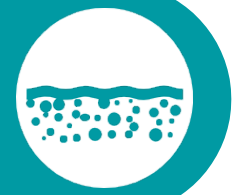


SuDSmart Design



Sustainable Drainage Assessment

Site Address

Willow Wick Farm
Willow Wick Lane
Finchampstead
RG40 3QH

Date

2024-05-09

Report Status

FINAL

Grid Reference

480486, 164594

Site Area

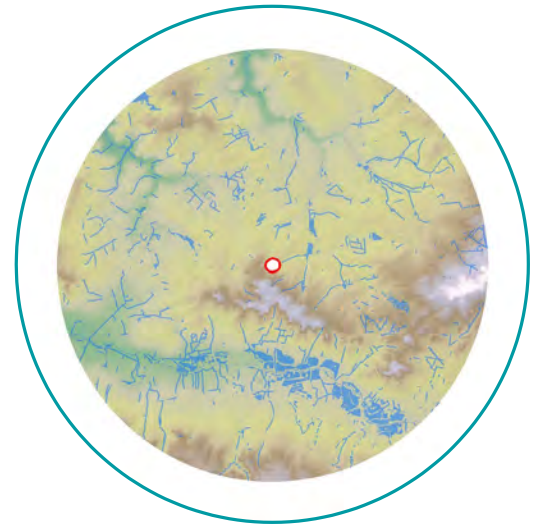
0.14 ha

Report Prepared for

Mr Jason Marino

Report Reference

81248R1



Discharge to existing

The existing Site drains surface water runoff to the pond, located c.15m east of the Site. The proposed development should continue to discharge via the existing connection to the pond, subject to confirmation of the existing location and level of the drainage prior to the commencement of any works.

The proposed Sustainable Drainage Scheme (SuDS) strategy is comprised of permeable paving and filter drains to attenuate surface water runoff during the 1 in 100 plus 40% climate change event.

Surface water will discharge to the pond at a controlled brownfield rate following permission from the relevant regulatory authorities.

Report Author

Lorna Baker
Consultant

Report Checker & Reviewer

David South
Senior Consultant

GeoSmart Information Ltd
Suite 9-11, 1st Floor, Old Bank Buildings,
Bellstone, Shrewsbury, SY1 1HU
+44(0)1743 298 100
info@geosmartinfo.co.uk
www.geosmartinfo.co.uk

1 Executive summary



This report assesses the feasibility of a range of Sustainable Drainage Scheme (SuDS) options in support of the Site development process. A SuDS strategy is proposed to ensure surface water runoff can be managed effectively over the lifetime of the development.

SuDS suitability

Risk	Issue	Result
Discharge Location	What is the infiltration potential at the Site?	High*
	What is the potential to discharge to surface water features?	High
	What is the potential to discharge to sewers?	Low
	What is the potential to discharge to highway drains?	Low
Flooding	What is the fluvial flood risk at the Site?	Negligible
	What is the pluvial flood risk at the Site?	Very Low
	What is the groundwater flood risk at the Site?	Negligible
Pollution	Is the groundwater a protected resource?	N/A
	Is the surface water feature a protected resource?	No

*Whilst mapping has identified a High potential for infiltration, an analysis of groundwater beneath the Site indicates a high groundwater table in which focused infiltration features cannot be utilized. Therefore, as the existing development currently discharges surface water to the nearby pond, drainage for the proposed development should utilize this existing connection and is therefore considered most feasible.

Summary of existing and proposed development

The Site is currently used within a residential capacity. At present there is a single detached dwelling and swimming pool with associated car parking and landscaped areas. Development proposals comprise the demolition of the existing building and construction of a replacement dwelling and two-car car port. The existing swimming pool will be retained as an open-air pool and soft landscaping improved.

Summary of discharge routes

GeoSmart's SuDS Infiltration Potential (SD50) map indicates the Site has a High potential for infiltration, primarily due to the anticipated high permeability of the underlying geology (sandstone). However, borehole records excavated during a Site Investigation indicate the

presence of a shallow water table beneath the Site. Therefore, as focused infiltration schemes should be 1m above the expected seasonal high-water table, infiltration is not considered feasible.

Ordnance Survey (OS) mapping indicates a pond (and drainage ditch) is located approximately 15m east of the Site and the existing Site drainage scheme currently discharges surface water to this feature. Therefore, surface water discharge to the pond is therefore considered the most feasible discharge route for the proposed development.

The asset location plan included in Appendix D confirms the Site is not located within proximity of a public surface or combined water sewer network. A foul sewer is located approximately 100m north on Heath Ride Lane which will accept proposed foul drainage from the Site via an existing connection. Due to the absence of nearby sewers, discharging surface water runoff to the sewer is therefore not feasible.

According to Google Streetview, there are no highway gullies located within Wick Hill Lane, indicating the absence of a highway drainage network.

Runoff rate and attenuation requirements

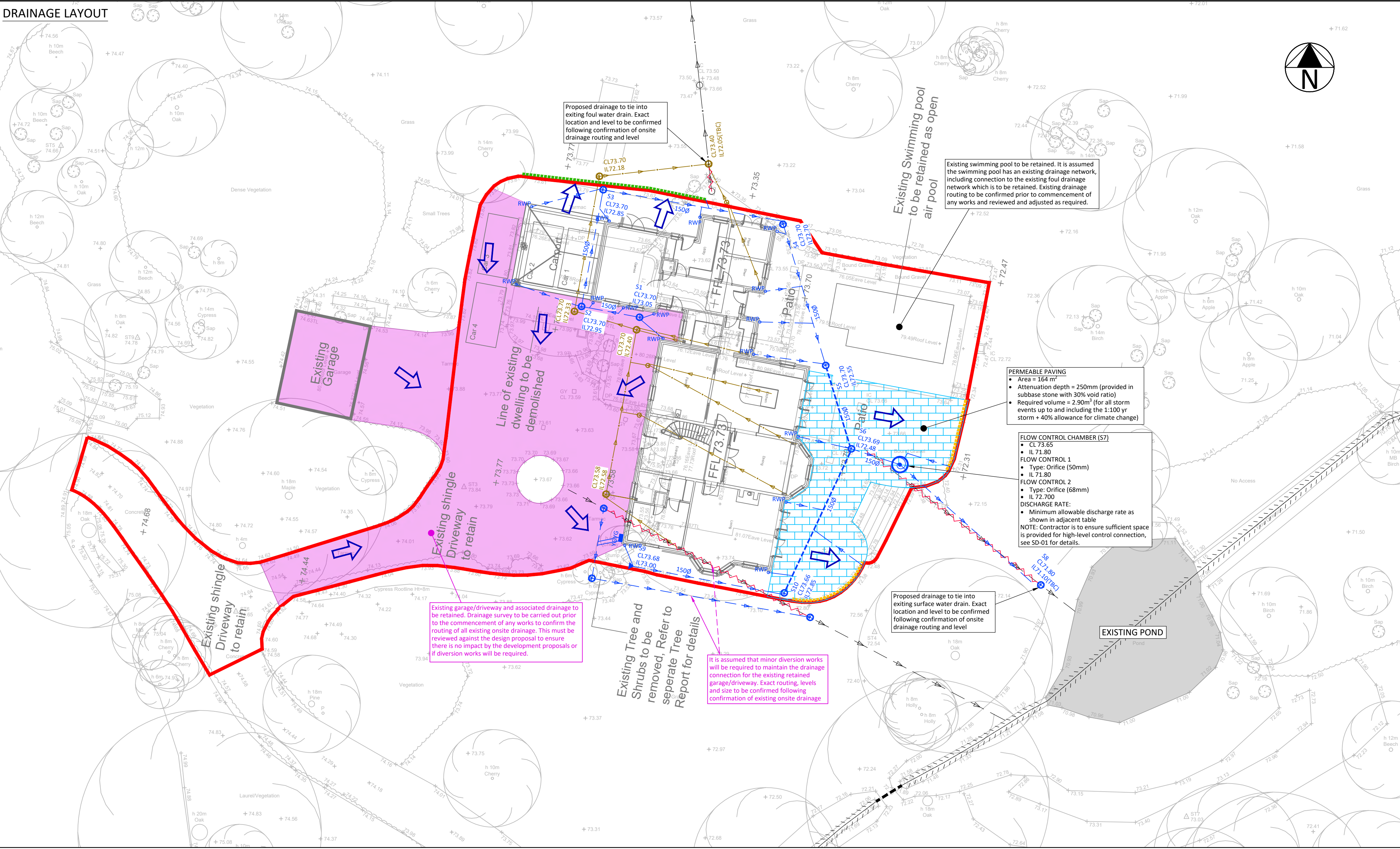
Discharging off-Site requires 2.90 m³ of attenuation to be provided to ensure there is no flooding within the development in all storm events up to and including the 1 in 100 year including a 40% allowance for climate change. This volume is subject to the discharge rate being restricted to the minimum allowable discharge rate given in Appendix A.

Recommendations / Next steps

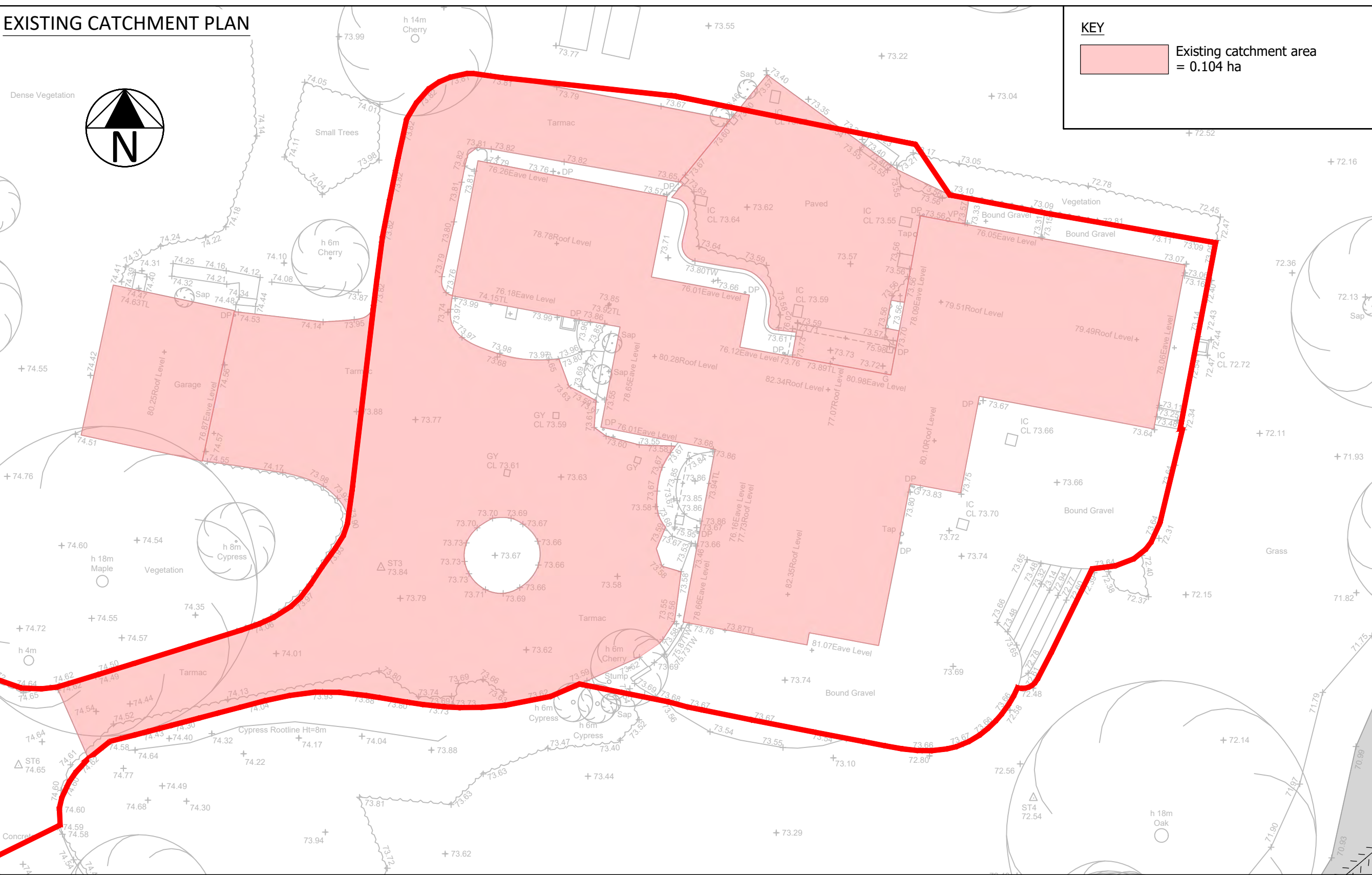
An investigation is required to confirm the capacity of the pond to accept surface water runoff as per the existing discharge location.

The location and level of the existing drainage routing should be confirmed prior to the commencement of any works as well as the locations of existing services. Permission should be gained for the diversion or lowering of works where required and protections should be arranged where necessary.

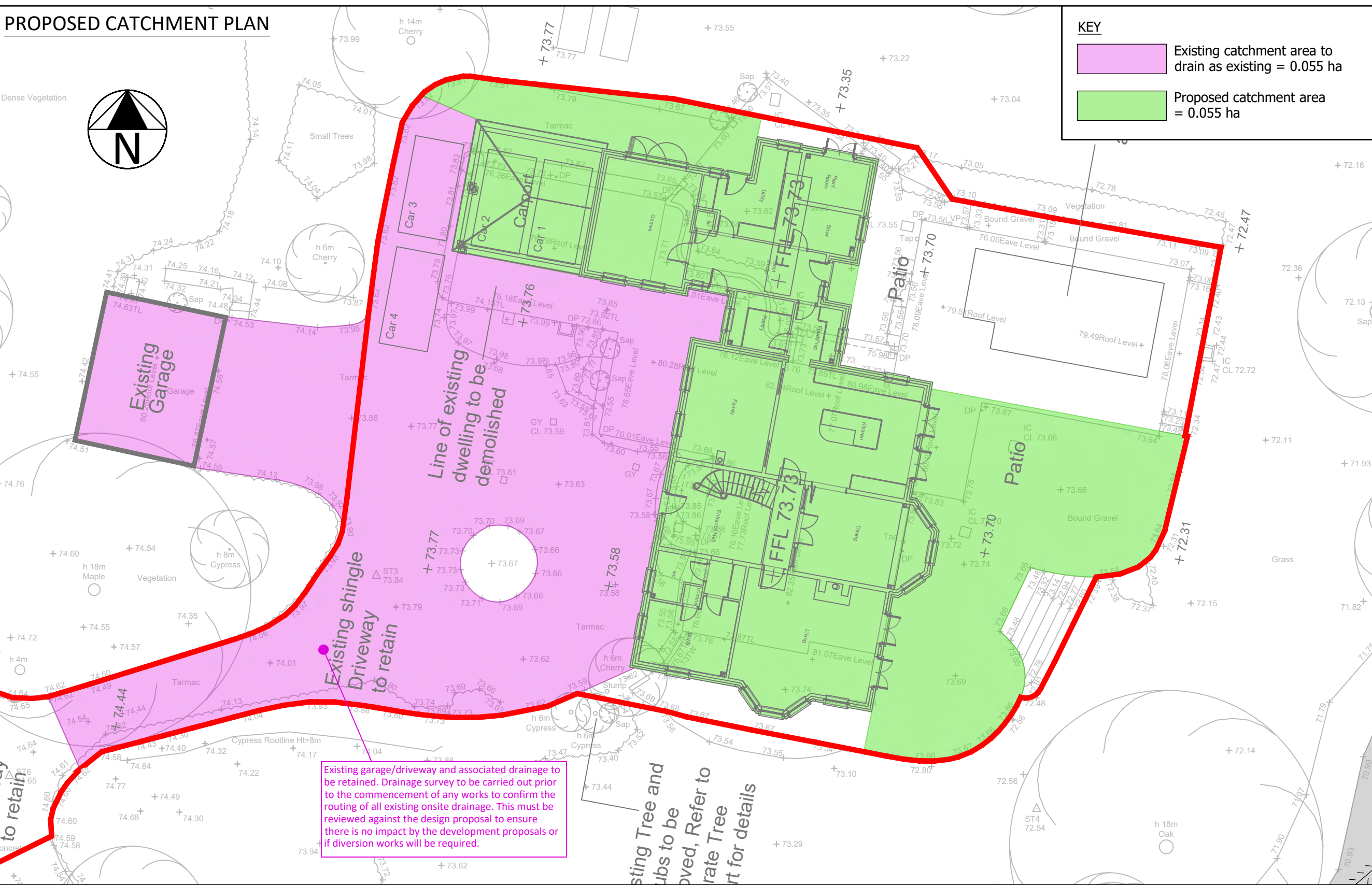
DRAINAGE LAYOUT



EXISTING CATCHMENT PLAN



PROPOSED CATCHMENT PLAN



MAINTENANCE SCHEDULE - FILTER DRAIN		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter including leaf litter and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
Occasional maintenance	Remove sediment from pre-treatment devices	Six monthly, or as required
	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NIUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter media	Five yearly, or as required
MAINTENANCE SCHEDULE - PERMEABLE PAVING		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on sitetpecific observations of clogging or manufacturer's recommendations
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
Remedial actions	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
Monitoring	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Three-monthly, 48 h after large storms in first six months
Monitoring	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

EXISTING BROWNFIELD DISCHARGE RATES (MODIFIED RATIONAL METHOD)		
Parameters		
Contributing area	0.05 ha ⁽¹⁾	
PIMP	100%	
CV	1	
Time of concentration	5 minutes	
Storm	Brownfield runoff rate	
1:1 year storm	9.9 l/s	
1:30 year storm	23.4 l/s	
1:100 year storm	29.6 l/s	
PROPOSED ALLOWABLE DISCHARGE RATES		
Storm	Discharge rate	Betterment over existing
1:1 year storm	4.95 l/s	50%
1:30 year storm	11.7 l/s	50%
1:100 year storm + 40% allowance for climate change	14.8 l/s	50%
Note: (1) Catchment area is based the developable area (existing catchment minus existing catchment area to drain to existing as per existing scenario)		

- KEY**
- Site boundary
 - Overland flow route
 - EXISTING PRIVATE DRAINAGE
 - Foul water sewer
 - Surface water sewer
 - Watercourse
 - Existing drainage to be abandoned (assumed, subject to onsite survey works)
- Note:**
- Routing shown is indicative only (based on sketch provided) showing the outfall routing of existing onsite drainage to help inform the design proposals. Exact level and routing of existing drainage features must be confirmed prior to the commencement of any works and design proposals reviewed and updated to suit.
 - Prior to abandoning any drainage the contractor is to confirm that no upstream connections are present.

- PROPOSED PRIVATE DRAINAGE (FOR DETAILS REFER TO SD-01)**
- Foul water drain
 - Surface water drain (100Ø unless stated otherwise)
 - Foul water inspection chamber
 - Foul water mini inspection chamber
 - Surface water inspection chamber
 - Flow control chamber
 - Rainwater pipe (exact location to be confirmed by others)
 - Gully
 - Filter drain with connection to proposed drainage network
 - Permeable paving
 - Perforated pipe set within permeable paving stone subbase
 - SC Fin drain located at low point of permeable paving within stone subbase with connection to proposed drainage network

- NOTES:**
- All building drainage works shall be carried out in accordance with the current British/European Standards BS EN 752, the current Building Regulations and the Local Authority Building Control specifications and requirements.
 - Exact location of rainwater downpipes and all internal drainage points to be confirmed by architect. Rainwater pipe outlets to be roof-able. Once confirmed this is then to be reviewed in line with the drainage proposals.
 - All drainage works to be constructed from the outfall towards the head of run to ensure the outfall can be achieved.
 - Contractor to verify location & level of receiving existing drainage prior to commencement of any works.
 - Contractor to verify locations of all existing services prior to commencement and arrange for any necessary protection, diversion or lowering works as required.
 - Proposed finished levels to be designed by others. As a result all proposed finished levels shown are to be reviewed in line with the proposed external works plan produced by others. Where levels are adjusted on the existing drive, existing gully locations are to be reviewed and adjusted as required.
 - Foul water minimum allowable gradient:
 - 1:80 where connected to a minimum of 1WC,
 - otherwise min 1:40
 - Surface water minimum allowable gradient of 1:100 unless otherwise stated.
 - Where retaining walls and plot/garage foundations are in the close vicinity of drainage, all foundations are to be below invert levels of pipes / tanks as not to cause loading onto drainage.
 - This drawing is intended to assist with gaining planning approval only. The contractor is to review all design proposals and make any required changes to ensure all proposals are coordinated and there is no conflicting information.
 - All proposals shown are based on information available at the time.
 - Prior to the commencement of any works all required agreements must be in place (i.e. S105 to communicate with the public sewer)

B		Below slab drainage points updated	23/05/24	JH	MG
A		First issue	03/05/24	JH	MG
REV.		DESCRIPTION	Date	BY	CHK
DRAWING STATUS: FOR INFORMATION ONLY					
DESIGN BY: JDIHI INFRASTRUCTURE SOLUTIONS					
CLIENT: Mr & Mrs J Marino					
ARCHITECT: Bonney Architecture					
PROJECT: Willow Wick Farm					
TITLE: Drainage Strategy Layout					
SCALE @ A1: 0 1:200 10 metres					
PROJECT NO: 23082		DRAWING NO: PDL-01		REV: B	

2 Site analysis

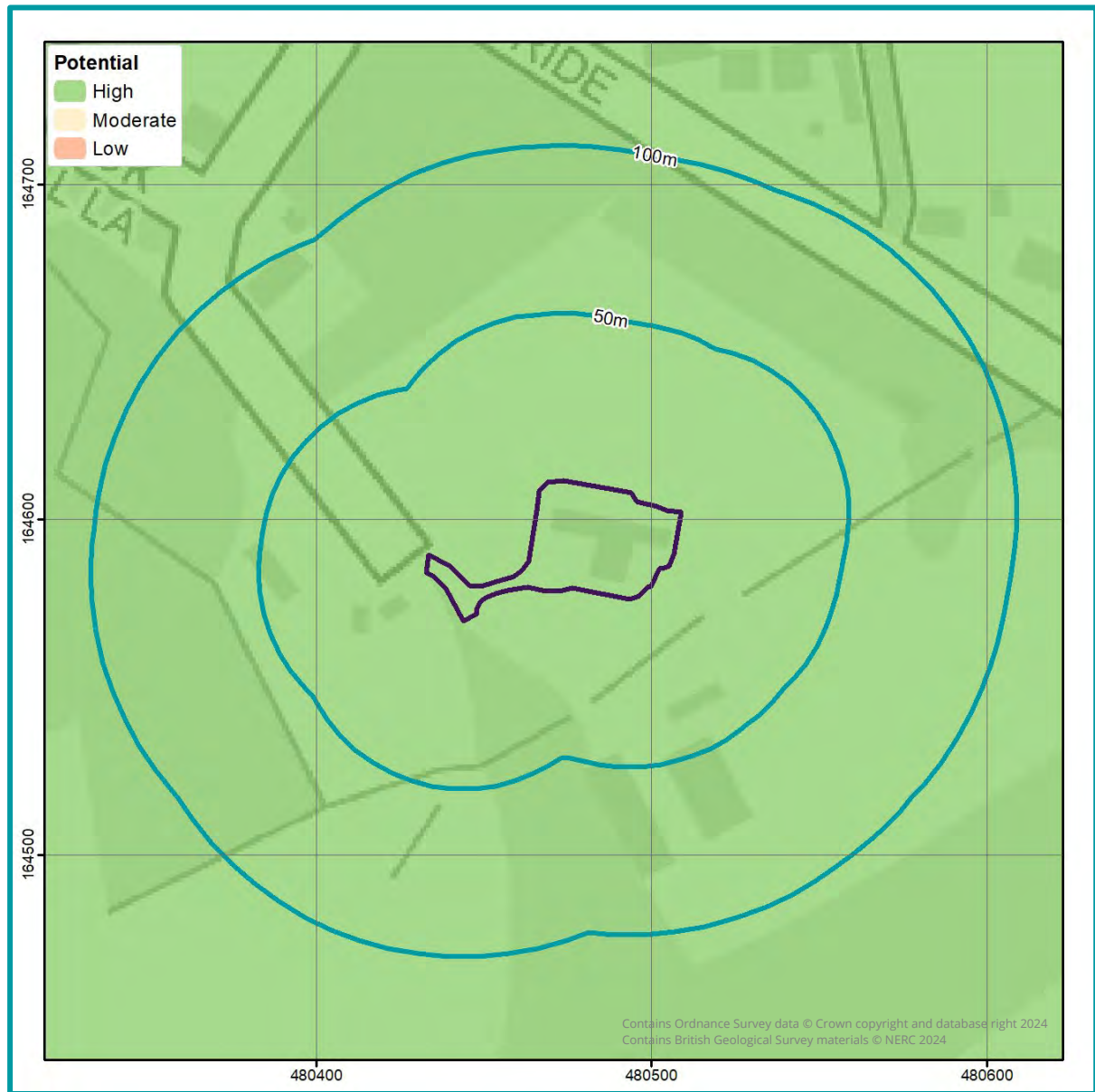


Site location

Figure 1. Aerial Imagery (Bluesky, 2024)



Figure 2. SuDS infiltration suitability (SD50) map (GeoSmart, 2024)



The GeoSmart SuDS Infiltration Suitability Map (SD50) screens the potential for infiltration drainage at the Site and indicates where further assessment is recommended. The map combines information on the thickness and permeability of the underlying material and the depth to the high groundwater table. It supports conceptual Site drainage design and the planning of further Site investigation.

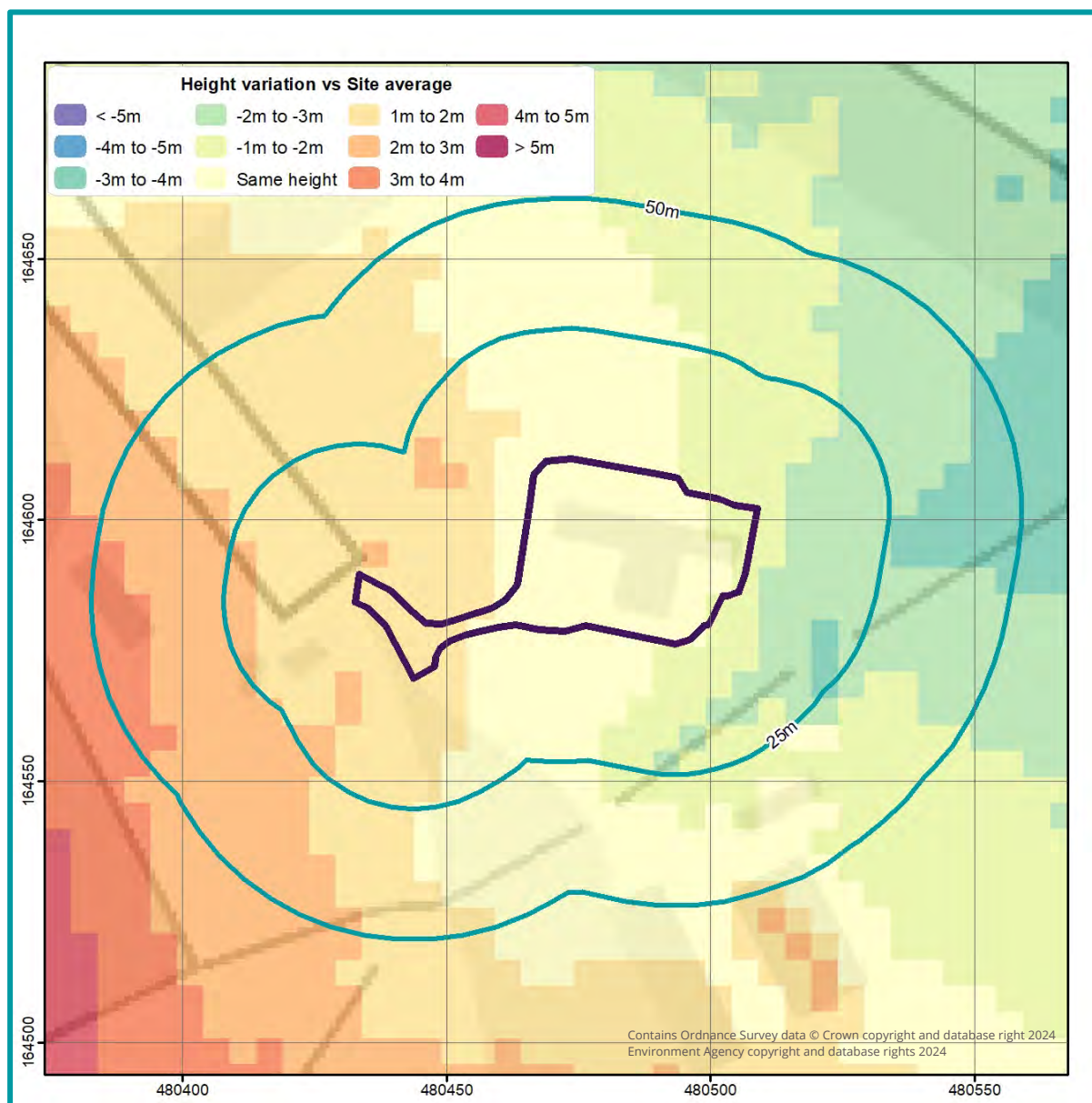
There is a High potential for infiltration SuDS across the Site. It is likely that the underlying geology at the Site has high permeability and an infiltration SuDS scheme should be possible at the Site.

Groundwater levels are expected to be sufficiently deep at the Site. Although, a Site Investigation is recommended to confirm the infiltration capacity and the depth to

groundwater. Various options can be considered for infiltration SuDS and these include infiltration trenches, soakaways, swales and permeable pavements.

However, whilst infiltration may be possible, as the existing surface water drainage discharges to the pond c.15m east of the Site, discharge via the existing route is therefore most feasible and discharge via infiltration is therefore not considered.

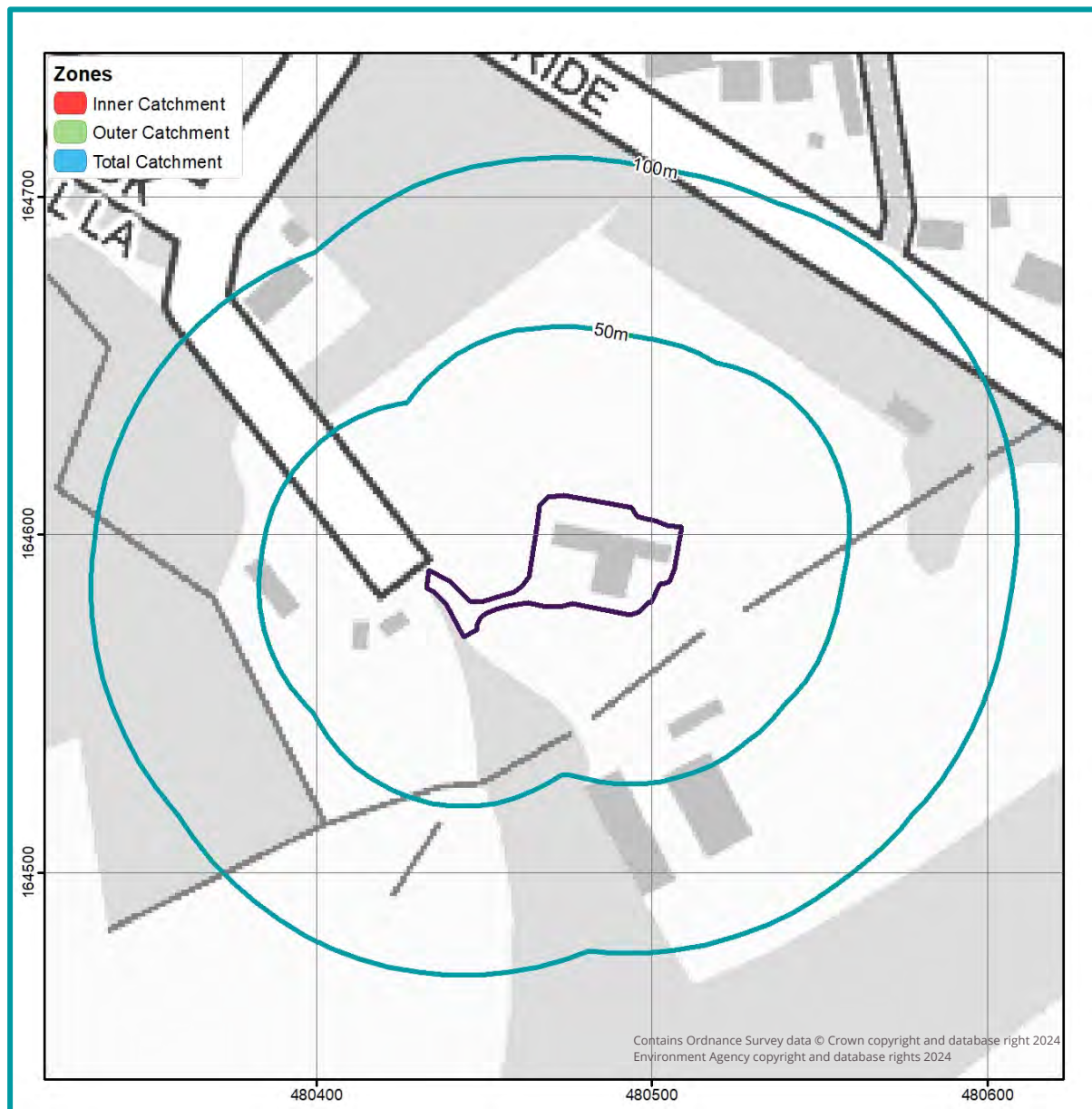
Figure 3. Site topography (GeoSmart, 2024)



An assessment of the topography at the Site has been undertaken using LiDAR DTM5 elevation data to identify the general slope and any localized depressions. The mapping shows a comparison between average ground levels on the Site with ground levels in the surrounding area. The mapping confirms the overall Site is generally sloping to the east.

Further analysis could be undertaken by visiting the Site or by collecting additional topographic survey to provide further confirmation of ground levels.

Figure 4. Source protection zone map (EA, 2024)

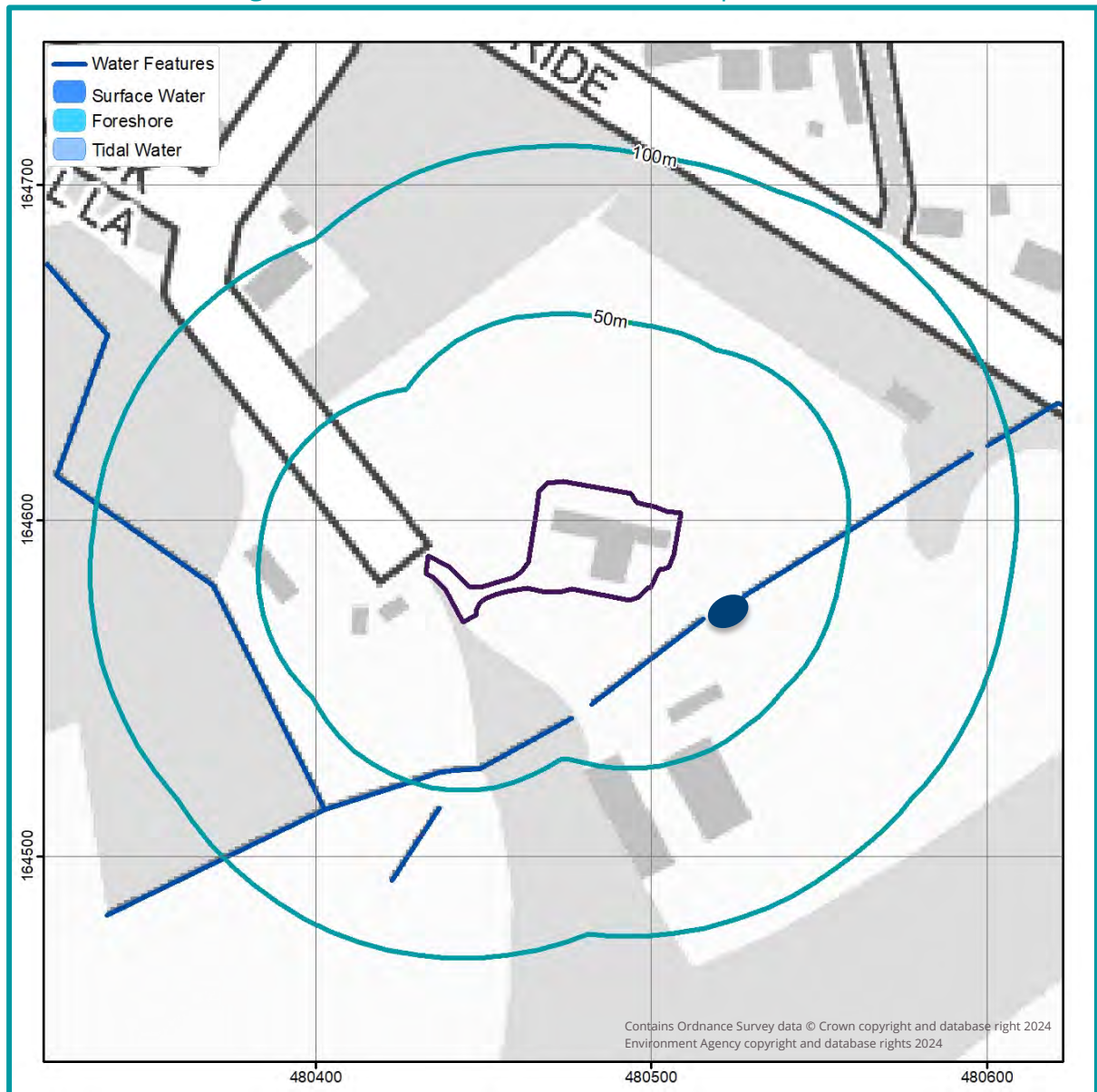


An assessment of the EA's groundwater Source Protection Zones (SPZs) has been undertaken within the vicinity of the Site and confirms the Site is not located within an SPZ.

Infiltration, if possible, is likely to be acceptable providing risk screening identifies suitable mitigation measures, if required, to prevent an impact on water quality from the proposed or historical land use and contaminated land.

If further analysis is required, this would involve a review of Site specific contaminated land data. If hazards are identified, it is recommended that the Local Authority and the Environment Agency are contacted to confirm the susceptibility of any SPZs within the wider area.

Figure 5. Surface water features map (EA, 2024)



The mapping above confirms that there are numerous surface water features located within proximity to the Site:

- Two unnamed surface water features (assumed as drainage ditches) are located c. 30m southeast and 55m southwest of the Site.
- A pond is located c.15m east of the Site and currently accepts surface water discharge from the existing Site drainage.

According to DEFRA's MagicMap, the Site is not within 250m of a SSSI or SPA. The nearest SSSI is the Longmoor Bog located approximately 820m north of the Site.

Figure 6. Sewer features map (OS & Thames Water, 2024)

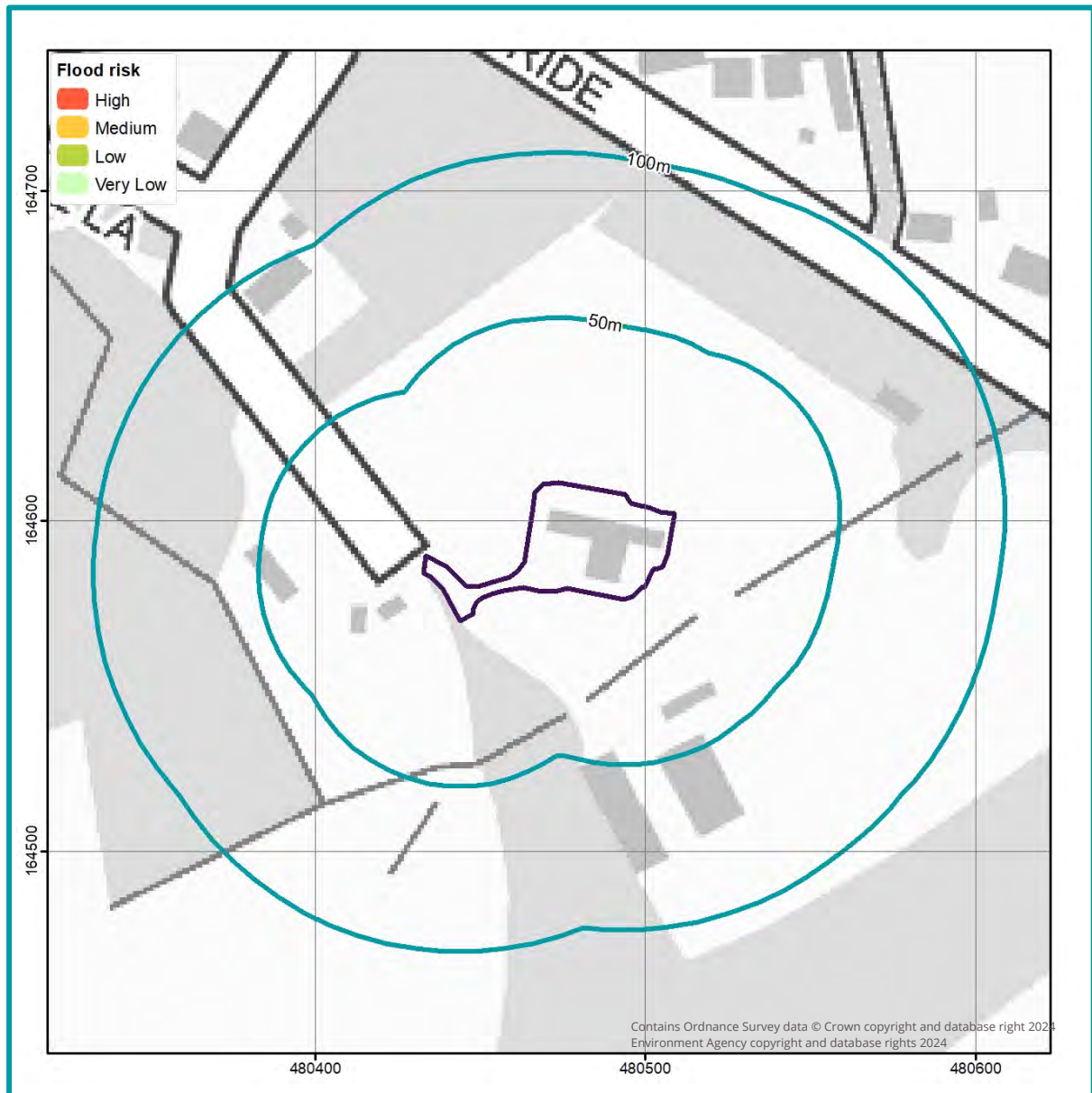


GeoSmart has undertaken an assessment of the location of sewer features within the vicinity of the Site. According to the asset location plan undertaken at the Site (Appendix D), there are no public surface water sewer or combined sewers located within the vicinity of the Site. However, there is a foul sewer located approximately 100m north of the Site on Heath Ride Lane at a lower elevation which the existing site discharges into.

Further analysis of the connections and condition of the public surface water drainage system should be undertaken by carrying out a CCTV survey or by contacting the drainage provider or the Local Council to confirm the presence, location and condition of the sewer. Consultation with the drainage provider would also be required to determine that sufficient capacity is available to accept the proposed discharge, and to gain permission to connect if required.

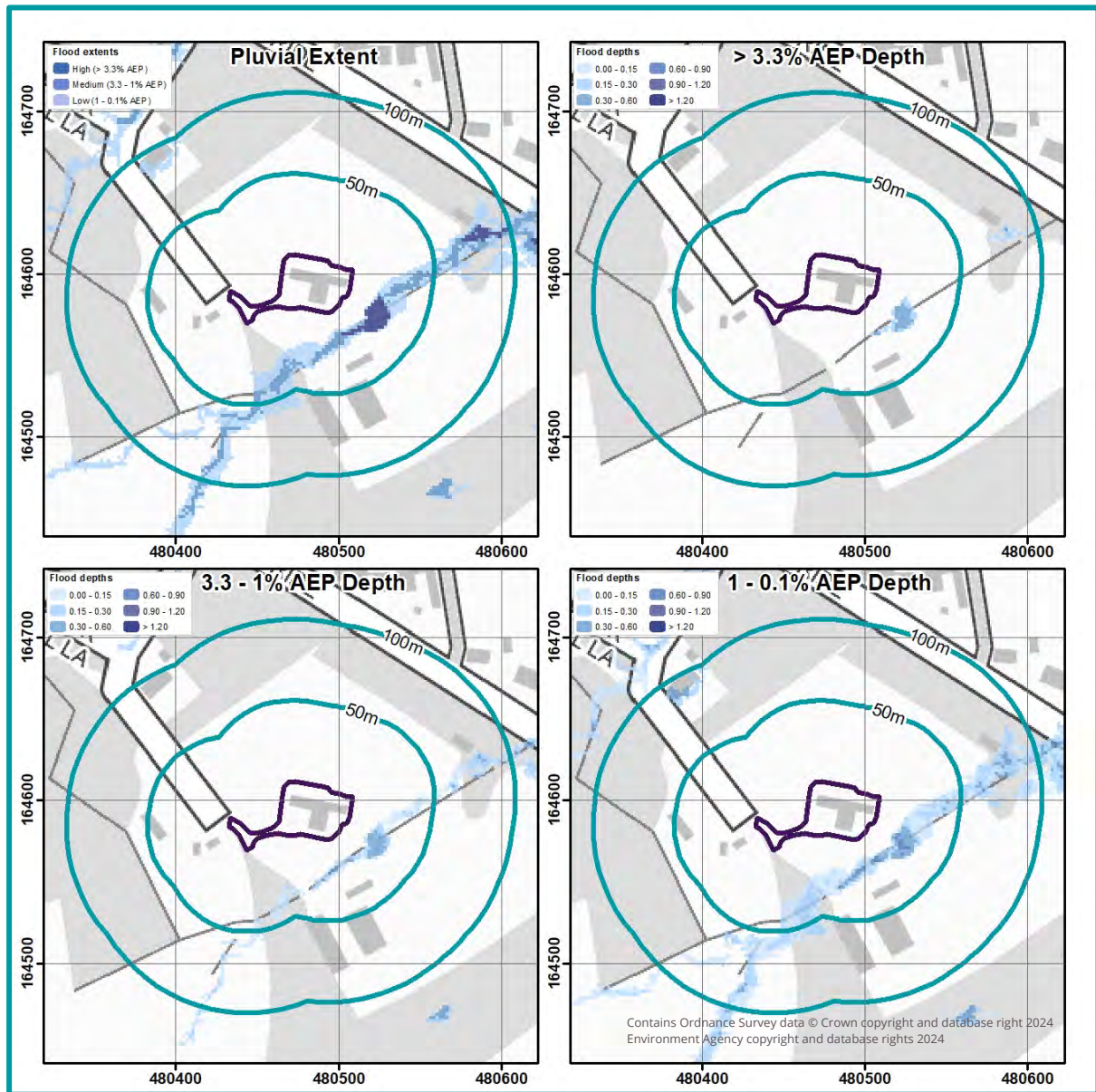
Where development is proposed above or within close proximity to the public sewer network, a build-over agreement or easement may be required with the relevant utility provider.

Figure 7. Risk of flooding from rivers & sea map (EA, 2024)



According to the EA's Risk of Flooding from Rivers and the Sea (RoFRS) map, the Site has a Very Low risk of flooding from fluvial or coastal flooding, with less than 0.1% annual probability of flooding, therefore the SuDs design is unlikely to be affected.

Figure 8. Risk of surface water flooding map (EA, 2024)

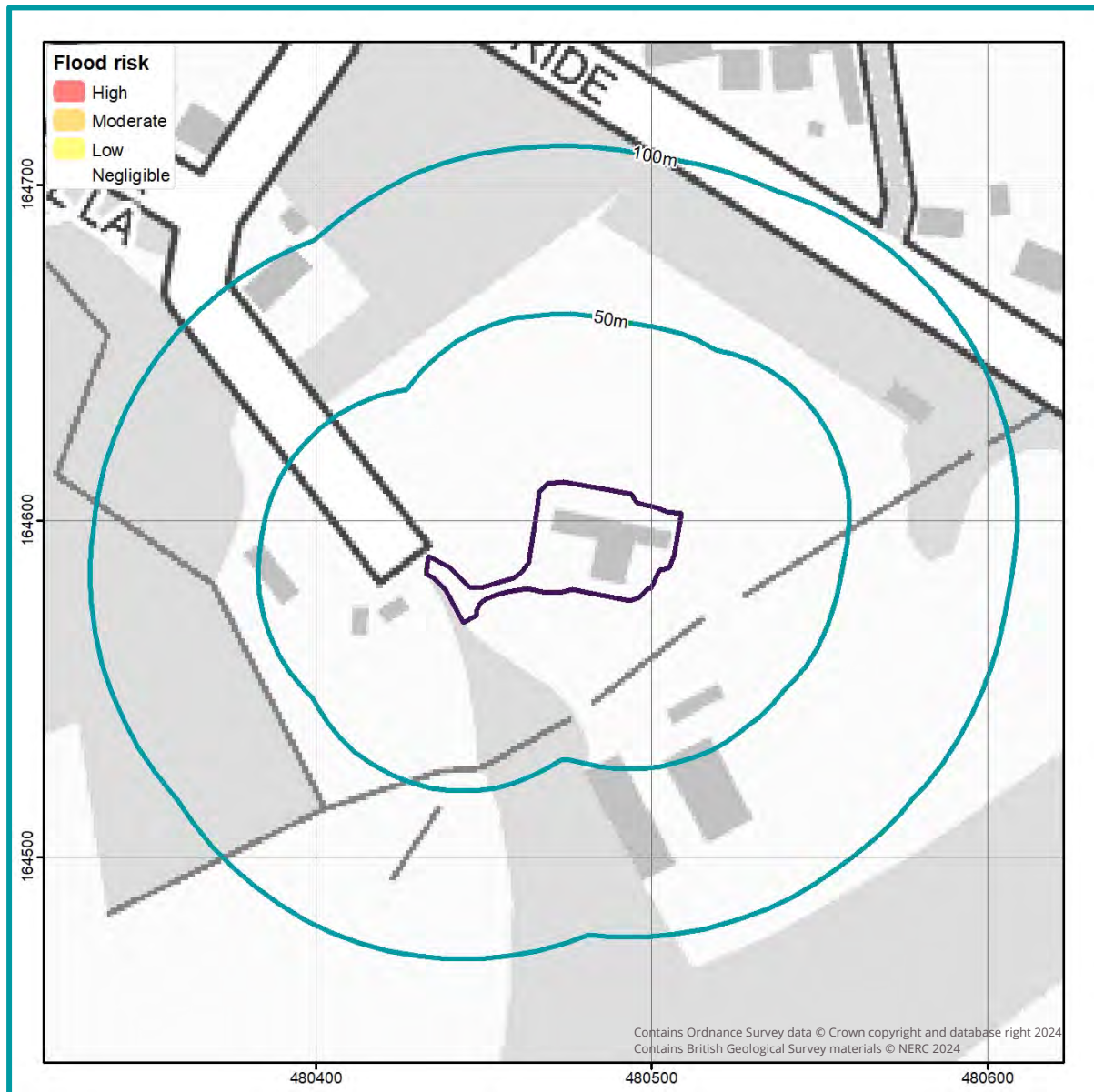


GeoSmart have undertaken an assessment of the risk of flooding from surface water (pluvial) sources within the vicinity of the Site using the EA's Risk of Flooding from Surface Water (RoFSW) mapping.

The above map shows the extent and depth of flooding during the >3.3% annual probability (AEP) (1 in 30 year – High risk), 3.3 – 1% AEP (1 in 100 year – Medium risk) and 1 – 0.1% AEP (1 in 1000 year – Low risk) events. This confirms that there are no areas of the Site which would be affected by surface water flooding.

Further analysis could be undertaken by visiting the Site or by contacting the Local Council and the Environment Agency to confirm the pluvial flood risk, flood depths and velocities where applicable.

Figure 9. Groundwater flood risk (GW5) map (GeoSmart, 2024)



GeoSmart have undertaken an assessment of the risk of flooding from groundwater within the vicinity of the Site. GeoSmart's Groundwater Flood Risk Screening (GW5) map confirms the Site has a Negligible risk of groundwater flooding during a 1% annual probability (1 in 100 year) event.

3 Site context



Site information

The purpose of this report is to assess the potential for disposing of surface water through a Sustainable Drainage System (SuDS) for the site of Willow Wick Farm, Willow Wick Lane, Finchampstead, RG40 3QH (the Site). The Site is located at in a setting of residential and agricultural use. The land slopes to the east from 74.90 mAOD to 72.61 mAOD. This is based upon a Site specific topographic survey undertaken by Geopoint Ltd and confirmed by EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of survey ± 150 mm (Appendix A).

Development

The Site is currently used within a residential capacity. At present there is a single detached dwelling and swimming pool with associated car parking and landscaped areas. Development proposals comprise the demolition of the existing building and construction of a replacement dwelling and two-car car port. The existing swimming pool will be retained as an open-air pool and soft landscaping improved. Site plans and drawings are provided in Appendix A.

Geology, permeability and thickness

British Geological Survey (BGS) national superficial and bedrock geology mapping confirms the geological formations underlying the Site and each formation may have a range of permeability.

Table 1. Site Geology

Geology present on-Site		Potentially permeable?
Superficial geology (Figure 11)	No superficial geology present	x
Bedrock geology (Figure 12)	Windlesham Formation (WIDS) (sandstone) (sand, silt and clay)	✓

The BGS website was used to extract ground information from the nearest borehole records to the Site, however no relevant borehole records were identified within proximity of the Site.

A Site investigation was conducted by The Brownfield Consultancy in March 2024 (Appendix B) and included the excavation of four borehole logs across the Site. These records indicate the underlying geology to comprise of topsoil to a depth of 0.40m below ground levels (bgl) overlying clay, sands and gravel of the Windlesham Formation to the base of the boreholes between 3.35 and 4.45m bgl. The logs recorded locally variable proportions of sand and clay.

Whilst infiltration may be possible, as the existing surface water drainage discharges to the pond c.15m east of the Site, discharge via the existing route is therefore considered most feasible. Discharge via infiltration is therefore not considered.

Figure 10. Superficial Geology (BGS, 2024)



Depth to groundwater

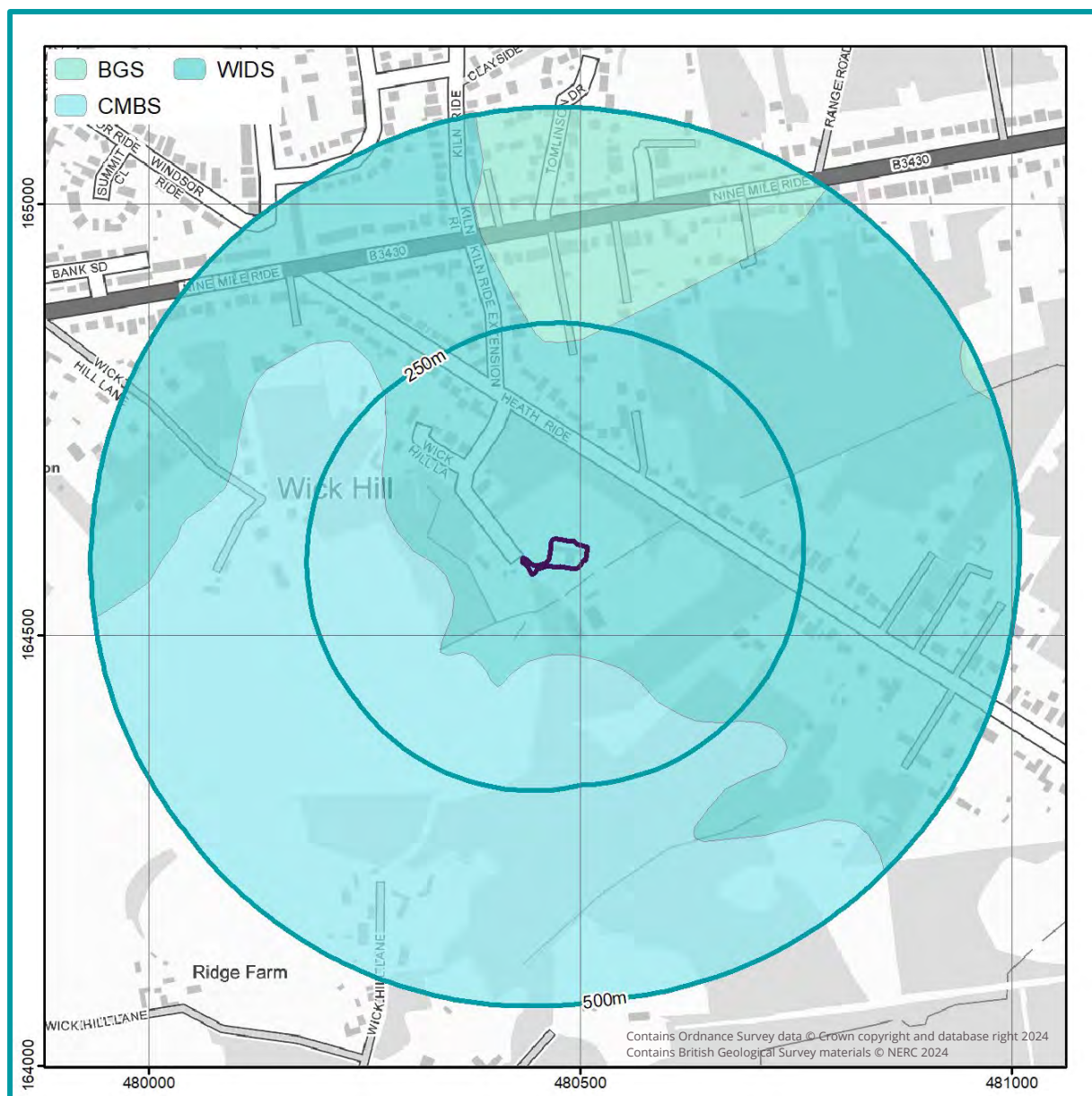
The SuDS system should be designed to operate in periods of extreme groundwater levels.

According to Site-specific ground investigation and GeoSmart's Groundwater Flood Risk (GW5) map, shallow groundwater may potentially be an issue at the Site. Whilst the GW5 map indicated a Negligible groundwater risk, the Site Investigation by The Brownfield Consultancy in March 2024 (Appendix B, recorded groundwater seepage in numerous boreholes across the Site:

- Borehole WS1 did not encounter groundwater down to the base of the borehole at 4.45m bgl.
- Borehole WS2 did not encounter groundwater down to the base of the borehole at 4.45m bgl.
- Borehole WS3 encountered groundwater seepage at 1.40m bgl.
- Borehole WS4 encountered groundwater seepage at 2.70m bgl.

As boreholes WS3 and WS4 encountered shallow groundwater, it is unlikely that a focused infiltration system would be at least 1 m above the expected seasonal high-water table and is therefore not feasible. Passage through unsaturated soil is important for improving the quality of infiltrating water before it reaches the water table.

Figure 11. Bedrock Geology (BGS, 2024)



Ground conditions

Infiltration SuDS features are not proposed at the Site, therefore a detailed investigation into the ground conditions is not required.

Water quality

The Site does not lie within an SPZ and infiltration features are not proposed therefore for the purposes of the sustainable drainage assessment further consideration of the historical land uses (and any associated contamination risks) is not considered necessary.

.

Infiltration systems should not be used where there is a risk of contaminating groundwater by infiltrating polluted runoff or where receiving groundwater is particularly sensitive.

The influence of surface runoff on water quality will depend on whether there is a source of contamination on-Site and the sensitivity of the receiving environment, either groundwater or surface water. The intervening pathway from source to receptor including mitigation and natural attenuation will determine the final impact.

The impact of contaminants on the groundwater will be reduced by travel and natural attenuation through the unsaturated soil zone. A greater depth of unsaturated zone and the presence of significant clay and organic material will provide greater protection for the underlying groundwater. Rapid flow through fractures will provide less protection than intergranular flow around soil and rock particles.

4 National & local policy context



National Guidance

CIRIA SuDS Manual (C753) (2015)

A development should utilise sustainable drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1. Use infiltration techniques, such as porous surfaces in non-clay areas,
2. attenuate rainwater in ponds or open water features for gradual release,
3. attenuate rainwater by storing in tanks or sealed water features for gradual release,
4. discharge rainwater direct to a watercourse,
5. discharge rainwater to a surface water sewer / drain,
6. discharge rainwater to the combined sewer.

Defra - Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems (2015)

Peak Flow control

For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

Volume control

Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event. The runoff volume must be discharged at a rate that does not adversely affect flood risk.

The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the Site for a 1 in 30 year rainfall event.

Ministry of Housing, Communities & Local Government – National Planning Practice Guidance: Flood risk assessments: climate change allowances (2022)

The Peak rainfall intensity allowances section provides advice on the increased rainfall effects on river levels and land and urban drainage systems. As of May 2022, the applicable climate change allowance is defined by specific Management Catchment for the 1 in 30 ($\geq 3.3\%$ AEP) and 1 in 100 (< 3.3 to 1% AEP) year event.

As the Site is located within the Loddon and tributaries Management Catchment the following climate change allowances are applicable.

Table 2. Loddon and tributaries Management Catchment peak rainfall allowances

Loddon and tributaries Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Central	20%	25%	20%	25%
Upper end	35%	35%	40%	40%

The drainage system should be designed to make sure there is no increase in the rate of runoff discharged from the Site for the upper end allowance.

Where on-Site flooding for the upper end allowance presents a significant flood hazard (for example, depths and velocities of surface water runoff cause a significant danger to people), you will need to take further mitigation measures to protect people and property (for example, raising finished floor levels). As a minimum, there should be no significant flood hazard to people from on-Site flooding for the central allowance.

Sub-national Drainage Policy (i.e. county/London plan level)

London Plan - Policy SI13 Sustainable drainage (2021)

Lead Local Flood Authorities should identify – through their Local Flood Risk Management Strategies and Surface Water Management Plans – areas where there are particular surface water management issues and aim to reduce these risks. Increases in surface water run-off outside these areas also need to be identified and addressed. Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:

1. Rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation);
2. Rainwater infiltration to ground at or close to source;
3. Rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens);
4. Rainwater discharge direct to a watercourse (unless not appropriate);
5. Controlled rainwater discharge to a surface water sewer or drain;
6. Controlled rainwater discharge to a combined sewer.

Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable, including on small surfaces such as front gardens and driveways.

Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improved water quality, and enhanced biodiversity, urban greening, amenity and recreation.

Development proposals should aim to get as close to greenfield run-off rates as possible depending on Site conditions. The well-established drainage hierarchy set out in this policy helps to reduce the rate and volume of surface water run-off. Rainwater should be managed as close to the top of the hierarchy as possible. There should be a preference for green over grey features, and drainage by gravity over pumped systems. A blue roof is an attenuation tank at roof or podium level; the combination of a blue and green roof is particularly beneficial, as the attenuated water is used to irrigate the green roof.

For many sites, it may be appropriate to use more than one form of drainage, for example a proportion of rainwater can be managed by more sustainable methods, with residual rainwater managed lower down the hierarchy. In some cases, direct discharge into the watercourse is an appropriate approach, for example rainwater discharge into the tidal Thames or a dock. This should include suitable pollution prevention filtering measures, ideally by using soft engineering or green infrastructure. In addition, if direct discharge is to a watercourse where the outfall is likely to be affected by tide-locking, suitable storage should be designed into the system. However, in other cases direct discharge will not be appropriate, for example discharge into a small stream at the headwaters of a catchment, which may cause flooding. This will need to be assessed on a case-by-case basis, taking into account the location, scale and quality of the discharge and the receiving watercourse. The maintenance of identified drainage measures should also be considered in development proposals.

London Plan - Sustainable design and Construction SPG: Section 3.4.9 (2014)

Most developments have been able to achieve at least 50% attenuation of the site's (prior to re-development) surface water runoff at peak times. This is the minimum expectation from development proposals.

On previously developed sites, runoff rates should not be more than three times the calculated greenfield rate. The only exceptions to this, where greater discharge rates may be

acceptable, are where a pumped discharge would be required to meet the standards or where surface water drainage is to tidal waters and therefore would be able to discharge at unrestricted rates provided unacceptable scour would not result.

Discharge to surface water course/sewer

There may be situations where it is not appropriate to discharge at greenfield runoff rates. These include, for example, sites where the calculated greenfield runoff rate is extremely low and the final outfall of a piped system required to achieve this would be prone to blockage.

Local Policy

Wokingham SuDS Strategy: Guidance on the use of sustainable drainage systems (Wokingham Borough Council, 2017)

The most relevant local policies are included below:

- **WokBC-LS4:** All proposals to discharge to a water body, public or private sewer shall be accompanied with correspondence confirming acceptance of the proposal from the receiving network owner and that the receiving network has the necessary capacity to receive additional flows and/or that required reinforcement works will be provided.
- **WokBC-LS5:** In addition to the requirements of S2, Wokingham requires demonstration that discharges from the proposed development for all return periods from the 1 in 1 through to the 1 in 100 year (inclusive), do not exceed their corresponding greenfield/previously developed discharge rates. Demonstration of this is required for the 1 in 1 year, 1 in 30 year, 1 in 100 year and 1 in 100 year including allowances for climate change.
- **WokBC-LS11:** Long term storage must be provided to limit the volume of runoff from the 1 in 100 year event with an allowance for 40% climate change, unless discharge rates have been restricted to QBar.
- **WokBC-LS13:** All surface storage features (ponds, wetlands and basins) must provide a 300mm freeboard above the maximum design water level, unless otherwise agreed.
- **WokBC-LS15:** The drainage system must be designed so that the capacity of the drainage system takes account of the likely impacts of climate change and likely changes in impermeable area within the development over the design life of the development. To allow for future urban expansion within the development (urban creep), an increase in paved surface area of 10% should be used, unless this would produce a percentage impermeability greater than 100%.
- **WokBC-LS24:** All infiltration systems must be sited so that they do not compromise the structural stability of buildings or roads. They must not be situated within 5m of any building or road and if situated on chalk geology they must be sited in accordance with CIRIA C754 – Engineering in Chalk.
- **WokBC-LS41:** The drainage system must be designed so that surface runoff not collected for use must be discharged to one or more of the following, listed in order of priority:

- discharge into the ground (infiltration); or where not reasonably practicable,
- discharge to a surface water body; or where not reasonably practicable,
- discharge to a surface water sewer, highway drain, or another drainage system; or where not reasonably practicable,
- discharge to a combined sewer.

5 Storage, volume and peak flow rate



Suggested minimum and aspirational storage requirements for an infiltration or attenuation SuDS scheme for the development footprint are set out below, with more detail provided in subsequent sections. Storage volumes may be reduced (but not below the minimum level) if the design incorporates off-Site discharge.

Table 3. Storage requirements at the proposed development Site (Discharge runoff to pond)

Attenuation scenario	Attenuation required (m ³)	Explanation
1 in 100 year including 40% CC	2.90	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year (3 hour, Critical Storm Duration) event including a 40% allowance for climate change*.

*See Appendix C for associated runoff and discharge calculations. Discharge rates all restricted as close as possible to greenfield rates in their respective events.

Surface water runoff

An increase in impermeable area on-Site will result in greater rainfall runoff. Reduction in runoff will help mitigate flood risk both on and off-Site. Further information on the surface water runoff calculations is provided in Section 12 'Background Information'.

Guidance

The Non-Statutory Technical Guidance for SuDS (Defra, March 2015) states:

"Where reasonably practicable, for Greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the Greenfield runoff volume for the same event. Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the Greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event."

Table 4. Change in impermeable area associated with the development

Total Site area	1420 m ²
Impermeable area (and as a percentage of the total area of the proposed development footprint of 550 m ²)	
Pre-development	Post-development
550 m ² (100%)	550 m ² (100%)
Impermeable land use: Existing dwelling Hard landscaping	New impermeable land use: Replacement dwelling Permeable paving* Hard landscaping

*Please note, while these areas will be utilized for SuDS, for the calculations a permeable paved area (164m²) will be classed as impermeable in order to assess the potential run-off volumes and rates for the Site post- development and the potential holding capability of the proposed SuDS features.

Guidance

"The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event' and 'flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development"

(Defra, March 2015, non-statutory guidance).

6 Runoff destination



Options for the destination for the runoff generated on-Site have been assessed in line with the prioritisation set out in the Building Regulations Part H document (HM Government, published in 2010 and updated in 2015) and Defra's Non-statutory Technical Standards for SuDS (2015).

Flow attenuation using infiltration SuDS (discharge to ground) is generally the preferred option. If discharge to ground is not available, runoff discharge to surface water is the other preferred method. Only if these two options are impractical should discharge to the sewer network be considered.

Discharge to ground

Baseline mapping indicates the Site has a high to moderate potential for infiltration, with permeable underlying sandstone. In addition, whilst groundwater flood risk mapping indicates a Negligible risk of groundwater, a Site Investigation by Brownfield Consultancy in March 2024 identified a shallow water table beneath the Site which would limit the use of infiltration features as the base of the infiltration system needs to be at least 1m above the expected seasonal high water table. Based on the available borehole information and groundwater flood risk mapping there is a low potential for occasional high groundwater levels.

Therefore, due to the shallow water table and as the existing Site drainage currently discharges to the nearby pond, discharge via infiltration is therefore not considered feasible.

There are no known issues identified relating to Site contamination or the presence of a SPZ.

Discharge to surface watercourse

There is a pond located approximately 15m east of the Site. It sits at a lower elevation than any potential SuDS scheme would be and is also in the direction of the natural flow path of runoff from the Site. The existing Site drainage, discharges to the existing pond and the proposed Site drainage will tie into the existing surface water drain.

Further investigation would be required to confirm the exact location, level and drainage routing of the existing and proposed on-Site drainage. A flow control device was proposed to limit peak discharge rates to the maximum selected rate as indicated in Section 6 along with the appropriate attenuation storage volume.

Discharge to sewer

GeoSmart has undertaken an assessment of the location of sewer features within the vicinity of the Site. According to the asset location plan undertaken at the Site (Appendix D), there are no public surface water sewer or combined sewers located within the vicinity of the Site.

A foul sewer is located approximately 100m north of the Site on Heath Ride Lane. The proposed development will utilize the existing connection to this foul sewer to discharge foul water.

7 Water quality



A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution. This can be effectively managed by an appropriate “train” or sequence of SuDS components that are connected in series. The frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals and various organic and inorganic contaminants). Therefore, the first 5-10 mm of rainfall (first flush) should be adequately treated with SuDS.

The minimum number of treatment stages will depend on the sensitivity of the receiving water body and the potential hazard associated with the proposed development SuDS Manual (CIRIA, 2015). The proposed development is a combination of very low (roof water) to low hazard (runoff from car parking). The Site does not lie within an SPZ and therefore additional treatment stages are not required.

Table 5. Level of hazard

Hazard	Source of hazard
Very Low	Residential roof drainage
Low	Residential, amenity uses including low usage car parking spaces and roads, other roof drainage.
Medium	Commercial, industrial uses including car parking spaces and roads (excluding low usage roads, trunk roads and motorways).
High	Areas used for handling and storage of chemicals and fuels, handling of storage and waste (incl. scrap-yards).

The recommended minimum number treatment stages suggested for the different runoff waters identified for the proposed development is highlighted in the table below.

Table 6. Minimum number of treatment stages for runoff

		Sensitivity of the receiving water body		
		Low	Medium	High
Hazard	Low	1	1	1
	Med	2	2	2
	High	3	3	3

8 Client checklist



A drainage strategy should now be compiled on the basis of the information provided. Prior to installation of the Site drainage system it is recommended that the client carries out the following checks to confirm the development proposals. GeoSmart would be able to support with any updates required to the drainage scheme, please contact us and we would be happy to provide you with a proposal to undertake the work.

Table 7. Potential SuDS limitations

Conditions in Non-Statutory Technical Standards (Defra, 2015), limitations to infiltration SuDS	Do these conditions arise at the Site?
Is the surface runoff greater than the rate at which water can infiltrate into the ground?	
Is there an unacceptable risk of ground instability?	
Is there an unacceptable risk of mobilising contaminants?	
Is there an unacceptable risk of pollution to groundwater?	
Is there an unacceptable risk of groundwater flooding?	
Is the infiltration system going to create a high risk of groundwater leakage to the combined sewer?	

Table 8. SuDS design considerations

Confirm that potential flooding on-Site in excess of the design storm event and exceedance flow routes have been considered.	
Review options for the control of discharge rates (e.g. hydrobrake).	
Confirm the owners/adopters of the drainage system. Consider management options for multiple owners.	
Is there an unacceptable risk of pollution to groundwater?	
Review access and way leave requirements.	
Review maintenance requirements.	

Health and safety considerations for SuDS

GeoSmart reports may include outline strategies or designs to support with development plans. Any drawings or advice provided do not comprise any form of detailed design. Implementation of any conceptual scheme options may constitute 'Construction Work' as defined by CDM Regulations (2015).

The CDM Regulations place specific Health and Safety duties on those commissioning, planning and undertaking construction works. If you are uncertain what this means you should seek the advice of your architect, builder or other competent professional.

GeoSmart does not provide health and safety advisory services but we are required to advise you of your general responsibilities under CDM (visit <http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/> for more information).

Please remember that detailed design work should be undertaken by a competent professional who might be your engineer, architect, builder or another competent party.

9 Methodology and limitations of study



This report assesses the feasibility of infiltration SuDS and alternative drainage strategies in support of the Site development process. From April 6th 2015 SuDS are regulated by Local Planning Authorities and will be required under law for major developments in all cases unless demonstrated to be inappropriate. What is considered appropriate in terms of costs and benefits by the Planning Authority will vary depending on local planning policy, and Site setting. The Lead Local Flood Authority will require information as a statutory consultee on major planning applications with surface water drainage implications. The National Planning Policy Framework requires that new developments in areas at risk of flooding should give priority to the use of SuDS and demonstrate that the proposed development does not increase flood risk downstream to third parties.

How was the suitability of SuDS estimated for the Site?

There are a range of SuDS options available to provide effective surface water management that intercept and store excess runoff. When considering these options, the destination of the runoff should be assessed using the order of preference outlined in the Building Regulations Part H document (HM Government, 2010) and Defra's National Standards for SuDS (2015):

1. Discharge to the ground;
2. Discharge to a surface water body;
3. Discharge to a surface water sewer;
4. Discharge to a local highway drain; and
5. Discharge to a combined sewer.

Data sets relating to each of the potential discharge options have been analysed to assess the feasibility of each option according to the hierarchy set out above. Hydrogeological characteristics for the Site are assessed in conjunction with the occurrence of SPZ's to assess infiltration suitability. The Site has been screened to determine whether flood risk from groundwater, surface water, fluvial or coastal sources may constrain SuDS. The distance to surface water bodies and sewers has been reviewed gauge whether these provide alternative options.

GeoSmart SuDS Infiltration Suitability Map (SD50)

The GeoSmart SuDS Infiltration Suitability Map (SD50) screens the suitability for infiltration drainage in different parts of the Site and indicates where further assessment is recommended. In producing the SuDS Infiltration Suitability Map (SD50), GeoSmart used data from the British Geological Survey on groundwater levels, geology and permeability to screen

for areas where infiltration SuDS may be suitable. The map classifies areas into 3 categories of High, Medium and Low suitability for infiltration SuDS. This can then be used in conjunction with additional data on Site constraints to give recommendations for SuDS design and further investigation.

The primary constraint on infiltration potential is the minimum permeability of the underlying material and in some cases the range in permeability may be considerable, ranging down to low. The map classifies these areas as moderate infiltration suitability requiring further investigation. In cases where the thickness of the receiving permeable horizon is less than 1.5 meters then additional Site investigation is recommended. If the Site is at risk of groundwater flooding for up to the 1% annual occurrence the map classifies these areas as moderate infiltration suitability requiring further investigation.

The GeoSmart SuDS Infiltration Suitability Map (SD50) is a national screening tool for infiltration SuDS techniques but a Site specific assessment should be used before final detailed design is undertaken. Further information on the GeoSmart SuDS Infiltration Suitability Map (SD50) is available at geosmartinfo.co.uk

How is the suitability to discharge to sewers and watercourses calculated?

The suitability to discharge to discharge to sewers and watercourses has been calculated using the distance from the Site to both. For example, where the Site is within 50 m of a surface water body. Discharge to surface water is potentially appropriate subject to land access arrangements and a feasibility assessment. Where the Site is within 50 m of a sewer, discharge to sewer is potentially appropriate subject to land access arrangements and a feasibility assessment. The utility company should be contacted to agree connection feasibility and sewer capacity.

Further information relating to sewers available in the area can be found in Appendix D.

What is a Source Protection Zone?

The Environment Agency 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, outer and total catchment) and a fourth zone of special interest, which is occasionally applied. The zones are used to set up pollution prevention measures in areas which are at a higher risk. The shape and size of a zone depends on the condition of the ground, how the groundwater is removed, and other environmental factors. Inner zone (Zone 1) is defined as the 50 day travel time from any point below the water table to the source (minimum radius of 50 metres). Outer zone (Zone 2) is defined by a 400 day travel time. Total catchment (Zone 3) is defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source.

How was surface water runoff estimated from the Site?

In accordance with The SuDS Manual (C753) (CIRIA, 2015), the Greenfield runoff from the Site has been calculated using the IoH124 method and is assumed representative of the runoff generated on the undeveloped surfaces that are affected by the proposed development. The method used for calculating the runoff complies with the NPPF (MHCLG, 2023). For the impermeable surfaces, it has been assumed that 100% runoff will occur (calculations provided in Appendix C). Rainfall data is derived from the Flood Estimation Handbook (FEH), developed by NERC (2009). Only areas affected by the proposed development are considered in the flow and volume calculations. Permeable areas that remain unchanged are not included in the calculations as it is assumed these will not be actively drained and attenuated.

What is the peak discharge rate?

An estimation of peak runoff flow rate and volume is required to calculate infiltration, storage and discharge requirements. The peak discharge rate is the maximum flow rate at which surface water runoff leaves the Site during a particular storm event, without considering the impact of any mitigation such as storage, infiltration or flow control. Proposed discharge rates (with mitigation) should be no greater than existing rates for all corresponding storm events. If all drainage is to infiltration there will be no discharge off-Site. Discharging all flow from Site at the existing 1 in 100 event would increase flood risk during smaller events. Flow restriction is generally required to limit the final discharge from Site during all events as a basic minimum to the green field QBAR rate. A more complex flow restriction which varies the final discharge rate from the Site depending on the storm event will reduce the volume of storage required on-Site. Drainage to infiltration SuDS is subtracted from the total discharge off-Site to achieve a beneficial net affect.

What is the total discharge volume?

The total discharge volume is calculated on the basis of the surface water runoff that has the potential to leave the Site as a result of the assumed 6 hour duration design storm event. The runoff is related to the underlying soil conditions, impermeable cover, rainfall intensity and duration of the storm event. The total volume generated by the current Site is compared to the potential total volume from the developed Site (not taking into consideration any mitigation). The difference provides the minimum total volume that will need to be stored and infiltrated on-Site or released at a controlled rate. Guidance indicates that the total discharge volume should never exceed the runoff volume from the development Site prior to redevelopment for that event and should be as close as is reasonably practicable to the Greenfield runoff volume.

10 Background SuDS information



SuDS control surface water runoff close to where it falls. SuDS are designed to replicate, as closely as possible, the natural drainage from the Site before development to ensure that the flood risk downstream does not increase as a result of the Site being developed, and that the Site will have satisfactory drainage under current and likely future climatic conditions. SuDS provide opportunities to reduce the causes and impacts of flooding; remove pollutants from urban runoff at source; and combine water management with green space with benefits for amenity, recreation and wildlife. Government planning policy and planning decisions now include a presumption in favour of SuDS being used for all development Sites, unless they can be shown to be inappropriate.

For general information on SuDS see our website: <http://geosmartinfo.co.uk/>

Infiltration SuDS

Government policy for England is to introduce sustainable drainage systems (SuDS) via conditions in planning approvals. Guidance indicates that capturing rainfall runoff on-Site and infiltrating it into the ground (infiltration SuDS) is the preferred method for managing surface water without increasing flood risk downstream.

The greatest benefit to general flood risk is if all runoff is infiltrated on-Site, however, this may not be feasible due to physical and economic constraints in which case infiltration may be considered as a part of an integrated drainage solution. The final design capacity for an infiltration SuDS system depends on the Site constraints and the requirements of the individual Planning Authority and the Lead Local Flood Authority.

The capacity of the ground to receive infiltration depends on the nature, thickness and permeability of the underlying material and the depth to the high groundwater table. The final proportion of the Site drained by infiltration will depend on topography, outfall levels and a suitable drainage gradient. It is important to note that, even if the whole Site cannot be drained by infiltration, the use of partial infiltration is encouraged, with the remainder of runoff discharged via other SuDS systems.

Types of infiltration SuDS

Infiltration components include infiltration trenches, soakaways, swales and infiltration basins without outlets, rain gardens and permeable pavements. These are used to capture surface water runoff and allow it to infiltrate (soak) and filter through to the subsoil layer, before returning it to the water table below.

An infiltration trench is usually filled with permeable granular material and is designed to promote infiltration of surface water to the ground. An infiltration basin is a dry basin or depression designed to promote infiltration of surface water runoff into the ground. Soakaways are the most common type of infiltration device in the UK where drainage is often connected to over-sized square or rectangular, rubble-filled voids sited beneath lawns.

According to the guidance in Building Research Establishment (BRE) Digest 365 (2016) a soakaway must be able to discharge 50% of the runoff generated during a 1 in 10 year storm event within 24 hours in readiness for subsequent storm flow. This is the basic threshold criteria for a soakaway design and the internal surface area of the proposed soakaway design options should be calculated on this basis by taking into account the soil infiltration rate for the Site.

Developers need to ensure their design takes account of the construction, operation and maintenance requirements of both surface and subsurface components, allowing for any machinery access required.

SuDS maintenance and adoption

Regular maintenance is essential to ensure effective operation of the soakaway(s) over the intended lifespan of the proposed development. A maintenance schedule for SuDs is required. Sewerage undertakers or Local Authorities may adopt SuDS and will require maintenance issues to be dealt with in accordance with their Management Plan. If the SuDS will not be adopted other provision is required with associated financial implications. Maintenance is a long-term obligation requiring the upkeep of all elements of the SuDS, including mechanical components (e.g. pumps), as well as inspections, regular maintenance and repair.

Additional background SuDS information can be found on our website: <http://geosmartinfo.co.uk/>

11 Further information



The following table includes a list of additional products by GeoSmart:

Additional GeoSmart Products			
✓	Additional assessment: FloodSmart Report		The FloodSmart Report range provides clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at a Site. Our consultants assess available data to determine the level of risk based on professional judgement and years of experience. Please contact info@geosmartinfo.co.uk for further information.
✓	Additional assessment: EnviroSmart Report		Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective. Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements. Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions. Please contact info@geosmartinfo.co.uk for further information.

12 References and glossary



British Geological Survey (BGS). (2024). BGS Onshore Geoindex. Based on British Geological Survey materials © NERC 2024. Accessed from: <https://mapapps2.bgs.ac.uk/geoindex/home.html> on 07/05/2024.

Building Research Establishment (BRE) (2016). Digest 365, Soakaway design.

CEH (2024) Online FEH web service Depth/duration/frequency modelling using the FEH 1999 and 2013 models. Accessed from: <https://fehweb.ceh.ac.uk/> on 07/05/2024.

CIRIA (2015) The SuDS manual (C753).

DEFRA (2015). Non-statutory technical standards for SuDS (March 2015).

DEFRA (2024). MagicMap. Accessed from: <http://magic.defra.gov.uk/MagicMap.aspx> on 07/05/2024.

GeoSmart (2024) GeoSmart GW5 Version 2.4.

HM Government (2010). The building regulations 2010 Part H drainage and waste disposal (2015 edition).

LASOO (2015) Practice Guidance, Local Authority SuDS Officer Organisation.

Ministry of Housing, Communities & Local Government. (2023). National Planning Policy Framework (NPPF).

Ministry of Housing, Communities & Local Government. (2022). National Planning Policy Guidance (NPPG).

Wokingham Borough Council (2017). Wokingham SuDS Strategy: Guidance on the use of sustainable drainage systems. Accessed from: <https://www.wokingham.gov.uk/community-and-safety/emergencies/drainage-and-flooding/> on 07/05/2024.

Glossary

General terms

Attenuation	Reduction of peak flow and increased duration of a flow event.
Combined sewer	A sewer designed to carry foul sewage and surface water in the same pipe.
Detention basin	A vegetated depression, normally is dry except after storm events, constructed to store water temporarily to attenuate flows. May allow infiltration of water to the ground.
Evapotranspiration	The process by which the Earth's surface or soil loses moisture by evaporation of water and by uptake and then transpiration from plants.
FEH	Flood Estimation Handbook, produced by Centre for Ecology and Hydrology, Wallingford (formerly the Institute of Hydrology).
Filter drain or trench	A linear drain consisting of a trench filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage, to store and conduct water, but may also be designed to permit infiltration.
First flush	The initial runoff from a site or catchment following the start of a rainfall event. As runoff travels over a catchment it will collect or dissolve pollutants, and the "first flush" portion of the flow may be the most contaminated as a result. This is especially the case for intense storms and in small or more uniform catchments. In larger or more complex catchments pollution.
Flood plain	Land adjacent to a watercourse that would be subject to repeated flooding under natural conditions (see Environment Agency's Policy and practice for the protection of flood plains for a fuller definition).
Greenfield runoff	This is the surface water runoff regime from a site before development, or the existing site conditions for brownfield redevelopment sites.
Impermeable surface	An artificial non-porous surface that generates a surface water runoff after rainfall.
Permeability	A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium, for example grain size, porosity and pore shape.

Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.
Sewerage undertaker	This is a collective term relating to the statutory undertaking of water companies that are responsible for sewerage and sewage disposal including surface water from roofs and yards of premises.
Soakaway	A subsurface structure into which surface water is conveyed to allow infiltration into the ground.
Treatment	Improving the quality of water by physical, chemical and/or biological means.

The terms included in this glossary have been taken from CIRIA (2015) guidance.

Data Sources

Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2024 BlueSky copyright and database rights 2024
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2024 Ordnance Survey data © Crown copyright and database right 2024
Flood Risk (RoFRS/Pluvial/Surface Water Features/SPZ)	Environment Agency copyright and database rights 2024 Ordnance Survey data © Crown copyright and database right 2024
Flood Risk (Groundwater) and SuDS infiltration suitability (SD50)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2024) Contains British Geological Survey materials © NERC 2024 Ordnance Survey data © Crown copyright and database right 2024
Sewer Location	Contains Ordnance Survey data © Crown copyright and database right 2024 Contains Thames Water Search data 2024
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2024 Environment Agency copyright and database rights 2024

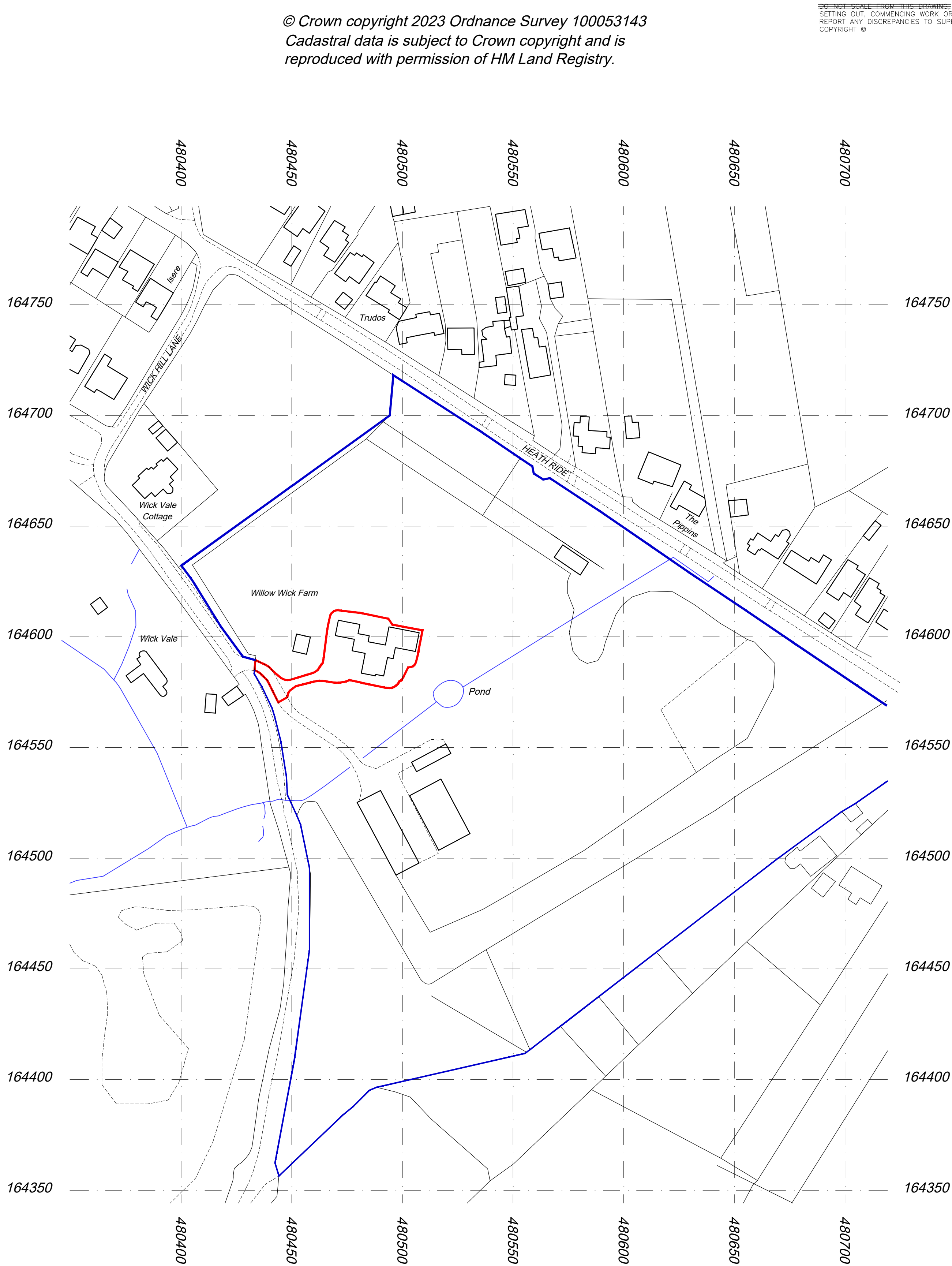
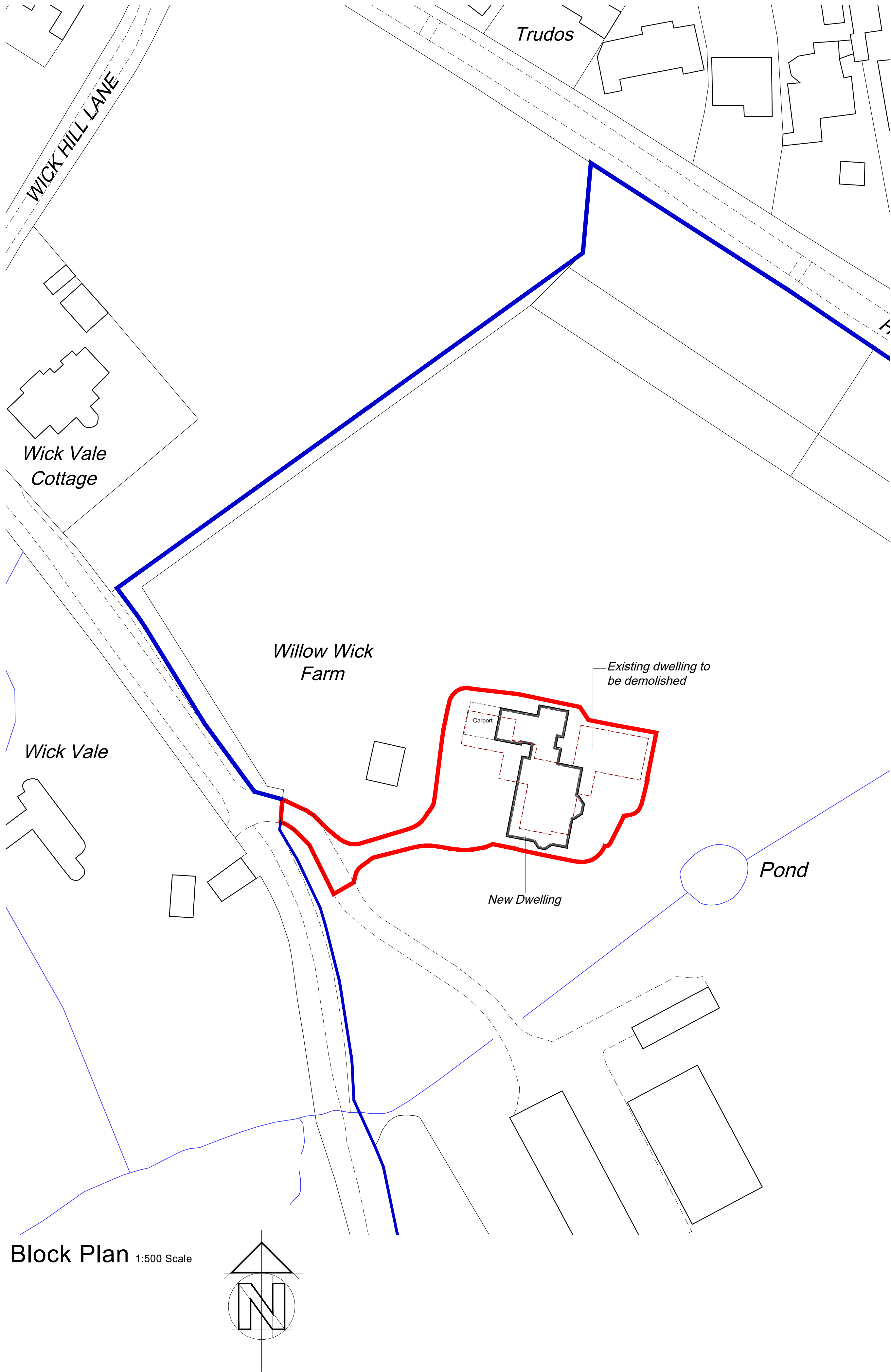
13 Appendices



Appendix A



Site plans



© Crown copyright 2023 Ordnance Survey 100053143
Cadastral data is subject to Crown copyright and is reproduced with permission of HM Land Registry.

DO NOT SCALE FROM THIS DRAWING. VERIFY ALL DIMENSIONS BEFORE SETTING OUT, COMMENCING WORK OR MAKING ANY SHOP DRAWINGS. REPORT ANY DISCREPANCIES TO SUPERVISING OFFICER IMMEDIATELY. COPYRIGHT ©

Rev A - Carport Added - 18-09-23

Bonney Architecture
PLANNING & TECHNICAL SERVICES

CLIENT Mr & Mrs J Marino

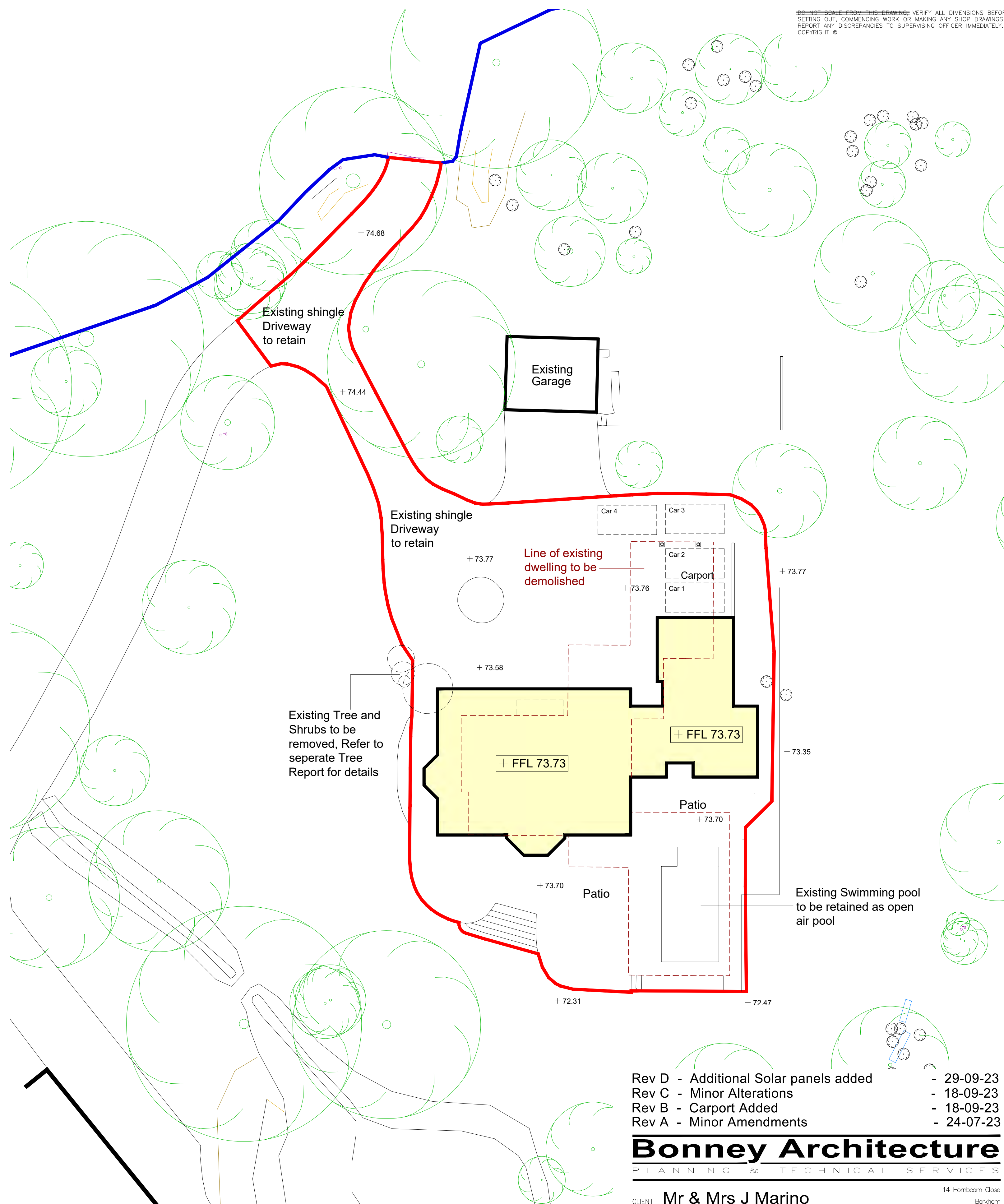
JOB Willow Wick Farm, Wick Hill Lane, Finchampstead, Wokingham, LOCATION / BLOCK PLAN

DRG

SCALE As Shown DRAWN P Bonney DATE July 2023

BA 0251|07|A

A geometric construction diagram showing the perspective drawing of a cube. It includes a circle, a rectangle, and various construction lines (dotted and solid) used to determine the cube's vertices and edges in perspective.



A geometric construction diagram showing how to draw a cube in perspective. It starts with a circle containing a square. A horizontal line passes through the center of the circle. Two vertical lines are drawn tangent to the top and bottom of the circle. From the corners of the square, lines are drawn towards a vanishing point on the right. These lines intersect the vertical tangents to define the front face of the cube. The back face is constructed by drawing lines parallel to the front face's edges.

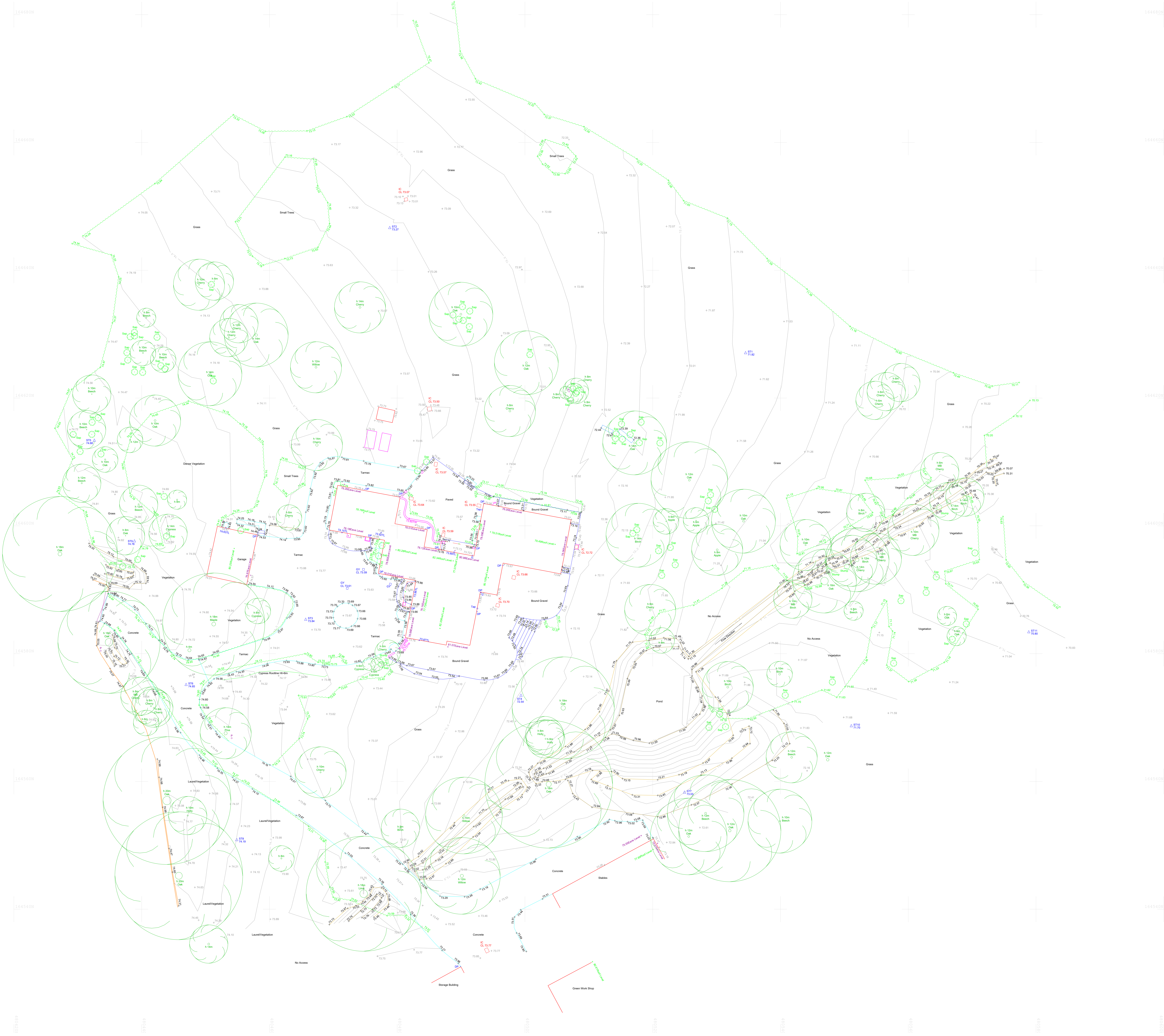
1:200 scale Bar
This Drawing has been produced for printing onto A1 size paper,
If printing on A3 please use the scale below for reference.

Bonney Architecture
PLANNING & TECHNICAL SERVICES

14 Hornbeam Close
Barkham
Wokingham
RG41 4UR
07515 355 770
architecture@gmail.com

bonneyarchitecture@gmail.com

| BA 0251|04|D



LEGEND

AV	Air Valve	ME	Manhole Electricity
BB	Belisha Beacon	MF	Manhole Foul
BI	Illum Bollard	MH	Manhole General
BL	Bollard	MK	Marker Post
BM	Bench Mark	MRF	Metal Railing Fence
BP	Brick Pillar	MS	Manhole Surface Water
BPS	Block Paving Slabs	MW	Water Supply/Meter
BRK	Brick	NB	Notice Board
BS	Bus Stop/Shelter	OHC	Over Head Cable
BW	Brick Wall	P	Post
BRW	Brick Retaining Wall	PB	Post Box
CB	Telephone Box	PI	Pipe
CBF	Close Boarded Fence	RE	Rodding Eye
CC	CCTV Camera	RG	Road Gully
Ce	Cats Eye	RN	Road Name Plate
CL	Cover Level	RP	Reflector Post
CLF	Chain Link Fence	PRF	Post & Rail Fence
CONC	Concrete	RS	Road Sign
CPS	Concrete Paving Slabs	PWF	Post & Wire Fence
CW	Concrete Wall	Sap	Sapling
CRW	Concrete Ret. Wall	SMP	Sheet Metal Piling
DK	Drop Kerb	SL	Soffit Level
EB	Electricity Box	Stu	Stump
EP	Electricity Pole	SP	Sign Post
FB	Flower Bed	SV	Stop Valve
FH	Fire Hydrant	SW	Slay Wire
FL	Flood Light	TH	Threshold Level
FS	Flag Staff	TL	Traffic Light
FP	Footpath	TP	Telegraph Pole
G	Gully	TPS	Tactile Paving
HW	Headwall	TSR	Tubular Steel Railings
IC	Inspection Cover	TV	Cable TV Point
IL	Invert Level	TC	Traffic Camera
IRF	Iron Railing Fence	TW	Top of wall
KW	Kerb Weir Inlet	VP	Vent
LB	Litter Bin	WL	Water level
LP	Lamp Post	WMP	Wire Mesh Fence
MB	Manhole Telecom	WO	Washout
MC	Manhole Cable	WPR	Wooden Post & Rail

- NOTES
1. The Grid is OSGB 36 using OSTN15 & OSGB15 on the OS Active Network
 2. All levels are related to OS Datum (Newlyn)
 3. Contours are shown at 0.25m intervals

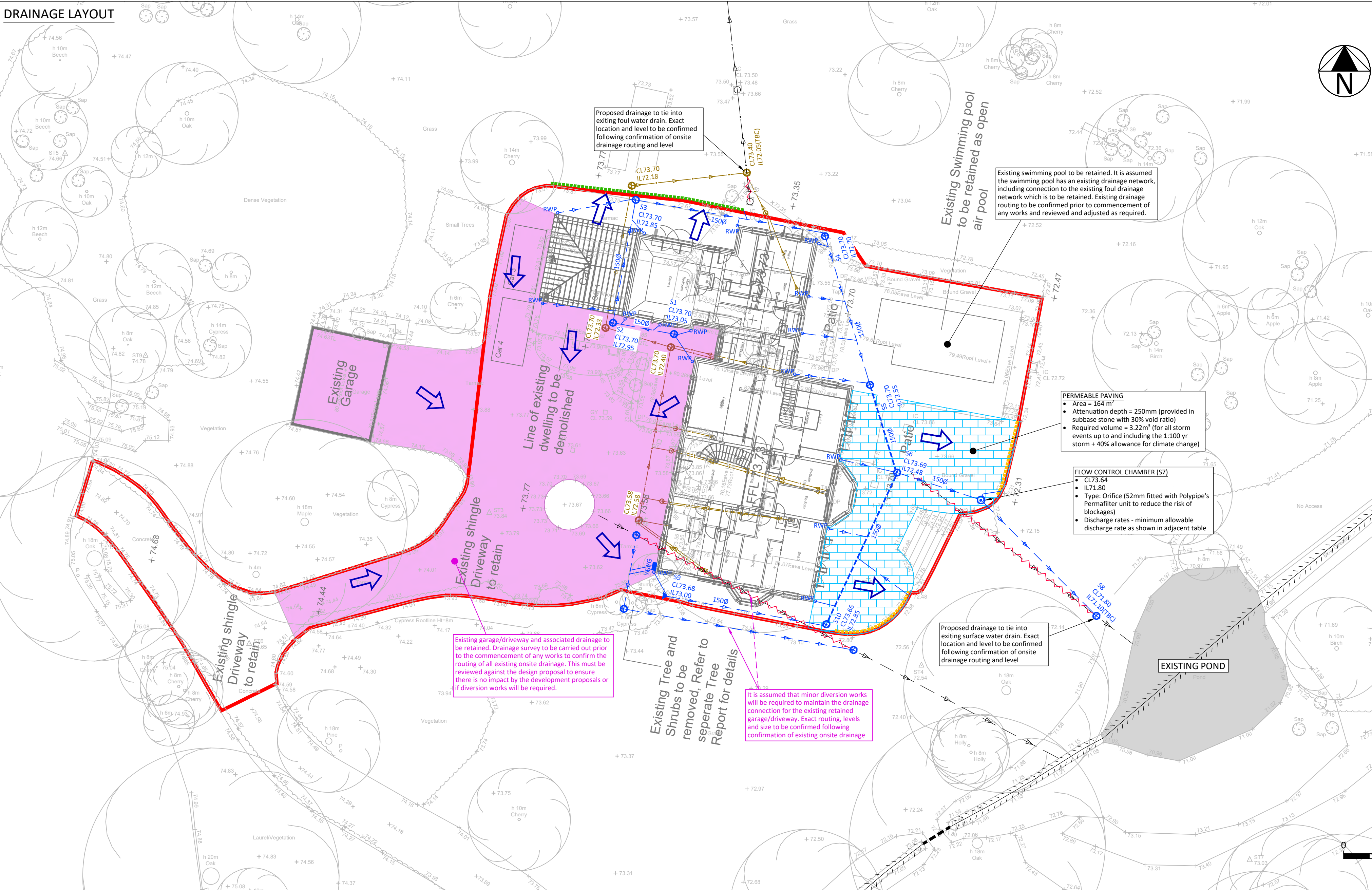
Rev	Date	Description	Checked
-----	------	-------------	---------

geopoint.
Geospatial Engineering & Surveying

Client	Bonney Architecture
Project	Willow Wick Farm, Willow Wick Lane, RG40 3QH
Title	Topographical Survey
Drawing No.	Geo23-042_T
Scale	1:500 @ A3
Date	21/04/2023
Drawn	oak
Checked	AS
Approved	oak

Geopoint Ltd.
Unit 8
Jupiter House
Calleeva Park
Aldermaston
Reading

DRAINAGE LAYOUT



MAINTENANCE SCHEDULE - FILTER DRAIN		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter including leaf litter and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NUG, 2007 or BS 3988:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

MAINTENANCE SCHEDULE - PERMEABLE PAVING		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
Remedial actions	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

- KEY**
- Site boundary
 - Overland flow route
 - EXISTING PRIVATE DRAINAGE
 - Foul water sewer
 - Surface water sewer
 - Watercourse
 - Existing drainage to be abandoned (assumed, subject to onsite survey works)

- Note:**
- Routing shown is indicative only (based on sketch provided) showing the outfall routing of existing onsite drainage to help inform the design proposals. Exact level and routing of existing drainage features must be confirmed prior to the commencement of any works and reviewed against the design proposals.
 - Prior to abandoning any drainage the contractor is to confirm that no upstream connections are present.

PROPOSED PRIVATE DRAINAGE (FOR DETAILS REFER TO SD-01)

- Foul water drain
- Surface water drain (1000 unless stated otherwise)
- Foul water inspection chamber
- Foul water mini inspection chamber
- Surface water inspection chamber
- Flow control chamber
- RWPs Rainwater pipe (exact location to be confirmed by others)
- Gully
- Filter drain with connection to proposed drainage network.
- Permeable paving
- Perforated pipe set within permeable paving stone subbase
- SC Fin drain located at low point of permeable paving within stone subbase with connection to proposed drainage network

- NOTES:**
- All building drainage works shall be carried out in accordance with the current British/European Standards BS EN 752, the current Building Regulations and the Local Authority Building Control specifications and requirements.
 - Exact location of rainwater downpipes and all internal drainage points to be confirmed by architect. Rainwater pipe outlets to be rod-able. Once confirmed this is then to be reviewed inline with the drainage proposals.
 - All drainage works to be constructed from the outfall towards the head of run to ensure the outfall can be achieved.
 - Contractor to verify location & level of receiving existing drainage prior to commencement of any works.
 - Contractor to verify locations of all existing services prior to commencement and arrange for any necessary protection, diversion or lowering works as required.
 - Proposed finished levels to be designed by others. As a result all proposed finished levels shown are to be reviewed in line with the proposed external works plan produced by others.
 - Foul water minimum allowable gradient
 - 1:80 where connected to a minimum of 1WC,
 - otherwise min 1:40
 - Surface water minimum allowable gradient of 1:100 unless otherwise stated.
 - Where retaining walls and plot/garage foundations are in the close vicinity of drainage, all foundations are to be below invert levels of pipes / tanks as not to cause loading onto drainage.
 - This drawing is intended to assist with gaining planning approval only. The contractor is to review all design proposals and make any required changes to ensure all proposals are coordinated and there is no conflicting information.
 - All proposals shown are based on information available at the time
 - Prior to the commencement of any works all required agreements must be in place (i.e. S106 to communicate with the public sewer)

EXISTING BROWNFIELD DISCHARGE RATES (MODIFIED RATIONAL METHOD)

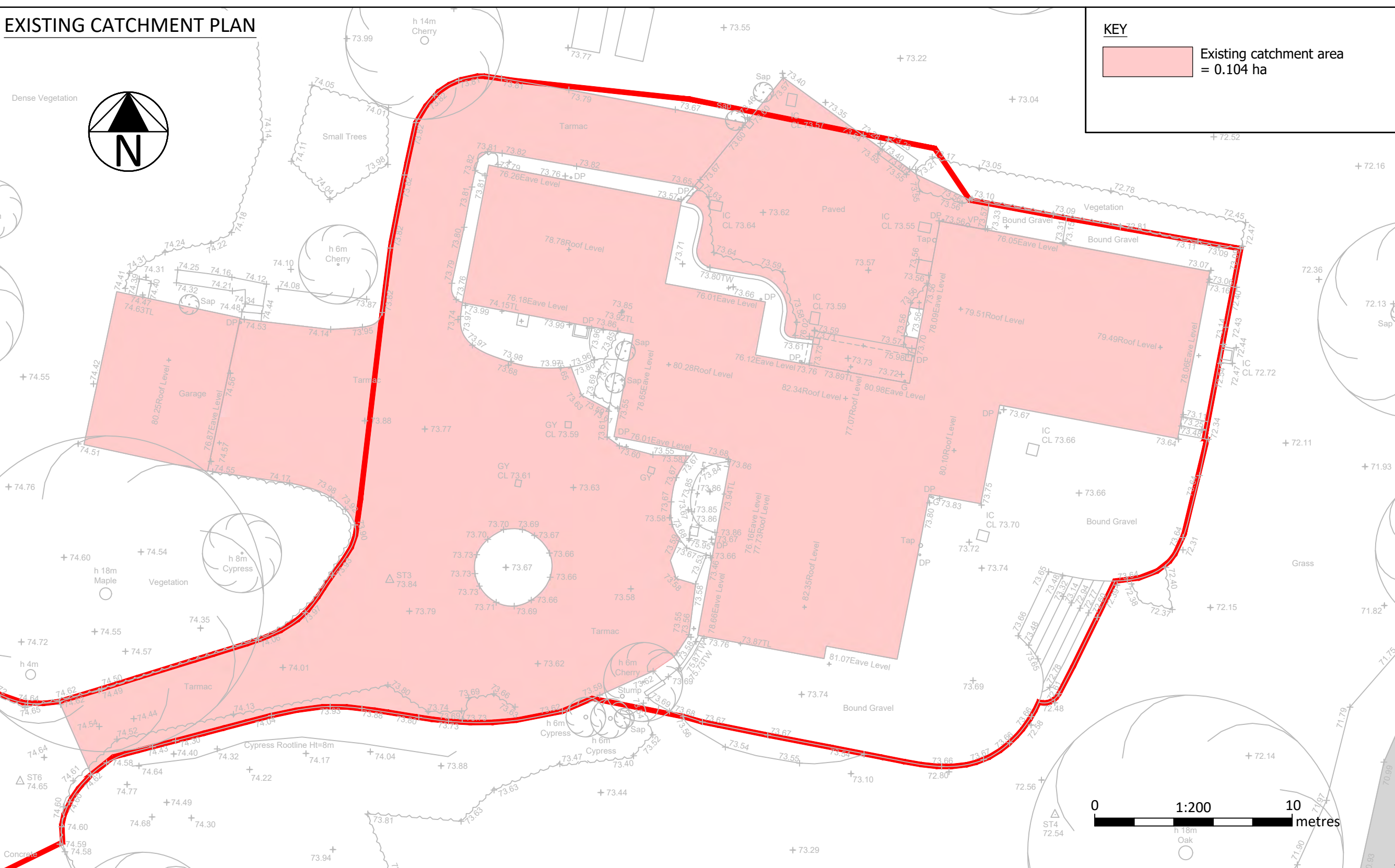
Parameters	
Contributing area	0.05 ha (1)
PIMP	100%
CV	1
Time of concentration	
Storm	Brownfield runoff rate
1:1 year storm	9.9 l/s
1:30 year storm	23.4 l/s
1:100 year storm	29.6 l/s

PROPOSED ALLOWABLE DISCHARGE RATES

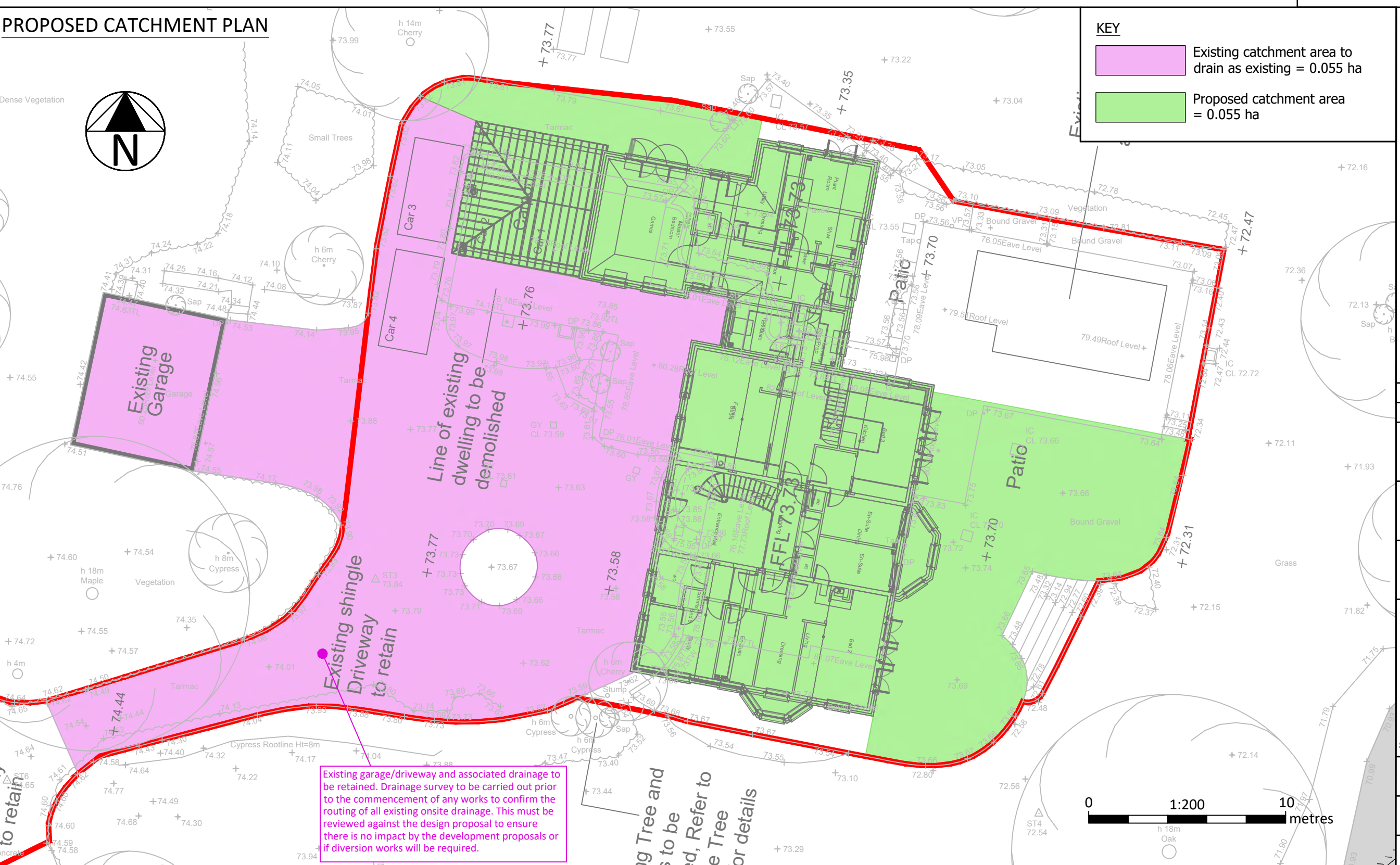
Storm	Discharge rate	Betterment over existing
1:1 year storm	4.95 l/s	50%
1:30 year storm	11.7 l/s	50%
1:100 year storm + 40% allowance for climate change	14.8 l/s	50%

Note: (1) Catchment area is based the developable area (existing catchment minus existing catchment area to drain to existing as per existing scenario)

EXISTING CATCHMENT PLAN

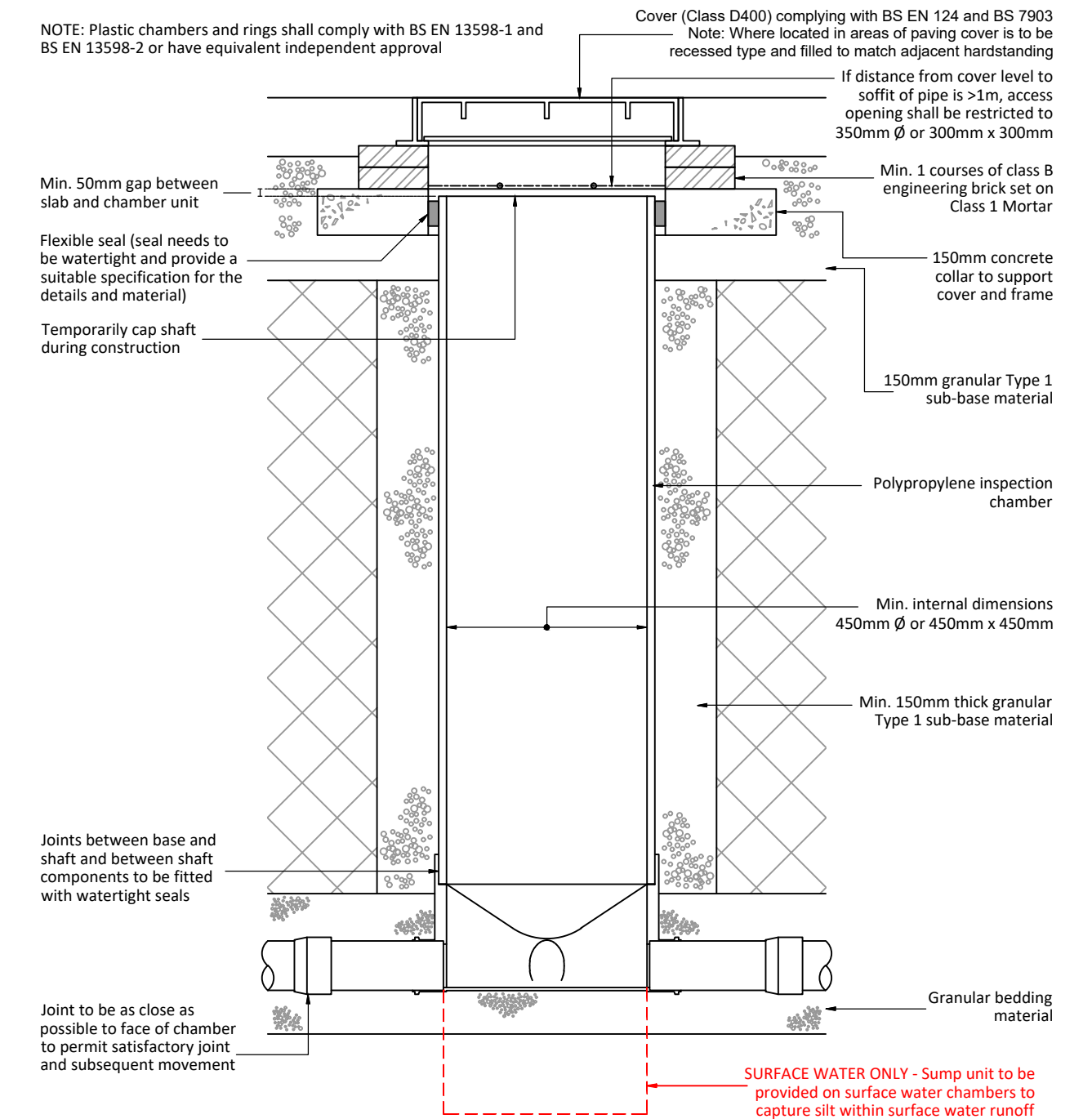


PROPOSED CATCHMENT PLAN

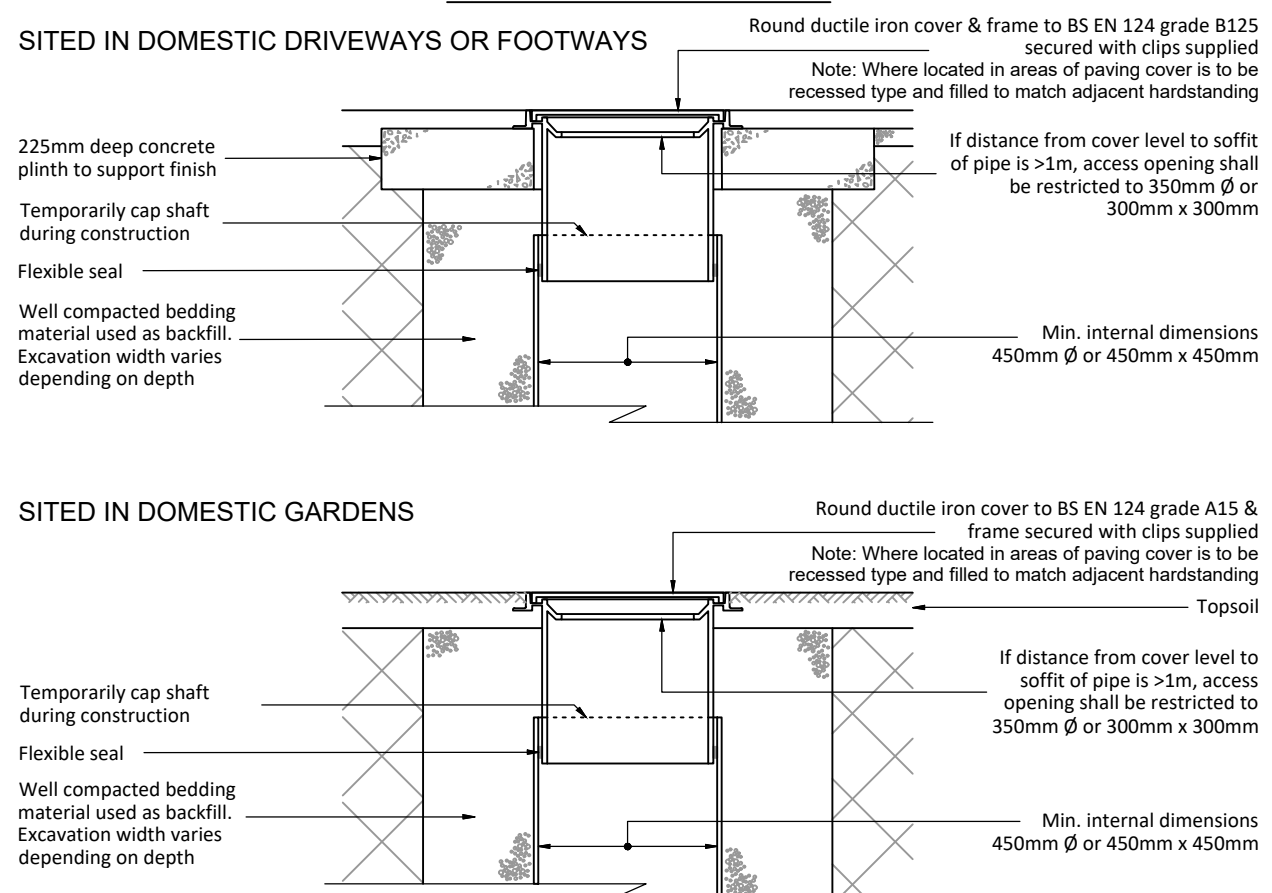


P01	25.04.24	Initial issue	JH	DS
Rev	Date	Detail	Drawn	Chkd
Client: Mr & Mrs J Marino				
Project: Willow Wick Farm				
Drawing Title: Drainage Strategy Layout				
 GeoSmart Information Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU				
Drawn by: JH		Checked by: DS		Date: April 2024
Scale: 1:200 @ A1			Status: Preliminary	
Drawing No: 81248 - PDL - 01			Issue: P01	

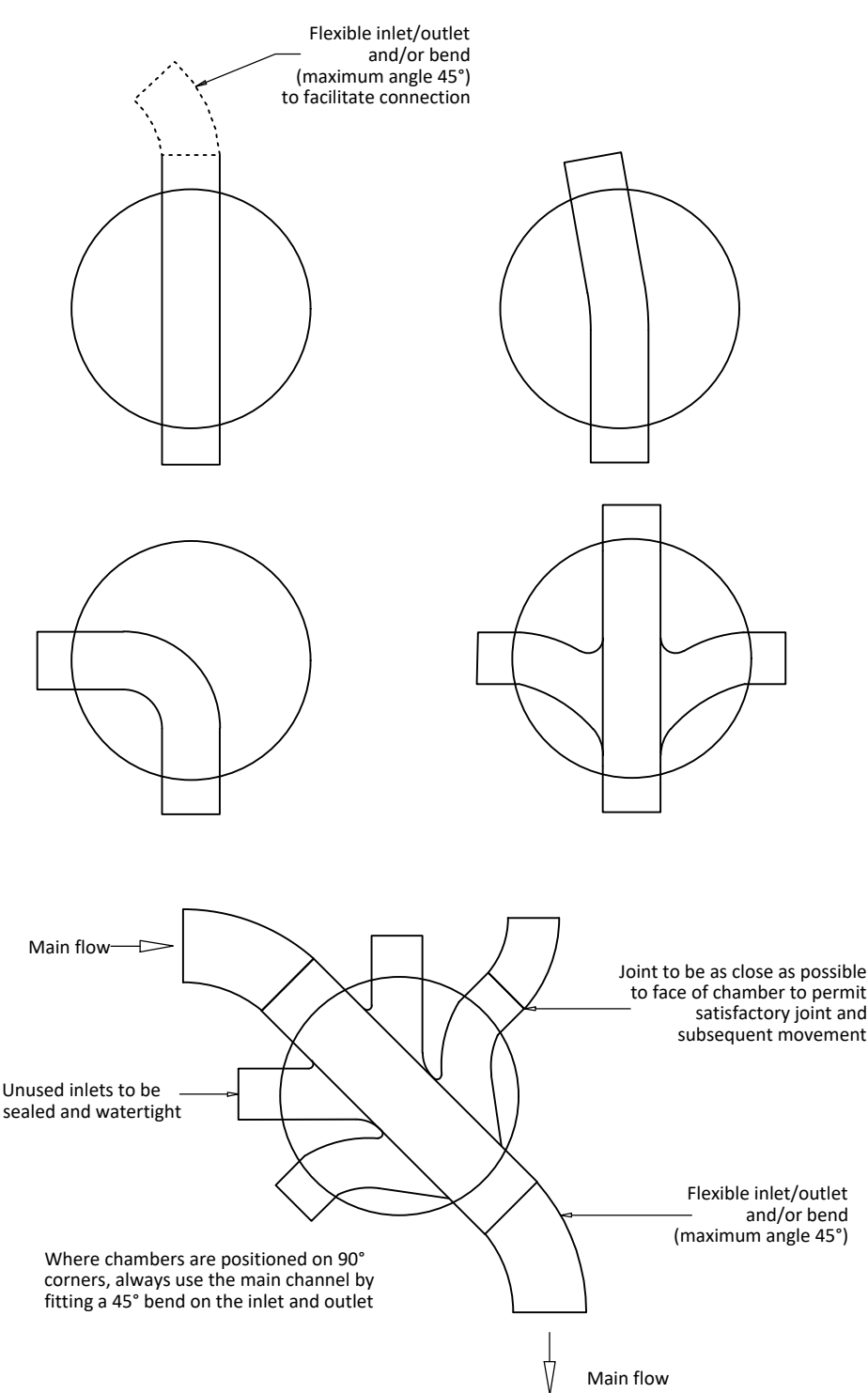
INSPECTION CHAMBER DETAIL
(Top detail shown to be provided in shared driveway areas subject to use by commercial vehicles. For all other areas see adjacent alternative top detail)



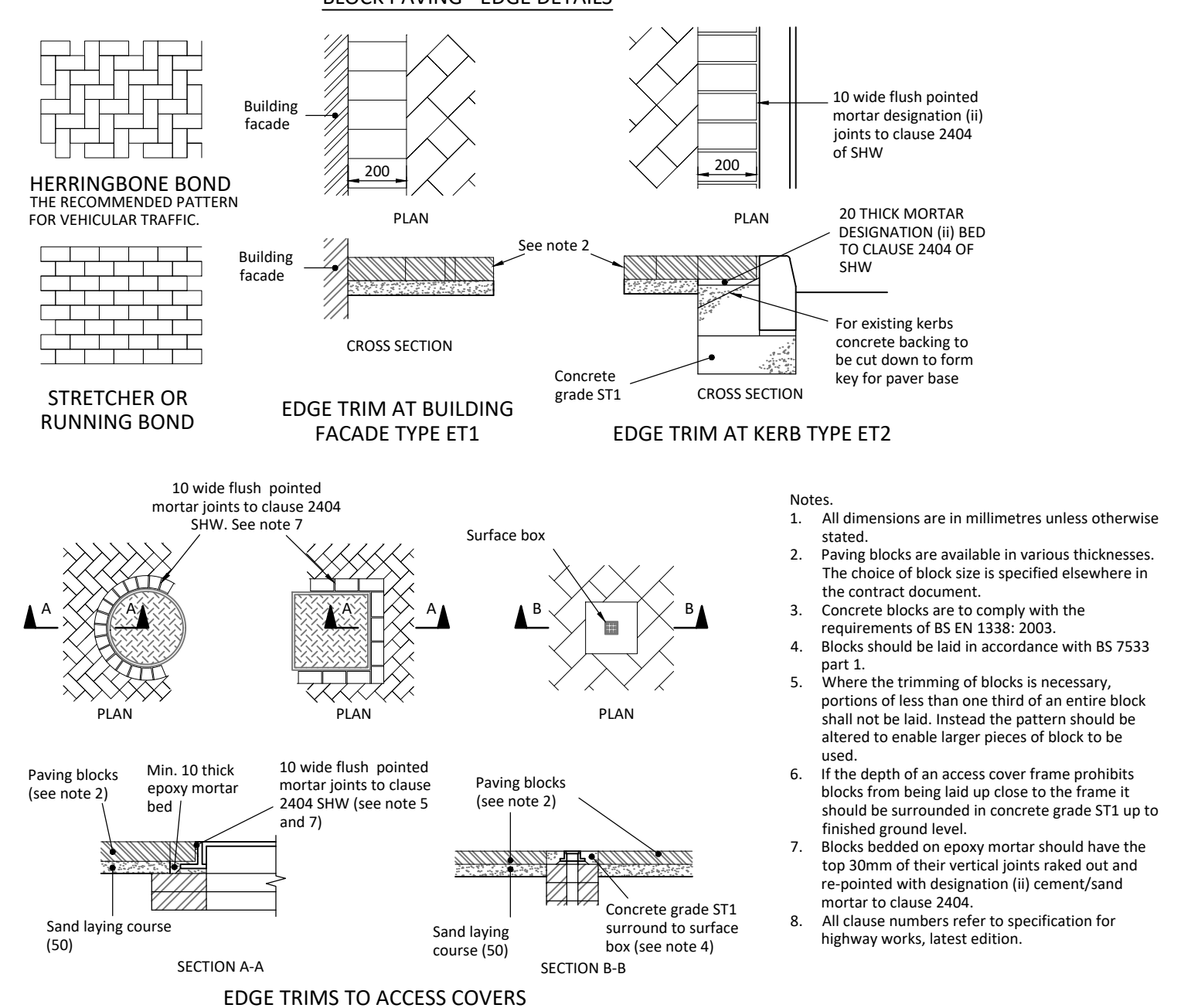
ALTERNATIVE TOP DETAILS
(Light vehicle loading and landscaped areas)



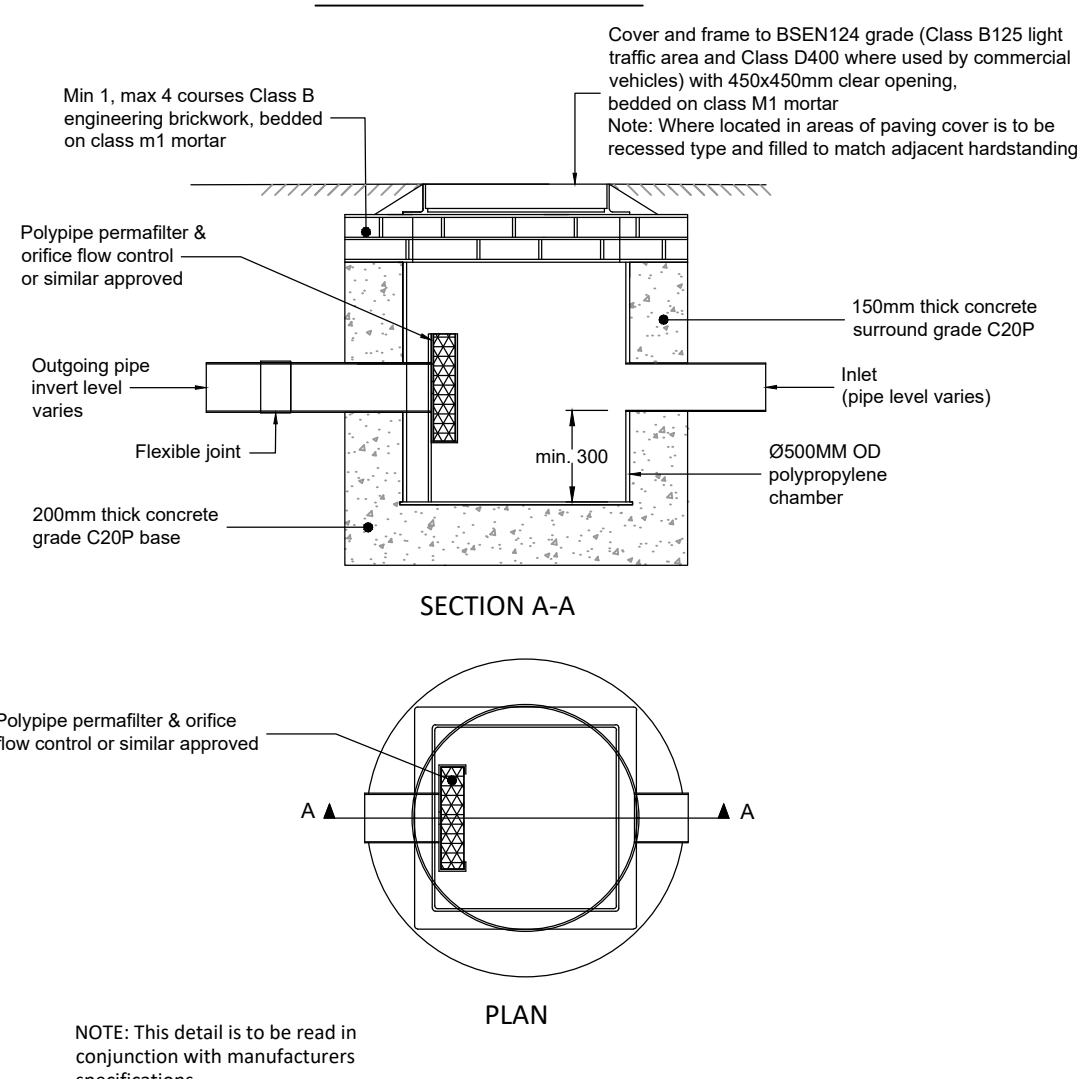
INSPECTION CHAMBER - ALTERNATIVE BASE LAYOUTS



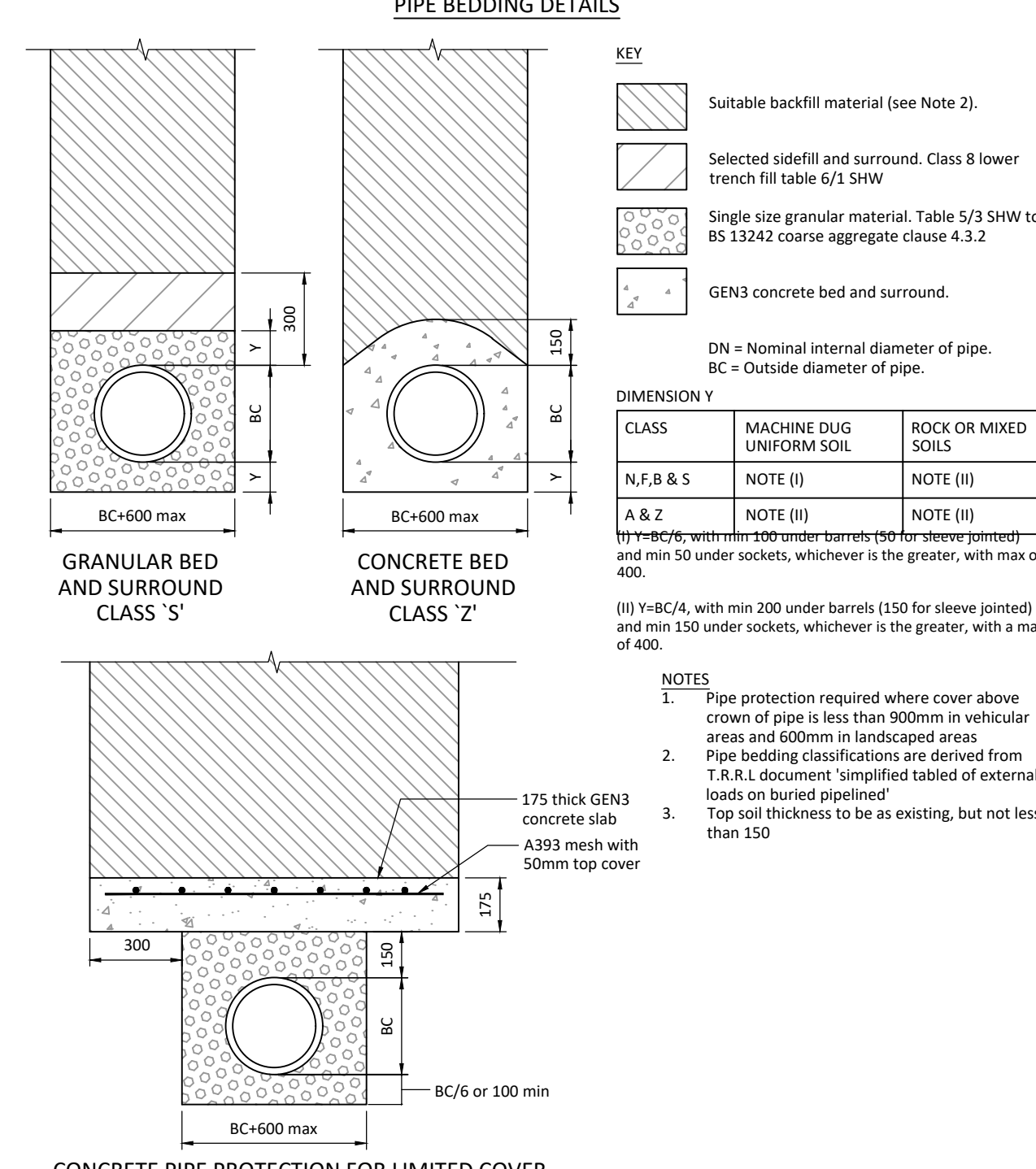
BLOCK PAVING - EDGE DETAILS



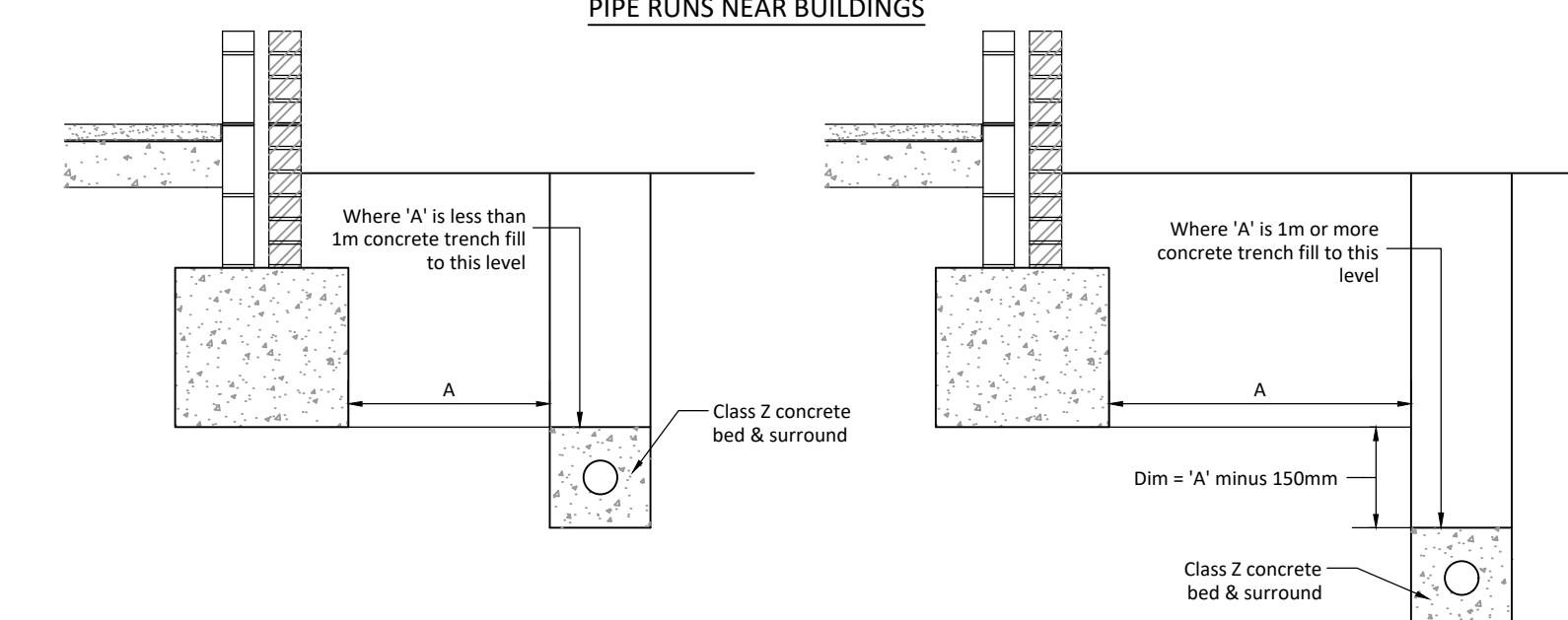
FLOW CONTROL CHAMBER



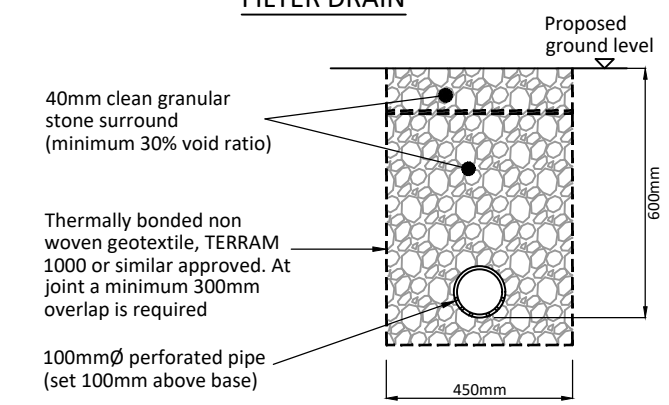
PIPE BEDDING DETAILS



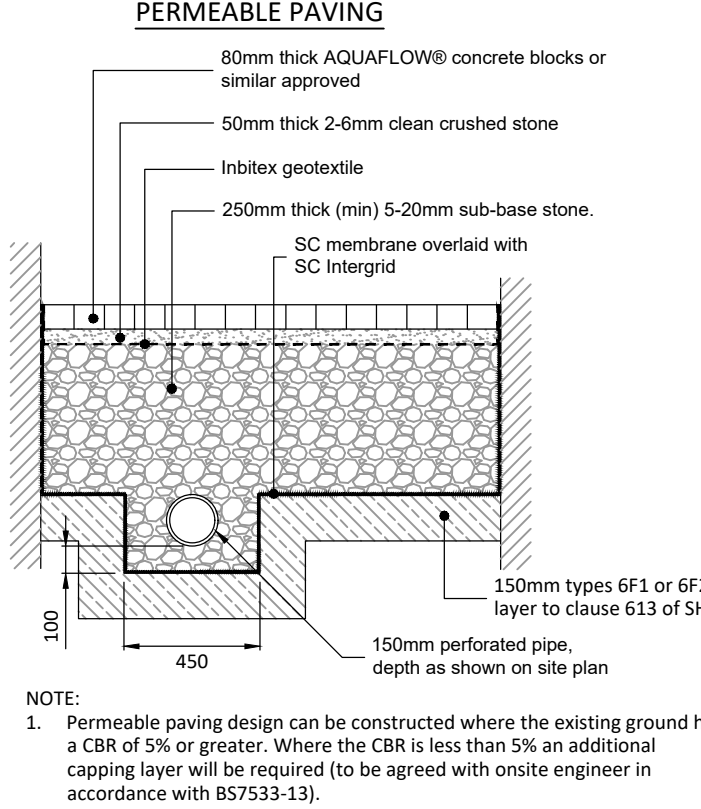
PIPE RUNS NEAR BUILDINGS



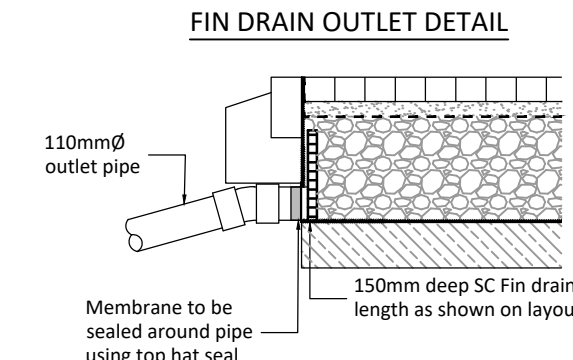
FILTER DRAIN



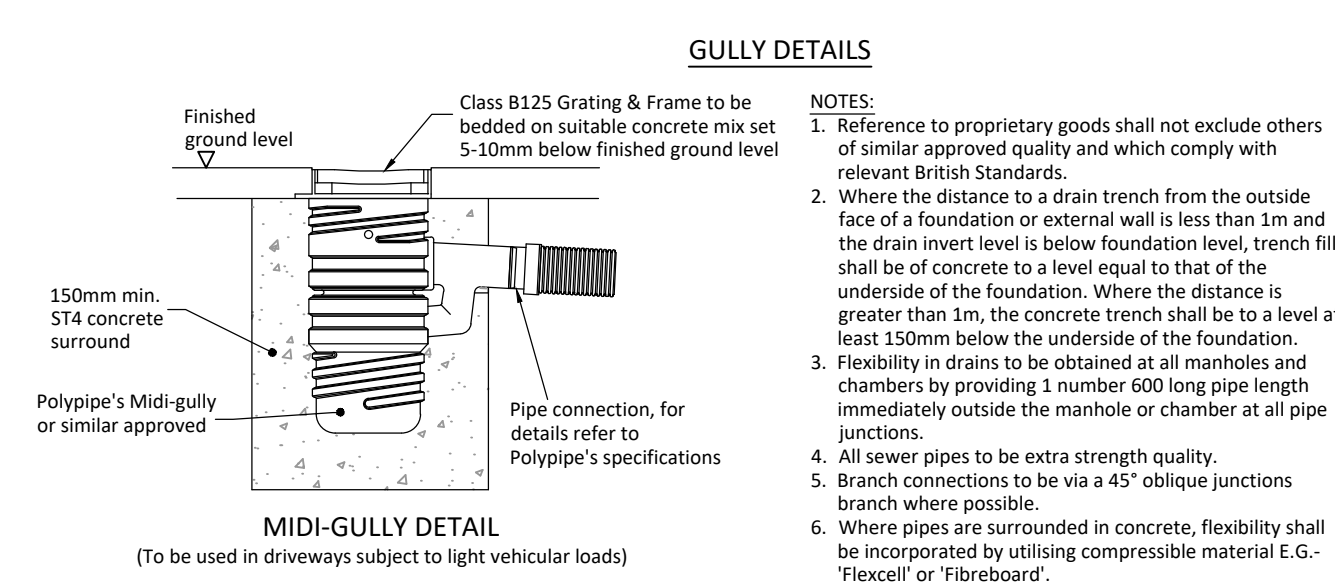
PERMEABLE PAVING



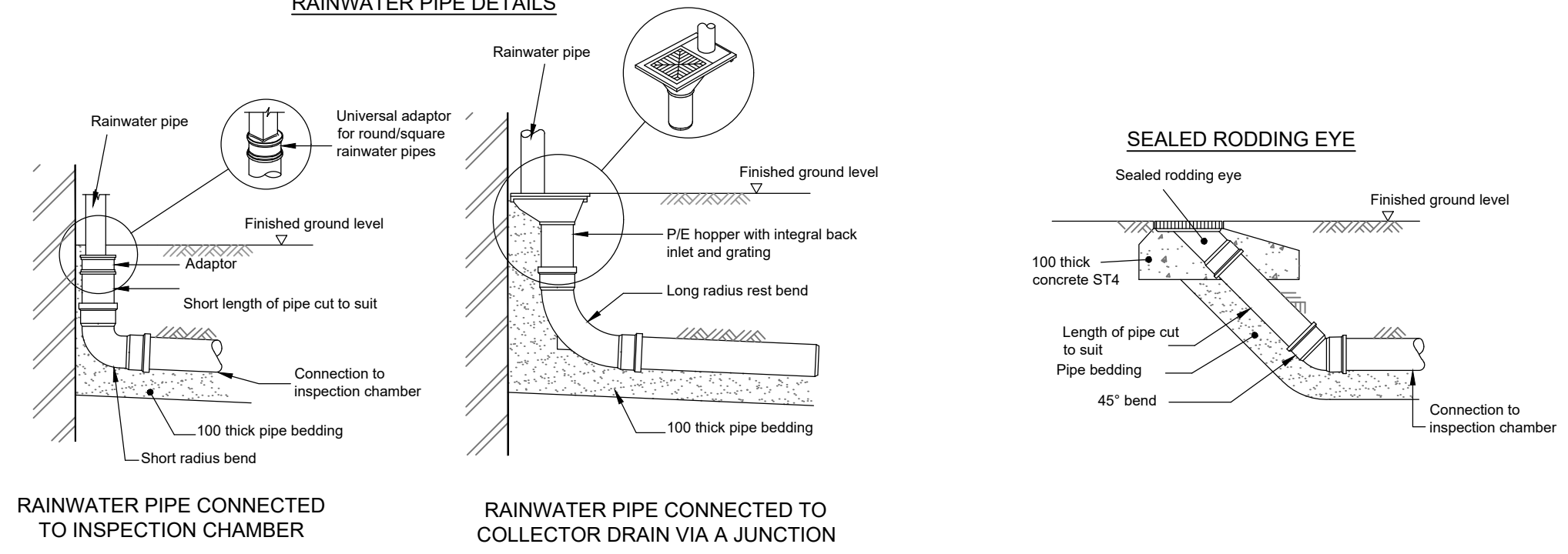
FIN DRAIN OUTLET DETAIL



GULLY DETAILS

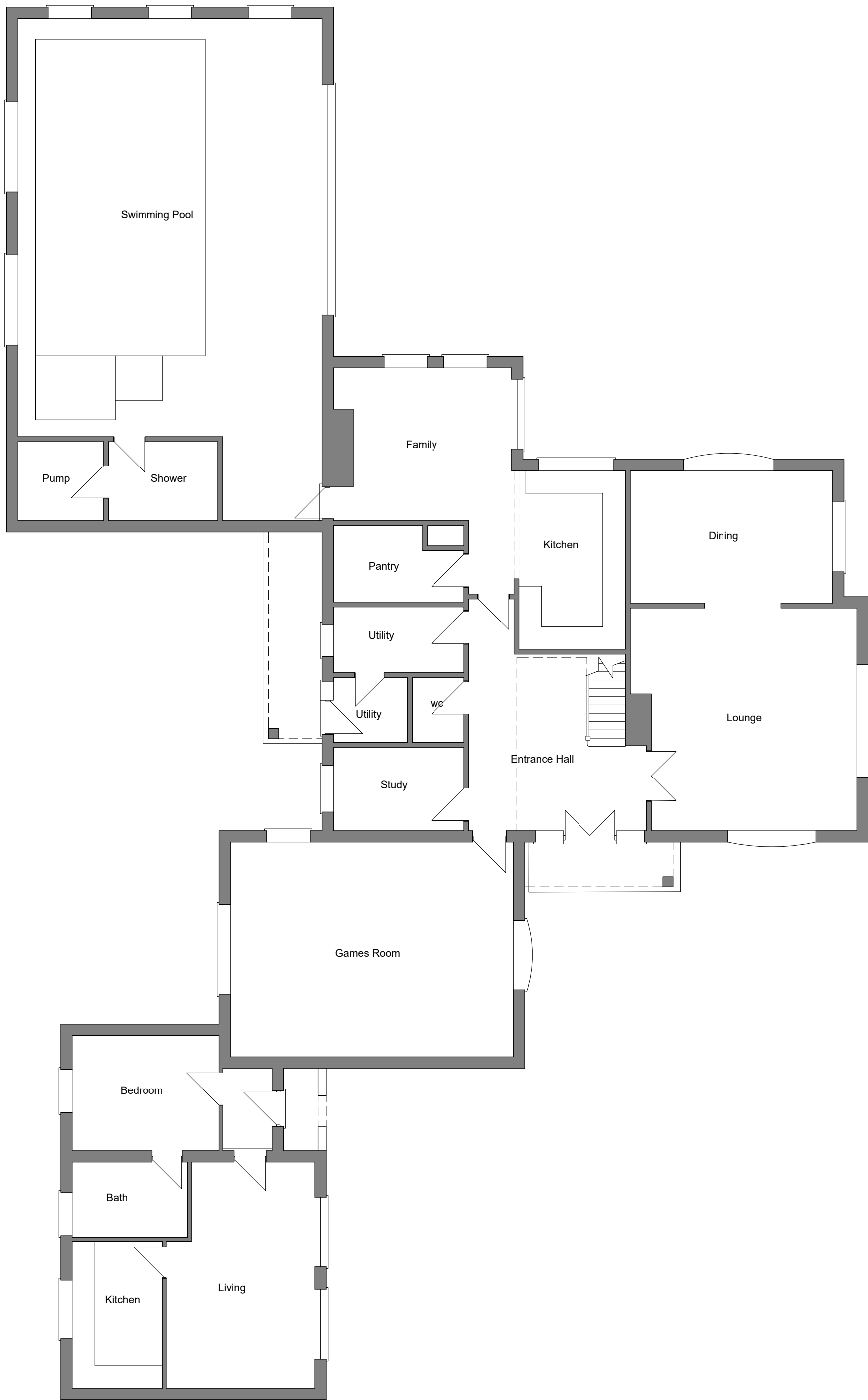


RAINWATER PIPE DETAILS



- Notes:
- All dimensions in millimetres unless indicated otherwise.
 - Reference to proprietary goods shall not exclude others of similar approved quality and which comply with relevant British Standards.
 - All pipework to be structure-walled UPVC to BSEN 1401
 - Concrete to be grade ST4 (GEN3).
 - Flexibility in drains to be obtained at all manholes and chambers by providing 1 n° 600 long pipe length immediately outside the manhole or chamber at all pipe junctions.
 - Branch connections to be via a 45° oblique junctions branch where possible.
 - This drawing is intended to assist with gaining planning approval only. The contractor is to review all design proposals and make any required changes to ensure all proposals are coordinated and there is no conflicting information.

P01	25.04.24	Initial issue	JH	DS
Rev	Date	Detail	Drawn	Chkd
Client:				
Mr & Mrs J Marino				
Project:				
Willow Wick Farm				
Drawing Title:				
Typical Drainage Details				
GeoSmart Information				
Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU				
Drawn by:	JH	Checked by:	DS	Date:
Scale:	NTS @ A1	Status:	Preliminary	
Drawing No:	81248 - SD - 01	Issue:	P01	



Ground Floor Plan 1:100 Scale



First Floor Plan 1:100 Scale

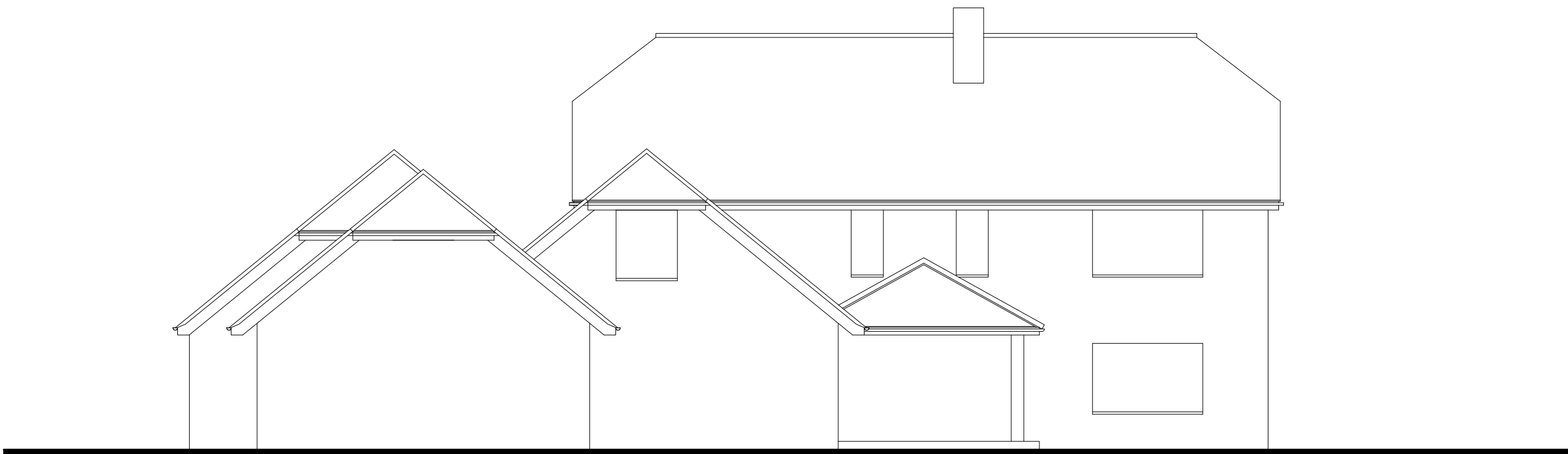
Site Plan 1:500 Scale

Rev A - First floor windows amended - Oct 23

Bonney Architecture
PLANNING & TECHNICAL SERVICES

CLIENT Mr & Mrs J Marino 14 Hornbeam Close
Barkham
Wokingham
RG41 4JR
07515 355 770
bonneyarchitecture@gmail.com
JOB Willow Wick Farm, Wick Hill Lane,
Finchampstead, Wokingham,
EXISTING PLANS
DRG

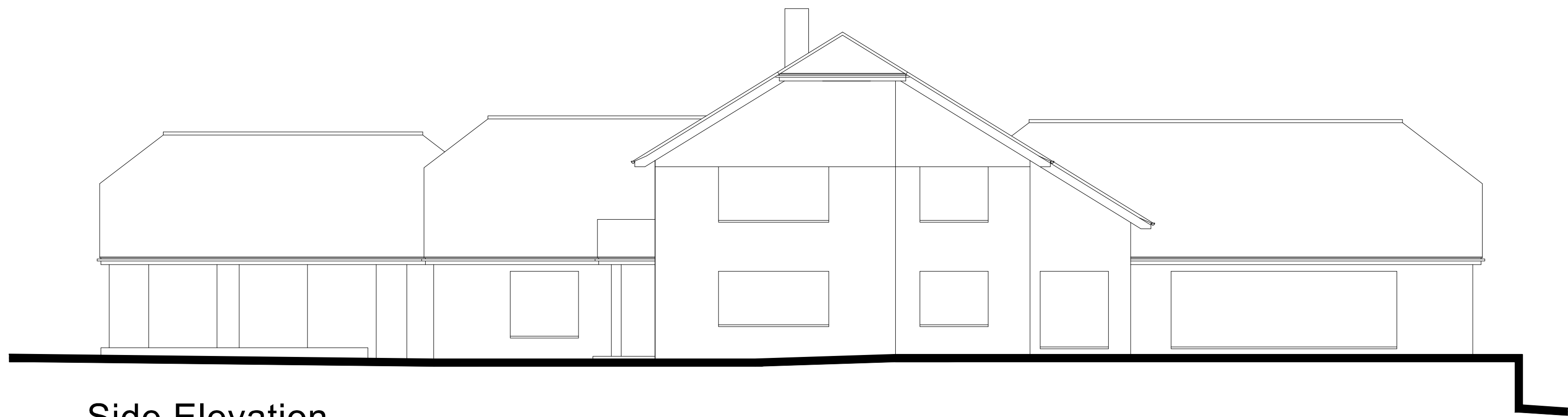
SCALE 1:100 @ A1 DRAWN P Bonney DATE July 2023 BA 0251 | 01 | A



Front Elevation 1:100 Scale



Side Elevation 1:100 Scale



Side Elevation 1:100 Scale



Rear Elevation 1:100 Scale

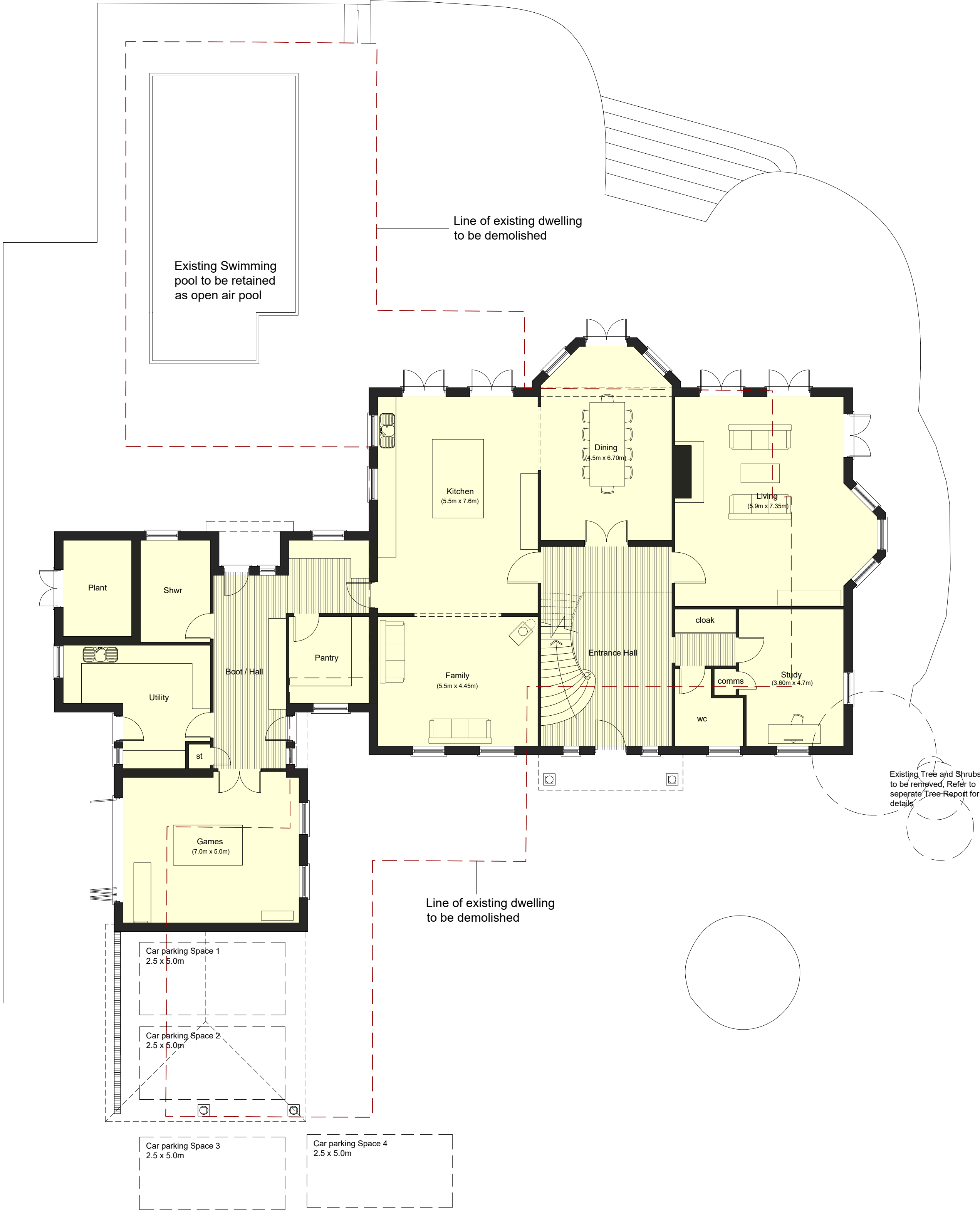
Bonney Architecture
PLANNING & TECHNICAL SERVICES

CLIENT Mr & Mrs J Marino

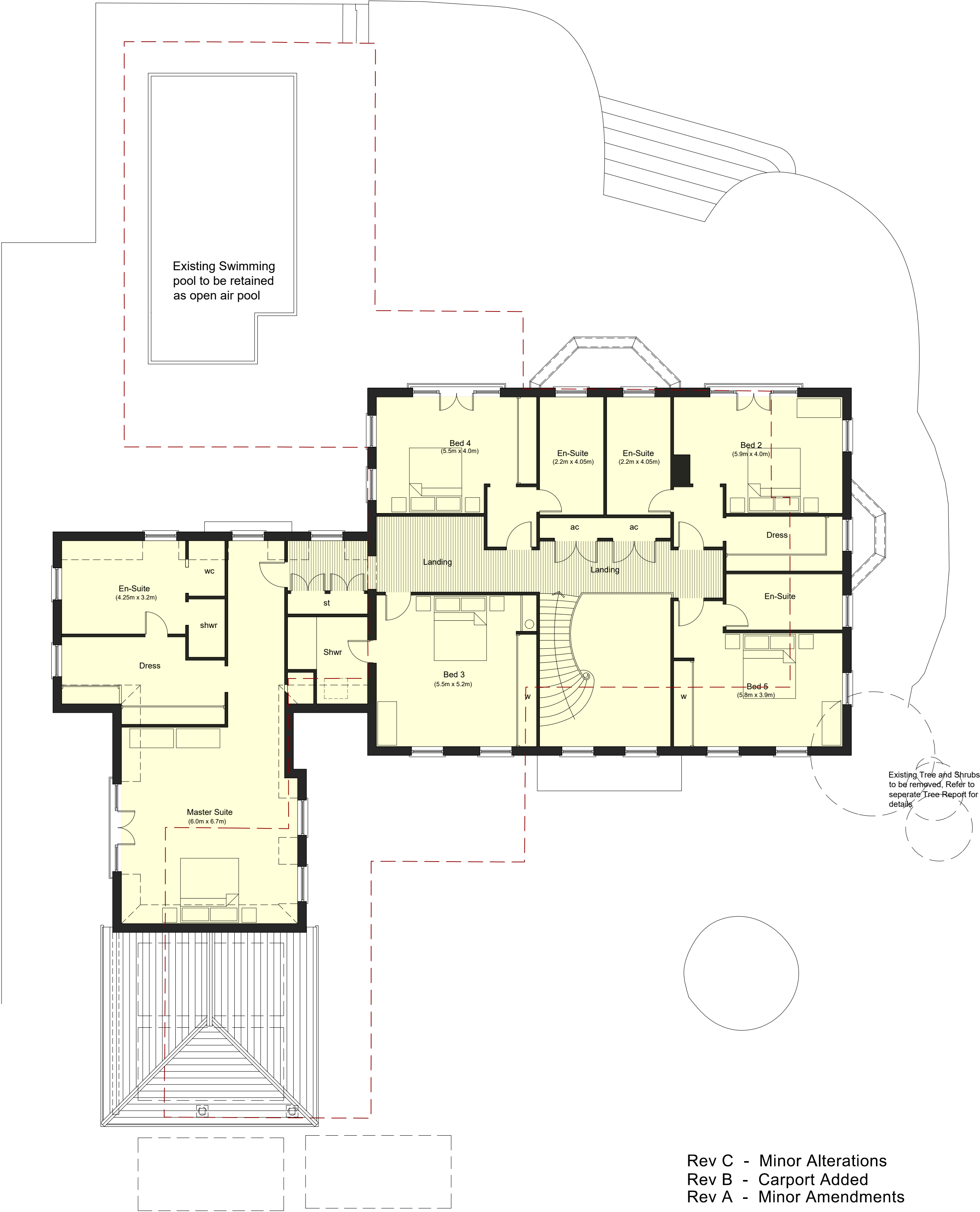
JOB Willow Wick Farm, Wick Hill Lane,
Finchampstead, Wokingham,
EXISTING ELEVATIONS

SCALE 1:100 @ A1 DRAWN P Bonney DATE July 2023

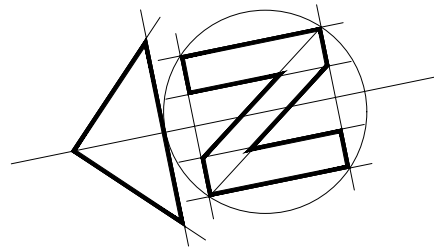
BA 0251|02



Ground Floor Plan 1:100 Scale



First Floor Plan 1:100 Scale



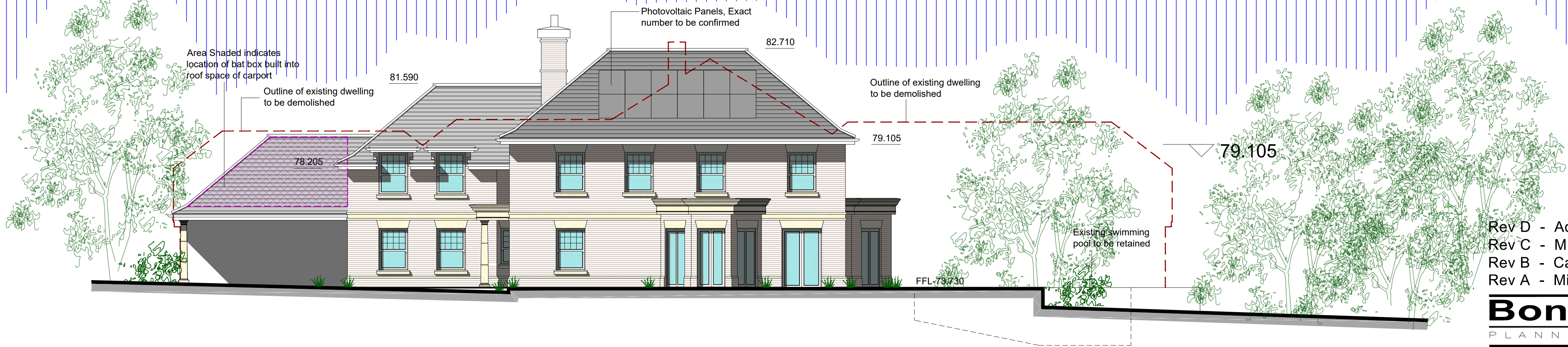
Rev C - Minor Alterations - 18-09-23
Rev B - Carport Added - 18-09-23
Rev A - Minor Amendments - 24-07-23

Bonney Architecture
PLANNING & TECHNICAL SERVICES

CLIENT Mr & Mrs J Marino
14 Hornbeam Close
Berkham
Wokingham
RG41 4UR
07515 355 770
bonneyarchitecture@gmail.com
JOB Willow Wick Farm, Wick Hill Lane,
Finchampstead, Wokingham,
PROPOSED FLOOR PLANS
DRG



West Elevation (Front) 1:100 Scale



South Elevation (Side) 1:100 Scale

Rev D - Additional Solar Panels added - 29-09-23
Rev C - Minor Alterations - 18-09-23
Rev B - Carport Added - 18-09-23
Rev A - Minor Amendments - 24-07-23

Bonney Architecture
PLANNING & TECHNICAL SERVICES

CLIENT Mr & Mrs J Marino
14 Hornbeam Close
Berkham
Wokingham
RG41 4UR
07515 335 770
bonneyarchitecture@gmail.com
JOB Willow Wick Farm, Wick Hill Lane,
Finchampstead, Wokingham,
PROPOSED ELEVATIONS 1 of 2
DRG

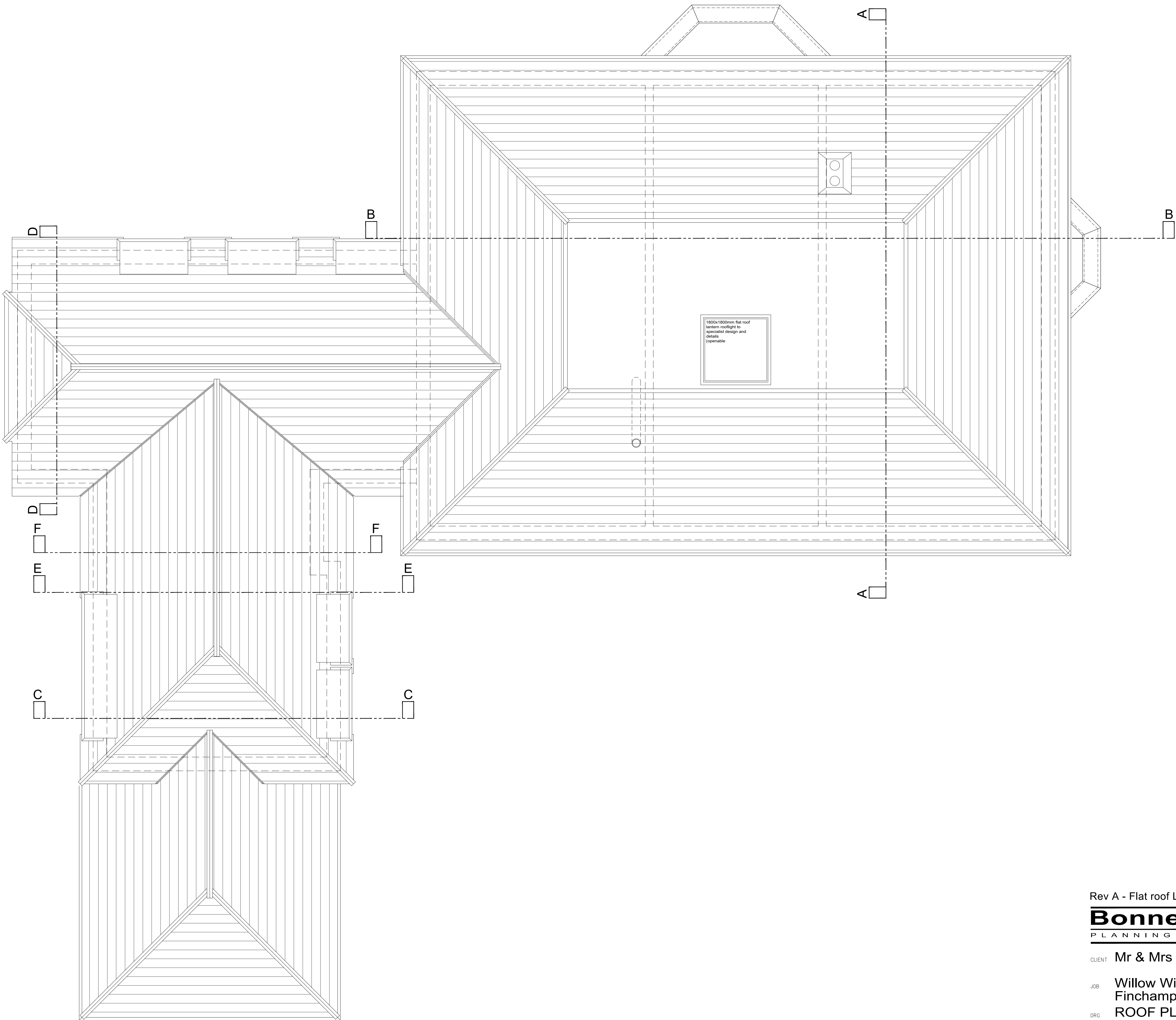
1:100 scale Bar
This Drawing has been produced for printing onto A1 size paper.
If printing on A3 please use the scale below for reference.
0m 1.0m 2.0m 4.0m 8.0m

SCALE 1:100 @ A1 DRAWN P Bonney DATE July 2023 BA 0251|05|D

Architectural elevation drawing of a two-story house. The drawing includes the following annotations and specifications:

- Material Specifications:**
 - Plain Roof Tile
 - Red Multi Facing Brickwork
 - Powder coated aluminum Bifold / French doors with sidelights
- Roof and Elevation Markings:**
 - 82.710 (Peak of main roof)
 - 81.810 (Peak of gable roof)
 - 81.590 (Roof level of carport)
 - 78.205 (Ground level)
 - Area Shaded indicates location of bat box built into roof space of carport.
- Structural and Site Annotations:**
 - Outline of existing dwelling to be demolished (indicated by a dashed red line)
 - Existing swimming pool to be retained (indicated by a dashed line)
 - FFL-73.730 (Finished Floor Level)
 - Bat box (located under the gable roof)

BA 0251|06|C



Rev A - Flat roof Lantern Added, Roof Amended - 04-05-24

Bonney Architecture
PLANNING & TECHNICAL SERVICES

CLIENT **Mr & Mrs J Marino**
14 Hornbeam Close
Barkham
Wokingham
RG41 4LR
JOB **Willow Wick Farm, Wick Hill Lane,
Finchampstead, Wokingham,**
07515 355 770
bonneyarchitecture@gmail.com
DRG **ROOF PLAN**

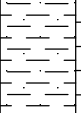
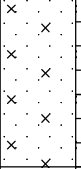
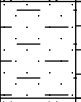
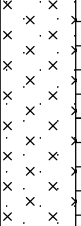
Appendix B



Site Investigation

BOREHOLE LOG

Project Willow Wick Farm. RG40 3QH				BOREHOLE No WS1	
Job No BC693	Date 11-03-24	Ground Level (m)	Co-Ordinates ()		
Contractor The Brownfield Consultancy Ltd				Sheet 1 of 1	

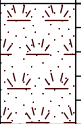
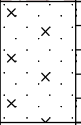
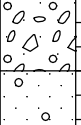
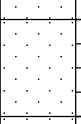
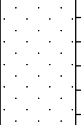
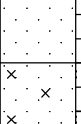
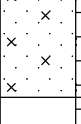
SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
						(0.30) 0.30	Black humic slightly gravelly SAND. Gravel is angular to subrounded, fine to coarse flint. (TOPSOIL)		
						(0.50) 0.80	Soft brown and grey mottled red brown very sandy CLAY. Fine hair roots of a live appearance. (WINDLESHAM FORMATION)		
1.00	D	N10 2,1/ 2,1,3,4				1.00	Brown and grey slightly sandy GRAVEL of angular to subrounded fine and medium flint. (WINDLESHAM FORMATION)		
1.00						(0.60) 1.60	Firm buff brown very sandy, locally silty CLAY. (WINDLESHAM FORMATION)		
2.00	D	N14 3,4/ 3,4,3,4				(0.70) 2.30	Light brown, orange brown and grey silty fine and medium SAND. Glauconitic green trace fossil / bioturbation. (WINDLESHAM FORMATION)		
2.60	D					(0.80) 3.10	Light grey slightly sandy SILT. (WINDLESHAM FORMATION)		
3.00		N24 3,3/ 3,5,7,9				(0.40) 3.50	Light grey clayey fine SAND. (WINDLESHAM FORMATION)		
4.00		N50/290mm 6,9/ 10,12,12,16				(0.95) 4.45	Light grey slightly sandy SILT. (WINDLESHAM FORMATION)		
							Borehole terminated at target depth. No obvious groundwater.		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Backfilled with arisings.
All dimensions in metres Scale 1:31.25			Client MFT Co. Ltd			Method/ Plant Used Dynamic Sampling Rig			Logged By JT		

BROWNFIELD DS LOG WILLOW WICK FARM GP1 GINT STD AGS 3.1.GDT 11/3/24

BOREHOLE LOG

Project Willow Wick Farm. RG40 3QH				BOREHOLE No WS2	
Job No BC693	Date 11-03-24	Ground Level (m)	Co-Ordinates ()		
Contractor The Brownfield Consultancy Ltd				Sheet 1 of 1	

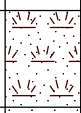
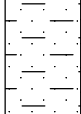
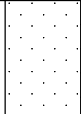
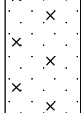
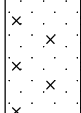
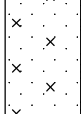
SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
1.00	D	N17 1,4/ 4,4,5,4				(0.50) 0.50	Grey slightly gravelly SAND. Gravel is angular to subrounded, fine to coarse flint. (TOPSOIL)		
1.00						(0.50) 1.00	Light brown silty fine SAND. (WINDLESHAM FORMATION)		
2.00						(0.30) 1.30	Brown and grey slightly sandy GRAVEL of angular to subrounded fine and medium flint. (WINDLESHAM FORMATION)		
2.00						(0.30) 1.60	Brown and grey slightly gravelly fine to coarse SAND. Gravel is angular to subrounded fine and medium flint. (WINDLESHAM FORMATION)		
2.00	D	N10 1,2/ 2,2,3,3				(0.40) 2.00	Orange brown and grey locally clayey fine and medium SAND. (WINDLESHAM FORMATION)		
3.00						(0.80) 2.80	Light brown and grey very sandy CLAY..... poss a clayey SA		
3.00						(0.65) 3.45	Light grey silty fine SAND. (WINDLESHAM FORMATION)		
		N50/290mm 2,4/ 10,10,15,15					Borehole terminated at target depth. No obvious groundwater.		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Backfilled with arisings.
All dimensions in metres Scale 1:31.25			Client MFT Co. Ltd			Method/ Plant Used Dynamic Sampling Rig			Logged By JT		

BROWNFIELD DS LOG WILLOW WICK FARM GP1 GINT STD AGS 3.1.GDT 11/3/24

BOREHOLE LOG

Project Willow Wick Farm. RG40 3QH				BOREHOLE No WS3	
Job No BC693	Date 11-03-24	Ground Level (m)	Co-Ordinates ()		
Contractor The Brownfield Consultancy Ltd				Sheet 1 of 1	

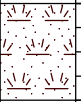
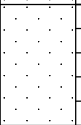
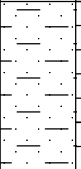
SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
1.00 1.00	D	N8 1,2/ 2,2,2,2				(0.40) 0.40	Grey slightly gravelly SAND. Gravel is angular to subrounded, fine to coarse flint. (TOPSOIL)		
						(0.60) 1.00	Light brown clayey, locally very clayey, fine and medium SAND. (WINDLESHAM FORMATION)		
						1.20	Soft orange brown and grey very sandy CLAY. (WINDLESHAM FORMATION)		
						1.40	Brown and grey slightly sandy GRAVEL of angular to subrounded fine and medium flint. (WINDLESHAM FORMATION)		
						(0.35) 1.75	Firm orange brown and grey very sandy CLAY. (WINDLESHAM FORMATION)		
2.00 2.00	D	N18 2,2/ 3,4,5,6				(0.25) 2.00	No Recovery.		
						(0.50) 2.50	Light brown and grey very sandy CLAY..... poss a clayey SA		
3.00 3.00		N19 3,3/ 5,4,5,5				(1.95)	Grey silty fine and medium SAND. (WINDLESHAM FORMATION)		
						4.45			
4.00 4.00		N39 4,5/ 8,9,10,12					Seepage at 1.40m. Water at 3.40m on completion. Water at 2.52m after 20 minutes Water at 1.50m after 40 minutes.		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Backfilled with arisings.
All dimensions in metres Scale 1:31.25			Client MFT Co. Ltd			Method/ Plant Used Dynamic Sampling Rig			Logged By JT		

BROWNFIELD DS LOG WILLOW WICK FARM GPJ GINT STD AGS 3.1.GDT 11/3/24

BOREHOLE LOG

Project Willow Wick Farm. RG40 3QH				BOREHOLE No WS4	
Job No BC693	Date 11-03-24	Ground Level (m)	Co-Ordinates ()		
Contractor The Brownfield Consultancy Ltd				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
1.00	D	N9 1,1/ 1,2,3,3				(0.40) 0.40	Grey slightly gravelly SAND. Gravel is angular to subrounded, fine to coarse flint. (TOPSOIL)		
1.00						(1.10) 1.50	Brown, becoming light brown at 0.60m, locally clayey fine and medium SAND. (WINDLESHAM FORMATION)		
2.00						(0.50) 2.00	Brown and grey very clayey SAND. (WINDLESHAM FORMATION)		
2.00	D	N11 1,3/ 2,3,3,3				(0.50) 2.50	Brown fine and medium SAND. (WINDLESHAM FORMATION)		
3.00						(0.70) 3.20	Brown and grey clayey, locally very clayey SAND. (WINDLESHAM FORMATION) 2.70 Seepage.		
						(0.25) 3.45	Grey silty fine and medium SAND. (WINDLESHAM FORMATION)		
		N39 1,4/ 6,7,10,16							

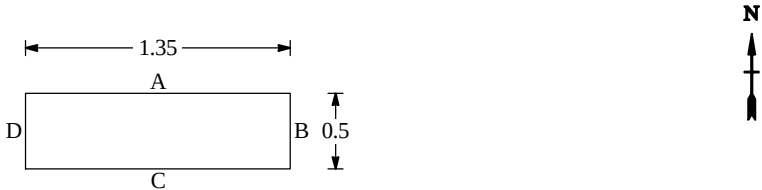
Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Backfilled with arisings.
All dimensions in metres Scale 1:31.25			Client MFT Co. Ltd			Method/ Plant Used Dynamic Sampling Rig			Logged By JT		

BROWNFIELD DS LOG WILLOW WICK FARM GP1 GINT STD AGS 3.1.GDT 11/3/24

TRIAL PIT LOG

Project Willow Wick Farm. RG40 3QH				TRIAL PIT No SA1
Job No BC693	Date 11-03-24	Ground Level (m)	Co-Ordinates ()	
Contractor The Brownfield Consultancy Ltd				Sheet 1 of 1

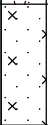
STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth 0.00-0.30	No		DESCRIPTION Black humic TOPSOIL with rare flint gravel. (TOPSOIL)			
0.30-1.00			Brown clayey, locally very clayey, fine and medium SAND. (WINDLESHAM FORMATION)			
1.00-1.20			Orange brown and grey clayey, locally very clayey, fine and medium SAND. (WINDLESHAM FORMATION)			
1.20			Borehole terminated at target depth. No obvious groundwater.			

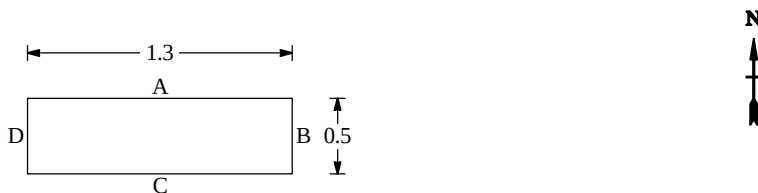
Shoring/Support: Stability: Stable.				GENERAL REMARKS BRE 365 soakaway test undertaken. Backfilled with arisings.	
					
All dimensions in metres Scale 1:31.25	Client	MFT Co. Ltd	Method/ Plant Used	Mini-excavator.	Logged By JT

BROWNFIELD TP WILLOW WICK FARM.GPJ GINT STD AGS 3_1.GDT 13/3/24

TRIAL PIT LOG

Project Willow Wick Farm. RG40 3QH				TRIAL PIT No SA2
Job No BC693	Date 11-03-24	Ground Level (m)	Co-Ordinates ()	
Contractor The Brownfield Consultancy Ltd				Sheet 1 of 1

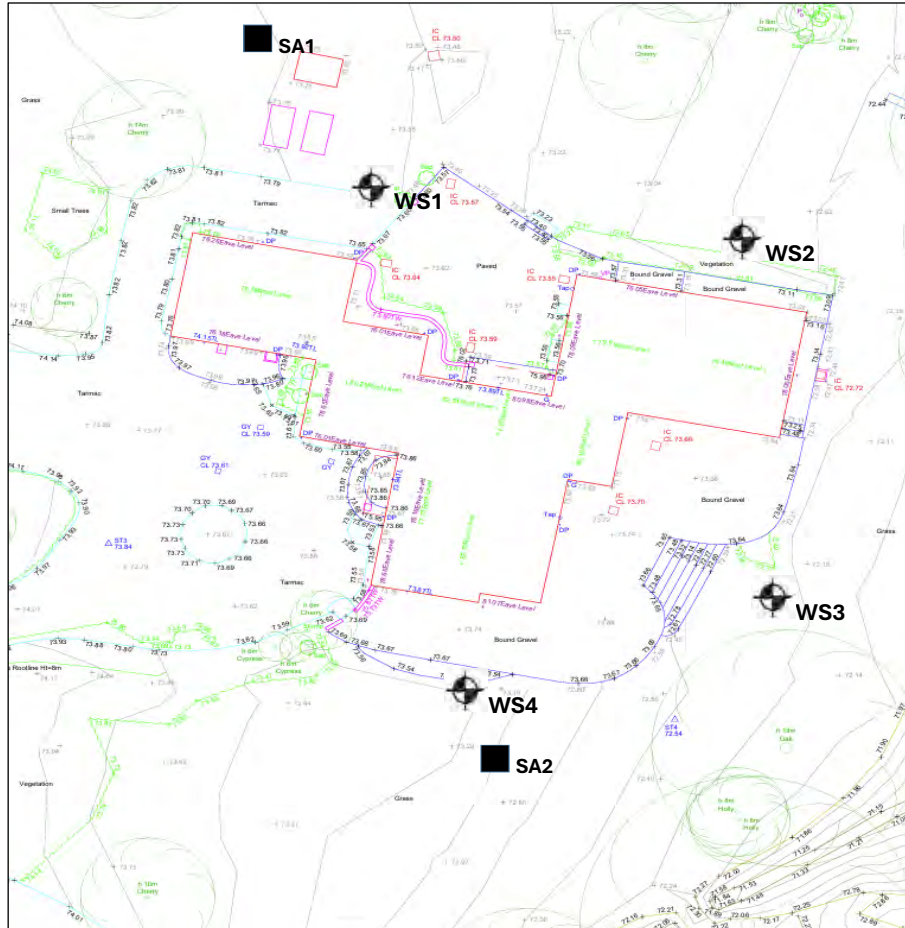
STRATA				SAMPLES & TESTS		
				Depth	No	Remarks/Tests
Depth	No		DESCRIPTION			
0.00-0.30			Grey slightly gravelly fine and medium SAND. Gravel is angular to subrounded, fine to coarse flint. (TOPSOIL)			
0.30-0.80			Light brown silty fine and medium SAND. (WINDLESHAM FORMATION)			
0.80			Pit terminated at target depth. Groundwater seepage at 0.80m.			

Shoring/Support: Stability: Stable. 					GENERAL REMARKS
					BRE 365 soakaway test undertaken. Backfilled with arisings.
All dimensions in metres Scale 1:31.25		Client MFT Co. Ltd	Method/ Plant Used Mini-excavator.	Logged By JT	

BROWNFIELD TP_WILLOW WICK FARM.GPJ GINT STD AGS 3_1.GDT 13/3/24

WILLOW WICK FARM

EXPLORATORY HOLE LOCATION PLAN



Woodstock
Memorial Road
Fenny Compton
CV47 2XU
Tel: 07852881086

Project:
Willow Wick Farm

Project No:
BC693

Test Location: SA1

Test No: 1

Date: 11.3.23

Water level during test

Time mins	Depth m bgl
0	0.440
7	0.460
14	0.470
38	0.500
58	0.530
108	0.570
136	0.580
159	0.590
194	0.600
229	0.615
256	0.620
286	0.625
316	0.625

Trial pit dimensions

depth (m)	1.20
length (m)	1.35
width (m)	0.50

$$f = \frac{V_p}{\alpha_p \times t_p}$$

f = soil infiltration rate

V_p = volume of water from 75% to 25% effective depth

α_p = Internal surface area at 50% effective depth

t_p = time for the water level to fall from 75% to 25% effective depth

time at 75% effective depth (mins)

time at 25% effective depth (mins)

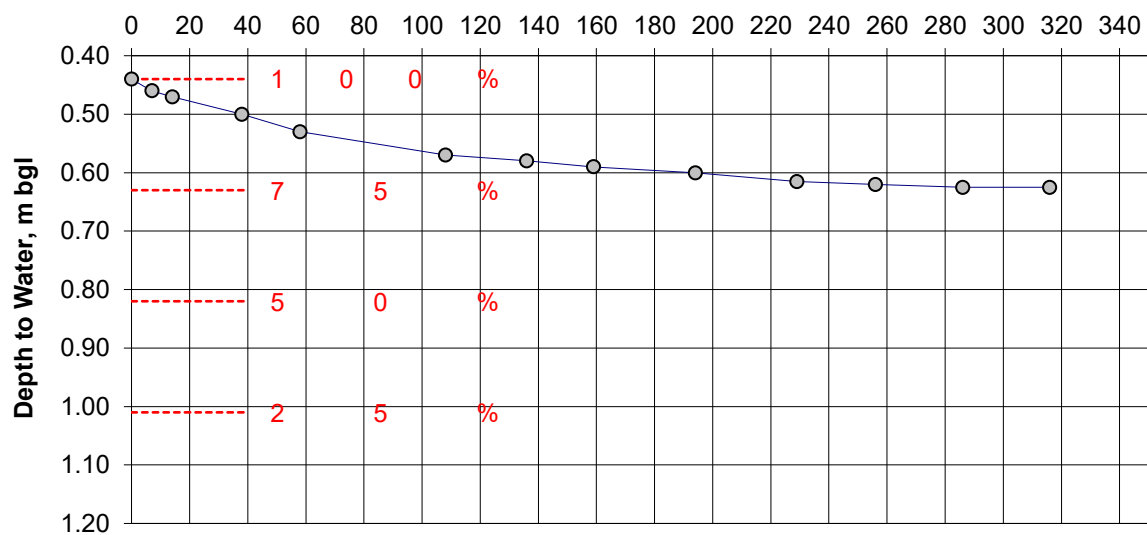
(from graph)

Calculated Soil Infiltration Rate =

- m/sec

Depth to Water vs Elapsed Time

Elapsed Time, minutes



Woodstock
Memorial Road
Fenny Compton
CV47 2XU
Tel: 07852881086

Project:
Willow Wick Farm

Project No:
BC693

Test Location: SA2

Test No: 1

Date: 11.3.23

Water level during test

Time mins	Depth m bgl
0	0.560
9	0.570
35	0.570
55	0.570
157	0.580
229	0.590
274	0.590

Trial pit dimensions

depth (m)	0.80
length (m)	1.30
width (m)	0.50

$$f = \frac{V_p}{\alpha_p \times t_p}$$

f = soil infiltration rate

V_p = volume of water from 75% to 25% effective depth

α_p = Internal surface area at 50% effective depth

t_p = time for the water level to fall from 75% to 25% effective depth

time at 75% effective depth (mins)

time at 25% effective depth (mins)

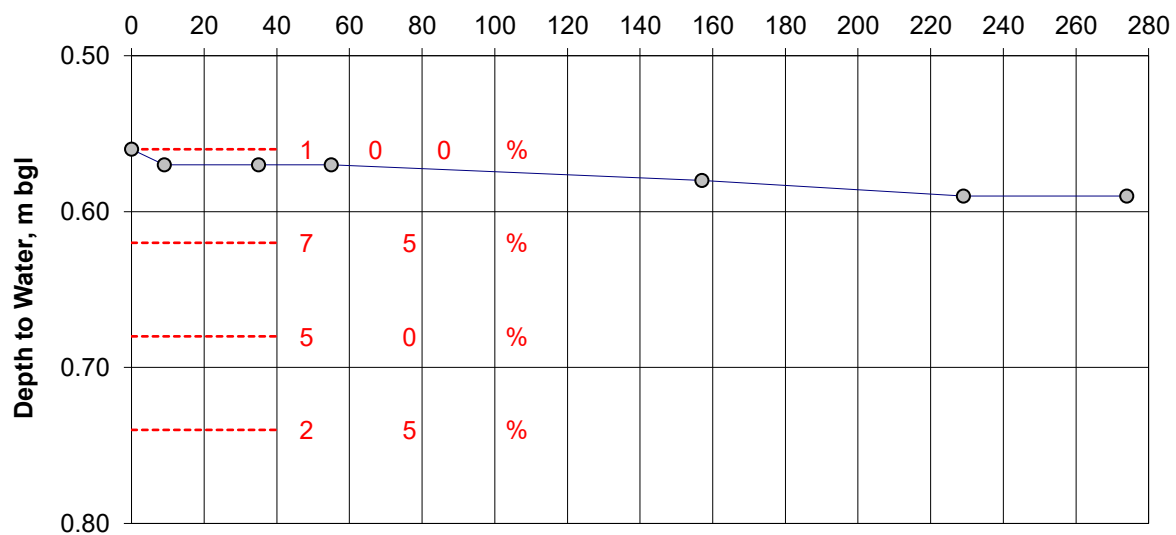
(from graph)

Calculated Soil Infiltration Rate =

- m/sec

Depth to Water vs Elapsed Time

Elapsed Time, minutes



Appendix C



Rainfall runoff calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.006	5.00	73.700	450	480480.080	164599.262	0.650
2	0.007	5.00	73.700	450	480475.319	164600.145	0.750
3	0.007	5.00	73.700	450	480477.096	164609.727	0.850
4	0.007	5.00	73.700	450	480491.858	164606.888	1.000
5	0.007	5.00	73.700	450	480495.364	164595.305	1.150
9	0.007	5.00	73.680	450	480479.590	164578.811	0.680
10	0.007	5.00	73.660	450	480491.959	164576.637	0.810
6	0.007	5.00	73.690	450	480497.475	164588.464	1.210
7			73.640	500	480504.027	164586.328	1.840
8			71.800	450	480513.018	164577.290	0.700

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	4.842	0.600	73.050	72.950	0.100	48.4	150	5.06	50.0
1.001	2	3	9.745	0.600	72.950	72.850	0.100	97.5	150	5.22	50.0
1.002	3	4	15.033	0.600	72.850	72.700	0.150	100.2	150	5.46	50.0
1.003	4	5	12.102	0.600	72.700	72.550	0.150	80.7	150	5.65	50.0
1.004	5	6	7.159	0.600	72.550	72.480	0.070	102.3	150	5.77	50.0
2.000	9	10	12.559	0.600	73.000	72.850	0.150	83.7	150	5.19	50.0
2.001	10	6	13.050	0.600	72.850	72.480	0.370	35.3	150	5.32	50.0
1.005	6	7	6.891	0.600	72.480	71.800	0.680	10.1	150	5.80	50.0
1.006	7	8	12.748	0.600	71.800	71.100	0.700	18.2	150	5.89	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.449	25.6	0.8	0.500	0.600	0.006	0.0	18	0.660
1.001	1.018	18.0	1.8	0.600	0.700	0.013	0.0	32	0.651
1.002	1.003	17.7	2.7	0.700	0.850	0.020	0.0	40	0.727
1.003	1.120	19.8	3.7	0.850	1.000	0.027	0.0	44	0.857
1.004	0.993	17.6	4.6	1.000	1.060	0.034	0.0	52	0.839
2.000	1.099	19.4	0.9	0.530	0.660	0.007	0.0	23	0.568
2.001	1.700	30.0	1.9	0.660	1.060	0.014	0.0	25	0.951
1.005	3.183	56.2	7.5	1.060	1.690	0.055	0.0	37	2.213
1.006	2.371	41.9	7.5	1.690	0.550	0.055	0.0	42	1.791



Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	✓
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node 7 Online Orifice Control

Flap Valve	x	Invert Level (m)	71.800	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.052		

Node 6 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	73.330	Slope (1:X)	80.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	13	Depth (m)	0.250
Safety Factor	2.0	Width (m)	9.000	Inf Depth (m)	
Porosity	0.30	Length (m)	18.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 95.66%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	73.068	0.018	0.8	0.0063	0.0000	OK
15 minute winter	2	10	72.982	0.032	1.8	0.0111	0.0000	OK
15 minute winter	3	10	72.890	0.040	2.8	0.0130	0.0000	OK
15 minute winter	4	11	72.744	0.044	3.7	0.0131	0.0000	OK
15 minute winter	5	11	72.606	0.056	4.6	0.0158	0.0000	OK
15 minute winter	9	10	73.023	0.023	1.0	0.0083	0.0000	OK
15 minute winter	10	10	72.876	0.026	2.0	0.0085	0.0000	OK
15 minute winter	6	14	72.558	0.078	7.4	0.0214	0.0000	OK
15 minute winter	7	14	72.557	0.757	7.4	0.1484	0.0000	SURCHARGED
15 minute summer	8	1	71.100	0.000	4.7	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	0.8	0.422	0.031	0.0094	
15 minute winter	2	1.001	3	1.8	0.545	0.098	0.0317	
15 minute winter	3	1.002	4	2.7	0.672	0.152	0.0603	
15 minute winter	4	1.003	5	3.7	0.712	0.185	0.0624	
15 minute winter	5	1.004	6	4.6	0.990	0.262	0.0495	
15 minute winter	9	2.000	10	1.0	0.526	0.050	0.0231	
15 minute winter	10	2.001	6	1.9	0.726	0.064	0.0687	
15 minute winter	6	1.005	7	7.4	0.865	0.132	0.0925	
15 minute winter	7	Orifice	8	4.8				3.7

Results for 30 year Critical Storm Duration. Lowest mass balance: 95.66%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	15	73.081	0.031	2.1	0.0108	0.0000	OK
15 minute winter	2	15	73.081	0.131	4.5	0.0454	0.0000	OK
15 minute winter	3	14	73.082	0.232	6.8	0.0751	0.0000	SURCHARGED
15 minute winter	4	15	73.078	0.378	9.3	0.1131	0.0000	SURCHARGED
15 minute winter	5	15	73.073	0.523	10.7	0.1470	0.0000	SURCHARGED
15 minute winter	9	15	73.071	0.071	2.4	0.0260	0.0000	OK
15 minute winter	10	15	73.072	0.222	6.3	0.0738	0.0000	SURCHARGED
15 minute winter	6	15	73.069	0.589	12.7	0.1621	0.0000	SURCHARGED
15 minute winter	7	15	73.058	1.258	10.0	0.2465	0.0000	SURCHARGED
15 minute summer	8	1	71.100	0.000	6.1	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	2	2.1	0.545	0.081	0.0460	
15 minute winter	2	1.001	3	4.4	0.691	0.247	0.1654	
30 minute summer	3	1.002	4	6.0	0.820	0.340	0.2647	
15 minute summer	4	1.003	5	7.4	0.829	0.374	0.2131	
15 minute summer	5	1.004	6	8.9	1.038	0.508	0.1260	
15 minute winter	9	2.000	10	2.4	0.678	0.122	0.1623	
15 minute summer	10	2.001	6	4.5	0.870	0.151	0.2297	
15 minute summer	6	1.005	7	10.5	0.988	0.186	0.1213	
15 minute winter	7	Orifice	8	6.3				8.9

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.66%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	22	73.558	0.508	2.9	0.1746	0.0000	FLOOD RISK
30 minute winter	2	22	73.557	0.607	6.0	0.2100	0.0000	FLOOD RISK
30 minute winter	3	22	73.551	0.701	8.1	0.2271	0.0000	FLOOD RISK
30 minute winter	4	22	73.530	0.830	9.1	0.2483	0.0000	FLOOD RISK
30 minute winter	5	24	73.505	0.955	11.2	0.2684	0.0000	FLOOD RISK
30 minute winter	9	25	73.496	0.496	3.4	0.1809	0.0000	FLOOD RISK
30 minute winter	10	25	73.495	0.645	7.7	0.2143	0.0000	FLOOD RISK
30 minute winter	6	26	73.495	1.015	18.3	3.2165	0.0000	FLOOD RISK
30 minute winter	7	26	73.478	1.678	9.0	0.3289	0.0000	FLOOD RISK
15 minute summer	8	1	71.100	0.000	7.1	0.0000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.000	2	3.7	0.595	0.143	0.0852	
15 minute winter	2	1.001	3	5.9	0.723	0.326	0.1716	
15 minute summer	3	1.002	4	7.6	0.853	0.431	0.2647	
15 minute winter	4	1.003	5	8.8	0.836	0.445	0.2131	
15 minute winter	5	1.004	6	11.0	1.057	0.625	0.1260	
15 minute winter	9	2.000	10	4.0	0.734	0.206	0.2211	
15 minute winter	10	2.001	6	6.3	0.870	0.209	0.2297	
15 minute winter	6	1.005	7	11.0	1.104	0.195	0.1213	
30 minute winter	7	Orifice	8	7.3				20.8

Pre-development discharge

Site Makeup

Brownfield ▼

OK

Brownfield Method

MRM ▼

Cancel

Contributing Area (ha)

0.050

PIMP (%)

100

CV

1.000

Time of Concentration (mins)

5.00

Betterment (%)

0

Calc

Return Period (years)	Q (l/s)
1	9.9
30	23.4
100	29.6

Appendix D



Thames Water Asset Location Plan

Asset Location Search



Property Searches

GeoSmart Information Ltd
1st Floor Old Bank Buildings
Suite 9-11 Bellstone
SHREWSBURY
SY1 1HU

Search address supplied Willow Wick Farm
Wick Hill Lane
Finchampstead
Wokingham
RG40 3QH

Your reference 81248

Our reference ALS/ALS Standard/2024_4975194

Search date 15 April 2024

Notification of Price Changes

From 1st April 2024 Thames Water Property Searches will be increasing the prices of its CON29DW Residential and Commercial searches along with the Asset Location Search. Costs will rise in line with RPI as per previous years, which is sat at 6%.

Customers will be emailed with the new prices by February 28th 2024.

Any orders received with a higher payment prior to the 1st April 2024 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk.



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0800 009 4540

Search address supplied: Willow Wick Farm, Wick Hill Lane, Finchampstead, Wokingham, RG40 3QH

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

With regard to the fresh water supply, this site falls within the boundary of another water company. For more information, please redirect your enquiry to the following address:

South East Water
Rocfort Road
Snodland

Asset Location Search



Property Searches

Kent
ME6 5AH

Tel: 0845 301 0845

www.southeastwater.co.uk.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

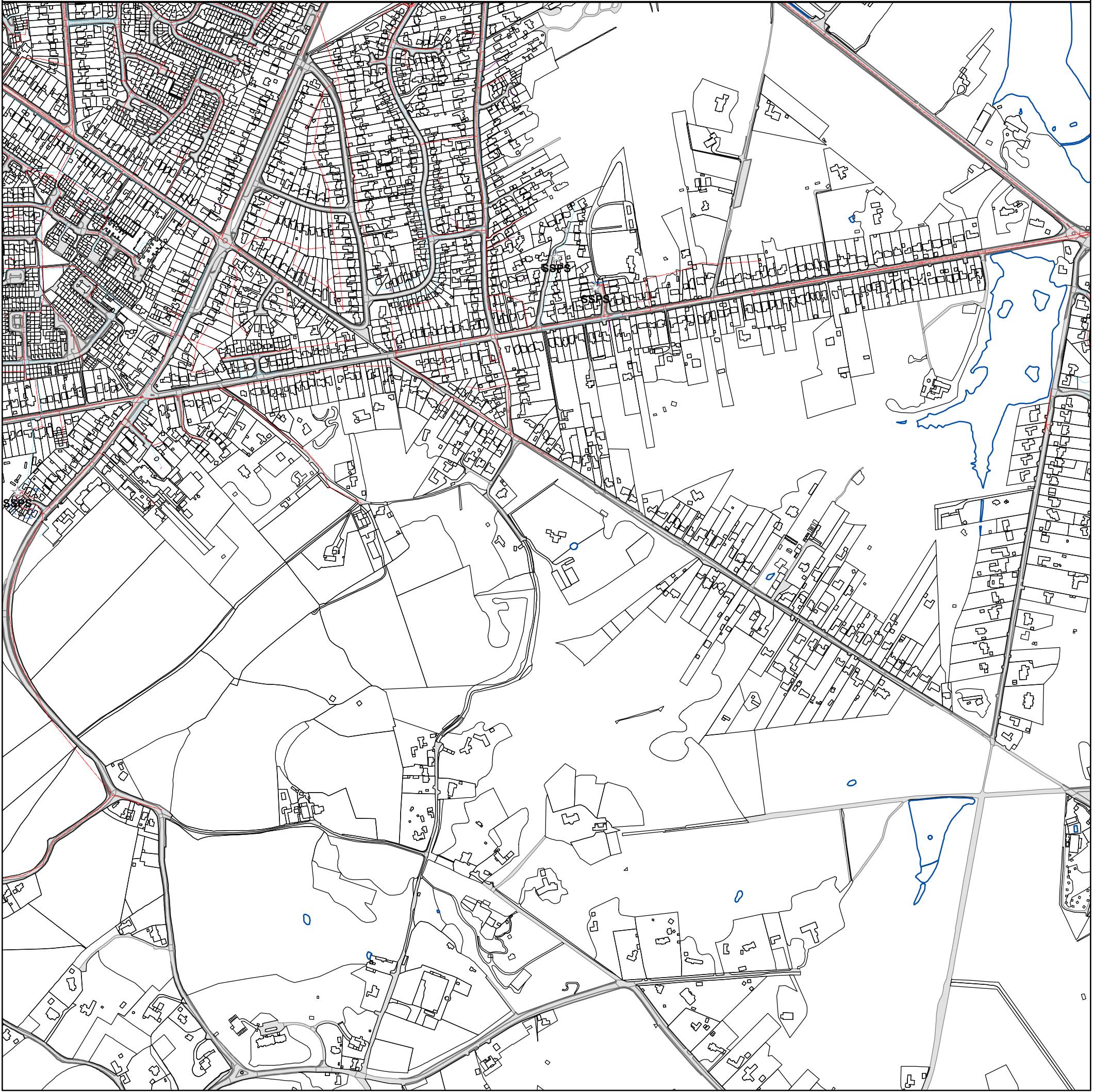
Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk



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 before any works are undertaken. Crown copyright Reserved

Scale: 1:7161
Width: 2000m
Printed By: ASuji
Print Date: 17/04/2024
Map Centre: 480470,164574
Grid Reference: SU8064NW

Comments:



Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

	Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Storm Sewer
	Sludge Sewer
	Foul Trunk Sewer
	Surface Trunk Sewer
	Combined Trunk Sewer
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Vacuum
	Thames Water Proposed
	Vent Pipe
	Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

	Sewer
	Culverted Watercourse
	Proposed
	Decommissioned Sewer
	Content of this drainage network is currently unknown
	Ownership of this drainage network is currently unknown

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plan are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

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		Meter
	Dam Chase		Vent
	Fitting		

Operational Controls

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

	Ancillary		Drop Pipe
	Control Valve		Well

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.

	Inlet		Outfall
	Undefined End		

Other Symbols

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

	Change of Characteristic Indicator		Public / Private Pumping Station
	Invert Level		Summit

Areas

Lines denoting areas of underground surveys, etc.

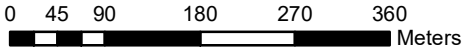
	Agreement
	Chamber
	Operational Site

Ducts or Crossings

	Casement	Ducts may contain high voltage cables. Please check with Thames Water.
	Conduit Bridge	
	Subway	
	Tunnel	

5) 'na' or '0' on a manhole indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. 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, please contact Property Searches on 0800 009 4540.



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 before any works are undertaken. Crown copyright Reserved

Scale: 1:7161
Width: 2000m
Printed By: ASuji
Print Date: 17/04/2024
Map Centre: 480470,164574
Grid Reference: SU8064NW

Comments:

Payment Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment within 14 days of the date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service or will be held to be invalid.
4. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800.

If you are unhappy with our service, you can speak to your original goods or customer service provider. If you are still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0300 034 2222 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking
Please Call 0800 009 4540 quoting your invoice number starting CBA or ADS	Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater.co.uk	By calling your bank and quoting: Account number 90478703 Sort code 60-00-01 and your invoice number

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Disclaimer

This report has been prepared by GeoSmart in its professional capacity as soil, groundwater, flood risk and drainage specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client and is provided by GeoSmart solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to GeoSmart at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, GeoSmart may, by prior written agreement, agree to such release, provided that it is acknowledged that GeoSmart accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. GeoSmart accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against GeoSmart except as expressly agreed with GeoSmart in writing.

For full T&Cs see <http://geosmartinfo.co.uk/terms-conditions>

Further information

Information on confidence levels and ways to improve this report can be provided for any location on written request to info@geosmart.co.uk or via our website. Updates to our model are ongoing and additional information is being collated from several sources to improve the database and allow increased confidence in the findings. Further information on groundwater levels and flooding are being incorporated in the model to enable improved accuracy to be achieved in future versions of the map. Please contact us if you would like to join our User Group and help with feedback on infiltration SuDS and mapping suggestion.

Important consumer protection information

This search has been produced by GeoSmart Information Limited, Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU.

Tel: 01743 298 100

Email: info@geosmartinfo.co.uk

GeoSmart Information Limited is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom.
- sets out minimum standards which firms compiling and selling search reports have to meet.
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals.
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.
- By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports.
- act with integrity and carry out work with due skill, care and diligence.
- at all times maintain adequate and appropriate insurance to protect consumers.
- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
- ensure that products and services comply with industry registration rules and standards and relevant laws.
- monitor their compliance with the Code.

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award up to £5,000 to you if the Ombudsman finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs contact details:

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk.

Please ask your search provider if you would like a copy of the search code

Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly. If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: admin@tpos.co.uk.

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision. Complaints should be sent to:

Martin Lucass

Commercial Director

GeoSmart Information Limited

Suite 9-11, 1st Floor,

Old Bank Buildings,

Bellstone, Shrewsbury, SY1 1HU

Tel: 01743 298 100

martinlucass@geosmartinfo.co.uk

14 Terms and conditions, CDM regulations and data limitations



Terms and conditions can be found on our website:

<http://geosmartinfo.co.uk/terms-conditions/>

CDM regulations can be found on our website:

<http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/>

Data use and limitations can be found on our website:

<http://geosmartinfo.co.uk/data-limitations/>