Proposed Replacement Dwelling -

Tivy Dale Drive

Cawthorne

Barnsley

Drainage Strategy

Project No. 2189

July 2026

Registered Office: Newstead House, Pelham Road, Nottingham, NG5 1AP
Tel: 07753 168226 - **Email:** info@nc29.co.uk - **Web:** www.nc29.co.uk
Directors: C. Cook FIHE IEng and **N. Cook** BA (Hons)
Registered in England. Registration Number: 11443830 V.A.T. Registration Number: 302 2744 45

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Contents

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Drainage Strategy Report

Tivy Dale Drive, Cawthorne, Barnsley

Introduction

This drainage strategy has been developed as part of the planning application to show the site is being developed in a sustainable manner.

This report is to accompany NC29 Ltd drawings 2189-001 (Proposed Drainage Layout) and 2189-002 (Proposed Drainage Details), and its purpose is to support and explain the methodology behind the drainage strategy for the site.

The following sections describes in detail the methods and assumptions behind the drainage strategy and how the site is proposed to drain in a sustainable manner.

Site Description

The site consists of an existing dwelling at 28 Tivy Dale Drive, Cawthorne, Barnsley. The centre of the site is located at approximately SE 28393 07803.

Development Proposals

The proposals are for a replacement dwelling.

Surface Drainage Discharge

For new developments there is a requirement to apply sustainable drainage principles (SuDS) to the disposal of surface water from the site. Generally, the aim should be to discharge surface water as high up the following hierarchy of drainage options as reasonably practicable:

1. Re-use
2. Into the ground (infiltration);
3. To a surface water body;
4. To a surface water sewer or highway drain;
5. To a combined sewer.

Re-Use

Where practical to do so, water butts will be installed to rainwater downpipes, which will allow the owner/occupiers to use stored rainwater for irrigation purposes.

Infiltration

Infiltration is the preferred method of water disposal as this reflects the natural ground conditions, recharges aquifers, lowers the risk of flooding as a result of urbanisation and lowers the chance of 'flash flooding'.

Upon review of geological maps it would appear that the bedrock consists of mudstone, siltstone and sandstone (Pennine Lower Coal Measures Formation).

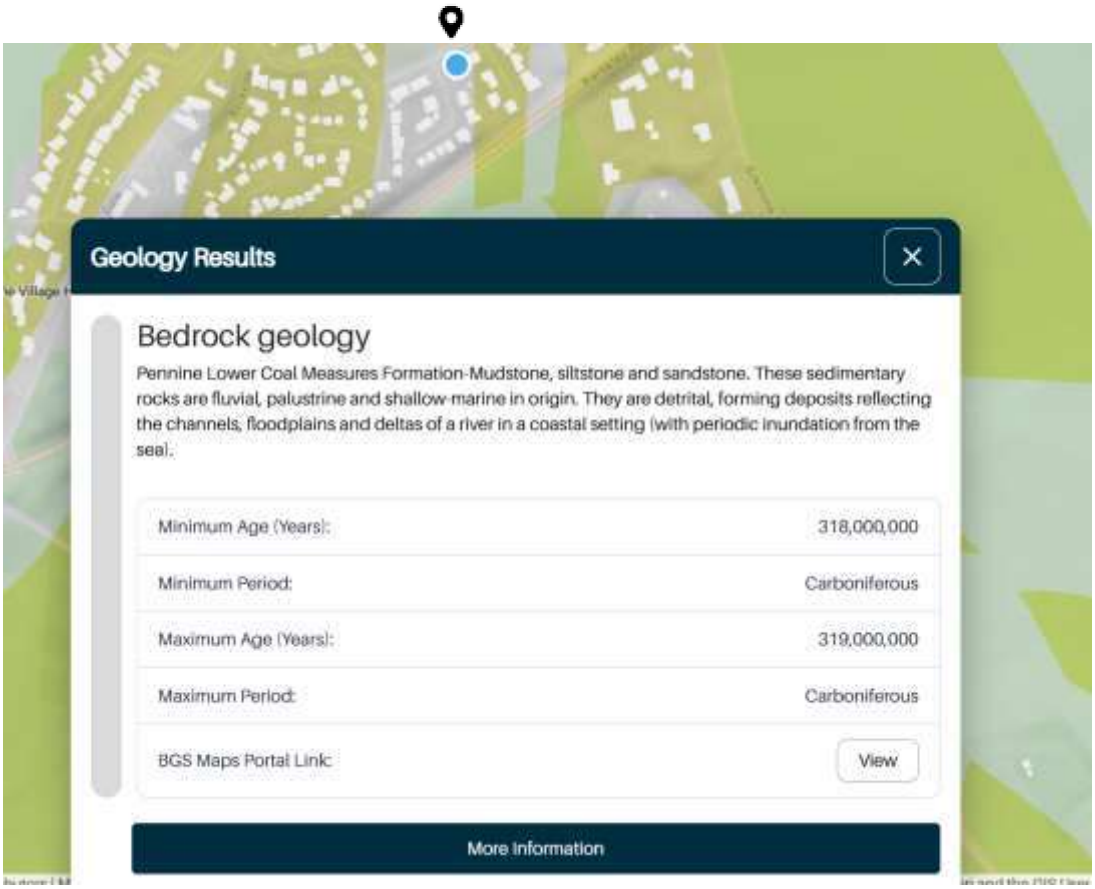

Figure 1 – Geological Map (Source: BGS)

A search of the DEFRA 'Magic Map' shows that the development site is not within the vicinity of a 'Source Protection Zone' and proposed infiltration devices will not affect 'Source Protection Zones'. Figure 2 below is an extract from the DEFRA 'Magic Map' showing 'Source Protection Zone' indicatively presented in coloured layers.

Figure 2 - Source Protection Zones (Source: DEFRA Magic Map)

Percolation testing will be undertaken prior to construction; however, geological maps indicate that the geology will not be conducive to infiltration.

Alternative Drainage Options

Discharge options for the proposed building have been assessed in accordance with the hierarchical approach set out in CIRIA's The SuDS Manual and The Building Regulations.

Infiltration is not considered to be a viable means for disposing of surface water; therefore, an alternative method will need to be identified.

There is a combined sewer located in Tivy Dale Drive, into which the site has an existing connection. It is proposed that the site discharges surface water into the existing combined sewer, via an existing site drain, subject to an indirect connection agreement with Yorkshire Water.

Surface Water Drainage Design

Surface Water - Roofs

Roof water will be collected via traditional rainwater goods and directed towards downpipes, which will discharge into the combined sewer network at a restricted rate, with attenuation in the form of geo-cellular storage.

Surface Water – Driveway

The proposed driveway will consist of Type B permeable pavement with 300mm thick Type 3 sub-base. The permeable pavement construction will allow surface water to discharge into the sub-grade via infiltration but will also include a positive discharge in the form of a Permavoid Diffuser Unit within the sub-base formation with piped connection to the combined sewer network at a restricted rate.

Drawings including a Proposed Drainage Layout and Construction Details have been included in **Appendix A**.

Proposed Site Discharge Rates

Discharge from the proposed development, including the building and external areas, is proposed at 30% betterment on the 1 in 1 year return period:

0.019 Ha

2.78 x 50 x 0.019 = 2.64 l/s

30% betterment = **1.85 l/s**

Detailed hydraulic calculations have been included as **Appendix B** which demonstrate that the attenuation has been sized appropriately to ensure no flooding in the critical 1%AEP storm event including a 40% allowance for climate change.

Water Quality

The methods of surface water disposal mentioned above have included provisions for water quality. In accordance with CIRIA C753, the pollution hazard features for the drainage areas are;

- Residential roofs - Very low
- Driveway - Low

To reduce the risk of pollution, CIRA have developed 'Pollution Hazard Indices' and the 'Mitigation Indices' that the SuDS components provide, further details of these are found in the figures below.

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

Figure 3 - Pollution Hazard Indices for Different Land use Classifications (Source: CIRIA 753)

	Mitigation indices[1]		
Type of SuDS component	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond[4]	0.7[3]	0.7	0.5
Wetland	0.8[3]	0.8	0.8
Proprietary treatment systems[5,6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Figure 4 - Indicative SuDS Mitigation Indices for Discharging Surface Water (Source: CIRIA 753)

To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each containment type) that equals or exceeds the pollution hazard index (for each contaminant type):

Total SuDS mitigation index ≥ pollution hazard index

(for each contaminant type) (for each contaminant type)

Where the mitigation index of an individual component is insufficient, two components (or more) in series will be required where:

$$\textit{Total SuDS mitigation index} = \textit{mitigation index}_1 + 0.5\ (\textit{mitigation index}_2)$$

Where:

$$\textit{Mitigation index}_n = \textit{mitigation index for component } n$$

Provided the total SuDS mitigation index exceeds the pollution hazard indices, then sufficient water quality will be provided.

For the calculations below the hazards are represented by;

Total suspended solids = Red

Metals = Blue

Hydrocarbons = Green

The figures are presented to show the actual achieved in the right-hand side column. The right-hand side's total must be higher than the left-hand side.

Residential Car Park

0.5 0.4 0.4 = Permeable Pavement 0.7 0.6 0.7

The mitigation provided by the permeable pavement exceeds all the pollution indices, therefore sufficient treatment has been provided.

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Finished Floor Levels

In line with best practice and in accordance with Building Regulations, the finished floor levels will generally be raised 150mm above external levels where practicable, other than local areas where level access is to be provided.

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Foul Water Drainage Design

In contrast to surface water drainage, the preferred method of foul water disposal is via sewers, which will connect into the Yorkshire Water foul water sewer network before eventually reaching a wastewater recycling centre where the water will receive treatment.

In some instances, other disposal methods such as drainage fields, private waste treatment plants, cesspits or septic tanks can be considered, but given the proximity of the foul water sewer it is unlikely that these will be considered an option and therefore a sewer will be proposed.

There is a combined sewer located in Tivy Dale Drive, into which the site has an existing connection. It is proposed that the site discharges foul water into the existing combined sewer, via an existing site drain, subject to an indirect connection agreement with Yorkshire Water.

The design proposal is for the foul effluent to be collected from the proposed buildings via below ground drainage and gravity falls to connect onto the existing sewer.

In accordance with 'Design and Construction Guidance' the proposed peak foul flows have been calculated as 4000 litres per dwelling per day or 0.05 litres per second.

Maintenance

It is crucial that the elements mentioned in the drainage elements and water quality are maintained to a sufficient standard to ensure that the devices can still function. The responsibility for maintaining the proposed drainage network will be a management company that is to be setup by the developer upon completion of the proposed development. The freehold of the land will remain with the developer.

Drainage Component	**Required Action**	**Typical Frequency**
Pipework, manholes and flow control devices	Stabilise adjacent areas	As required
	Remove weeds	As required
	Clear any poor performing structures	As required
	Inspect all structures for poor operation	Three monthly, 48 hours after large storms
	Monitor inspection chambers. Inspect silt accumulation rates and determine silt clearance frequencies.	Annually

Generally, the maintenance requirements for SuDS are either from CIRIA 753, or manufacturer's guidance.

Geo-Cellular Attenuation Maintenance

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Figure 5 – Geo-Cellular Attenuation Maintenance Requirements (Source: CIRIA 753)

Permeable Pavement Maintenance

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

Figure 6 – Permeable Pavement Maintenance Requirements (Source: CIRIA 753)

Conclusion

- This drainage strategy document demonstrates that the site can be drained appropriately including the use of a Sustainable Drainage System.
- All storm water, up to and including the 1 in 100 year event + 40% climate change events are stored below ground.
- The proposals do not increase the risk of flooding and are therefore compatible with the requirements of NPPF.
- Intrusive ground investigation will be carried out prior to construction; however, it is assumed that infiltration is not viable for the purposes of this report.
- A proposed drainage layout can be found on NC29 Ltd drawing 2189-001.
- Finished floor levels will be set at a minimum of 150mm above existing ground levels. The finished floor levels shown on the drawings are indicative only and are subject to change to suit the specific plot drainage.
- The site is not located in a Source Protection Zone.

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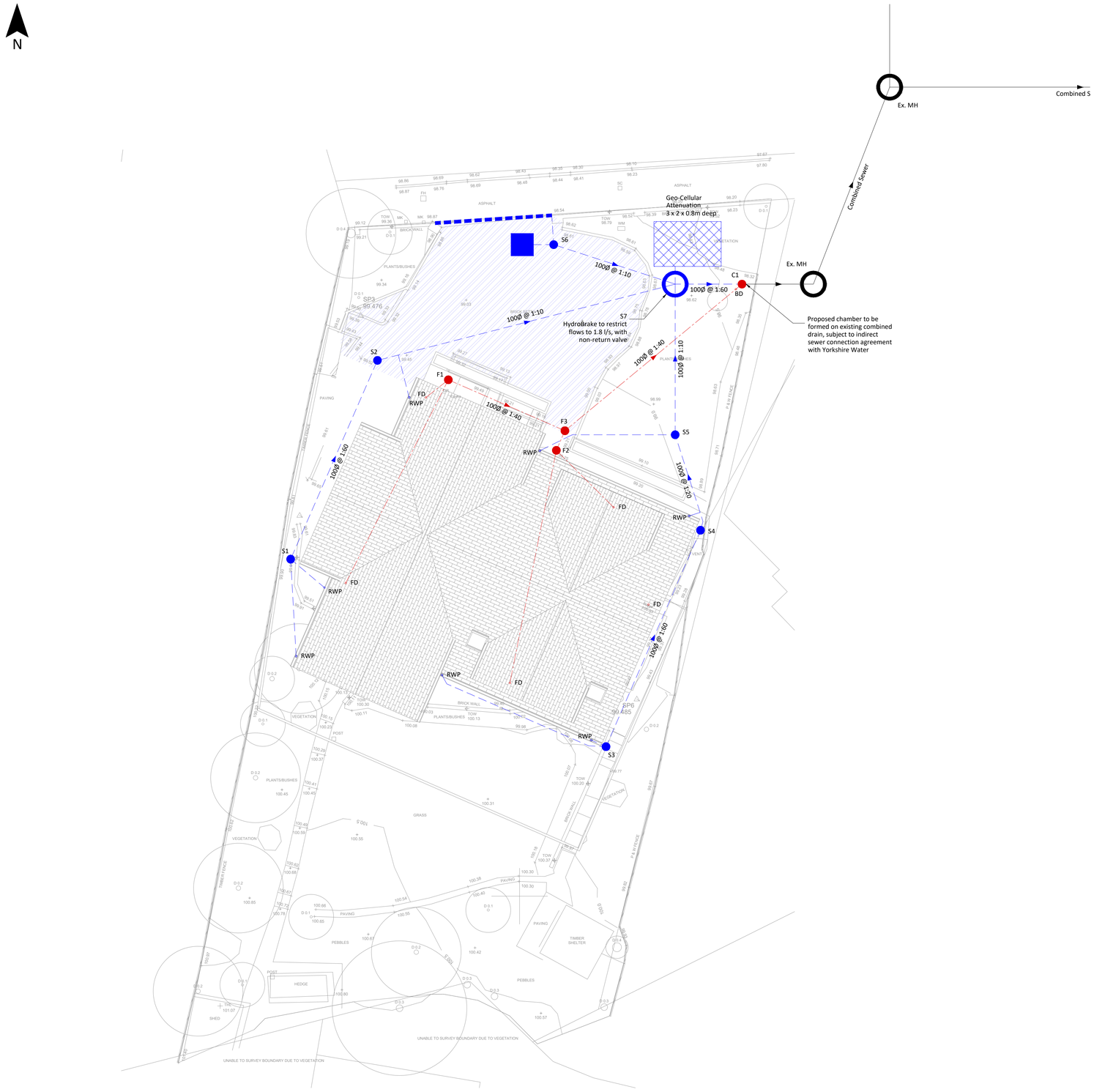
Appendices

Appendix A – Proposed Drainage Drawings



Key

- Proposed Surface Water Drain
- Proposed Linear Drain
- Proposed Foul Water Drain
- Existing Drainage
- Proposed Inspection Chamber
- Proposed Manhole
- RWP — Rainwater Downpipe
- FD — Foul Drainage Point (with rodding access)
- BD — Proposed Backdrop
- Proposed Permeable Pavement (Type B) Min. 300mm th'k Type 3 sub-base
- Proposed Permavoid Diffuser Unit
- Proposed Geo-Cellular Attenuation

Notes

1. Do note scale this drawing.
2. This drawing is to be read in conjunction with all other project drawings and specifications.
3. All dimensions are in millimetres unless stated otherwise.
4. Should there be any conflict between the details indicated on this drawing and those indicated on other drawings the Project Engineer shall be informed prior to construction.
5. Until technical approval has been obtained from the relevant authority, it should be understood that all drawings issued are preliminary and not for construction. Should the contractor commence site work prior to such approval being given, it is entirely at their own risk.
6. All 100ø proposed drainage pipes shown are to be laid at a minimum gradient of 1:80.
7. All 150ø proposed drainage pipes shown are to be laid at a minimum gradient of 1:150.
8. All existing land drains encountered on site during construction are to be re-connected.
9. Temporary protection to be provided to drainage work during construction as necessary.
10. Topographical survey and architectural layout based on third party information.
11. Anticipated foul flow rates calculated using discharge unit method to BS EN 12056-2.
12. Drawing to be read in conjunction with Causeway Flow design pack.
13. Pipes to be structured walled to BS EN 13476, Polypropylene to BE EN 1852 or PVC-U to BS EN 1401.
14. Both clay and concrete pipes shall be strength class 120 (100/150mm min crushing strength 28kN/m). Thermoplastic pipes shall have a minimum ring stiffness of SN4
15. Pipes which run adjacent to buildings shall be installed in strict accordance with Building Regulations Part H, clauses 2.23 to 2.25
16. Class Z concrete bed and surround to all foul and surface water pipes with less than 900mm cover depth. Type S granular bed and surround to all foul and surface water pipes with greater than 900mm cover depth.
17. All manholes and inspection chambers subject to vehicular trafficking to have D400 load-rated covers and frames to BS EN 124. All manholes and inspection chambers not subject vehicular trafficking to have B125 load-rated covers and frames to BS EN 124.
18. Concrete to be GEN1 unless specified otherwise.
19. The first flexible joint in pipes adjoining a manhole shall be a maximum length of 600mm from the inside face of the manhole, connecting to a rocker pipe. The length of the rocker pipe shall be 600mm.
20. All foul and surface water pipes to be constructed to Building Regulations Part H.
21. Permeable pavement sub-base to consist of min. 300mm thick MoT Type 3.
22. Geo-cellular units to be PolyStorm PSM1A or similar approved.
23. Geo-cellular units to be installed in accordance with manufacturer's instructions and specification.
24. Manufacturer to provide structural calculations to relevant industry guidance which confirm the product is suitable for use at the proposed depth and expected loading conditions.

CDM Requirements

Risk - Deep excavation
Control method - Contractor to design trench support to depths shown on drawings and in the manhole schedule, appropriate to the ground conditions.
Risk - Water ingress into excavations, including ground water
Control method - Contractor to specify method of dealing with ingress of water into excavations, in particular if ground water is experienced. Contractor to undertake trench inspections prior to entry into any excavation, and again if left overnight or if conditions change.

-	-	-
Revision	Details	Date

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Newstead House, Pelham Road
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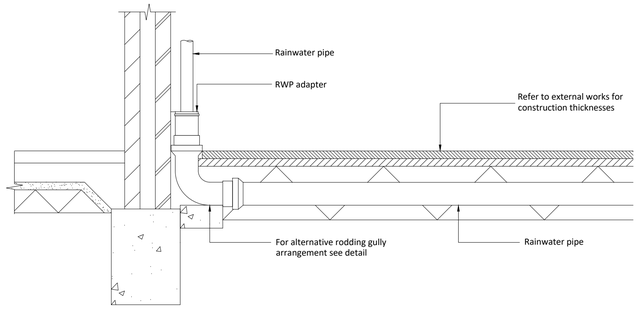
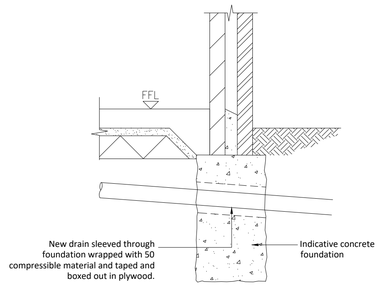
Tel : 07753 168226 Web: www.nc29.co.uk
Email : info@nc29.co.uk

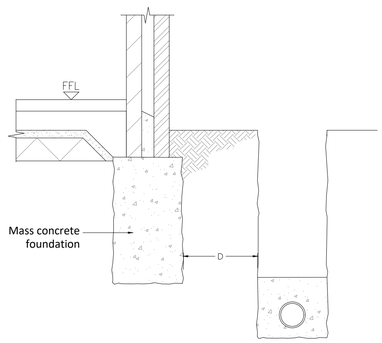
Project	Proposed Replacement Dwelling Tivy Dale Drive, Cawthorne		
Client	James and Gemma Ixer		
Title	Proposed Drainage Layout		
Drawn	CC	Checked	CC
Date	July 2026	Scale	1:100
Number	2189/001	Status	Preliminary



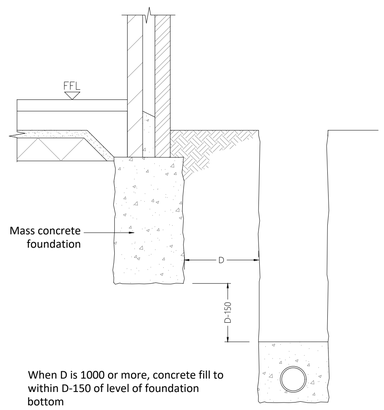
Typical Rainwater Pipe Detail
Scale 1:20



Drain Sleeved Through Foundation Detail
Scale 1:20



When D is less than 1000, concrete fill to level of foundation bottom



When D is 1000 or more, concrete fill to within D-150 of level of foundation bottom

Pipe Protection Near Foundation Details
Scale 1:20

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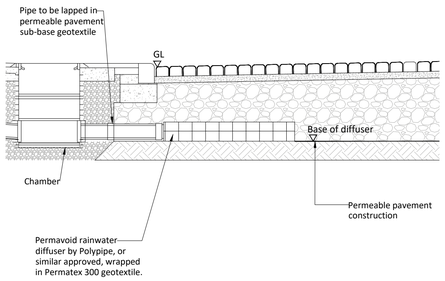
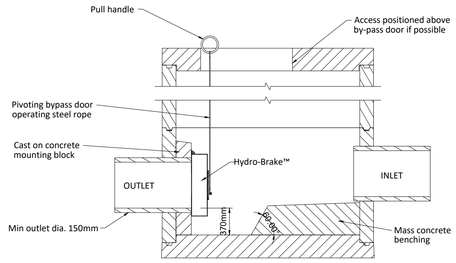


Typical Permavoid Diffuser Unit Detail
Scale 1:25



Typical HydroBrake Chamber Detail
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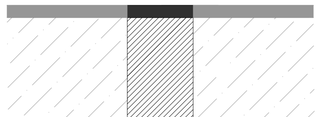
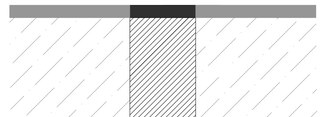


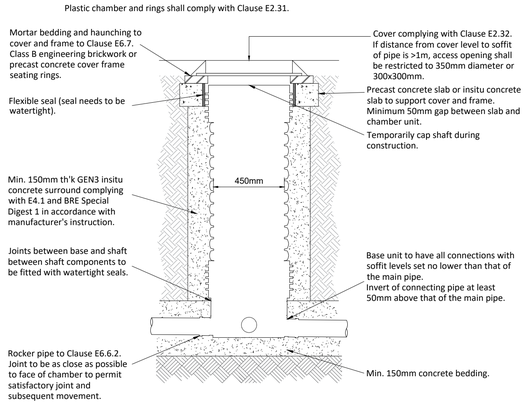
Class S granular bed and surround - pipe cover depth >900mm trafficked areas or >600mm non-trafficked areas



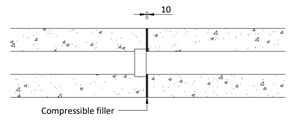
Class Z concrete bed and surround - pipe cover depth <900mm trafficked areas or <600mm non-trafficked areas

Typical Pipe Bedding Details
Scale 1:50

Plastic chamber and rings shall comply with Clause E2.31.



Typical Inspection Chamber Detail
Scale 1:20



Typical Flexible Joint to Concrete Bed and Surround Detail
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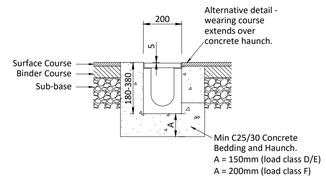
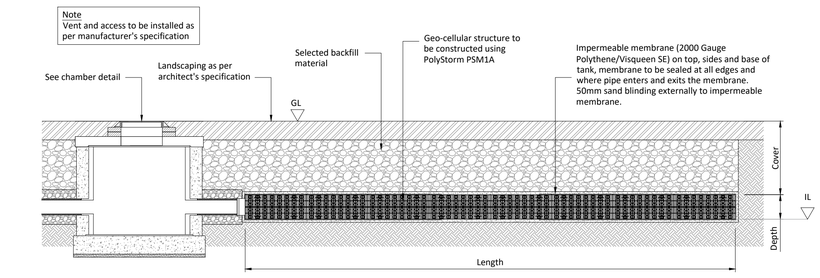
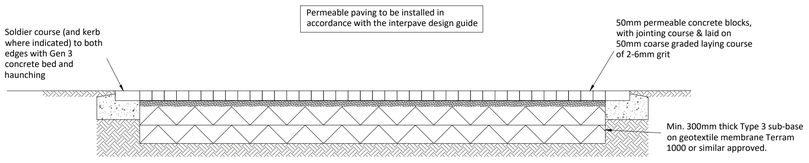


Typical Linear Drain Detail
Scale 1:20



Typical Geo-Cellular Attenuation Detail
Scale 1:50



Proposed Permeable Pavement Detail
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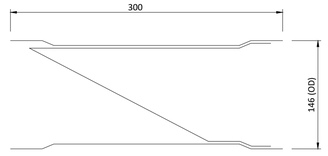

Typical Non-Return Valve Detail
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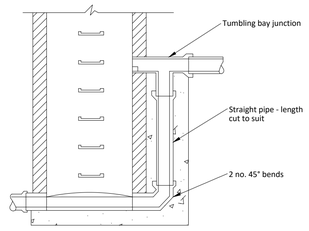

Typical Backdrop Detail
Scale 1:50

-	-	-
Revision	Details	Date

NC29 Ltd
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Tel : 07753 168226 Web: www.nc29.co.uk
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Project	Proposed Replacement Dwelling Tivy Dale Drive, Cawthorne		
Client	James and Gemma Ixer		
Title	Proposed Drainage Details		
Drawn	CC	Checked	CC
Date	July 2026	Scale	As Shown
Number	2189/002	Status	Preliminary

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Appendix B – Surface Water Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	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)	2.000
Ratio-R	0.400	Preferred Cover Depth (m)	0.600
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)	Invert Level (m)
S1	0.004	4.00	99.400	450	0.700	98.700
S2	0.004	4.00	99.400	450	0.863	98.537
S3	0.004	4.00	99.400	450	0.700	98.700
S4	0.004	4.00	99.400	450	0.877	98.523
S5	0.004	4.00	99.000	450	0.700	98.300
S6	0.008	4.00	98.600	450	0.700	97.900
S7			98.600	1200	1.400	97.200
C1			98.300	450	1.151	97.149

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	9.700	0.600	98.700	98.537	0.163	59.5	100	4.16	50.0
1.001	S2	S7	13.700	0.600	98.537	97.200	1.337	10.2	100	4.26	50.0
2.000	S3	S4	10.500	0.600	98.700	98.523	0.177	59.3	100	4.17	50.0
2.001	S4	S5	4.100	0.600	98.523	98.300	0.223	18.4	100	4.21	50.0
2.002	S5	S7	6.700	0.600	98.300	97.200	1.100	6.1	100	4.25	50.0
3.000	S6	S7	5.700	0.600	97.900	97.200	0.700	8.1	100	4.03	50.0
1.002	S7	C1	3.000	0.600	97.200	97.149	0.051	58.8	100	4.31	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.000	7.9	0.5	0.600	0.763	0.004	0.0	18	0.564
1.001	2.428	19.1	1.1	0.763	1.300	0.008	0.0	16	1.298
2.000	1.002	7.9	0.5	0.600	0.777	0.004	0.0	18	0.565
2.001	1.809	14.2	1.1	0.777	0.600	0.008	0.0	18	1.052
2.002	3.153	24.8	1.6	0.600	1.300	0.012	0.0	18	1.789
3.000	2.725	21.4	1.1	0.600	1.300	0.008	0.0	15	1.413
1.002	1.006	7.9	3.8	1.300	1.051	0.028	0.0	49	0.996

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	9.700	59.5	100	Circular	99.400	98.700	0.600	99.400	98.537	0.763
1.001	13.700	10.2	100	Circular	99.400	98.537	0.763	98.600	97.200	1.300
2.000	10.500	59.3	100	Circular	99.400	98.700	0.600	99.400	98.523	0.777
2.001	4.100	18.4	100	Circular	99.400	98.523	0.777	99.000	98.300	0.600
2.002	6.700	6.1	100	Circular	99.000	98.300	0.600	98.600	97.200	1.300
3.000	5.700	8.1	100	Circular	98.600	97.900	0.600	98.600	97.200	1.300
1.002	3.000	58.8	100	Circular	98.600	97.200	1.300	98.300	97.149	1.051

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	450	Manhole	Adoptable	S2	450	Manhole	Adoptable
1.001	S2	450	Manhole	Adoptable	S7	1200	Manhole	Adoptable
2.000	S3	450	Manhole	Adoptable	S4	450	Manhole	Adoptable
2.001	S4	450	Manhole	Adoptable	S5	450	Manhole	Adoptable
2.002	S5	450	Manhole	Adoptable	S7	1200	Manhole	Adoptable
3.000	S6	450	Manhole	Adoptable	S7	1200	Manhole	Adoptable
1.002	S7	1200	Manhole	Adoptable	C1	450	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	99.400	0.700	450	0	1.000	98.700	100
S2	99.400	0.863	450	1	1.000	98.537	100
				0	1.001	98.537	100
S3	99.400	0.700	450	0	2.000	98.700	100
S4	99.400	0.877	450	1	2.000	98.523	100
				0	2.001	98.523	100
S5	99.000	0.700	450	1	2.001	98.300	100
				0	2.002	98.300	100
S6	98.600	0.700	450	0	3.000	97.900	100
S7	98.600	1.400	1200	1	3.000	97.200	100
				2	2.002	97.200	100
				3	1.001	97.200	100
				0	1.002	97.200	100

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
C1	98.300	1.151	450	1	1.002	97.149	100

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	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0

Node S7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	97.200	Product Number	CTL-SHE-0059-1800-1400-1800
Design Depth (m)	1.400	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.8	Min Node Diameter (mm)	1200

Node S6 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	97.900	Slope (1:X)	10.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	31	Depth (m)	0.300
Safety Factor	2.0	Width (m)	7.000	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node S7 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	97.200	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	41	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.000	Number Required	1
Porosity	0.95	Pit Length (m)	3.000		

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	98.722	0.022	0.8	0.0061	0.0000	OK
15 minute winter	S2	10	98.557	0.020	1.6	0.0050	0.0000	OK
15 minute winter	S3	10	98.722	0.022	0.8	0.0059	0.0000	OK
15 minute winter	S4	10	98.547	0.024	1.6	0.0060	0.0000	OK
15 minute winter	S5	10	98.321	0.021	2.4	0.0058	0.0000	OK
15 minute summer	S6	10	97.918	0.018	1.5	0.0098	0.0000	OK
30 minute winter	S7	24	97.425	0.225	4.2	1.5346	0.0000	SURCHARGED
30 minute winter	C1	24	97.178	0.029	1.4	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	S1	1.000	S2	0.8	0.671	0.102	0.0116	
15 minute winter	S2	1.001	S7	1.6	1.060	0.084	0.0610	
15 minute winter	S3	2.000	S4	0.8	0.594	0.102	0.0142	
15 minute winter	S4	2.001	S5	1.6	1.206	0.113	0.0054	
15 minute winter	S5	2.002	S7	2.4	1.418	0.097	0.0302	
15 minute summer	S6	3.000	S7	1.5	1.198	0.070	0.0250	
30 minute winter	S7	1.002	C1	1.4	0.723	0.177	0.0058	3.0

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	98.731	0.031	1.5	0.0084	0.0000	OK
15 minute summer	S2	10	98.564	0.027	3.0	0.0068	0.0000	OK
15 minute summer	S3	10	98.730	0.030	1.5	0.0081	0.0000	OK
15 minute summer	S4	10	98.557	0.034	3.0	0.0085	0.0000	OK
15 minute summer	S5	10	98.329	0.029	4.5	0.0079	0.0000	OK
15 minute summer	S6	10	97.925	0.025	2.9	0.0141	0.0000	OK
30 minute winter	S7	30	97.738	0.538	7.7	3.6739	0.0000	SURCHARGED
15 minute winter	C1	33	97.178	0.029	1.4	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 summer	S1	1.000	S2	1.5	0.800	0.191	0.0182	
15 minute summer	S2	1.001	S7	3.0	1.078	0.157	0.0652	
15 minute summer	S3	2.000	S4	1.5	0.700	0.191	0.0225	
15 minute summer	S4	2.001	S5	3.0	1.424	0.211	0.0087	
15 minute summer	S5	2.002	S7	4.5	1.463	0.182	0.0325	
15 minute summer	S6	3.000	S7	2.9	1.295	0.135	0.0266	
30 minute winter	S7	1.002	C1	1.4	0.726	0.180	0.0059	5.8

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.49%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S1	10	98.743	0.043	2.7	0.0116	0.0000	OK
15 minute summer	S2	10	98.574	0.037	5.4	0.0092	0.0000	OK
15 minute winter	S3	10	98.741	0.041	2.7	0.0112	0.0000	OK
15 minute summer	S4	10	98.571	0.048	5.4	0.0120	0.0000	OK
60 minute winter	S5	50	98.564	0.264	3.9	0.0722	0.0000	SURCHARGED
60 minute winter	S6	51	98.564	0.664	4.2	1.6908	0.0000	FLOOD RISK
60 minute winter	S7	51	98.563	1.363	9.1	6.1043	0.0000	FLOOD RISK
60 minute winter	C1	51	97.181	0.032	1.8	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	S1	1.000	S2	2.7	0.937	0.344	0.0280	
15 minute summer	S2	1.001	S7	5.4	1.133	0.283	0.0713	
15 minute winter	S3	2.000	S4	2.7	0.804	0.343	0.0353	
15 minute summer	S4	2.001	S5	5.4	1.643	0.380	0.0135	
60 minute winter	S5	2.002	S7	3.9	1.187	0.157	0.0524	
60 minute winter	S6	3.000	S7	2.6	1.389	0.121	0.0446	
60 minute winter	S7	1.002	C1	1.8	0.767	0.223	0.0069	13.2

NC29 Ltd

Appendix C – Yorkshire Water Sewer Map and Pre-Development Enquiry

	427825 : 407538	Map Name : SE2707NE	Title	Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS
	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : R Thornton Contact Tel :		Notes	This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.
			(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2024. All rights reserved Ordnance Survey Licence number AC0000813445	Date Req : 15/07/2026, 13:36:18 Source : Sewer Network Enquiry
				Date Gen : 15/07/2026, 13:36:26

UPN: Undefined Originator: R Thornton, New Supplies,

Yorkshire Water Services
Developer Services
Sewerage Technical Team
PO BOX 52
Bradford
BD3 7AY

Tel: 0345 120 8482

Email:
Technical.Sewerage@yorkshirewater.co.uk

NC29 Ltd
Newstead House; 17 Pelham Road
Nottingham
NG5 1AP

Your Ref:
Our Ref: B/02046

15th July 2026

Dear Sir/Madam,

28 Tivy Dale Drive, Cawthorne, Barnsley, S75 4EN - Pre-Planning Sewerage Enquiry X386394

Thank you for your recent enquiry. Our charge of £585.60 plus VAT has been paid through reference YW-2026-001291. The following comments reflect our view, with regard to the public sewer network only, based on a 'desktop' study of the site and are valid for a maximum period of twelve months:

Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records. The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months: The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months: Development of the site should take place with separate systems for foul and surface water drainage on site. This permission is not an acceptance in respect to any planning conditions imposed under the Grant of Planning Permission.

YorkshireWater

Foul Water

Foul Water may discharge to the public combined water sewer network via existing connections. This permission is not an acceptance in respect to any planning conditions imposed under the Grant of Planning Permission.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2010. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order. Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

If other methods of surface water disposal are not viable and subject to providing satisfactory evidence as to why they have been discounted, curtilage surface water discharges to the public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing use of the site less a 30% reduction in the existing discharge. Any discharge of surface water from the site should discharge to similar points of connection to that of the existing use of the site. You will need to demonstrate positive drainage, based on a 1 in 1 year storm, to the public sewer to Yorkshire Water by means of investigation and calculation carried out at your expense.

To do this, Yorkshire Water requires to see existing drainage layouts with pipe sizes, gradients, gullies, downpipes and connection points, measured impermeable areas of the present use of the site, along with the calculations that show the existing discharge rate from the site to the public sewer. This permission is not an acceptance in respect to any planning conditions imposed under the Grant of Planning Permission. .

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply online or obtain an application form from our website (www.yorkshirewater.com/developers/sewerage/sewerage-connections/) or by telephoning 0345 120 84 82.

YorkshireWater

Under the provisions of section 111 of the Water Industry Act 1991 it is unlawful to pass into any public sewer (or into any drain or private sewer communicating with the public sewer network) any items likely to cause damage to the public sewer network interfere with the free flow of its contents or affect the treatment and disposal of its contents. Amongst other things this includes fat, oil, nappies, bandages, syringes, medicines, sanitary towels and incontinence pants. Contravention of the provisions of section 111 is a criminal offence.

The developer should note that the site drainage details submitted have not been approved for the purposes of adoption or diversion. If the developer wishes to have the sewers included in a sewer adoption/diversion agreement with Yorkshire Water (under Sections 104 and 185 of the Water Industry Act 1991), they should contact our Developer Services Team (Telephone 0345 120 84 82) at the earliest opportunity. Sewers intended for adoption and diversion should be designed and constructed in accordance with the WRc publication 'Sewers for Adoption - a design and construction guide for developers' 6th Edition, as supplemented by Yorkshire Water's requirements.

All the above comments are based upon the information and records available at the present time and are valid for a period of 12 months. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours faithfully

Reuben Thornton
Town Planning Team