



Langley Lane Farm

Sustainable Drainage Strategy

Job Number
FRA251035

Report Date
09th May 2025

Client
Mr K Broome



www.thelkgroup.com

Ground Investigation | Land Remediation | Project Management



LK CONSULT

DOCUMENT QUALITY ASSURANCE

Site Address	Langley Lane Farm, Langley Lane, Middleton, M24 5LJ
Report Title	Sustainable Drainage Strategy
Job Number	FRA251035
Client	Mr K Broome

Revision	0	Date of Issue	01/05/2025
Document Ref:	FRA251035-SuDS-Langley Lane Farm-R0		
Status	Draft for Comment		
Written By	Dan Percival		
Approved By	Matthew Bell		

Revision	1	Date of Issue	09/05/2025
Document Ref:	FRA251035-SuDS-Langley Lane Farm-R0		
Status	Update to drainage strategy following Client review		
Written By	Dan Percival		
Approved By	Matthew Bell		

DISCLAIMER

This report has been prepared by LK Consult Ltd (LKC) who have exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant, experienced in preparing reports of a similar scope.

However, to the extent that the report is based or relies upon information contained in records, reports or other materials provided to LKC, which have not been independently produced or verified, LKC gives no warranty, representation, or assurance as to the accuracy or completeness of such information.

This report is prepared solely for the benefit of the client named above. It may not be relied upon by or submitted to a third party for their reliance for the purposes of valuation, mortgage, insurance, and regulatory approval until all invoices have been settled in full.

Those using this information in subsequent assessments or evaluations do so at their own risk.

EXECUTIVE SUMMARY

Scope and Background

This Sustainable Drainage (SuDS) Strategy has been undertaken by LK Consult Ltd (LKC) to support the planning application for the proposed residential dwelling at Langley Lane Farm.

LKC has prepared this SuDS Strategy in line with the NPPF and Technical Guidance where appropriate.

Consultations

Rochdale Borough Council – Lead Local Flood Authority (LLFA) has been contacted during preparation of this report. The consultation response from the LLFA has been considered within the preparation of this report.

The Environment Agency (EA) website has been utilised to assess if there are any limitations that may affect the form of SuDS that may be appropriate to this site. The records show that the site is within Flood Zone 1.

Drainage Strategy

The outline drainage strategy considers the use of an infiltration-based SuDS not to be feasible. It is expected that surface water runoff arising from the development will discharge into Whittle Brook to the north of the site.

The proposed development will increase the proportion of the site covered by impermeable surfaces and will therefore generate more runoff. Attenuation will be required to restrict surface water runoff generated by the proposed development taking into account the impacts of future climate change. Storage will be provided within permeable paving and underground geocellular storage crates to restrict runoff to a rate of 1.0l/s during all events up to and including the 1 in 100 year plus 45% climate change event.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
1. Introduction	1
1.1. Background	1
1.2. Site Details	1
2. Site Setting	2
2.1. Environmental Setting	2
2.2. Site and Access Levels	2
3. Consultation	3
4. Sustainable Drainage Strategy.....	4
4.1. Introduction	4
4.2. Sustainable Drainage Hierarchy	4
4.3. Surface Water Management	5
4.4. Maintenance and Management Plan.....	14
4.5. SuDS for Pollution Mitigation	16
5. Conclusion	18

Figures

Figure 1 – Site Location and Boundary Plan

Appendices

Appendix A – Proposed Development Plan

Appendix B – LLFA Consultation

Appendix C – United Utilities Sewer Records

Appendix D – Impermeable Catchment Plan

Appendix E – Outline Surface Water Drainage Strategy

Appendix F – Causeway Drainage Calculations

Appendix G – References

1. Introduction

1.1. Background

LKC were commissioned to carry out an outline Sustainable Drainage Strategy for Langley Lane Farm, Langley Lane, Middleton, M24 5LJ. The report was undertaken to support a planning application for the proposed erection of a single storey residential dwelling.

The report will consider the impact of the development on surface water runoff accounting for the impacts of future climate change. The sustainable drainage assessment in Section 4 will provide an overview of the SuDS techniques which could be considered on the site.

This outline SuDS assessment considers the principles presented in the national Non-Statutory Standards for Sustainable Drainage Systems (Defra, 2015)¹ and the Planning Practice Guidance (PPG) August 2022². The sustainable drainage assessment is presented with reference to the hydrological and hydrogeological context of the development.

The report findings are based upon professional judgement and are summarised below. The report includes baseline data from the Environment Agency (EA), rainfall data from the Wallingford Studies and Hydrogeological information from the British Geological Survey (BGS). The assessment will summarise and refer to these datasets in the text.

Drainage on the site has been assessed by considering the following key constraints:

- Topography of the site.
- Local water features and hydrological context.
- Underlying geology, soil types and permeability.
- Layout and geometry of the proposed development.

1.2. Site Details

A summary of the general site details is presented in Table 1-1.

Location	To the north of Langley Lane, Middleton, M24 5LJ. Centred at National Grid Reference 385930E 407700N. A site location plan is included as Figure 1.
Area	Approximately 4,200m ² .
Topography	123-126m above ordnance datum (m AOD).
Current Site Use	Yard associated with Langley Lane Farm and fields.
Proposed Development	Proposed development comprises the erection of 1no. residential dwelling with garden and soft landscaping. Proposed development plans are included as Appendix A.

Table 1-1: Summary of site details.

2. Site Setting

2.1. Environmental Setting

LKC have previously undertaken a Preliminary Risk Assessment for the site³ (LKC251127, dated 2nd April 2025) and pertinent environmental information for the site is summarised in Table 2-1 below.

Summary of the Environmental Setting			
Geology	Superficial		Till, Devensian (Diamicton)
	Bedrock		Pennine Lower Coal Measures formation (described as comprising mudstone, siltstone and sandstone).
	BGS Boreholes		BGS records indicate there are no BGS boreholes in the immediate vicinity of the site.
	Defra Soilscape Mapping		Type 15 – Naturally wet very acid sandy and loamy soils.
Hydrogeology	Aquifer Designation	Superficial	Secondary B Aquifer.
		Bedrock	Secondary A Aquifer.
	Source Protection Zone (SPZ)		Site not within an SPZ.
Hydrology	All adjacent and internal surface water		The nearest watercourse is Whittle Brook which is located along the northern boundary of the site. Whittle Brook is classified as an ordinary watercourse and flows in a generally south westerly direction. Whittle Brook is partially culverted within the site to provide access into fields to the north. An existing wildlife pond is located in the north eastern area of the site.
	Flooding		Flood Zone 1.
Flood Zone	The site is within Fluvial Flood Zone 1 whereby the land is classified as having a less than 1 in 1,000 annual probability of fluvial or tidal flooding.		
Site History			Historical mapping indicates the site has largely comprised a vacant field prior to the current site use. The aforementioned culvert is recorded on mapping from 1848.

Table 2-1: Summary of the Environmental Setting.

2.2. Site and Access Levels

The proposed development plans included as Appendix A indicate topographic levels within the site. Ground levels within the site are shown to range between 125.30m AOD at the site entrance to a level of approximately 123.00m AOD in the northern corner of the site.

Levels along Whittle Brook as it exists the culvert within the site are shown to range between 121.34m AOD to 120.03m AOD.

3. Consultation

Information from all relevant consultees is summarised in Table 3-1 below.

Source	Details	
Lead Local Flood Authority (LLFA)	Consultation has been undertaken with Rochdale Borough Council in its role as LLFA to confirm surface water management requirements for the proposed development. Within their response (dated 23rd April and included as Appendix B), the LLFA have indicated the following: • There are no records of flood defences and the site is remote from any main rivers; • There is an ordinary watercourse through the site which appears to have a significant upstream catchment and should be assessed with regard to flood risk; • There are no records of historic flooding; • Development drainage will be expected to discharge to watercourses, at a greenfield rate, before considering discharge to sewers (subject to infiltration assessment initially); • Surface water discharge should follow the below hierarchy of drainage options: ○ Control at source (infiltration / water recycling); ○ On site treatment (basins, swales, rain gardens, tree pits); ○ Local Treatment (adoptable ponds, basins, swales); ○ Regional treatment; ○ Discharge to watercourses / bodies; ○ Discharge to surface water sewers; ○ Discharge to combined sewers. • The LLFA consider surface based green SuDS features to be more acceptable than traditional buried storage solutions; • Only adoptable highways would be allowed to discharge to any highway drainage. There are records of highway drainage and gullies in Langley Lane. There is also a culvert in Langley Lane which is assumed to also be receiving highway runoff. • The site is not within a Critical Drainage Area (CDA) but the watercourses discharged to may impact a CDA downstream and this should be assessed.	
United Utilities (UU)	Sewer Records	UU sewer records (included as Appendix C) indicate a 225mm diameter public surface water sewer, flowing in a westerly direction, located beneath Langley Lane.
Internal Drainage Board (IDB)	The site is not located within an IDB area.	

Table 3-1: Summary consultee information.

4. Sustainable Drainage Strategy

4.1. Introduction

The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface run-off from development sites through the use of Sustainable Drainage Systems (SuDS).

SuDS will not alleviate flooding in an area prone to flooding; however, properly designed SuDS have the potential to prevent the surface water runoff from new development increasing downstream flood risk. The effective disposal of surface water from development is a material planning consideration in determining proposals for the development and use of land.

The accepted principles are that surface water arising from a developed area should, as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

The Planning Practice guidance identifies that surface water runoff should be disposed of in the following order of preference:

1. Into the ground (infiltration);
2. To a surface water body;
3. To a surface water sewer, highway drain, or another drainage system; or
4. To a combined sewer.

Suitability of different SuDS will be governed by prevailing site conditions, such as the type and scale of development, topography, ground conditions (soil permeability, ground stability, depth to water table), local hydrogeology and risk of groundwater contamination (presence of sensitive aquifers and source protection zones) etc.

4.2. Sustainable Drainage Hierarchy

4.2.1. Infiltration

BGS online mapping indicates the site is underlain by superficial deposits of Glacial Till which is further underlain by bedrock deposits from the Pennine Lower Coal Measures Formation which is described as comprising mudstone, siltstone and sandstone. Based on the predominantly cohesive nature of the underlying geology, the use of infiltration for the disposal of surface water runoff is likely to be unsuitable. Infiltration testing in accordance with BRE365 guidance should be undertaken at the detailed design stage to confirm site specific infiltration rates.

4.2.2. Watercourses

Whittle Brook flows in a south westerly direction and is partially culverted within the northern area of the site. Given the proximity of the Whittle Brook to the site, it is proposed to discharge surface water runoff generated by the proposed development to the watercourse subject to agreement with the LLFA and appropriate consent.

Proposed development plans indicate external areas of the site will be laid in close proximity to the culverted section of Whittle Brook, however, proposed built development will be located approximately 4m away from the culvert. It is recommended that further investigation via an appropriate survey is undertaken to confirm the location, size, depth and condition of the culverted section of Whittle Brook.

4.2.3. Surface water sewer, highway drain, or another drainage system

It is proposed to discharge surface water runoff generated by the proposed development to Whittle Brook therefore discharge to a surface water sewer, highway drain, or another drainage system has not been considered further.

4.2.4. Combined sewer

UU public sewer records indicate there are no public combined sewers within the immediate vicinity of the site.

4.3. Surface Water Management

4.3.1. Greenfield Runoff Rates

Consultation with the LLFA has identified that surface water runoff generated by the proposed development should be restricted to greenfield runoff rates. Proposed hardstanding areas have been measured as 1,007m² (0.101 ha), as shown on the catchment plan drawing included as Appendix D. Greenfield runoff rates for the proposed hardstanding area have been estimated using the IH124 method and are summarised in Table 4-1.

Return Period	Runoff Rate (l/s)
1 in 1	0.7
QBAR	0.7
1 in 30	1.5
1 in 100	1.9

Table 4-1: Summary of existing greenfield runoff rates

For the purposes of this assessment, it is proposed to restrict surface water runoff generated by the proposed development at a rate of 1.0l/s, which represents the minimum practicable rate for self cleansing of a Hydrobrake or similar flow control device, during all events up to and including the 1 in 100 year plus 45% climate change event thereby providing betterment over the 1 in 30 and 1 in 100 year events.

4.3.2. Attenuation Requirements

An initial Quick Storage Estimate has been undertaken using Causeway Flow modelling software to determine the attenuation that is likely to be required to achieve the proposed discharge rate. The Quick Storage Estimate indicates that between 72 – 115m³ of attenuation will be required based on the proposed hardstanding area of 0.101ha with an average volume requirement of 93.5m³.

4.3.3. Consideration of SuDS

The NPPF requires applications that could affect drainage on or around a site to incorporate Sustainable Drainage Systems to control surface water runoff. An options appraisal of potential SuDS features commensurate to the scale and nature of the proposed development has been undertaken to determine potential SuDS features that could be utilised to provide the required surface water attenuation volume. Table 4-2 provides a summary of the SuDS options appraisal with consideration of CIRIA C753 (The SuDS Manual)⁴ for the proposed development.

SuDS Option	Description	Benefits	Comments	Appropriate for Development
Infiltration				
Soakaways	Soakaways provide stormwater attenuation, stormwater treatment and groundwater recharge. Runoff is treated by physical filtration to remove solids, by absorption into the soil and removal and by biochemical reactions involving micro-organisms growing on the soil.	Water quantity Water quality	Based on the predominantly cohesive nature of the underlying geology, the use of infiltration based SuDS features has not been considered at this stage.	X
Infiltration basin	Infiltration basin reduce the volume of runoff from a drainage area, can be very effective at pollutant removal via filtering through the soils, contributes to groundwater recharge and baseflow augmentation. Runoff is treated by physical filtration to remove solids, by absorption into the soil and removal and by biochemical reactions involving micro-organisms growing on the soil.	Water quantity Water quality Biodiversity Amenity	Based on the predominantly cohesive nature of the underlying geology, the use of infiltration based SuDS features has not been considered at this stage.	X
Infiltration trench	An Infiltration trench can create temporary subsurface storage of stormwater runoff, thereby enhancing the natural capacity of the ground to store and drain water. Infiltration trenches allow water to dissipate into the surrounding soils from the bottom and sides of the trench	Water quantity Water quality Amenity	Based on the predominantly cohesive nature of the underlying geology, the use of infiltration based SuDS features has not been considered at this stage.	X

	where runoff is treated by physical filtration, adsorption and biochemical reactions involving micro-organisms growing in the soil. Infiltration trenches are easy to integrate into a site. They are ideal for use around playing fields, recreational areas, or public open space.			
Rain gardens	Attractive features that can help to improve open space. Can be planned as landscaping features. Flexible layout to fit into landscape. Runoff can be treated by physical filtration to remove solids, by absorption and removal by biochemical reactions involving micro-organisms growing on the soil. They can reduce rate of run off and provide some volume reduction.	Amenity Biodiversity Water quality Water quantity	Rain gardens are relatively small depressions in the ground that provide limited attenuation benefits. However, rain gardens could be incorporated into the proposed development to contribute towards slowing the flow of surface water runoff in addition to providing water quality and amenity/biodiversity benefits.	*
Filtration				
Filter drain / trench	Filter trenches create temporary subsurface storage of stormwater runoff and provide stormwater treatment. These trenches can be used to filter and convey stormwater to downstream SuDS components.	Water quantity Water quality	Filter drains/ trenches could be incorporated into the proposed development in place of a traditional piped network to convey surface water runoff to downstream SuDS.	*
Filter strip	A filter strip offers no storage and is used solely to remove pollutants from surface water. The vegetation traps organic and mineral particles that are	Water quality Amenity Biodiversity	It is proposed to provide permeable paving that will provide the required treatment of surface water runoff prior to	x

	then incorporated into the soil, while the vegetation takes up any nutrients. A filter strip features medium amenity potential. Local wild grass and flower species can be introduced for visual interest and to provide a wildlife habitat.		discharge to the receiving watercourse.	
Retention & Detention				
Detention basin	Detention basins provide flow control through attenuation of stormwater runoff for a wide range of rainfall events. Basins treat runoff in a variety of ways: settlement of solids in still or slow moving water, adsorption by the soil, biological activity. Basins offer many opportunities for the landscape designer. Basins should not be built on but can be used for sports and recreation. Basins can be part of public open space.	Water quantity Water quality Biodiversity Amenity	There is limited space available in which to provide an open detention basin. Notwithstanding, a wildlife pond was recently installed in the north eastern area of the site which will provide amenity and biodiversity benefits. The wildlife pond is an online feature connected to Whittle Brook and has not been designed to cater for the surface water attenuation volumes required to restrict surface water runoff generated by the proposed development. Moreover, the pond is located within the north eastern corner of the site which is not considered to be hydrologically preferable for surface water runoff as levels within Whittle Brook are shown to be lower to the west.	x
Attenuation Ponds	Ponds will attenuate the surface water flow prior to discharging to the public surface water	Water quantity Water quality Biodiversity Amenity	There is limited space available in which to provide an open attenuation pond.	

	sewers. The storage volume afforded by these features should not include any permanent water in the pond. Ponds treat runoff in a variety of ways: settlement of solids in still water (having plants in the water enhances calm conditions and promotes settlement), adsorption by aquatic vegetation, biological activity. Permanently wet ponds can be used to store water for reuse and offer excellent opportunities for the provision of wildlife habitats. Ponds can be part of public open space.			X
Geo-cellular storage systems	Geo-cellular systems can be used to control and manage rainwater surface water runoff either as a soakaway or as a storage tank. Geo-cellular storage systems provide high storage volume capacity High void ratios (up to 96%). Capable of managing high flow events.	Water quantity	Given the lack of sufficient space for above ground attenuation features, it is proposed to provide the majority of the required attenuation volume within below ground geocellular storage crates situated below the proposed driveway. .	✓
Oversized Pipes	Oversized pipes can reduce rate of run off and provide some volume reduction.	Water quantity	Attenuation will be provided within below ground geocellular storage crates therefore the use of oversized pipes is not required.	X
Tanks	Storage tanks can be used to control and manage rainwater surface water runoff providing high storage volume capacity.	Water quantity	Attenuation will be provided within below ground geocellular storage crates therefore the use of an attenuation tank is not required.	X

	Tanks are capable of managing high flow events.			
Swales & Conveyance Channels				
Swales	Swales are effective at removing polluting suspended solids through filtration and sedimentation. The vegetation traps organic and mineral particles that are then incorporated into the soil, while the vegetation takes up any nutrients. Swales are often integrated into the surrounding land use. Local wild grass and flower species can be introduced for visual interest and to provide a wildlife habitat. Swales are usually designed as conveyance systems but can also be designed with check dams to increase attenuation and, where applicable, infiltration.	Water quality Biodiversity Amenity Water quantity	Based on site constraints including available space, presence of existing watercourse and associated culvert and site levels, there is limited potential to incorporate swales for the conveyance of surface water runoff.	X
Channels & rills	Channels and rills are open surface water channels with hard edges. Effective in water & pollution treatment. Can act as pre-treatment to remove silt before water is conveyed into further SuDS features. Can be visually appealing in urban landscapes. Amenity value for the local community and biodiversity value (design dependant).	Water quality Amenity Water quantity Biodiversity	including available space, presence of existing watercourse and associated culvert and site levels, there is limited potential to incorporate channels or rills for the conveyance of surface water runoff.	X
Control Structures				

Flow control devices	Flow control devices (e.g. Hydrobrake style flow control systems or similar) and restricted orifices enable the discharge to be restricted to a constant rate from proposed development to control the peak flow. Complex controls can reduce upstream storage requirements.	Water quantity	Surface water runoff generated by the proposed development will discharge to Whittle Brook via a Hydrobrake or similar flow control device.	✓
Inlets, outlets and controls	Inlets, outlets and other control structures are key elements of well-designed SuDS. Inlet and outlet features allow water to flow into and out of features and also limit the rate at which water flows along and out of the system. There are many different approaches and products available and they can be easily designed to add interest to the urban landscape. Can provide accurate flow control from one SuDS feature to another.	Water quality Amenity	Surface water runoff will discharge into the proposed geocellular crates via an appropriate collection network. Water will discharge into Whittle Brook via an appropriate outlet. Detailed design of proposed inlets and outlets will be undertaken at the detailed design stage.	✓
Source Control				
Green roofs	Green roofs are areas of vegetation installed on the top of buildings and are separated into extensive and intensive roofs depending on substrate depths, planting and maintenance requirements. Green roofs can provide benefits in terms of reducing peak flow rates, particularly for	Water quality Water quantity Amenity Biodiversity	The proposed development will comprise pitched roofs which will limit the feasibility of green roofs.	✗

	small and medium sized storm events as well as ecological, aesthetic and amenity benefits.			
Blue roofs	Blue roofs are designed to attenuate and manage stormwater on a flat roof in urban areas where options for ground-based attenuation systems are limited, and in particular, where construction is being carried out within flood sensitive areas.	Water quantity Amenity Biodiversity	The proposed development will comprise pitched roofs which will limit the feasibility of providing attenuation at roof level.	x
Rainwater harvesting	Rainwater harvesting comprises the collection and storage of rainfall for non-potable uses such as toilet flushing or irrigation. When required, the water is pumped to the point of use, thus displacing what would otherwise be a demand for mains-water. Rainwater harvesting contributes towards reducing overall demand on the main water supply as well as improving climate resilience.	Water quantity	Rainwater harvesting could be incorporated into the proposed development to provide water for non-potable uses. However, the attenuation benefits provided by rainwater harvesting are considered to be limited and would only be realised when the tanks were not full.	*
Permeable Pavements – with granular and geo-cellular storage systems	Permeable pavements allow inflow of rainwater into underlying sub-base material. Any geo-cellular storage systems would have to be lined with an impermeable membrane to provide storage rather than infiltration for runoff from highways.	Water quality Water quantity	Permeable paving will be provided within the proposed driveway area. Permeable paving will provide at source attenuation and treatment and will contribute towards an overall reduction in the size of the proposed geocellular storage crates.	✓
Other SuDS				

Wetlands	These comprise of shallow ponds and marshy areas, covered almost entirely in aquatic vegetation. Wetlands provide both stormwater attenuation and treatment. Wetlands detain flows for an extended period to allow sediments to settle, and to remove contaminants by facilitating adhesion to vegetation and aerobic decomposition. They also provide significant ecological benefits.	Water quality Water quantity Amenity Biodiversity	There is limited space to provide wetlands within the site.	X
----------	---	--	---	---

Table 4-2: Summary of the SuDS options appraisal.

Notes

✓ Suitable for use given the nature and scale of the development.

* Possibly suitable for use – not included in the client and architect design proposal at present.

X Not suitable.

4.3.4. Surface Water Drainage Strategy

It is proposed to restrict surface water runoff generated by the proposed development to a rate of 1.0l/s, which represents the minimum practicable rate for self-cleansing of a Hydrobrake or similar flow control device, during all events up to and including the 1 in 100 year plus 45% climate change event.

To achieve this rate, attenuation will be provided within the form of permeable paving across the proposed driveway area and geocellular storage crates located beneath the driveway. Permeable paving will measure an overall area of 355m² with a sub-base depth of 0.3m and a porosity of 30% and will therefore providing approximately 31.95m³ of attenuation. The proposed geocellular storage crates will measure an area of 46m² and will be 1.6m deep (including 0.6m of cover) with a 95% porosity thereby providing approximately 43.7m³ of attenuation.

Surface water runoff stored within the geocellular crates will discharge into Whittle Brook to the north of the site via a Hydrobrake or similar flow control device that will restrict runoff to a rate of 1.0 l/s.

The proposed outline surface water drainage strategy is included as Appendix E with supporting calculations included as Appendix E. Detailed drainage design will be required at the detailed design stage.

4.4. Maintenance and Management Plan

Maintenance of proposed SuDS features will be required to ensure these remain operational over the lifetime of the proposed development. An indicative maintenance plan for the proposed SuDS and associated features is provided in Table 4-3. The SuDS maintenance and inspections responsibility rests with the owners or could be arranged through appointment of a site management company.

Maintenance Schedule	Required Action	Typical Frequency
Permeable Paving		
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweeping over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site specific observations of clogging or manufacturers recommendations.
Occasional Maintenance	Stabilise and mow contributing adjacent areas.	As required.
	Removal of weeds or management using appropriate treatment applied directly into the weeds by an applicator rather than spraying.	As required.
Remedial Actions	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required
	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required

	Rehabilitation of surface and upper substructure by remedial sweeping.	Every 10 to 15 years or as required.
Monitoring	Initial inspection	Monthly for three months after installation.
	Inspect for evidence of poor operation and/or weed growth – If required, take remedial action.	Quarterly, 48 hr after large storms in first six months.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually
Geocellular Storage Crates		
Regular Maintenance	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually or as required.
Remedial Actions	Repair/rehabilitate inlets, outlet and overflows and vents.	As required.
Monitoring	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years or as required.
	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
Inlet and Outlet Headwalls		
Regular Maintenance	Litter removal	As required
	Inspect vegetation above and around headwall and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from aprons	Annually
	Flap valves and grilles: Check for and clear obstructions	Quarterly

Remedial Actions	Remedial Actions	Repair of erosion or other damage around headwalls
Monitoring	Inspect structures for evidence of poor operation	Monthly/after large storms
	Inspect structures, pipework etc. for evidence of physical damage	Monthly/after large storms
	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly
	Check flap valves	Half yearly
Hydrobrake Flow Control		
Regular Maintenance	Inspect vegetation above and around flow control chamber and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Remove sediment from flow control chambers	Annually
	Flow control devices: Check for and clear obstructions	Quarterly
Remedial Actions	Repair of Penstock and flow control device	As required
Monitoring	Inspect structures for evidence of poor operation	Monthly/after large storm
	Inspect structures, flow control and pipework etc. for evidence of physical damage	Monthly/after large storm
	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

Table 4-3: Indicative SuDS Maintenance Plan

4.5. SuDS for Pollution Mitigation

The proposals for the site have been assessed against the CIRIA SuDS Manual C753 to determine the requirements for the treatment of surface water prior to its discharge from the site to the receiving watercourse. The SuDS features incorporated within the site should be designed to have a total pollution mitigation index that is equal to or greater than the pollution hazard index. Owing to the proposed use of the site containing a residential property with an individual driveway the pollution hazard level is considered within Table 4-4 below.

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons (HCs)
Residential Roofs	Very Low	0.2	0.2	0.05
Individual Driveways	Low	0.5	0.4	0.4

Table 4-4. Pollution Hazard Index adopted from Table 26.2 CIRIA SuDS Manual C753.

A Simple Index Approach has been undertaken to determine Sufficiency of Pollution Mitigation Indices for selected SuDS components, based on the land use featuring the highest pollution hazard level.

Where possible, surface water runoff generated by the proposed development will discharge into the proposed permeable paving. The SuDS pollution mitigation indices for the proposed permeable paving (TSS: 0.7, Metals: 0.6, HCs: 0.7) are greater than (or equal to) the pollution hazard index for each land use within the proposal thereby providing the required treatment of runoff prior to discharge.

5. Conclusion

The site currently comprises a yard area associated with the existing Langley Lane Farm. The proposed development comprises the construction of a single residential dwelling with associated access and parking.

The proposed development will result in an overall hardstanding area of 0.101ha therefore the management of surface water runoff is required to ensure there is no increase in downstream flood risk.

It is proposed to restrict surface water runoff generated by the proposed development to a rate of 1.0l/s during all events up to and including the 1 in 100 year plus 45% climate change event. Attenuation will be provided in the form of permeable paving and underground geocellular storage that will provide a combined storage volume of approximately 75.65m³. Surface water runoff will discharge into Whittle Brook via a Hydrobrake or similar flow control device. Detailed surface water drainage design will be required at the detailed design stage. The proposed permeable paving will ensure sufficient treatment of runoff prior to discharge to the receiving watercourse.

Maintenance of proposed SuDs features will be required to ensure these remain operational over the lifetime of the proposed development.

Figures

Appendix A – Proposed Development Plan

NOTES

1. On no account may this drawing be scaled.
2. Any discrepancy to be reported to the Architect immediately.
3. The Contractor must check all dimensions on site.
4. This drawing is copyright of P.J. Enterprises Ltd t/a LR-Design) it may not be reproduced, or part reproduced without the express consent of propertysign.

Drawing Status

- ☐ PRELIMINARY FOR APPROVAL
- ☐ AGREED LAYOUT -SIGNED OFF
- ☒ PLANNING DRAWING
- ☐ BUILDING CONTROL DRAWING
- ☐ TENDER DRAWING
- ☐ CONTRACT DRAWING
- ☐ CONSTRUCTION DRAWING
- ☐ AS-BUILT DRAWING

PLANNING

Project
Langley Lane Farm,
Langley Lane
Middleton M24 5LJ

Drawing Title
Existing and proposed site plans

Scale
1:500 @ A1

Date
18.04.2025

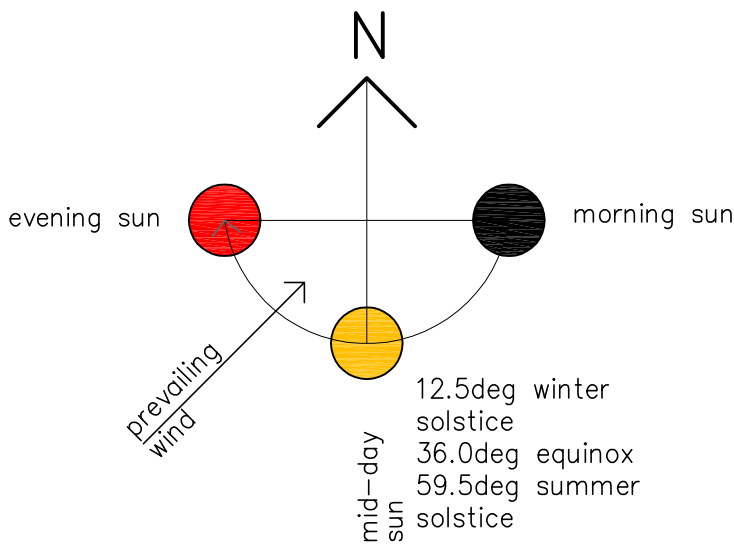
Drawing No.
230001-003

Revision

Revision Details



Existing site plan layout



Proposed site plan layout



Architectural services

Office 3
131a Bury New Road,
Prestwich
M25 9NX
t. +44(0)161 820 9196
e. project@lr-design.net
www.lr-design.net

Appendix B – LLFA Consultation

Dan Percival

From: Abigail Barker
Sent: 23 April 2025 11:02
To: Dan Percival; Matt Bell
Subject: FW: Flood Information Request - M24 5LJ

Follow Up Flag: Follow up
Flag Status: Flagged

Chased up response for Langley Lane.

Abigail Barker

Operations Assistant

07815306790

www.thelkgroup.com

a.barker@thelkgroup.com



Ground Investigation

Land Remediation

Project Management

Trust us to move your
project forward

[Find out more >>>](#)

From: Abigail Barker

Sent: 23 April 2025 11:01

To: 'Keith Mealey' <Keith.Mealey@Rochdale.Gov.UK>; Sarah Parkington <Sarah.Parkington@Rochdale.Gov.UK>

Cc: Francis Comyn <Francis.Comyn@Rochdale.Gov.UK>

Subject: RE: Flood Information Request - M24 5LJ

Good morning,

Thank you for sorting.

Have a good rest of your day,

Abigail

Abigail Barker

Operations Assistant

07815306790

Trust us to move your
project forward

[Find out more](#) >>>

From: Keith Mealey <Keith.Mealey@Rochdale.Gov.UK>

Sent: 23 April 2025 09:32

To: Abigail Barker <a.barker@thelkgroup.com>; Sarah Parkington <Sarah.Parkington@Rochdale.Gov.UK>

Cc: Francis Comyn <Francis.Comyn@Rochdale.Gov.UK>

Subject: RE: Flood Information Request - M24 5LJ

Abigail

For clarity – [responses in blue](#) to your email 20/03/25

To complete the FRA and SuDS Strategy, we would be grateful if you could supply us with the following, if available, for the vicinity of the site:

- *Details of any flood defences in the immediate area, including their extent, crest levels (and datum), assumed level of standard, construction and maintenance regime, as well as any other structures which may influence the local hydraulics.*

[There are no records of flood defenses, the site is remote from any main rivers.](#)

[There is an ordinary watercourse through the site which appears to have a significant upstream catchment and should be assessed with regard to Flood Risk.](#)

- *Records of any historic flood events and potential sources of flooding from rivers, land drainage, groundwater, foul and surface water sewers on site and in the area.*

[There are no records of historic flooding](#)

- *Any restrictions applied to ordinary watercourses and sewers in the area.*

[Development drainage will be expected to discharge to watercourses, at greenfield rates, before considering discharge to sewers, \(subject to infiltration assessment initially\).](#)

- *Highway drainage restrictions and records.*

[Only adoptable highways would be allowed to discharge to any highway drainage. There are records of highway drainage and gullies in Langley Lane. There is also a culvert in Langley Lane which is assumed to also be receiving highway runoff.](#)

- *Indications if the site is within the Critical Drainage Area.*

[The site is not “within” a CDA but the watercourses discharged to may impact a CDA downstream and this should be assessed.](#)

[Policies that may relate to Sustainable Drainage Systems \(SuDS\).](#)

[Rochdale Core Strategy, Adopted October 2016 - Policy G8](#)

[Rochdale, Unitary Development Plan \(UDP\) 2006 - Policy EM/7 and EM/8.](#)

The aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable: The ordered drainage techniques to be assessed with the aim to reduce or omit lower techniques:

- Control at Source (Infiltration / Recycling)
- On Site Treatment (Basins, Swales, Rain gardens, Tree pits)
- Local Treatment (Adoptable Ponds, Basins, Swales etc)
- Regional Treatment (ditto usually to a larger scale)
- Discharge to Watercourses / Bodies
- Discharge to SW Sewers
- Discharge to Combined Sewers

It should be noted that surface based green SuDS are more acceptable than traditional buried storage solutions.

Keith Mealey

Flood & Drainage Engineer
Public Protection & Customers



☎ 07872 500 722

✉ keith.mealey@rochdale.gov.uk

Rochdale Borough Council
Floor 2, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to www.rochdale.gov.uk

For news, events and social media updates go to www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Abigail Barker <a.barker@thelkgroup.com>

Sent: Wednesday, April 23, 2025 8:43 AM

To: Sarah Parkington <Sarah.Parkington@Rochdale.Gov.UK>; Keith Mealey <Keith.Mealey@Rochdale.Gov.UK>

Cc: Francis Comyn <Francis.Comyn@Rochdale.Gov.UK>

Subject: RE: Flood Information Request - M24 5LJ

Good morning all,

Apologies, I am struggling to see any responses from Keith regarding this site.

Best wishes,

Abi

Abigail Barker

Operations Assistant

07815306790

www.thelkgroup.com

a.barker@thelkgroup.com



Ground Investigation

Land Remediation

Project Management

Trust us to move your
project forward

[Find out more](#) 

From: Sarah Parkington <Sarah.Parkington@Rochdale.Gov.UK>

Sent: 22 April 2025 16:48

To: Keith Mealey <Keith.Mealey@Rochdale.Gov.UK>

Cc: Francis Comyn <Francis.Comyn@Rochdale.Gov.UK>; Abigail Barker <a.barker@thelkgroup.com>

Subject: RE: Flood Information Request - M24 5LJ

Good afternoon,

Thanks Keith, I am not aware of any reported flooding issues to us for this area.

Many thanks

Sarah Parkington

Delivery Manager (Roch Valley Flood & Climate Resilience)
Economy



ROCHDALE
BOROUGH COUNCIL

 01706 924356

 07356 120540

 sarah.parkington@rochdale.gov.uk

Rochdale Borough Council
Floor 3, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to www.rochdale.gov.uk

For news, events and social media updates go to www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Keith Mealey <Keith.Mealey@Rochdale.Gov.UK>

Sent: 22 April 2025 16:03

To: Sarah Parkington <Sarah.Parkington@Rochdale.Gov.UK>

Cc: Francis Comyn <Francis.Comyn@Rochdale.Gov.UK>; Abigail Barker <a.barker@thelkgroup.com>

Subject: RE: Flood Information Request - M24 5LJ

Sarah

Please see [my responses](#) below

Keith Mealey

Flood & Drainage Engineer
Public Protection & Customers



ROCHDALE
BOROUGH COUNCIL

☎ 07872 500 722

✉ keith.mealey@rochdale.gov.uk

Rochdale Borough Council
Floor 2, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to www.rochdale.gov.uk

For news, events and social media updates go to www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Francis Comyn <Francis.Comyn@Rochdale.Gov.UK>

Sent: Tuesday, April 22, 2025 9:50 AM

To: Keith Mealey <Keith.Mealey@Rochdale.Gov.UK>; Sarah Parkington <Sarah.Parkington@Rochdale.Gov.UK>

Subject: FW: Flood Information Request - M24 5LJ

Hi both

Sarah – can you confirm to Keith if there are any recorded flood events to include?

Cheers

Fran

Francis Comyn

Service Manager Strategic Planning
Economy



ROCHDALE
BOROUGH COUNCIL

☎ 01706 924353

☎ 07976 059367

✉ francis.comyn@rochdale.gov.uk

Rochdale Borough Council
Floor 3, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to www.rochdale.gov.uk

For news, events and social media updates go to www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Sharon Hill L <Sharon.Hill@Rochdale.Gov.UK>

Sent: Thursday, April 17, 2025 10:59 AM

To: Keith Mealey <Keith.Mealey@Rochdale.Gov.UK>; Strategic Planning <Strategic.Planning@Rochdale.Gov.UK>

Subject: FW: Flood Information Request - M24 5LJ

Hi Keith

The same company have requested information on another site – please see below.

Sharon Hill L

Team Leader (Planning Support, Data & Innovation)
Economy



☎ 01706 924305

✉ sharon.hill@rochdale.gov.uk

Rochdale Borough Council
Floor 3, Number One Riverside
Smith Street, Rochdale, OL16 1XU

To access our services go to www.rochdale.gov.uk

For news, events and social media updates go to www.rochdale.gov.uk/newsandevents

Please consider the environment before printing this email.

From: Abigail Barker <a.barker@thelkgroup.com>

Sent: 16 April 2025 16:07

To: Development Management <development.management@rochdale.gov.uk>

Subject: FW: Flood Information Request - M24 5LJ

You don't often get email from a.barker@thelkgroup.com. [Learn why this is important](#)

:CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good afternoon,

Just forwarding the email as requested

Best wishes,

Abigail

Abigail Barker

Operations Assistant

07815306790

www.thelkgroup.com

a.barker@thelkgroup.com



Ground Investigation

Land Remediation

Project Management

Trust us to move your
project forward

[Find out more](#) 

From: Abigail Barker

Sent: 20 March 2025 16:26

To: Development.management@rochdale.gov.uk; Stephen.mcann@rochdale.gov.uk;
environmental.managament@rochdale.gov.uk

Cc: Matt Bell

Subject: Flood Information Request - M24 5LJ

To whom it may concern,

LK Consult Ltd. has been commissioned to undertake a Flood Risk Assessment (FRA) and Sustainable Drainage Systems (SuDS) Strategy, for **Langley Lane, M24 5LJ** centered at approximate **National Grid Reference 385940,407685**.

The area of interest appears to be within Flood Zone 1.

The site location is attached to this email.

To complete the FRA and SuDS Strategy, we would be grateful if you could supply us with the following, if available, for the vicinity of the site:

- Details of any flood defences in the immediate area, including their extent, crest levels (and datum), assumed level of standard, construction and maintenance regime, as well as any other structures which may influence the local hydraulics.
[There are no records of flood defenses, the site is remote from any main rivers.](#)
[There is an ordinary watercourse through the site which appears to have a significant upstream catchment and should be assessed with regard to Flood Risk.](#)
- Records of any historic flood events and potential sources of flooding from rivers, land drainage, groundwater, foul and surface water sewers on site and in the area.
[There are no records of historic flooding](#)
- Any restrictions applied to ordinary watercourses and sewers in the area.
[Development drainage will be expected to discharge to watercourses, at greenfield rates, before considering discharge to sewers, \(subject to infiltration assessment initially\).](#)
- Highway drainage restrictions and records.
[Only adoptable highways would be allowed to discharge to any highway drainage. There are records of highway drainage and gullies in Langley Lane. There is also a culvert in Langley Lane which is assumed to also be receiving highway runoff.](#)
- Indications if the site is within the Critical Drainage Area.
[The site is not "within" a CDA but the watercourses discharged to may impact a CDA downstream and this should be assessed.](#)
Policies that may relate to Sustainable Drainage Systems (SuDS).
[Rochdale Core Strategy, Adopted October 2016 - Policy G8](#)
[Rochdale, Unitary Development Plan \(UDP\) 2006 - Policy EM/7 and EM/8.](#)

The aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable: The ordered drainage techniques to be assessed with the aim to reduce or omit lower techniques:

- Control at Source (Infiltration / Recycling)
- On Site Treatment (Basins, Swales, Rain gardens, Tree pits)
- Local Treatment (Adoptable Ponds, Basins, Swales etc)
- Regional Treatment (ditto usually to a larger scale)
- Discharge to Watercourses / Bodies
- Discharge to SW Sewers
- Discharge to Combined Sewers

It should be noted that surface based green SuDS are more acceptable than traditional buried storage solutions.

If you have any queries, please do not hesitate to get in touch.

We are, of course, happy to pay your reasonable charge for this service. Please let me know by return what information is available, what the charge will be, and we will pay the relevant fees by debit card as soon as possible.

Any advice or recommendations you may have regarding the potential discharges from the development of this site would also be appreciated.

We will be in contact with all other relevant authorities to get a more complete understanding of the issues in the area.

Regards
Abigail

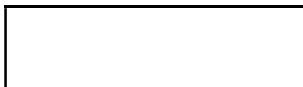
Abigail Barker

Operations Assistant

07815306790

www.thelkgroup.com

a.barker@thelkgroup.com



Ground Investigation

Land Remediation

Project Management

Trust us to move your
project forward

[Find out more](#)

This email, its contents and any attachments are intended only for the above named. As the email may contain confidential and/or legally privileged information, if you are not, or suspect that you are not, the above named or the person responsible for delivery of the message to the above named, please delete or destroy the email and any attachments immediately and inform the sender of the error. Unauthorised access, use, disclosure, storage or copying is not permitted and may be unlawful. The views of the author may not necessarily reflect those of Rochdale Borough Council.

Rochdale Borough Council undertakes monitoring of both incoming and outgoing e-mails. You should therefore be aware that if you send an e-mail to a person within Rochdale Borough Council it may be subject to any monitoring deemed necessary by Rochdale Borough Council from time to time. Rochdale Borough Council cannot guarantee that this message or any attachment is virus free or has not been intercepted and amended.

As a public body, Rochdale Borough Council may be required to disclose this email (or any response to it) under the Freedom of Information Act 2000, unless the information in it is covered by one of the exemptions within the Act.

Appendix C – United Utilities Sewer Records

Abigail Barker

From: no-reply@uuplc.co.uk
Sent: 26 March 2025 16:11
To: CLa
Subject: Customer reference: FRA251035; Search address: Langley Lane Farm

Dear LKGroup,

Your order no UUPS-ORD-640457 is complete. Please click on the link to [Download report](#).

Please note you will need to sign in to your account to view this report.

Kind regards,

The Property Searches team

The information contained in this e-mail is intended only for the individual to whom it is addressed. It may contain legally privileged or confidential information or otherwise be exempt from disclosure. If you have received this Message in error or there are any problems, please notify the sender immediately and delete the message from your computer. You must not use, disclose, copy or alter this message for any unauthorised purpose. Neither United Utilities Group PLC nor any of its subsidiaries will be liable for any direct, special, indirect or consequential damages as a result of any virus being passed on, or arising from the alteration of the contents of this message by a third party.

United Utilities Group PLC, Haweswater House, Lingley Mere
Business Park, Lingley Green Avenue, Great Sankey,
Warrington, WA5 3LP
Registered in England and Wales. Registered No 6559020

www.unitedutilities.com
www.unitedutilities.com/subsidiaries

LKGroup**Unit 29
Eton Hill Road,
Radcliffe,
m26 2zs****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: FRA251035
Our Ref: UUPS-ORD-640457
Date: 26/03/2025****Dear Sirs****Location: Langley Lane Farm**

I acknowledge with thanks your request dated 20/03/2025 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,



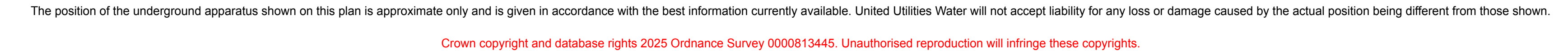
Karen McCormack
Property Searches Manager

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 effect.
- 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.



**SEWER
RECORDS**

 **United
Utilities**
Water for the North West

Appendix D – Impermeable Catchment Plan



 Site Boundary
 (Area = 3066.286m²)

 Proposed Hardstanding Area
 (Area = 1006.801m²)

Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information. Subject to detailed design.



LK CONSULT

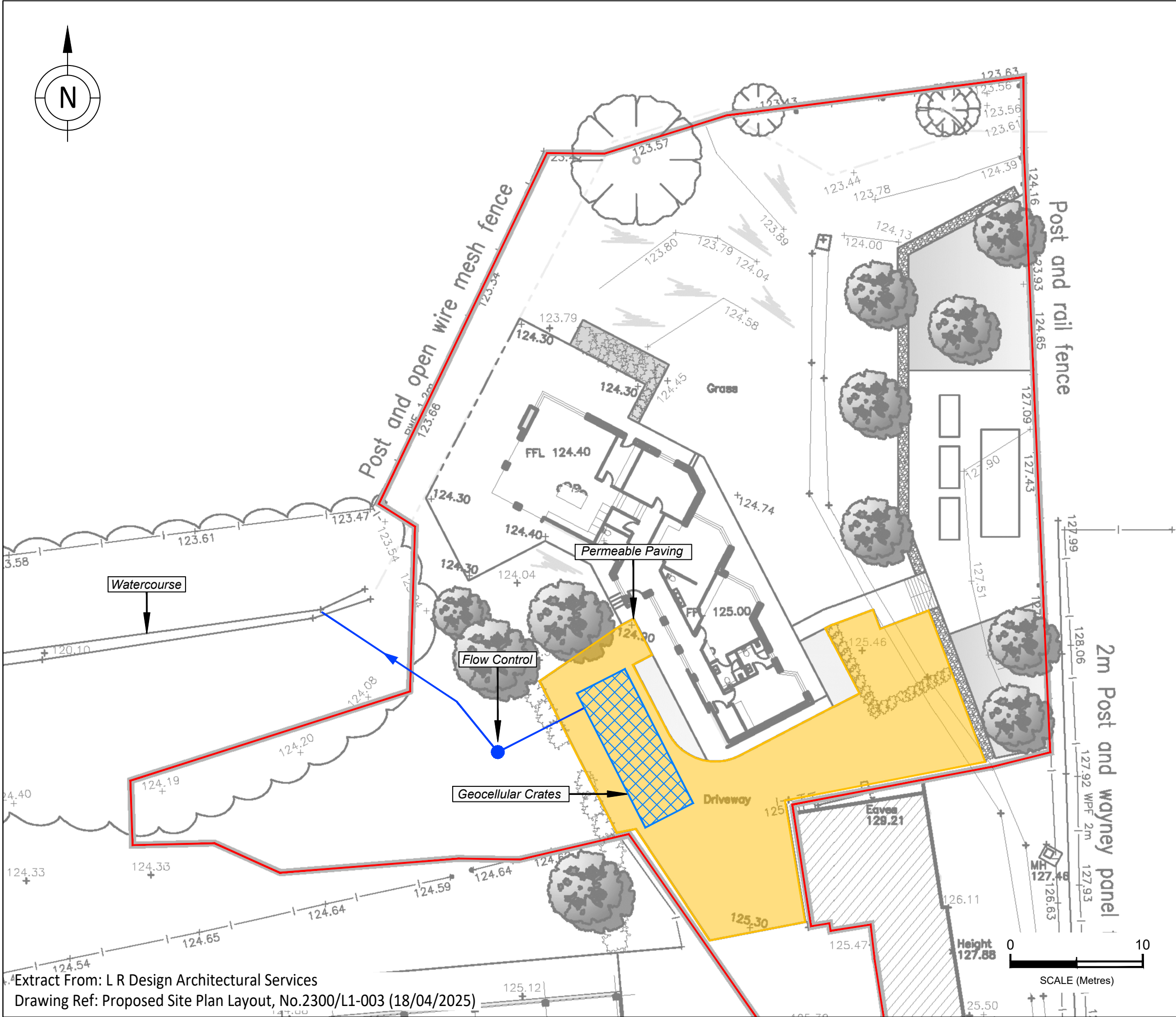
Client: **Mr K Broome**

Site: **Langley Lane Farm**

Title:	Proposed Hardstanding Areas (Appendix D)
--------	---

Job No.: FRA251035		Scale (See Scale Bar): See Scale Bar		Figure:	Revision:
Drawn By: AC	Checked By: DP	Drawn: Apr 2025			

Appendix E – Outline Surface Water Drainage Strategy



KEY

- Site Boundary
(Area = 3066.286m²)
- Permeable Paving
(Area = 355m² with a sub-base depth of 0.3m & a porosity of 30% providing 31.95m³ of attenuation)
- Geocellular Storage Crate System
(Area = 46m² by 1.6m deep, including 0.6m of cover, with a porosity of 95% & will provide 43.7m³ of attenuation)
- Surface Water Pipe
- Flow Control (Hydrobrake or Similar)
(Runoff Rate = 1l/s)

NOTE:

1. This drawing represents an Outline Surface Water Drainage Strategy only. Detailed surface water drainage design will be required at the detailed design stage.
2. Surface water runoff generated by the proposed development will be restricted to a rate of 1.0l/s which represents the minimum practicable rate for self cleansing of a Hydrobrake or similar flow control device.
3. Storage to be provided within permeable paving & geocellular storage for all events up to and including the 1 in 100 year plus 45% climate change.
4. Surface water runoff to discharge into Whittle Brook via a Hydrobrake or similar flow control device subject to agreement with the LLFA and receipt of appropriate Ordinary Watercourse consent.
5. Whittle Brook is culverted within the site. It is recommended that the location, size, depth and condition of the culvert is confirmed via an appropriate survey.

Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information. Subject to detailed design.

LK CONSULT

Client: Mr K Broome			
Site: Langley Lane Farm			
Title: Outline Surface Water Drainage Strategy (Appendix E)			
Job No.: FRA251035	Scale (See Scale Bar): See Scale Bar	Figure:	Revision: A
Drawn By: AC	Checked By: DP	Date: May 2025	

Appendix F – Causeway Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	45	Minimum Backdrop Height (m)	0.200
CV	1.000	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)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Depth/Area 1	0.066	100.000	7.747	73.357	1.600

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	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

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 %)
100	45	0	0

Node Depth/Area 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	98.400	Product Number	CTL-SHE-0047-1000-1000-1000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Node Depth/Area 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	98.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	432

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	46.0	46.0	1.000	46.0	70.0	1.001	0.0	70.0

Results for 100 year +45% CC 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
360 minute winter	Depth/Area 1	344	99.399	0.999	7.0	43.6392	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
360 minute winter	Depth/Area 1	Hydro-Brake®	1.0	59.8

Appendix G – References

¹ Department for Environment, Food & Rural Affairs, March 2015, “Non-statutory technical standards for sustainable drainage systems”.

² Ministry of Housing, Communities and Local Government, August 2022, “Planning practice guidance”.

³ LKC251127, dated 2nd April 2025 , Phase 1 Preliminary Risk Assessment.

⁴ CIRIA, December 2015, “The SUDS Manual”, C753.

Based across the UK with
offices in Manchester, Liverpool,
Swindon and Glasgow.

Manchester (Head Office)

Unit 29
Eton Business Park
Eton Hill Rd, Radcliffe
M26 2ZS

0161 763 7200
info@thelkgroup.com

Manchester (Ancoats Office)

84 Silk Street
Ancoats
Manchester
M4 6BJ

0161 763 7200
info@thelkgroup.com

Glasgow

Wright Business Centre
1 Lonmay Road
Glasgow
G33 4EL

0141 773 6269
info@thelkgroup.com

Swindon

39 Bowman House Business Centre
Bowman Court
Whitehill Lane
Royal Wootton Bassett
Swindon
SN4 7DB

01793 987390
info@thelkgroup.com



LK GROUP