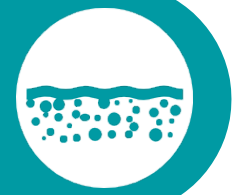


SuDSmart Plus



Sustainable Drainage Assessment

Site Address

Land to the rear of Owlerbarrow House
Owlerbarrow Road
Bury
BL8 1RD

Date

15/10/2025

Report Status

FINAL

Grid Reference

378189, 411405

Site Area

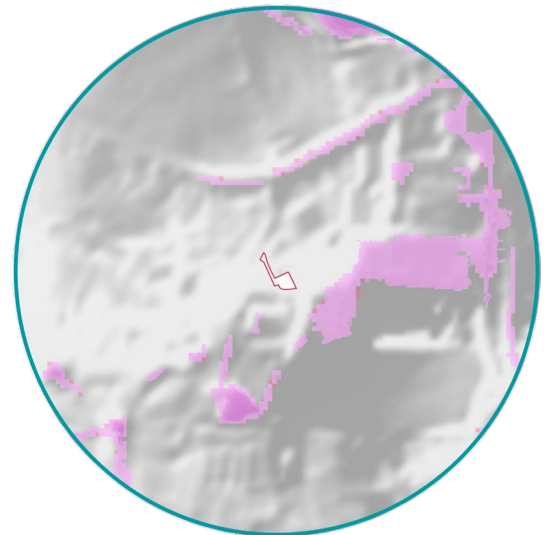
445 m²

Report Prepared for

Annmarie Bennett

Report Reference

EF000203R2



Infiltrate to Ground

The proposed Sustainable Drainage Scheme (SuDS) strategy is comprised of a rainwater harvesting butt, SuDS planter, soakaway and permeable paving to attenuate surface water runoff during the 1 in 100 plus 45% climate change event.

Surface water will discharge to ground via infiltration subject to infiltration testing, and the incorporation of SuDS.

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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
Runoff destination feasibility	Priority 1: rainwater collected for non-potable use	Yes
	Priority 2: infiltration to ground	Medium
	Priority 3: discharge to an above ground surface water body	Low
	Priority 4: discharge to surface water sewer	Low
	Priority 5: discharge to combined sewer	Medium
Flooding	What is the river (fluvial) and/or tidal flood risk at the Site?	Very Low
	What is the surface water (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?	No
	Is the surface water feature a protected resource?	N/A

Summary of existing and proposed development

The Site is currently used within a residential capacity. At present there is a greenhouse, garden shed and landscaped areas. Development proposals comprise the removal of the greenhouse and garden shed, and the construction of a single-storey residential property with associated landscaping and car parking.

National Standard 1: Runoff Destinations

Priority 1: collection for non-potable use

In line with DEFRA's national guidance, the potential for the collection of rainwater for non-potable use across the proposed development has been considered.

Rainwater harvesting butts are proposed at the base of the downpipes of the development in order to provide rainwater re-use potential at the Site, as well as to provide biodiversity

and amenity benefits. Captured water will be used to water vegetation and ensure their long-term viability as sustainable amenity features. Due to the limited storage capacity and requirement to retain captured rainwater for non-potable use, the volume of runoff which could be attenuated has not been considered within the report.

Priority 2: infiltration to ground

GeoSmart's SuDS Infiltration Potential (SD50) map indicates that the Site has a Moderate potential for infiltration, primarily due to the anticipated modest permeability of the underlying geology (superficial till above bedrock sandstone/mudstone, siltstone and sandstone).

Infiltration to ground is therefore likely to be feasible subject to site investigation comprising trial pits to confirm the depth to groundwater and allow infiltration tests to be undertaken to confirm the feasibility of an infiltration SuDS scheme.

Priority 3: discharge to above ground surface water body

Ordnance Survey (OS) mapping indicates that there are no surface water features within 100 m of the Site. Therefore, discharge to surface water feature is not feasible.

Priority 4: discharge to surface water sewer

The asset location plan included in Appendix C confirms that there are no public surface water sewers within the vicinity of the Site that could feasibly be discharged to. As such, discharge to surface water sewer is not considered to be feasible.

Priority 5: discharge to combined sewer

According to the United Utilities asset location plan obtained for the Site (Appendix C), there is a public combined sewer located c. 35 m to the north of the Site; therefore, discharge to sewer is likely to be appropriate.

If Site investigation proves on-Site infiltration is not possible, and as no watercourses have been identified within the vicinity of the Site, then off-Site discharge to the combined sewer with flow attenuation and storage may be a suitable alternative option. Due to the gradient difference between the Site and the combined sewer network, a pump is likely to be required to allow for a connection to the sewer.

Runoff rate and attenuation requirements

Discharging via infiltration requires 6.82 m³ of attenuation to be provided to ensure there is no flooding as a result of the development in all storm events up to and including the 1 in 100 year including a 45% allowance for climate change. This volume has been calculated using Causeway Flow v.10.7 based on an assumed infiltration rate of 1 x 10⁻⁵ m/s taken from Table 25.1 of the CIRIA SuDS (C753) (2015) as the worst case scenario for 'slightly silty slightly clayey sand' soil type. This is subject to the results of infiltration testing and would ensure runoff is not increased above the greenfield scenario.

Discharging off-Site requires 4.42 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 45% allowance for climate change. This volume is subject to the discharge rate being restricted to 2 l/s (as close to the Greenfield 1 in 1 year rate as possible, without increasing the potential for blockages).

Proposed SuDS strategy

SuDS features comprised of a rainwater harvesting butt, SuDS planter, soakaway and permeable paving are proposed to attenuate a minimum of 6.82 m³ of surface water runoff. The SuDS features would provide some water quality benefits (interception and filtration) prior to infiltrating to ground. Focused infiltration features should be sited at least 5m from building foundations.

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 45% allowance for climate change and will not cause flooding to the proposed development in accordance with DEFRA's national standards for SuDS (2025).

Amenity and biodiversity

The inclusion of SuDS planters and rainwater harvesting butts provides both amenity and biodiversity benefits within the SuDS design. SuDS planters introduce green features that enhance the streetscape, support pollinator-friendly planting, and create small-scale habitats that increase biodiversity. SuDS planters will be populated by native vegetation that is happy with occasional inundations. Rainwater harvesting butts offer residents a sustainable source of water for use in landscaped areas, reducing potable water demand.

SuDS & drainage network maintenance

The management and maintenance of the SuDS features, in line with the details and schedules outlined in Section 10 of this report, will be undertaken by contractors appointed by the owners and occupiers of the new residential building.

Recommendations / Next steps

A site investigation is recommended to confirm the infiltration capacity of the ground in line with BRE 365 guidelines to confirm the infiltration rate and the groundwater level.

Where site investigation confirms the underlying ground conditions are not conducive to infiltration, the capacity of the public sewer network should be confirmed with the utility provider and permission to connect gained where required.

2 Proposed SuDS strategy



The most suitable SuDS options are outlined below and a SuDS strategy schematic is shown overleaf. Supporting information is provided in subsequent sections.

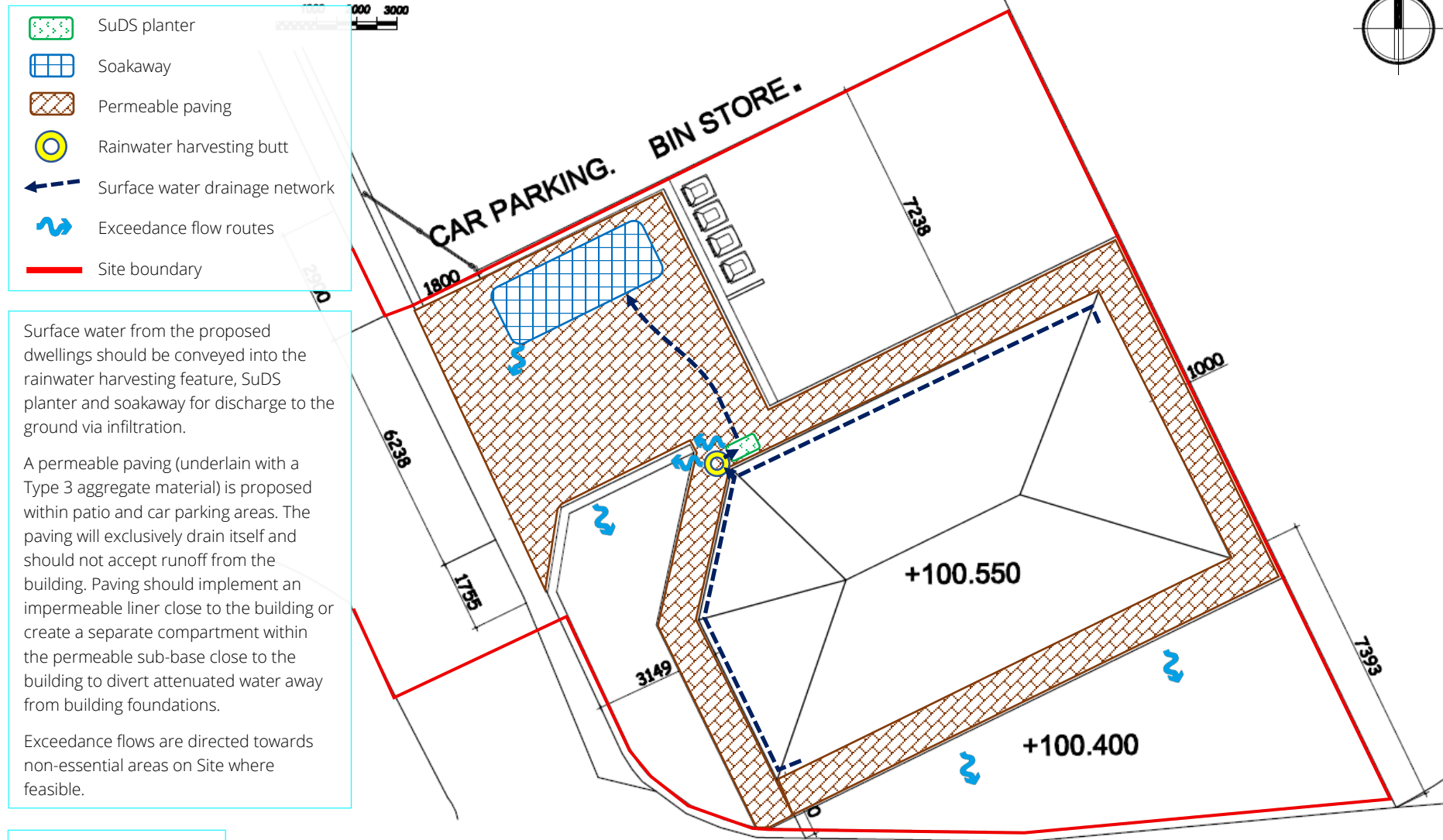
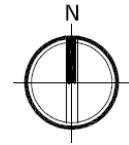
Table 1. Proposed SuDS type, features, discharge location and rate restriction

SuDS type	Source control (interception) and infiltration SuDS.
SuDS features	Rainwater harvesting butt, SuDS planter, soakaway and permeable paving.
Discharge location	Infiltration.
Discharge rate	$1 \times 10^{-5} \text{ m/s}^*$

Table 2. Proposed SuDS sizing (dimensions) and attenuation volumes

Rainwater harvesting	To comply with DEFRA's national standards for SuDS (2025), rainwater harvesting butts should be established for each proposed development. In terms of attenuation storage within this SuDS scheme, the volume of run-off which could be attenuated by rainwater harvesting has not been considered within the preliminary SuDS strategy.
SuDS planters	SuDS planters are proposed to take overflow from the rainwater harvesting butts for water quality and biodiversity purposes. In terms of attenuation storage within this SuDS scheme, the volume of run-off which could be attenuated by rain planters has not been considered within the preliminary SuDS strategy.
Permeable paving	A 108 m^2 area of permeable paving (underlain with a Type 3 aggregate material with a 30% porosity) is proposed within patio and car parking areas. The paving will exclusively drain itself and should not accept runoff from the building. Paving should implement an impermeable liner close to the building or create a separate compartment within the permeable sub-base close to the building to divert attenuated water away from building foundations.
Soakaway	A soakaway within the garden area with a length of 4 m, width of 1.5 m, depth of 1.2 m, comprising geocellular crates with a void ratio of 95%, would provide c. 6.82 m^3 of attenuation.
Total attenuation provided	6.82 m^3

Figure 1. Proposed SuDS scheme



Schematic is not to scale

3 National & local policy context



National Guidance

DEFRA - National standards for sustainable drainage systems (SuDS) (2025)

Standard 1: runoff destinations

A 'SuDS approach' shall be adopted to address the management of surface water by the development and where it should be discharged. Runoff shall be treated as a resource and managed in a way that avoids negative impacts of the development on flood risk, the morphology and water quality of receiving waters and the associated ecology.

Runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below hierarchy:

- priority 1: collected for non-potable use
- priority 2: infiltrated to ground
- priority 3: discharged to an above ground surface water body
- priority 4: discharged to a surface water sewer, or another piped surface water drainage system
- priority 5: discharged to a combined sewer

Note 1: priority 1 is the highest priority and priority 5 is the lowest.

Note 2: for the purposes of this standard, a combined sewer is a sewer intended to receive both foul sewage and surface runoff and does not include a sewer intended to receive only foul sewage, even if it has the capacity to accommodate additional flows or has an element of surface water in it already.

To utilise a lesser priority final destination, appropriate evidence shall be provided that demonstrates all higher priority final destinations have been utilised to the maximum extent practicable. Higher cost alone shall not be a reason to utilise lower priority final destinations.

Where more than one final destination is utilised, each final destination's ability to accept runoff shall be maximised in order of priority.

Standard 2: management of everyday rainfall (interception)

Apply a 'SuDS approach' so that at least the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface waters or piped drainage systems.

Evidence shall be provided that the approach to managing runoff from 'everyday' rainfall has been developed alongside and in support of the management of runoff quality (standard 4) and the delivery of amenity and biodiversity benefits (standards 5 and 6).

Standard 3: management of extreme rainfall and flooding

A 'SuDS approach' shall be adopted to address the management of development runoff during extreme rainfall, including allowances for climate change and urban creep to:

- protect people and property on the development from flooding of the surface water drainage system
- mitigate any increased flood risk to people and property adjacent to or downstream of the development
- protect the receiving water body from morphological damage or minimise the impact on sewer capacity

When discharging to an infiltration feature, the system shall be appropriately sized to accommodate the design event based on ground conditions and contributing areas.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff (rate and volume) for the 1% annual exceedance probability (AEP) event shall be controlled to ensure the runoff from the development does not increase flood risk elsewhere.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff rate for the 50% AEP event shall be controlled to ensure development runoff from an event of this magnitude has no negative impact.

Any flooding from the surface water drainage system for events up to the 1% AEP event shall be managed within the development.

Any flooding from off-site sources for the 1% AEP event should be managed on site or safely routed through the site, ensuring any downstream risks are not increased compared to the pre-development scenario.

The risks (both on and off the development) associated with flooding from the surface water drainage system for exceedance events greater than the 1% AEP event shall be appropriately managed.

Standard 4: water quality

Apply a 'SuDS approach' that protects surface waters, groundwater and coastal waters by managing the quality of the surface water runoff to adequately address water quality risks from the development.

The proposed SuDS management train(s) shall be based on a robust water quality risk assessment, appropriate to the pollution hazard and sensitivity of receiving waters, reflecting industry recognised guidance or other quantitative assessment as agreed with the approving body and permitting requirements.

Standard 5: amenity

A 'SuDS approach' shall be adopted that maximises benefits for amenity through the creation of multi-functional places and landscapes.

Standard 6: biodiversity

A 'SuDS approach' shall be adopted to ensure the surface water drainage system maximises biodiversity benefits throughout the development lifecycle.

The surface water drainage system shall add biodiversity value by:

- creating diverse, self-sustaining, resilient local ecosystems which contribute to net gains in biodiversity
- supporting and promoting natural local habitat and species, for example, through local nature recovery strategies (LNRS)
- contributing to the delivery of local biodiversity strategies
- contributing to habitat connectivity

Standard 7: design of drainage for construction, operation, maintenance, decommissioning and structural integrity

A 'SuDS approach' shall be adopted to ensure that surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.

The designer shall provide a management and maintenance plan that supports the design objectives detailed in standards 1 to 6 and ensures the performance of the surface water drainage system with regards to runoff destinations, everyday and extreme rainfall, water quality, amenity and biodiversity is maintained throughout the lifetime of the development.

Surface water drainage design shall examine for the likelihood and consequences of potential failure scenarios that may occur during the operation phase and safely manage the associated risks.

The surface water drainage system shall be designed to ensure structural integrity of all components under anticipated loading conditions for the design life of the development so that it does not affect the structural integrity of any existing or proposed components within, or adjacent to, the development.

Urban Creep

Within developments an urban creep uplift factor shall be applied by adding a percentage increase to the calculated area of the impermeable area within the property curtilages. This shall be 10% for all developments unless there are no external private permeable spaces, for example, flats and apartments, when it shall be 0%.

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 Irwell Management Catchment the following climate change allowances are applicable.

Table 3. Irwell Management Catchment peak rainfall allowances

Irwell Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Central	25%	30%	25%	30%
Upper end	35%	40%	40%	45%

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.

Local Policy

Greater Manchester Combined Authority – Strategic Flood Risk Assessment (JBA, 2019)

7.11 Sustainable Drainage Systems (SuDS)

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and consequently a potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts, and other drainage infrastructure.

Managing surface water discharges from new development is therefore crucial in managing and reducing flood risk to new and existing development downstream. Carefully planned development can also play a role in reducing the amount of properties that are directly at risk from surface water flooding. The then DCLG (now MHCLG) announced, in December 2014, that local planners should be responsible for delivering SuDS.

Changes to planning legislation gave provisions for major applications of ten or more residential units or equivalent commercial development to require sustainable drainage within the development proposals in accordance with the 'non-statutory technical standards for sustainable drainage systems', published in March 2015.

A Practice Guidance document has also been developed by the Local Authority SuDS Officer Organisation (LASOO) to assist in the application of the non-statutory technical standards.

7.11.2 SuDS hierarchy

The runoff destination should always be the first consideration when considering design criteria for SuDS including the following possible destinations in order of preference:

1. To ground;
2. To surface water body;
3. To surface water sewer;
4. To combined sewer.

Effects on water quality should also be investigated when considering runoff destination in terms of the potential hazards arising from development and the sensitivity of the runoff destination.

GMCA has carried out a site suitability assessment on the GMSF allocations and Call for Sites submissions to consider whether a site is in or near to a SPZ (see Section 6.5.1).

Developers should also establish that proposed outfalls are hydraulically capable of accepting the runoff from SuDS through consultation with the LLFA, EA and UU.

The non-statutory technical standards for sustainable drainage systems (March 2015) sets out appropriate design criteria based on the following:

1. Flood risk outside the development;
2. Peak flow control; 3. Volume control;
4. Flood risk within the development;
5. Structural integrity;
6. Designing for maintenance considerations;
7. Construction.

In addition, the LPA may set local requirements for planning permission that include more rigorous obligations than these non-statutory technical standards.

More stringent requirements should be considered where current Greenfield sites lie upstream of high risk areas. This could include improvements on Greenfield runoff rates. CIRIA has also produced several guidance documents relating to SuDS that should be consulted by the LPA and developers.

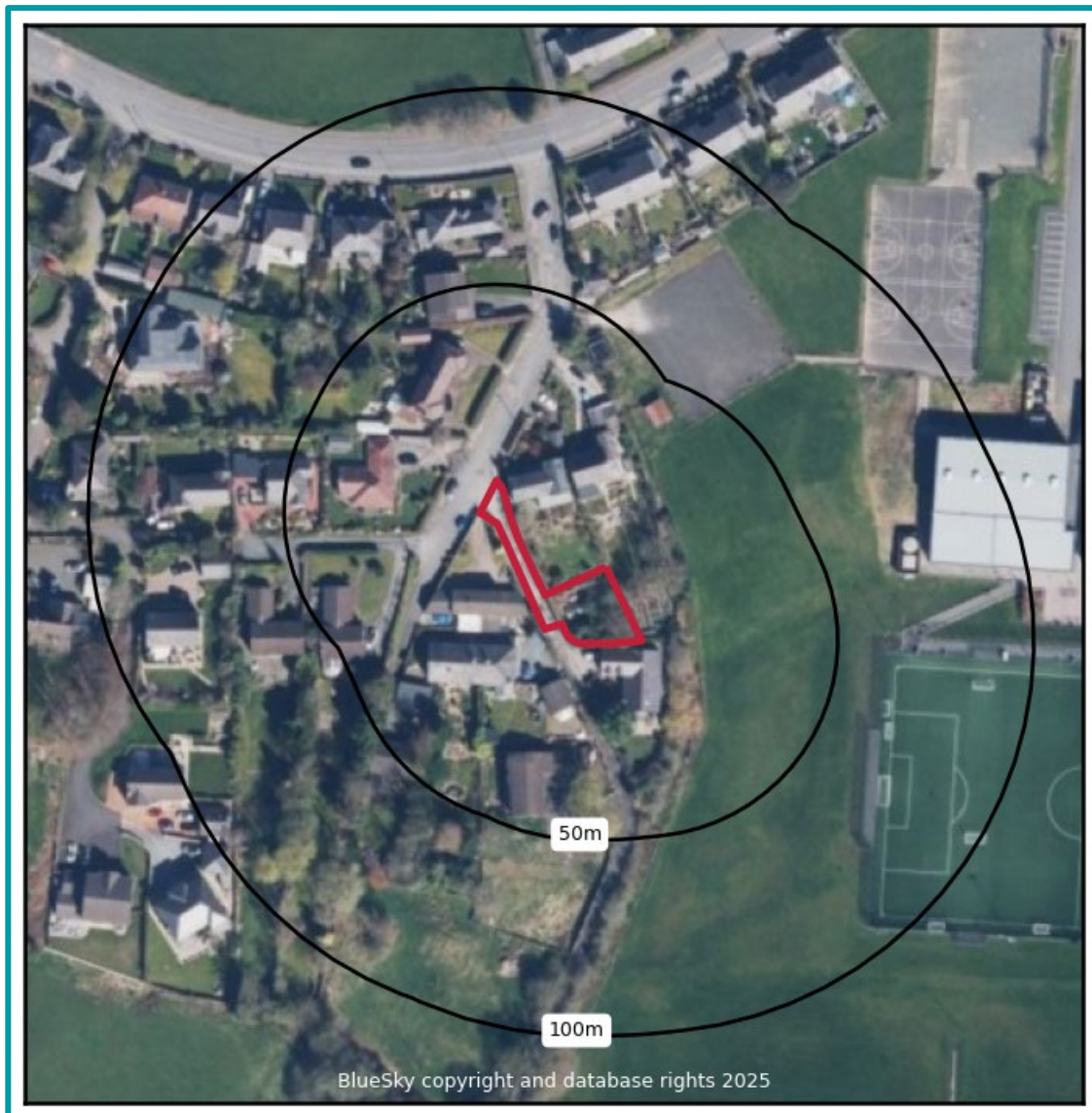
Many different SuDS techniques can be implemented. As a result, there is no one standard correct drainage solution for a site. In most cases, a combination of techniques, using the Management Train principle, will be required, where source control is the primary aim.

4 Site analysis



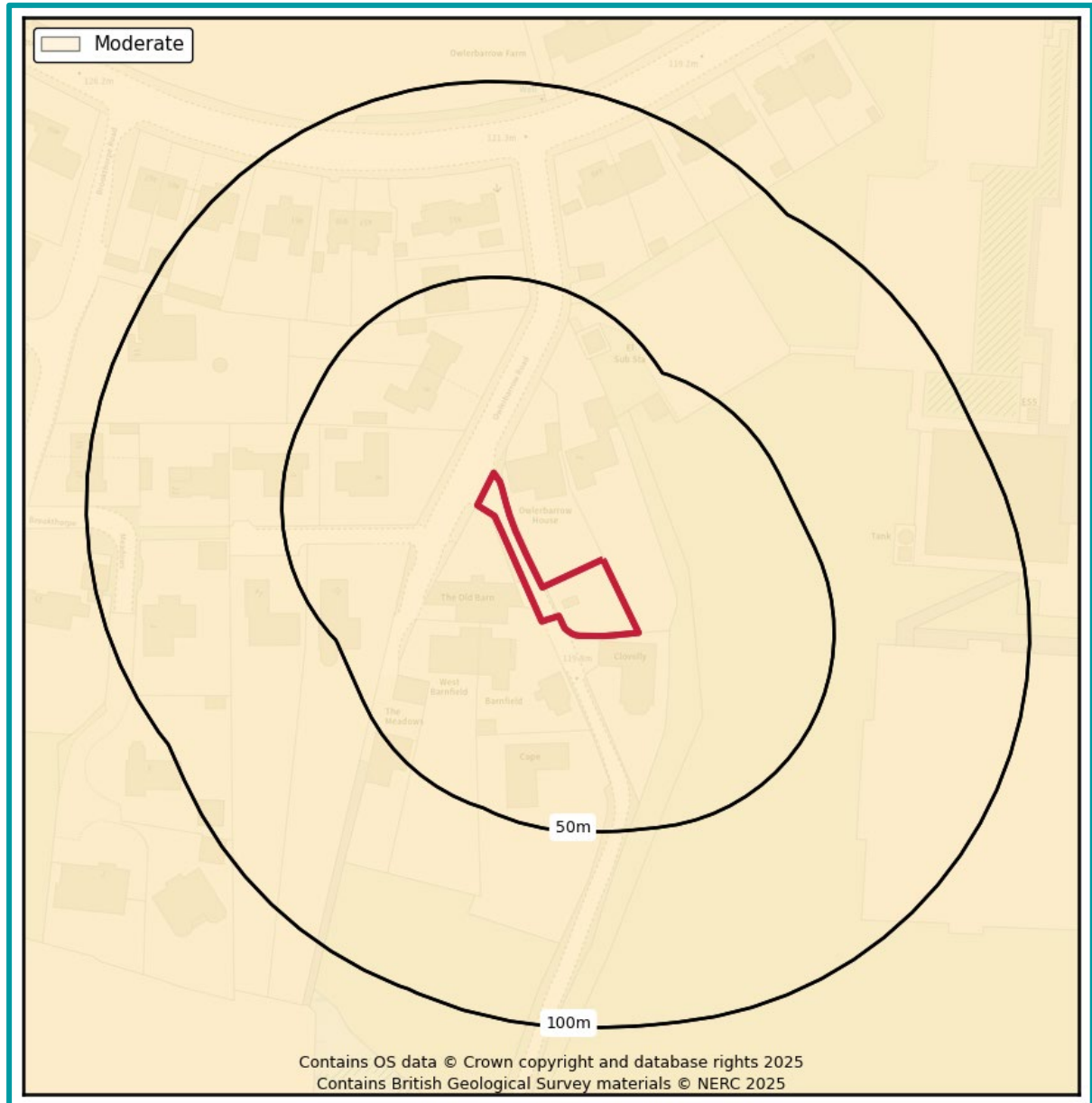
Site location

Figure 2. Aerial Imagery (Bluesky, 2025)



Infiltration suitability

Figure 3. SuDS infiltration suitability (SD50) map (GeoSmart, 2025)

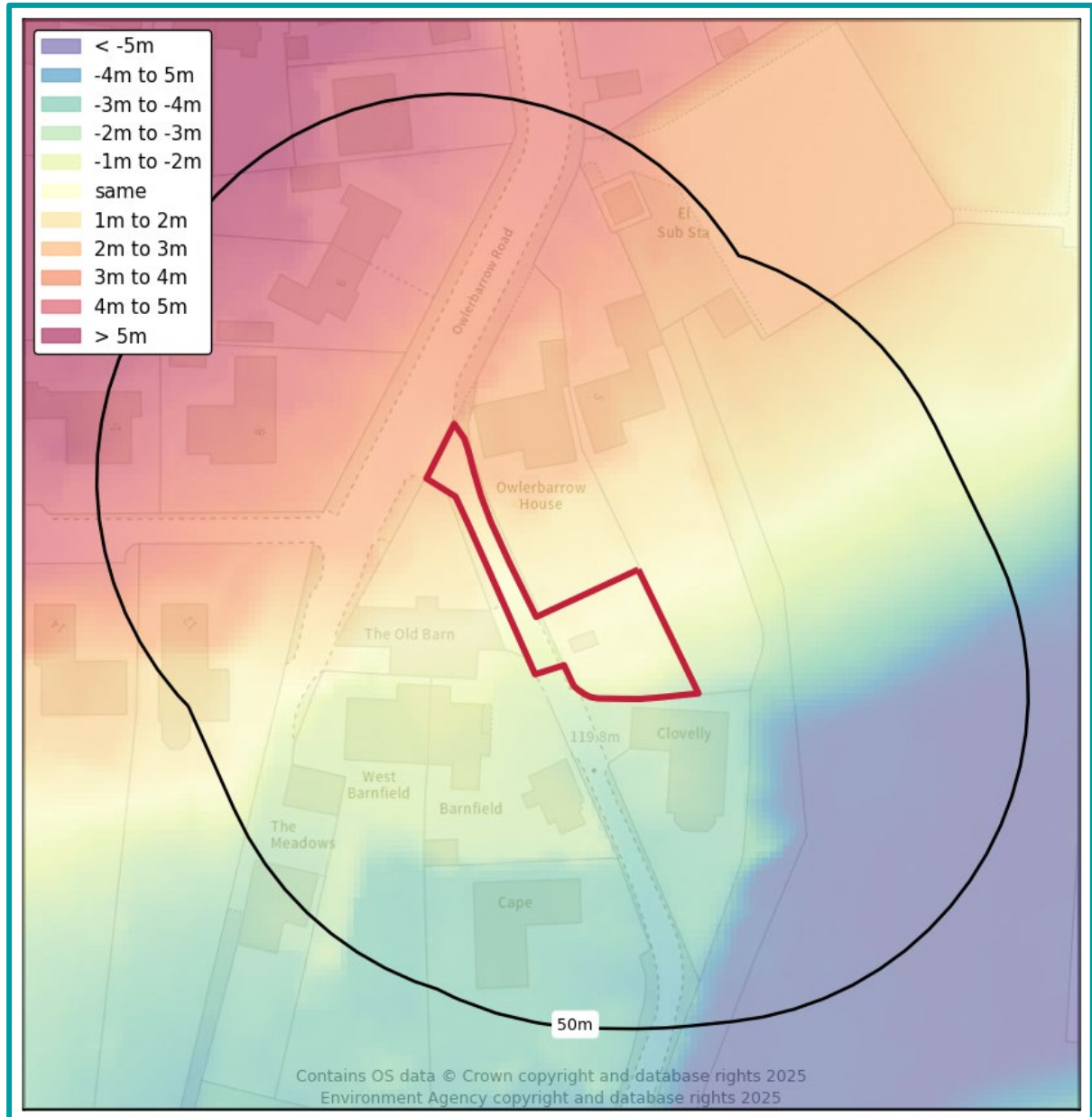


According to GeoSmart's SD50 mapping, there is a Moderate potential for infiltration SuDS across the Site. It is likely that the underlying geology at the Site has modest permeability and an infiltration SuDS scheme may be possible at the Site.

As such, infiltration is considered to be potentially feasible and is proposed for the primary SuDS strategy. Site Investigation is recommended to confirm the infiltration capacity and the depth to groundwater.

Topography

Figure 4. Site topography (GeoSmart, 2025)



According to a review of the LiDAR DTM5 elevation data for the prevailing area, the ground levels within the vicinity of the Site typically fall to the southeast.

The topography on-Site typically falls to the southeast, with ground levels ranging from 116.75 to 121.28 mAOD. Ground levels in the area proposed for development range from 116.75 to 199.23 mAOD. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ± 150 mm.

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

Land designations

Figure 5. Source protection zone map (EA, 2025)

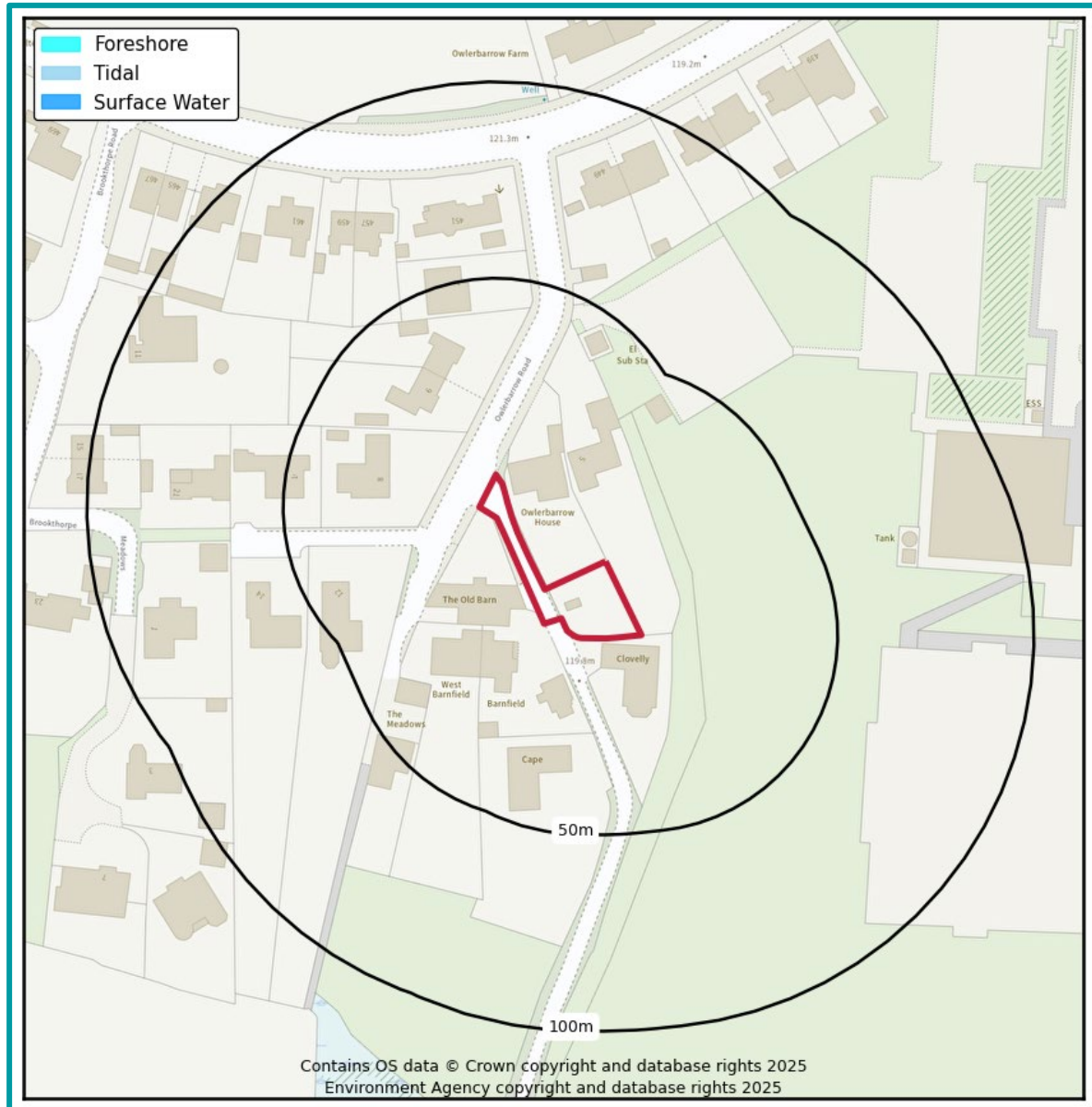


According to DEFRA's Magic Map, the Site is not located within a groundwater Source Protection Zone (SPZ). The mapping also confirms that the Site is not within 250m of a SSSI or SPA.

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.

Surface water features

Figure 6. Surface water features map (EA, 2025)

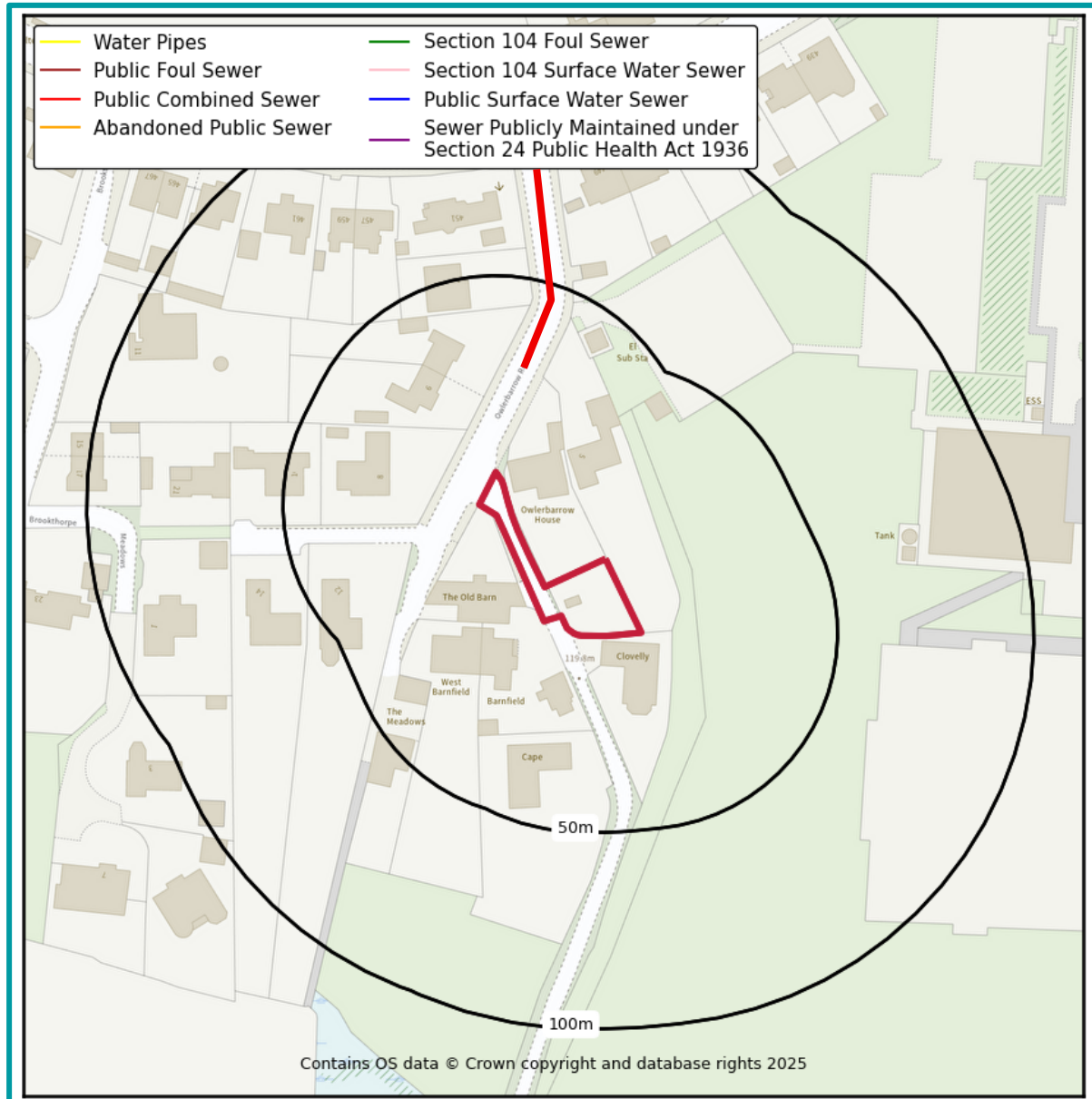


Ordnance Survey (OS) mapping indicates that there are no surface water features within 100 m of the Site. Therefore, discharge to surface water feature is not feasible.

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 potentially unmapped surface water features.

Sewer features

Figure 7. Sewer features map (OS & United Utilities, 2025)



According to the United Utilities asset location plan obtained for the Site (Appendix C), there is a public combined sewer, located c. 35 m to the north of the Site. Therefore, discharge to sewer is likely to be appropriate.

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.

Flood risk

Figure 8. Risk of flooding from rivers & sea map (EA, 2025)



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 during both the present day and climate change (2036 to 2069) scenarios, with less than 0.1% annual probability of flooding. Therefore, the SuDS design is unlikely to be affected.

Figure 9. Risk of surface water flooding map (EA, 2025)

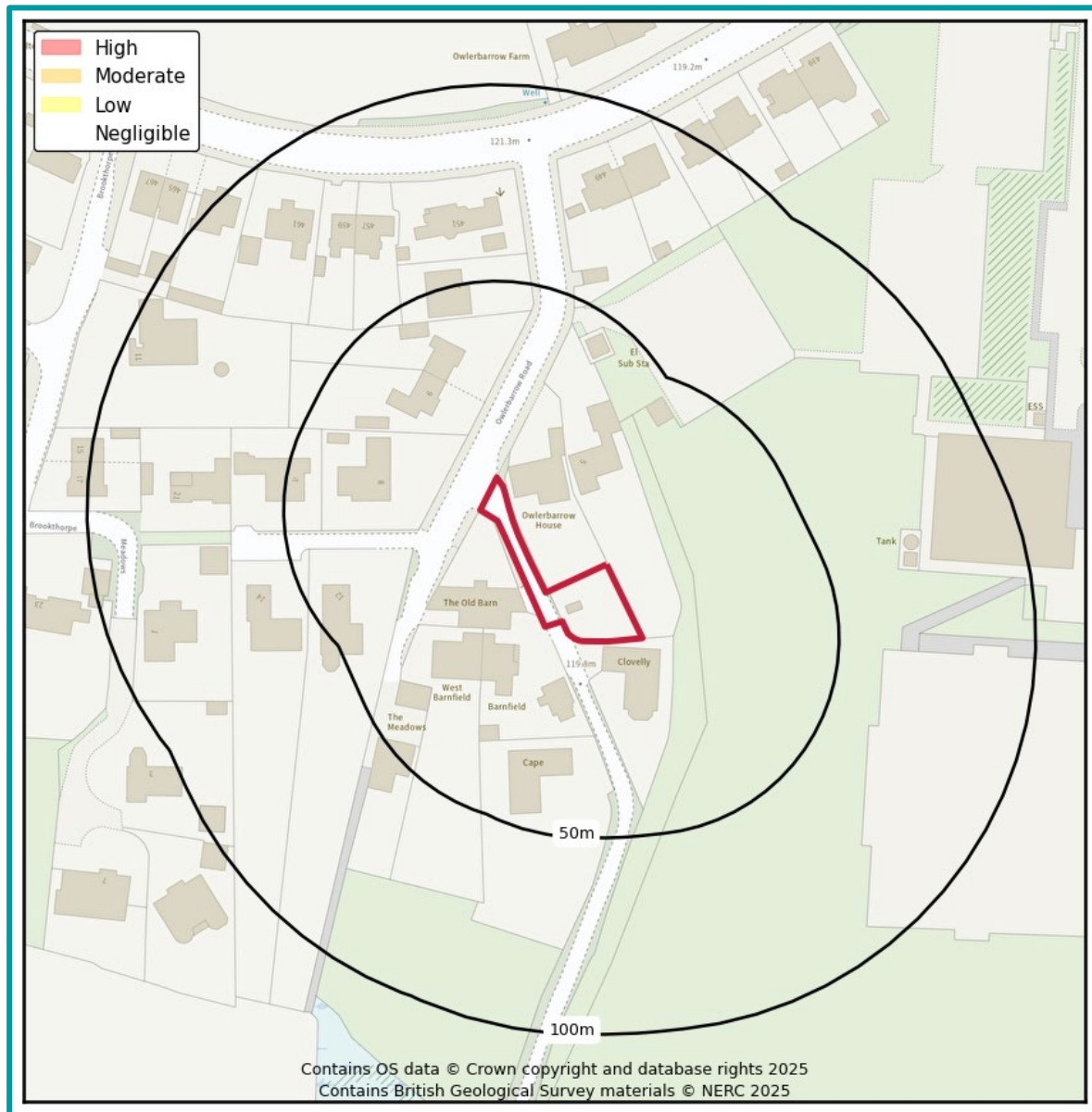


The EA's Risk of Flooding from Surface Water (RoFSW) mapping confirms the Site is considered to be at Very Low risk of surface water flooding during both the present day and climate change (2050s) scenarios.

The above map shows the extent 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 during the present day and climate change scenarios.

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

Figure 10. Groundwater flood risk (GW5) map (GeoSmart, 2025)



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.

5 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 to the rear of Owlerbarrow House, Owlerbarrow Road, Bury, BL8 1RD ('the Site'). The Site is located within a setting of predominantly residential land use.

Development

The Site is currently used within a residential capacity. At present there is a greenhouse, garden shed and landscaped areas. Development proposals comprise the removal of the greenhouse and garden shed, and the construction of a single-storey residential property with associated landscaping and car parking. 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; each formation may have a range of permeabilities.

Table 4. Site Geology

Geology present on-Site		Likely to be permeable?
Superficial geology (Figure 11)	Devensian Till (TILLD) – diamicton	✓
Bedrock geology (Figure 12)	Pennine Lower Coal Measures Formation (PLCM) – sandstone (c. 70% of Site area)	✓
	Pennine Lower Coal Measures Formation (PLCM) – mudstone, siltstone and sandstone (c. 30% of Site area)	

According to a review of the BGS borehole database (BGS, 2025), the nearest available borehole record mapped within the same geological strata as the Site (ref: SD71SE14) is located c. 180 m to the northwest at an elevation of c. 128.30 mAOD (estimated using LiDAR).

A summary of the geological strata encountered by the boreholes is provided within the table overleaf:

Table 5. Summary of BGS borehole information

Strata encountered	BGS borehole SD71SE14	
	Depth to base of stratum (m bgl)	Strata composition
Topsoil	0.30	Soil
Devensian Till	4.42	Marl
	4.93	Sand
	6.76	Gravel
	7.67	Loam and sand
	8.89	Sand
	10.41	Gravel
	11.02	Marl
	13.16	Loam and sand
	15.60	Marl
The borehole record continues to a depth of 92.91 m bgl		

Figure 11. Superficial Geology (BGS, 2025)

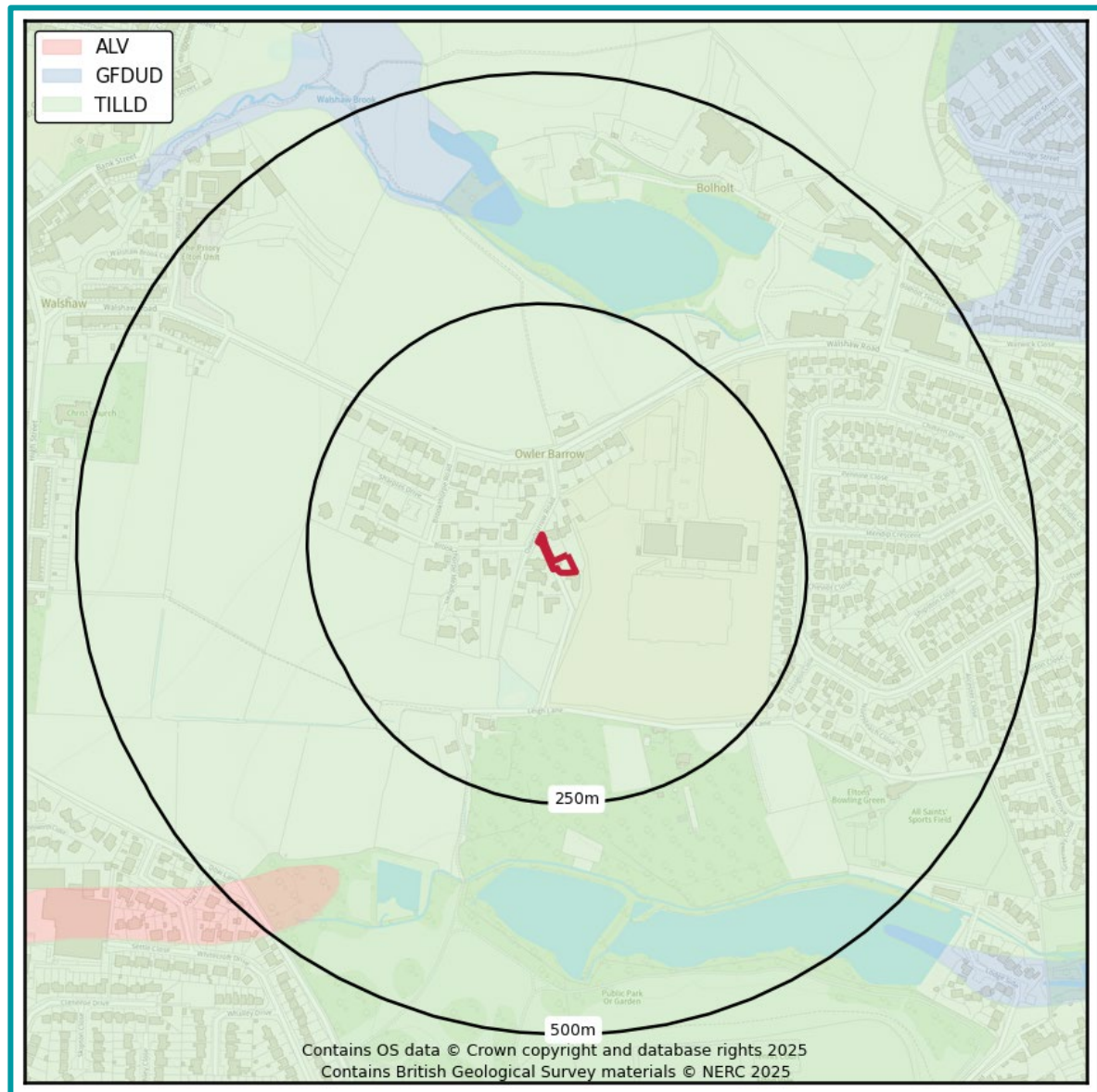
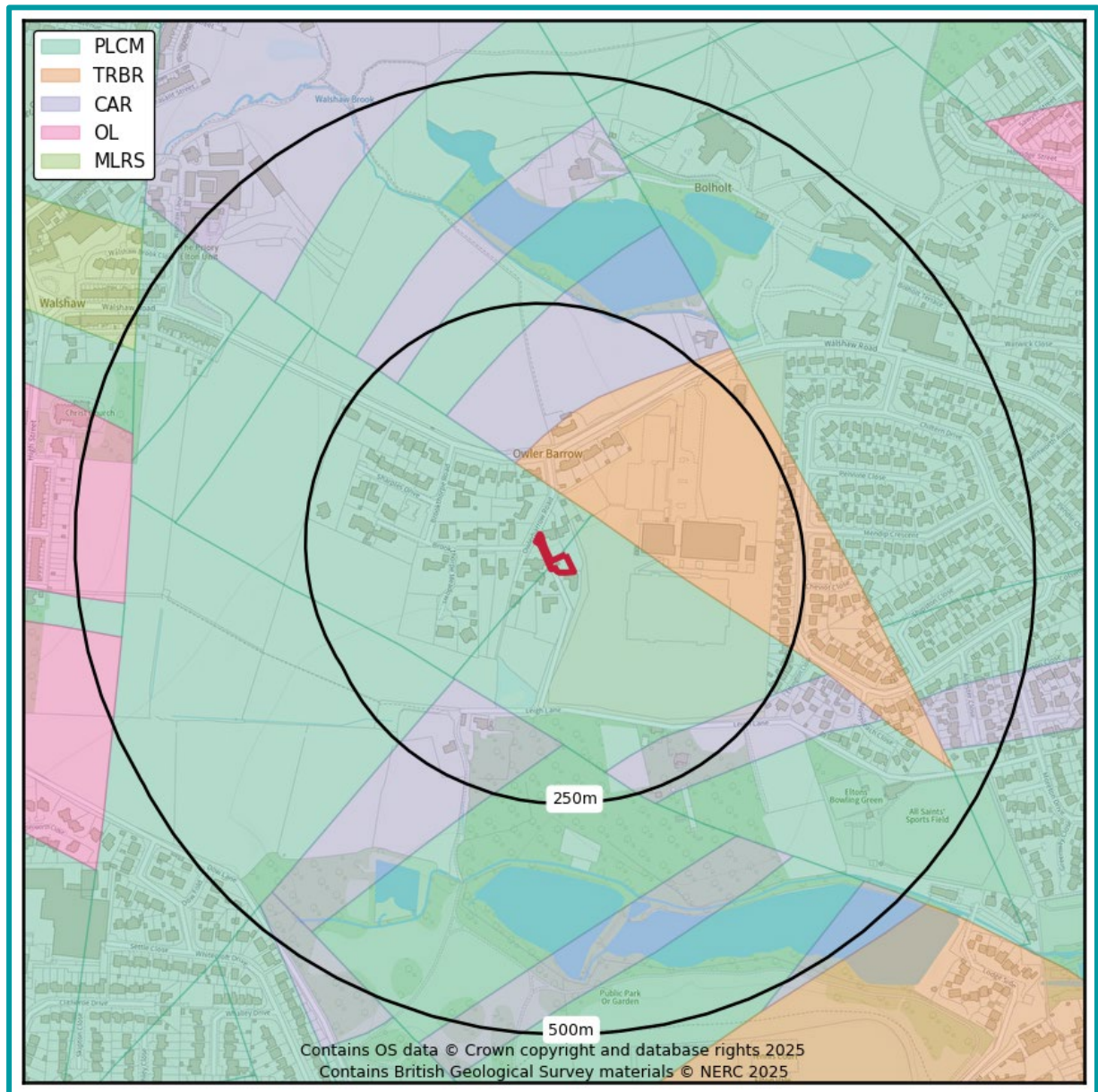


Figure 12. Bedrock Geology (BGS, 2025)



Depth to groundwater

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

Borehole ref: SD71SE14 does not include any information regarding groundwater strikes and therefore the depth to groundwater at the Site cannot be confirmed.

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

The soil infiltration coefficient must be sufficient to accommodate the constraints on the dimensions of the soakaway and its emptying time.

Ground conditions

A Site specific review of underlying ground conditions is recommended to ensure focused infiltration does not cause ground instability as a result of landslide or collapse associated with dissolution or shallow mining. Hazards that should be considered include soluble rocks, landslides, compressible ground, collapsible ground, shrink-swell clays, running sand and shallow mining.

Soakaways should be a minimum of 5m away from the foundations of a building and local guidance may recommend a greater distance, such as 10m on some areas of the Chalk. A detailed ground assessment is recommended: on steep slopes where infiltrating water would produce saturation and instability downslope; or within layered geology, where infiltrating water would produce springs down gradient.

Water quality

The Site does not lie within an SPZ. The infiltrated water quality should be of sufficient quality that it does not give rise to pollution of the underlying groundwater. Further consultation with the water company is unlikely to be required.

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.

6 Runoff destination



National Standard 1: runoff destinations

Options for the destination for the runoff generated on-Site have been assessed in line with the prioritisation set out in DEFRA's national standards for sustainable drainage systems (2025).

Priority 1: Collection for non-potable use

An assessment of the potential for rainwater collection and re-use across the proposed development has been undertaken, which confirms that there is the potential for the provision of rainwater harvesting measures at the Site. Captured water could be used to water vegetation in order to provide additional amenity and biodiversity benefits.

Priority 2: Discharge to ground

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

According to GeoSmart's SD50 screening data, the Site has Moderate potential for infiltration. Based on the available hydrogeological information (Section 5) the permeability of the underlying strata is likely to be sufficient to accommodate focused infiltration SuDS features, and shallow groundwater is unlikely to be a concern at the Site.

Infiltration SuDS are proposed into permeable superficial overlying a bedrock aquifer.

A site investigation comprising trial pits is recommended to confirm the depth to groundwater and allow infiltration tests to be undertaken to confirm the feasibility of an infiltration SuDS scheme.

Priority 3: Discharge to above ground surface water body

Ordnance Survey (OS) mapping indicates that there are no surface water features within 100 m of the Site; therefore, discharge to surface water feature is not feasible.

Priority 4: Discharge to surface water sewer

According to the United Utilities asset location plan obtained for the Site (Appendix C), there are no public surface water sewers within the vicinity of the Site.

Priority 5: Discharge to combined sewer

According to the United Utilities asset location plan obtained for the Site (Appendix C), there is a public combined sewer located c. 35 m to the north of the Site; therefore, discharge to sewer is likely to be appropriate.

If Site investigation proves on-Site infiltration is not possible, and as no watercourses have been identified within the vicinity of the Site, then off-Site discharge to the combined sewer with flow attenuation and storage may be a suitable alternative option.

7 Storage, volume and peak flow rate



Urban creep

According to Paragraph 3.3 of the DEFRA National standards for SuDS, urban creep should be taken into account as part of the SuDS design. Urban creep accounts for the potential for impermeable areas to increase over the lifespan of a development, such as extensions to proposed building footprints and increases in patio areas.

Therefore, in accordance with the required allowance for a Site with external private permeable spaces, a 10% urban creep allowance has been applied to the proposed impermeable areas.

Surface water runoff

An increase in impermeable areas on-Site will result in greater rainfall runoff. A reduction in runoff will help mitigate flood risk both on and off-Site.

Table 6. Change in impermeable area associated with the development

Total Site area	446 m ²
Impermeable area (and as a percentage of the total area of the proposed development footprint of 289 m ²) [†]	
Pre-development	Post-development
9 m ² (17%)	183 m ² (63%) [‡]
Impermeable land use: 9 m ² existing shed/greenhouse Permeable land use: landscaped areas	New impermeable land use: 86 m ² proposed dwelling, 80 m ² paved areas* New permeable land use: 123 m ² landscaped areas

*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.

‡ An additional 10% Urban Creep uplift factor has been applied to the post-development impermeable area in order to account for the potential for impermeable areas to increase over the lifespan of a development.

† An c. 157 m² area consisting of the shared access road is understood to be unaffected by the development proposals. As such, this area is considered to drain as existing and has been excluded from the drainage calculations.

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.

Table 7. Primary strategy - Storage requirements for the proposed development (discharge of runoff via infiltration)

Attenuation scenario	Attenuation required (m ³)	Explanation
1 in 100 year including 45% CC	6.82*	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 45% allowance for climate change. Calculations are based on an assumed infiltration rate of 1×10^{-5} m/s (0.036 m/hr) (the worst-case infiltration rate for 'slightly silty, slightly clayey sand' soil types, taken from Table 25.1 of the CIRIA SuDS manual (C753) (2015) – to be confirmed via infiltration testing).

*Subject to confirmation through infiltration testing.

Table 8. Secondary strategy - Storage requirements for the proposed development (discharge of runoff to combined sewer)

Attenuation scenario		Attenuation required (m ³)	Explanation	
Discharge runoff to combined sewer	1 in 30 year	1.41	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 30 year (0.25 hour, Critical Storm Duration) event*. Flooding of the Site of 0.81 m ³ should be contained within permeable landscaped areas within the Site to ensure no flooding of internal areas during the 1 in 100 year storm event.	A further 2.20 m ³ should be managed within overland flow routes to ensure there is no increase in flood risk in all events up to the 1 in 100 year
	1 in 100 year	2.22	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year (0.25 hour, Critical Storm Duration) event*.	including 40% allowance for climate change.
	1 in 100 year including 45% CC	4.42	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year (0.50 hour, Critical Storm Duration) event including a 45% allowance for climate change*.	

*See Appendix B for associated runoff and discharge calculations. Subject to discharge rates being limited to 2 l/s (as close to the equivalent Greenfield 1 in 1 year rate as possible, without increasing the potential for blockages).

Peak discharge rates

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 runoff is disposed of via infiltration, there will be no discharge off-Site.

The table below presents peak discharge rates for a range of storm events used to assess the impact of the proposed development and select the maximum permitted discharge rate.

Table 9. Peak discharge rates associated with the development

Rainfall event	Greenfield runoff rates (l/s)	Existing runoff rates ¹ (l/s)	Potential runoff rates without attenuation (l/s)	Potential minus existing (l/s)
QBAR	0.25	N/A	N/A	N/A
6 hour 1 in 1 year	0.21	0.17	0.28	0.11
6 hour 1 in 10 year	0.35	0.26	0.42	0.16
6 hour 1 in 30 year	0.42	0.32	0.54	0.21
6 hour 1 in 100 year	0.52	0.40	0.66	0.26
6 hour 1 in 100 year + 20% CC	N/A	N/A	0.79	0.39
6 hour 1 in 100 year + 45% CC	N/A	N/A	0.96	0.56

¹ Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces calculated using the loH124 method.

Relevant national, regional and local planning policy has been consulted in Section 3 to determine restrictions on runoff from previously developed and greenfield sites. In some cases, greenfield rates may be requested, but in practice it is difficult to restrict discharge rates at any one control point to less than 2 l/s, without increasing the risk of any potential blockages occurring in the drainage network.

Total discharge volumes

The table below presents discharge volumes for a range of storm events used to assess the impact of the proposed development and calculate the required storage volumes.

Table 10. Total discharge volumes associated with the development

Rainfall event	Greenfield runoff volume (m ³)	Existing runoff volume ² (m ³)	Potential runoff volume without attenuation (m ³)	Potential minus existing (m ³)
QBAR	3.73	N/A	N/A	N/A
6 hour 1 in 1 year	3.54	3.66	6.06	2.40
6 hour 1 in 10 year	5.49	5.67	9.13	3.46
6 hour 1 in 30 year	6.76	7.00	11.58	4.58
6 hour 1 in 100 year	8.32	8.61	14.24	5.63
6 hour 1 in 100 year + 20% CC	N/A	N/A	17.09	8.48
6 hour 1 in 100 year + 45% CC	N/A	N/A	20.65	12.04

² Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces, as calculated using the loH124 method.

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). The Site does not lie within an SPZ and therefore additional treatment stages are not required.

Table 11. 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).

Table 12. 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

9 Proposed SuDS strategy



Sustainable drainage systems

DEFRA's national standards for SuDS require the below ground drainage systems to have the capacity to accommodate at least the 1 in 30 year event and to manage the 1 in 100 year event without flooding of on-site buildings and substations. All runoff should be managed on-Site though for the 1 in 100 year event, accounting for the maximum impacts of climate change to ensure flood risk is not increased to third-parties.

It is assumed that drainage from areas outside the development footprint will continue to use existing drainage arrangements.

A surface water drainage strategy (summarised in Section 2 of this report) includes the following SuDS features to intercept, attenuate and treat surface water runoff.

Primary SuDS Strategy:

Ground conditions at the Site are conducive to infiltration. Surface water runoff will be managed within SuDS features and infiltrated to ground.

Table 13. Proposed SuDS type, features, discharge location and rate restriction

SuDS type	Source control (interception) and infiltration SuDS.
SuDS features	Rainwater harvesting butt, SuDS planter, soakaway and permeable paving.
Discharge location	Infiltration.
Discharge rate	1×10^{-5} m/s*

*Based upon an assumed infiltration rate of 1×10^{-5} m/s, the worst-case infiltration rate for 'slightly silty, slightly clayey sand' soil types, taken from Table 25.1 of the CIRIA SuDS manual (C753) (2015) - to be confirmed via infiltration testing.

Table 14. Proposed SuDS sizing (dimensions) and attenuation volumes

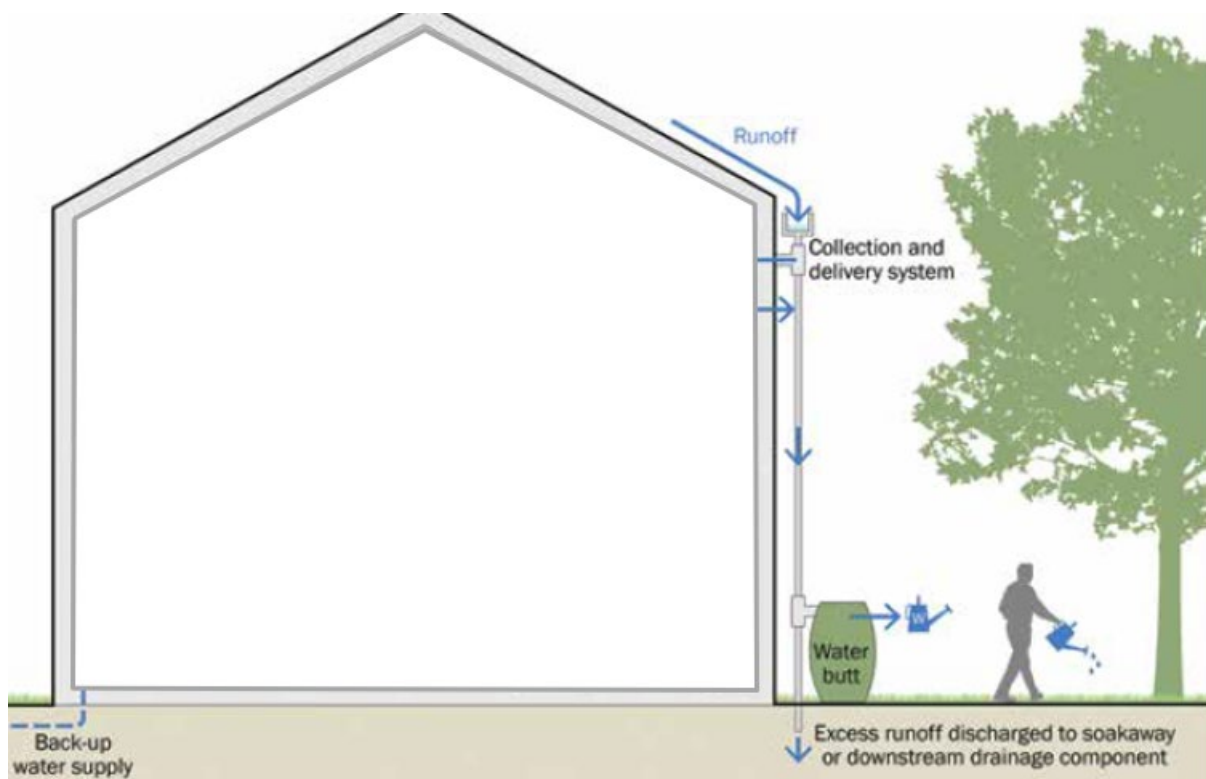
Rainwater harvesting	To comply with DEFRA's national standards for SuDS (2025), rainwater harvesting butts should be established for each proposed development. In terms of attenuation storage within this SuDS scheme, the volume of run-off which could be attenuated by rainwater harvesting has not been considered within the preliminary SuDS strategy.
SuDS planters	SuDS planters are proposed to take overflow from the rainwater harvesting butts for water quality and biodiversity purposes. In terms

	of attenuation storage within this SuDS scheme, the volume of run-off which could be attenuated by rain planters has not been considered within the preliminary SuDS strategy.
Permeable paving	A 108 m² area of permeable paving (underlain with a Type 3 aggregate material with a 30% porosity) is proposed within patio and car parking areas. The paving will exclusively drain itself and should not accept runoff from the building. Paving should implement an impermeable liner close to the building or create a separate compartment within the permeable sub-base close to the building to divert attenuated water away from building foundations.
Soakaway	A soakaway within the garden area with a length of 4 m, width of 1.5 m, depth of 1.2 m, comprising geocellular crates with a void ratio of 95%, would provide c. 6.82 m ³ of attenuation.
Total attenuation provided	6.82 m ³

Rainwater harvesting

Run-off from the proposed development roof should be led into rainwater harvesting butts via rainwater downpipes and guttering. Overflow from the butts should be discharged into the infiltration system provided by the soakaway.

Due to the relatively insignificant amounts of attenuation provided by rainwater harvesting tanks in this instance and the requirement to retain water for non-potable uses such as garden maintenance, the volume of run-off which could be attenuated by rainwater harvesting has not been considered within the report.



Modified from Figure 11.3 of the CIRIA SuDS Manual (C753) (2015)

SuDS planters

SuDS planters are proposed to take overflow from the rainwater harvesting butts for water quality and biodiversity purposes. The rain planter should provide an area to store and treat rainwater where water is collected. Rain gardens should be populated by native vegetation that is happy with occasional inundations.

Due to the relatively insignificant amounts of attenuation provided by rain planters in this instance, the volume of run-off which could be attenuated by rainwater harvesting has not been considered within the report.

Soakaways

Soakaways should be used to store run-off and infiltrate collected water gradually into the ground. Roof water should be collected and conveyed by underground pipes to the proposed soakaways. The base of the infiltration features should lie at an elevation at least 1 m above the highest winter groundwater levels, to ensure there is sufficient space for surface water to discharge. Soakaway excavation should be outside of the root zone of any protected trees and dimensions will depend on the depth to the sand layer where the soakaway is eventually situated.

Draining via soakaways means that property owners are less likely to pay for the utility company to drain surface water. In terms of future ownership and maintenance, where a soakaway drains a single property, the ownership and maintenance would be the property owner's responsibility.

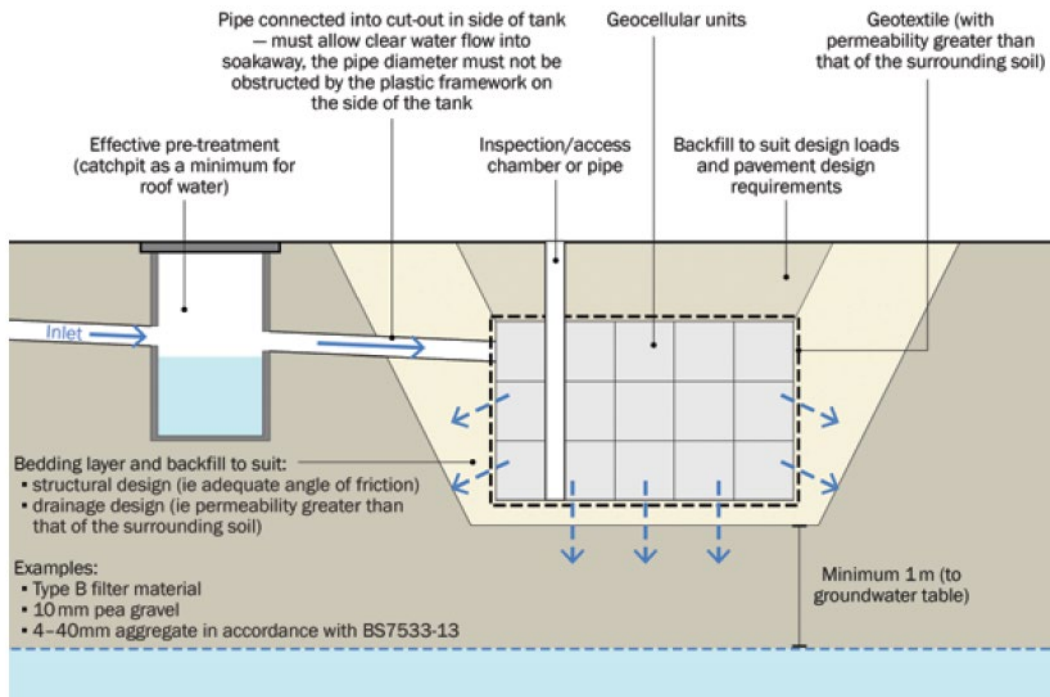


Figure 13.1 of the CIRIA SuDS Manual (C753) (2015)

Permeable paving

Unlined permeable paving is proposed for driveway and patio areas to intercept runoff. Suitable aggregate materials (angular gravels with suitable grading as per CIRIA, 2015) will improve water quality due to their filtration capacity and usually work to a 30% porosity. Paving could also implement an impermeable liner close to the building or create a separate compartment within the permeable sub-base close to the building to further divert attenuated water away from building foundations.

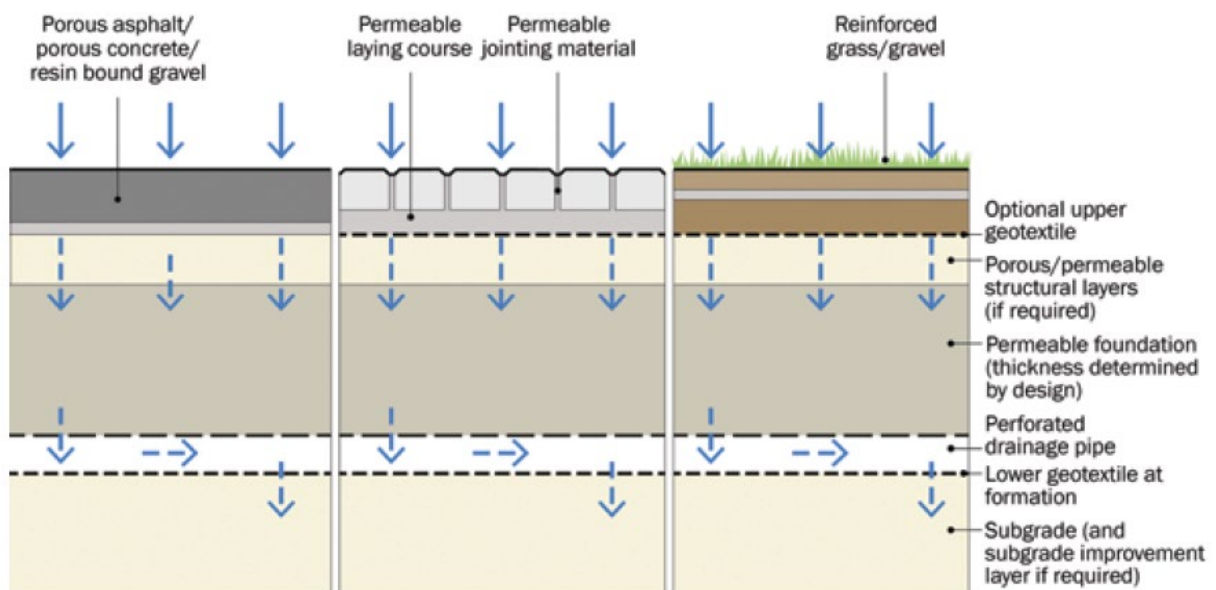


Figure 20.13 of the CIRIA SuDS Manual (C753) (2015)

Exceedance flows

Exceedance flow routes are included within the proposed SuDS drainage layout. Where possible, exceedance flows should be directed into non-essential areas of the Site such as the landscaped areas. The SuDS system recommended for the Site should provide enough storage that this method would only be utilised during a worst case scenario.

Secondary SuDS strategy:

Where infiltration to ground is not achievable at the Site, runoff should be managed and attenuated on-Site and discharged at a restricted rate of 2 l/s.

SuDS features listed in the primary strategy (other than the soakaway) are still applicable to the secondary strategy for the Site. Permeable paving can still be incorporated if discharge to ground is not achievable. However, the paving will need to be lined to ensure groundwater does not interact with the system.

Table 15. Proposed SuDS type, features, discharge location and rate restriction

SuDS type	Source control (interception) and attenuation SuDS.
SuDS features	Rainwater harvesting butt, SuDS planter and lined permeable paving.
Discharge location	Public combined sewer.
Discharge rate	2 l/s.

*As close to the Greenfield 1 in 1 year rate as possible, without increasing the risk of blockage.

Table 16. Proposed SuDS sizing (dimensions) and attenuation volumes

Rainwater harvesting	To comply with DEFRA's national standards for SuDS (2025), rainwater harvesting butts should be established for each proposed development. In terms of attenuation storage within this SuDS scheme, the volume of run-off which could be attenuated by rainwater harvesting has not been considered within the preliminary SuDS strategy.
SuDS planters	SuDS planters are proposed to take overflow from the rainwater harvesting butts for water quality and biodiversity purposes. In terms of attenuation storage within this SuDS scheme, the volume of run-off which could be attenuated by rain planters has not been considered within the preliminary SuDS strategy.
Permeable paving	A 108 m ² area of lined permeable paving (underlain with a Type 3 aggregate material with a 30% porosity) is proposed within patio and

	car parking areas to a depth of 0.30 m would provide c. 9.72 m ³ of attenuation.
Total attenuation provided	9.72 m ³
Total attenuation required	4.42 m ³
Freeboard storage provided	5.30 m ³

Pump

Due to the gradient difference between the Site and the combined sewer network, a pump will be required to allow for a connection to the sewer. The pump should be designed by a specialist manufacturer with a rate of 2 l/s.

Drainage protection devices

A non-return flap valve is recommended for outflow pipes to reduce the risk of backflow from the sewer during a large scale rainfall event.

Amenity and biodiversity

The inclusion of SuDS planters and rainwater harvesting butts provides both amenity and biodiversity benefits within the SuDS design. SuDS planters introduce green features that enhance the streetscape, support pollinator-friendly planting, and create small-scale habitats that increase biodiversity. SuDS planters will be populated by native vegetation that is happy with occasional inundations. Rainwater harvesting butts offer residents a sustainable source of water for use in landscaped areas, reducing potable water demand.

10 SuDS maintenance



Regular maintenance is essential to ensure effective operation of the SuDS features over the intended lifespan of the proposed development. The SuDS Manual (C753) (CIRIA, 2015) provides a maintenance schedule for SuDS with details of the necessary required actions as shown in the Table below.

Table 17. SuDS operation and recommended maintenance requirements

Asset type	Maintenance schedule (and frequency)
Soakaway	Regular maintenance: - Remove sediment and debris from pretreatment and inspection chamber. Clean gutters, filters, downpipes. Trim roots prevent blockages (annually). - Reconstruct/ clean if performance deteriorates, replace clogged geotextile (as required) Monitoring: - Inspect inlets/outlets, silt traps – note rate of accumulation (monthly). - Check water levels and emptying time (annually).
Permeable pavements	Regular maintenance: - Brushing and vacuuming (three times per year). - Trimming any roots and surrounding grass and weeds that may be causing blockages (annually or as required). Monitoring: - Initial inspection (monthly). - Inspect for poor performance and inspection chambers (annually).
Hydro-Brake Flow Control (secondary strategy)	Low amounts of maintenance required as there are no moving parts within the Hydro-Brake® Flow Control. Initial monthly inspection at the manhole once the construction phase is over. If blockages occur they normally do so at the intake. Hydro-Brake® Flow Controls are fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur. Inspection should be undertaken annually or when a storm event occurs.
Underground drainage pipe network	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).

Asset type	Maintenance schedule (and frequency)
	- 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).
Rainwater harvesting	Regular maintenance: - Inspection of tank for debris and sediment build up (annually and following poor performance). - Inspection of inlets, outlets, overflow areas, pumps and filters (annually and following poor performance). - Cleaning of tank, inlets, outlets, gutters, roof drain filters and withdrawal devices (annually or as required). Remedial actions: - Repair or overflow erosion damage or damage to tank and associated components (as required)
SuDS planter	Regular maintenance: - Remove litter and debris from basin (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).
Pump (secondary strategy)	To be maintained as per manufacturer's guidance.

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.

11 Background information

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 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, 2024). For the impermeable surfaces, it has been assumed that 100% runoff will occur (calculations provided in Appendix B). 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.

12 Additional Products



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.

13 References and glossary



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OWLERBARROW ROAD, BURY, BL8 1RD.

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.
Source Protection Zone (SPZ)	Areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. They are a policy tool used to control activities close to water supplies intended for human consumption.
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 2025 BlueSky copyright and database rights 2025
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2025 Ordnance Survey data © Crown copyright and database right 2025
Flood Risk (RoFRS/Pluvial/Surface Water Features/SPZ)	Environment Agency copyright and database rights 2025 Ordnance Survey data © Crown copyright and database right 2025
Flood Risk (Groundwater) and SuDS infiltration suitability (SD50)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2025) Contains British Geological Survey materials © NERC 2025 Ordnance Survey data © Crown copyright and database right 2025
Sewer Location	Contains Ordnance Survey data © Crown copyright and database right 2025 Contains United Utilities search data 2025
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2025 Environment Agency copyright and database rights 2025

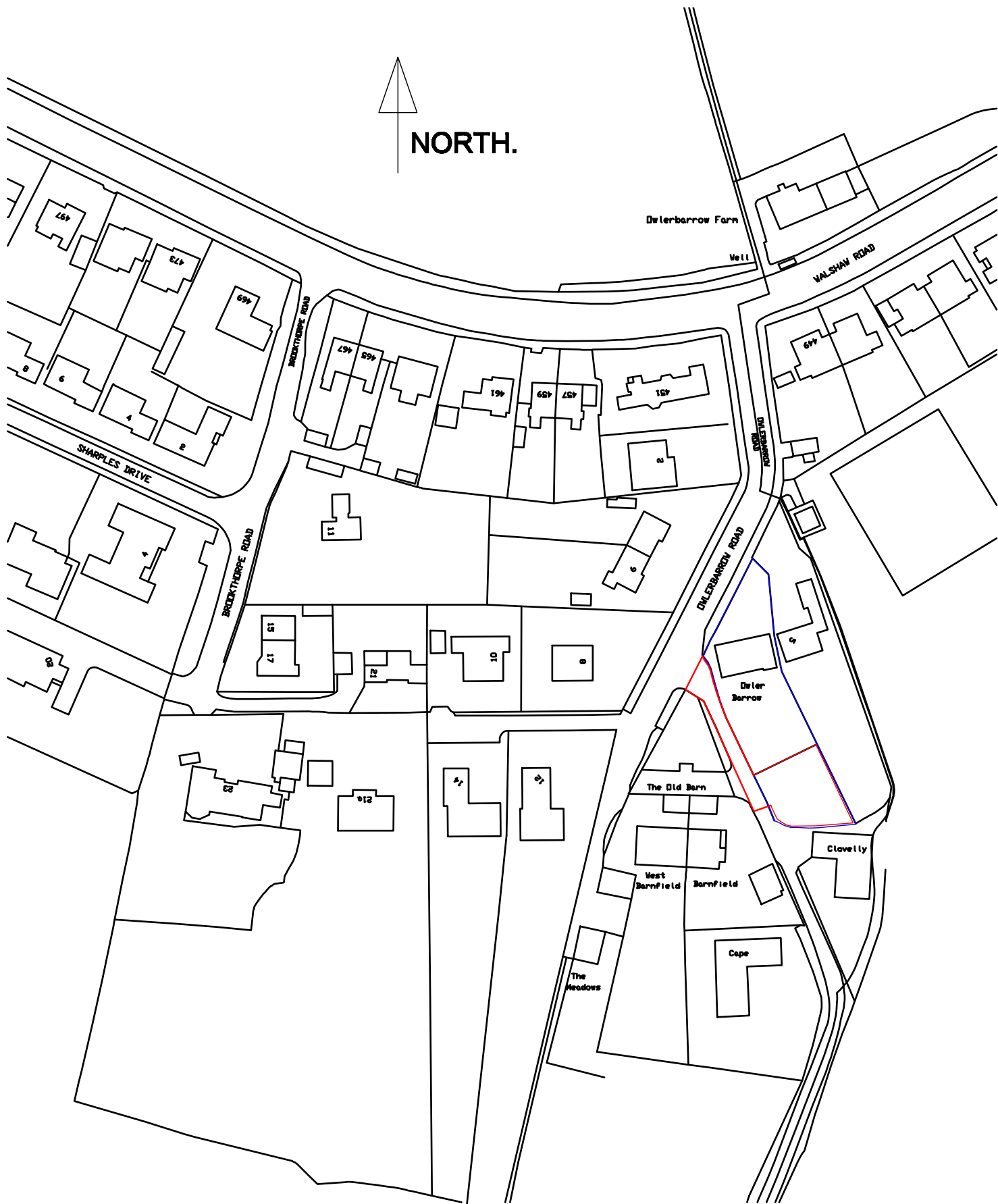
14 Appendices



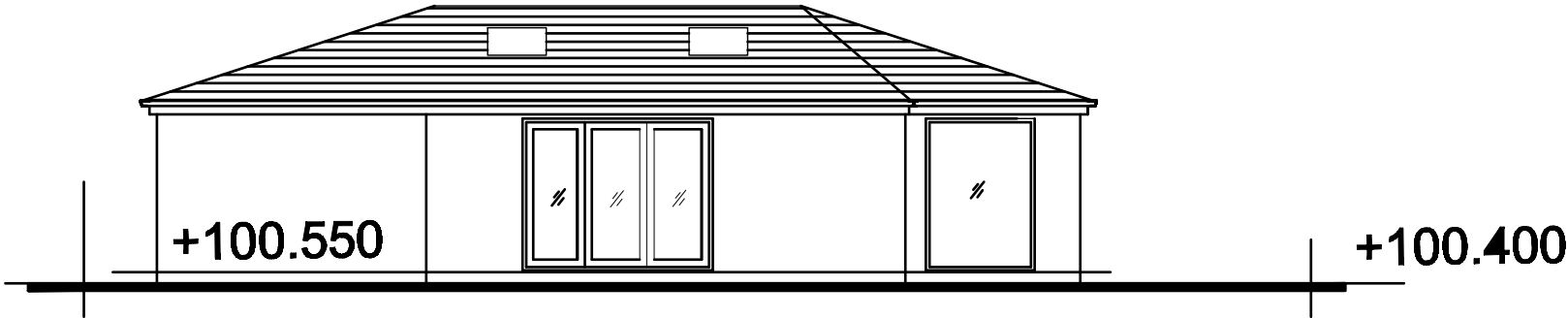
Appendix A



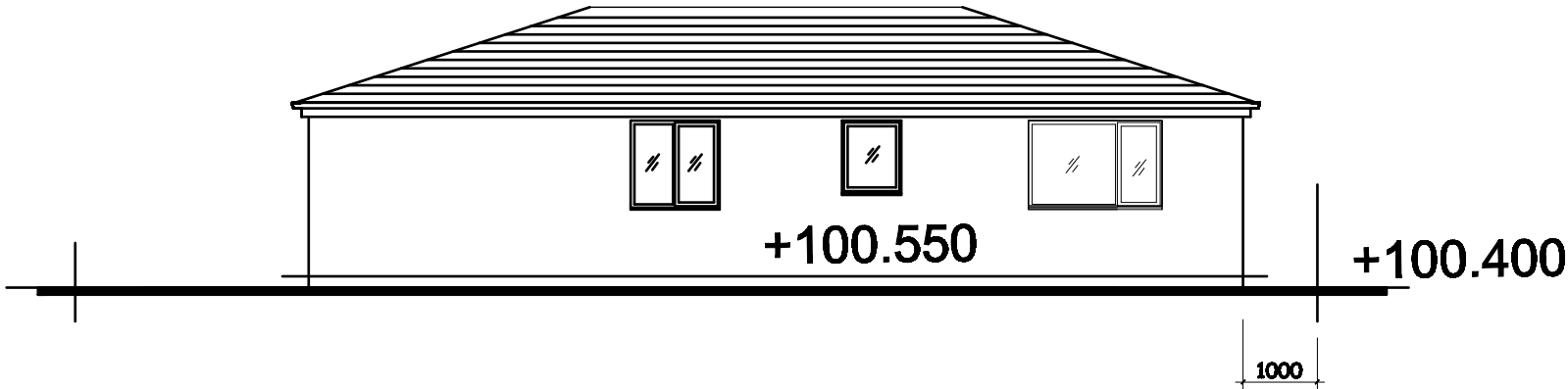
Site plans



LOCATION PLAN Scale 1.1250

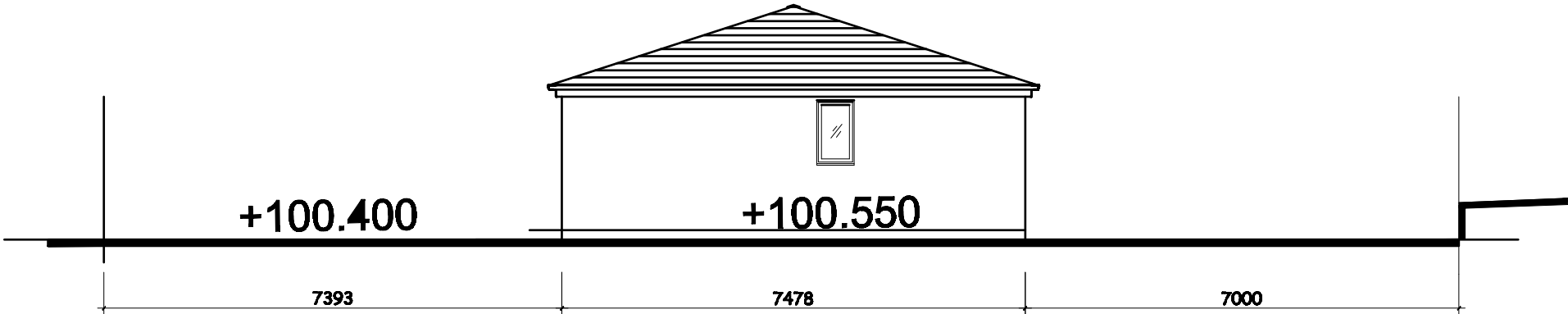
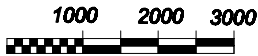


PROPOSED NORTH ELEVATION

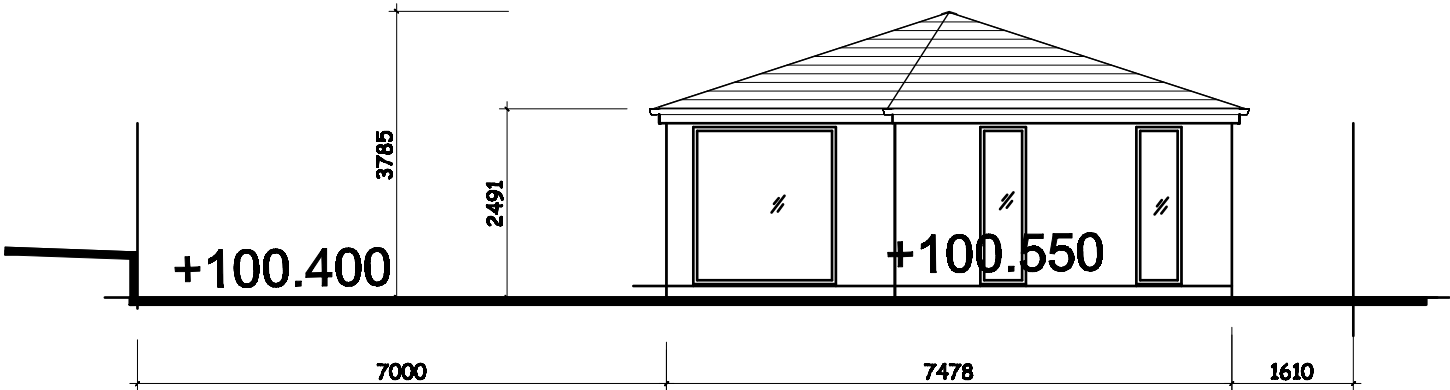


PROPOSED SOUTH ELEVATION.

Revision	Title : PROPOSED RESIDENTIAL DWELLING.	Project : LAND AT REAR OF OWLERBARROW HOUSE, OWLERBARROW ROAD, BURY. BL8 1RD	MTC Designs 31 Edend Drive Bolton BL2 6TB T: 01204 418714 M: 07708028914 Email: mitchael@mtcdesigns.co.uk Scale 1:100 @ A3 Date : October 2021. Drawing No: P01
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PROPOSED EAST ELEVATION.



PROPOSED WEST ELEVATION.

Revision

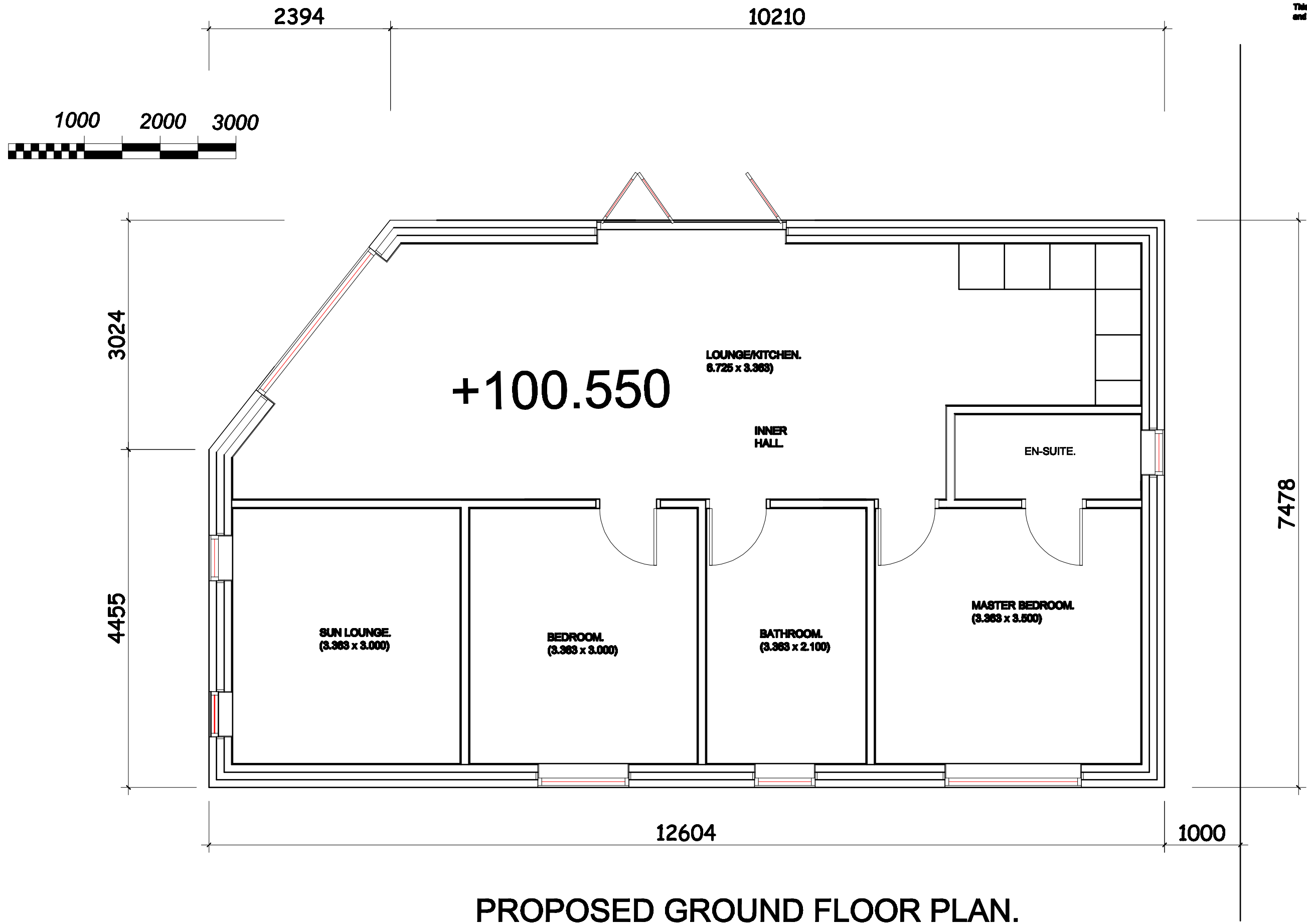
Title :
PROPOSED RESIDENTIAL DWELLING.

Project :
LAND AT REAR OF OWLERBARROW HOUSE,
OWLERBARROW ROAD,
BURY.
BL8 1RD

MTC Designs
31 Edford Drive Bolton BL2 6TB
T: 01204 418714 M: 07708028814
Email: michael@out@mtc.com

Scale 1:100 @ A3
Date : October 2021.

Drawing No: P02

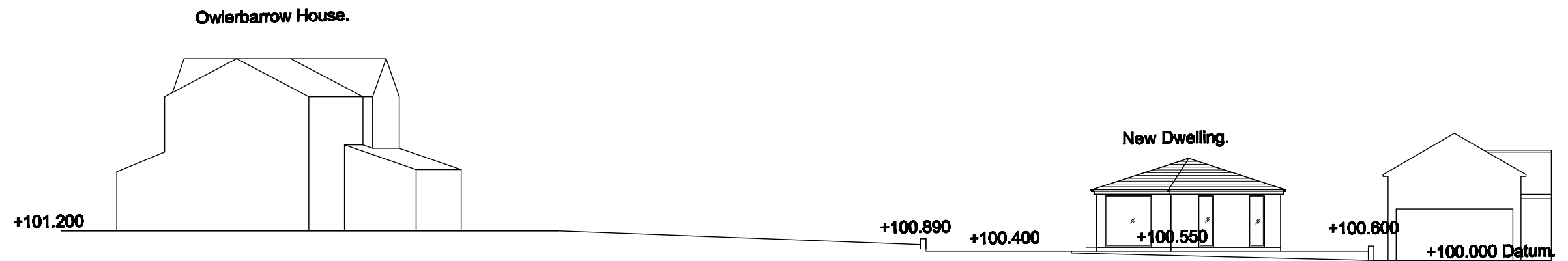


PROPOSED GROUND FLOOR PLAN.

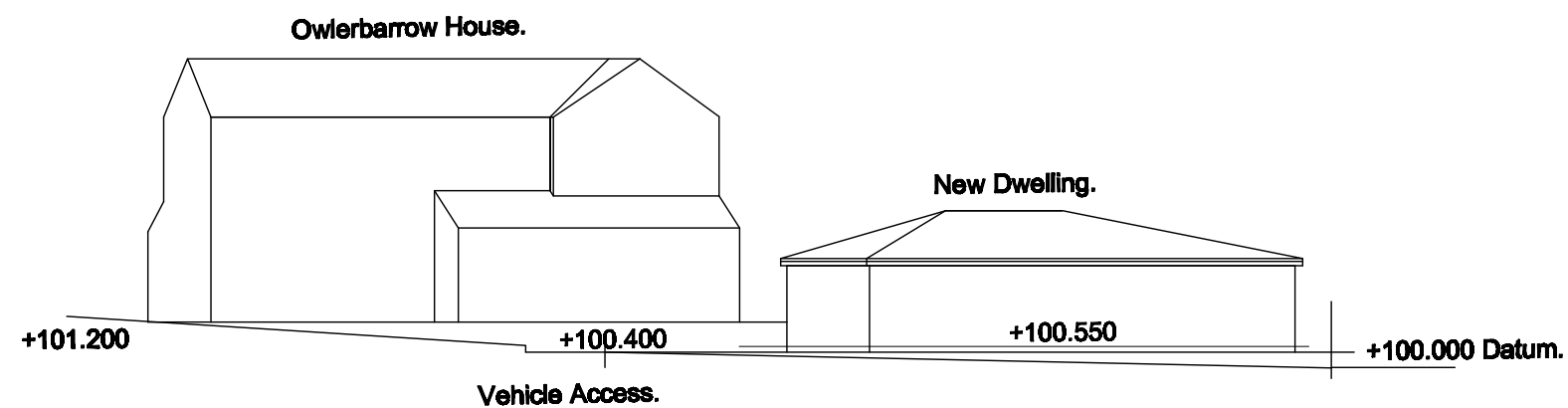
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Revision	Title : PROPOSED RESIDENTIAL DWELLING.	Project : LAND AT REAR OF OWLERBARROW HOUSE, OWLERBARROW ROAD, BURY. BL8 1RD	MTC Designs 31 Exford Drive Bolton BL2 6TB T: 01204 416714 M: 07700008914 Email: mtchealthcourt@aol.com Scale 1:100 @ A3 Date : October 2021.	Drawing No: P04
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EAST TO WEST ELEVATION



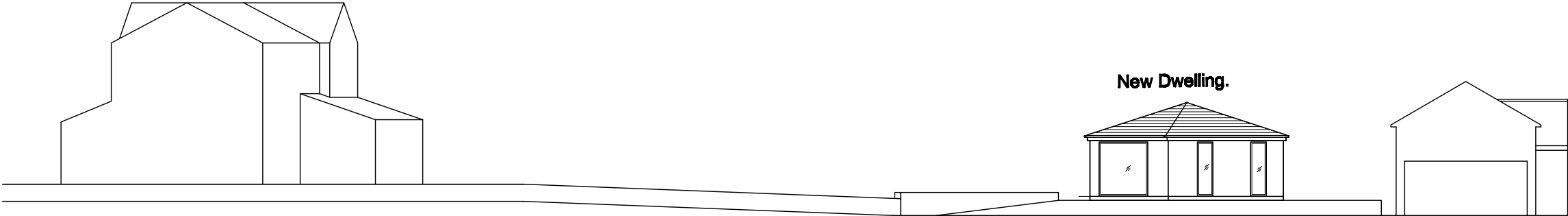
NORTH TO SOUTH ELEVATION

Revision.	Title : PROPOSED RESIDENTIAL DWELLING.	Project : LAND AT REAR OF OWLERBARROW HOUSE, OWLERBARROW ROAD, BURY. BL8 1RD	MTC Designs Scale: 1:200 @ A3 Date: April 2022.	31 Exford Drive Bolton BL2 6TB T: 01204 418714 M: 07708026514 Email: michael@court@aol.com Drawing No: P05
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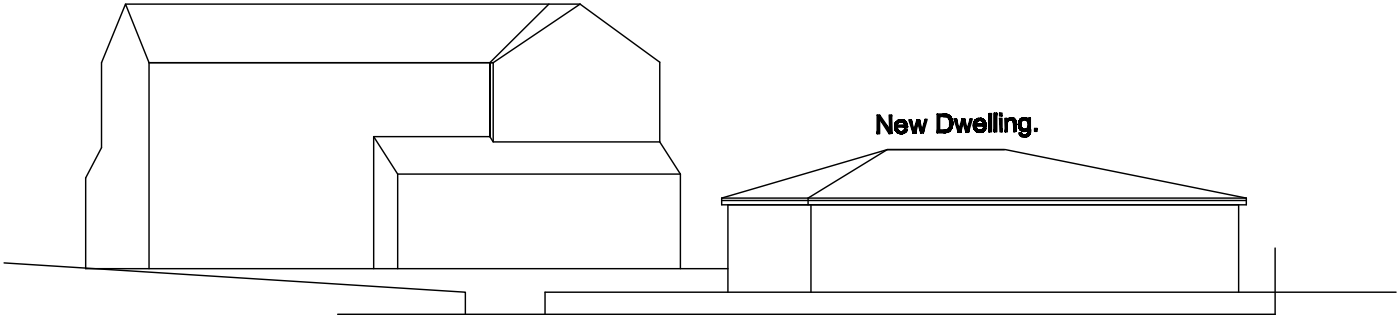
Revision:	Title: PROPOSED RESIDENTIAL DWELLING.	Project: LAND AT REAR OF OWLERBARROW HOUSE, OWLERBARROW ROAD, BURY. BL8 1RD	MTC Designs Scale: 1:500 @ A3 Date: October 2021.	31 Edford Drive Bolton BL2 6TB T: 01204 418714 M: 07700088514 Email: michael@ourtown.co.uk Drawing No: P06
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Owlerbarrow House.



EAST TO WEST ELEVATION

Owlerbarrow House.



Vehicle Access.

NORTH TO SOUTH ELEVATION

Revision.

Title :
PROPOSED RESIDENTIAL DWELLING.

Project :
LAND AT REAR OF OWLERBARROW HOUSE,
OWLERBARROW ROAD,
BURY.
BL8 1RD

MTC Designs
Scale: 1:200 @ A3
Date: April 2022.
31 Exford Drive Bolton BL2 6TB
T: 01204 418714 M: 07708028514
Email: michaeltcourt@aol.com
Drawing No: P06

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)	1.200
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)	Node Type	Depth (m)
Dwelling	0.009	5.00	10.000	Manhole	1.800

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	20.0		

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	45	10	0

Node Dwelling Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Invert Level (m)	8.200	Depth (m)	1.200
Side Inf Coefficient (m/hr)	0.03600	Time to half empty (mins)	905	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	1.500	Number Required	1
Porosity	0.95	Pit Length (m)	4.000		

Results for 2 year +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Dwelling	990	8.502	0.302	0.1	1.7545	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
1440 minute winter	Dwelling	Infiltration	0.0					

Results for 30 year +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	Dwelling	660	8.831	0.631	0.3	3.6683	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
720 minute winter	Dwelling	Infiltration	0.1					

Results for 100 year +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	Dwelling	870	9.006	0.806	0.3	4.6824	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
960 minute winter	Dwelling	Infiltration	0.1					

Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Dwelling	1350	9.374	1.174	0.3	6.8213	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
1440 minute winter	Dwelling	Infiltration	0.1					

Appendix C



United Utilities Asset Location Plan

GeoSmart Information

Suite 9-11, Old Bank Buildings
Bellstone,
Shropshire,
SY1 1HU

FAO:

How to contact us:

United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

Your Ref: EF000201
Our Ref: UUPS-ORD-682647
Date: 07/10/2025

Dear Sirs

Location: OWLERBARROW HOUSE OWLERBARROW ROAD, BURY, BL8 1RD

I acknowledge with thanks your request dated 06/10/2025 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

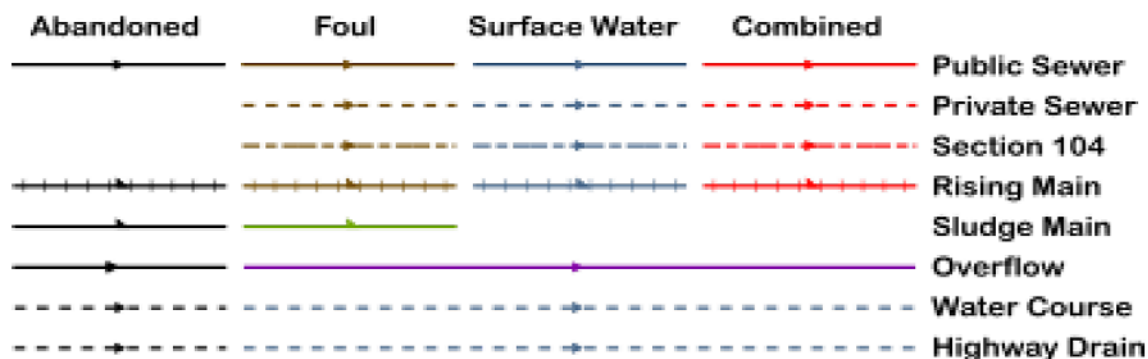
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

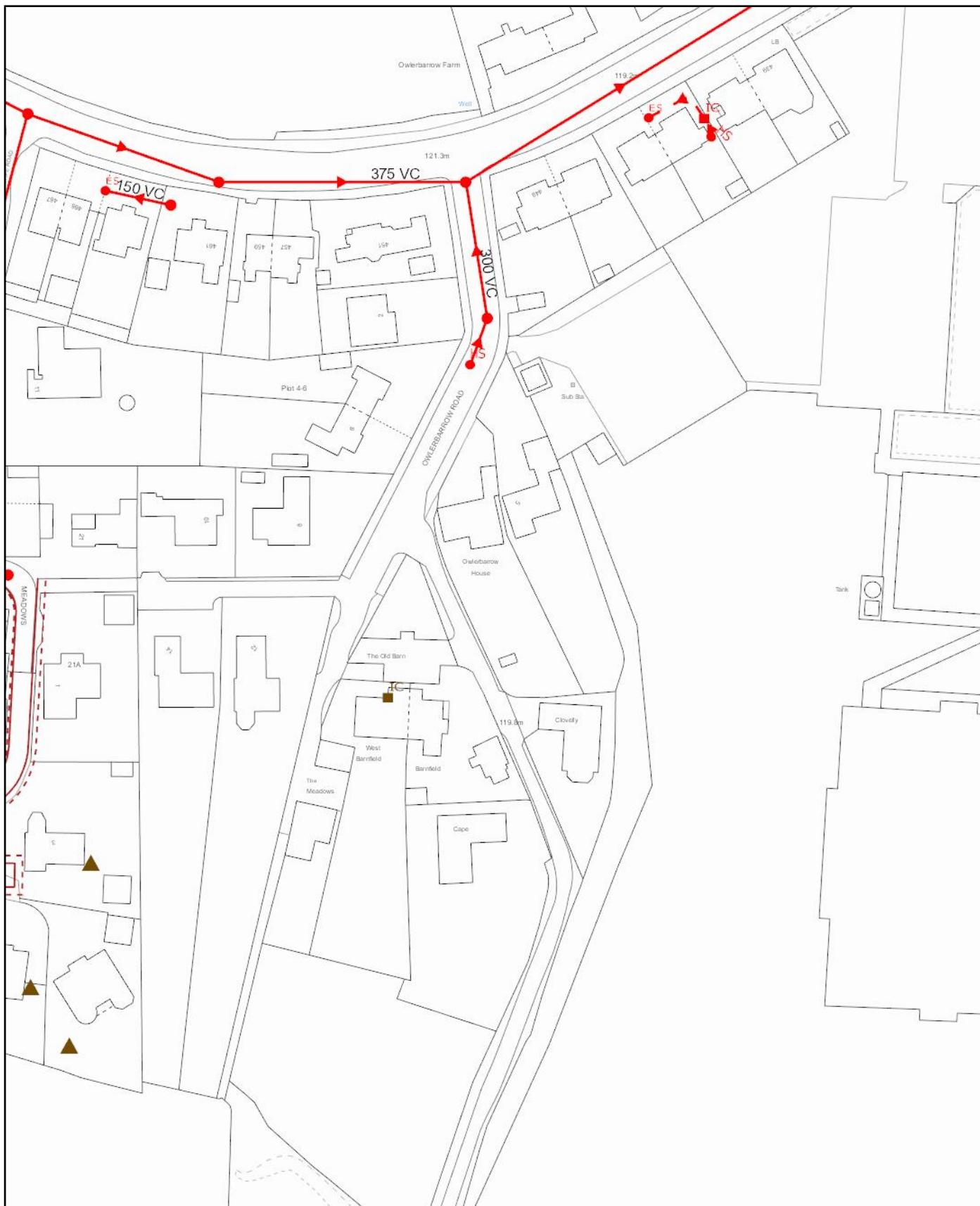
- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

Manhole	Side Entry Manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	DNM Network Monitoring Point
Drop Shaft	Change of Characteristic
Orifice Plate	



Scale: 1:1250
Date: 07/10/2025

SEWER RECORDS

Address or Site Reference: OWLERBARROW HOUSE OWLERBARROW ROAD, BUR Y, BL8 1RD
Printed by: Property Searches



The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Further information

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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

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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.

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- display the Search Code logo prominently on their search reports.
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- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
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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

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- 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:

Liz Lloyd

Finance Manager

GeoSmart Information Limited

Suite 9-11, 1st Floor,

Old Bank Buildings,

Bellstone, Shrewsbury, SY1 1HU

Tel: 01743 298 100

support@geosmartinfo.co.uk

15 Terms and conditions, CDM regulations and data limitations



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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/>