GeoSmart Information

SuDSmart Plus

Sustainable Drainage Assessment

Site Address

Land North West of Mays Lane
Arkley
Barnet
EN5 2AH

Grid Reference

523113, 195135

Report Prepared for

Green Planning Studio LTD.
On behalf of
Martin Casey

Date

2024-12-19

Report Status

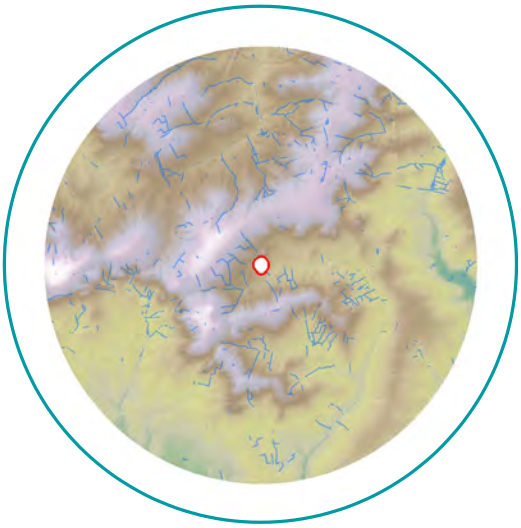
FINAL

Site Area

0.83 ha

Report Reference

81841.01R3



Discharge to water feature

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

Surface water will discharge via Dollis Brook to the west of the Site, following confirmation from the relevant authority.

Report Author

David South

Senior Consultant

Report Checker

Annabel Elleray

Project Consultant

Report Reviewer

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Senior Drainage Engineer

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Witness Appeal Information

Author Information

David South BSc

7 years experience

Reviewer information

Wajid Wastakaran MEng

9 years experience

Wajid Wastakaran will be able to attend the witness appeal in relation to this Site.

2 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?	Low
	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 river (fluvial) flood risk at the Site?	Very Low
	What is the surface water (pluvial) flood risk at the Site?	Very Low to Low*
	What is the groundwater flood risk at the Site?	Negligible
Pollution	Is the groundwater a protected resource?	No
	Is the surface water feature a protected resource?	No

*Although the EA's mapping identifies a Very Low to High risk, the risk has been reduced to Very Low to Low in the associated FRA (ref: 81841) as the development area is not affected in the Low-risk event.

Summary of existing and proposed development

The Site is currently vacant grassland with no built infrastructure in place at the Site. There is an area of hardstanding located to the east of the site.

Development proposals comprise the erection of two utility/dayrooms, two mobile homes and two touring caravans in the northeast of the Site. An access road constructed of loose bound permeable hardstanding is also proposed. Site plans and drawings are provided in Appendix A.

Summary of discharge routes

GeoSmart's SuDS Infiltration Potential (SD50) map indicates the Site has a Low potential for infiltration, primarily due to the low permeability of the underlying geology (London Clay). Infiltration to the ground is therefore unlikely to be feasible.

Ordnance Survey (OS) mapping indicates the Dollis Brook is located adjacent to the western boundary of the Site and due to the short distance discharge via this route is considered feasible.

The asset location plan search included in Appendix C confirms there are no public sewers within the vicinity of the Site and hence discharge to sewer is considered unfeasible.

Runoff rate and attenuation requirements

Discharging off-Site requires 77.54 m^3 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 1.5 l/s (Greenfield 1 in 1 year rate).

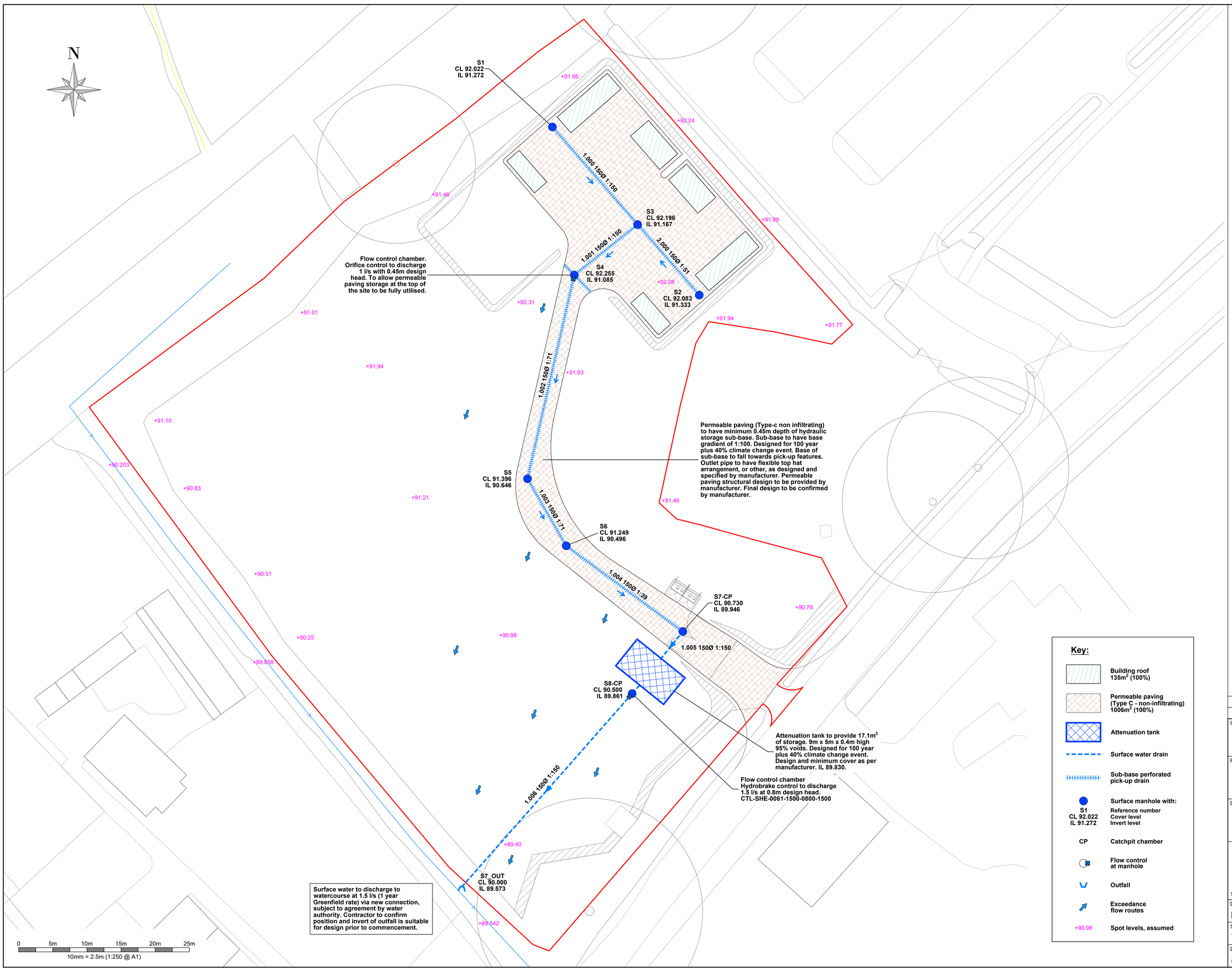
Proposed SuDS strategy

SuDS features comprised of permeable paving and an attenuation tank are proposed to attenuate a minimum of 77.54 m^3 of surface water runoff. The SuDS features would provide some water quality benefits (interception and filtration) prior to discharging to the nearby watercourse.

The proposed SuDS strategy would ensure surface water runoff is stored on-Site in SuDS features for the 1 in 100-year event including a 40% allowance for climate change and will not cause flooding to the proposed development in accordance with DEFRAs non-statutory technical standards (DEFRA, 2015).

Recommendations / Next steps

The condition and capacity of the surface watercourse should be confirmed, and permission should be obtained from the Local Council for proposed outfalls and any other permits required.



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Drainage Strategy

- **Drainage strategy consists of permeable paving, attenuation tank and controlled discharge to the nearby watercourse.**
- **Permeable paving will discharge via perforated pick up drains, or top hat type outlets. Base of storage sub-base to fall towards pick up / discharge points, all as manufacturer's design.**
- **Surface water will discharge to the nearby watercourse via new outfall, subject to agreement by water authority.**
- **Discharge rate will be controlled by hydrobrake to 1.5 l/s, subject to approval. 1.5 l/s is equal to the equivalent Greenfield runoff rate for the proposed development site.**

Rev	Date	Detail	Drwn	Chkd
P01	19.12.24	Initial issue	DS	WW

Client:
Patrick Casey

Project:
Land NW of Mays Lane
Arkley, Barnet, EN5 2AH

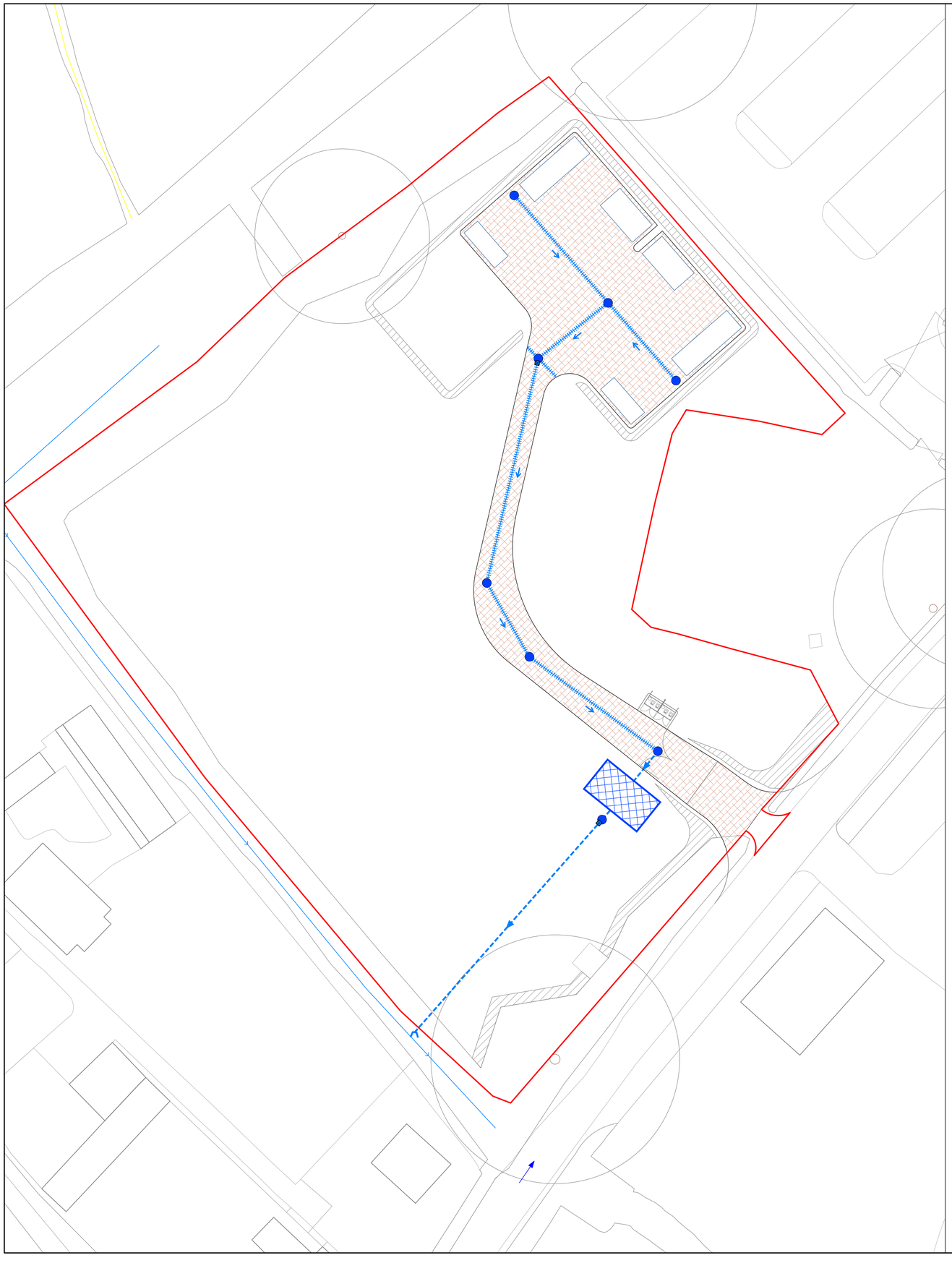
Drawing Title:
Proposed Surface Water Drainage Layout

GeoSmart Information
Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU

Drawn by:	Checked by:	Date:
DS	WW	Dec. 2024

Scale:	Status:
1:250 @ A1	Preliminary

Drawing No:	Issue:
81841 100	P01



	Asset Type	Maintenance Schedule (and Frequency)	Party Responsible
	Permeable pavements	Regular maintenance: • Brushing and vacuuming (three time per year) • Trimming any roots and surrounding grass and weeds that may be causing blockages (annually or as required) Monitoring: • Initial inspection (monthly) • Inspect surface for poor performance or ponding (annually or after large storm events)	Privately owned and maintained by site owners or specialist asset management company as agreed / appointed by site owners.
	Underground drainage pipe network and manholes / catchpits	Regular maintenance: • Remove sediment and debris from pre-treatment devices and floor of inspection tube or chamber (annually) • Cleaning of gutters and any filters on downpipes (annually) • Trimming any roots that may be causing blockages (annually or as required) Monitoring: • Inspect silt traps and note rate of sediment accumulation (monthly in the first year and then annually)	
	Attenuation tank	Regular maintenance: • Remove litter and debris from inlets and outlets (monthly) • Trimming any roots and surrounding grass blockages (as required) Monitoring: • Inspect inlets, outlets and overflows for blockages (monthly or after a heavy storm) • Inspect inlets and outlets for silt accumulation (half yearly) • Inspect infiltration surfaces for compaction and ponding (monthly) • Survey inside of tank for sediment build-up and remove (annually or as required)	
	Hydrobrake	Regular maintenance: • Remove silts from the Hydrobrake chamber sump (annually) • Remove any debris obstructing the inlet, outlet or control ensuring the emergency drain down mechanism if replaced correctly (annually) Monitoring: Inspect the hydrobrake control from the surface for signs of blockage or damage (as required) • Inspect the Hydrobrake chamber sump for build up of silt and the inlet and outlet for debris (annually) • Check the emergency drain down mechanism is in good working order (annually)	
	Outfall	Regular maintenance: • Remove litter and debris (monthly or as required) • Manage other vegetation and remove nuisance plants (monthly at start then as required) • Repair / rehabilitate outlet, as required Monitoring: • Inspect structure and pipework for blockages and clear if required (monthly or as required)	

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P01	19.12.24	Initial issue	DS	WW

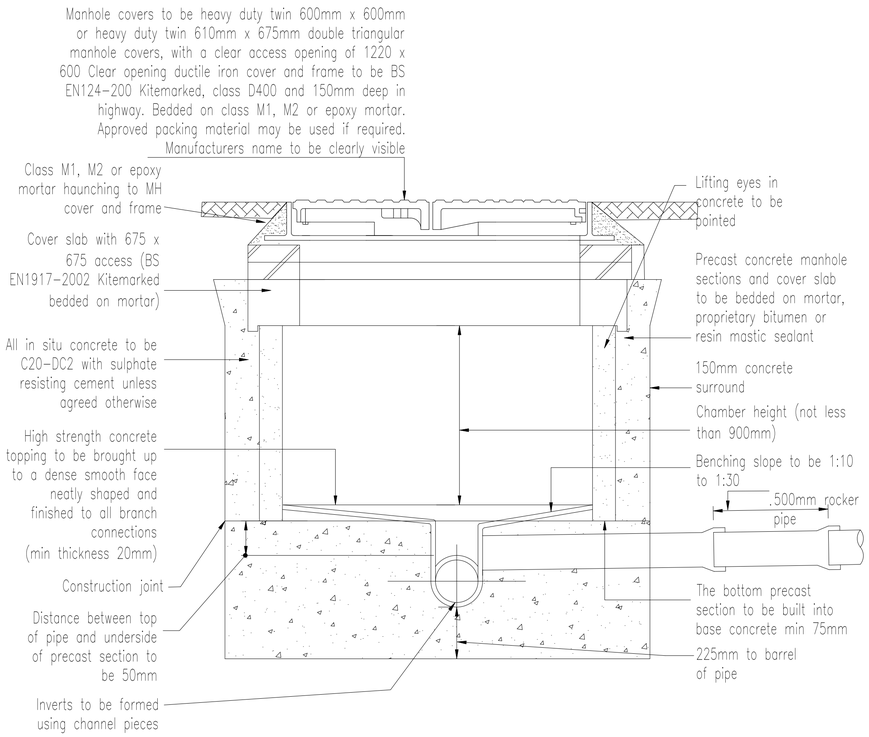
Client:
Patrick Casey

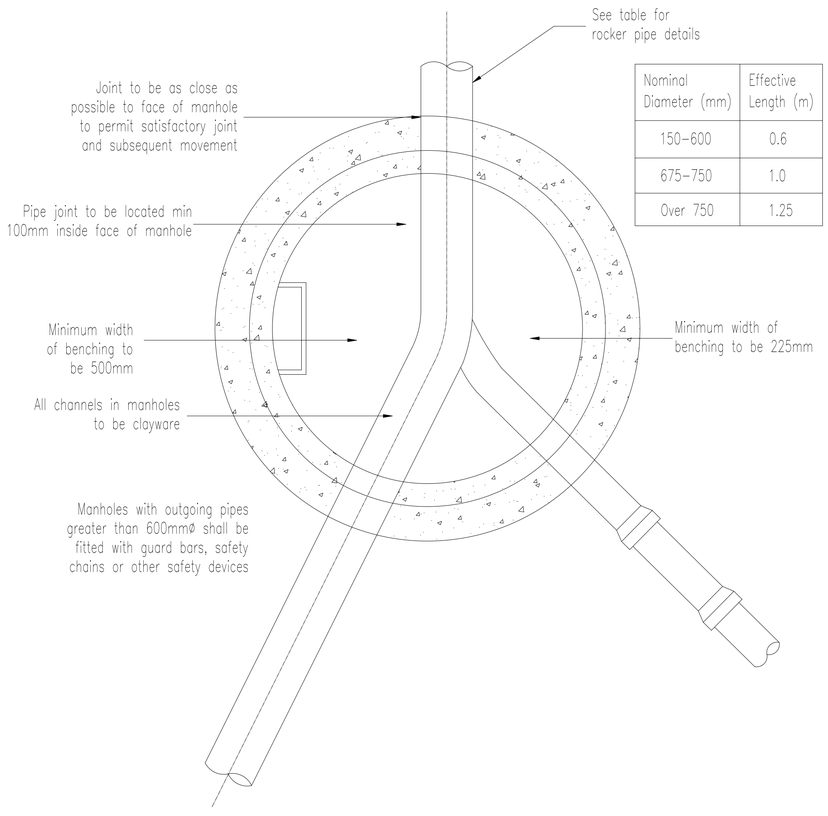
Project:
Land NW of Mays Lane
Arkley, Barnet, EN5 2AH

Drawing Title:
Management and Maintenance Plan

GeoSmart Information
Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU

Drawn by:	Checked by:	Date:
DS	WW	Dec. 2024
Scale: N.T.S		Status: Preliminary
Drawing No: 81841 101		Issue: P01

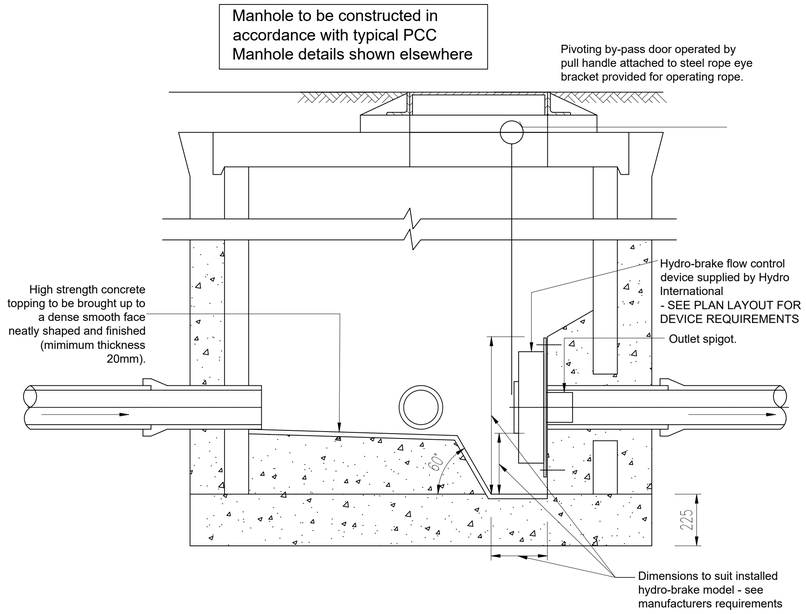




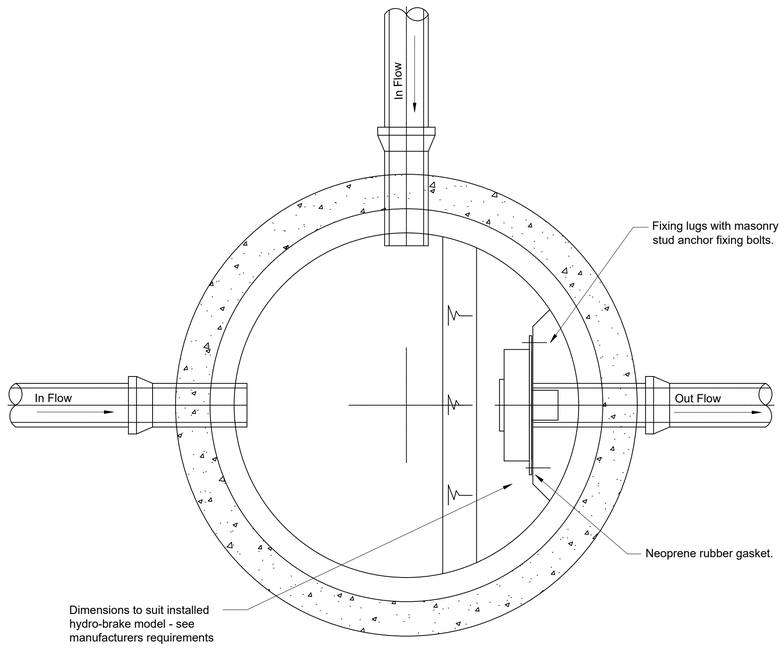
Nominal Diameter (mm)	Effective Length (m)
150-600	0.6
675-750	1.0
Over 750	1.25

TYPICAL MANHOLE DETAIL-TYPE E

Max depth from ground level to soffit of pipe <1.0m
The design of the manhole will need to comply with the undertakers safety policy



FLOW CONTROL MANHOLE (HYDRO-BRAKE)



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Land NW of Mays Lane
Arkley, Barnet, EN5 2AH

Drawing Title:
Cross Sections Part 1

GeoSmart Information
Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU

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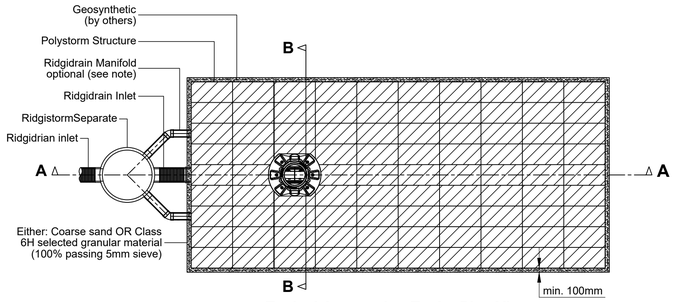
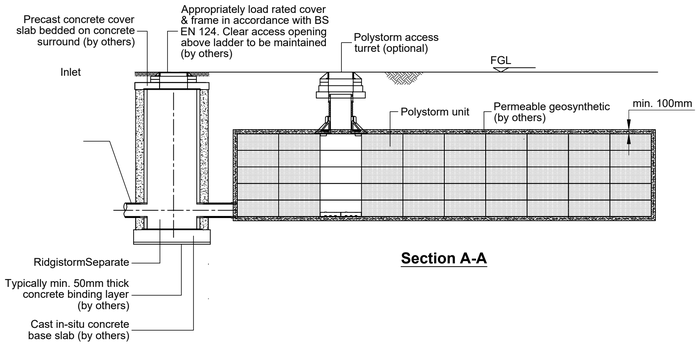
N.T.S	Preliminary

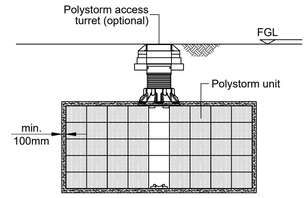
Drawing No:	Issue:
81841 102	P01



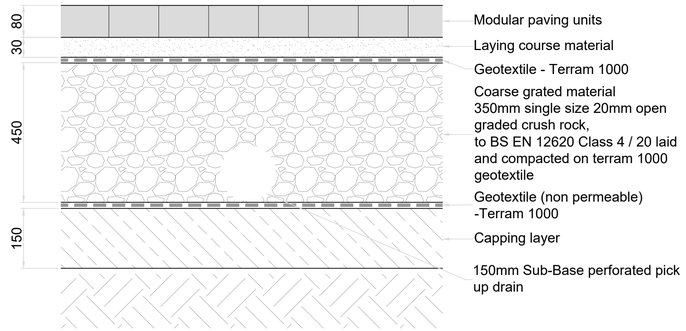
Typical Attenuation Tank - Plan View



Section A-A

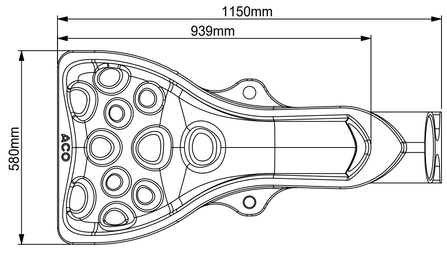


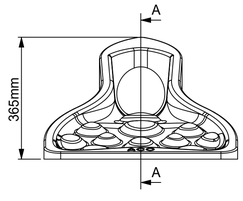
Section B-B

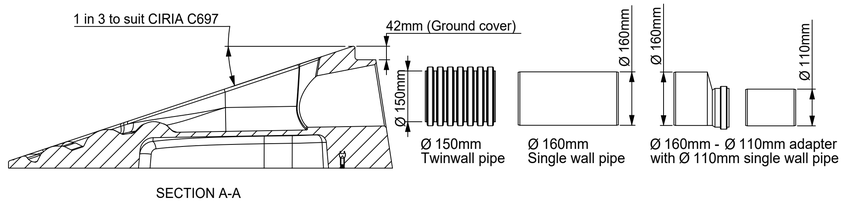


Permeable Block Paving

Scale 1:10







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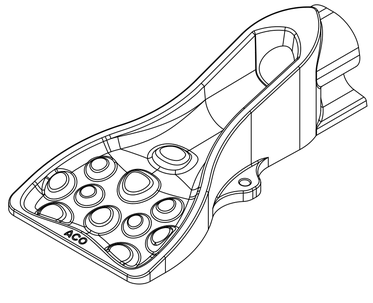

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P01	19.12.24	Initial issue	DS	WW

Client:

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Land NW of Mays Lane
Arkley, Barnet, EN5 2AH

Drawing Title:

Cross Sections Part 2

GeoSmart Information
Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU

Drawn by:	Checked by:	Date:
DS	WW	Dec. 2024
Scale: N.T.S		Status: Preliminary
Drawing No: 81841 103		Issue: P01

3 Site analysis

Site location

Figure 1. Aerial Imagery (Bluesky, 2024)

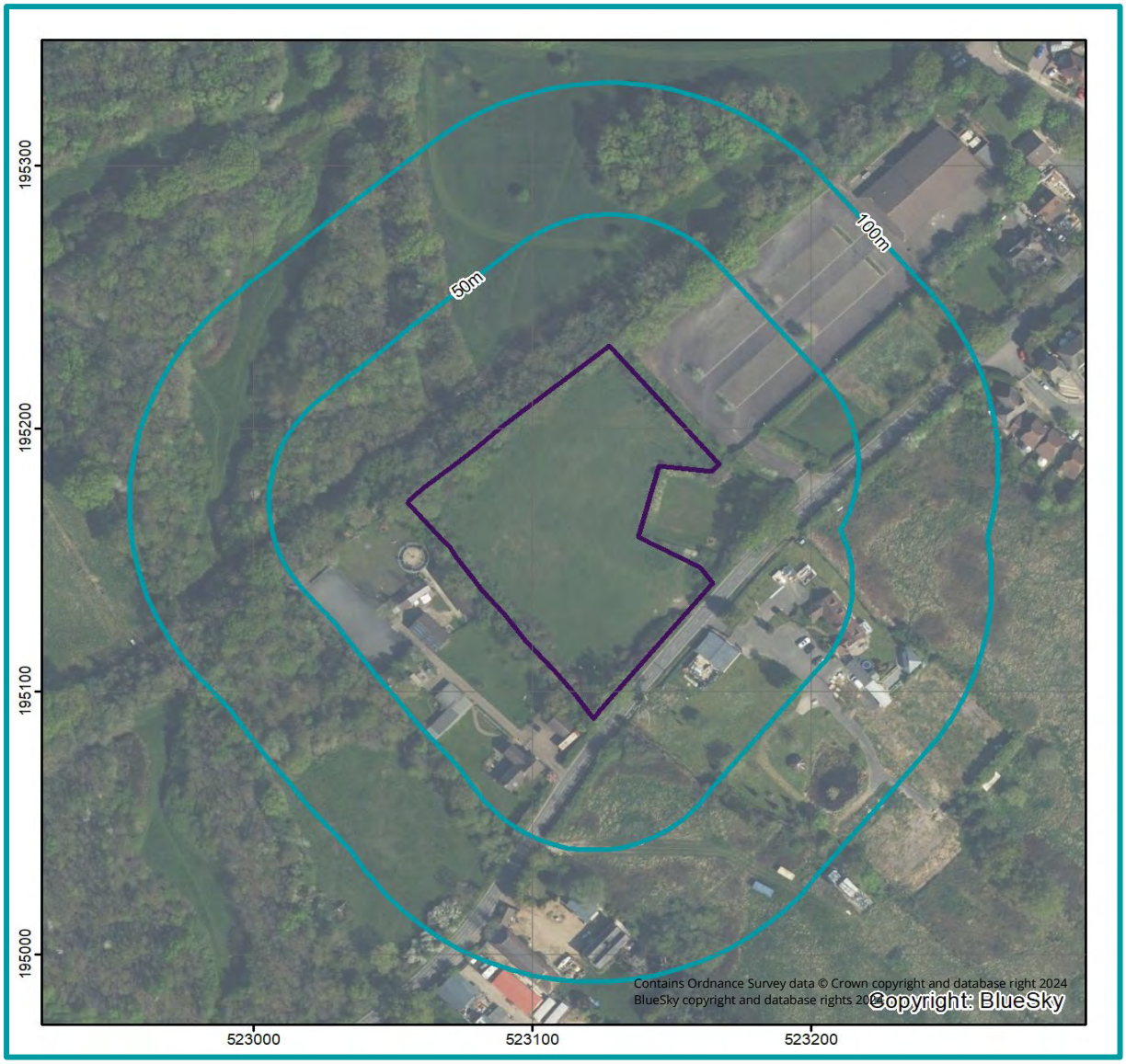
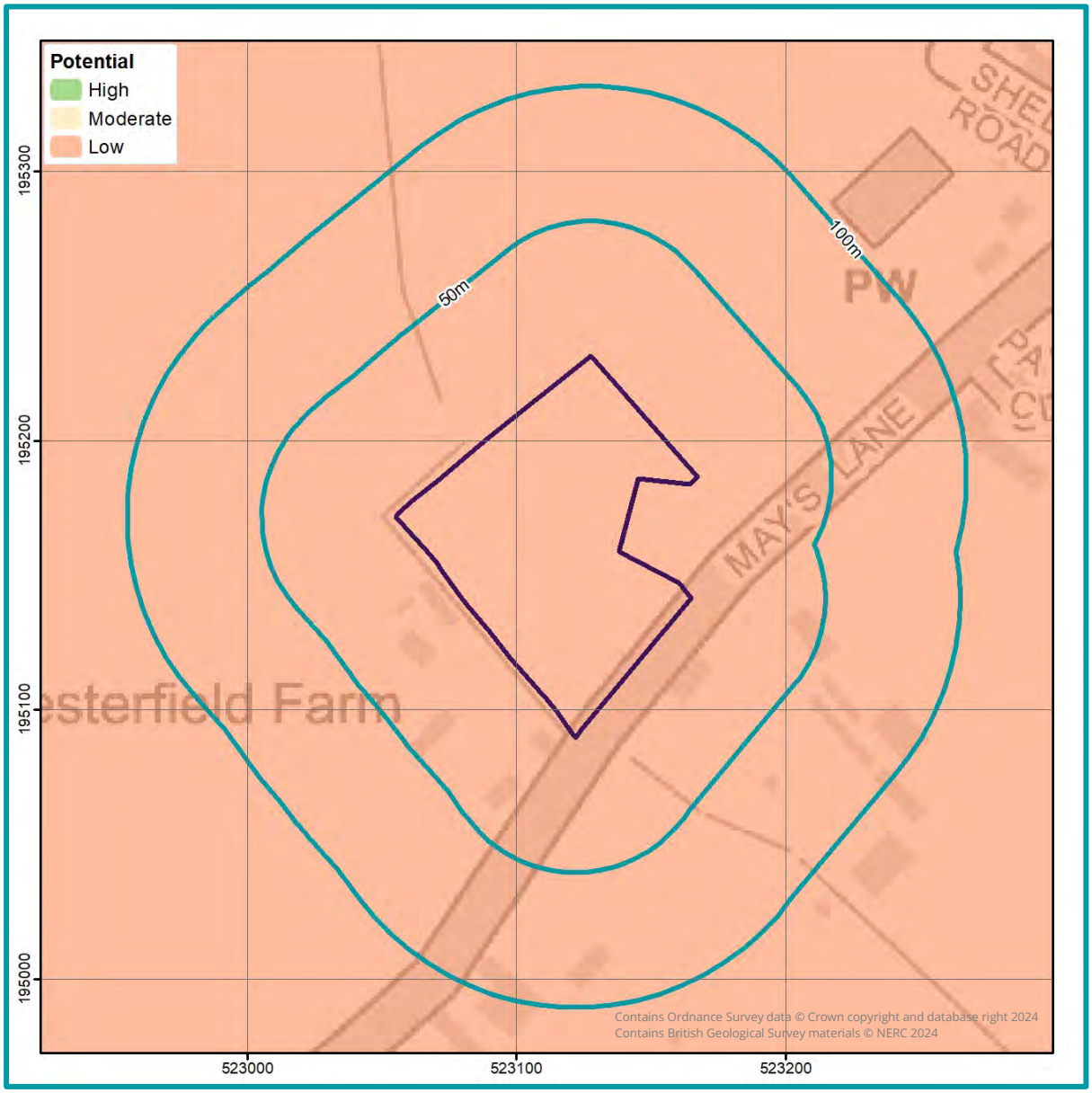


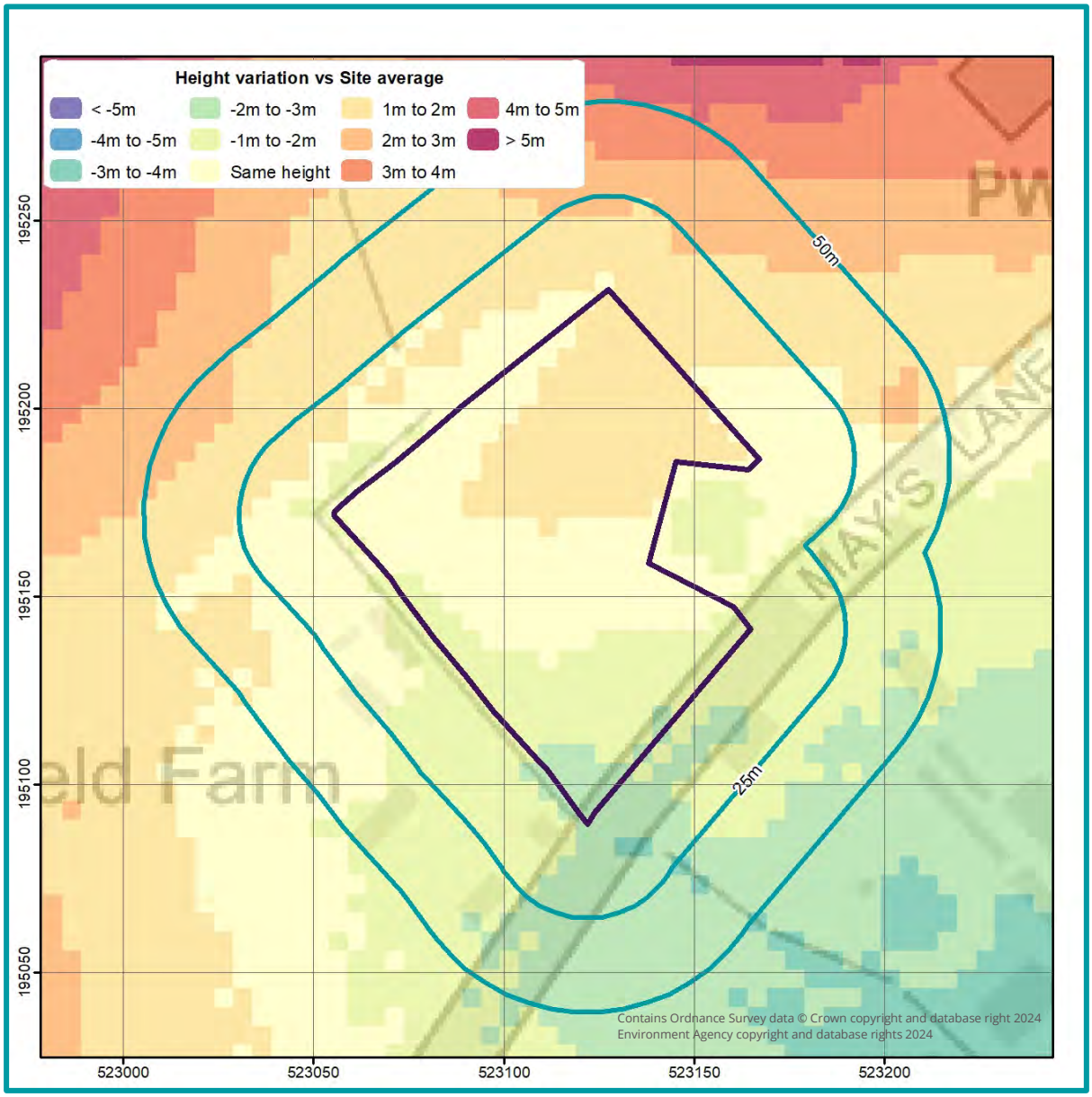
Figure 2. SuDS infiltration suitability (SD50) map (GeoSmart, 2024)



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.

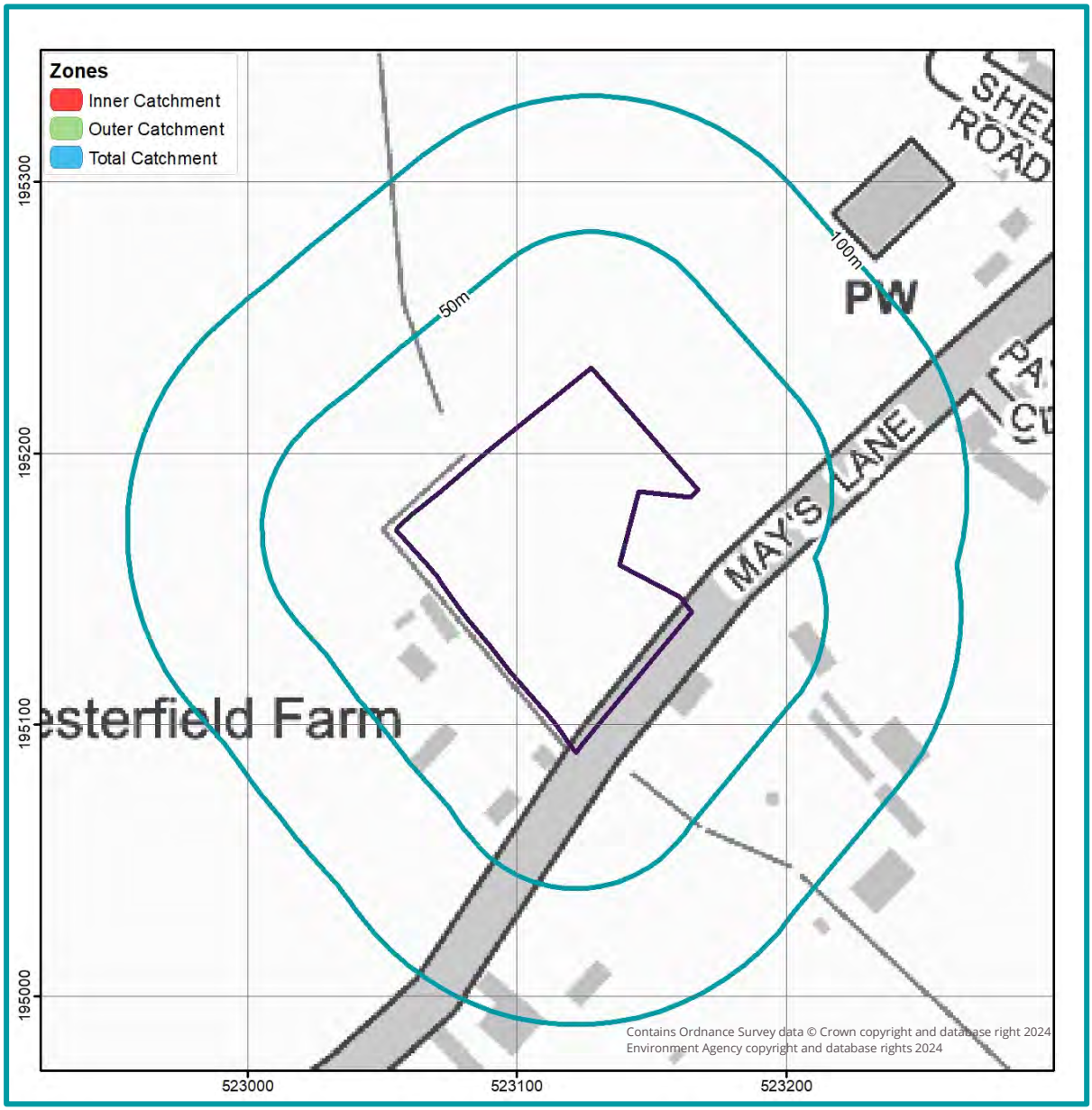
There is a Low potential for infiltration SuDS across the Site. It is likely that the underlying geology at the Site has low permeability which would limit the effectiveness of a proposed infiltration SuDS scheme.

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 localised 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 on a gradual slope to the southeast. There is an area of raised ground in the northeast corner of the Site.

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

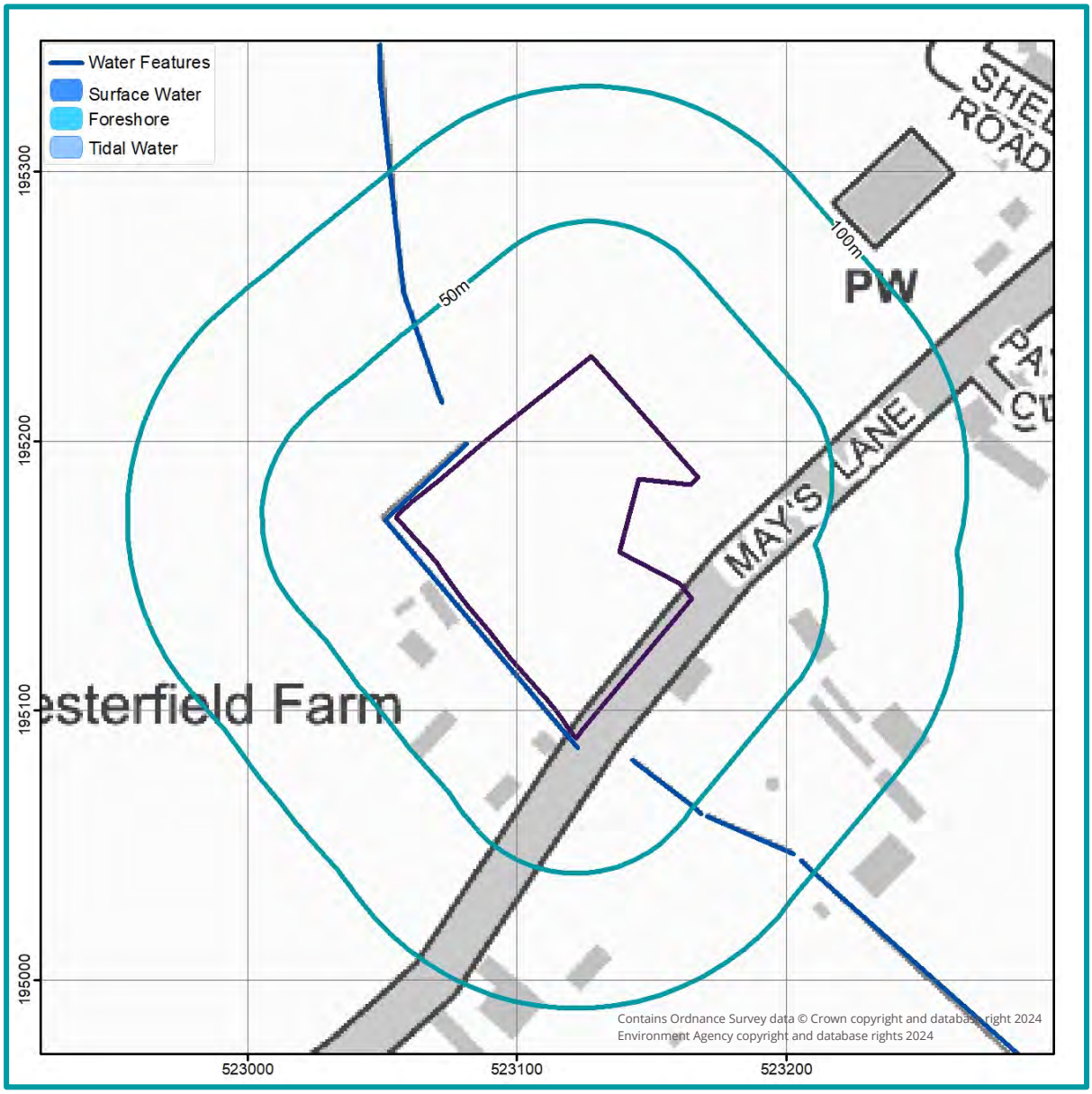


An assessment of the EA's groundwater Source Protection Zones (SPZs) has been undertaken within the vicinity of the Site and confirms the Site is not located within an SPZ.

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)



OS mapping indicates a surface water (Dollis Brook) is located adjacent to the western boundary of the Site and hence discharge should be considered. Further discussions should be held with the regulators to agree a suitable discharge route and any easements required.

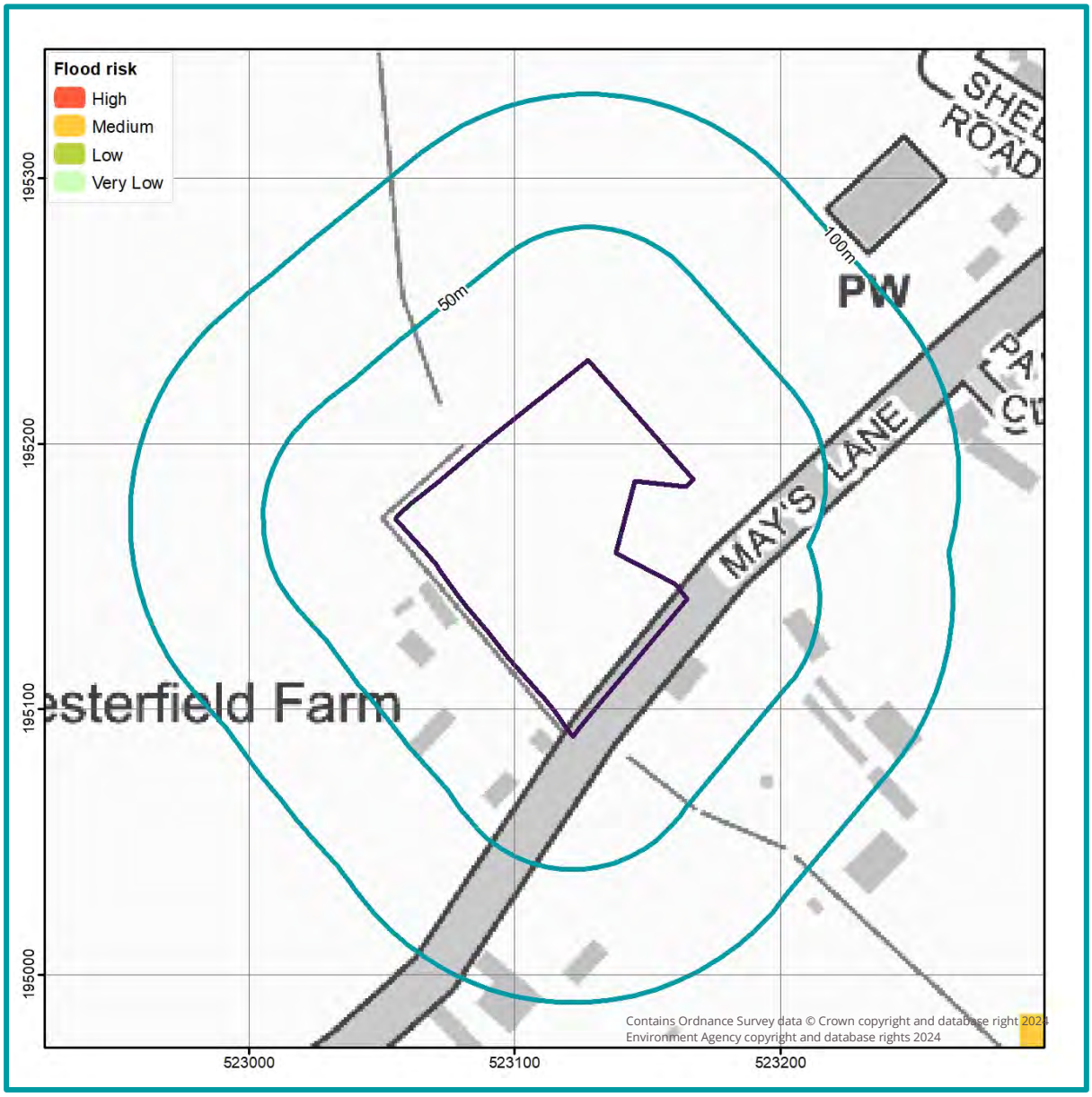
According to the EA's Magic Map, the Site is not within 250m of a SSSI or SPA.

Further analysis could be undertaken by visiting the Site or by contacting the Local Council and the Environment Agency (EA) to confirm the presence, location and condition of any mapped or additional unmapped surface water features.

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 Thames Water asset location plan undertaken at the Site (Appendix C), there are no public surface water sewer or combined sewers located within the vicinity of the Site.

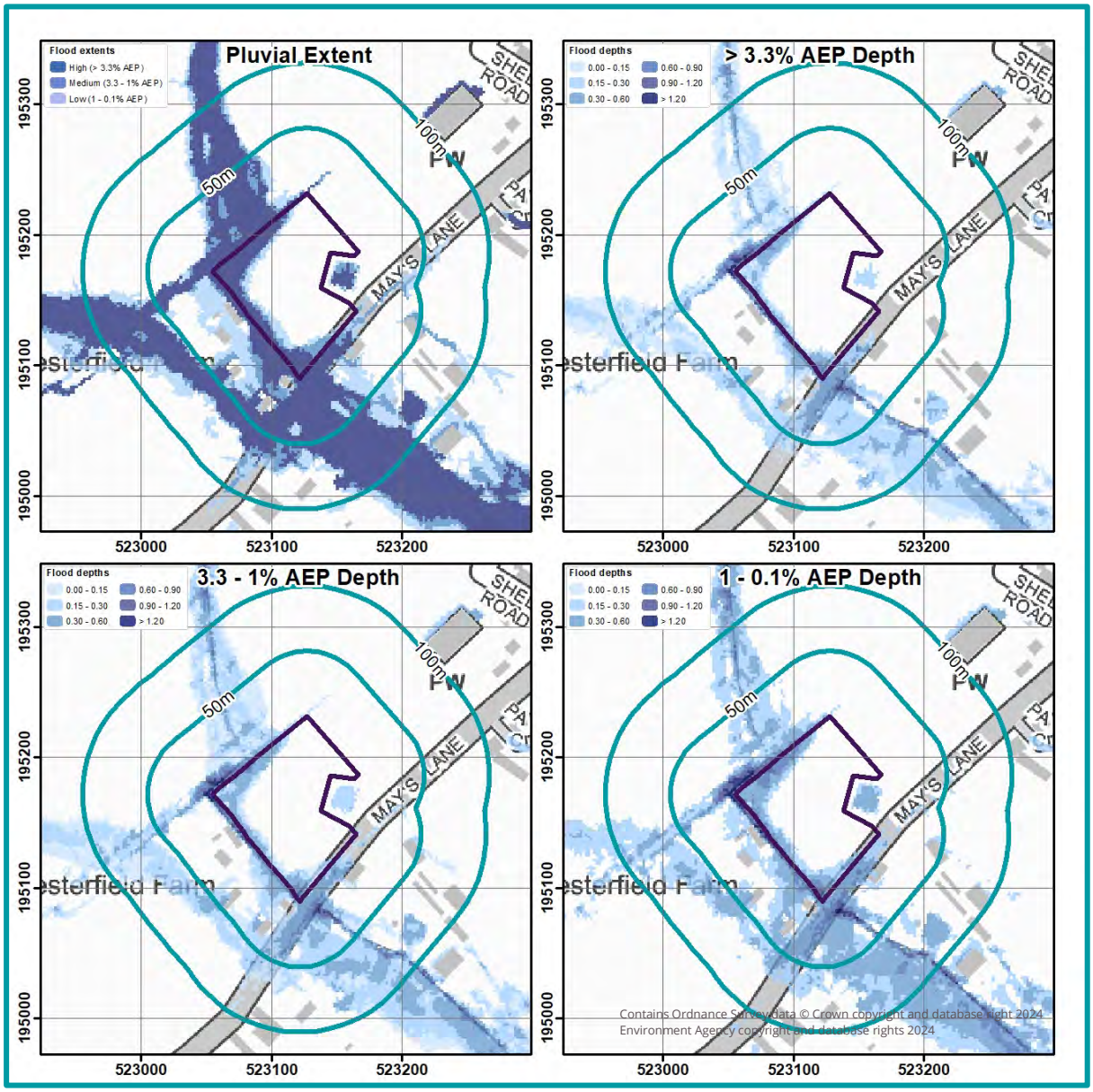
Figure 7. Risk of flooding from rivers & sea map (EA, 2024)



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.

A separate Flood Risk Assessment has been undertaken (ref: 81841), where the potential risks to the development are discussed further.

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

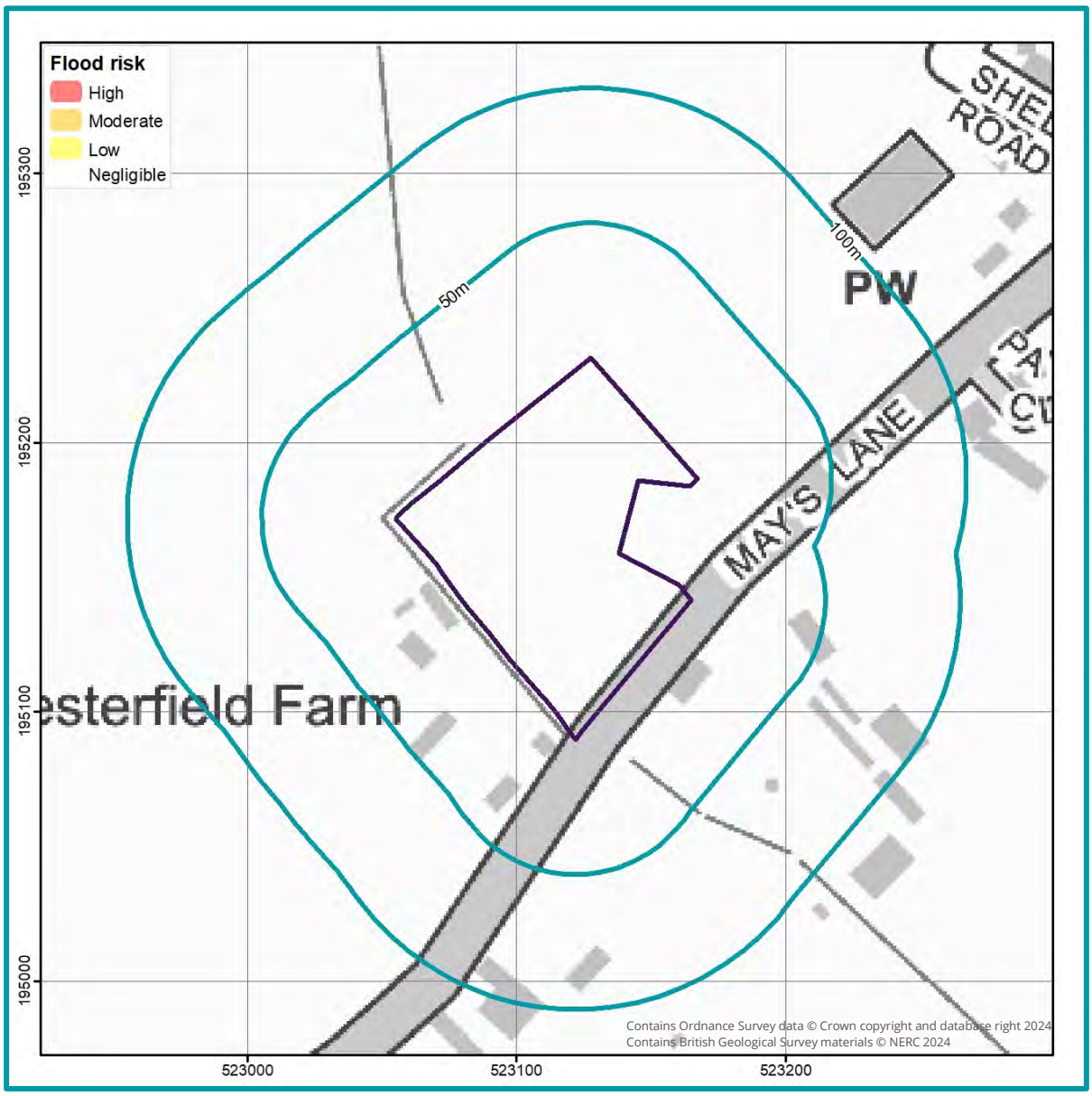


GeoSmart have undertaken an assessment of the risk of flooding from surface water (pluvial) sources within the vicinity of the Site using the EA's Risk of Flooding from Surface Water (RoFSW) mapping. The EA's mapping confirms the Site is considered to be at Very Low to High risk of surface water flooding. In the relevant FRA, the risk has been reduced to Very Low to Low as the area proposed for development remains unaffected in the Low-risk scenario (ref: 81841).

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. OR This confirms there are areas where flooding could occur in a 1 in 30 year, 1 in 100 year and 1 in 1000 year events. Flooding in these areas may constrain certain types of SuDS features being used.

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.

4 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 land northwest of Mays Lane, EN5 2AH (the Site). The Site is located at the in a setting of commercial and residential use.

The general ground levels on the Site are between 89.17 and 92.25 mAOD with the Site falling gradually in a south easterly direction. This is based upon a Site specific topographic survey.

Development

The Site is currently vacant grassland with no built infrastructure in place at the Site. There is an area of hardstanding located to the east of the site.

Development proposals comprise the erection of two utility/dayrooms, two mobile homes and two touring caravans in the northeast of the Site. An access road constructed of loose bound permeable hardstanding is also proposed. 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

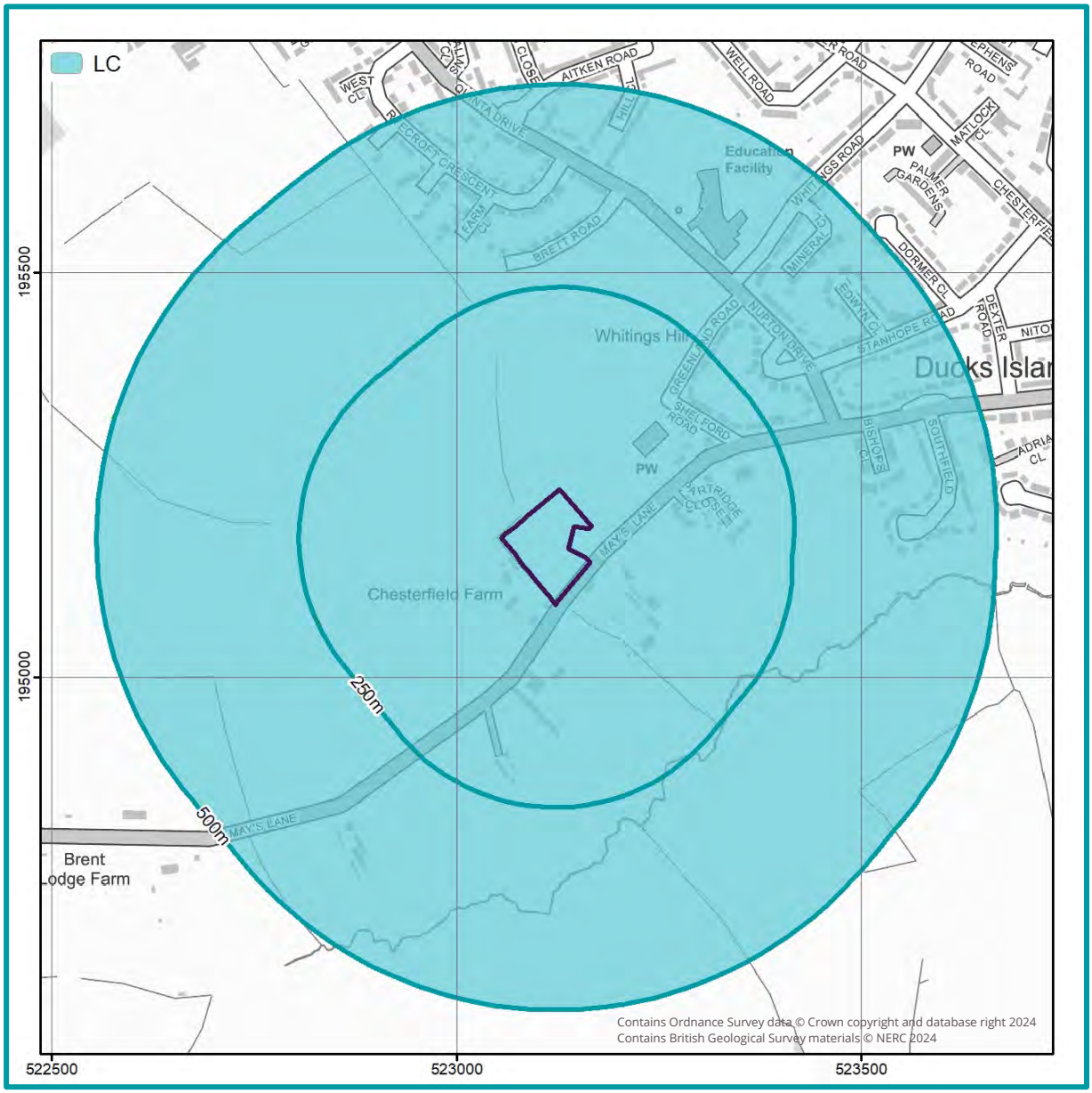
Geology present on-Site		Potentially permeable?
Superficial geology (Figure 11)	No superficial deposits present	N/A
Bedrock geology (Figure 12)	London Clay formation (LC)	✓

The permeability of the underlying material at the Site shown within the BGS mapping is low, confirmation of the infiltration capacity is not considered to be required.

The BGS website was used to extract ground information from the nearest borehole records to the Site. Unfortunately, no relevant boreholes within 500m of the Site were available to confirm the underlying geology.

Figure 10. Superficial Geology (BGS, 2024)

Figure 11. Bedrock Geology (BGS, 2024)



Depth to groundwater

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

According to GeoSmart's Groundwater Flood Risk (GW5) map, shallow groundwater is unlikely to be an issue at the Site.

Relevant borehole/trial pit records were not available within the vicinity of the Site to confirm the depth to groundwater at the Site.

Infiltration features are not proposed at the Site, given the anticipated low permeability of the underlying geology.

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.

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.

5 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 (≥ 3.3% AEP) and 1 in 100 (< 3.3 to 1% AEP) year event.

As the Site is located within the London Management Catchment the following climate change allowances are applicable.

Table 2. London Management Catchment peak rainfall allowances

London Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Central	20%	20%	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.

Regional Drainage Policy

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

London Borough of Barnet – Core Strategy SPD – Sustainable Design and Construction (2012)

Developments will be required to demonstrate how they have considered the London Plan drainage hierarchy (Policy 5.13: Sustainable Drainage) and achievement of a maximum runoff rate which is equivalent to greenfield rates (typically 2 litres per second hectare). The Barnet LLFA pro-forma detailing SUDs strategy should be submitted with the application.

Design Principles

Replacement and enhancement of natural environmental features – Almost all development sites will have some existing or potential value as wildlife habitat. Proposals should include an assessment of existing wildlife habitats and seek to preserve and enhance existing habitats and features or, if not possible, to replace these with new habitats which can evolve in a locally sustainable way aiming to achieve no net loss in habitat. Existing mature, healthy trees and other vegetation should be incorporated into layouts rather than be felled. Where possible existing ponds and hedges should be retained given their ecosystem service role.

Green roofs, trees and green façades and rainwater gardens – ensure that the built form of the development can contribute to the ecological environment. The built environment should aim to be permeable to wildlife, incorporating design features aimed at sustaining and increasing the population of particular species and facilitating climate change adaptation. Any building or built structure has the potential to be designed or adapted to support biodiversity; in turn buildings can benefit through better environmental performance. Green roofs, façades, trees and rainwater gardens can help to attenuate water run off, reduce the urban heat island effect, reduce solar heating of a building and provide habitat for wildlife. The design of a flat roof in a development should use a green roof which should be planted with sedums and native wildflowers, in order to provide sufficient foraging resources and structural variation for a range of species to colonise the roof.

Low maintenance, indigenous landscaping–, landscaping should aim to choose plants which are beneficial to wildlife using indigenous plants wherever possible, require low levels of water and are low maintenance to enable the appearance and amenity of the environment to remain high in low rainfall years. Consideration should also be given to the long term management of existing habitats, new landscaping and other biodiversity design features.

6 Storage, volume and peak flow rate

Suggested minimum and aspirational storage requirements for an attenuation SuDS scheme for the development footprint are set out below, with more detail provided in subsequent sections.

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

Attenuation scenario		Attenuation required (m^3)	Explanation
Discharge runoff to watercourse	1 in 100 year including 40% CC	77.54	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100-year event including a 40% allowance for climate change*.

*See Appendix B for associated runoff and discharge calculations. Discharge rates all restricted as close as possible to greenfield rates.

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	8325 m^2
Impermeable area (and as a percentage of the total area of the proposed development footprint of 2780 m^2)	
Pre-development	Post-development
0 m^2	1109 m^2 (40%)
Impermeable land use: None Permeable land use: Vacant field	New impermeable land use: 135 m^2 proposed touring caravans and dayrooms. New permeable land use: 1,141 m^2 of permeable surfacing*

*Please note, while these areas will be utilised for SuDS, for the calculations these areas 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).

7 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

The Site has Low potential for infiltration SuDS, with low permeability clays underlying the Site, and hence infiltration to ground is not considered feasible.

Discharge to surface watercourse

Dollis Brook is located on the western boundary of the Site and hence discharge is considered feasible. Permission should be obtained from the EA/LLFA to discharge to the brook.

Access would need to be arranged and the outfall would be subject to river level and flood conditions. A flow control device would be required to limit peak discharge rates to the maximum selected rate as indicated in Section 5 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 C), there are no public surface water sewer or combined sewers located within the vicinity of the Site, and hence discharge to the public sewer network is considered unfeasible.

8 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 and road). 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

Health and safety considerations for SuDS

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).

9 Further information

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

Additional GeoSmart Products			
✓	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.

10 References and glossary

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GeoSmart Information

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

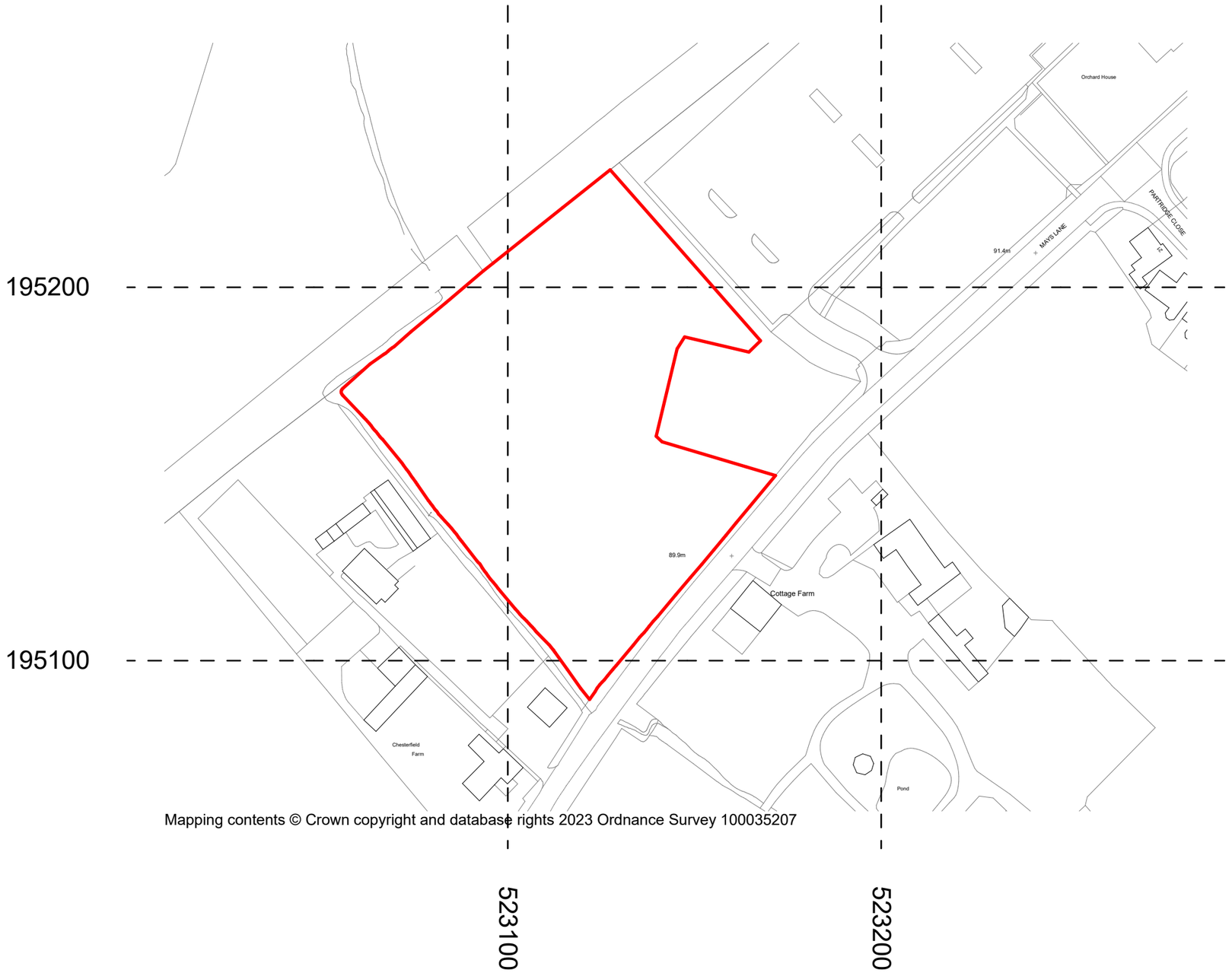
Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2024 BlueSky copyright and database rights 2024
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2024 Ordnance Survey data © Crown copyright and database right 2024
Flood Risk (RoFRS/Pluvial/Surface 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

11 Appendices

GeoSmart Information

Appendix A

Site plans



Site Plan Key/Legend

Red Line Boundary

Issue ID	Issue Name	Current Revision	Initials	Date
P01	Initial Transmittal	P01	EG	24/08/2023

Green Planning Studio

Client
Patrick Casey

Project
23_1285 Land NW of Mays Lane - Land Use
Land NW of Mays Lane,
Mays Lane,
Arkley,
Barnet,
EN5 2AH

Drawing Title
Site Location Plan

Scale @A3	Date	Drawn
1:1250	24/08/2023	EG

Case No	Status
23_1285	Initial Status

Drawing No	Rev
001	P01

ISO 19650 No:
23_1285-GPS-ZZ-GF-DR-A-001

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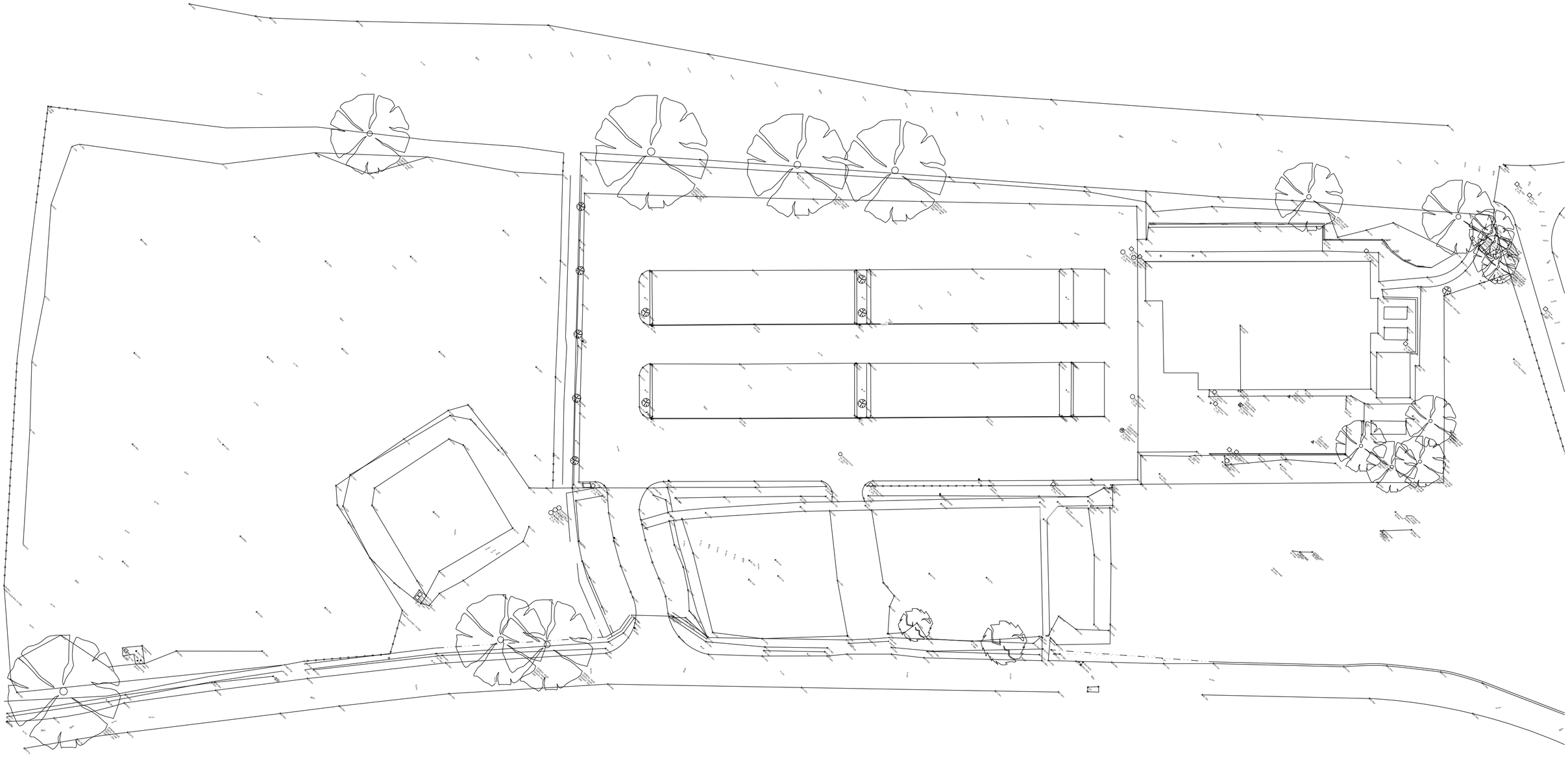
RIBA Chartered Practice



GeoSmart Information

Appendix B

Rainfall runoff calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.007	5.00	92.022	600	268.625	304.274	0.750
2	0.007	5.00	92.083	600	284.380	285.870	0.750
3	0.060	5.00	92.196	600	278.912	292.424	1.029
4	0.014	5.00	92.255	600	269.486	284.614	1.170
5	0.003	5.00	91.396	600	262.967	254.270	0.750
6	0.003	5.00	91.249	600	268.070	244.841	0.753
7	0.014	5.00	90.730	1200	285.942	233.304	0.784
8			90.700	1200	277.900	223.463	0.870
8_OUT			90.000	600	252.420	194.549	0.427

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	3	15.692	0.600	91.272	91.167	0.105	150.0	150	5.32	50.0
2.000	2	3	8.535	0.600	91.333	91.167	0.166	51.4	150	5.10	50.0
1.001	3	4	12.241	0.600	91.167	91.085	0.082	150.0	150	5.57	50.0
1.002	4	5	31.036	0.600	91.085	90.646	0.439	70.7	150	6.00	49.6
1.003	5	6	10.721	0.600	90.646	90.496	0.150	71.5	150	6.15	49.0
1.004	6	7	21.272	0.600	90.496	89.946	0.550	38.7	150	6.37	48.2
1.005	7	8	12.709	0.600	89.946	89.861	0.085	150.0	150	6.63	47.2
1.006	8	8_OUT	38.539	0.600	89.830	89.573	0.257	150.0	150	7.41	44.5

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	0.818	14.5	0.9	0.600	0.879	0.007	0.0	26	0.461
2.000	1.406	24.8	0.9	0.600	0.879	0.007	0.0	20	0.679
1.001	0.818	14.5	10.0	0.879	1.020	0.074	0.0	92	0.883
1.002	1.197	21.2	11.8	1.020	0.600	0.088	0.0	80	1.229
1.003	1.191	21.0	12.1	0.600	0.603	0.091	0.0	82	1.232
1.004	1.623	28.7	12.3	0.603	0.634	0.094	0.0	68	1.558
1.005	0.818	14.5	13.8	0.634	0.689	0.108	0.0	117	0.929
1.006	0.818	14.5	13.0	0.720	0.277	0.108	0.0	112	0.924

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	2 year (l/s)	1.5
Summer CV	0.750	Drain Down Time (mins)	1440	100 year (l/s)	5.5
Winter CV	0.840	Additional Storage (m³/ha)	20.0	Check Discharge Volume	x
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

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 %)
2	0	10	0
30	0	10	0
100	0	10	0
100	40	10	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 2 year	0.88
Greenfield Method	FEH	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.278	Betterment (%)	0
SAAR (mm)	697	QMed	1.5
Host	1	QBar	1.7
BFIHost	0.217	Q 2 year (l/s)	1.5
Region	6	Q 100 year (l/s)	5.5
QBar/QMed conversion factor	1.136		

Node 8 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	89.830	Product Number	CTL-SHE-0061-1500-0800-1500
Design Depth (m)	0.800	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.5	Min Node Diameter (mm)	1200

Node 4 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.0		
Invert Level (m)	91.085	Diameter (m)	0.026		

Node 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	91.596	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	544	Depth (m)	0.450
Safety Factor	2.0	Width (m)	30.000	Inf Depth (m)	
Porosity	0.30	Length (m)	20.000		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	90.796	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	3.500	Inf Depth (m)	
Porosity	0.30	Length (m)	30.000		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	90.796	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	
Porosity	0.30	Length (m)	5.000		

Node 6 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	90.649	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	
Porosity	0.30	Length (m)	5.000		

Node 7 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	90.130	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.450
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	20.000		

Node 8 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	89.830
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	648

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	45.0	0.0	0.400	45.0	0.0	0.401	0.0	0.0

Results for 2 year +10% A Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	1	136	91.706	0.434	0.4	0.2117	0.0000	SURCHARGED
180 minute winter	2	136	91.706	0.373	0.4	0.1819	0.0000	SURCHARGED
180 minute winter	3	136	91.706	0.539	3.1	6.2736	0.0000	SURCHARGED
180 minute winter	4	136	91.705	0.620	1.4	0.3387	0.0000	SURCHARGED
15 minute winter	5	11	90.673	0.027	1.4	0.0101	0.0000	OK
15 minute winter	6	11	90.522	0.026	1.8	0.0095	0.0000	OK
15 minute winter	7	11	90.000	0.054	3.8	0.0829	0.0000	OK
360 minute winter	8	232	89.929	0.099	1.7	4.3380	0.0000	OK
15 minute summer	8_OUT	1	89.573	0.000	0.8	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	3	-3.9	-0.273	-0.267	0.2763	
15 minute summer	2	2.000	3	-2.2	-0.130	-0.089	0.1503	
15 minute winter	3	1.001	4	2.2	0.370	0.151	0.2155	
180 minute winter	4	Orifice	5	1.1				
15 minute winter	5	1.003	6	1.4	0.687	0.068	0.0224	
120 minute winter	6	1.004	7	1.5	0.605	0.051	0.0597	
15 minute winter	7	1.005	8	3.8	0.679	0.264	0.0713	
360 minute winter	8	Hydro-Brake®	8_OUT	1.3				24.9

Results for 30 year +10% A Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	1	176	91.833	0.561	0.7	0.2737	0.0000	FLOOD RISK
180 minute winter	2	176	91.833	0.500	0.7	0.2439	0.0000	FLOOD RISK
180 minute winter	3	176	91.833	0.666	7.6	25.6716	0.0000	SURCHARGED
180 minute winter	4	176	91.832	0.747	1.4	0.4080	0.0000	SURCHARGED
15 minute winter	5	10	90.681	0.035	2.4	0.0129	0.0000	OK
15 minute winter	6	10	90.532	0.036	3.7	0.0134	0.0000	OK
15 minute winter	7	11	90.040	0.094	9.7	0.1435	0.0000	OK
180 minute winter	8	172	90.022	0.192	3.2	8.4197	0.0000	SURCHARGED
15 minute summer	8_OUT	1	89.573	0.000	1.2	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	3	2.8	-0.216	0.191	0.2763	
15 minute winter	2	2.000	3	-3.4	-0.195	-0.135	0.1503	
15 minute winter	3	1.001	4	-4.6	0.425	-0.320	0.2155	
180 minute winter	4	Orifice	5	1.2				
15 minute winter	5	1.003	6	2.4	0.750	0.113	0.0341	
60 minute winter	6	1.004	7	2.3	0.620	0.082	0.1040	
15 minute winter	7	1.005	8	9.6	0.851	0.661	0.1426	
180 minute winter	8	Hydro-Brake®	8_OUT	1.5				48.1

Results for 100 year +10% A Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	1	232	91.898	0.626	0.8	0.3056	0.0000	FLOOD RISK
240 minute winter	2	232	91.898	0.565	0.8	0.2759	0.0000	FLOOD RISK
240 minute winter	3	232	91.898	0.731	8.4	37.5700	0.0000	FLOOD RISK
240 minute winter	4	232	91.898	0.813	1.5	0.4438	0.0000	SURCHARGED
15 minute winter	5	10	90.684	0.038	2.8	0.0141	0.0000	OK
15 minute winter	6	10	90.536	0.040	4.5	0.0148	0.0000	OK
240 minute winter	7	232	90.087	0.141	3.3	0.2142	0.0000	OK
240 minute winter	8	232	90.086	0.256	3.3	11.2145	0.0000	SURCHARGED
15 minute summer	8_OUT	1	89.573	0.000	1.3	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	3	-4.6	-0.315	-0.320	0.2763	
15 minute winter	2	2.000	3	3.6	0.204	0.145	0.1503	
15 minute summer	3	1.001	4	-6.0	0.449	-0.418	0.2155	
240 minute winter	4	Orifice	5	1.3				
15 minute winter	5	1.003	6	2.8	0.775	0.134	0.0389	
30 minute winter	6	1.004	7	3.7	0.621	0.131	0.1620	
15 minute winter	7	1.005	8	12.2	0.899	0.841	0.1718	
240 minute winter	8	Hydro-Brake®	8_OUT	1.5				68.2

Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	1	344	92.014	0.742	0.8	0.3620	0.0000	FLOOD RISK
360 minute winter	2	344	92.014	0.681	0.8	0.3323	0.0000	FLOOD RISK
360 minute winter	3	344	92.014	0.847	8.6	58.5475	0.0000	FLOOD RISK
360 minute winter	4	344	92.013	0.928	1.6	0.5068	0.0000	FLOOD RISK
15 minute winter	5	10	90.689	0.043	3.6	0.0159	0.0000	OK
15 minute winter	6	10	90.542	0.046	6.0	0.0171	0.0000	OK
360 minute winter	7	360	90.215	0.269	3.4	0.9577	0.0000	SURCHARGED
360 minute winter	8	360	90.214	0.384	3.3	16.8445	0.0000	SURCHARGED
15 minute summer	8_OUT	1	89.573	0.000	1.4	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	3	5.1	0.290	0.354	0.2763	
15 minute winter	2	2.000	3	5.1	0.292	0.207	0.1503	
15 minute winter	3	1.001	4	-9.4	-0.537	-0.654	0.2155	
360 minute winter	4	Orifice	5	1.4				
15 minute winter	5	1.003	6	3.6	0.814	0.169	0.0469	
15 minute summer	6	1.004	7	5.7	0.622	0.199	0.2346	
15 minute winter	7	1.005	8	16.5	0.959	1.145	0.2071	
360 minute winter	8	Hydro-Brake®	8_OUT	1.5				105.5

GeoSmart Information

Appendix C

Thames Water Asset Location Plan

Asset Location Search

Thames Water Property Searches

GeoSmart Information Ltd
SHREWSBURY
SY1 1HU

Search address supplied 298
Mays Lane
Barnet
EN5 2AH

Your reference 81841.01

Our reference ALS/ALS Standard/2024_4964381

Search date 28 March 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

Asset Location Search

Property Searches

Search address supplied: 298, Mays Lane, Barnet, EN5 2AH

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

Asset Location Search

Thames Water Property Searches

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:

Affinity Water Ltd
Tamblin Way
Hatfield
AL10 9EZ
Tel: 0345 3572401

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

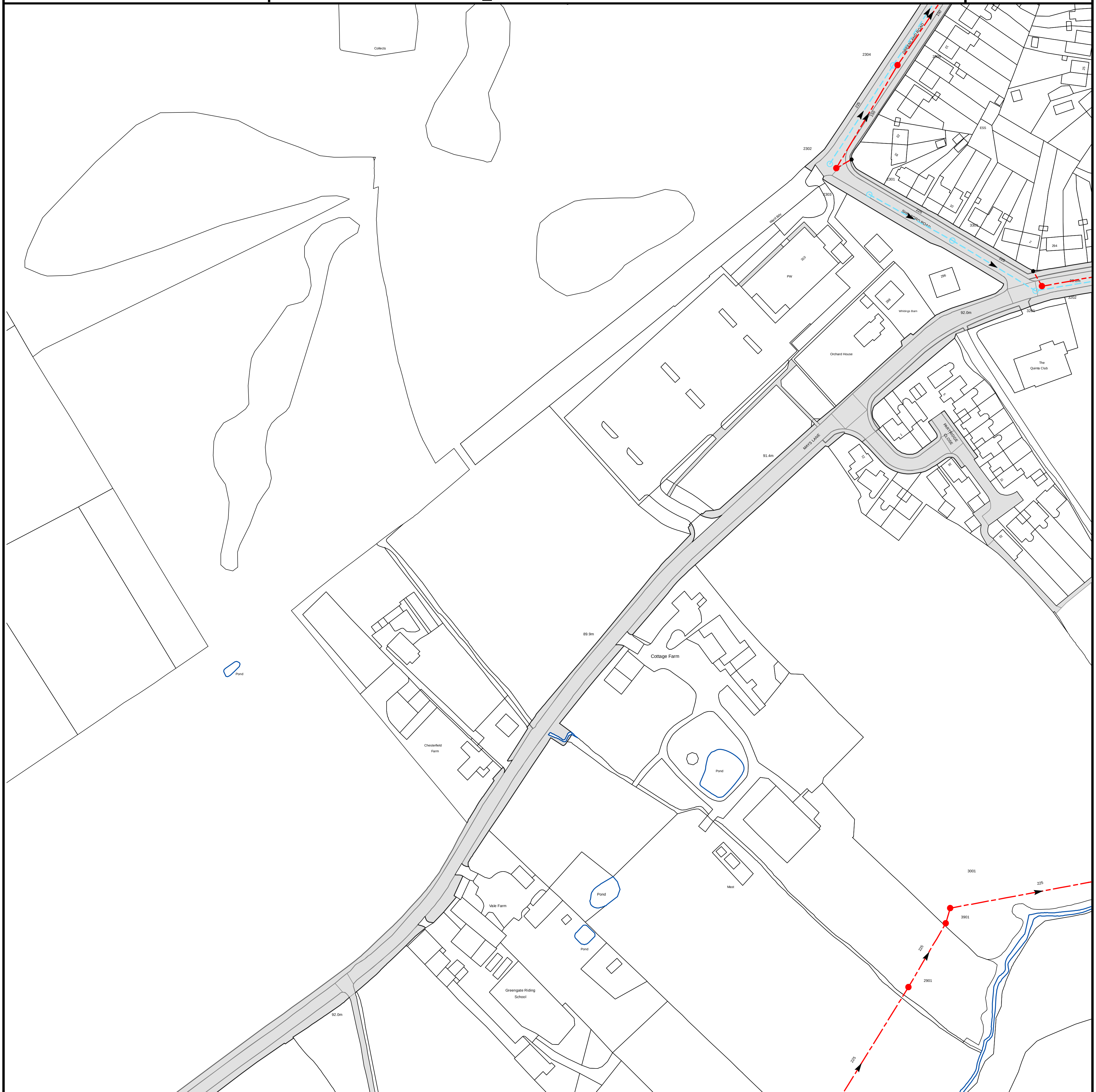
Clean Water queries

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

Asset Location Search Sewer Map - ALS/ALS Standard/2024_4964381



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 523131,195169

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
331B	n/a	n/a
2901	87.13	84.92
3901	86.78	84.58
3001	23.76	n/a
3201	91.31	89.54
3202	91.24	89.54
3301	92.92	91.05
2301	95.36	93.51
2303	96.97	95.04
2302	96.98	95.57
2305	96.78	94.38
2304	96.78	94.95

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

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

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 divects the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Ancillary
- Drop Pipe
- Control Valve
- Weir

End Items

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

- 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

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.
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.

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

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

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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/