FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

Proposed Residential Development,

Jacktrees, Cleator Moor

Reference	RWO/FRADS/22087
Date	December 22
Client Name	Gleeson Regeneration
Version	4

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APPENDICES

CONFIDENTIALITY STATEMENT

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Gleeson Regeneration Limited

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DOCUMENT HISTORY

VERSION	PURPOSE/DESCRIPTION	DATE
1	First Issue	20.12.2022
2	Appendix C updated.	18.01.2023
3	Appendix C updated.	17.04.2024
4	Unit numbers updated to 62, Appendix C, D, E updated.	17.07.2025

1.0 EXECUTIVE SUMMARY

This assessment has looked at the implications of a proposed residential development in relation to drainage and flood risk.

The site is in Flood Zone 1, placing the risk of flooding for dwellings as low.

Other sources of flooding have been assessed and the risk of flooding from these sources is considered to be low and/or manageable with mitigation.

Any potential impact of the development can be adequately addressed by designing and constructing surface water drainage in accordance with relevant guidance and good practices.

Discharge of surface water to the existing public surface water to the North of the development is deemed most viable following the Part H hierarchy. The use of infiltration methods for the disposal of surface water has been considered and is not deemed feasible due to the existing geological makeup of the site. It is therefore proposed surface water will discharge into the existing surface water sewer located to the East of the site that ultimately discharges to the existing watercourse further West of the site at a greenfield run-off rate (Qbar) of 20.0 litres/second with onsite attenuation provided in the form of a basin. The proposed method of discharge and rate will be in accordance with the Cumbria County Council design standards.

By ensuring that the discharge rate is restricted there will be no increase in the flood risk to third parties. This will offer an improved position to the catchment downstream by capturing controlling and conveying flows at a controlled discharge rate. The proposed method of discharge and rate will be in accordance with the Cumbria County Council design standards and the Pre-Planning Enquiry Response from United Utilities.

Source control of pollutants in high-risk areas will be provided by pre-treatment by filter drains or permeable paving adjacent to shared driveways to direct the flow into the adoptable drainage network, pre-treatment by road gullies, and final treatment by an attenuation basin with low weather flow channel.

To ensure that the risk to third party land flooding is not increased the proposed drainage system will need to be designed to ensure that the proposed-on site drainage system shall be designed in accordance with the requirements of Sewers for Adoption and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall event.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event with a 50% allowance for climate change, with an allowance for urban creep in accordance with the LLFA Standards.

Any flooding for the 100-year event with climate change will need to be stored on site to protect third party land from potential overland flows.

Foul water from the development site is proposed to discharge at 2.87 litres/second into existing public foul water sewer located to the North of the site in Crowgarth Close. The point of connection has been confirmed by United Utilities via Pre-Development Enquiry ref 05533254.

A maintenance regime and strategy has been produced under a separate document which determines the details for inspection and maintenance specification for the sustainable drainage systems (SuDS) maintained by a management company on behalf of the developer if they are not to be adopted by the Local Authority or Water Company.

Surface water during construction has been considered with interceptor drains included in the temporary state and the basin being constructed as the first element of the development site.

2.0 INTRODUCTION

RWO Associates (RWO) has been instructed by Gleeson Regeneration to prepare a Flood Risk Assessment and Drainage Strategy to support a planning application for a proposed residential development off Jacktrees Road, Cleator Moor.

The client wishes to develop the site for 62 residential dwellings, a location plan is included in Appendix A and Proposed Site Layout in Appendix C.

This document reviews the risks of flooding in accordance with current guidance and identifies the risk of flooding along with proposed mitigation. To undertake the flood risk assessment a site walkover has been undertaken along with utilising the topographical survey and flood data obtained.

The aim of the drainage strategy is to demonstrate that there is a viable strategy for managing surface and foul water at the site within the policy and planning requirements.
This strategy considers: -

- Identify existing site drainage characteristics.
- Describe and assess the proposed development.
- Assess the flood risk in accordance with the Department of Communities and Local Government (DCLG) Technical Guidance and the National Planning Policy Framework (NPPF)
- Consider existing information provided through discussions with the Environment Agency (EA), the Lead Local Flood Authority (LLFA) and Water Authority (UU) to develop a strategy for the proposed development to be produced and identify any mitigation measures required.
- The destination of surface water emanating from impermeable areas of the development
- What restriction in rate of discharge is required, and what storage and SuDS options could be used to meet any surface water storage requirements?
- How foul water from the site will be managed.
- Surface water management during the construction phase.

3.0 THE SITE

The proposed development site forms a roughly triangular shaped piece of land, with boundaries roughly facing northeast, west and south, located to the east of Jacktrees Road. The site is located approximately 5.5km to the southeast of Whitehaven, with a site area of approximately 2.1 Ha.

The site currently comprises pastureland, divided into three fields by post and wire fences. Mature trees and hedgerows are located on the western boundary along Jacktrees Road and across the southern boundary. The eastern half of the site slopes down at a gradient of up to 1 in 10 to the southwest from around 84mAOD within the north-eastern proximately 74.5mAOD within the central area. The western half of the site is more flat lying at levels between 73mAOD and 74.5m AOD. The southwestern area adjacent to Jacktrees Road, roughly 35m x 25m in extent, is occupied by farm shed buildings with concrete hardstanding's. The site is currently accessed via a metal sheet gate on Jacktrees Road used as access to the farm buildings on site.

The site-centred ordnance survey reference is NY 01744 14567. A site location plan is provided in **Appendix A** and an aerial photograph is presented as Figure 1 below.

Figure 1 – Site location (Red marker indicates the approximate centre of site)

A topographical survey is included in **Appendix B**.

4.0 PROPOSED DEVELOPMENT

It is proposed to develop the site for residential purposes which will consist of 62no. residential dwellings. The new development will require associated infrastructure such as roads, drainage, and utilities.

All residential dwellings will be developed in Flood Zone 1.

The highways within the site will be offered for adoption under a Section 38 agreement with the Highway Authority (Cumbria County Council) and the foul and surface water drainage networks will be offered for adoption under a Section 104 agreement with United Utilities or alternatively a NAV (new appointments and variation) company.

A proposed Site Layout is in **Appendix C** and a topographical survey is included in **Appendix B**.

5.0 EXISTING DRAINAGE

Public sewer records obtained from United Utilities are provided in **Appendix D** which identifies the following public sewers in the vicinity of the site.

- A 75mm public foul water rising main is recorded on the northeastern portion of the site and is to remain as is with appropriate easement between the main and any proposed plots.
- Various public sewers are located offsite to the east, north and west including foul, surface and combined.
- There are surface water drains to the east and north of the development site.
- There are no records of any land drainage on the site, however, such structures are often present on agricultural land.
- Existing ponds are located to the East of the site, it is noted that the existing UU surface water sewers discharge into the ponds.
- No diversion works are currently proposed based on review of current records but if the contractor or developer discovers any drainage not identified then this is to be reported to the engineer or relevant body for review prior to any works undertaken.

The River Keekle and River Ehen are located southwest and southeast, approximately 450-500m offsite.

6.0 FLOOD RISK

The site under consideration is located within Flood Zone 1 on the latest version of the Indicative Floodplain Maps available on the Gov.uk website, a copy of the flood map is provided in **Appendix E**.

NPPF Technical Guidance advises the following.

Flood Zone 1 is defined as a low-risk area, which comprises land assessed as having assessed as having less than 1 in 1,000 annual probability of river or sea flooding (0.1%).

NPPF Technical Guidance states that all uses of land are appropriate in Flood Zone 1.

As the site is located within Flood Zone 1 and has a site area greater than 1.0-hectare other sources of flooding should be considered.

The proposed site usage falls within the 'more vulnerable' category as identified in the NPPF Table 2: Flood Risk Vulnerably Classification. As such the exception test, will not need considering based on the NPPF Table 3: Flood risk vulnerability and flood zone 'compatibility'.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Table 1 – 'NPPF Table 3: Flood risk Vulnerability Classification'

Essential infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind Turbines.
Highly Vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunication installations required to be operational during flooding. • Emergency disposal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure").
More vulnerable • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for **dwelling houses**, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, *subject to a specific warning and evacuation plan.*
Less vulnerable • Police, ambulance and fire stations which are not required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure. • Land and buildings used for agricultural and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals workings and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewerage treatment works (if adequate measures to control pollution and manage sewerage during flooding events are in place).
Water-compatible development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of defence installations. • Ship building, repairing, dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water based recreation (excluding sleeping accommodation). • Lifeguard and coastal stations. • Amenity open space, nature conversation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, *subject to specific warning and evacuation plan.*

Table 2 – 'NPPF Table 2: Flood Risk Vulnerability Classification'

Sources of Potential Flooding

Other Sources of Flood Risk:

The table below identifies the potential sources of flood risk to the development.

Flood Risk	
Risk of flooding from rivers and the sea	Low
Flood storage areas: part of floodplain	Not identified
Historical flood areas	Not identified
Areas benefiting from flood defences	Not identified
Flood defences	Not identified
Surface water flood risk	Low
Groundwater flooding	Low

Surface Water (Pluvial) Flooding

The Environment Agency Surface Water (Pluvial) Flood Map provided below indicates the site is at a low risk of flooding. When reviewing the overland flood routes against the topographical survey these are flows leaving the site and as such the development will capture and convey these flows to the new drainage system once development. This will in turn reduce the risk of flooding offsite.

The risk of flooding from this source is therefore considered low.

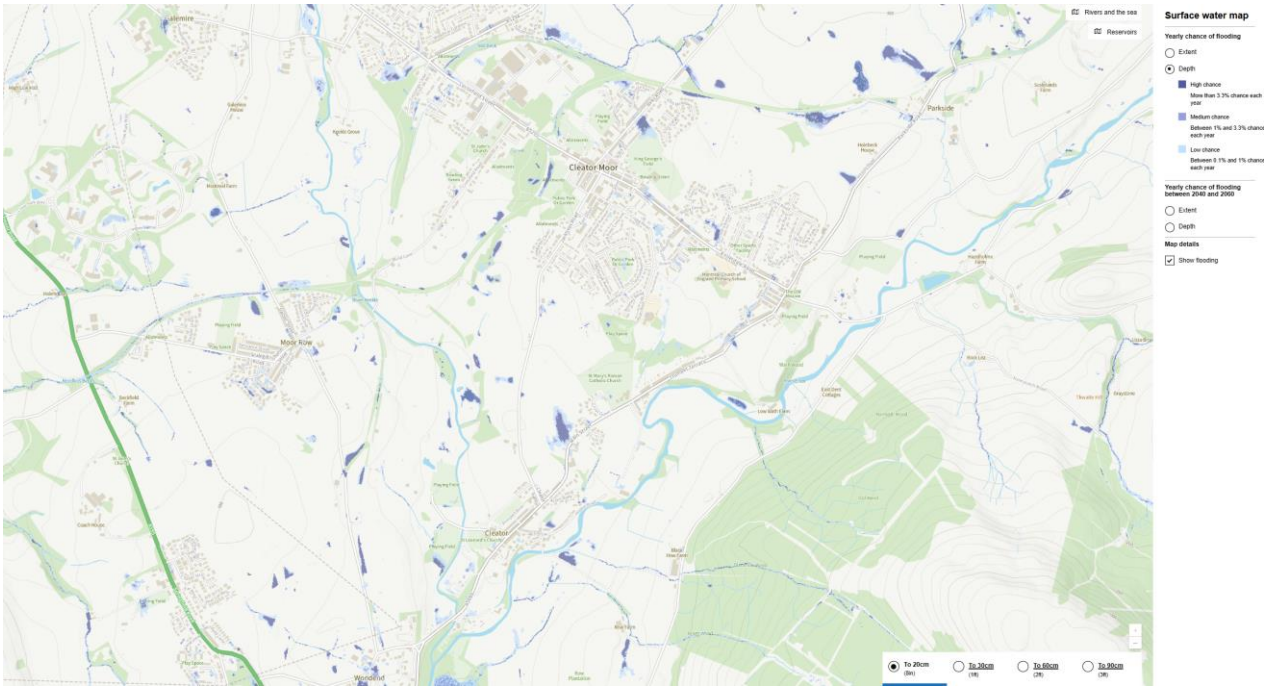


Figure 2 – Surface Water (Pluvial) Flood Map

Groundwater Flooding

The intrusive Geotechnical site investigation undertaken by GVR Geo report reference, G-22-055, this indicates the majority of groundwater is at depths of 3.6m and below. Although two number monitoring points had ground water as shallow as 0.33m, this is most likely surface water runoff entering the monitoring point given the depths noted in the other monitoring points.

Based on the groundwater monitoring undertaken groundwater is deemed a low and/or manageable risk.

6.2 Groundwater

Groundwater strikes were not encountered in any of the trial pits during excavation.

The boreholes recorded groundwater strikes within the bedrock at varying depths of between 3.6m and 25.7m bgl during drilling. Borehole RH06 also recorded a groundwater strike in the infilled mine workings at a depth of 29.5m bgl.

Monitoring wells were installed in all boreholes with the base of screens extending from 4.1-5.0m depth. Six monitoring visits were undertaken between August and October 2018. The monitoring recorded groundwater levels fluctuating between depths of 0.33m and 4.39m in boreholes RH02 and RH04. Borehole RH05 was not monitored.

These results are likely to represent perched discontinuous groundwaters within the granular Glacial Till soils, with the main groundwater table at depth within the bedrock.

Extract 1 – Groundwater Flood Map

Flooding from Sewers

The sewers near the site are public sewers owned by United Utilities and will be subject to regular maintenance and inspection, therefore blockage of these sewers is unlikely.

The risk of flooding from sewers is low.

The measures to mitigate the risks of flooding from new drainage are as detailed in Section 7.0.

Flooding from Reservoirs, Canals and Other Artificial Sources

The site is not located in an area identified as being at potential risk in the event of a reservoir failure or canal breach when reviewing the online Environment Agency Flood maps.

Summary

It is proposed that the finished floor levels will be a minimum of 150mm above external ground levels to reduce the risk of surface water flooding and a further 300mm above the areas highlighted as low risk within the Flood Map in Figure 2.

Therefore, based on the above the risk of flooding from the above sources, the flood risk is therefore considered manageable and low.

7.0 SURFACE AND FOUL WATER DRAINAGE

The proposed site drainage will comprise of a separate foul and surface water draiage system.

The following summarises the requirements for the discharge of surface and foul water from the site.

Sustainable Urban Drainage Systems (SUDS)

As noted above in section 6.0, an instruisve site investigaiotn has been undertaken and this has considered the potential use of soil inifltraiotn as a menas to dispose of surface water. The majority of the site is underlain with till clays, some small areas have localised bands of sands and gravels but given potential leaching issues adjacent the use of infiltration has been excluded.

Drainage	The ground conditions may be locally suitable for soakaway drainage systems. However, consideration should be given to the potential for surface water infiltration to permeate to the adjacent infilled opencast and the potential to generate contaminated leachates.

Figure 4 – Soil Types (Soilscapes)

Infiltration drainage has been excluded following an intrusive site investigation.

Whilst the disposal of surface water by infiltration methods is not feasible Sustainable Urban Drainage System (SUDS) may be used in conjunction with conventional drainage systems to improve water quality as well as manage surface water discharge.

The following audit has been carried out relating to suitability of SUD's systems:

Drainage Method	Description/Suitability	Proposal/Feasibility
1. Infiltration.	An intrusive site investigation has variable ground and potential leaching issues.	Not Applicable.
2. Ponds and wetlands.	Suitable subject to land being made available.	Applicable.
3. Infiltration Basins.	An intrusive site investigation has variable ground and potential leaching issues.	Not Applicable.
4. Detention Basins.	Suitable subject to land being made available.	Applicable.
5. Swale.	May be utilised convey water/improve water quality.	Due to the site topography swales have been ruled out.
6. French/Filter drain.	May be utilised convey water/improve water quality.	Applicable. Impermeable membrane is to be utilised.
7. Pervious/Permeable Pavement.	A tanked permeable paving system may be utilised.	Applicable only if an impermeable membrane is utilised.
8. Geocellular Systems/Tank systems.	May be used as surface water attenuation.	Applicable.
9. Oversized pipes.	May be used as surface water attenuation.	Applicable.
10. Box culverts.	May be used as surface water attenuation.	Applicable.
11. Purpose designed tanks.	May be used as surface water attenuation.	Applicable.

Surface Water Drainage

The disposal of surface water shall be in accordance with the Requirement H3 of Building Regulations. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway/infiltration system, watercourse, and public sewer in that priority order.

As noted in the SUDS sections, the discharge of surface water drainage via infiltration methods is not feasible.

There are no identifiable watercourses on the site or near the boundary.

It is therefore proposed to discharge surface water to the public sewer located to the east of the site downstream of 5702, subject to United Utilities approval. United Utilities have agreed with the connection point, correspondence can be found in **Appendix D.**

The site will discharge on a greenfield discharge rate basis which has been calculated utilising the IH124 methodology, giving a proposed discharge rate of 20l/s, subject to relevant approvals. The IH124 calculation is included in **Appendix F**.

It is proposed to drain the site via an adoptable gravity piped network on site and it is proposed to attenuate the 2yr, 30yr, 100yr, 100yr + 50% climate change and 100yr + 50%CC with Urban Creep events via an online attenuation basin with a grassed low weather flow channel in accordance with the latest Ciria Guidance. The flow rate is not restricted prior to entering the attenuation basin area but the flow is restricted to greenfield run off prior to leaving the site. The flow is to be restricted by a hydro brake flow control manhole (the hydro brake is to be maintained by United Utilities). The hydro brake (flow control) is positioned within manhole structure downstream of the attenuation basin.

The attenuation volumes have been confirmed during, and full Source Control Micro Drainage calculations have been undertaken for the 2yr, 30yr, 100yr, and 100yr + 50% Climate Change + 10 % Urban Creep events to identify the required surface water attenuation volumes and these are included in **Appendix G**. These have been carried out to demonstrate compliance with the design requirements as set out above.

The proposed attenuation basin is proposed to have a side slope of 1 in 5 and a water depth no greater than 1.0m with a freeboard of 0.3m.

Source control of pollutants in high-risk areas will be provided by pre-treatment by filter drains adjacent to shared driveways to direct the flow into the adoptable drainage network, pre-treatment by road gullies, and final treatment by an attenuation basin with low weather flow channel.

By ensuring that the discharge rate is restricted there will be no increase in the flood risk to third parties. This will offer an improved position to the catchment downstream by capturing controlling and conveying flows at a controlled discharge rate. The proposed method of discharge and rate will be in accordance with the Cumbria County Council design standards and the Pre-Planning Enquiry Response from United Utilities.

The main consideration in terms of flood risk is to third party land. In order to ensure that the risk to third party land flooding is not increased the proposed drainage system will need to be designed to ensure that;

The proposed on site drainage system shall be designed in accordance with the requirements of Sewers for Adoption and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall event.

- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event (including an allowance of 50% for the effects of future climate change), as defined in NPPF Technical Guidance.

Any flooding for the 100-year event with climate change will need to be stored on site to protect third party land from potential overland flows.

A maintenance regime and strategy has been produced under a separate document which determines the details for inspection and maintenance specification for the sustainable drainage systems (SuDS) maintained by a management company on behalf of the developer if they are not to be adopted by the Local Authority or Water Company.

The principles of the Surface Water Management Plan (SWMP) as set out above will ensure that surface water from the development site will be collected, attenuated and conveyed in such a way that it manages the flows in accordance with best practices.

A copy of the SuDS identification Plan identifying the key drainage elements can be found in **Appendix H**.

Foul Water Drainage

Foul water from the development site is proposed to discharge at 2.87 litres/second into existing public foul water sewer (ref 6713) located to the North of the site in Crowgarth Close. The point of connection has been confirmed by United Utilities via Pre-Development Enquiry ref 05533254. A foul water pumping station will then be required after the flow control manhole to ensure a connection to the existing foul water sewer in Crowgarth Close can be accommodated.

Discharge rates from the development of 62 dwellings are estimated in accordance with the Sewer for Adoption recommendation of 4000L/dwelling/day resulting in a discharge of 2.87 litres/second peak foul discharge.

A copy of the United Utilities sewer records is provided in **Appendix D**.

A copy of the Foul Drainage calculations can be found in **Appendix I**.

8.0 WATER QUALITY

Water quality treatment has been reviewed with reference to the Ciria SuDS Manual C753 and implemented as far as practical, in the absence of treatment specification by Cumbria County Council.

The drainage design indicates that most of the surface water will drain to the attenuation basin located to the Southeast of the site prior to a restricted discharge to the existing watercourse, as highlighted in Section 7.0. In accordance with C753 Simple Index Approach, the detention basin will provide enough water quality treatment for runoff from low traffic roads. Permeable paving/filter drains will be implemented in the higher risk areas of driveways, shared driveways, and residential carparks, while road gullies will provide additional treatment, particularly for total suspended solids (TSS) and metals adhered to TSS.

The Simple Index Approach identifies that the treatment provided by particular features (Total SuDS mitigation index) should be greater than or equal to the pollution level for each contaminant caused by the proposed development (Pollution Hazard Index):

Total SuDS mitigation index ≥ Pollution hazard index

The hazard and treatment indices are provided in C753 and identified below as relevant to the proposed development. In accordance with the Ciria SIA tool, the land use with the highest Pollution Hazard Index has been selected.

Table 4 – Pollution Hazard Index (Ciria SuDS Manual C753)

Land Use	Total Suspended Solids	Metals	Hydrocarbons
Individual property driveways, residential carparks, low traffic roads	0.5	0.4	0.4

Table 5 – Total SuDS mitigation index (Ciria SuDS Manual C753)

SuDS Component	Total Suspended Solids	Metals	Hydrocarbons
Filter Strips	0.4	0.4	0.5
Filter Drains	0.5	0.4	0.4
Permeable Paving	0.7	0.6	0.7
Road gullies (RG)	unstated	-	-
Basin	0.5	0.5	0.6

Table 4 and 5 illustrate that permeable paving is sufficient to treat Total Suspended Solids (TSS), Metals and Hydrocarbons at driveways, shared drives and residential carparking and the detention basin is sufficient to provide treatment of runoff from low traffic roads, with additional pre-treatment provided by the road gullies.

9.0 CONSTRUCTION SURFACE WATER MANAGEMENT

To manage surface water during construction two processes are proposed.

- Interceptor drains with sumps constructed within each phase/parcel of development,
- The proposed basin to be constructed at the start of construction works.

Interceptor drains will collect and capture overland flows once site topsoil strip has been undertaken and allow the flows to be conveyed to the basin. The interceptor drains will ensure that the overland flows are managed. Sumps will be formed at low points on the interceptor drains, and this will allow debris and potential pollutants to be captured.

The basin will act as a final phase of protection to the downstream network in terms of water quality and provide attenuation.

An indicative surface water construction management drawing will be procured prior to construction.

10.0 CONCLUSIONS

This assessment has demonstrated that the proposed residential development poses a low risk of flooding, as it is located within Flood Zone 1 and other potential sources of flooding have been evaluated as low or manageable through appropriate mitigation.

A robust surface water drainage strategy has been developed, discharging at a controlled greenfield run-off rate of 20.0 litres/second into the existing surface water sewer in Crowgarth Close, in line with Cumbria County Council design standards and United Utilities' pre-planning advice.

Infiltration methods were deemed unsuitable due to site geology, and a comprehensive sustainable drainage system (SuDS), including attenuation via a basin, will ensure that the development does not increase flood risk to third parties. Pollution control will be achieved through various pre-treatment measures, and the system will be designed to meet national standards, ensuring no flooding under critical storm events, including a 1 in 100-year storm plus climate change and urban creep allowances.

Foul water will be discharged to the existing network at an agreed rate of 2.87 litres/second. A detailed maintenance strategy has also been prepared to ensure long-term functionality of the SuDS, whether adopted by relevant authorities or managed privately.

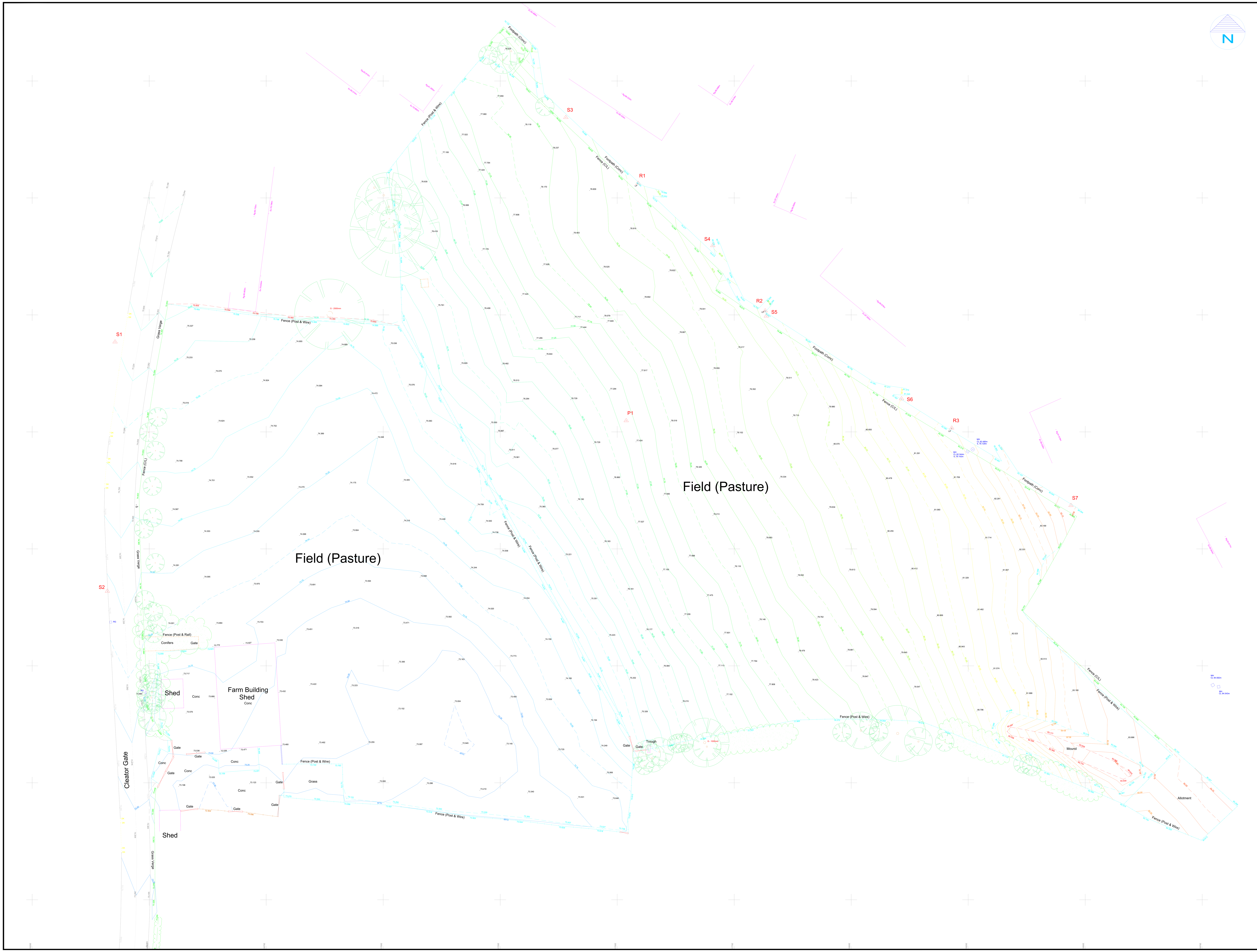
Temporary drainage measures, including interceptor drains and early basin construction, will protect the site and surrounding areas during the construction phase.

Overall, the development's drainage and flood risk strategy is compliant with current guidance and represents a sustainable, well-considered approach to managing water on-site and off-site.

Appendix A Site Location Plan

Location Map	
Site	Jacktrees, Cleator
Client	Gleeson Regeneration
Job Number	22087
Scale	NTS

Appendix B Topographic Survey



Survey Features

- Btm of Batter
- Top of Batter
- Fence (General)
- Fence (Palisade)
- Fence (Metal)
- Fence (Close Board)
- Hedgeline
- Wall
- Building (Structure)
- Road (Channel)
- Track
- Kerbing
- Footpath
- Tree / Vegetation Canopy
- Edge of Stone
- Concrete
- Tarmac / Asphalt
- DK Drop Kerbing DK
- Centreline
- Verge
- Edging Kerbs
- Watercourse / Ditch
- Contour (Major)
- Contour (Minor)
- Overhead Electricity Cable
- Overhead Telecom Cable

- 0.000m Ground Level
- LP Lampost
- EP Electricity Pole
- TP Telegraph Pole
- GAS Gas Valve
- CATV Cables / Comms
- BT British Telecom
- Bollard Bollard
- Survey Station
- SP Sign Post
- Tree
- Bush / Shrub
- Bin Waste Bin
- LC Lighting Column
- POST Wooden Post
- MH CL 0.000m Manhole (Square)
- MH CL 0.000m Manhole (Triangular)
- MH CL 0.000m Manhole (Circular)
- IC CL 0.000m Inspection Chamber
- CL 0.000m Inspection Chamber (Circular)
- SV Stop Valve
- AV Air Valve
- FH Fire Hydrant
- SC Stop Cock
- Invert Level 0.000m Invert Level
- WO Wash Out
- RG Road Gully
- Gully
- POLE Metal Pole

Underground Utility Mapping

- Underground Electricity Utility
- Underground Gas Utility
- Underground Water Utility
- Underground BT Utility
- Underground Telecom Utility
- Unknown route obtained with GPR
- Unknown Utility
- Surface Water
- Foul Water
- Combined Sewer
- EOT End of Trace
- Loss of GPR Reflection
- Loss/End of Signal

Notes :-

DO NOT SCALE FROM DRAWING
DIMENSIONS TO BE TAKEN ON SITE

Site Grid

Ordnance Survey Grid & Datum
(Trimble GPS System OSTN15 Transformation)
RTK Network

SURVEY STATIONS				
Name	Easting	Northing	Height	Remark
P1	301751.925	514577.400	77.356	
R1	301754.459	514628.131	81.388	
R2	301781.612	514600.877	82.047	
R3	301821.484	514575.822	84.452	
S1	301642.706	514594.226	75.344	
S2	301641.064	514540.954	74.268	
S3	301739.025	514642.206	78.588	
S4	301770.432	514614.808	80.117	
S5	301781.856	514599.748	79.838	
S6	301810.754	514582.077	81.616	
S7	301846.963	514559.272	83.888	

REV	AMENDMENT	DRAWN	DATE

Jacktrees
Road
Cleator Moor
JOB TITLE

Gleeson Homes
CLIENT

Topographical
Survey
DRAWING TITLE

1:250 @ A0 SCALE	J D Gibson DRAWN
15/04/2019 DATE	J D Gibson APPROVED

GSM
GIBSON SURVEYING & MAPPING

Gibson Surveying and Mapping Ltd

21 West View,
Crook,
County Durham.
DL159EY.

Mob. 07896698645
Tel. 01388 764106

email : info@gsmsurvey.co.uk
www.gsmsurvey.co.uk

PROJECT No.	DRG No.	REV
	GH/JR/TS01	

LEGEND:

	Btm of Batter
	Top of Batter
	Fence (General)
	Fence (Palisade)
	Fence (Metal)
	Fence (Close Board)
	Hedgeline
	Wall
	Building (Structure)
	Road (Channel)
	Track
	Kerbing
	Footpath
	Edge of Stone
	Concrete
	Tarmac / Asphalt
DK	Drop Kerbing
	Centreline
	Verge
	Edging Kerbs
	Watercourse / Ditch
	Contour (Major)
	Contour (Minor)
	Overheads
	Telecom

0.000m	Ground Level	MH CL 0.000m	Manhole (Square)
LP	Lampost	MH CL 0.000m	
EP	Electricity Pole	MH CL 0.000m	
TP	Telegraph Pole	IC CL 0.000m	
GAS	Gas Valve	CL 0.000m	
	Cables / Comms	SV	Stop Valve
BT	British Telecom	AV	Air Valve
	Bollard	FH	Fire Hydrant
	Survey Station	SC	Stop Cock
SP	Sign Post	Invert Level 0.000m	Invert Level
	Tree	WO	Wash Out
	Bush / Shrub	RG	Road Gully
	Hedges / Overgrowth	GY	Gully
Bin	Waste Bin	POLE	Metal Pole
	Filter Drain	LC	Lighting Column
		POST	Wooden Post

0 20m 40m 60m 80m 100m

Scale 1:1000

DEVELOPMENT:

LAND AT JACKTREES ROAD (CLEATOR GATE)

DRAWING:

TOPOGRAPHICAL SURVEY

DRAWN BY: K Peacock & R Reid	DATE: 28.09.23	
SHEET SIZE: A0	SHEET #:1/1	
DRAWING NUMBER	21.02.25-GLESSON-TOPO-001	REVISION
SITE REFERENCE	CLEATOR GATE	
Revisions	Details	Date

PEACOCK PRECISION SERVICES LTD
CIVIL ENGINEER & SURVEYOR
info@peacockprecisionltd.co.uk
M: 07979181711

Appendix C Propsed Site Layout

Proposed Residential Development @ Jacktree's Road. Cleator Moor. Cumbria.

MJGleeson
the urban regeneration specialist

Key:

- Plot bin storage 900 x 2100 holding 3no bins comprising 10no 600 x 300 concrete paving slabs.
- Plot gate access.
- Plot front door 1200 x 1200 level landing where required comprising 8no 600 x 300 concrete paving slabs. Path to be 900 wide 600 x 300 concrete paving slabs.
- Rear patio 1200 x 1200, level with floor level comprising 18no 600 x 300 concrete paving slabs. Path to be 900 wide 600 x 300 concrete paving slabs.
- Plot footpath 900mm wide comprising 600 x 300 concrete paving slabs.
- Plot drive parking. Tarmac finish.
- Red line submission boundary.
- House type referance, handing, elevation style, facing material with plot number.
- 1800 high Brick Wall.
- 1800 high Heavy Duty Vertical lap fence Standard Boundary Detail ???.
- Low trip fence 600mm high. Standard Boundary Detail ????.
- Plot meter box positions. E=Electric G=Gas.
- Front garden turfed and landscaped Turf to be "Rowlan Medalion" or similar approved.
- Rear garden rotavated.
- Extent of adopted roads and footpaths. Finish tarmac.
- Extent of adopted roads. Finish brick paving.
- External step 150mm rise and 225m going.
- Existing tree removed.
- Existing tree retained.
- Private drive access to plots. Finish Tarmac.
- Visitor parking bay within private drive. Finish Tarmac.
- Bin collection point within private drive. Finish Tarmac.
- Car charging point.
- Street nameplates.
- Street names.
- Street lighting as dwg ???.
- Affordable units.

Elevation style.

- R Render 21
- U Urban 21
- C Country 21

Schedule.

TYPE	OCCUPANCY	ARRANGEMENT	No	GROSS INTERNAL FLOOR AREA (GIA) SQFT	GROSS INTERNAL FLOOR AREA (GIA) SQM	GIA TOTALS PER TYPE SQFT	GIA TOTALS PER TYPE SQM	Mix %	Mix%	Brief Mix	Spaces Req	Spaces Del
250	2B	semi/town	10	753	69.95	7,530	699.54	16%	16%		20	20
254	2B	det	4	656	60.94	2,624	243.77	6%	6%		8	8
350	3B	semi/town	9	904	83.98	8,136	755.83	15%			23	22
351	3B	semi/town	3	904	83.98	2,712	251.94	5%			8	7
377	3B	semi/town	10	1143	106.18	11,430	1061.85	16%	35%		25	30
353	3B	detached	2	904	83.98	1,808	167.96	3%			5	5
359	3B	detached	7	984	91.41	6,888	639.90	11%	15%		18	20
435	4B	detached	3	1221	113.43	3,663	340.29	5%			8	9
401	4B	detached	12	1066	99.03	12,792	1188.38	19%			30	36
452	4B	detached	2	1211	112.50	2,422	225.00	3%	27%		5	6
			62			60,005	5574.46		100%	0%	148	163

Gross Site Area	5.12	acres	Red Line Boundary	2,288.13	sqm	
POS Area	0.59	acres				
Pump Station	0.02					
Nett Site Area	4.51	acres	Nett Site Area	2,015.52	sqm	
Density	13,304.88	sqft/acre				
Density	1,236.02	sqm/acre				
Density	13.75	units/acre				

ADOPTED VISITOR PARKING SPACES 4
TOTAL PARKING SPACES 169

Scale: 0 5 10 20 50

North
pm noon am

Designers of the Built Environment

Drawn By • PK
Checked by • NL
Date • 02/01/25

Scale • 1:500@A1
Date • 02/01/25
Drg No • TL-03

Client • Keepmoat Homes Ltd.
Site • Jacktree's
Plan • Technical Layout.

Knapton & Knapton Ltd
D143 • D Mill • Dean Clough Mills • Halifax • HX3 5AX • +44 1422 380047 • www.knaptonandknapton.co.uk

Appendix D United Utilities Records

Alex Erskine

From: Stephen Jones <Stephen.Jones@mjgleeson.com>
Sent: 18 March 2025 19:23
To: wastewaterdeveloperservices@uuplc.co.uk
Cc: thomas.bethell@uuplc.co.uk; Alex Erskine
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT
Attachments: A1 - Sewer - United Utilities.pdf; D001-ENGINEERING PLAN-SHEET 1 OF 2-REV4.pdf; D002-ENGINEERING PLAN-SHEET 2 OF 2-REV1.pdf

Thanks Tom greatly appreciated.

Can you please confirm the MH Ref. for the point of connection for the foul water. Alex at RWO and I understood the POC was MH6713 (Please see attached plans)

Regards

Stephen Jones
Technical Director

gleeson

m: +447973796568
Manelli House | Cowper Road | Gilwilly Industrial Estate | Penrith | Cumbria | CA11 9BN

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>
Sent: 18 March 2025 10:12
To: Stephen Jones <Stephen.Jones@mjgleeson.com>
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Hi Stephen,

Thanks for the details of the investigation below.

As discussed, I am happy to confirm we will accept surface water flows to the 225mm public surface

water sewer to the west of the site, subject to confirmation the discharge has onward flow to a recognised watercourse. Discharge rates must be restricted to the greenfield QBAR runoff rate which is 20.5 l/s (based on 2.1ha stated on the originally submitted enquiry form, using the IH124 method).

As discussed, a surface water pumping station is not required for this connection.

Foul can connect to the 150mm public foul sewer at the north east of ht site (which is not fully mapped on the records) as per previous correspondence.

Can you please confirm if the 66 properties stated on the originally submitted application form is for the overall site or just for phase 1? If just phase 1, can you please provide total number of properties expected for the entire site?

Kind regards,

Tom

If you are happy with the service we have provided, please consider submitting a nomination in the following link – this only takes a moment and would be greatly appreciated: **unitedutilities.com/wow**

Thomas Bethell
Developer Engineer
Developer Services & Metering
Customer Services
01925 429088
unitedutilities.com

---------- Original Message ----------
From: Stephen Jones [stephen.jones@mjgleeson.com]
Sent: 12/03/2025 13:32
To: wastewaterdeveloperservices@uuplc.co.uk
Cc: daniel.mcdermott@uuplc.co.uk; thomas.bethell@uuplc.co.uk
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

I will send the Lidar survey under separate cover together with the photos

Regards

Stephen Jones
Technical Director

[Image is no longer available]

m: +447973796568
Manelli House | Cowper Road | Gilwilly Industrial Estate | Penrith | Cumbria | CA11 9BN

[Image is no longer available][Image is no longer available][Image is no longer available][Image is no longer available][Image is no longer available]

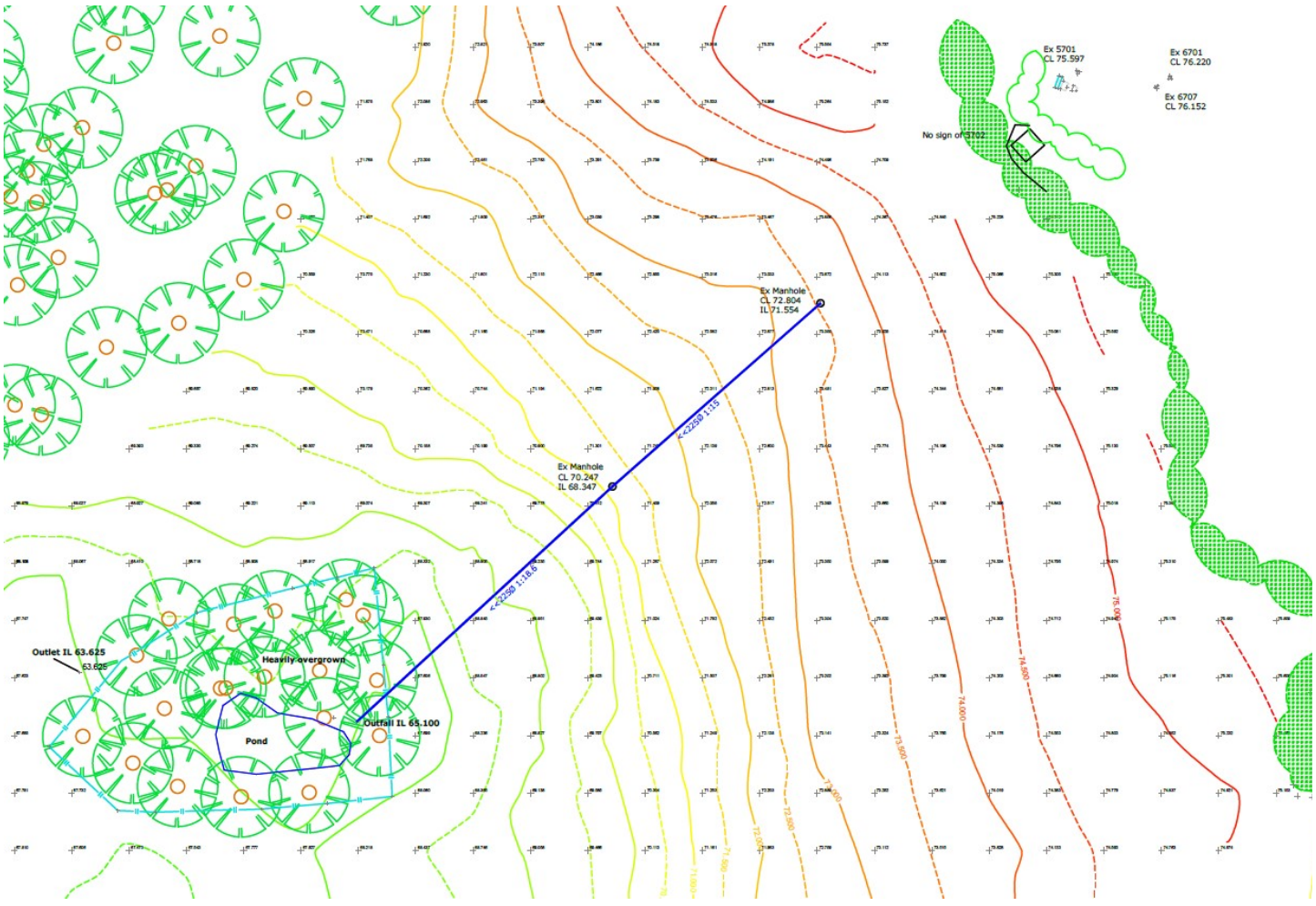
[Image is no longer available]

[Image is no longer available] [Image is no longer available] [Image is no longer available]

From: Stephen Jones <Stephen.Jones@mjgleeson.com>
Sent: 12 March 2025 13:28
To: wastewaterdeveloperservices@uuplc.co.uk
Cc: thomas.bethell@uuplc.co.uk; daniel.mcdermott@uuplc.co.uk
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Sorry Tom,

I should of included the extract below of the attached Lidar Survey in my email.



Regards

Stephen Jones
Technical Director

gleeson

m: +447973796568
Manelli House | Cowper Road | Gilwilly Industrial Estate | Penrith | Cumbria | CA11 9BN

From: Stephen Jones <Stephen.Jones@mjgleeson.com>
Sent: 12 March 2025 11:39
To: wastewaterdeveloperservices@uuplc.co.uk
Cc: thomas.bethell@uuplc.co.uk; daniel.mcdermott@uuplc.co.uk
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Hi Tom,

Sorry I've not got back to you sooner. It has taken longer than I would have liked for one reason or another to investigate and survey the farmland for a suitable SW outfall.

Please see screenshot showing the location and reference numbers of photos taken along the boundary/hedge line at the location of the water/ditchcourse you had identified. I will forward the photos under separate cover.

Photos 0928 & 0910 (see screenshot below) show the watercourse and the cover stone over the same to the location of the footpath. The watercourse can be best described as an overland route rather than a clearly defined ditchcourse suitable for discharging albeit restricted surface water flows from the housing development. Also, the watercourse is located on the farmland adjoining Donaldson Dairy's land, which we have had favourable discussions concerning an easement over their land (see screenshot below).

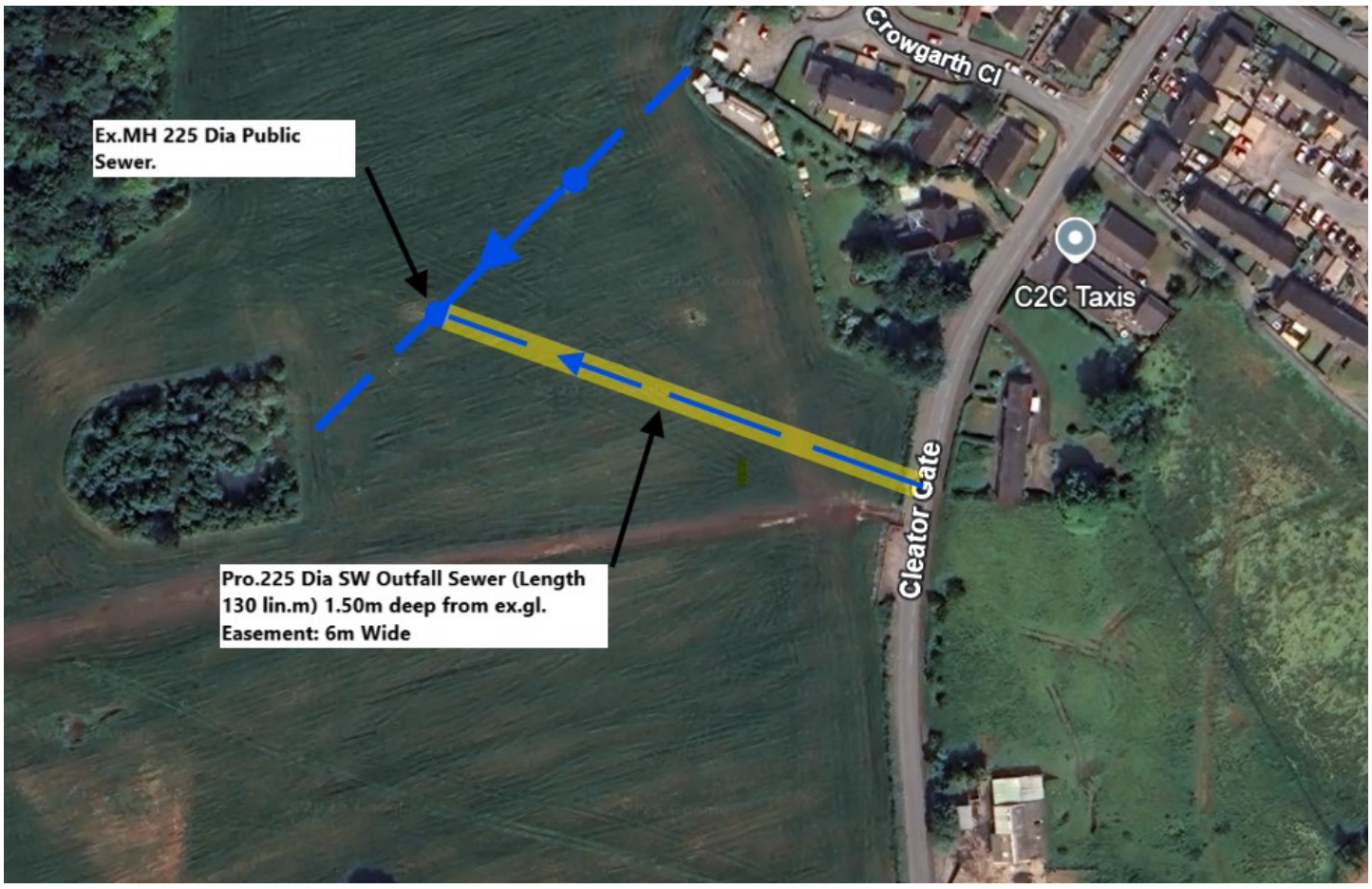
I would, therefore, propose the restricted surface water flows from the housing development (Phase 1 & 2) discharge by gravity sewer to the existing 225 Dia., gradient of 1/19 public sewer, which outfalls to the pond located within Donaldson Diary's farmland. Please see attached Lidar survey (PDF) showing the topography of the Dairy's farmland, receiving Pond and ex. public sewer. Notably, there are 2No manholes on the line of the public sewer located within the farmland that aren't shown on the sewer records.

As discussed the other day, we (Gleeson) are obligated to complete on the acquisition of the land by the end of this land for development provided the F&SW POC have been agreed. It would, therefore, be much appreciated if you could get back to me at the earliest opportunity.


C2C Taxis
Highfield Rd
Melbreak Ave
Cleator Gate
Phase 1
Development Site
Phase 2
0937
0936
9033
0928
0932
0910
River Keekle

Photo No. 0928

Photo 0910



Should you require any further information and/or would like to discuss the above please let me know.

Many thanks

Stephen Jones
Technical Director

gleeson

m: +447973796568
Manelli House | Cowper Road | Gilwilly Industrial Estate | Penrith | Cumbria | CA11 9BN

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>
Sent: 13 February 2025 13:32
To: Stephen Jones <Stephen.Jones@mjgleeson.com>
Cc: aerskine@rwo.group
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Good Afternoon Stephen,

Thank you for detailing the issues with obtaining landowner permissions. To reach a watercourse. I accept a solution which only includes crossing the land marked in purple in your email is required, i.e. I accept the land boundaries marked in green and yellow are unlikely to be possible to cross.

There does appear to be a watercourse on the boundary between the purple and yellow areas, so a watercourse system of some kind may well be reachable without crossing the yellow or green boundaries. I have circled this red in the attached snippet. This is likely where the flows from our surface water sewer (which is mapped to outfall to natural ponds just north) will end up. So another option may be to discharge directly to the same natural ponds that our existing sewer discharges to. These options would need to be explored further, but ultimately if these are explored and properly discounted then I would be willing to accept a connection to public 225mm surface water sewer.

I would also comment that the topo lines suggest it is roughly downhill to this area from the site, so I would not envisage a pumping station being required. We would require detailed justification/evidence proving a pumping station is required before we would consider adopting one (whether the outfall ends up being to watercourse or to the public surface water sewer).

I also note your point on infiltration – evidence of the ground conditions will need to be provided in support of the planning application to prove this, before infiltration is discounted.

Finally, regarding our planning response: We have not objected, we have requested a pre-commencement condition is attached to any decision notice. This is because the drainage details were insufficient and could not be approved through compliance conditions. We detailed in our response the reasons why, these being:

1. Evidence of how the public rising main has been accurately located is required,

2. Evidence the hierarchy has been followed (including evidence of ground conditions and evidence of why discharge to watercourse is not feasible if that does end up being the case)
3. Detailed drainage layout required following the above

Hope this helps,

Kind regards,

Tom

Thomas Bethell
Developer Engineer
Developer Services & Metering
Customer Services
01925 429088
unitedutilities.com

---------- Original Message ----------
From: Stephen Jones [stephen.jones@mjgleeson.com]
Sent: 06/02/2025 14:34
To: wastewaterdeveloperservices@uuplc.co.uk; thomas.bethell@uuplc.co.uk
Cc: daniel.mcdermott@uuplc.co.uk; aerskine@rwo.group
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Good afternoon Tom,

I have entered into discussions with the riparian owner of the parcels of land shown edged Purple (CU217582) and Yellow (CU97740) concerning obtaining their approval to construct the proposed surface water outfall sewer serving our development over their land to the R. Keekle.

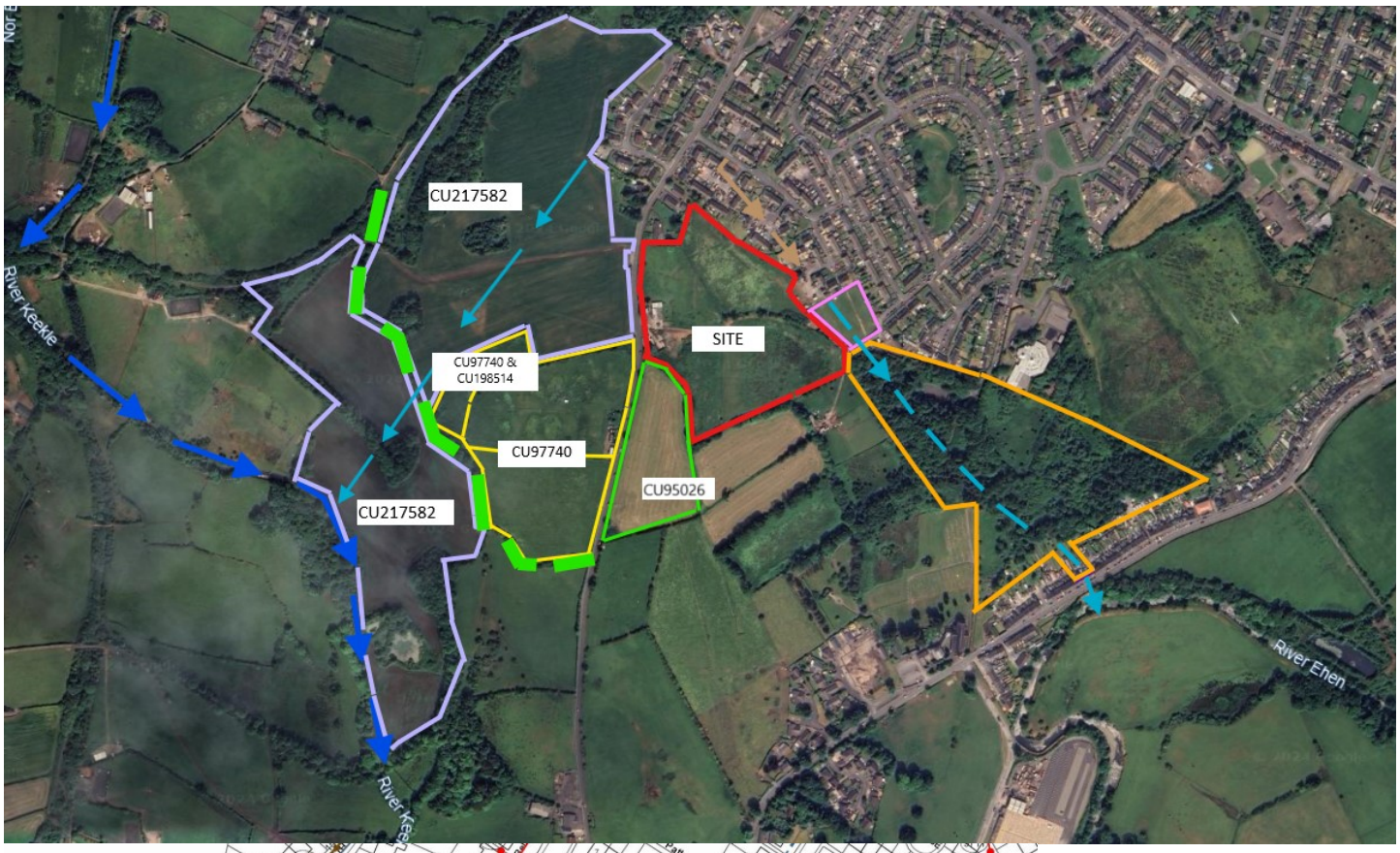
I am having difficulty contacting the riparian owner of the land edged Green (CU95026) who no longer lives at the address registered on the 'Official copy of the register of title' for the land. We can't rule out the owner has passed away and there may be complication with the registered title of the land that could take a considerable time to resolve (see screenshot below & attached).

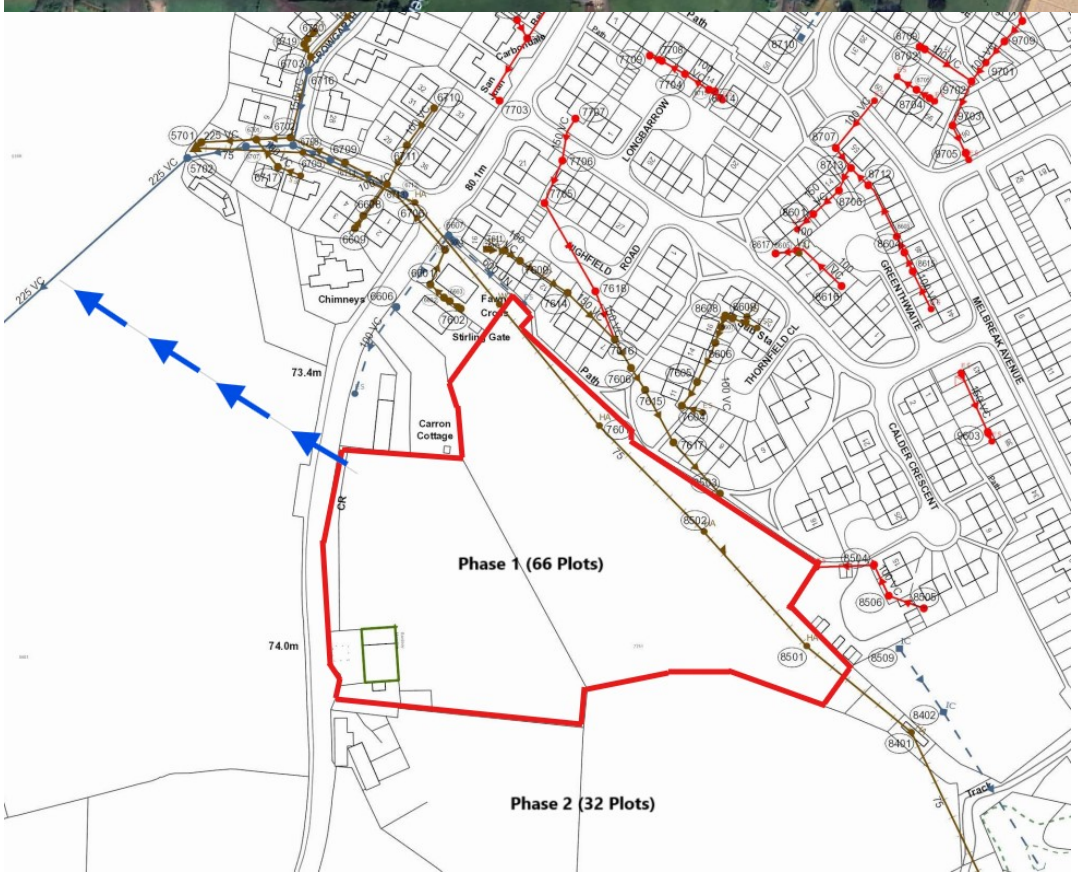
Our initial discussions with the daughter of the riparian owner of the land edged Yellow (CU97740) does not hold out much hope of obtaining approval. I believe from my conversation with his daughter that the riparian owner is elderly and in poor health and his daughter is his carer.

In view of the issues and difficulties we have faced to date with negotiating and obtaining the approval needed from the riparian owners to construct an outfall structure over their land I would like to put forward an alternative proposal for the surface water outfall to be lifted by way of a submersible pumping station to a POC located on the existing 275 Dia public sewer that is located within the land edged Purple (CU217582) and outfalls to the R. Keekle. (see screenshot below & attached).

I have had more favourable discussions with the riparian owner of the land edged Purple (CU217582) and believe I will obtain their approval to construct the surface water outfall to the POC located on the aforementioned existing 275 Dia. public sewer

Soakaways are not an option due to the CLAY strata underlying the site.


CU217582
SITE
CU97740 &
CU198514
CU97740
CU95026
CU217582
River Keekle
River Ehen


Phase 1 (66 Plots)
Phase 2 (32 Plots)
Carron Cottage
Stirling Gate
Chimneys
73.4m
74.0m
HIGHFIELD ROAD
LONGBARROW
GREENTHWAITE
MELBREAK AVENUE
CALDER CRESCENT
THORNFIELD CL
Track

Also, can you please arrange for United Utilities to remove their objection held with the LPA in relation to the POC for foul water sewer serving our above development now that the same has been agreed.

Many thanks

Regards

Stephen Jones
Technical Director

gleeson

m: +447973796568
Manelli House | Cowper Road | Gilwilly Industrial Estate | Penrith | Cumbria | CA11 9BN

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>
Sent: 25 April 2024 09:41
To: Stephen Jones <Stephen.Jones@mjgleeson.com>
Cc: aerskine@rwo.group
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Good Morning Stephen / Alex,

Further to the below our network team have now completed dye testing and have confirmed the 150mm foul public

line to the north of the site (which abruptly ends on the sewer records) flows on to connect to the 750mm combined public sewer to the south east.

As a result I am happy to confirm a foul connection would be accepted here and in fact this would now be our preferred connection point as it would bypass the pumping station serving Crowgart Close. I believe this is also a much better connection point for yourselves.

Please can you confirm receipt and that the foul connection point will be amended to connect to this line?

Kind regards,

Tom

United Utilities
Water for the North West

Thomas Bethell
Developer Engineer
Developer Services & Metering
Customer Services
M: 07880 339 195
unitedutilities.com

---------- Original Message ----------
From: Stephen Jones [stephen.jones@mjgleeson.com]
Sent: 17/04/2024 15:55
To: wastewaterdeveloperservices@uuplc.co.uk; aerskine@rwo.group
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Perfect, thanks Tom

Regards

Stephen Jones
Technical Director

gleeson

m: +447973796568
Manelli House | Cowper Road | Gilwilly Industrial Estate | Penrith | Cumbria | CA11 9BN

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>
Sent: Wednesday, April 17, 2024 3:37 PM
To: aerskine@rwo.group; Stephen Jones <Stephen.Jones@mjgleeson.com>
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Good Afternoon Alex / Stephen,

I've discussed with our network team – they are going to dye test the foul line that abruptly ends on the records to try and ascertain where it ends up.

I will let you know as soon as I hear back on this

Kind regards,

Tom

Thomas Bethell
Developer Engineer
Developer Services & Metering
Customer Services
M: 07880 339 195
unitedutilities.com

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---------- Original Message ----------
From: wastewaterdeveloperservices@uuplc.co.uk [wastewaterdeveloperservices@uuplc.co.uk]
Sent: 05/04/2024 13:55
To: aerskine@rwo.group
Subject: RE: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Hi Alex,

Just tried to call

Apologies, just seen your email below. I am more than happy to have a teams meeting – only problem is I am on holiday next week (8th – 12th) and have a few loose ends to tie up today.

Would any of the following afternoons be okay (any time after 13:30)?

Monday 15th April
Tuesday 16th
Friday 19th

If so please send a teams meeting invite to my direct email thomas.bethell@uuplc.co.uk

Kind regards,

Tom

Thomas Bethell
Developer Engineer
Developer Services & Metering
Customer Services
M: 07880 339 195
unitedutilities.com

---------- Original Message ----------
From: Alex Erskine [aerskine@rwo.group]
Sent: 04/04/2024 13:26
To: wastewaterdeveloperservices@uuplc.co.uk
Subject: RE: Automatic reply: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Thanks Tom,

Are you free for a Teams with the developer to run over the surface water and the responsibility of the foul water that isn't fully chartered?

Regards,

Alex

Alex Erskine
Director
07368 253826

RWO Newcastle
t: +44 (0)191 258 5632
a: 19-20 Brenkley Way, Newcastle upon Tyne, NE13 6DS

RWO Leeds
t: +44 (0)113 532 3500
a: 4 Park Place, Leeds, LS1 2RU

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>
Sent: Thursday, April 4, 2024 1:19 PM
To: Alex Erskine <aerskine@rwo.group>
Subject: RE: Automatic reply: 05533254 Jacktrees Road ,Cleator Moor, Moor Row, Cleator Moor, Cumberland, CA25 5NT

Good Afternoon Alex,

Pre Development Enquiry - Jacktrees Road, Cleator Moor CA25 5NT – UU ref 05533254

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.
If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:
https://www.unitedutilities.com/builders-developers/working-near-our-assets/

Foul Water
Foul flow from this site will be allowed to drain into the public foul water/combined sewer system. There is a gravity foul public system to the north but this is 100mm at first which would not be appropriate to connect to. It becomes 150mm at UUMH6713 (in Crowgarth Close) which would be appropriate.
Alternatively there is a 150mm public foul system running roughly south east along the eastern boundary, but unfortunately this is not fully chartered and you would need to investigate this further to confirm where it connects before we could accept a connection to this system.
If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.
In accordance with our infrastructure plans we may ask you to change your point of connection.
Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Surface Water
All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.
Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.
This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**
2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**

4. **to a combined sewer.**

For guidance, The **North West SuDS Pro-Forma** provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.
The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).
The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration
Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.
A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal. Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:
https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs
If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:
https://www.gov.uk/government/publications/groundwater-protection-position-statements
Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Waterbody
Our records show a private surface water system to the east with an outfall south east of the site, suggesting there is a watercourse system here. There are also private surface water systems to the west which will likely discharge to watercourse downstream which should be investigated.

Therefore if an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to a nearby watercourse.
We would encourage you to identify and engage with any third party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

Highway Drainage
If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Levels
For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to

incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage
United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances.

Existing Wastewater Assets Crossing the Site
According to our public sewer records there is a public foul rising main located within your site boundary. This is a critical asset - we will require unrestricted access to the sewer for maintenance purposes, and a minimum clearance of 6m (3m from the centre line of the pipe) must be maintained. The asset must be accurately located on site before any site layout or drainage strategy can be accepted, in order to assure us that the clearance distances are indeed being met.

Existing Water Assets Crossing the Site
It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address: DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:
https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/

Connection Application
Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a f

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

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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
0102	68.18	CO	66.02	750			CO	80.33933	1 in 55
0607		CO		100			VC	11.5178	
0606		CO		100			VC	19.68478	
0203	69.79	CO	67.35	750			CO	63.3255	1 in 48
0202		CO	0	150			VC	41.57358	
9802		CO		100			VC	14.46346	
9801	0	CO		100			VC	5.900954	
9803		CO		100			VC	3.529799	
0811		CO		100			VC	1.880929	
0810		CO		150			VC	25.04586	
9703		CO		100			VC	12.35325	
9702		CO		100			VC	19.39373	
8704		CO		100			VC	6.088665	
8705		CO		100			VC	9.568464	
8702		CO		100			VC	22.7904	
9701		CO		100			VC	9.521439	
9709		CO		100			VC	11.30497	
8709		CO		100			VC	2.395478	
9711		CO		100			VC	10.97669	
9712		CO		100			VC	20.00584	
9713		CO		100			VC	13.07764	
9804		CO		100			VC	13.3601	
0701		CO		100			VC	1.979912	
0201		CO	0	150			VC	40.99232	
9301	77.63	CO	75.98	150			VC	56.29554	
0501		CO		150			VC	14.70363	
8505		CO		100			VC	15.12924	
8616		CO		100			VC	23.95278	
8615		CO		100			VC	8.384974	
8604		CO		100			VC	7.136553	
8603		CO		100			VC	23.81545	
8601		CO		150			VC	8.729019	
8706		CO		150			VC	14.20747	
8713		CO		150			VC	10.38795	
8712		CO		100			VC	10.0584	
9716		CO		100			VC	9.876478	
8707		CO		100			VC	9.96316	
9705		CO		100			VC	3.208701	
8506		CO		100			VC	13.75258	
8504		CO		100			VC	23.39228	
0504		CO		100			VC	11.60524	
9603		CO		150			VC	4.32893	
6701	76.23	FO	74.92	225			VC	22.18728	1 in 50
6708	76.73	SW	75.25	225			VC	18.99012	1 in 50
6702	76.72	FO	75.33	225			VC	13.94659	1 in 36
6703	77.58	FO	75.81	150			VC	33.57718	1 in 73
6716	77.48	SW	75.8	150			VC	30.86674	1 in 58
7615		FO		150			VC	23.89895	
7605		FO		100			VC	11.4628	
8606		FO		100			VC	17.60753	
8607		FO		100			VC	6.70976	
8608		FO		100			VC	4.979555	
8609		FO		100			VC	3.32999	
8605		CO		100			VC	8.703774	
6603		FO		100			VC	2.780894	
7607		SW		100			VC	3.630443	
7602		FO		100			VC	5.432907	
7610		FO		100			VC	7.540497	
7609		FO		100			VC	10.86758	
7706		CO		150			VC	18.6132	
7614		FO		150			VC	26.83336	
7616		FO		150			VC	13.35994	
7606		FO		150			VC	10.52693	
7707		CO		150			VC	17.99121	
7702		CO		100			PF	30.45983	
8715		CO		100			VC	2.326643	
8714		CO		100			VC	11.73406	
7704		CO		100			VC	10.70084	
7708		CO		100			VC	5.345768	
7710		CO		100			PF	8.681736	
6714	77.43	FO	76.13	150			VC	24.1752	1 in 38
6719		FO		100			VC	5.810091	
6720		FO		100			VC	2.68111	
6715	79.6	SW	77.97	150			VC	44.1872	1 in 21
6704	79.8	FO	78.15	150			VC	42.4134	1 in 18
6801	82.68	FO	80.82	150			VC	34.43325	1 in 13
6802	82.81	SW	80.92	150			VC	40.6319	1 in 14
6710	79.64	FO	78.41	100			VC	18.60108	1 in 16
5702	75.39	SW	74.25	225			VC	157.1755	
6606		SW		100			VC	39.09671	
6607		SW		100			VC	35.57747	
6602		FO		100			VC	7.912308	
6601		FO		100			VC	15.15215	
6604		FO		100			VC	35.42337	
6609		FO		100			VC	6.070738	
6608		FO		100			VC	15.98184	
6712	78.02	SW	76.66	150			VC	33.07931	1 in 50
6713	77.75	FO	76.44	150			VC	18.92321	1 in 65
6711	78.63	FO	77.22	150			VC	17.62618	1 in 23
6717		FO		100			VC	14.03801	
6709	77.27	SW	75.98	150			VC	16.1815	1 in 28
6707	76.16	SW	74.85	225			VC	24.15434	1 in 42
7617		FO		150			VC	27.94888	
7618		CO		150			VC	20.86497	
0506		CO		150			VC	20.91419	
7705		CO		150			VC	41.13361	
5701	75.61	FO	74.46	225			VC	3.126979	
9817		CO		100			VC	37.52711	
0507		CO		100			VC	3.817053	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

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

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

MANHOLE FUNCTION

- FO Foul
- SW Surface Water
- CO Combined
- OV Overflow

SEWER SHAPE

- CI Circular
- TR Trapezoidal
- EG Egg
- AR Arch
- OV Oval
- BA Barrel
- FT Flat Top
- HO HorseShoe
- RE Rectangular
- UN Unspecified
- SQ Square

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- PE Polyethylene
- RP Reinforced Plastic Matrix
- CO Concrete
- CSB Concrete Segment Bolted
- CSU Concrete Segment Unbolted
- CC Concrete Box Culverted
- PSC Plastic / Steel Composite
- GRC Glass Reinforced Plastic
- DI Ductile Iron
- PVC Polyvinyl Chloride
- CI Cast Iron
- SI Spun Iron
- ST Steel
- VC Vitrified Clay
- PP Polypropylene
- PF Pitch Fibre
- MAC Masonry, Coursed
- MAR Masonry, Random
- U Unspecified

Address or Site Reference:

Jacktrees Road,

Scale: 1:1250 **Date:** 09/04/2018

Sheet: 1 of 1

Printed by: Property Searches

SEWER RECORDS

United Utilities
helping life flow smoothly

Appendix E Gov.UK Flood Map

Flood map for planning

Your reference	Location (easting/northing)	Created
Unspecified	**301743/514558**	**16 July 2025 11:06**

Your selected location is in flood zone 1, an area with a low probability of flooding.

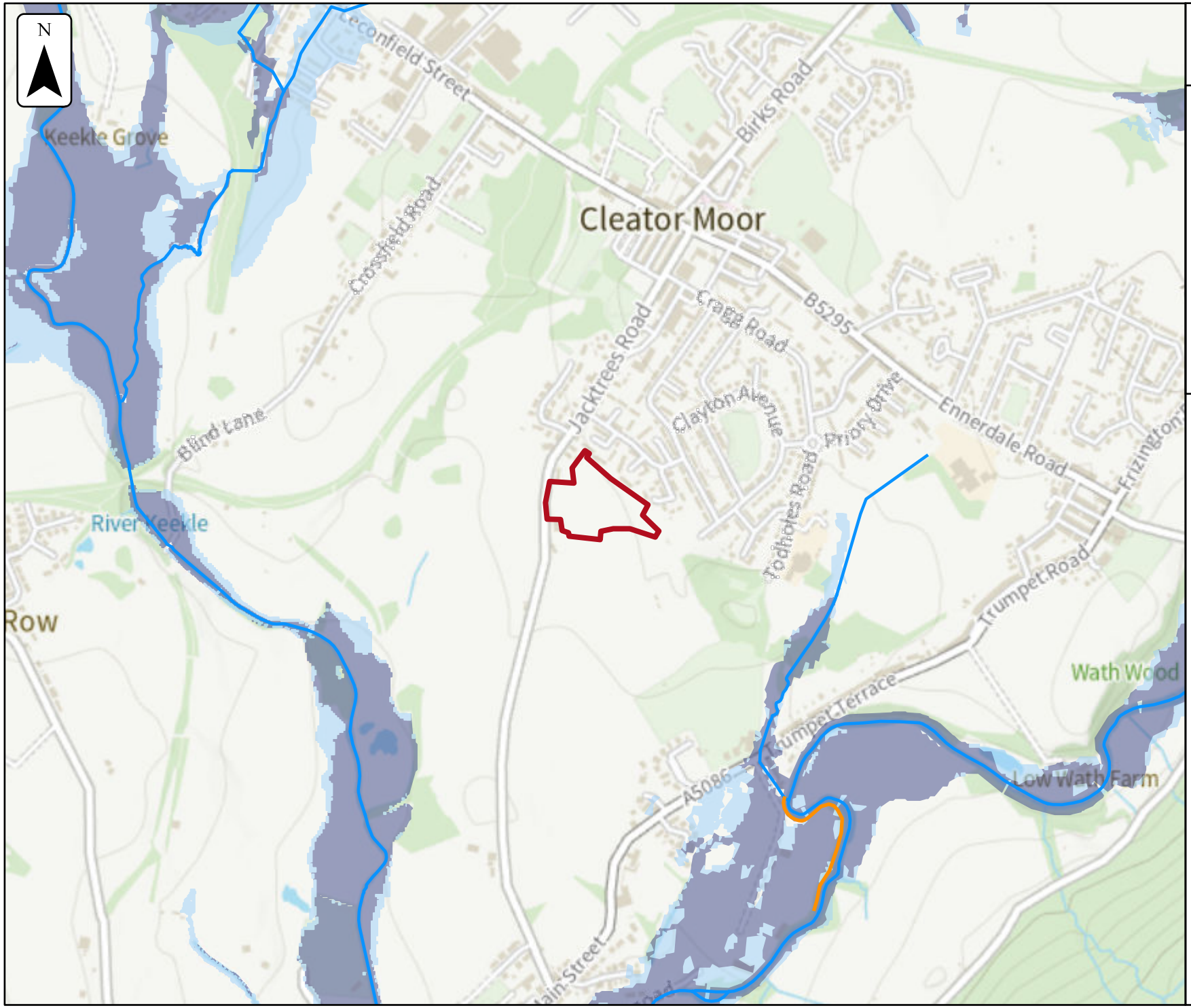
You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.



Environment Agency

Flood map for planning

Your reference
Unspecified

Location (easting/northing)
301743/514558

Scale
1:10,000

Created
16 Jul 2025 11:06

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 100 200 300m

Appendix F IH124 Calculation

Print | Close Report

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Ross Oakley
Site name:	Jacktrees
Site location:	Cleator

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	54.51608° N
Longitude:	3.51877° W
Reference:	2575818686
Date:	Dec 15 2022 18:35

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 2.07

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics	Default	Edited
SAAR (mm):	1278	1278
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	20.21	20.21
1 in 1 year (l/s):	17.58	17.58
1 in 30 years (l/s):	34.36	34.36
1 in 100 year (l/s):	42.04	42.04
1 in 200 years (l/s):	47.9	47.9

Appendix G Surface Water Attenuation Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
HW1			73.000	450	301699.002	514484.326	1.200
HW2			73.000	450	301687.786	514474.672	1.250
SW1	0.070	5.00	78.912	1200	301748.005	514628.248	2.512
SW2	0.025	5.00	79.014	1200	301751.598	514622.794	2.754
SW3	0.070	5.00	77.433	1350	301733.070	514594.764	1.377
SW4	0.071	5.00	74.831	1350	301658.181	514566.877	1.356
SW5	0.198	5.00	74.644	1350	301683.236	514566.920	1.519
SW6	0.079	5.00	75.995	1500	301732.423	514566.471	3.150
SW7	0.028	5.00	75.516	1350	301741.093	514546.004	2.764
SW8	0.085	5.00	81.094	1200	301808.531	514565.264	3.269
SW9	0.035	5.00	81.245	1200	301813.874	514557.416	3.495
SW10	0.022	5.00	80.286	1200	301806.159	514539.467	2.836
SW11	0.087	5.00	79.112	1200	301806.332	514514.755	1.799
SW12	0.029	5.00	77.729	1350	301781.335	514515.778	1.379
SW13	0.067	5.00	76.720	1800	301763.977	514524.451	4.173
SW14			75.174	1500	301747.073	514505.487	2.691
SW15	0.064	5.00	74.109	1500	301734.154	514502.307	1.659
SW16	0.140	5.00	73.403	1500	301705.292	514500.762	1.503
SW17			73.233	1500	301705.581	514490.264	1.383
SW18FC			73.087	1800	301679.783	514470.826	1.437
OUTFALL			73.000	1200	301666.626	514463.365	1.450

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
S17A	HW2	SW18FC	8.879	0.600	71.750	71.700	0.050	177.6	300	8.00	50.0
S1	SW1	SW2	6.531	0.600	76.400	76.335	0.065	100.5	150	5.11	50.0
S2	SW2	SW3	33.600	0.600	76.260	76.056	0.204	164.7	225	5.66	50.0
S3	SW3	SW6	28.300	0.600	76.056	74.500	1.556	18.2	225	5.81	50.0
S4	SW4	SW5	25.055	0.600	73.475	73.275	0.200	125.3	225	5.36	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
S17A	1.176	83.2	145.0	0.950	1.087	1.070	0.0	300	1.192
S1	1.002	17.7	9.5	2.362	2.529	0.070	0.0	78	1.020
S2	1.016	40.4	12.9	2.529	1.152	0.095	0.0	87	0.906
S3	3.082	122.6	22.4	1.152	1.270	0.165	0.0	65	2.356
S4	1.167	46.4	9.6	1.131	1.144	0.071	0.0	69	0.922

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
S5	SW5	SW6	49.189	0.600	73.125	72.920	0.205	239.9	375	6.06	50.0
S6	SW6	SW7	22.227	0.600	72.845	72.752	0.093	239.0	450	6.34	50.0
S7	SW7	SW13	31.436	0.600	72.752	72.622	0.130	241.8	450	6.75	50.0
S8	SW8	SW9	9.494	0.600	77.825	77.750	0.075	126.6	225	5.14	50.0
S9	SW9	SW10	19.537	0.600	77.750	77.450	0.300	65.1	225	5.34	50.0
S10	SW10	SW11	24.713	0.600	77.450	77.313	0.137	180.4	225	5.76	50.0
S11	SW11	SW12	25.019	0.600	77.313	76.350	0.963	26.0	225	5.92	50.0
S12	SW12	SW13	19.404	0.600	76.350	75.500	0.850	22.8	225	6.04	50.0
S13	SW13	SW14	25.405	0.600	72.547	72.483	0.064	397.0	525	7.13	50.0
S14	SW14	SW15	13.304	0.600	72.483	72.450	0.033	403.2	525	7.33	50.0
S15	SW15	SW16	28.904	0.600	72.450	71.900	0.550	52.6	525	7.48	50.0
S16	SW16	SW17	10.503	0.600	71.900	71.850	0.050	210.1	525	7.59	50.0
S17	SW17	HW1	8.862	0.600	71.850	71.800	0.050	177.2	525	7.68	50.0
S18	SW18FC	OUTFALL	15.125	0.600	71.650	71.550	0.100	151.3	225	8.24	50.0
1.009	HW1	HW2	14.799	0.600	71.800	71.750	0.050	296.0	525	7.87	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
S5	1.165	128.7	36.5	1.144	2.700	0.269	0.0	136	1.006
S6	1.310	208.4	69.5	2.700	2.314	0.513	0.0	179	1.185
S7	1.303	207.2	73.3	2.314	3.648	0.541	0.0	184	1.194
S8	1.160	46.1	11.5	3.044	3.270	0.085	0.0	76	0.965
S9	1.623	64.5	16.3	3.270	2.611	0.120	0.0	77	1.359
S10	0.970	38.6	19.2	2.611	1.574	0.142	0.0	112	0.969
S11	2.577	102.5	31.0	1.574	1.154	0.229	0.0	85	2.267
S12	2.750	109.3	35.0	1.154	0.995	0.258	0.0	87	2.456
S13	1.118	242.0	117.4	3.648	2.166	0.866	0.0	258	1.109
S14	1.109	240.1	117.4	2.166	1.134	0.866	0.0	259	1.103
S15	3.094	669.8	126.0	1.134	0.978	0.930	0.0	153	2.399
S16	1.541	333.7	145.0	0.978	0.858	1.070	0.0	242	1.489
S17	1.679	363.5	145.0	0.858	0.675	1.070	0.0	230	1.588
S18	1.061	42.2	145.0	1.212	1.225	1.070	0.0	225	1.080
1.009	1.296	280.7	145.0	0.675	0.725	1.070	0.0	268	1.307

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.300	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	50	0	0

Node SW18FC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	71.650	Product Number	CTL-SHE-0197-2020-1150-2020
Design Depth (m)	1.150	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	20.2	Min Node Diameter (mm)	1500

Node HW2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	71.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	590.0	0.0	1.000	590.0	0.0	1.001	0.0	0.0

Node SW5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	74.275	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	2	Depth (m)	
Safety Factor	2.0	Width (m)	9.000	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	HW1	12	72.042	0.242	129.7	0.0385	0.0000	OK
120 minute winter	HW2	90	71.916	0.166	52.1	69.0417	0.0000	OK
15 minute winter	SW1	10	76.482	0.082	9.0	0.1388	0.0000	OK
15 minute winter	SW2	10	76.347	0.087	12.0	0.1147	0.0000	OK
15 minute winter	SW3	11	76.120	0.064	20.8	0.1558	0.0000	OK
15 minute winter	SW4	10	73.543	0.068	9.1	0.1690	0.0000	OK
15 minute winter	SW5	11	73.257	0.132	34.2	0.5342	0.0000	OK
15 minute winter	SW6	11	73.029	0.184	63.4	0.4179	0.0000	OK
15 minute winter	SW7	11	72.937	0.185	67.0	0.3025	0.0000	OK
15 minute winter	SW8	10	77.904	0.079	10.9	0.1306	0.0000	OK
15 minute winter	SW9	10	77.824	0.074	15.3	0.0982	0.0000	OK
15 minute winter	SW10	11	77.561	0.111	17.9	0.1428	0.0000	OK
15 minute winter	SW11	10	77.396	0.083	28.7	0.1736	0.0000	OK
15 minute winter	SW12	11	76.438	0.088	32.1	0.1628	0.0000	OK
15 minute winter	SW13	11	72.801	0.254	107.3	0.7273	0.0000	OK
15 minute winter	SW14	11	72.704	0.221	106.4	0.3910	0.0000	OK
15 minute winter	SW15	11	72.595	0.145	113.2	0.3682	0.0000	OK
15 minute winter	SW16	12	72.172	0.272	129.1	0.9886	0.0000	OK
15 minute winter	SW17	12	72.110	0.260	129.0	0.4589	0.0000	OK
120 minute winter	SW18FC	90	71.912	0.262	19.8	0.6661	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	71.550	0.000	18.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	HW1	1.009	HW2	130.4	2.245	0.465	0.8960	
120 minute winter	HW2	S17A	SW18FC	19.8	0.745	0.239	0.4141	
15 minute winter	SW1	S1	SW2	8.8	0.949	0.499	0.0609	
15 minute winter	SW2	S2	SW3	11.8	1.019	0.293	0.3930	
15 minute winter	SW3	S3	SW6	20.5	2.267	0.167	0.2562	
15 minute winter	SW4	S4	SW5	8.8	0.893	0.190	0.2480	
15 minute winter	SW5	S5	SW6	33.4	0.982	0.259	1.6713	
15 minute winter	SW6	S6	SW7	63.6	1.040	0.305	1.3608	
15 minute winter	SW7	S7	SW13	67.0	1.132	0.323	1.8871	
15 minute winter	SW8	S8	SW9	10.8	0.909	0.234	0.1127	
15 minute winter	SW9	S9	SW10	15.1	0.987	0.234	0.3006	
15 minute winter	SW10	S10	SW11	17.8	1.090	0.462	0.4045	
15 minute winter	SW11	S11	SW12	28.6	2.072	0.279	0.3450	
15 minute winter	SW12	S12	SW13	32.3	2.329	0.295	0.2689	
15 minute winter	SW13	S13	SW14	106.4	1.122	0.440	2.4103	
15 minute winter	SW14	S14	SW15	105.7	1.594	0.440	0.8973	
15 minute winter	SW15	S15	SW16	113.4	1.424	0.169	2.3282	
15 minute winter	SW16	S16	SW17	129.0	1.176	0.387	1.1528	
15 minute winter	SW17	S17	HW1	129.7	1.275	0.357	0.9022	
120 minute winter	SW18FC	Hydro-Brake®	OUTFALL	19.8				151.2

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	HW1	11	72.199	0.399	314.6	0.0634	0.0000	OK
120 minute winter	HW2	116	72.183	0.433	120.1	226.4921	0.0000	SURCHARGED
15 minute winter	SW1	10	76.604	0.204	22.0	0.3449	0.0000	SURCHARGED
15 minute winter	SW2	10	76.407	0.147	29.2	0.1926	0.0000	OK
15 minute winter	SW3	11	76.161	0.105	50.6	0.2558	0.0000	OK
15 minute winter	SW4	10	73.588	0.113	22.3	0.2809	0.0000	OK
15 minute winter	SW5	10	73.352	0.227	83.9	0.9158	0.0000	OK
15 minute winter	SW6	11	73.191	0.346	156.6	0.7843	0.0000	OK
15 minute winter	SW7	11	73.104	0.351	163.9	0.5743	0.0000	OK
15 minute winter	SW8	10	77.961	0.136	26.7	0.2251	0.0000	OK
15 minute winter	SW9	10	77.877	0.127	37.5	0.1691	0.0000	OK
15 minute winter	SW10	11	77.683	0.233	44.3	0.2990	0.0000	SURCHARGED
15 minute winter	SW11	10	77.455	0.142	69.8	0.2985	0.0000	OK
15 minute winter	SW12	11	76.504	0.154	78.2	0.2850	0.0000	OK
15 minute winter	SW13	11	72.994	0.447	260.3	1.2817	0.0000	OK
15 minute winter	SW14	11	72.845	0.362	259.2	0.6393	0.0000	OK
15 minute winter	SW15	11	72.689	0.239	277.2	0.6081	0.0000	OK
15 minute winter	SW16	11	72.426	0.526	318.1	1.9101	0.0000	SURCHARGED
15 minute winter	SW17	11	72.320	0.470	315.8	0.8301	0.0000	OK
120 minute winter	SW18FC	116	72.178	0.528	20.7	1.3446	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	71.550	0.000	20.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	HW1	1.009	HW2	315.6	2.850	1.124	1.7268	
120 minute winter	HW2	S17A	SW18FC	20.7	0.744	0.249	0.6253	
15 minute winter	SW1	S1	SW2	21.4	1.216	1.207	0.1113	
15 minute winter	SW2	S2	SW3	29.0	1.275	0.717	0.7625	
15 minute winter	SW3	S3	SW6	50.2	2.867	0.410	0.4955	
15 minute winter	SW4	S4	SW5	21.7	1.127	0.468	0.4847	
15 minute winter	SW5	S5	SW6	82.2	1.110	0.639	3.7716	
15 minute winter	SW6	S6	SW7	155.6	1.197	0.746	2.9286	
15 minute winter	SW7	S7	SW13	162.8	1.199	0.786	4.2920	
15 minute winter	SW8	S8	SW9	26.5	1.122	0.574	0.2291	
15 minute winter	SW9	S9	SW10	37.4	1.173	0.580	0.6029	
15 minute winter	SW10	S10	SW11	42.5	1.345	1.101	0.8129	
15 minute winter	SW11	S11	SW12	69.2	2.498	0.675	0.6923	
15 minute winter	SW12	S12	SW13	77.7	2.839	0.711	0.5308	
15 minute winter	SW13	S13	SW14	259.2	1.452	1.071	4.5059	
15 minute winter	SW14	S14	SW15	258.3	2.026	1.076	1.6935	
15 minute winter	SW15	S15	SW16	276.7	1.647	0.413	4.5056	
15 minute winter	SW16	S16	SW17	315.8	1.491	0.946	2.2044	
15 minute winter	SW17	S17	HW1	314.6	1.678	0.865	1.6833	
120 minute winter	SW18FC	Hydro-Brake®	OUTFALL	20.2				350.9

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	HW1	232	72.767	0.967	142.7	0.1538	0.0000	FLOOD RISK
240 minute winter	HW2	232	72.766	1.016	142.5	570.4232	0.0000	FLOOD RISK
15 minute winter	SW1	11	77.126	0.726	42.6	1.2252	0.0000	SURCHARGED
15 minute winter	SW2	11	76.645	0.385	54.0	0.5056	0.0000	SURCHARGED
15 minute winter	SW3	11	76.215	0.159	93.5	0.3880	0.0000	OK
15 minute winter	SW4	12	74.516	1.041	43.2	2.5812	0.0000	SURCHARGED
15 minute winter	SW5	12	74.391	1.266	151.1	8.1140	0.0000	FLOOD RISK
15 minute winter	SW6	12	74.188	1.343	260.1	3.0477	0.0000	SURCHARGED
15 minute winter	SW7	12	74.004	1.252	257.8	2.0458	0.0000	SURCHARGED
15 minute winter	SW8	12	79.180	1.355	51.8	2.2364	0.0000	SURCHARGED
15 minute winter	SW9	12	79.096	1.346	61.6	1.7915	0.0000	SURCHARGED
15 minute winter	SW10	12	78.808	1.358	67.7	1.7465	0.0000	SURCHARGED
15 minute winter	SW11	12	78.319	1.006	112.2	2.1110	0.0000	SURCHARGED
15 minute winter	SW12	12	77.013	0.663	121.8	1.2272	0.0000	SURCHARGED
15 minute winter	SW13	12	73.739	1.192	411.4	3.4162	0.0000	SURCHARGED
15 minute winter	SW14	12	73.465	0.982	410.1	1.7356	0.0000	SURCHARGED
15 minute winter	SW15	11	73.280	0.830	442.0	2.1072	0.0000	SURCHARGED
15 minute winter	SW16	11	72.936	1.036	518.1	3.7592	0.0000	SURCHARGED
240 minute winter	SW17	228	72.767	0.917	143.7	1.6199	0.0000	SURCHARGED
240 minute winter	SW18FC	232	72.761	1.111	20.6	2.8277	0.0000	SURCHARGED
15 minute summer	OUTFALL	1	71.550	0.000	20.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	HW1	1.009	HW2	142.5	1.080	0.508	3.1971	
240 minute winter	HW2	S17A	SW18FC	20.6	0.743	0.247	0.6253	
15 minute winter	SW1	S1	SW2	39.7	2.256	2.242	0.1150	
15 minute winter	SW2	S2	SW3	53.4	1.415	1.323	1.1704	
15 minute winter	SW3	S3	SW6	93.7	3.275	0.765	0.8097	
15 minute winter	SW4	S4	SW5	38.5	1.157	0.830	0.9965	
15 minute winter	SW5	S5	SW6	142.7	1.294	1.109	5.4254	
15 minute winter	SW6	S6	SW7	241.8	1.526	1.160	3.5217	
15 minute winter	SW7	S7	SW13	255.7	1.614	1.234	4.9808	
15 minute winter	SW8	S8	SW9	41.1	1.084	0.891	0.3776	
15 minute winter	SW9	S9	SW10	56.0	1.408	0.868	0.7770	
15 minute winter	SW10	S10	SW11	67.2	1.690	1.742	0.9829	
15 minute winter	SW11	S11	SW12	107.5	2.702	1.049	0.9950	
15 minute winter	SW12	S12	SW13	121.3	3.051	1.110	0.7716	
15 minute winter	SW13	S13	SW14	410.1	1.899	1.695	5.4883	
15 minute winter	SW14	S14	SW15	411.6	1.987	1.714	2.8741	
15 minute winter	SW15	S15	SW16	444.1	2.056	0.663	6.2442	
15 minute winter	SW16	S16	SW17	514.0	2.380	1.541	2.2690	
240 minute winter	SW17	S17	HW1	142.7	0.985	0.393	1.9145	
240 minute winter	SW18FC	Hydro-Brake®	OUTFALL	20.2				505.1

Appendix H SuDS Identification Plan

DESIGN RISK NOTES:

1. IN ACCORDANCE WITH THE CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015, IT IS THE POLICY OF THIS PRACTICE TO 'DESIGN OUT' AS MANY IDENTIFIABLE RISKS AS POSSIBLE FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE OF THE PROJECT.
2. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE PRE CONSTRUCTION INFORMATION WHICH IS DEFINED IN THE CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015.
3. A COMPETENT CONTRACTOR SHOULD BE AWARE OF 'NORMAL' RISKS INVOLVED WITH THE CONSTRUCTION PROCESS. HOWEVER ADDITIONAL PRECAUTIONS WILL NEED TO BE CONSIDERED FOR THE FOLLOWING ITEMS:
   A) NONE IDENTIFIED.
4. SAFE METHODS AND SYSTEMS OF WORK REMAIN THE RESPONSIBILITY OF THE CONTRACTOR AND MUST BE IDENTIFIED IN THE CONSTRUCTION PHASE PLAN. THE CONSTRUCTION PHASE PLAN MUST BE IN PLACE PRIOR TO THE START OF ANY MOBILIZATION OR SITE WORKS.
5. RESIDUAL RISKS THAT HAVE BEEN IDENTIFIED AND CANNOT BE 'DESIGNED OUT' ARE AS FOLLOWS:
   A) NONE IDENTIFIED.
6. IF ANY PARTY USING THIS DRAWING CONSIDERS THAT THERE ARE 'ABNORMAL' RISKS THAT HAVE NOT BEEN IDENTIFIED ABOVE, THEN THE ENGINEER SHOULD BE NOTIFIED.

ADDITIONAL HEALTH & SAFETY NOTES:

1. CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION.

ROADS & DRAINAGE

2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE
3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER.
4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY APPROVED CONTRACTOR ONLY.
5. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS LEPTOSPIROSIS (WEILS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED.
6. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.

PIPES & CABLES

7. CONTRACTOR TO OBTAIN ALL SERVICE RECORDS PRIOR TO WORKS COMMENCING.
8. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY.

EXCAVATION/FILL

9. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS.
10. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.
11. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.

DRAINAGE NOTES

1. ALL ADOPTABLE DRAINAGE WORKS AND MATERIALS TO BE IN ACCORDANCE WITH "CODE FOR ADOPTION", THE RELEVANT BRITISH/EUROPEAN AND WATER AUTHORITIES STANDARDS/REQUIREMENTS/ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND KITEMARKED.
2. MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600MM AND SHALL BE CLASS D400 TO BS EN 124 WITH 150MM DEEP FRAMES IN HIGHWAYS.
3. FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT.
4. ALL ADOPTABLE SEWERS TO BE KITEMARKED (CERTIFIED TO WIS 4-35-01 AND BS/EN13476).
5. PLASTIC CHANNEL SECTIONS IN MANHOLES ARE NOT ACCEPTABLE AND THE WATER AUTHORITY PREFER CLAYWARE CHANNEL IN MANHOLES. PLASTIC CHANNELS ARE DIFFICULT TO SET IN CONCRETE BECAUSE THEY FLOAT AND A SATISFACTORY FINISH CANNOT BE OBTAINED ON THE BENCHING.
6. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
7. THE ADOPTABLE SEWERS SHOULD BE A MINIMUM OF 1M AND MANHOLES 0.5M FROM KERB FACES AND SERVICE MARGINS.
8. SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES.
9. SEWERS TO BE LAID IN CLASS “S” BEDDING (150MM GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2M IN HIGHWAYS AND VERGES (OR LESS THAN 900MM IN NONE VEHICULAR ACCESS AREAS) THEN A CLASS 'Z' BEDDING(CONCRETE SURROUND) SHOULD BE PROVIDED.
10. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).
11. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
12. ALL PRIVATE DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS 2010 EDITION.
13. CONTRACTOR TO ESTABLISH POSITION SIZE AND DEPTH OF ALL EXISTING SEWERS AND SERVICES PRIOR TO COMMENCEMENT ON SITE.
14. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
15. THE CONTRACTOR SHALL ALLOW FOR ALL TRAFFIC MANAGEMENT IN CONNECTION WITH ROAD AND SEWER WORKS.
16. THE CONTRACTOR SHALL ALLOW FOR KEEPING SEWER TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SUMPS AND DEWATERING AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY.
17. FOR PIPE SPECIFICATION PLEASE REFER TO ADDITIONAL NOTES.
18. VITRIFIED CLAY PIPES AND FITTINGS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN295 AND BS 65 RESPECTIVELY AND BE KITEMARKED. ALL PIPES SHALL BE EXTRA STRENGTH TO BS 65 OR EQUIVALENT BS EN295 PIPE CRUSHING STRENGTH.
19. STRUCTURED WALL PLASTIC PIPES TO WIS 4-35-01 MAY BE USED FOR FOUL & SURFACE WATER DRAINAGE, SUBJECT TO ADOPTING AUTHORITY APPROVAL.
20. PRECAST CONCRETE PRODUCTS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 5911 AND BE KITEMARKED. CONCRETE PIPES TO BE CLASS 120 UNLESS NOTED OTHERWISE.
21. GULLY GRATES AND FRAMES SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN124 AND BE OF A NON-ROCKING DESIGN WITH CAPTIVE HINGE ACCESS AND BE KITEMARKED. LOAD CLASS D400 FOR ROADS AND SERVICE YARD AREAS. CLASS C250 TO BE USED IN CAR PARKING AREAS.
22. BACKFILLING AND REINSTATEMENT TO TRENCHES IN PUBLIC HIGHWAYS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND SPECIFICATIONS OF THE ADOPTING AUTHORITY, OR, IN THE ABSENCE OF SUCH, IN ACCORDANCE WITH THE REQUIREMENTS OF "THE STREET WORKS REGULATIONS 1992" AND RELEVANT PROVISIONS OF H.A.U.C. "SPECIFICATION FOR THE REINSTATEMENT OF OPENINGS IN HIGHWAYS" JUNE 1992, BOTH UNDER SECTION 71 OF THE NEW ROADS AND STREET WORKS ACT 1991.
23. ALL TRADITIONAL RAINWATER PIPE DOWN COMERS TO DISCHARGE TO TRAPPED GULLIES.
24. ALL ROAD GULLIES ARE TO BE TRAPPED GULLIES.
25. ALL GULLY LEADS TO BE 150mm DIAMETER.
26. ALL REDUNDANT EXISTING DRAINAGE TO BE GRUBBED UP OR GROUTED, ANY EXISTING LIVE DRAINAGE SHOULD BE REPORTED TO THE ENGINEER AND RECONNECTED.
27. ALL ROAD GULLIES & LEADS TO BE CLEARED OF DEBRIS UPON COMPLETION OF WORKS.
28. THE CONTRACTOR MUST ENSURE THAT ANY OF THE EXISTING DRAINAGE WHICH IS LIVE IS KEPT CLEAR OF DEBRIS AND SHOULD ALLOW FOR JETTING THROUGH THE NEW & EXISTING DRAINAGE UPON COMPLETION.
29. CONTRACTOR TO TAKE MEASURES TO PROTECT HIS OPERATIVES WITH RESPECT TO THE PRESENCE OF GAS IN SEWER TRENCHES AND MANHOLES THROUGH THE USE OF GAS MONITORING EQUIPMENT AND BREATHING APPARATUS AS REQUIRED.
30. CONTRACTOR TO APPLY FOR SEWER PERMITS AND ROAD OPENING PERMITS AS NECESSARY FROM THE APPROPRIATE AUTHORITIES, PRIOR TO COMMENCING WORKS.
31. ADOPTABLE PLASTIC SEWER PIPES TO BE LAID IN MAXIMUM 3m LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.
32. WHERE PLASTIC PIPES ARE INSTALLED PRIOR TO GETTING APPROVAL THEN A LIGHT LINE CCTV SURVEY AND REPORT ARE REQUIRED PRIOR TO APPROVAL.
33. WHERE A B125 COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING EYES SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTABLE.
34. THERE SHOULD BE ENOUGH CLEARANCE TO ACCOMMODATE THE BEDDING FOR BOTH PIPES, APPROX 300MM : IF CROSSOVER IS NEAR THE ROCKER THEN THE CLEARANCE NEEDED MAY BE INCREASED
35. THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS : 100MM DIA. 40KN/M, 150MM DIA. 40KN/M, 225MM DIA. 45KN/M AND 300MM DIA. 72KN/M. THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE - (CLASS 120 TO EN 1916/BS5911-1 2002). PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476.

KEY

- SITE BOUNDARY
- PROPOSED PRIVATE DRIVE TO BE PERMEABLE PAVING
- PROPOSED PRIVATE SHARED DRIVE TO BE PERMEABLE PAVING
- PROPOSED SuDS BASIN

DESIGN NOTES:

1. ALL WORKS TO COMPLY WITH CURRENT VERSION OF THE FOLLOWING DOCUMENTS:
   - DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB)
   - SPECIFICATION FOR HIGHWAY WORKS (SHW)
   - LOCAL AUTHORITY DESIGN GUIDE AND SPECIFICATION
2. PRIOR TO COMMENCING WORKS THE CONTRACTOR SHOULD INVESTIGATE AND LOCATE AS NECESSARY ANY STATUTORY UNDERTAKERS EQUIPMENT WITHIN THE NEW ACCESS AND DISCUSS REQUIREMENTS FOR LOWERING/DIVERSION AND PROTECTION WITH THE RELEVANT UNDERTAKER.
3. ALL WORKS WITHIN THE PUBLIC HIGHWAY TO MEET LOCAL AUTHORITY REQUIREMENTS. CONTRACTOR TO APPLY FOR ROAD OPENING NOTICES ETC AS REQUIRED.
4. CBR VALUE NOT AVAILABLE. ROAD CONSTRUCTION DETAIL SUBJECT TO CONFIRMATION OF CBR VALUES. CONTRACTOR TO ALLOW FOR LAB TESTS TO BE UNDERTAKEN IN AGREEMENT WITH LOCAL AUTHORITY HIGHWAY ENGINEER PRIOR TO WORKS COMMENCING.
5. PROPOSED LEVELS HAVE BEEN BASED ON THE EXISTING TOPOGRAPHICAL SURVEY BY GSM RECEIVED **JUNE 2019**.
6. PROPOSED DRAWING BASED ON THE LATEST ARCHITECTURAL LAYOUT PROVIDED BY GLEESON.
7. SLOPES GREATER THAN 1 IN 6 MAY REQUIRE STABILISATION. GEOTECHNICAL ENGINEER TO BE CONTACTED TO CONFIRM REQUIREMENTS

DRAINAGE NOTES:

1. ALL PIPES 100Ø UNLESS OTHERWISE STATED.
2. ALL PRIVATE TO ADOPTABLE CONNECTIONS 150Ø UNLESS OTHERWISE STATED.
3. ALL PPIC'S IN TRAFFICKED AREAS TO HAVE D400 COVERS & CONCRETE SURROUND.
4. ALL INTERNAL PLOT DRAINAGE REQUIRES CONFIRMATION PRIOR TO CONSTRUCTION.
5. CONTRACTOR TO CONFIRM MH COVER & INVERT LEVEL OF PROPOSED CONNECTION POINT PRIOR TO CONSTRUCTION. ANY VARIATION TO BE REPORTED TO ENGINEER.
6. THE INVERT LEVEL OF THE EXISTING SEWERS ARE TO BE VERIFIED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS. ANY DISCREPANCY MUST BE NOTIFIED TO THE ENGINEER.
7. EXISTING MANHOLES TO BE MODIFIED TO ACCOMMODATE THE PROPOSED LATERAL CONNECTIONS. CONTRACTOR TO APPLY TO THE WATER AUTHORITY FOR THE SECTION 106 APPROVAL TO MAKE THE CONNECTIONS. PIPES ARE TO BE LAID WITH COMMON INVERT LEVELS.
8. ALL STUB PIPES ARE TO BE CAPPED.
9. ALL PIPES CONNECTIONS TO BE SOFFIT TO SOFFIT UNLESS STATED OTHERWISE. REFER TO MANHOLE SCHEDULE FOR FURTHER INFORMATION.
10. STONE FILLED LAND DRAINS REQUIRED IN BACK GARDENS WHERE FALLING TOWARDS PROPERTY.
11. FLOOD DEFENSE WORKS APPLICATION OR EQUIVALENT TO BE MADE TO THE LOCAL AUTHORITY PRIOR TO CARRYING OUT ANY WORKS TO THE EXISTING WATERCOURSE.

PIPE MATERIALS

- **150-225Ø: UPVC PIPES TO BE BSI KITEMARKED AND CERTIFIED TO WIS 4-35-01 & BS/EN13476.**
- **300-450Ø: CONCRETE PIPES TO BE BSI KITEMARKED, CLASS 120 CONCRETE & CERTIFIED TO BS5911 & 1916.**

SUBJECT TO LOCAL AUTHORITY & WATER AUTHORITY APPROVAL

Date	Revisions	Drawn	Checked	Rev
10/02/2025	UPDATED TO TENDER ISSUE	SR	AE	2
17/04/2024	FIRST ISSUE	RM	AE	1

Dwg Status SCHEMATIC

NORTH EAST
0191 2585632

YORKSHIRE
0113 535 3500

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Client: GLEESON HOMES

Project: JACKTREES ROAD

Title: SUDS IDENTIFICATION PLAN

DO NOT SCALE	Scale @ A0: 1:250	Drawn NN	Checked AE	Date 17/04/2024
Job No 22087		Dwg No D500		Rev 2

Appendix I Foul Drainage Calcualtion

Drainage Calculations

Number of dwellings	62

Foul Discharge Rate = 2.8704

NB. Foul discharge rate calculated using Sewers for Adoption 6th Edition Methodology,

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