Guild Living (Epsom) Ltd

Land at Epsom Hospital

Flood Risk Assessment

Issue 04 | 19 January 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 270352-00

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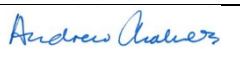
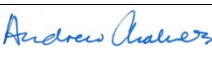
		Signature			
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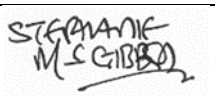
		Signature			

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Executive Summary

Guild Living (Epsom) Ltd is preparing a planning application for the redevelopment of the southern part of Epsom General Hospital (the site). The site is located on land previously developed for Epsom General Hospital.

This Flood Risk Assessment (FRA) has been produced to support the planning application. The assessment of the flood risk considers the following potential sources of flood both on and from fluvial flooding, pluvial flooding and flooding from artificial sources, including sewers, reservoirs and canals.

There are two Environment Agency (EA) main rivers 1 kilometre (km) from the site. The site is located within Flood Zone 1. There are no records of other ordinary watercourses or ditches in proximity to the site, which is considered to be at very low risk of fluvial flooding.

Records indicate that much of the site is at low risk of surface water flooding, with a localised area of 'high' risk. Appropriate mitigation measures to manage the localised risk of the 'high' risk area at the centre of the site has been considered. Overall, the site is considered to be at low risk from pluvial flooding.

Public sewer records have been obtained from Thames Water which show that there are no public sewers within the site boundary. The nearest public combined sewer (675mm diameter) is located to the south of the site in Woodcote Green Road. The sewer flows in an easterly direction and is assumed to continue following the road to the junction 300m from the site.

Mapping indicates that the site is in an area with 25% - 50% susceptibility to groundwater flooding. There were no groundwater flooding incidents recorded within the vicinity of the site. Based on this information, the site is considered to be at medium risk of groundwater flooding.

Based on the available data, it is considered that the site is at Low Risk from flooding due to artificial sources.

As the site is unlikely to be impacted by sea level rise or river basin catchments, allowances for climate change have not been considered for this development. Increased rainfall affects land and urban drainage systems. The site is classified as 'More Vulnerable' in accordance with the Planning Practice Guidance. A 40% allowance for climate change should be considered for rainfall events.

Hydrock have been appointed by Guild Living to carry out a drainage strategy report for the approval of Surrey County Council Lead Local Flood Authority (LLFA). Measures have been recommended within this report to ensure the residual flood risk can be managed. It recommends that detailed ground investigations are undertaken; that surface water runoff is restricted to existing brownfield rates with a 50% betterment (extract from Surrey County Council –

SuDS Design Guidance[1]); that the below ground drainage system is to contain a 1 in 100-year storm plus 40% climate change and that storm water drainage system is designed to mimic existing flow paths across the site.

This report confirms that developing this site in its current proposal, would not increase the risk of flooding within the site or elsewhere.

[1] Surrey County Council (2019); 'Guide to Sustainable Drainage in Planning'[Available at: https://www.surreycc.gov.uk/__data/assets/pdf_file/0020/201944/Sustainable-drainage-systems-SuDS-planning-advice.pdf]

1 Introduction

Background

Guild Living (Epsom) Ltd is preparing a planning application for the redevelopment of the southern part of Epsom General Hospital (the site); the northern part will remain in hospital use. The scheme comprises of; demolition of the existing hospital buildings, accommodation block and associated structures and redevelopment of the site to provide a new care community for older people arranged in two buildings, comprising 267 care residences, 10 care apartments and 28 care suites proving transitional care, together with ancillary communal and support services Use Class C2, 24 key worker units Use Class C3, children's nursery Use Class E, as well as associated back of house and service areas, car and cycle parking, altered vehicular and pedestrian access, landscaping, private amenity space and public open space.

This Flood Risk Assessment (FRA) has been produced to support the planning application. In accordance with the National Planning Policy Framework requirements, an FRA is required for any proposed development greater than 1 hectare (ha) in area. This report makes reference to the Foul and Surface Water Drainage Strategy Report, ref 12053-HYD-XX-ZZ-RP-C-0001 Rev P05 produced by Hydrock, dated 15th January 2021.

This report confirms that the proposed development would not increase the risk of flooding within the site or elsewhere.

Scope

The Flood Risk Assessment presents an overview of the setting of the site and considers both existing flood risks to and from the site, as well as those that might arise after the proposed development has been constructed with the effect of climate change. It considers the following potential sources of flood:

- Fluvial flooding (i.e. from Rivers);
- Pluvial flooding (from surface water); and
- Artificial sources, including sewers, reservoirs and canals.

Planning Policy

National Policy

The National Planning Policy Framework (NPPF)[2] outlines the Government's economic, environmental and social planning policies for England. The NPPF sets out the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

[2] Ministry of Housing, Communities and Local Government, (2019); 'National Planning Policy Framework.'

Section 10 of the NPPF and the associated Planning Practice Guidance (PPG[3]) detail current policy with respect to flood risk in England. Paragraph 103 (footnote 20) of the NPPF outlines that development proposals located within Flood Zone 1, with a site area greater than 1 ha require a site-specific FRA.

The NPPF recommends that local plans should be supported by a Strategic Flood Risk Assessment (SFRA) and develop policies to manage flood risk from all relevant sources, taking account of advice from the Environment Agency and other relevant bodies, such as Lead Local Flood Authorities (LLFAs) and Internal Drainage Boards (IDBs).

Local Planning Authorities (LPAs) should apply a sequential, risk-based approach to the location of development to avoid, where possible, flood risk to people and property and manage any residual risk, taking account of the impacts of climate change.

Local Policy

The Epsom and Ewell Local Development Framework 'Core Strategy' was adopted in 2007 and forms the statutory guidance for land use and planning for the Borough up to 2022[4].

Policy CS 6 of the Core Strategy states *that "the Council will ensure that new development avoids increasing the risk of, or from, flooding".*

Epsom and Ewell Borough Council commissioned a revised Level 1 SFRA for the local area in 2018[5]. This SFRA looks at the risk of flooding within the borough and help to inform the selection of options for the Local plan and decision on planning applications.

Surrey County Council is the Lead Local Flood Authority and will consider advice from the Surface Water Management Plan (SWMP)[6] to ensure that where a serious and exceptional risk of surface water flooding exists, adequate and appropriate consideration has been given to mitigate the risk. Mitigation measures should minimise the risk of flooding on the site and within the surrounding area. Mitigation measures for the site are outlined in Section 3.

[3] Ministry of Housing, Communities and Local Government, (2014); 'National Planning Policy Framework, Planning Practice Guidance- Flood Risk and Coastal Change.' [Available at: gov.uk/guidance/flood-risk-and-coastal-change]
[4] Epsom and Ewell Borough Council (2007); 'The Epsom and Ewell Core Strategy.'
[5] Jacobs/Epsom and Ewell Borough Council (2018); 'Strategic Flood Risk Assessment, SFRA Update'
[6] Jacobs/Epsom and Ewell Borough Council (2011); 'Epsom & Ewell Surface Water Management Plan, Volume 1 – Summary Report and Action Plan'

2 Site Information

2.1 Location and Description

The site is located to the south of Epsom town centre, bordered by Dorking Road (A24) to the north and Woodcote Green Road to the south. The London circular road (M25) is located less than half a mile to the south-west of the site. The Ordnance Survey National Grid Reference for the approximate centre of the site is TQ 20430 59764. The site comprises an area of approximately 1.48ha. The site falls within the jurisdiction of Ewell and Epsom Borough Council in the county of Surrey. The surrounding area is predominantly suburban housing and recreational land.

The site is currently occupied by redundant Epsom General Hospital buildings and the associated infrastructure, formerly operated by Epsom & St Helier University NHS Trust. It is proposed that the existing buildings on site will be demolished. A site location plan is provided in Figure 1.

Figure 1 Site Location Plan

2.2 Topography

The site is located on land previously developed for Epsom General Hospital. The Environment Agency (EA's) LiDAR dataset and a topographic survey undertaken by RGL Surveys Ltd in 2018 indicates that ground levels on the site range from approximately 62.7m above ordnance datum (AOD) in the north-west of the site, sloping down to 58.9mAOD in the south-east of the site.

2.3 Geology and Hydrogeology

A review of the British Geological Survey Maps 1:50,000 “Geology of Britain Viewer” has been conducted to identify likely geological sequence. Site investigation was undertaken by Arcadis, comprising of three boreholes across the site.

These records found that the superficial geology comprised a layer of made ground (up to 1.9m thick) underlain by River Terrace Deposits (granular). The bedrock geology varied across the site, comprised of London Clay formation to the west, and Lambert Group Formation to the east.

Groundwater was monitored post investigation. The monitored groundwater level varied across the site, typically ranging from 1.4m to 5.6m below existing ground level.

Interactive mapping on the EA’s website indicates that the site is not located within a Groundwater Source Protection Zone, however a Zone 2 boundary does exist nearby, approximately 500m to the east.

The site is located within a Groundwater Vulnerability Zone, classified as a ‘minor aquifer with high vulnerability’.

The EA aquifer classifications for the identified superficial deposits and bedrock underlying the site are ‘Secondary A’, thus defined as ‘permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flows to rivers. These are generally aquifers formerly classified as minor aquifers’. The site is subsequently classified as being in a Nitrate Vulnerable Zone.

3 Development Flood Risk

The table below has been produced to understand and assess flood risk in line with the NPPF requirements. This outlines the findings of this FRA.

Development Description and Location

What type of development is proposed and where will it be located? Include whether it is a new development, an extension to existing development or change of use etc.

The site is located at OS National Grid Reference TQ 20430 59764.

A site plan of the proposed development is provided in Appendix A.

As detailed in the site description, the site will be developed primarily as residential accommodation and residential care/support facilities. This will include provision for car parking, commercial and community space.

What is its vulnerability classification?

The vulnerability classification of the site varies according to the proposed land use (Table 2- Paragraph: 066 Reference ID: 7-066-20140306):

- Residential Institutions – More Vulnerable.

Table 1 shows the classification of flood risk vulnerability and flood zone compatibility according to Table 3 of the PPG. Based on the classification, the proposed development is a 'More Vulnerable' development.

Table 1 PPG (Table 3- Paragraph: 067 Reference ID: 7-067-20140306) Flood Risk vulnerability and flood zone 'compatibility'

Flood Risk Vulnerability Classification (Table 3 PPG)		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test required	✓	✓
	3A	Exception Test required	✓	X	Exception Test required	✓
	3B	Exception Test required	✓	X	X	X

As mentioned previously, the site lies within Flood Zone 1. The NPPF indicates that the proposed development is appropriate within the current Flood Zone without the need for the exception test.

Definition of the Flood Hazard

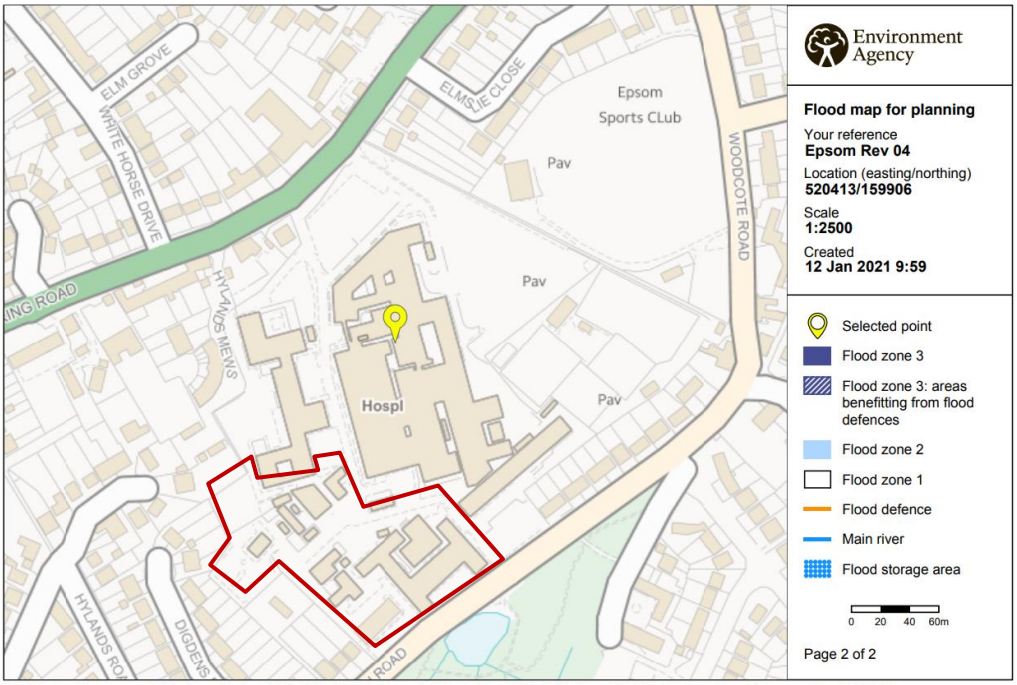
What potential sources of flooding could affect the site?

The NPPF requires that all potential sources of flooding that could affect the proposed development are considered within the FRA. This includes flooding from rivers and the sea, direct rainfall, rising groundwater, overwhelmed sewers and other artificial sources.

Fluvial and Tidal

The nearest EA main river (Hogsmill River) is located approximately 1 kilometre (km) north-east of the site. The Rye Brook is also located 1km to the west of the site. The EA online Flood Risk Map for Planning (Appendix B) identifies that the site is located within Flood Zone 1, where the probability of being flooded by river or sea is less than 1 in 1000, i.e. there is less than 0.1% Annual Exceedance Probability (AEP) that the site will suffer from river or sea flooding in any given year. Therefore, the watercourse is considered to have no influence on the Site Flood Risk.

Figure 2 Fluvial Flood Risk Map for the site (gov.uk)



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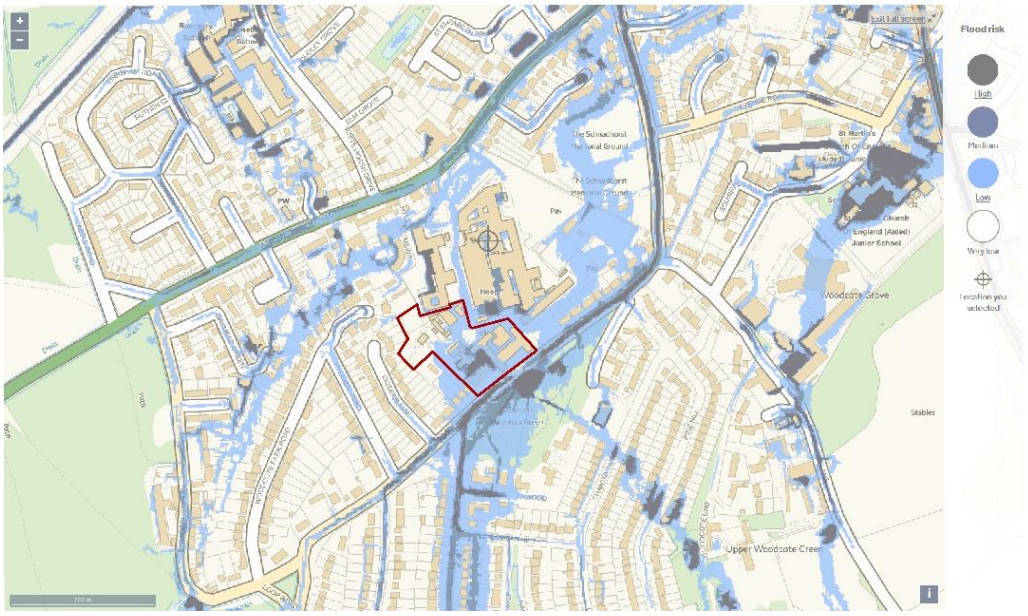
Other Watercourses/Drainage Ditches

There are no records of other ordinary watercourses or ditches in proximity to the site. Based on this assessment, the site is considered to be at very low risk of fluvial flooding.

Pluvial

Overland flows result from rainfall that fails to infiltrate the surface and travels over the ground surface; this can be exacerbated where the permeability of the ground is low due to the type of soil, or urban development with impermeable surfaces.

Figure 3 Long-Term Pluvial Flood Risk Map for the site (gov.uk)



The site is generally sloping from north-west to south-east, therefore pluvial flows will also typically flow in the same direction. The SFRA notes that several surface water flood events occurred in the borough in between 2007 and 2018. These were recorded as highway flooding incidents. The nearest record of historical surface water flooding is located 300m west of the site. Figure 104 of the SFRA indicates that works have been completed on the section of highway immediately to the south to reduce flood risk.

The EA's 'Risk of Flooding from Surface Water mapping'[7] indicates that much of the site is at low risk of surface water flooding (<0.1% AEP, 1 in 100 - 1 in 1000 year), however a localised area of 'high' risk (3.3% AEP, 1 in 30 year) exists at a low point within the centre of the site.

Whilst these maps illustrate when the capacity of existing surface water network may be exceeded in extreme rainfall events, it is based on generalised information and does need to be verified in terms of topographical levels and indicative flow routes. A copy of the EA online pluvial flood risk mapping can be found in Appendix C.

The 'high' risk area at the centre of the site has been considered further below. This identifies appropriate mitigation measures to manage the localised risk.

Overall the site is considered to be at low risk from pluvial flooding.

[7] Environment Agency, 'Flood Risk from Surface Water Mapping' [Online], Available at: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map [Accessed: January 2021]

Flooding from Sewers

Flooding from sewers occurs as a result of a rainfall event exceeding capacity of the sewer drainage system, a system blockage due to debris or sediment, or a surge due to high water levels in a receiving watercourse.

Thames Water is responsible for the management of the surface water and foul sewer networks surrounding the site. Thames Water records have been reviewed to provide an indication of the local assets. These records can be found in Appendix E. These records show a 675mm diameter combined sewer running along the southern boundary of the site on Woodcote Green Road, with an invert level of approx. 57.71mAOD according to the Hydrock Drainage Strategy, dated January 2021.

The nearest known surface water sewer (150mm diameter) identified is located 300m west of the site on Hylands Road. Whilst these records provide an indication of the nearby assets that may be suitable to service the site, Thames Water have reiterated that there may be additional networks that are not part of their mapped GIS records.

Section 5.3.4 of the SFRA identifies the sewer flooding history within the borough from 1991 onwards. The wider area is considered to have high susceptibility to intense rainfall within the SWMP, however there are no sewer flooding incidents recorded within the postcode of the site. On this basis, the site is considered to be at low risk from sewer flooding.

Flooding from Groundwater

Groundwater flooding can occur when groundwater levels rise above the ground surface levels. The underlying geology has a major influence on where this type of flooding takes place; it is most likely to occur in low-lying areas underlain by permeable rocks (aquifers).

Figure 110 of the SFRA indicates where groundwater may emerge due to geological conditions. This information is shown as a proportion of 1km squares. The mapping indicates that the site is in an area with 25% - 50% susceptibility to groundwater flooding (i.e. medium risk).

There were several groundwater flooding incidents recorded in the borough between 2000-2014, however none were within the vicinity of the site.

The groundwater level within the site has been investigated during ground investigation works. This monitored the groundwater level across the site; ranging from 1.4m to 5.6m below existing ground level.

Based on this information, the site is considered to be at medium risk of groundwater flooding.

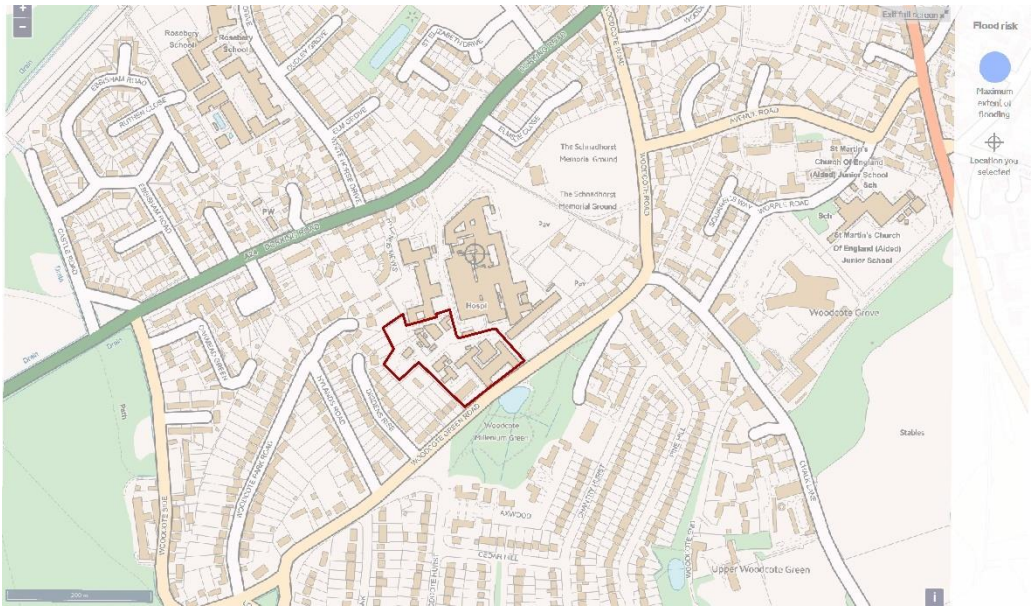
Flooding from Artificial Sources

Artificial flood sources include raised channels (i.e. canals) or storage features such as ponds and reservoirs.

Canal and reservoir flooding may occur as a result of the capacity of a reservoir facility being exceed and/or as a result of a raised embankment failure. The Canal and River Trust mapping shows that the site is not located near a canal therefore this source of flooding is not considered further.

The EA's Flood Risk from Reservoirs mapping (Appendix D) shows that the site is not located within an area at risk of flooding from a reservoir.

Figure 4 Reservoir Flood Risk Map for the site (gov.uk)



An additional surface water feature (pond) is located 100m south of the site. Given its location and the site topography, it is unlikely that this feature will pose a flood risk to the proposed development.

The site is considered to be at low risk from flooding due to burst water mains. The boundary levels along the south of the site and Woodcote Green Road typically fall south-east (away from the site). Therefore, it is concluded that any burst flows will also fall in this general direction.

Based on the available data, it is considered that the site is at low risk from flooding due to artificial sources.

What are the existing surface water drainage arrangements for the site?

The site is currently used for community/hospital facilities. Existing private surface water sewers within the site collect run-off from existing roofs / paved areas which convey flows through the site via a combined system which discharges at five locations around the site (one to the north and four to the south).

Thames Water records have been reviewed. These showed the nearest 675mm diameter combined sewer is located to the south of the site in Woodcote Green Road.

Probability

Which flood zone is the site within?

Following a review of the EA Flood Maps, the proposed development lies within **Flood Zone 1**. This means that the annual probability of the site being flooded by a river or sea is less than 1 in 1000, i.e. there is less than 0.1% annual probability that the site will suffer from river or sea flooding in any given year.

If there is a Strategic Flood Risk Assessment covering the site, what does it show?

The site is part of Epsom and Ewell Borough Councils SFRA and forms part of 'Epsom South'. There are several localised critical drainage areas around the site. These critical drainage areas have been modelled and predicted to flood from a 1% AEP (1 in 100) annual chance surface water event, based on flooded depths greater than 50mm, within Flood Zone 1.

The SFRA flood risk mapping indicates that a relatively small proportion of the borough is susceptible to river flooding, however this is not within the vicinity of the site.

What is the probability of the site flooding, taking into account the contents of the SFRA and any further site-specific assessment?

The site is at very low risk of flooding from river and tidal sources.

The probability of surface water flooding is considered low on site. This has been assessed using the EA Surface Water Flood Risk mapping, and various site information. Whilst the EA Surface Water Flood Risk mapping identifies different areas of the site as low to high risk, it should be reiterated that the mapping is based on generalised information and a review of the wider site information has also been considered to conclude the overall flood risk probability.

This means the probability of surface water flooding is defined as 0.1% - 1% (1 in 100 - 1 in 1000 year).

The probability of flooding from artificial sources is considered low on site.

Upon review of the available information, the probability of Groundwater flooding is considered low – medium. The remaining residual risks and mitigations measures for this method of flooding are discussed in further detail in below.

What are the existing rates and volumes of run-off generated by the site?

Existing surface water run-off rates and volumes are detailed within Section 2 of the Hydrock Foul and Surface Water Drainage Strategy Report, submitted as part of the development planning application.

Climate Change

How is flood risk at the site likely to be affected by climate change?

The effect of climate change has been considered within Section 4.7 of the Epsom and Ewell Borough Council SFRA.

As the site is unlikely to be impacted by sea level rise or river basin catchments, these allowances have not been considered for this development.

Increased rainfall affects land and urban drainage systems. The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to flooding throughout the lifetime of the development. Table 2 shows anticipated changes in extreme rainfall intensity in small and urban catchments.

Table 2 Peak rainfall intensity allowance in small and urban catchments (use 1961 to 1990 baseline) (Source: gov.uk website)

Applies across all of England	Total potential change anticipated for the '2020s'	Total Potential Change anticipated for the '2050s' (2040 to 2069)	Total Potential Change anticipated for the '2080s' (2070 to 2115)
Upper end (upper 90th percentile)	10%	20%	40%
Central (50th percentile)	5%	10%	20%

The site is classified as 'More Vulnerable' in accordance with Table 2 of the Planning Practice Guidance. In accordance with the EA guidance, consideration should be made of both the central and upper end allowances to assess a range of impacts.

Based on Table 2, a 40% allowance for climate change should be considered for rainfall events within a 1 in 100-year return period during the lifetime of the development.

Detailed Development Proposals

Please provide details of the development layout, referring to the relevant drawings

The proposed development will be constructed on brownfield land, on the southern part of Epsom General Hospital.

The indicative site layout shows the proposed development and surroundings. The 1.48ha site consists of care residences and community amenities split across two main buildings, to the west and east of the site. There is also provision for car parking, landscaping and private and public open space.

Under the current development proposals, the impermeable area of the site will be reduced to approximately 1.149ha. Discharge flows will be restricted to a 50% betterment on existing brownfield run-off rates.

A site layout is provided in Appendix A and drainage layout provided in Appendix F.

Where appropriate, demonstrate how land uses most sensitive to flood damage have been placed in areas within the site that are at least risk of flooding

The entire site lies within Flood Zone 1 and therefore the site is at a low-very low risk of fluvial flooding. However, EA Surface Water mapping indicates a small area of the site to be at 'high' risk of pluvial flooding. A large proportion of the site is at 'low' risk of surface water flooding.

The proposed residential care dwellings are not currently proposed within the small area identified at 'high risk' of pluvial flooding. A preliminary cut and fill assessment has been undertaken by Hydrock, which currently proposes the new site levels to be as per (or close to) existing levels.

Finished floor levels have currently been specified as:

- East Building: 59.025mAOD;
- West Building: 58.67mAOD;
- Undercover Car Park: 60.095mAOD

Flood Risk Management Measures

How will the site be protected from flooding, including the impacts of climate change over the development's lifetime?

As the site is located in Flood Zone 1; flood risk management measures are not applicable for fluvial or tidal risk.

It has been identified that the site is at risk of surface water flooding. To protect against surface water flooding, finished external levels will direct flows away from the proposed buildings to low risk areas of the site, such as the car park and public open space.

On-site drainage measures have considered the impacts of climate change. In particular, a 40% allowance for climate change has been considered for rainfall events attenuated within a 1 in 100-year return period.

Offsite Impacts

How will you ensure that your proposed development and the measures to protect your site from flooding will not increase flood risk elsewhere?

All existing private drainage within the boundary will be made redundant during the works, with only four of the five existing connection points to remain live.

The developer is required to provide a sustainable drainage solution that will ensure runoff from the site does not exceed the current existing rates with 50% betterment.

These runoff rates and volumes should be agreed with Surrey County Council as the LLFA for all major developments. Preliminary discussions with the LLFA have been completed and this is referenced within the Hydrock Foul and Surface Water Drainage Strategy Report.

Attenuation features in the form of a buried crated storage tank and permeable paving storage sub-base shall be provided to manage surface water flows generated from the proposed development, whilst also ensuring flow control (Hydro-Brake) is in place to limit the discharge off-site to the existing Brownfield rates with 50% betterment. All relevant climate change allowances will be included within the design rainfall run-off events.

Infiltration measures are unsuitable due to the ground conditions and the Nitrate Vulnerable Zone, although site specific ground investigation and further consultation with Epsom and Ewell Borough Council will confirm this.

Residual Risks

What flood-related risks will remain after you have implemented the measures to protect the site from flooding?

The key residual flood risk is associated with groundwater flooding. It is recognised that there is potential for high groundwater levels across site, and appropriate building construction should be integrated into the scheme to mitigate groundwater risk. This may include measures such as basement tanking, eliminating infiltration system from the drainage strategy and sealing off building penetrations.

It has been identified that a small portion of the site is at high risk from surface water flows entering the site. The proposed building layouts will be located out of this area. The proposed drainage strategy also includes recommended measures to ensure overland flows entering the site are intercepted and connected into the proposed on-site drainage.

Attenuation should be appropriately sized to manage surface water flows generated from the developed and will be fitted with flow control to limit any

discharge off-site. Infiltration measures are unlikely to be considered further due to the existing groundwater designations at the site and groundwater level.

Pumping Station

Due to the difference in proposed levels on site and the existing surface water sewer, flow will be discharged off-site via a surface water pumping station. Therefore, risks associated with mechanical failure/disruption should be considered. This includes consideration for providing; appropriate power back-up, emergency storage or back-up pumps. The surface water pumping station and mitigation measures should ensure that the site is not placed at additional flood risk.

In the event of pump failure and surface water surcharging the network, surface flooding is likely to occur at the lowest cover level in the network. This is located within the plaza/landscaped area of the site and is likely to result in a mirroring of the ponding considered for any overland flow routes within Appendix G of the Hydrock Drainage Strategy Report.

Access/Egress

The proposed siting of the two main buildings to the east and west of the site and the low fluvial and pluvial flood risk ensure that access/egress can be maintained at all times.

There are currently no proposed sub-structure levels greater than 1m below existing ground level.

How, and by whom, will these risks be managed over the lifetime of the development?

The drainage systems for the developed site will not be adopted and therefore maintained privately. A schedule of necessary operation and maintenance will be required to detail the appropriate maintenance regime for the final drainage features. This will include the network and any SuDS features. This will ensure that the system operates adequately and to full capacity, ensuring unnecessary flooding from the onsite drainage system is avoided.

4 Conclusions and Recommendations

4.1 Conclusions

This FRA has been prepared based on the requirements of the NPPF. The following conclusions have been drawn:

- The flood risk from tidal, fluvial, overland flow and artificial sources is low. The flood risk from groundwater sources is classified as medium risk;
- The proposals will not create an unacceptable increase in flood risk elsewhere; and
- No major flood risks to or form the site have been identified in this FRA. Overall the site is assessed to be at **low** flood risk.

Mitigation measures have been identified to ensure the residual risk can be managed. Therefore, it is considered that the proposed development meets the requirements of the NPPF with regards to flood risk.

Table 3 Summary of Residual Flood Risk from Assessed Sources

Source	Description	Flood Risk
Tidal & Fluvial	-	Very Low
Fluvial	-	Low
Pluvial / Overland Flow	-	Low
Groundwater	-	Medium
Sewer	-	Low
Artificial	-	No Risk

4.2 Recommendations

As a result of these findings, the following recommendations can be made, in accordance with the recommendations identified within the Hydrock Foul and Surface Water Drainage Strategy Report:

- The runoff from the site should be restricted to existing Brownfield rates with a minimum 50% betterment, based on the recommendations from Thames Water. This should include all rainfall events up to and including the 1 in 100-year return period plus 40% climate change allowance;
- The on-site, below ground drainage system should be designed to contain a 1 in 100-year storm plus 40% climate change. Flows will be controlled at a restricted rate via a Hydro-Brake and be attenuated in the form of a buried crated storage tank and permeable paving storage sub-base before being pumped off-site via a surface water pumping station;

- Further CCTV drainage investigation will confirm the exact connectivity and point of discharge of all the existing drainage connection points discharging from the site;
- The detailed design should be developed taking account of the recommendations above. Although surface water flooding is not a major concern for this site, all finished floor levels should be placed above the lower-lying ground levels as a precautionary measure.

Appendix A

Site Layout Plan

ISO A1 594mm x 841mm

LANDSCAPE CONSULTANT TO PROVIDE DRAWINGS

KEY

1 BED (S)	CHILDassist
1 BED (M)	RETAIL
1 BED (L)	CARE AMENITY LFoH
2 BED (C)	CARE AMENITY BoH
2 BED (S)	WELLNESS LFoH
2 BED (M)	WELLNESS BoH
2 BED (L)	F&B LFoH
2 BED (XL)	F&B BoH
3 BED (M)	AMENITY LFoH
GCS-A	AMENITY BoH
GCS-B	AMENITY SUPPORT LFoH
KW (1B)	AMENITY SUPPORT BoH
KW (2B)	PLANT
GCR-A	PARKING
GCR-B	CIRCULATION BoH
GCR-C	CIRCULATION LFoH

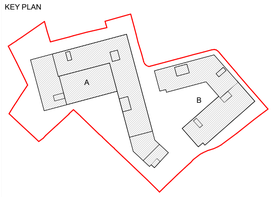
NOTE
Drawing to be read in conjunction with schedule of accommodation
Ref: EPS001-MPI-XX-ZZ-XX-A-000001

FOR COMMENT

REV.	DATE	DESCRIPTION	BY

PURPOSE OF ISSUE: PLANNING
STATUS: S0

KEY PLAN



NOTES
1. ALL DIMENSIONS IN MILLIMETERS (mm) AND LEVELS IN METERS (m) ABOVE NATIONAL DATUM.
2. DO NOT SCALE FROM THIS DRAWING. ONLY WRITTEN DIMENSIONS SHALL BE USED.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTUAL DRAWINGS AND SPECIFICATIONS AS WELL AS ALL RELEVANT INFORMATION FROM THE STRUCTURAL, MEP AND CIVIL ENGINEERS.
4. THIS DRAWING HAS BEEN PREPARED IN ACCORDANCE WITH THE SCOPE OF APPONTMENT WITH THE CLIENT AND IS SUBJECT TO THE TERMS OF THAT APPOINTMENT AND SHOULD ONLY BE USED FOR THE PURPOSE FOR WHICH IT IS INTENDED.

Scale 1 : 500
0m 5 10 25 50 m

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CLIENT: GUILD LIVING

PROJECT: GUILD LIVING @ EPSOM
EPSOM

DRAWING TITLE: LEVEL 00 MASTERPLAN

DISCIPLINE			SCALE @ A1
ARCHITECTURE			1 : 500
DRAWN	DESIGNED	CHECKED	APPROVED
SN	DR	DR	RK

DRAWING No: EPS001-MPI-00-DR-A-01_100
REV:

DATE: 18/01/2021 20:07:14
FILE LOCATION: BIM 360://18120 - Epsom/EPS001-MPI-ZZ-ZZ-M3-A-000001_PLANNINGDEC2020.rvt

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Appendix B

Fluvial Flood Risk Map

Flood map for planning

Your reference	Location (easting/northing)	Created
Epsom FRA	**520419/159876**	**18 Jan 2021 11:28**

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.
https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

Environment Agency

Flood map for planning

Your reference
Epsom FRA

Location (easting/northing)
520419/159876

Scale
1:2500

Created
18 Jan 2021 11:28

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Flood storage area

0 20 40 60m

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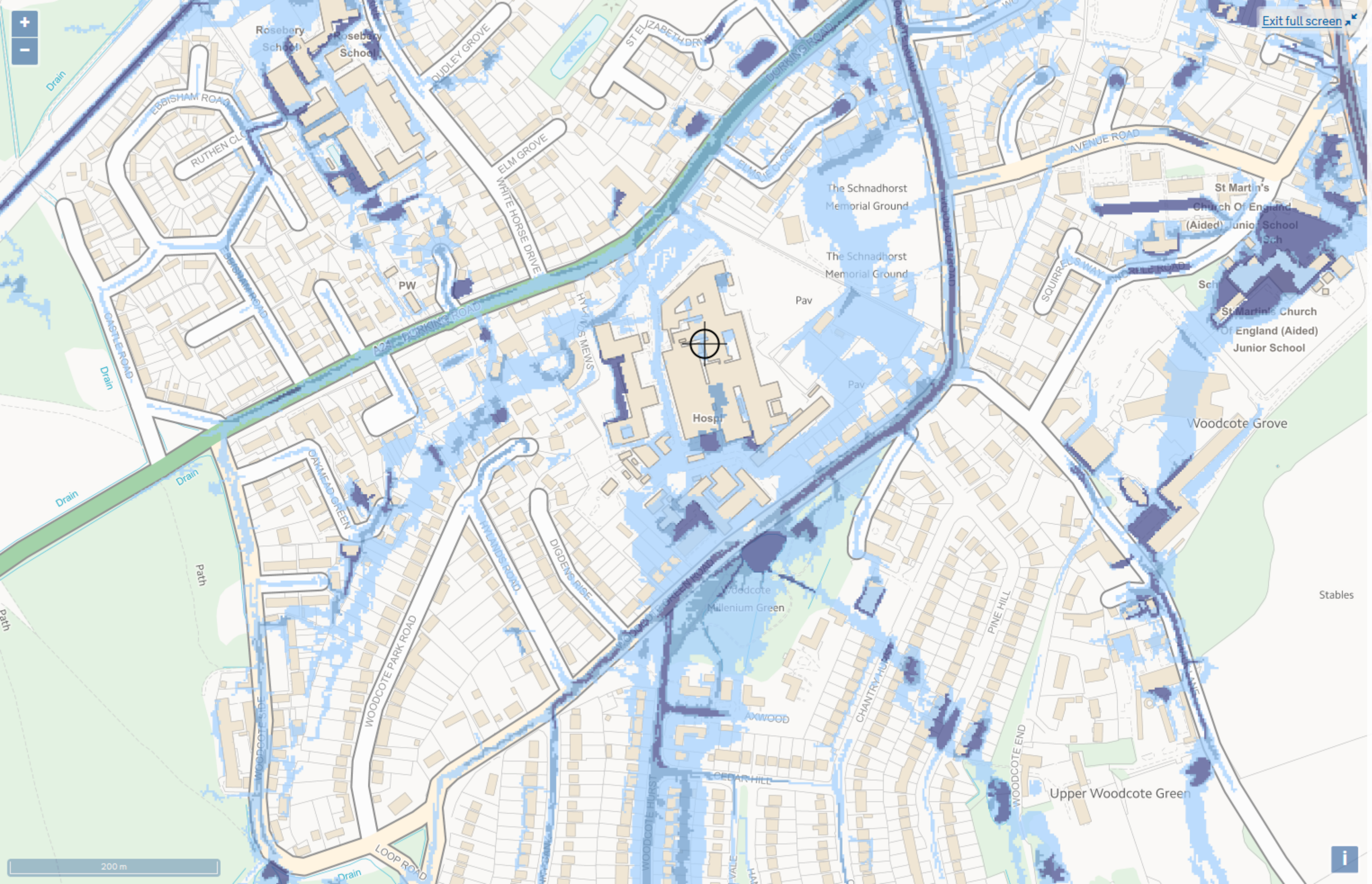
Appendix C

Pluvial Flood Risk Map


Exit full screen
Flood risk
High
Medium
Low
Very low
Location you selected
Rosebery School
Rosebery School
DUDLEY GROVE
ELM GROVE
WHITE HORSE DRIVE
EBBISHAM ROAD
RUTHEN CL
CASTLE ROAD
DORKING ROAD
A24
ST ELIZABETH DRIVE
ELMORE CLOSE
The Schnadhorst Memorial Ground
The Schnadhorst Memorial Ground
Pav
Pav
HYLTONS MEWS
Hospl
PW
AVENUE ROAD
SQUIRRELS WAY
St Martin's Church Of England (Aided) Junior School
St Martin's Church Of England (Aided) Junior School
Woodcote Grove
Drain
Drain
Drain
Path
Path
OAKMEAD GREEN
WOODCOTE PARK ROAD
WOODCOTE SIDE
HYLANDS ROAD
DIGDENS RISE
LOOP ROAD
Woodcote Millenium Green
AXWOOD
CEDAR HILL
WOODCOTE HURST
CHANTRY HURST
PINE HILL
WOODCOTE END
Upper Woodcote Green
Stables
200 m

Appendix D

Reservoir Flood Risk Map

Exit full screen

Flood risk

Maximum extent of flooding

Location you selected

Rosebery School

Rosebery School

DUDLEY GROVE

ST ELIZABETH DRIVE

DORKING ROAD

WOODCOTE ROAD

AVENUE ROAD

EBBISHAM ROAD

RUTHEN CLOSE

ELM GROVE

WHITE HORSE DRIVE

ELMSLIE CLOSE

The Schnadhorst Memorial Ground

The Schnadhorst Memorial Ground

Pav

Pav

St Martin's Church Of England (Aided) Junior School

Sch

Sch

SQUIRREL'S WAY

WORPLE ROAD

St Martin's Church Of England (Aided) Junior School

EBBISHAM ROAD

CASTLE ROAD

PW

A24 DORKING ROAD

HYLANDS MEWS

Hospl

Drain

Drain

Drain

Path

OAKMEAD GREEN

WOODCOTE PARK ROAD

HYLANDS ROAD

DIGDENS RISE

WOODCOTE GREEN ROAD

Woodcote Millenium Green

Woodcote Grove

Stables

WOODCOTE SIDE

AXWOOD

CHANTRY HURST

PINE HILL

CHALK LANE

CEDAR HILL

WOODCOTE END

Upper Woodcote Green

200 m

Appendix E

Thames Water Sewer Records & Correspondence

Asset Location Search Sewer Map - ALS/ALS Standard/2019_4094929

The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 520385,159767

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
2603	65.02	63.65
2604	63.16	61.01
2602	64.87	64.12
36YZ	n/a	n/a
36ZP	n/a	n/a
2601	64.76	63.35
371A	n/a	n/a
1703	64.63	63
2701	63.95	62.33
1704	64.52	63.21
2801	63.57	62.62
281A	n/a	n/a
2901	61.93	58.67
2904	61.64	57.85
2902	62.01	60.68
2903	61.77	60.02
2905	60.25	56.95
191A	n/a	n/a
3901	58.99	56.02
391A	n/a	n/a
3902	57.84	54.04
3001	57.86	55.07
201A	n/a	n/a
2005	63.26	60.99
181A	n/a	n/a
1805	64.39	62.59
1904	62.35	59.85
1905	62.37	59.47
1702	64.46	63.66
191C	n/a	n/a
191B	n/a	n/a
1903	61.56	60.26
1601	67.99	65.46
1701	65.79	64.77
3604	60.81	59.02
3603	60.67	58.62
36YY	n/a	n/a
36YX	n/a	n/a
4701	59.86	57.37
4601	61.05	59.06
5701	59.34	56.91
5702	58.65	56.11
5703	60.42	58.49
5605	62.53	61.5
5704	60.34	59.32
5606	62.41	60.54
5607	62.15	60.44
5608	61.73	60.25
5705	60.47	59.55
5609	61.22	59.86
5610	60.93	59.55
5706	60.52	59.71
5707	60.74	59.93
5611	60.93	60.51
5708	60.92	60.31
5709	60.92	60.21
5710	60.94	60.25
6801	57.7	54.92
6802	58.37	55.69
6601	65.23	62.4
4503	62.97	61.82
4502	62.45	60.07
4501	61.41	60.59
5501	65.49	63.45
451A	n/a	n/a
3502	61.56	59.52
551B	n/a	n/a
551A	n/a	n/a
5604	62.14	60.49
5603	61.31	59.41
5601	61.16	59.03
5612	64.64	62.94
251A	n/a	n/a
251B	n/a	n/a
2501	66.15	63.93
2502	64.23	62.18
2503	63.58	61.46
3601	61.54	59.57
3602	61.38	59.32

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

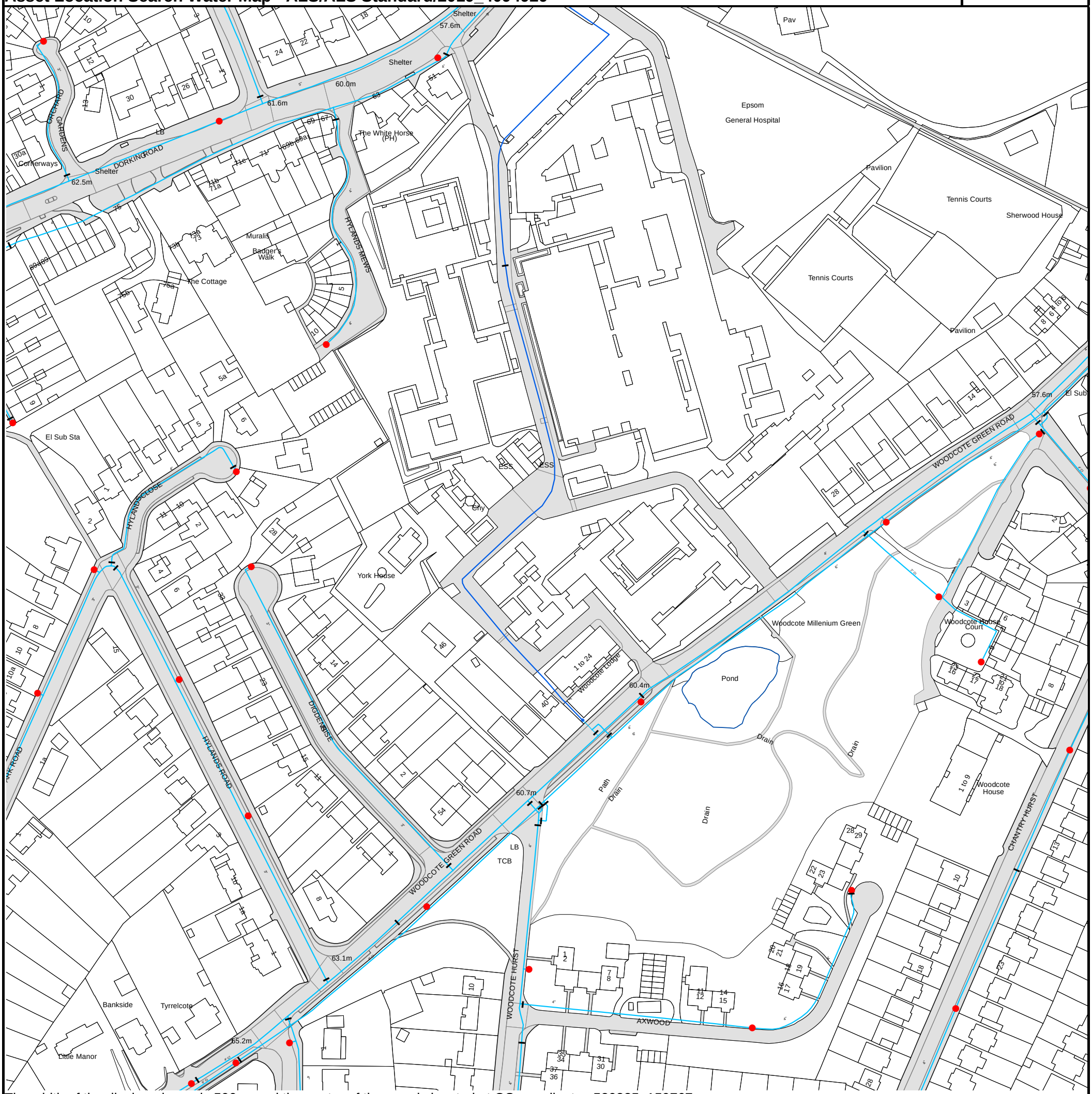
Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2019_4094929



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 520385, 159767.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

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ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Mr Jason Magee
Hydrock
By email to JasonMagee@hydrock.com

Wastewater pre-planning
Our ref DS6064489–DTS 62970

11 September 2019

Pre-planning enquiry: Epsom Hospital, Dorking Rd, Epsom, Surrey, KT18 7EG

Dear Mr Magee,

Thank you for providing information on your Redevelopment of Hospital into retirement. For Connection 1 to the north into 380mm foul sewer in Dorking Rd; Existing: Surf and foul water sewer connections draining 6400sqm surface and 201 hospital beds by gravity. Proposed: no surface water discharge and 335 beds retirement by gravity. Connection 2 to the South into 675mm foul at Woodcote Green; Existing 5,929sqm surface and 468 hospital beds by gravity. Proposed 334 retirement beds and same surface water drainage regime as before (5,929sqm)

Foul Water

We're pleased to confirm that there will be sufficient foul water capacity in our sewerage network to serve your development, so long as your phasing follows the timescale you've suggested.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

Surface Water

We confirm that there will be sufficient capacity in our sewerage network to accept the surface water discharge rate provided as part of the enquiry, however this does not preclude the requirement as set out by Policy 5.13 of the London Plan. Management of surface water from the site should follow policy 5.13 of the London Plan, development should 'aim to achieve greenfield run-off rates' utilising Sustainable Drainage and where this is not possible information explaining why it is not possible should be provided to both the LLFA and Thames Water. Typically greenfield run off rates of 5l/s/ha should be aimed for using the drainage hierarchy. The hierarchy lists the preference for surface water disposal as follows; Store Rainwater for later use > Use infiltration techniques, such as porous surfaces in non-clay areas > Attenuate rainwater in ponds or open water features for gradual release > Discharge rainwater direct to a watercourse > Discharge rainwater direct to a surface water sewer/drain > Discharge rainwater to the combined sewer.
To reduce flood risk from the sewers, the developer should aim to achieve greenfield runoff rates and at least 50% reduction for all storm events

What happens next?

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

Please note that we may contact you if we need to carry out any network modelling associated with this. The modelling would be done at our cost and within your timescales.

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on the numbers below.

Yours sincerely

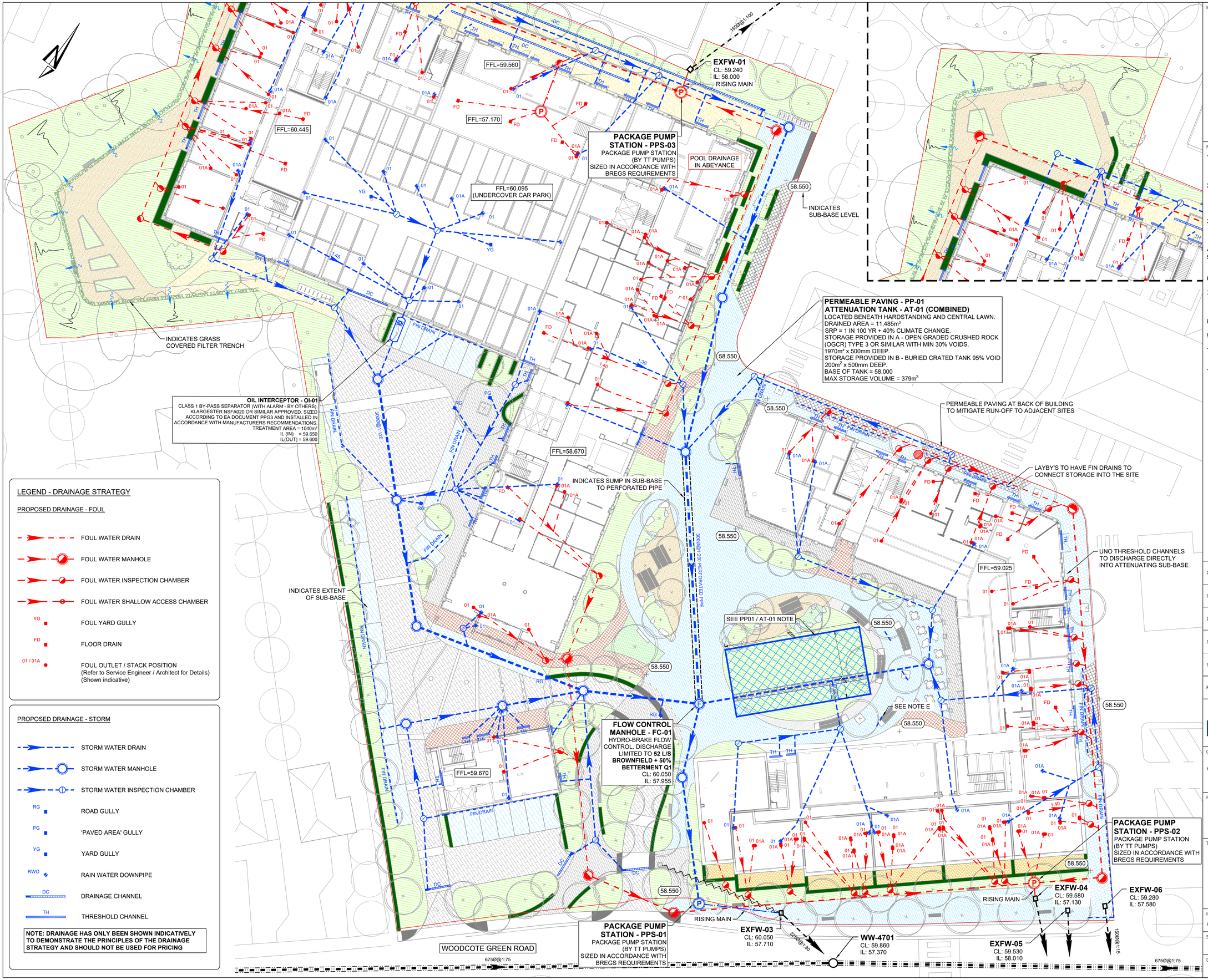
Jose Varela

Developer Services – Adoptions Engineer Mobile 07747 640250 Landline 02035 778753
jose.varela@thameswater.co.uk Clearwater Court, Vastern Road, Reading, RG1 8DB

Find us online at developers.thameswater.co.uk

Appendix F

Hydrock Drainage Strategy



LEGEND - DRAINAGE STRATEGY

PROPOSED DRAINAGE - FOUL

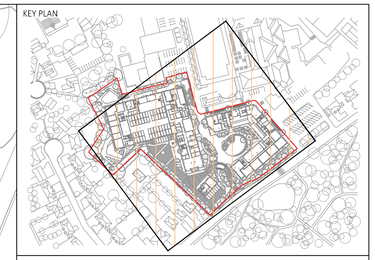
- FOUL WATER DRAIN
- FOUL WATER MANHOLE
- FOUL WATER INSPECTION CHAMBER
- FOUL WATER SHALLOW ACCESS CHAMBER
- YG — FOUL YARD GULLY
- FD — FLOOR DRAIN
- 01 / 01A — FOUL OUTLET / STACK POSITION (Refer to Service Engineer / Architect for Details) (Shown indicative)

PROPOSED DRAINAGE - STORM

- STORM WATER DRAIN
- STORM WATER MANHOLE
- STORM WATER INSPECTION CHAMBER
- RG — ROAD GULLY
- PG — 'PAVED AREA' GULLY
- YG — YARD GULLY
- RWO — RAIN WATER DOWNPIPE
- DC — DRAINAGE CHANNEL
- TH — THRESHOLD CHANNEL

NOTE: DRAINAGE HAS ONLY BEEN SHOWN INDICATIVELY TO DEMONSTRATE THE PRINCIPLES OF THE DRAINAGE STRATEGY AND SHOULD NOT BE USED FOR PRICING

KEY PLAN



NOTES

1. All dimensions are to be checked on site before the commencement of works. Any discrepancies are to be reported to the Architect & Engineer for verification. Figured dimensions only are to be taken from this drawing.
2. The DWG file is issued for the purposes of coordination only and do not represent formal drawing issue and are not to be reprinted in any form. Formal issue of drawings is via DWF, Adobe PDF files and/or hard copies and their associated information issue sheets.
3. Note that all care has been taken with the export of DWG files and their content, but we recommend that you make due dimensional checks before using any DWG file information. Any errors found are to be reported to Hydrock immediately.
4. All levels are shown in metres above Ordnance Datum (m AOD).
5. All private drainage to comply with current Building Regulations, BS EN-752 Drain and Sewer systems outside Buildings and other relevant British Standards and Codes of Practices.
6. Drainage pipework routes under building footprint will require Co-ordination with foundations.
7. Final foul pipe connection routes and manholes are subject to confirmation of above ground drainage design discharge points at ground level by others to allow final pipe sizes, configuration and connections.
8. Door threshold drainage channel requirements to be advised by others.
9. Surface water drainage RWP locations to be confirmed by Architect.
10. External levels shown on this drawing relating to the civils, drainage works etc are to be confirmed on receipt of final external levels drawing (by others).
11. Foul drainage shown indicative subject to detailed design.

REV	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P05	FFL'S DROPPED. DRAINAGE UPDATED TO SUIT					
	J.MAGEE	15/01/21	J.MAGEE	15/01/21	-	15/01/21
P04	LAYOUT UPDATED					
	J.MAGEE	06/01/21	J.MAGEE	06/01/21	-	06/01/21
P03	LAYOUT UPDATED					
	J.MAGEE	30/03/20	J.MAGEE	30/03/20	R.JACK	30/03/20
P02	PRELIMINARY ISSUE					
	A.TODD	20/12/19	R.JACK	20/12/19	R.JACK	20/12/19
P01	PRELIMINARY ISSUE					
	J.MAGEE	12/12/19	J.MAGEE	12/12/19	R.JACK	12/12/19

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e: bristolcentral@hydrock.com

CLIENT
GUILD LIVING

PROJECT
EPSOM HOSPITAL
LATER LIVING DEVELOPMENT

TITLE
DRAINAGE STRATEGY

HYDROCK PROJECT NO.	SCALE @ A1
C-12053-C	1:250
STATUS DESCRIPTION: PLANNING	STATUS: S2
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER): 12053-HYD-00-ZZ-DR-C-7000	REVISION: P05