1m above the maximum anticipated groundwater level'.

Due to presence of chalk within the underlain strata and a relatively high groundwater table recorded within the Phase 1 development area this could result in disregarding infiltration techniques as a method of discharging surface water flows. Therefore, it has been assumed, until proven otherwise, that infiltration is not viable. This, however is to be confirmed upon completion of further Phase 1 site investigation works.

Delta Simons Phase 1 Environmental Assessment and Clancy Geo-Environmental Appraisal Report can be found in Appendix D of this report.

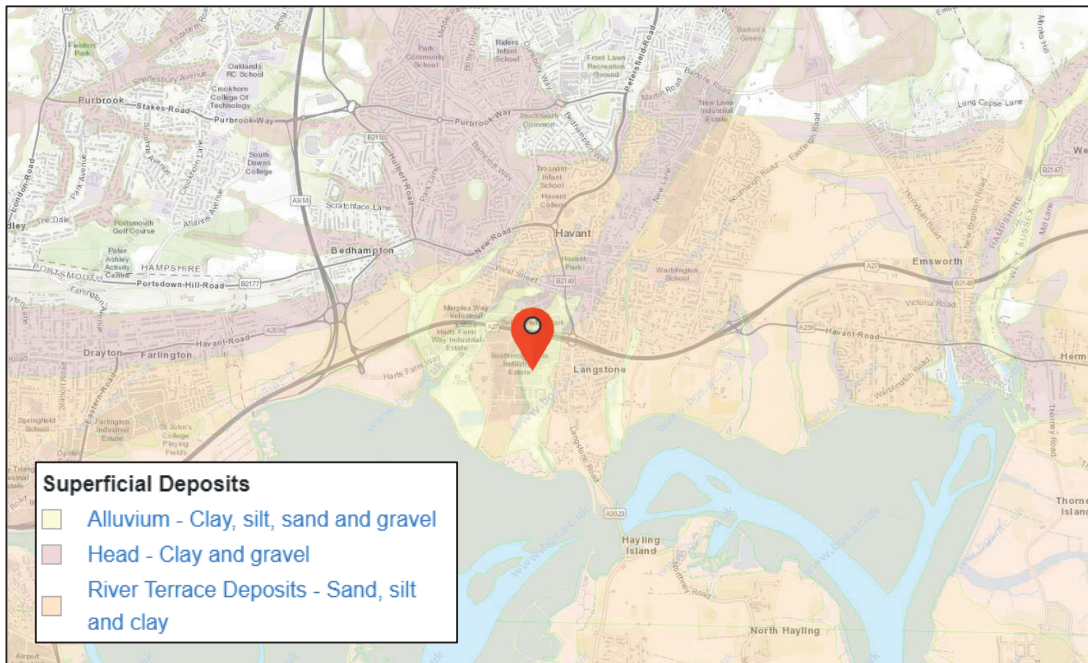


Figure 2. BGS – Superficial Deposits

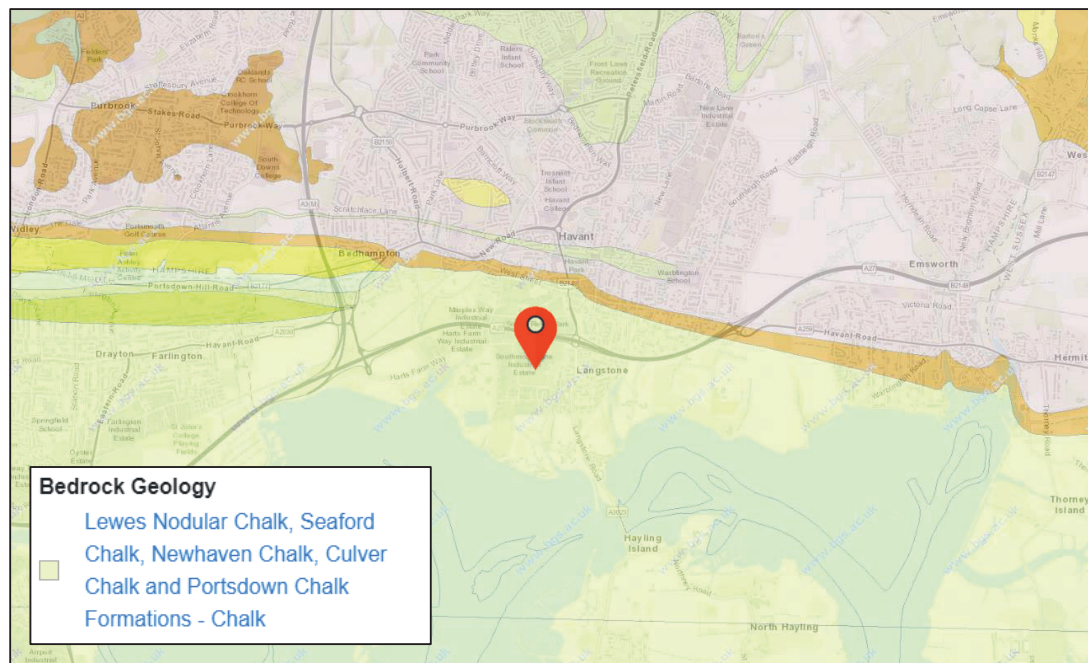


Figure 3. BGS – Bedrock Geology

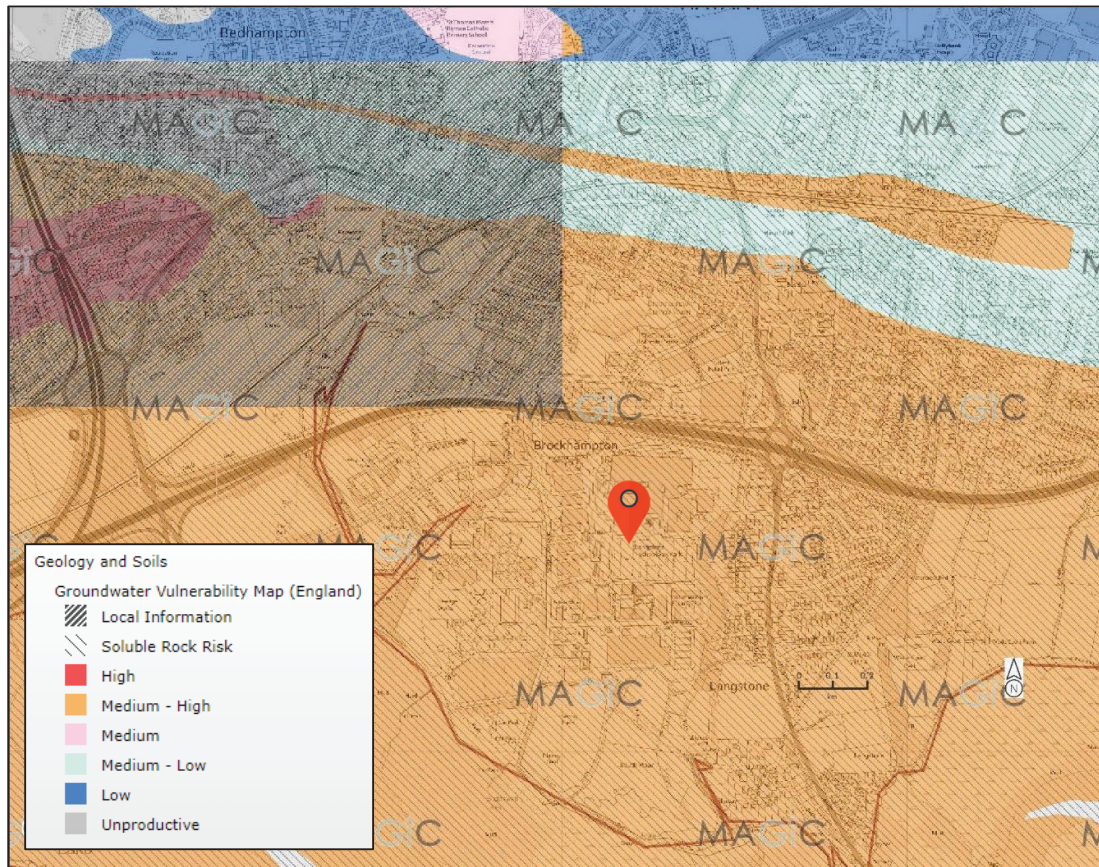


Figure 4. Magic Map – Groundwater Vulnerability

2.5 Aquifer Designation

An extract from the geographic information map (Figure 5 & Figure 6) provided by Natural England indicates that the site is located on a Superficial Drift Principle Aquifer (See Figure 5), and on a Bedrock Aquifer classed as Unproductive Strata (See Figure 6).

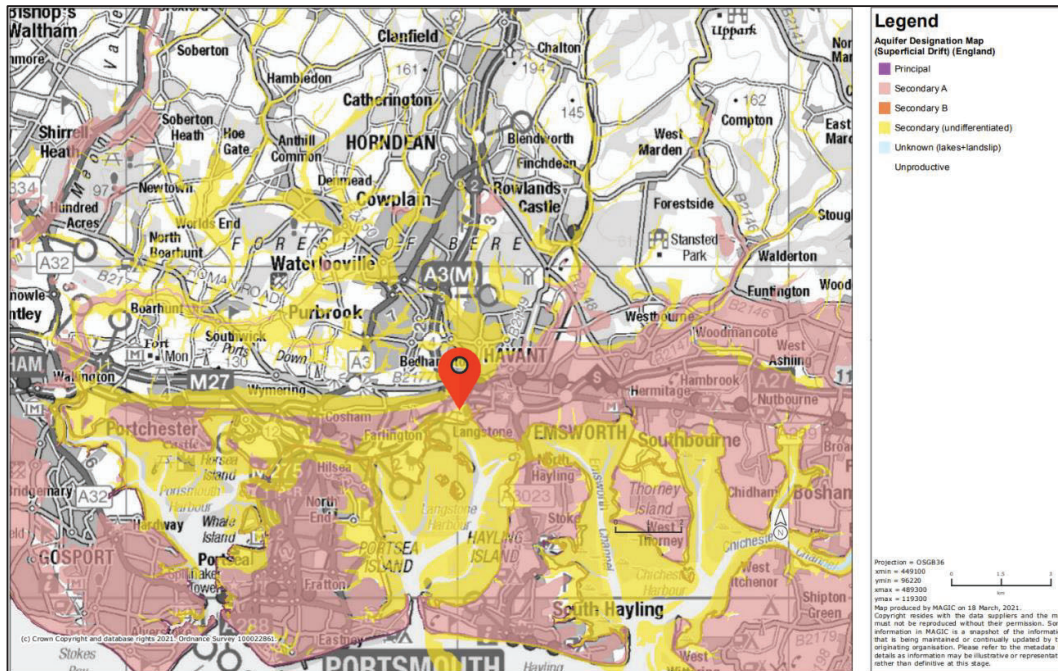


Figure 5. Aquifer Superficial Drift Designation Map

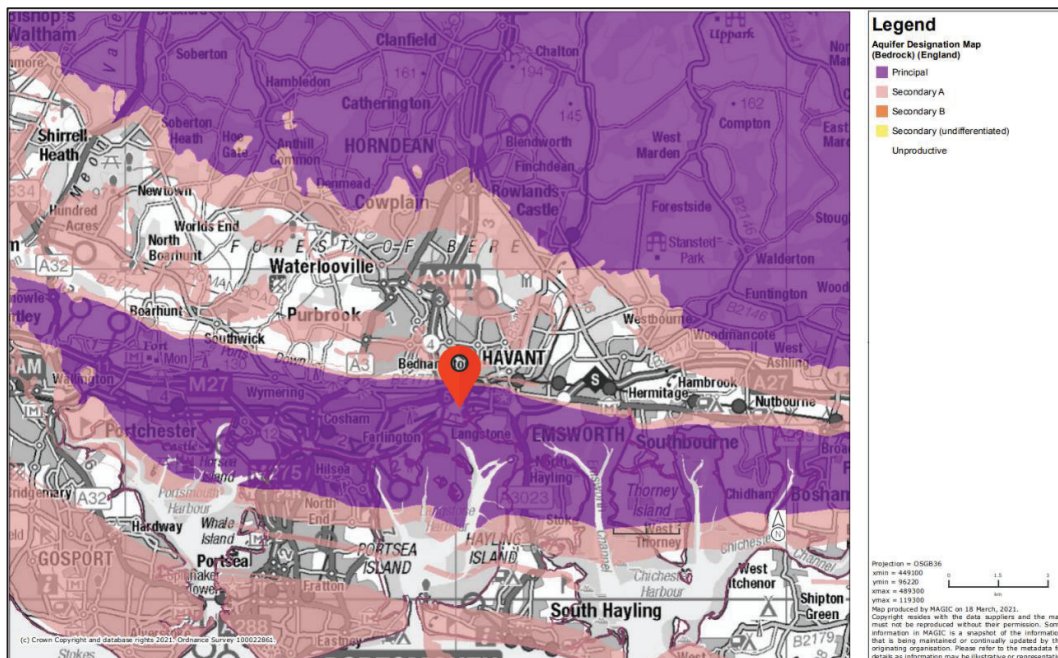


Figure 6. Aquifer Bedrock Designation Map

2.6 Site Specific Flood Risks

This section reviews the possible sources of flooding relevant for the site and assesses the impacts both on the development itself and on other areas as a result of the proposed development.

The Environment Agency is responsible for the provision of information pertaining to flood risk from tidal and main watercourses throughout England and Wales. The EA provides an online information service through its flood map data.

An extract from the flood map is given in Figure 7. indicating the site is largely located in Flood Zone 1. Figure 7. also indicates Mill Stream (located to the east of the side-wide development) as being potentially prone to flooding since this is shown to be within a Flood Zone 3 area. However, it is known that raised earthworks exist between the site-wide development plot and the Mill Stream which is believed to have been built to offer protection from flooding.

The EA identifies the majority of the site as having less than 1 in 1,000 annual probability of river or sea flooding.

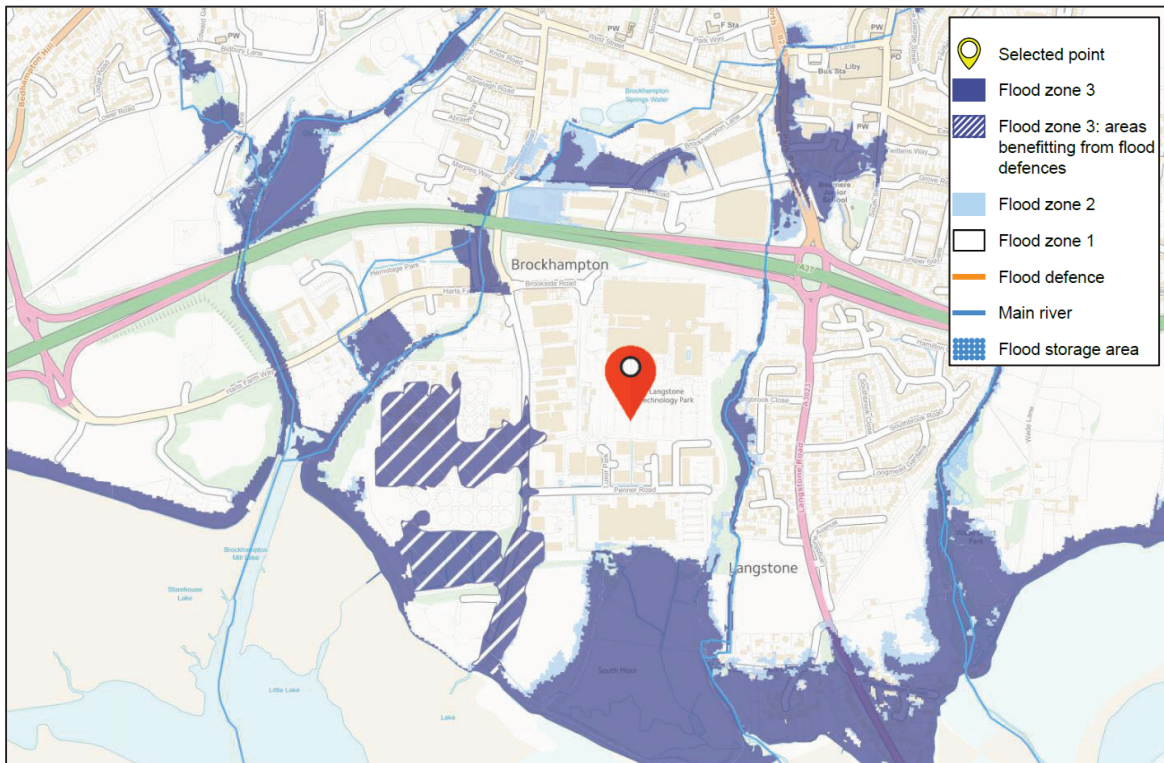


Figure 7. Flood Map for Planning by EA

2.6.1 Tidal/Fluvial Flooding

Tidal/Fluvial flooding occurs when sea levels rise and flow into a water course causing the water table levels to rise or water levels rise as a result of high or intense rainfall flowing into a watercourse, resulting in water courses overflowing their banks.

Sea (Tidal) Flooding – The site is located approximately 750m north of the coast and is therefore not at risk of flooding due to tidal flows.

River (Fluvial) Flooding – There is an existing river, Mill Stream, located adjacent to the side-wide eastern boundary which flows from north to south towards the coast, approximately 750m south of the development. Information from the EA main river map indicates the Mill Stream as a main river. The site however is not located within the floodplain of the Mill Stream, therefore there is low risk of flooding from fluvial flows.

From Figure 8. It can be seen that the proposed site is in a very low risk area of flooding from tidal/fluvial flows. Meaning, each year this area has a chance of flooding less than 1 in 1,000 (0.1%) from tidal and fluvial flows.

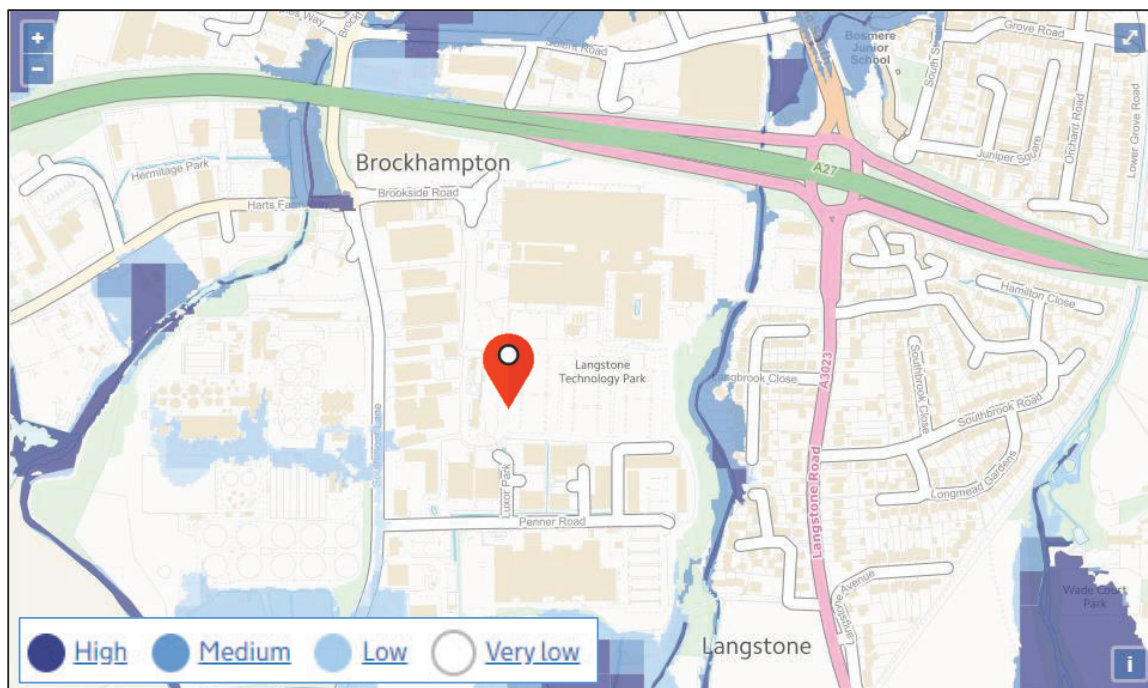


Figure 8. Tidal/Fluvial Flood Risk Map

2.6.2 Surface Water Flooding (Pluvial Flooding)

Surface water flooding can occur when heavy rainfall overwhelms the local drainage network and also depends on existing ground levels, rainfall and the local drainage network. The EA website contains mapping of areas believed vulnerable to surface water flooding. This shows the site to be in various areas of low to medium risk of surface water flooding during extreme rainfall events on site. However, with that said the majority of the site is located within a very low risk area meaning that each year this area has a chance of pluvial flooding of less than 0.1%. This can be seen in Figure 9.

As mentioned above, the existing site consists of various localised patches of low to medium flood risk. This can be caused by an inadequate or poorly maintained or damaged drainage system that is not able to deal with the run off from the large amount of hardstanding area associated with the existing site, especially in more recent times as rainfall intensities have increased.

The Phase 1 development will include a drainage system that can cope with large storm events, reducing the risks and/or limit surface water flooding during the most extreme storm events to areas such as carparks. This will also apply to any future development that may take place within the park. Through the addition of larger attenuation and a reduction in discharge rates other areas within the park that may not be re-developed will also see a benefit due to the reduced load on the system.

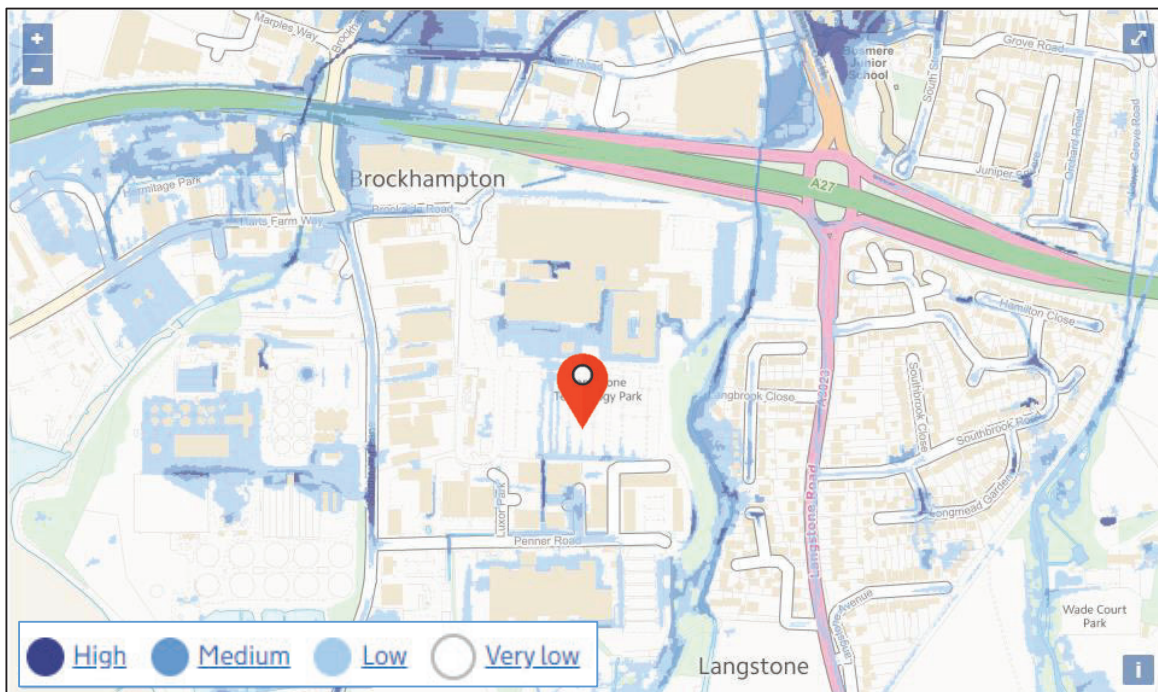


Figure 9. Surface Flood Risk Map

2.6.3 Artificial Sources of Flooding

Artificial sources include any water bodies not covered under other categories and typically include canals, lakes and reservoirs.

It is important to note that reservoir flooding is an extremely unlikely event to occur. All large reservoirs are inspected and supervised by reservoir panel engineers and, as the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensure that reservoirs are inspected regularly and essential safety works is carried out.

At the time of writing this report the EA reservoir flood maps were unavailable to view due to changes being carried out. The EA stated *'The Flood Risk Regulations require the Environment Agency to produce and publish reservoir flood maps, including information on the depth and velocity of flooding that would result from reservoir failure. These maps will be available on our website by the end of March'*. However, in accordance with Clancy FRA and SUDS Strategy, the EA flooding map clearly indicated the risk of flooding from reservoirs at the site as extremely low.

Clancy FRA and SUDS Strategy can be found in Appendix D.

2.6.4 Historic Flooding

As stated within Clancy FRA and SUDS Strategy, no record of historical flooding history of the site has been found in the Havant Borough Council Strategic Flood Risk Assessment (SFRA).

2.6.5 Sewer Flooding

Sewer flooding coincides with heavy rainfall, and may occur if the amount of rainfall exceeds the capacity of the sewer system, the system becomes blocked and/or water surcharges (i.e. rises above the ground) due to high water levels in the receiving watercourse.

As stated in section 2.6.2 of this report, the phase 1 re-development plot will include a drainage system that can cope with large storm events, reducing the risks and/or limit surface water flooding during the most extreme storm events.

2.6.6 Groundwater Flooding

Groundwater flooding occurs as a result of water rising up from the underlying aquifers or from water flowing from springs. This tends to occur after long periods of sustained heavy rainfall and can be sporadic in both location and time, often lasting longer than a river or surface water flood.

As mentioned in section 2.4 of this report and as shown in Figure 4. the site has a medium to high groundwater vulnerability. In accordance with Clancy FRA and SUDS Strategy, Appendix F, there are a number of historic boreholes logs spread out over the entirety of the technology park. Groundwater was encountered in these boreholes between approximately 1.35-2.25m bgl, therefore the risk of flooding due to ground water can be considered low for the site-wide and phase 1 development areas.

Clancy FRA and SUDS Strategy can be found in Appendix D.

2.7 Source Protection Zone

The EA have defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. The maps show three main zones (inner which is buffered around the abstraction point, outer and total catchment) and a fourth zone of special interest.

The zones are used in conjunction with the EA's Groundwater Protection Policy to set up pollution prevention measures in areas which are at a higher risk, and to monitor the activities of potential polluters nearby.

As shown in Figure 10. the proposed development is not located within any source protection zone.

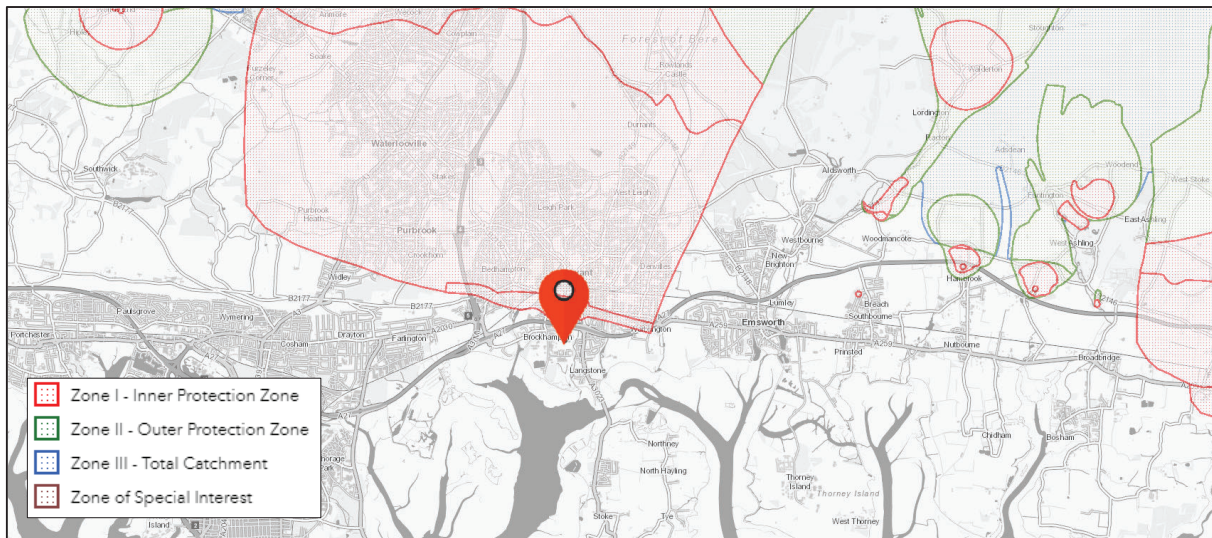


Figure 10. Source protection zones map

3 Proposed Site

3.1 Description of development

The proposed amendments to the Phase 1 development at Langstone Technology park is to demolish existing building units, such as a gym (located within the south west area of Phase 1) and erect a series of warehouse units with associated service yard, car parking and soft landscaping areas, whilst retaining a number of existing car parking spaces also.

A copy of the proposed layout plan (Reference No. 11319_PL004) can be found in Appendix B. The site layout plan indicates three development boundaries. These are all part of the Phase 1 development and have been named as Area 1, Area 2 and Area 3 for the purposes of our analysis. This has been shown in Figure 1. Allowance will also be made for access, landscaping and services infrastructure

Since the existing site within areas 1 and 2 currently consists primarily of hardstanding areas and the proposed development will have no effect to the impermeable area currently, it is the existing impermeable area figures that will be used within the drainage design for areas 1 and 2. In contrast, since Area 3 currently consists primarily of permeable area, it is the proposed impermeable area figure that will be used within the drainage design for area 3. The existing and proposed impermeable and permeable areas for each area are as follows:

Area 1

Existing impermeable: 0.114 ha

Existing permeable: 0.170 ha

Area 2

Existing impermeable: 2.406 ha

Existing permeable: 0.257 ha

Area 3

Proposed impermeable: 0.163 ha

Proposed permeable: 0.000 ha

A copy of the permeable and impermeable areas plan can be found in Appendix B.

The proposed site levels will be set such that they try to (where possible) follow the contours of the existing site so as to minimise the requirement for any retaining walls and also adhere to best practice and building regulation design standards.

Proposed development levels will also be set such that they try to minimise any surface water flooding from the new development drainage network and ensure that should any flooding occur it is controlled and kept within the new development boundaries and does not affect neighbouring properties or highway land.

4 Drainage Strategy

4.1 Hierarchy of Disposal

Generally, the aim should be to discharge surface water run-off as high up the following hierarchy of drainage options as reasonably practicable. These are as follows;

1. Into the ground (infiltration)
 - As stated within section 2.4 of this report due to presence of chalk within the underlain strata and a relatively high groundwater table recorded within the phase 1 development area this could result in disregarding infiltration techniques as a method of discharging surface water flows. It has therefore been assumed, until proven otherwise, that infiltration is not viable. This however, is to be confirmed upon completion of further phase 1 site investigation works.
2. To a surface water body
 - As identified in section 2.6.1 of this report, there is a main river located east of the site-wide development. However, since the phase 1 development area is located approximately 300m west of the Mill Stream it is considered unviable to discharge its surface water flows via this method.
3. To a surface water sewer, highway drain, or other drainage systems
 - As stated in section 2.3 of this report existing private surface water drainage located within the southern car parking area of the site-wide development (proposed area 2) area currently exits the site via 375mm diameter pipes heading south towards Penner Road. In addition, there are multiple other private surface water sewers which exist throughout the site-wide development, in particular, an existing surface water sewer which runs through the access road, directly north of Area 3. From Southern Water's public sewer map it is evident there is a small stretch of surface water sewer that enters the site-wide development from the A27 at the north west corner which continues to travel south, through proposed area 1 before leaving its western development boundary. The existing Southern Water's surface water sewers diameter ranges from 600-750mm

In line with Clancy FRA and SUDS Strategy it is proposed to retain and utilise the existing private surface water connection points as a way of discharging the surface water flows for the proposed development areas 2 and 3. As for area 1, it is proposed to connect to Southern Water's existing surface water sewer, manhole reference 1651 (indicated on their public sewer map). It is important to note that, Southern Water's public sewer map does not provide an invert level for manhole 16521, therefore at this stage the proposed surface water outfall connection for Area 1 has been based on assumptions only. These assumptions have been noted on the proposed drainage strategy.

Clancy FRA and SUDS Strategy can be found in Appendix D and the location of the existing surface water connection point to be retained can be seen on the proposed drainage strategy found in Appendix B.

4.2 Sustainable Drainage

In accordance with the approved Clancy FRA and SUDS Strategy the following potential SuDS techniques have been considered for the proposed site.

1. Pervious Pavements

- Pervious pavements provide a pavement suitable for pedestrian and/or vehicular traffic while allowing rainwater to infiltrate through the surface and into the underlying layers. The water is temporarily stored between infiltration to the ground, reuse or discharge to a watercourse or other drainage system. Pavements with aggregate sub-bases can provide good water quality treatment.

When permeable paving for car parking bays is used, the stone sub-base not only stores and slows down the rate of discharge, but also raises the water quality. It should not be used in the loading yard areas, due to the impact of the heavily loaded HGVs on the long-term durability of the pavement finish.

Pervious pavements have been adopted on the proposed Phase 1 development.

2. Geo-cellular/Modular Systems

- Modular plastic geo-cellular systems with a high void ratio can be used to create a below ground storage structure. Modular tanks can be used for runoff attenuation but require silt trap protection and a suitable means of access for cleaning and inspection.

Geo-cellular systems have been adopted on the proposed Phase 1 development.

Other potential SuDS features such as green roofs, swales and ponds have not been incorporated into the re-development due to the style and function of the proposed building units and space restrictions.

As previously mentioned throughout this report, it has been assumed, until further site investigation works have been carried out, that infiltration is not viable. This is due presence of chalk within the underlain strata and a relatively high ground water table. Soakaways have therefore not been incorporated into the phase 1 development.

4.3 Sustainable Drainage Maintenance

The various SuDS features will remain privately owned and be maintained by the client. The exact details of this arrangement will be defined when future tenants are confirmed.

The SuDS operation and maintenance strategy will be in accordance with CIRIA C753 best practice, as tabled below:

Table 1. SuDS Operation and maintenance requirements

Monthly	Inspect upstream catchpits for silt and vortex control manhole for debris. Clean out if necessary, using vacuum tanker.
Every Six Months	Remove sediment from the inlet catchpit with a vacuum tanker twice a year as necessary, ideally at the start of Spring when general landscaping tidying up is carried out after winter damage and autumn leaf fall.
Annually	Annually inspect/check all sumps, inlets, outlets, vents to tanks to ensure that they are in good condition and operating as designed. Inspect distribution pipe by CCTV. If necessary clean out.
Remediation Inspection & tasks following significant storm events	Inspect upstream and downstream catchpits for silt and vortex control manhole for debris. Clean out as necessary using vacuum tanker.
Contingency plan details	Exceedance flows as defined in the Drainage Strategy Drawing.

5 Drainage Strategy – Surface Water

5.1 Proposed Surface Water Runoff Rate

As previously mentioned in section 3.1, areas 1 and 2 have been based on its existing impermeable area, whilst area 3 has been based on its proposed impermeable area. These areas have been outlined below.

Area 1

Existing impermeable: 0.114 ha

Existing permeable: 0.170 ha

Area 2

Existing impermeable: 2.406 ha

Existing permeable: 0.257 ha

Area 3

Proposed impermeable: 0.163 ha

Proposed permeable: 0.000 ha

In accordance with the LLFA requirements, future developments, wherever possible, should provide sufficient balancing/attenuation on site to achieve greenfield runoff rates. If greenfield runoff rates cannot be achieved, full justification must be provided.

Since the development of areas 1 and 2 will not have any effect to the existing impermeable area (60% of area 1 and 89% of area 2 is currently impermeable) it can be argued and pushed that the existing runoff rates and volumes should remain the same. The runoff rates and storage required should therefore be based on the 1 in 100 year. However, since the LLFA is likely to insist on a betterment, it is believed that limiting the discharge rate to 1 in 1 year brownfield runoff rates should be enough to suffice the betterment requirement.

Since area 3 currently consists primarily of permeable area (75% currently permeable), its discharge rate will be based on greenfield rates.

In line with the approved Clancy FRA and SUDS Strategy, section 5.2.5, the proposed surface water discharge rate for areas 1 and 2 will be based on the existing 1 in 1 year runoff rate, whilst area 3 will be based on greenfield rates.

The runoff rates for areas 1 and 2 have been calculated using the Modified Rational Method (MRM) in accordance with Clancy FRA and SUDS Strategy surface water runoff calculations as shown in Appendix D of their report. These results are shown in Table 2. below.

Table 2. Brownfield Runoff Rates (MRM Method)

Return Period	1:1 Year	1:30 Year	1:100 Year + 40% CC
Area 1 - Brownfield Runoff Rate (l/s)	13.6	33.27	42.9
Area 2 (Development West of Existing Car Park) - Brownfield Runoff Rate (l/s)	168.7	413.9	533.9
Area 2 Existing Car Park) - Brownfield Runoff Rate (l/s)	19.1	46.8	60.3

The above table has been based on the following characteristics:

- M5-60 Rainfall depth: 19.00mm
- 'r' Ratio M5-60/MS-2 day: 0.350
- Existing impermeable area:
Area 1: 0.170 ha
Area 2 (development west of existing car park): 2.115 ha
Area 2 (existing car park): 0.239 ha

In accordance with Clancy FRA and SUDS Strategy, Appendix D, the maximum flow the 375mm dia discharge pipe can take is 132.0l/s. As the hydraulic capacity of the discharge pipe is not expected to be able to meet the proposed flow rates as outlined in Table 2, the entire area 2 plot has therefore been limited to a discharge rate of 132.0l/s. Since the car park located within the western side of area 2 is to remain, the existing discharge rate will remain at 19.1l/s and the development area located west of the existing car park will be limited to a discharge rate of 112.9l/s (132.0l/s-19.1l/s).

In accordance with Clancy FRA and SUDS Strategy the runoff rates for area 3 have been calculated based on greenfield runoff rates. These results are shown in Table 3.

Table 3. Greenfield Runoff Rates

Return Period	1:1 Year	1:30 Year	1:100 Year + 40% CC
Area 3 - Greenfield Runoff Rate (l/s)	0.8	2.1	2.9

The above table has been based on the following characteristics:

- M5-60 Rainfall depth: 19.00mm
- 'r' Ratio M5-60/MS-2 day: 0.350
- Proposed impermeable area: 0.163 ha

Although Table 3 indicates a flow rate of 2.9l/s within the 1 in 100 year + CC, Clancy FRA and SUDS Strategy states 'a minimum flow rate of 5.0l/s is recommended to reduce the likelihood of debris build up in the network'

Area 3 will therefore discharge at a flow rate of 5.0l/s.

Clancy FRA and SUDS Strategy can be found in Appendix D and a copy of the brownfield and greenfield runoff rate calculations can be found in Appendix C.

5.2 Proposed Attenuation Storage

Attenuation storage is provided to enable the runoff rate from the site into the receiving sewer to be limited to an acceptable rate to protect against flooding downstream. The estimate storage volume has been calculated using FSR hydrological zones and factor for FEH, climate change and hydrological region.

Through the use of a hydraulic modelling software and based on the discharge rates as shown in Tables 2 and 3 above, the total required attenuation for the Phase 1 development is approximately 1095m³ in a 1 in 100 year + 40% climate change storm event. The required attenuation for each area can be seen in Table 4 below.

Table 4. Required Attenuation

-	Attenuation (m ³)
Area 1	40
Area 2	995
Area 3	60

A copy of the hydraulic drainage calculations can be found in Appendix C.

**Note: The storage requirement is subject to detail design.*

5.3 Proposed Surface Water Drainage Strategy

In accordance with the approved Clancy FRA and SUDS Strategy the proposal for the phase 1 development is to attenuate all surface water flows from impermeable areas to its current and proposed runoff rate (areas 1 and 2 and area 3 respectively) with the use of below ground geocellular tanks, permeable paving and a flow control device.

The building roofs are to discharge into the main drainage network. The permeable surface that will allow flows to be attenuated within the porous subbase beneath will be constructed in the new car parking bays. This will be subject to detail design and will be connected further downstream to ground cellular storage to achieve the required attenuation volume of this plot.

Levels within car parking areas should be designed at the appropriate detailed design stage such that critical 100 year plus climate change storm events are contained above ground, but safely within the site boundaries without risk to surrounding properties, the building or that restricts access/egress.

Surface water discharging from the development will be attenuated and controlled using a vortex flow control unit with a discharge rate of 13.6l/s (area 1), 132.0l/s (area 2) and 5.0l/s (area 3). To demonstrate compliance with the criteria set out in section 5.1 of this report, a drainage modelling exercise software, Microdrainage, has been undertaken to confirm that the proposed drainage strategy will meet the proposed runoff rates. These results can be found in Appendix C.

For the 1 in 100 year plus climate change event should any flooding occur at the surface level this would be contained safely on site, in parking areas, without risk to proposed or existing buildings.

A copy of the proposed drainage strategy can be found in Appendix B.

6 Drainage Strategy – Foul Sewerage

6.1 Proposed foul drainage strategy

From the proposed layout plan (Reference No. 11319_PL004), it can be seen that foul drainage is required to serve the four units located within area 2.

As mentioned in section 2.3 of this report, there is an existing Southern Water foul network that runs directly through and along the northern boundary of the site-wide development. It is believed that this existing foul drainage discharges to a sewer treatment works located approximately 200m west of the phase 1 western development boundary. The majority of the foul drainage serving the existing buildings located within the technology park is assumed to connect to the public foul sewer that runs through the park prior to discharging to the sewer treatment works.

The proposed foul network will be connected, via gravity into the existing foul manhole, referenced 1600 (located north of area 2 proposed access) as indicated on Southern Water's public sewer map.

Foul flow comparison calculations (existing and proposed) have been carried out in order to determine the approximate foul flow reduction (from demolition of B1000 and the gym) and addition (area 2 development) for the proposed Phase 1 development. It has been estimated, based on these calculations that, due to the demolition of B1000 and the gym, there will be an overall reduction in foul flows following the development of plot 1. These calculations have been based on an allowance of 15% office space and 75% commercial space for building units 1-4 (located within area 2).

Phase 1 is expected to have a foul flow reduction rate of 0.89l/s in comparison with the existing foul flow rates. These calculations can be found in Appendix C.

Southern Water's public sewer map can be found in Appendix A of this report and a copy of the foul drainage strategy network can be found in Appendix B.

7 Summary

The Phase 1 development's proposal is to demolish existing building units, such as a gym (located within the south west area of the site) and develop a series of warehouse units with associated service yard, car parking and soft landscaping areas, whilst retaining a number of existing car parking spaces also.

The EA Flood Map for planning depicts the site is within Flood Zone 1 area, with very low risk of flooding from tidal & fluvial, primarily low risk of flooding from surface water and an extremely low risk from flooding from artificial sources. The proposed development is classed as less vulnerable usage and it is located in Flood Zone 1 which meets the sequential test. An exception test is not required.

The surface water will be designed to cater for storm events up to 1 in 100 year plus 40% climate change. It is proposed, areas 1 and 2 will discharge at existing brownfield rates of 13.6l/s and 132.0l/s respectively and area 3 will discharge at greenfield runoff rates of 5.0l/s. To ensure that the development will discharge surface water at the proposed rates, a vortex flow control unit (Hydrobrake) will be used for each area to limit flows leaving the development.

The use of SuDS features has been considered and has been incorporated within the design. Surface water discharge will be attenuated via a combination of permeable car park bays and cellular storage. Due to a high ground water table, no infiltration techniques have been implemented. An oil interceptor has been proposed for each area, so it will ensure that the water quality will be raised prior to being discharged off site.

The site does not pose any increased flood risk to the site itself or adjacent developments, and is not susceptible to flooding by other means.



Appendix A – Existing Information

- A.1 Site Location Plan
- A.2 Topographical Survey
- A.3 Southern Water Public Sewer Map



PHASE 1 DEVELOPMENT

FUTURE DEVELOPMENT

LANGSTONE TECHNOLOGY PARK
SITE-WIDE

GRID COORDINATES:
E: 471279
N: 105702

FOR INFORMATION

Rev	31/03/2021	FIRST ISSUE.	CR.	BY	CHKD

Revision Schedule

BAYNHAM MEIKLE

Consulting Structural & Civil Engineers

8 Meadow Road, Edgbaston, Birmingham B17 8BU
Tel: 0121 434 4100 Fax: 0121 434 4073 Email: admin@bm-p.co.uk



Project Title

LANGSTONE TECHNOLOGY PARK
PHASE 1

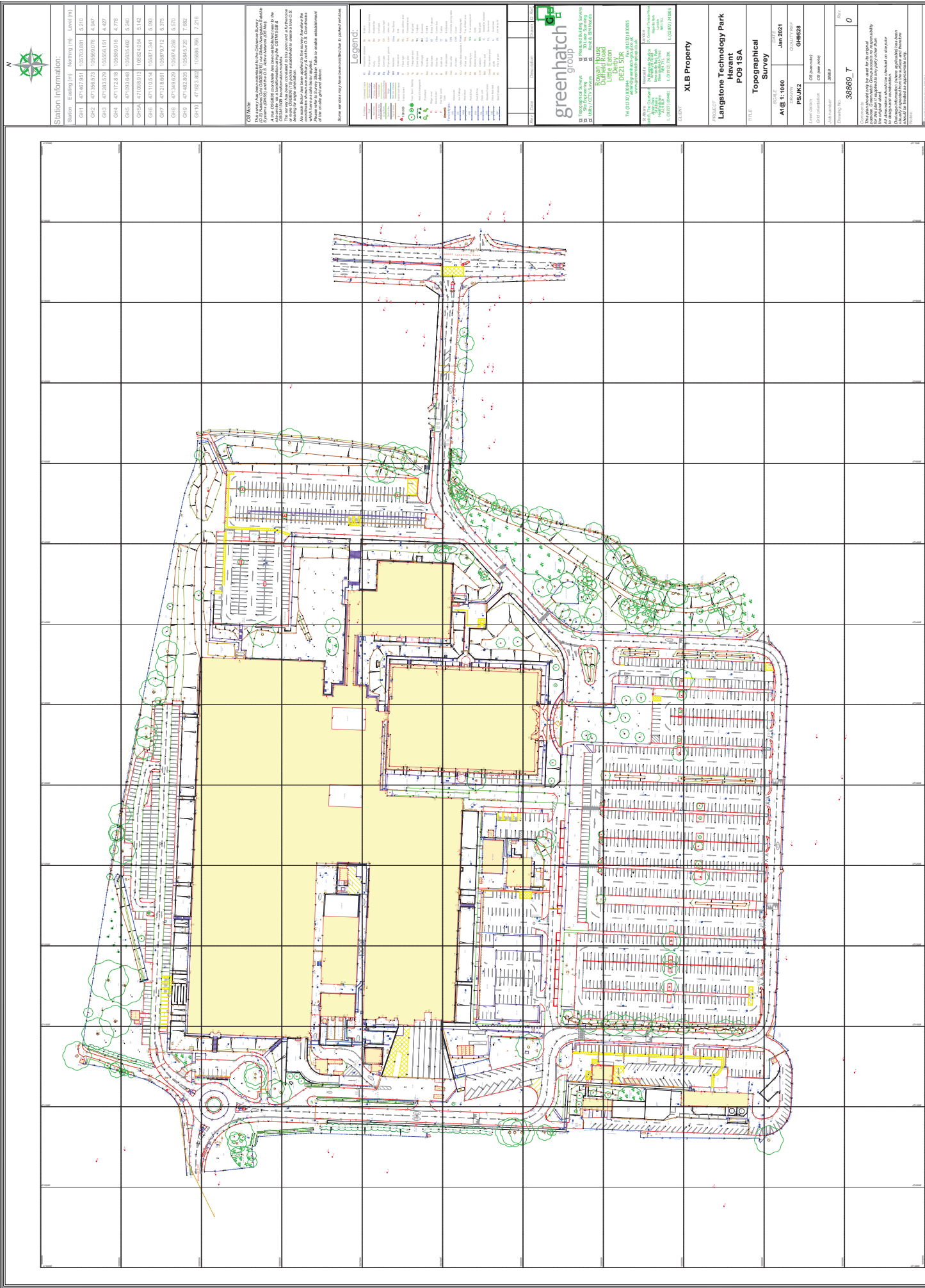
Drawing Title

SITE LOCATION PLAN



Drawn by	C.R.	Checked by	—	Project Engineer	G.L.
Date	MARCH 2021	Scale @ A3	N.T.S.		
Project No.	13055	Drawing No.	SK100	Rev	—







470794

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement

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