



**ARCH
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DRAINAGE STRATEGY & FLOOD RISK ASSESSMENT



GOODWILLIES TIMBER YARD
PURBROOK



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for

GOODWILLIES TIMBER YARD
PURBROOK

Client:

Foreman Homes
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1.0 Executive Summary

Arch Associates has been appointed by Foreman Homes to prepare a flood risk assessment and drainage strategy to support a full planning application for a residential scheme at Goodwillies Timber Yard, Purbrook

The circa 3.41ha site is bound by London Road to the north and existing dwellings along all other boundaries. Under the new proposals, up to 111 dwellings will be erected with associated access, parking and landscaping.

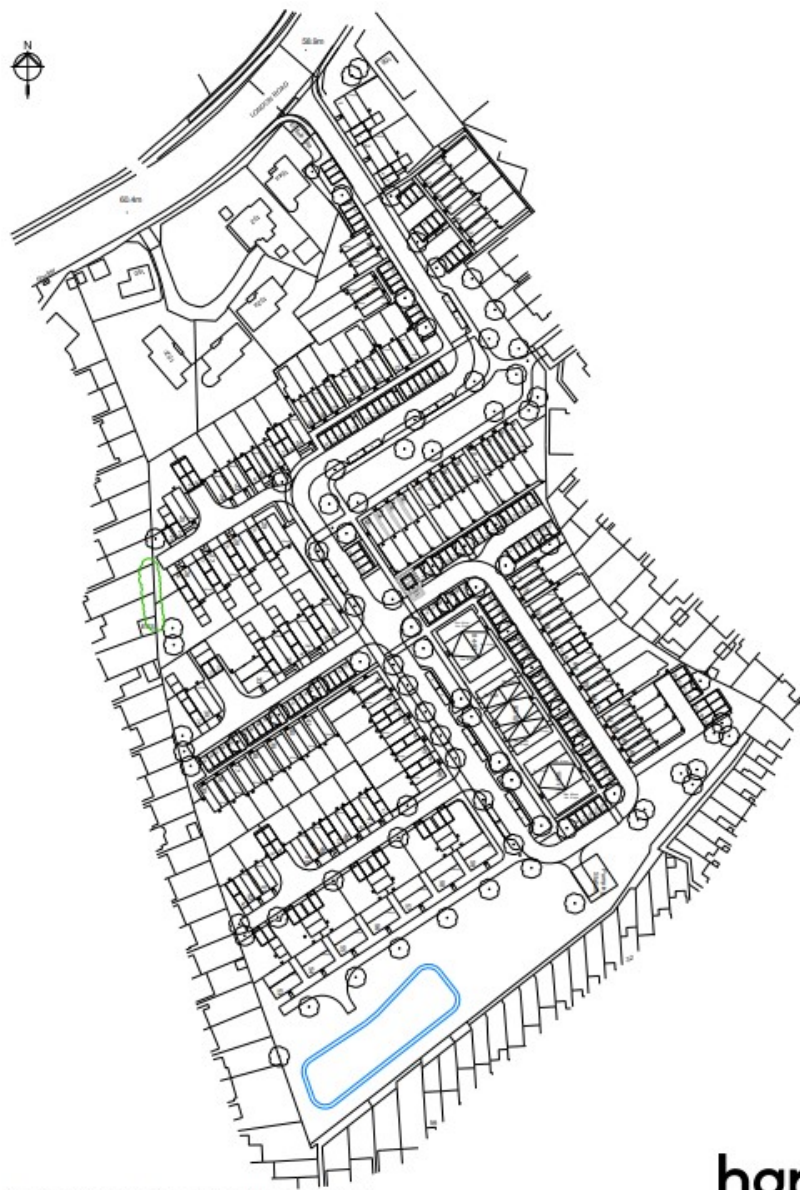
The proposed foul drainage system comprises a piped gravity system discharging into an existing Southern Water manhole located adjacent to the entrance of the site and a package pumping station which serves dwellings that cannot discharge via gravity. The rising main connects into the gravity system to facilitate a singular connection. The proposed foul water strategy is discussed in more detail in Section 3.1.

The proposed surface water strategy will similarly discharge via infiltration through permeable paving. The permeable paving has been split into zones across the site to utilise infiltration rates obtained from BRE365 testing that are relevant to each parcel rather than apply a singular, conservative infiltration rate to the entire site. The proposed surface water strategy is discussed in more detail in Section 3.2.



2.0 The Site

The site previously comprised a timber yard, which has since permanently closed, and areas of dense vegetation to the south. The circa 3.41ha site is bound by London Road to the north and existing dwellings along all other boundaries. Under the new proposals, up to 111 dwellings will be erected with associated access, parking and landscaping. Refer to Appendix 1 for the proposed masterplan.



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A review of the UK Government's Flood-Warning Information Services mapping online indicates that the site is entirely within Flood Zone 1 and therefore is at very low risk of flooding from tidal and fluvial services. Refer to the image above.



A review of the UK Government's surface water flood risk map indicates that the site is not subject to flooding in the 1:30 or 1:100 year events, however a small section of the site is shown to flood in the 1:1000 year event as shown in the image above. The buildings would remain safe due to the FFLs being set generally at a minimum of 150mm above the proposed ground levels. A surface depression has been provided at the southern end of the site to provide emergency storage in exceedance events so that runoff does not drain to the existing properties to the south. The site is not located nearby to any reservoirs and so is not subject to flooding from this source.

2.1 Existing Site Topography and Drainage

The site comprises steep slopes with the topographical survey showing spot levels ranging from 59.93mAOD to 55.57mAOD. Refer to the topographical survey in Appendix 2.

Review of the Southern Water asset plan from 2024 confirms that there are no feasible public surface water sewers within or adjacent to the proposed development. The asset plan identifies a 200mm diameter public foul water sewer within London Road to the north that flows to the north-east. The closest surface water sewer resides within Corbett Road to the west, which cannot be connected due to the existing dwellings between the asset and the site. DF Groundworks produced a report on existing private drainage within the Goodwillies Timber Yard entrance and Brightside to the west for consideration within the drainage strategy. Refer to the Southern Water Asset Plan in Appendix 3 and Drainage Inspection Report in Appendix 4.

Geology

Borehole logs from Soils Ltd confirm bedrock of sandy silty clay. This is in accordance with BGS online mapping, which states that the bedrock beneath the site is largely the Wittering Formation. There is a small section at the northernmost extent of the site where the London Clay Formation is present.

Groundwater was investigated most recently by Omnia in May 2025 within 10no. explorative holes on site, which are summarised in the image below. The borehole logs confirm that groundwater was not encountered for most locations, but was noted to be 1.76mbgl in the shallowest case. Refer to Appendix 5 for further details.





Location	Shallowest Groundwater Level (mbgl)	Highest Groundwater Elevation (m AOD)	Deepest Groundwater Level (mbgl)	Lowest Groundwater Elevation (m AOD)	Date of Shallowest Groundwater Level
GW201	3.88	57.02	Dry	Dry	29/04/2025
GW202	N/A (Dry)	Dry	Dry	Dry	N/A
GW203	1.81	60.09	Dry	Dry	31/01/2025
GW204	N/A (Dry)	Dry	Dry	Dry	N/A
GW205	1.76	58.44	Dry	Dry	27/02/2025
GW206	1.97	59.03	Dry	Dry	27/02/2025, 26/03/2025, 29/04/2025
GW207	N/A (Dry)	Dry	Dry	Dry	N/A
GW208	N/A (Dry)	Dry	Dry	Dry	N/A
GW209	N/A (Dry)	Dry	Dry	Dry	N/A
GW210	N/A (Dry)	Dry	Dry	Dry	N/A

In addition to the groundwater monitoring, Omnia carried out 8no. BRE365 compliant infiltration tests to establish if drainage via infiltration would be suitable for the site. Refer to the image below for infiltration rates observed.

Table 4-1 Summary of Infiltration rate

Location	Test Number	Pit Dimensions (L x W x D)	Depth to fill (m bgl)	Strata Type	Duration of Test (hrs:mins)	Infiltration Rate (m/s)
SA301	1	2.20 x 0.40 x 2.70	1.48	SAND	21:57	N/A
	2		1.46		24:00	N/A
SA302	1*	2.20 x 0.40 x 2.50	1.35	SAND	01:08	1.14x10 ⁻⁵
	2		1.33		01:48	7.17x10 ⁻⁶
	3		1.35		02:48	4.81x10 ⁻⁶
SA303	1	2.26 x 0.40 x 2.50	1.31	CLAY	24:00	N/A
SA304	1	2.20 x 0.40 x 2.50	1.38	SAND	20:00	6.66x10 ⁻⁷
	2		1.10		18:20	6.99x10 ⁻⁷
	3		1.39		17:10	8.21x10 ⁻⁷
SA305	1	2.30 x 0.40 x 2.50	1.33	SAND	01:25	8.80x10 ⁻⁶
	2		1.33		03:20	3.77x10 ⁻⁶
	3		1.34		03:45	3.52x10 ⁻⁶
SA306	1	2.20 x 0.40 x 2.50	1.43	SAND	08:00	2.14x10 ⁻⁶
	2		1.44		13:45	1.17x10 ⁻⁶
	3		1.44		19:00	8.33x10 ⁻⁷
SA307	1	2.30 x 0.45 x 2.50	1.46	SAND	04:00	3.45x10 ⁻⁶
	2		1.46		05:40	2.27x10 ⁻⁶
	3		1.45		05:55	2.47x10 ⁻⁶
SA308	1	2.30 x 0.40 x 2.50	1.45	SAND	00:46	1.69x10 ⁻⁵
	2		1.44		01:20	1.01x10 ⁻⁵
	3		1.44		01:20	1.01x10 ⁻⁵

The groundwater conditions and infiltration rate results are discussed in further detail in Section 3.2.

3.0 Proposed Foul and Surface Water Drainage

3.1 Foul Water

The proposed foul drainage system comprises a piped gravity system discharging into an existing Southern Water manhole located adjacent to the entrance of the site and a package pumping station which serves dwellings that cannot discharge via gravity. The rising main connects into the gravity system to facilitate a singular connection.

The proposed foul water drainage strategy has been designed in accordance with the Sewerage Sector Guidance – Appendix C and Part H of the Building Regulations. Refer to Appendix 6 – Drainage Strategy Drawings for details.

The hydraulic design for the discharge rate for the foul wastewater design has been calculated in accordance with Sewerage Sector Guidance – Appendix C which states design flow rates for dwellings should be 4000l/day. Therefore, the discharge rate for the proposed residential development of 76 dwellings equates to a peak foul discharge rate of approximately 5.14 litres/second.

Noting the presence of permeable paving throughout the site to facilitate the surface water strategy, the foul water drainage is shown to be installed/beneath the permeable subbase. As this is not accepted by Southern Water or a NAV, the foul drainage will not be put forward for adoption.



3.2 Surface Water

Given the infiltration potential observed by Omnia and in line with the SuDS discharge hierarchy, drainage via infiltration is to be utilised for the scheme. Due to the built-up nature of the site, permeable paving has been proposed as foundation offsets applied to soakaways would create a sub-optimal solution regarding sizing/siting/depths of point infiltration features.

As detailed in Section 2.1, the borehole logs confirm that groundwater was not encountered for most locations, but was noted to be 1.76mbgl in the shallowest case. Omnia state within their report that a full review of all intrusive locations of window sample and trial pit locations indicated that no actual groundwater was struck during intrusive works. As such, and given that this site sits atop the hill, we perceive that the readings taken for GW203, GW205 and GW206 are due to perched groundwater. This was put forward to HCC via a Pre-App consultation, who accepted that a reduction in the depth of unsaturated soil in localised areas would be acceptable as the risk of groundwater saturation is very low. Refer to Appendix 6 for Pre-App correspondence.

Noting the range of infiltration rates established within the boreholes across the site, an approach is taken within the drainage design to conservatively zone the permeable paving so that a representative infiltration rate can be applied. This avoids the need for excessive depths of subbase material where not required. Due to the drainage strategy discharging entirely by infiltration, this is deemed to comply with National Standards for SuDS requirement for interception. Refer to Appendix 7 – Drainage Strategy Drawings for details.

Hydraulic calculations provided demonstrate that the various permeable paving catchments provide the necessary level of attenuation for storm events up to and



inclusive of the 1:100 year + 45% climate change. 10% urban creep has been applied to the 1:100 year event to cater for the conversion of permeable surfaces into impermeable surfaces over time. Refer to Appendix 8.

The total site area is circa 34,100m², comprising industrial roofing, hard landscaping and areas of dense vegetation. The existing impermeable area equates to 23,300m². The post-development impermeable area will 17,020m², resulting in a decrease of surface water volume leaving the site.

Overland/surface exceedance flows due to extreme events or blockage of drainage systems would naturally flow south toward the gardens of existing dwellings on Corbett Road, mirroring the existing conditions. The buildings would remain safe due to the FFLs being set generally at a minimum of 150mm above the proposed ground levels. A surface depression has been provided at the southern end of the site to provide emergency storage in exceedance events so that runoff does not drain to the existing properties to the south.

SuDS Treatment Train Components

As shown on the proposed drainage layout, the rainwater falling on impermeable roofs will be collected and directed to the permeable paving via diffuser units. Rainwater falling on the external hard surfacing, including the roads and private driveways, will percolate directly through the permeable paving into the existing substrate.

Based on the guidance in CIRIA C753, the following analysis has been undertaken with the relative mitigation indices for the proposed levels of treatment taken from CIRIA C753 Tables 26.3 (surface waters) and Table 26.4. The resultant assessment is summarised within the Table below.

Element	Pollution Hazard Indices			
	Pollution Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Roads*	Medium	0.7	0.6	0.7
	Pollution Mitigation Indices			
Permeable Paving		0.7	0.6	0.7
Sufficiency		Sufficient	Sufficient	Sufficient

*Given the varied land use across the proposed site, the land use type with the highest pollution index is selected for assessment.

4.0 Maintenance of SUDS features:

The maintenance regime of the surface water drainage system and its components is outlined within the accompanying Arch Associates Limited SuDS Maintenance Manual.

5.0 Protection of the Drainage System During Construction:

All building materials on site shall be stored on a flat surface, and that the manufacturer's recommendations regarding storage are being followed Which may include avoid extended exposure to sunlight, protection from damage etc.

Runoff shall be prevented from entering the constructed pipe systems during the construction with measures including capping off the pipe openings.