
Job name: Hay Green Barn, Hay Green Lane, Birdwell, Barnsley

Job No: S12716-JNP-XX-XX-RP-C-1001 P02

Date: 16/10/2025

Subject: Drainage Statement

1. Introduction

1.1 JNP Group was instructed by JR Planning Consultants to develop a drainage strategy for:

Hay Green Barn,
Hay Green Lane,
Birdwell,
Barnsley,
S70 5XQ

hereinafter referred to as 'the site'.

1.2 The development comprises a single lodge type dwelling, driveway and associated landscaped area.

1.3 This document summarises the rationale supporting the drainage strategy.

1.4 The site is located off Hay Green Lane approximately 4.5 km south of Barnsley town centre. The centre of the site is located at National Grid Reference 435105, 401634. The site covers an area of approximately 0.31 hectares (Appendix A).

1.5 The site has had a caravan on site, with surface water assumed to discharge onto the ground adjacent to the caravan and foul water directed to a septic tank to the east of barns adjacent to the site (Appendix B).

1.6 This document amends the drainage strategy proposed in the P01 version of the report. Changes to the report are highlighted in blue and a revised layout and calculations are included in Appendices D and E.

2. Existing Drainage

2.1 The development site contains an existing caravan but is assumed to not benefit from a formal surface water drainage system. Surface water runoff generated within the site is expected to infiltrate into the ground or flow overland towards the north.

2.2 Greenfield runoff rates are indicated below. The runoff calculations are provided in Appendix C.

Table 2.1 Greenfield Run-off Rates (IH124 method)

Return Period	Flow Rate (l/s/ha)
Q1	1.7
Q _{BAR}	2.0
Q30	3.5
Q100	4.1

3. Hierarchy for Surface Water Disposal

3.1 The National Standards for Sustainable Drainage Systems (Defra, 2011) state that the following options must be considered in accordance with the hierarchy for surface water disposal:

Discharge to Ground (Infiltration)

3.2 The site is underlain by a sandstone unit which is part of the Pennine Middle Coal Measures.

3.3 There are no boreholes nearby.

3.4 The site is located towards the top of a hill with levels falling to the north, south and east. Groundwater levels below the site are not known, but given this upland location, a shallow water table is not anticipated to be present.

3.5 Infiltration testing has been completed at the site. As infiltration drainage systems will be shallow, testing commensurate with this was completed.

3.6 Two small pits were excavated in the east and north east part of the site, both 0.3m wide by 0.3m long; one was 0.3m deep and the second 0.5m deep.

3.7 Infiltration testing was completed in both pits, with each pit filled three times.

3.8 Infiltration rates were calculated for all the tests using both the BRE365 methodology and BS6297:2007 + A1:2008 Design and Installation of Drainage Fields for use in Wastewater Treatment (Appendix G).

3.9 Based on the available geologic and hydrogeological information summarised above, infiltration drainage is deemed feasible at the development site.

Discharge to Surface Water Body

3.10 There is a pond to the north of the site. However, there is no outlet for the pond and it is assumed to be man-made.

3.11 As discharge to ground is considered feasible and considering the above, discharge of surface water to the pond is not considered further.

Discharge to Sewer

3.12 As discharge to ground is proposed, discharge to sewer is not considered further.

4. Surface Water Drainage Strategy

4.1 The proposed surface water drainage strategy has been designed in accordance with *Building Regulations Part H* and in compliance with the *NPPF*, local requirements and current best practices, to collect, convey and attenuate runoff from all impermeable areas (134 m²). Refer to the drawing in Appendix D.

4.2 The proposed drainage strategy intends to collect runoff via rainwater pipes before discharging into an infiltration basin.

4.3 An infiltration rate of 1×10^{-6} m/s was originally assumed for the basin.

4.4 Infiltration testing results in the deeper holes were:

- Test 1 1.1×10^{-6} m/s
- Test 2 1.1×10^{-6} m/s
- Test 3 1.8×10^{-6} m/s

4.5 The results are consistent with the value used in the design so this has not been amended.

4.6 The driveway will remain permeable and infiltrating to ground.

4.7 The proposed drainage strategy has been designed so that:

- Flooding does not occur on any part of the site for all events up to 1.0% AEP (1 in 100 years) + 40% climate change allowance.

4.8 The performance of the proposed surface water drainage strategy has been tested for storm events with 100.0% AEP, 3.3% AEP and 1.0% AEP + 40% climate change and durations of 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960 and 1440 minutes.

4.9 The results of the simulations are included in Appendix D and demonstrate how the proposed surface water drainage strategy can manage surface water flood risk at the development site without increasing flood risk elsewhere for storm events up to the 1.0% AEP + 40% climate change allowance.

5. Sustainable Drainage Systems (SuDS)

5.1 In accordance with the *NPPF*, (major) developments should incorporate sustainable drainage systems (SuDS) unless there is clear evidence that this would be inappropriate. In addition to water quantity control, SuDS should consider opportunities to provide water quality and amenity / biodiversity benefits (i.e. multifunctionality approach).

5.2 The proposed drainage strategy is reliant on an infiltration basin to manage runoff quantity. The table below shortlists other SuDS deemed compatible with the site's characteristics and which inclusion in the proposed development must be continuously assessed as the design progresses.

5.3 It is important to note the need to remove silt from runoff prior to discharge into SuDS features. SuDS such as filter drains, swales, bioretention systems and pervious pavements are sustainable alternatives to proprietary treatment systems otherwise required to manage silt.

Table 5.1: Sustainable Drainage Systems (SuDS)

SuDS Component	Description and Opportunities
Green / Blue Roofs	<p>Green roofs are areas of living vegetation installed on the top of buildings for a range of reasons including visual benefit, ecological value, enhanced building performance and reduction of surface water runoff. A blue roof is a roof designed explicitly to store water for use within the building (rainwater harvesting) or controlled discharge. Green roofs that include reservoir storage zones beneath the growing medium could also be considered blue roofs.</p> <p>Green roofs can improve the thermal performance of buildings, help combat the urban heat island effect and contribute to improved air quality.</p> <p>Through evapotranspiration, green roofs can reduce peak flow rates to a site drainage system (principally for small and medium-sized events) but are unlikely to have a significant impact on downstream attenuation storage requirements. Blue roofs can be designed to provide significant attenuation (and evapotranspiration). Should flat roofs be included in the design, green roofs could be considered for these.</p>
Pervious Pavements	<p>Pervious pavements provide a pavement suitable for pedestrian and / or vehicular traffic, while allowing rainwater to infiltrate through the surface and into the underlying structural layers. The water is temporarily stored beneath the overlying surface before use, infiltration to the ground or controlled discharge downstream.</p> <p>Pervious pavements help reduce flow rates from a site by providing attenuation storage. A flow control structure is required to constrain the rate of water discharged from the sub-base via an outlet pipe. Pervious pavement drainage has been shown to have decreased concentrations of a range of surface water pollutants, including heavy metals, oil and grease, sediment and some nutrients. Pervious pavements are typically built as an alternative to impermeable surfaces and therefore require no extra development space for their construction..</p>
Bioretention Systems Tree Pits	<p>Bioretention systems (including rain gardens) are shallow landscaped depressions that can reduce runoff rates and volumes and treat pollution. They also provide attractive landscape features and biodiversity.</p> <p>Bioretention systems can help reduce flow rates from a site by promoting infiltration / evapotranspiration and providing some attenuation storage. Bioretention systems can also provide very effective treatment functionality.</p> <p>Bioretention systems are a very flexible surface water management component that can be integrated into a wide variety of developments / densities using different shapes, materials, planting and dimensions.</p>
Rainwater Harvesting Tanks.	<p>The collection, filtration and storage of rainwater from the roof. The water can then be re-used for toilets, washing machines and general garden use. Below ground tanks assists in keeping the water cool, eliminating bacterial growth, and keeping a high quality of water.</p>

6. Exceedance Events

6.1 In the event of a storm event greater than the 1.0% AEP + 40% climate change, or a failure of the

drainage system, exceedance flows may be generated from the drainage network. Exceedance flows will flow to Hay Green Lane to the north and then along the lane to the north east, as currently occurs, thus not increasing flood risk from the pre-development conditions.

7. Water Quality Management

7.1 The suitability of the proposed drainage strategy to manage the development's pollution risk has been assessed using the simple index approach in *The SuDS Manual* (2015), as summarised in the table below.

Table 7.1: Water Quality Management (Simple Index Approach)

Runoff Route / Treatment Train				
Land Use / SuDS	Hazard Level	TSS	Metals	Hydrocarbons
Pollution Hazard Indices				
Residential roofs	Very Low	0.2	0.2	0.05
SuDS Mitigation Indices				
Infiltration trench / basin		0.6	0.4	0.4
Total SuDS Mitigation Index \geq Pollution Hazard Index (for each contaminant type)				

8. Operation and Maintenance

- 8.1 The function of the surface water drainage system must be understood by those responsible for maintenance, regardless of whether individual components are below ground or on the surface. In any system properly designed, monitored and maintained, performance deterioration can usually be minimised.
- 8.2 The long-term operation and maintenance of the proposed surface water drainage strategy will be the responsibility of entities, as detailed in the table below. Appropriate legal agreements defining maintenance responsibilities and access rights over the lifetime of the proposed development must be established prior to construction.

Table 8.1: Entities Responsible for SuDS Maintenance

SuDS Component	Location	Function	Responsible Entity
Infiltration basin	Landscape area	Store & treat runoff	Owner or private management company

- 8.3 Where the user / benefiter of a system is not responsible for maintenance, then it is important to ensure that they know when the SuDS is not functioning correctly and who to contact if any issue arises.
- 8.4 Maintenance plans are often required to clearly identify who is responsible for maintaining

proposed SuDS as well as the maintenance regime to be applied. Maintenance plans can also form a useful tool for public engagement with SuDS and understanding their wider benefits. The maintenance requirements of the proposed surface water drainage strategy are summarised in the table below.

Table 8.2: Typical Operation and Maintenance Requirements

Operation and Maintenance Activity	SuDS Component
	Infiltration basin
Inspection	■
Litter and debris removal	■
Grass cutting	■
Weed and invasive plant control	□
Shrub management (including pruning)	□
Sediment management	■
Shoreline vegetation management	□
Aquatic vegetation management	□
Vegetation replacement	□
Structure rehabilitation/repair	□
Key: ■ Will be required □ May be required	

9. Drainage During Construction

- 9.1 A plan for managing surface water during the construction phase is provided in Appendix F.
- 9.2 Drainage is typically an early activity in the construction of a development, taking form during the earthworks phase as it is the responsibility of the contractor to manage all construction runoff rates and water quality. However, the connection of piped drainage system to SuDS components should not take place until the end of construction works, unless a robust strategy for silt removal prior to occupation of the site is implemented.
- 9.3 Silt-laden runoff from construction sites represents a common form of waterborne pollution and cannot enter SuDS components not specifically designed to manage this, as it can overwhelm the system and pollute receiving water features. Any gullies and piped systems should be capped off during construction and fully jetted and cleaned prior to connection to SuDS components.
- 9.4 The three principal aspects of drainage during construction are conveying runoff, controlling runoff and trapping sediments:
- Conveyance of runoff can be achieved through small ditches / swales, channels and drains. Runoff control measures should be implemented to ensure that runoff does not overwhelm the temporary drainage system causing flooding on site or elsewhere.

- Control of runoff can be achieved through perimeter ditches or appropriate grading to ensure that any runoff from the construction site stays on site
- Construction runoff should be directed to dedicated settlement basins with adequate upstream sediment and pollution control such as sediment basins, silt fences and straw bales prior to infiltration or off-site discharge.

9.5 Additional conveyance, control and treatment measures should be installed as needed during grading. Slope stability needs to be considered when using open water features to convey, control and treat runoff across the site. Any necessary surface stabilisation measures should be applied immediately on all disturbed areas where construction work is either delayed or incomplete.

9.6 Maintenance inspections should be performed weekly, and maintenance repairs should be made immediately after periods of rainfall.

9.7 All drainage infrastructure (namely underground features) must be protected from damage by construction traffic and heavy machinery through the implementation of measures such as protective barriers and storing construction materials away from the drainage infrastructure.

10. Foul Water Drainage Strategy

10.1 The existing site discharges foul water to a septic tank to the west of barns neighbouring the site. This area is within the same ownership as the development site. **The condition of this tank is unknown, so an alternative system is proposed.**

10.2 In accordance with records obtained from Yorkshire Water (Appendix F), a public foul sewer is located within a small development of houses to the south west of the site. This connects to a combined sewer in Birdwell to the west via a pumped sewer. However, access to the gravity drainage section of the sewer would need access through third party land. Connection to the sewer is therefore not proposed.

10.3 It is proposed to discharge foul water from the site into a new package treatment plant which discharges to a drainage field to the north east of the lodge (Appendix E).

10.4 Infiltration testing determined a V_p between 18.75 and 19.5 (Appendix G). Details of the drainage field calculation are shown on the Drainage Layout in Appendix D.

Document Issue Record

Technical Note No	Rev	Date	Prepared	Reviewed	Approved
B26074-JNP-XX-XX-RP-C-1002	P01	16/04/2025	SLL	LC	LC
B26074-JNP-XX-XX-RP-C-1002	P02	16/10/2025	SLL	LC	LC

List of Appendices

- Appendix A** **Proposed Site Layout**
- Appendix B** **Existing Site Layout**
- Appendix C** **Existing Runoff Rates**
- Appendix D** **Proposed Drainage Strategy**
- Appendix E** **Drainage Calculations**
- Appendix F** **Yorkshire Water Sewer Records**
- Appendix G** **Infiltration Testing Results**

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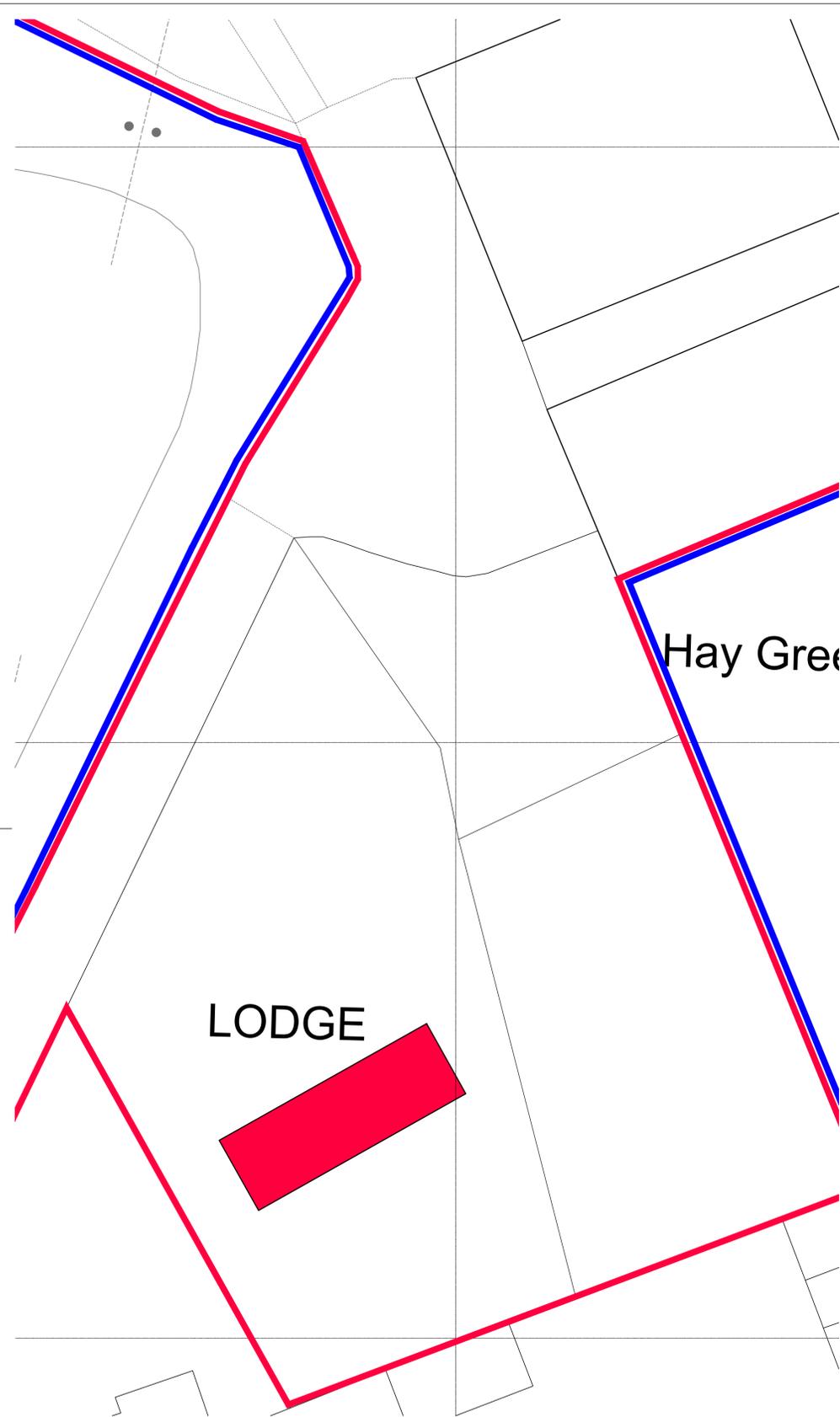
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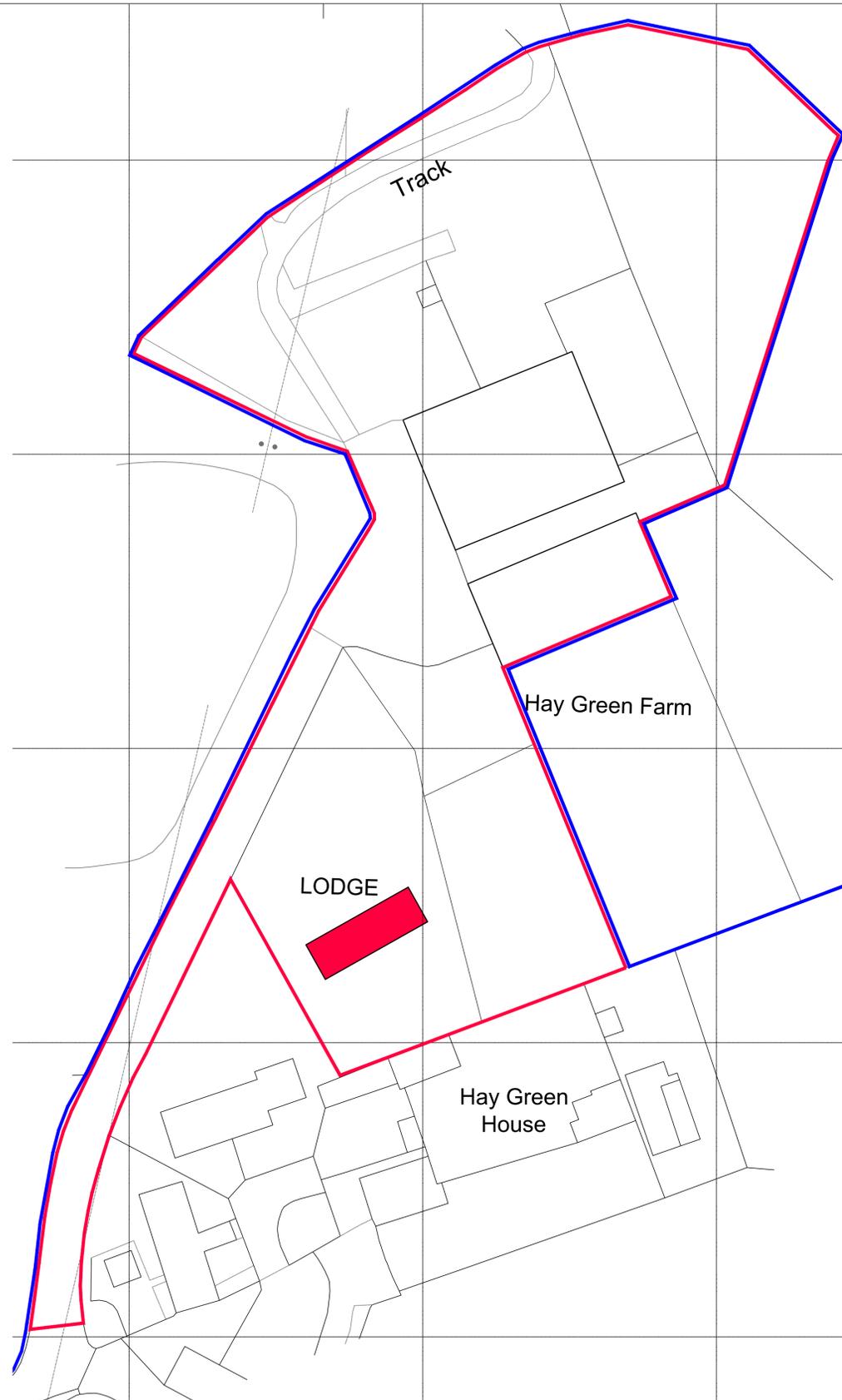
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Appendix A

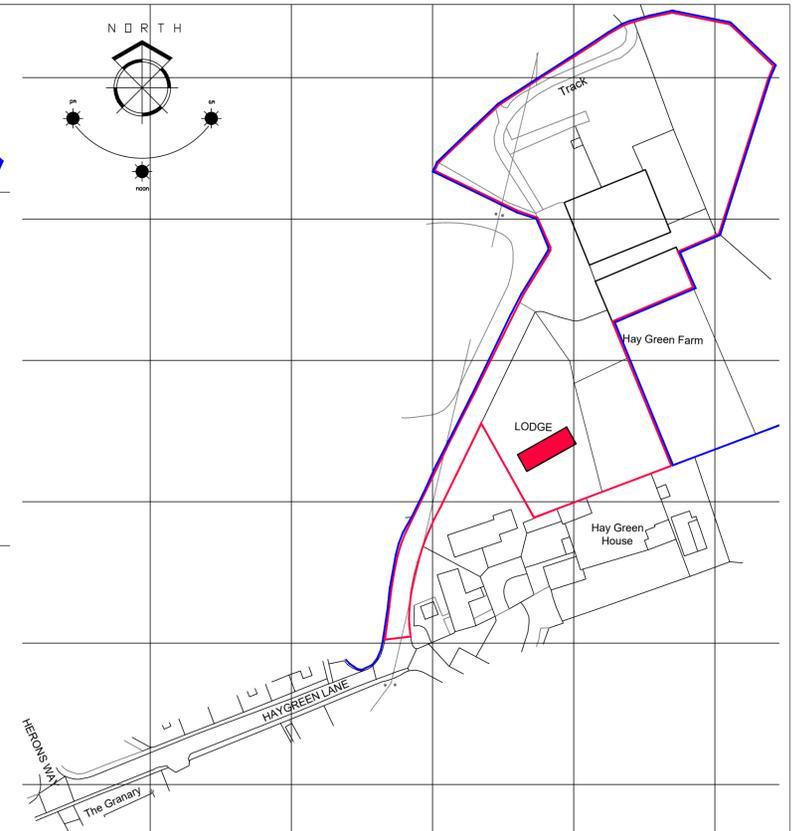
Proposed Site Layout



SITE PLAN SCALE 1:250



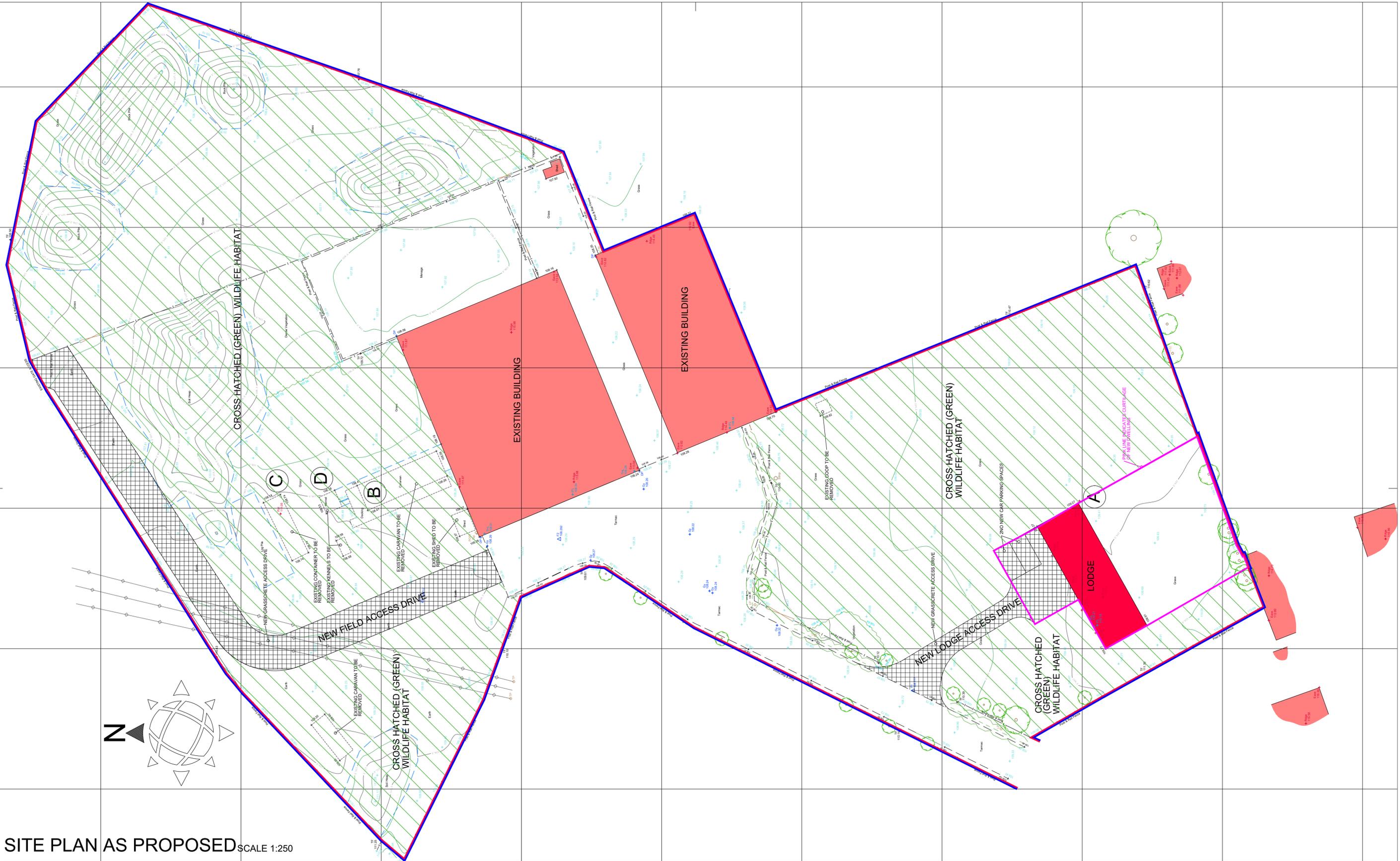
BLOCK PLAN SCALE 1:500



LOCATION PLAN
SCALE 1:1250

Date	Suffix	Description	Date	Suffix	Description

Project.	NEW DWELLING AT HAYGREEN FARM, HAYGREEN LANE, BIRDWELL BARNLSLEY, S70-5XA	Client.	MR S. EATON
Drawing Title.	SITE & LOCATION PLANS	Date.	NOV 2023
Ref.	104-98	Scale.	AS INDICATED
Dwg. No.	01	Rev.	A



SITE PLAN AS PROPOSED SCALE 1:250



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Revisions.

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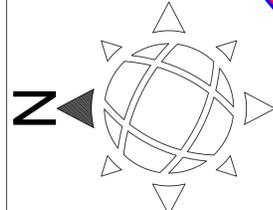
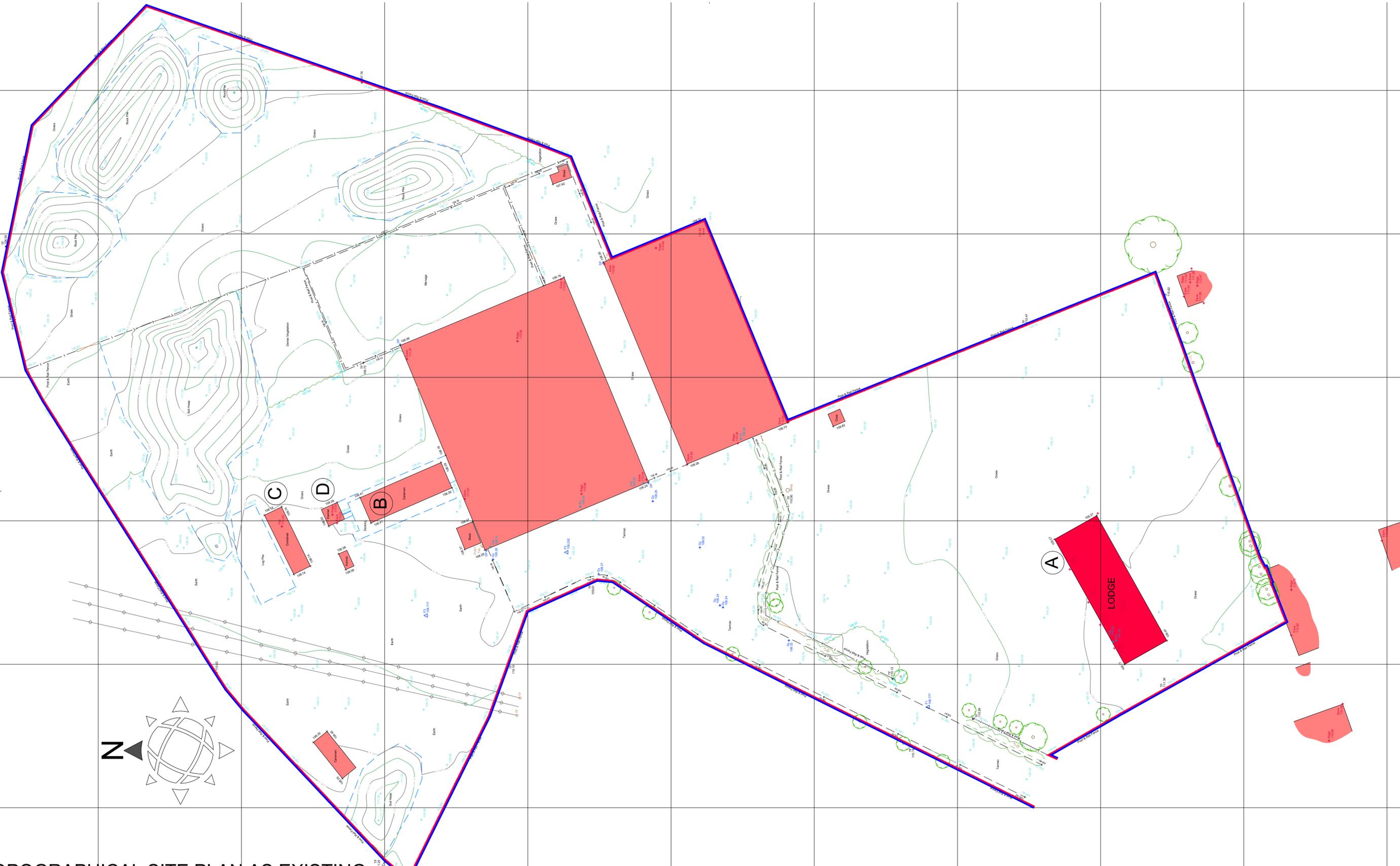
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Project. NEW DWELLING AT HAYGREEN FARM, HAYGREEN LANE, BIRDWELL BARNLSLEY, S70-5XA	Client. MR S. EATON
Drawing Title. PLANNING DRAWING SITE PLAN AS PROPOSED	Date. NOV 2023 Ref. 104-98
Scale. AS INDICATED Dwg. No. 04	Rev. A

SHEET SIZE: A1

Appendix B

Existing Site Layout



TOPOGRAPHICAL SITE PLAN AS EXISTING SCALE 1:250



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Revisions.					
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Project:	NEW DWELLING AT HAYGREEN FARM, HAYGREEN LANE, BIRDWELL BARNSELY, S70-5XA	Client:	MR S. EATON
Drawing Title:	PLANNING DRAWING TOPOGRAPHICAL SURVEY	Date:	NOV 2023
Ref:	104-98	Scale:	AS INDICATED
		Dwg. No.:	03
		Rev.:	

Appendix C

Existing Runoff Rates

Woodvale House Woodvale Road Brighthouse, HD6 4AB	New Dwelling at Haygreen Farm, Haygreen Lane Birdwell, Barnsley, S70 5XA
Date 25/04/2025 File S12716-JNP-92-XX-CA-	Designed by CPY Checked by SL



Innovyze Source Control 2020.1.3

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	1.000	Urban	0.000
SAAR (mm)	751	Region Number	Region 3

Results 1/s

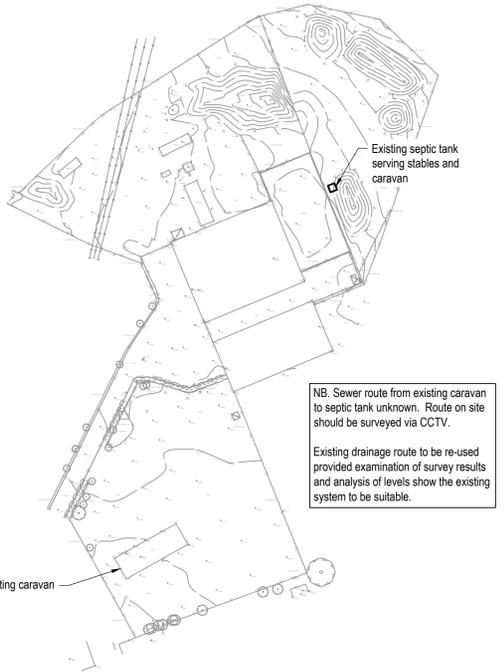
QBAR Rural 2.0
QBAR Urban 2.0

Q100 years 4.1

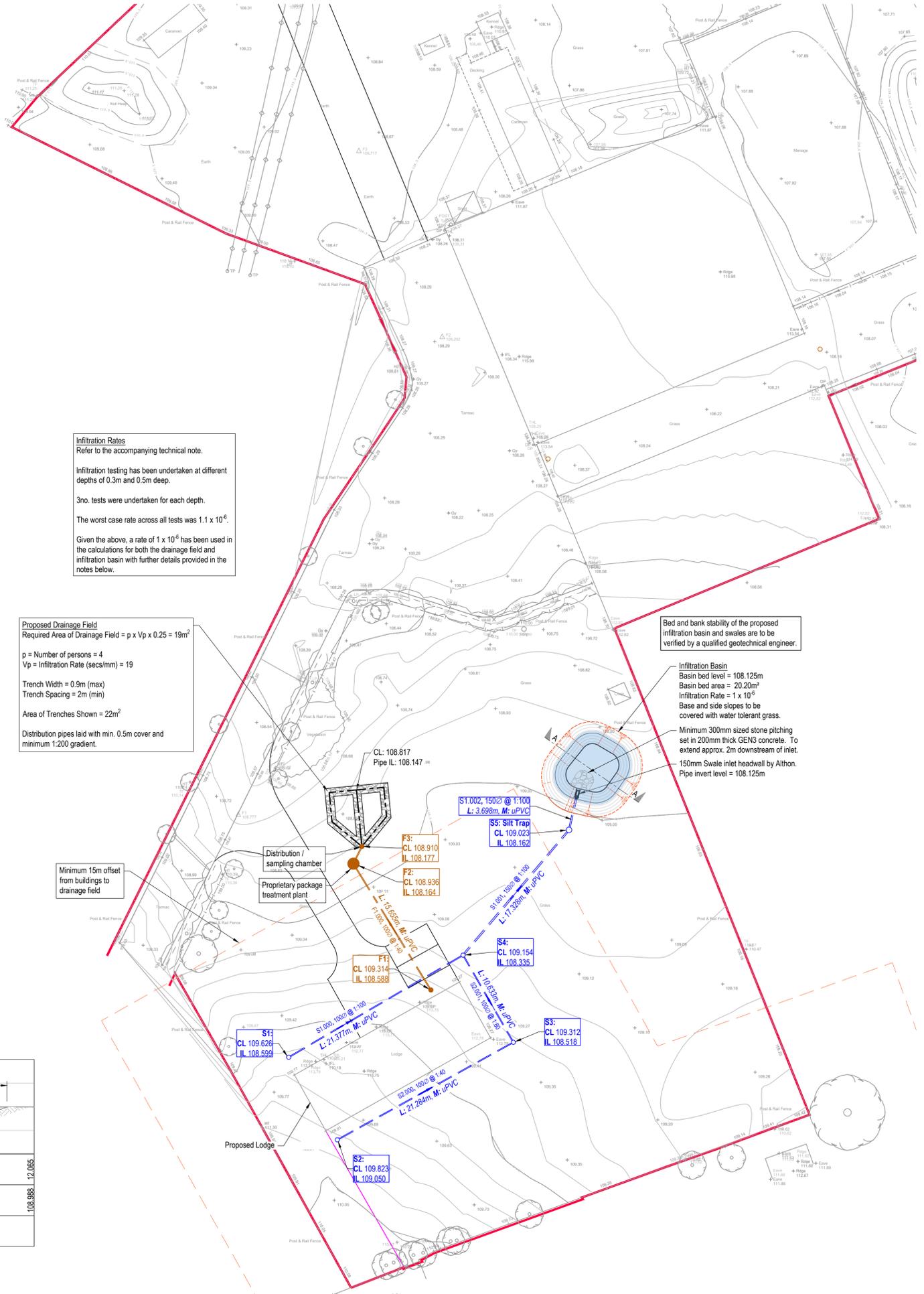
Q1 year 1.7
Q30 years 3.5
Q100 years 4.1

Appendix D

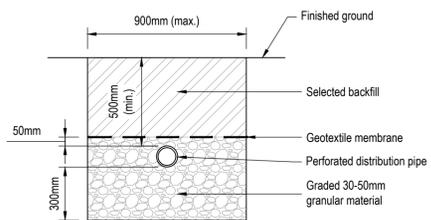
Proposed Drainage Strategy



Existing Site Layout
(Scale 1:1000)



Proposed Drainage Layout
(Scale 1:250)



Drainage Field Typical Detail
(Scale 1:20)

Infiltration Rates
Refer to the accompanying technical note.

Infiltration testing has been undertaken at different depths of 0.3m and 0.5m deep.

3no. tests were undertaken for each depth.

The worst case rate across all tests was 1.1 x 10⁶.

Given the above, a rate of 1 x 10⁶ has been used in the calculations for both the drainage field and infiltration basin with further details provided in the notes below.

Proposed Drainage Field
Required Area of Drainage Field = p x Vp x 0.25 = 19m²

p = Number of persons = 4
Vp = Infiltration Rate (secs/mm) = 19

Trench Width = 0.9m (max)
Trench Spacing = 2m (min)

Area of Trenches Shown = 22m²

Distribution pipes laid with min. 0.5m cover and minimum 1:200 gradient.

Infiltration Basin Section A-A
(Scale 1:100)

Chainage (m)	0.000	5.000	10.000	12.665
Existing Ground Levels (m)	108.937	108.949	108.973	108.988
Proposed Ground Level (m)	108.125	108.949	108.673	108.988

Infiltration Basin Section A-A
(Scale 1:100)

Private Drainage Notes

- This drawing is to be read in conjunction with and checked against all other drawings, engineering details, specification and any structural, geotechnical or other specialist documents provided.
- All pipes to be vitrified clay or UPVC and shall be 100mmØ laid to a fall of 1:80 unless noted otherwise or indicated by size and invert levels. All connections when laid shall be plugged, protected as necessary and marked with a stake for future use.
- Building drainage shall comply with BS 8301 1985, BS EN 752 and Building Regulations Part H. Inspection chambers located within garages to have double seal bolt down covers.
- Gully top and manhole cover specification to be in accordance with BS EN 124 and located in accordance with the intended use and loading classification as described within groups 1-6:
- This drawing is schematic for clarity only, positions of pipe runs and manholes may vary on site due to site conditions.
- Connections to pre-formed inspection chamber bases should ensure the main channel is used in all cases. High velocity discharges (e.g. from SVPs) should use the main channel where practicable.
- Cover and invert levels are indicative and may vary on site. In any case the following minimum cover to depth of cover to the crown of pipes without protection shall be as follows:
 - Domestic gardens and pathways without any possibility of vehicular access - 0.35m
 - Domestic driveways, parking areas and yards with height restrictions to prevent entry by vehicles with a gross weight in excess of 7.5 tonnes - 0.5m
 - Domestic driveways, parking areas and narrow streets without footways (e.g. Mews developments) with limited access for vehicles with a gross weight in excess of 7.5 tonnes - 0.9m
 - Agricultural land and public open space - 0.9m
 - Other highways and parking areas with unrestricted access to vehicles with a gross weight in excess of 7.5 tonnes - 1.2m

Note: any protection required where drainage does not comply with a-e above shall be as follows:-

- Vitrified clay pipes - provide a 100mm min. thick concrete bed and surround (instead of class 'S' bedding) and a 13mm thick compressible filter at each joint.
- UPVC pipes - provide a concrete bridging (in addition to class 'S' bedding) in accordance with appendix A15, Building Regulations part 'H'.

Note: in-situ concrete used in connection with a) and b) above shall be standard mix GEN3 in accordance with BS 5328.

- Where pipes pass under buildings, unless beam & block floors are used, they are to be surrounded in concrete.
- All branch drains, or connections, are to discharge to the collectors obliquely, and in the direction of the main flow.
- Finished floor levels (FFL's), assumed to be typically a minimum of 150mm above finished ground level outside, refer to architects drawing for details.
- All new private shallow 225mm diameter surface water and foul inspection chambers and rodding eyes shown without cover levels (CL) shall be assumed to be at external ground level, and invert levels (IL) are to be typically between 450 and 600mm below CL, subject to the length of the internal house connections.
- All low spots on hardstanding areas to have double gullies.
- Prior to topsoiling of rear gardens, the gardens should be reworked, rotovated or decompacted to a depth of 600mm. Once this is carried out, no plant is to access these areas, any further consolidation of subsoil to be reworked as necessary. Before reworking or rotovating the Contractor is to mark all drain runs in the area.
- Pipe bedding to be Class 'S' bedding (100mm granular bed and surround).
- Excavations for manholes, pipe runs etc located within a 45 degree load distribution splay from any adjoining existing foundations, are to be adequately supported for the duration of the works and building drainage protected.
- Foundations adjacent to pipe runs or manholes are to have their formation level set above the invert level no higher than the equivalent of the horizontal distance between the pipe/excavation trench and the foundation, minus 500 mm.
- Where excavations for pipe runs are parallel and in close proximity to each other and/or other service trenches, the contractor shall ensure that adequate safety measures, including temporary shoring, are provided in line with current health & safety Legislation and good practice. Particular attention is to be paid to adjacent trenches of differing invert levels.
- All existing drainage found on site during the works shall be investigated, its operational status confirmed, and the following applied:-
 - Inoperative drainage shall be cut back and pipe runs filled with concrete grout.
 - 'Live' drainage shall be temporarily re-routed to allow the new drainage to be constructed.
- Where existing drainage is to be re-used including road, building and external drainage systems, the contractor shall ensure that all chambers and drainage runs are cleaned, de-silted and made good.
- Covers to existing chambers to be re-used shall be replaced where necessary to suit proposed development loading class, see note 5. Chamber covers shall also be adjusted to suit final ground levels as necessary.
- Where necessary, existing chambers shall be re-benched to suit new pipework arrangement.
- The Contractor shall consider and take adequate measures to ensure surface water runoff during construction is managed to prevent pollution of surface water receptors and increased flood risk.

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HAZARD IDENTIFICATION BOX			
This table is provided to assist the Principal Contractor to fulfil their obligations under the CDM Regulations 2015			
Hazard Ref	Hazard Type	Hazard Description	Mitigation Measures/Residual Risk
▲	Construction/Management/Working/Excavation/Installation		

Rev.	Date	Description	Drn / Chk / Apprd
P03	16/10/2025	Site layout updated to show access drive and drainage field moved to avoid access drive	LC / SL
P02	10/10/2025	Foul water outlet revised to discharge to drainage field	LC / SL
P01	07/05/2025	First Issue	CY / SH / SL

Submittal: **S4 - Suitable for Stage Approval**

JNP GROUP
CONSULTING ENGINEERS

Amersham • Belfast • Brighouse • Bristol
Hartlepool • Sheffield • Warwick

www.jnpgroup.co.uk

Client: **Mr S. Eaton**

Job: **New Dwelling at Hay Green Farm, Hay Green Lane, Birdwell, Barnsley, S70 5XA**

Title: **Drainage Plan**

Classification: **FI_60_20**

Scale @ A1: **As Shown**

Accredited Contractor: **HAS**

Constructionline: **Constructionline**

Supplier to others: **Supplier to others**

Project - Originator - Volume/System - Level/Location - Type - Discipline - Number

S12716 - JNP - 92 - XX - DR - C - 2000

Revision: **P03**

Appendix E

Drainage Calculations

JNP Group		Page 1
Woodvale House Woodvale Road Brighthouse, HD6 4AB	New Dwelling Hay Green Farm Birdwell, Barnsley, S70 5XA	
Date 07/05/2025 File	Designed by CPY Checked by SH	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.353	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	21.284	0.266	80.0	0.007	4.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	10.633	0.315	33.8	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	21.377	0.384	55.7	0.007	4.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	17.328	0.173	100.2	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.003	3.698	0.045	82.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	2.000#	0.010	200.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.41	109.123	0.007	0.0	0.0	0.0	0.86	6.8	0.9
1.001	50.00	4.55	108.857	0.007	0.0	0.0	0.0	1.33	10.5	0.9
2.000	50.00	4.34	108.926	0.007	0.0	0.0	0.0	1.03	8.1	0.9
1.002	50.00	4.92	108.542	0.014	0.0	0.0	0.0	0.77	6.0	1.9
1.003	50.00	4.98	108.319	0.014	0.0	0.0	0.0	1.11	19.6	1.9
1.004	50.00	5.02	108.125	0.014	0.0	0.0	0.0	0.71	12.5	1.9

JNP Group		Page 2
Woodvale House Woodvale Road Brighthouse, HD6 4AB	New Dwelling Hay Green Farm Birdwell, Barnsley, S70 5XA	
Date 07/05/2025 File	Designed by CPY Checked by SH	
Innovyze	Network 2020.1.3	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.007	0.007	0.007
1.001	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.007	0.007	0.007
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.014	0.014	0.014

JNP Group		Page 3
Woodvale House Woodvale Road Brighthouse, HD6 4AB	New Dwelling Hay Green Farm Birdwell, Barnsley, S70 5XA	
Date 07/05/2025 File	Designed by CPY Checked by SH	
Innovyze	Network 2020.1.3	

Online Controls for Storm

Pump Manhole: 6, DS/PN: 1.004, Volume (m³): 0.2

Invert Level (m) 108.125

JNP Group		Page 4
Woodvale House Woodvale Road Brighthouse, HD6 4AB	New Dwelling Hay Green Farm Birdwell, Barnsley, S70 5XA	
Date 07/05/2025 File	Designed by CPY Checked by SH	
Innovyze	Network 2020.1.3	

Storage Structures for Storm

Infiltration Basin Manhole: 6, DS/PN: 1.004

Invert Level (m) 108.125 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00360 Porosity 1.00
 Infiltration Coefficient Side (m/hr) 0.00360

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	20.2	0.400	44.3	0.800	70.4
0.200	31.1	0.600	59.7		

JNP Group		Page 5
Woodvale House Woodvale Road Brighthouse, HD6 4AB	New Dwelling Hay Green Farm Birdwell, Barnsley, S70 5XA	
Date 07/05/2025 File	Designed by CPY Checked by SH	
Innovyze	Network 2020.1.3	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.353
Region England and Wales Cv (Summer) 1.000
M5-60 (mm) 19.000 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.
1.000	1	15 minute 1 year Summer I+0%	109.823	109.153	-0.070	0.000	0.19
1.001	2	15 minute 1 year Summer I+0%	109.312	108.881	-0.076	0.000	0.13
2.000	3	15 minute 1 year Summer I+0%	109.626	108.953	-0.073	0.000	0.16
1.002	3	15 minute 1 year Summer I+0%	109.154	108.588	-0.054	0.000	0.43
1.003	4	15 minute 1 year Summer I+0%	109.023	108.363	-0.106	0.000	0.19
1.004	6	1440 minute 1 year Winter I+0%	109.000	108.278	0.003	0.000	0.00

		Pipe		
		US/MH Overflow	Flow	
PN	Name	(l/s)	(l/s)	Status
1.000	1	1.3		OK
1.001	2	1.3		OK
2.000	3	1.3		OK
1.002	3	2.5		OK
1.003	4	2.5		OK
1.004	6	0.0		SURCHARGED

JNP Group		Page 6
Woodvale House Woodvale Road Brighthouse, HD6 4AB	New Dwelling Hay Green Farm Birdwell, Barnsley, S70 5XA	
Date 07/05/2025	Designed by CPY	
File	Checked by SH	
Innovyze	Network 2020.1.3	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.353
Region England and Wales Cv (Summer) 1.000
M5-60 (mm) 19.000 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.
1.000	1	15 minute 30 year Summer I+0%	109.823	109.171	-0.052	0.000	0.47
1.001	2	15 minute 30 year Summer I+0%	109.312	108.896	-0.061	0.000	0.31
2.000	3	15 minute 30 year Summer I+0%	109.626	108.970	-0.056	0.000	0.39
1.002	3	15 minute 30 year Summer I+0%	109.154	108.654	0.012	0.000	1.04
1.003	4	1440 minute 30 year Winter I+0%	109.023	108.410	-0.059	0.000	0.02
1.004	6	1440 minute 30 year Winter I+0%	109.000	108.410	0.135	0.000	0.00

Pipe

PN	US/MH Name	Overflow (l/s)	Flow (l/s)	Status
1.000	1	3.1		OK
1.001	2	3.1		OK
2.000	3	3.1		OK
1.002	3	6.0	SURCHARGED	
1.003	4	0.3		OK
1.004	6	0.0	SURCHARGED	

JNP Group		Page 7
Woodvale House Woodvale Road Brighthouse, HD6 4AB	New Dwelling Hay Green Farm Birdwell, Barnsley, S70 5XA	
Date 07/05/2025	Designed by CPY	
File	Checked by SH	
Innovyze	Network 2020.1.3	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.353
Region England and Wales Cv (Summer) 1.000
M5-60 (mm) 19.000 Cv (Winter) 1.000

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)

Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

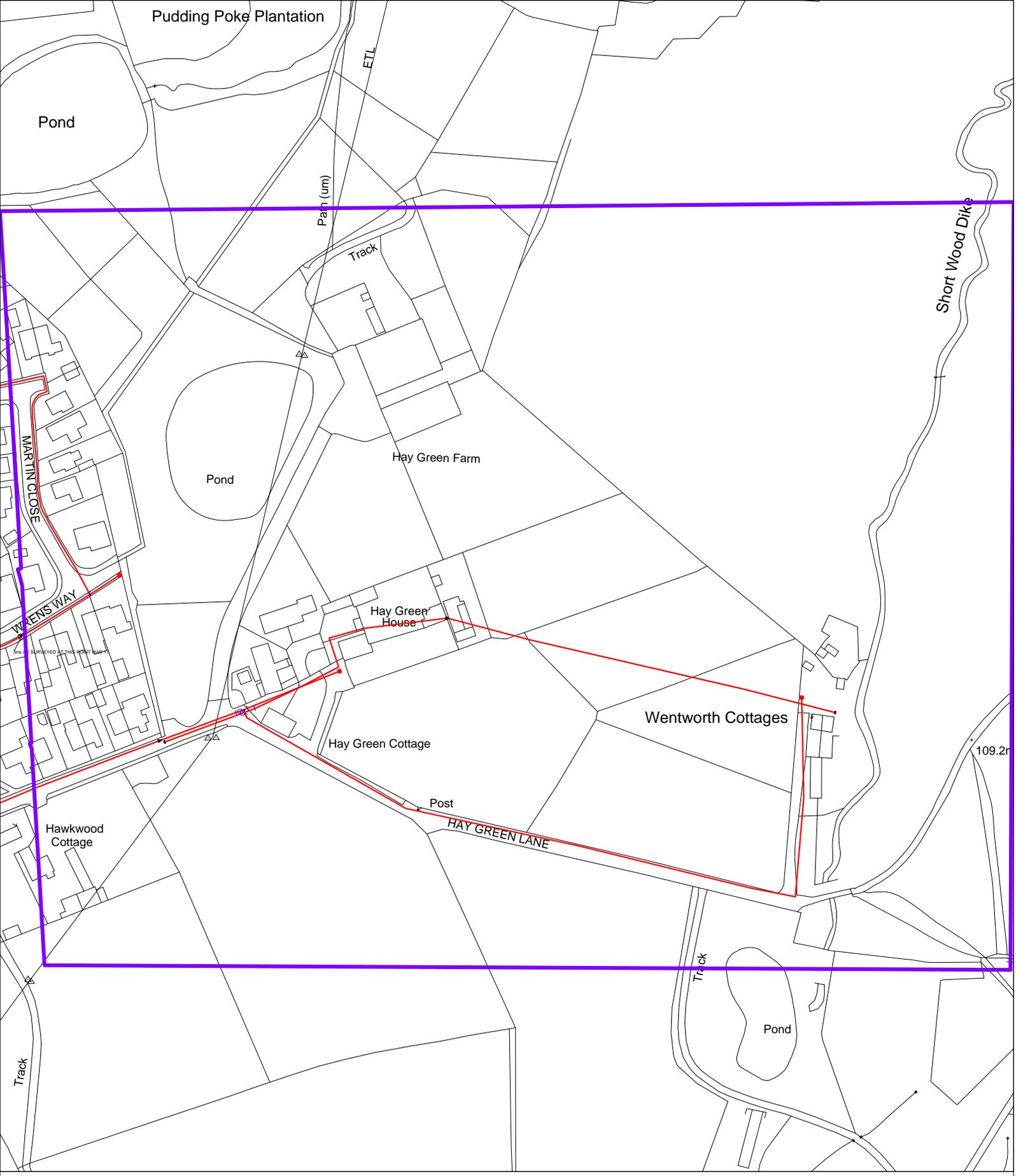
PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.
1.000	1	15 minute 100 year Summer I+40%	109.823	109.195	-0.028	0.000	0.86
1.001	2	15 minute 100 year Summer I+40%	109.312	109.021	0.064	0.000	0.50
2.000	3	15 minute 100 year Summer I+40%	109.626	109.095	0.069	0.000	0.65
1.002	3	15 minute 100 year Summer I+40%	109.154	108.943	0.301	0.000	1.65
1.003	4	1440 minute 100 year Winter I+40%	109.023	108.568	0.099	0.000	0.04
1.004	6	1440 minute 100 year Winter I+40%	109.000	108.569	0.294	0.000	0.00

Pipe

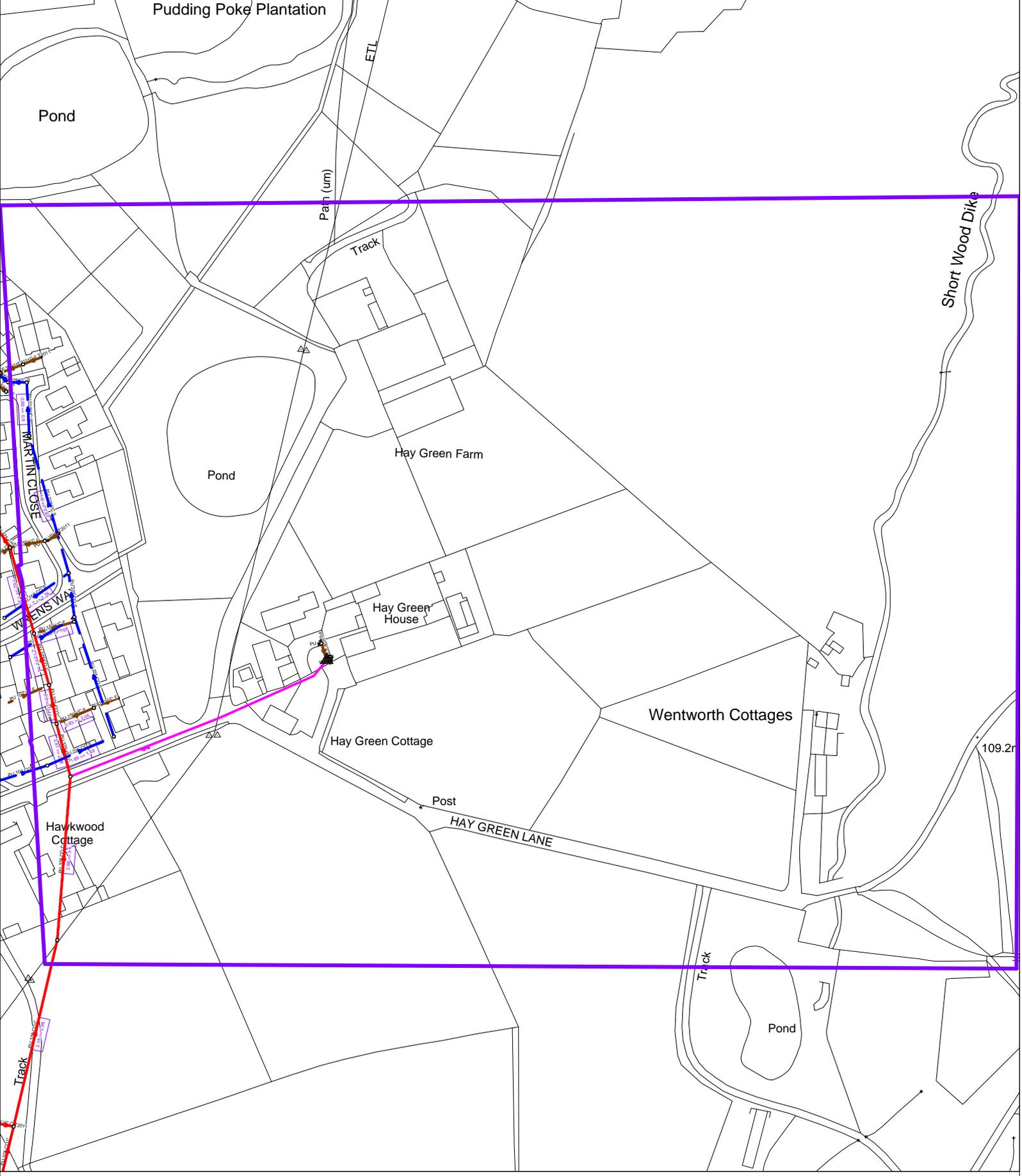
PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status
1.001	2	4.9	FLOOD RISK	
2.000	3	5.1	SURCHARGED	
1.002	3	9.5	FLOOD RISK	
1.003	4	0.5	SURCHARGED	
1.004	6	0.0	SURCHARGED	

Appendix F

Yorkshire Water Sewer Records



Public Clean Water Network 23/04/2025 16:09:36 OS Grid Coordinates: 434943 : 401347 Map Name : SE3401SE svcGISSafeMovePD



Public Waste Water Network 23/04/2025 16:09:37 OS Grid Coordinates: 434943 : 401347 Map Name : SE3401SE svcGISSafeMovePD

Appendix G

Infiltration Testing Results



Test Location:

Pit 2

Test No: 2

Date: 15 Sep 2025

Water level during test

Time mins	Depth m bgl
0	0.140
5	0.205
10	0.240
15	0.255
30	0.265
45	0.275
105	0.285
165	0.295
225	0.310
285	0.320
345	0.330
405	0.340
465	0.350
525	0.360
585	0.370
1065	0.450
1125	0.460
1185	0.470
1245	0.480
1305	0.490
1365	0.500

Trial pit dimensions

depth (m)	0.50
length (m)	0.30
width (m)	0.30

$$f = \frac{V_{p75-25}}{a_{s50} \times t_{p75-25}}$$

f = soil infiltration rate

V_{p75-25} = volume of water from 75% to 25% effective depth

a_{s50} = internal surface area at 50% effective depth

t_{p75-25} = time for the water level to fall from 75% to 25% effective depth

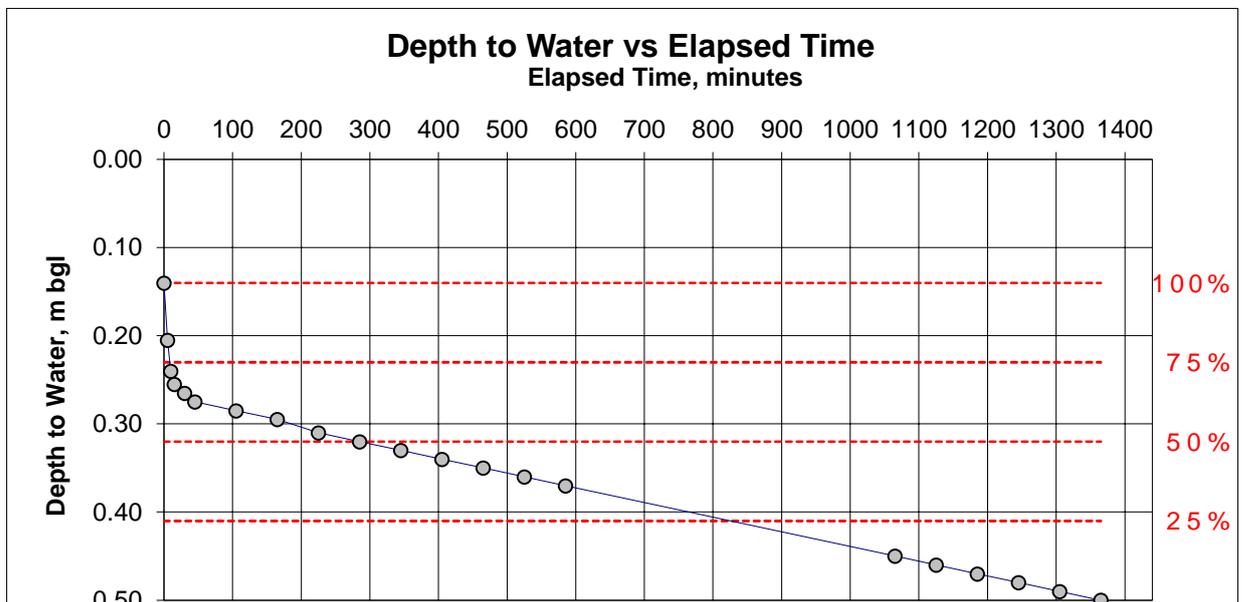
time at 75% effective depth (mins) 10

time at 25% effective depth (mins) 840

(from graph)

Calculated Soil Infiltration Rate = 1.1E-06 m/sec

.49.



Test Location: Pit 2 Test No: 1 Date: 12 Sep 2025

Water level during test

Time mins	Depth m bgl
0	0.140
5	0.205
10	0.240
15	0.255
30	0.265
60	0.275
120	0.285
180	0.295
240	0.305
300	0.315
360	0.325
420	0.335
480	0.345
540	0.355
600	0.365
660	0.375
720	0.385
780	0.395
1440	0.495

Trial pit dimensions

depth (m)	0.50
length (m)	0.30
width (m)	0.30

$$f = \frac{V_{p75-25}}{a_{s50} \times t_{p75-25}}$$

f = soil infiltration rate

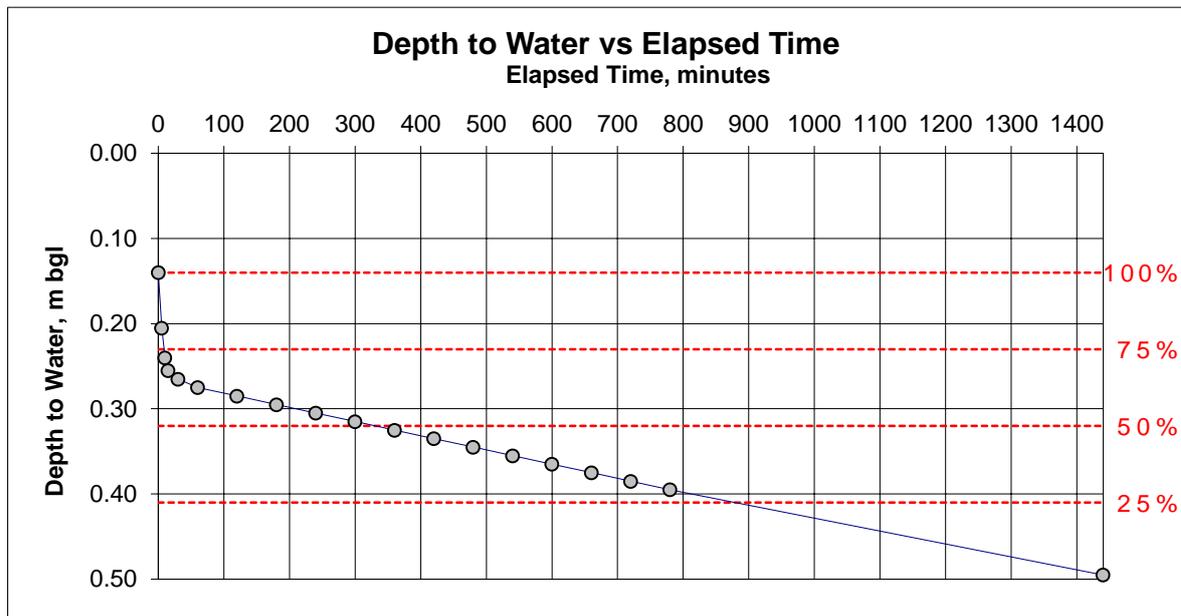
V_{p75-25} = volume of water from 75% to 25% effective depth

a_{s50} = internal surface area at 50% effective depth

t_{p75-25} = time for the water level to fall from 75% to 25% effective depth

time at 75% effective depth (mins) 10
time at 25% effective depth (mins) 850
(from graph)

Calculated Soil Infiltration Rate = 1.1E-06 m/sec





Test Location:

Pit 1

Test No: 1

Date: 12 Sep 2025

Water level during test

Time mins	Depth m bgl
0.00	0.140
5.00	0.203
10.00	0.240
15.00	0.255
30.00	0.265
60.00	0.275
120.00	0.285
210.00	0.300

Trial pit dimensions

depth (m)	0.30
length (m)	0.30
width (m)	0.30

$$f = \frac{V_{p75-25}}{a_{s50} \times t_{p75-25}}$$

f = soil infiltration rate

V_{p75-25} = volume of water from 75% to 25% effective depth

a_{s50} = internal surface area at 50% effective depth

t_{p75-25} = time for the water level to fall from 75% to 25% effective depth

time at 75% effective depth (mins)

4

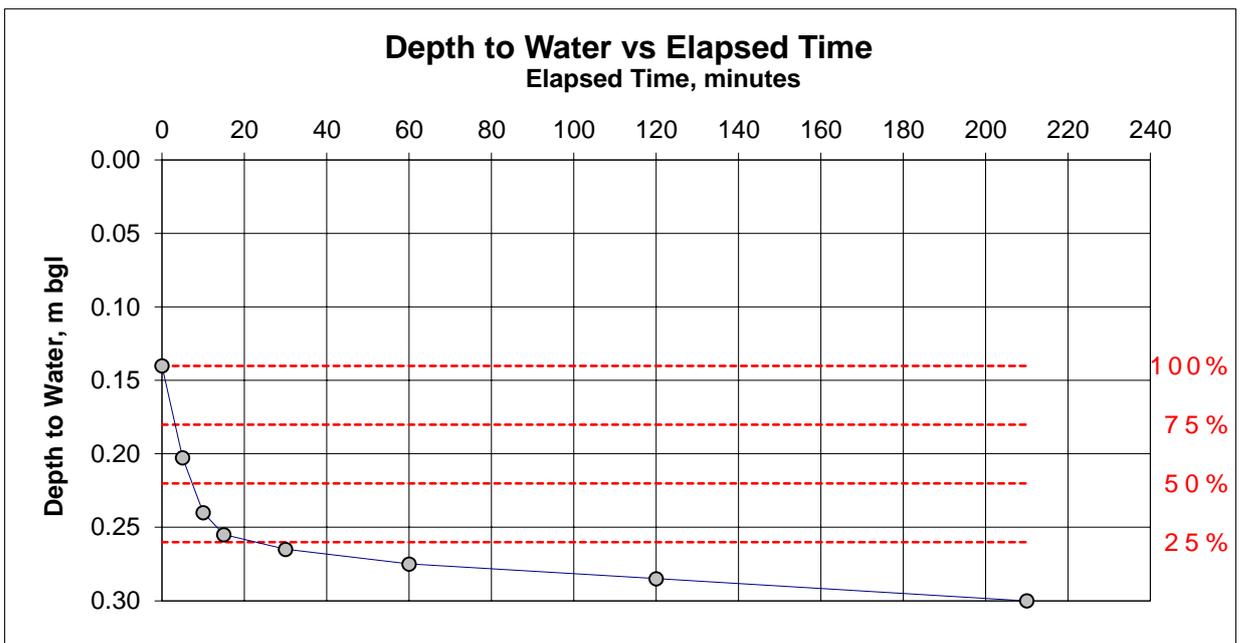
time at 25% effective depth (mins)

30

(from graph)

Calculated Soil Infiltration Rate =

2.5E-05 m/sec





Test Location:

Pit 1

Test No: 2

Date: 15 Sep 2025

Water level during test

Time mins	Depth m bgl
0	0.140
5	0.205
10	0.240
15	0.255
30	0.265
45	0.275
105	0.285
165	0.295

Trial pit dimensions

depth (m)	0.30
length (m)	0.30
width (m)	0.30

$$f = \frac{V_{p75-25}}{a_{s50} \times t_{p75-25}}$$

f = soil infiltration rate

V_{p75-25} = volume of water from 75% to 25% effective depth

a_{s50} = internal surface area at 50% effective depth

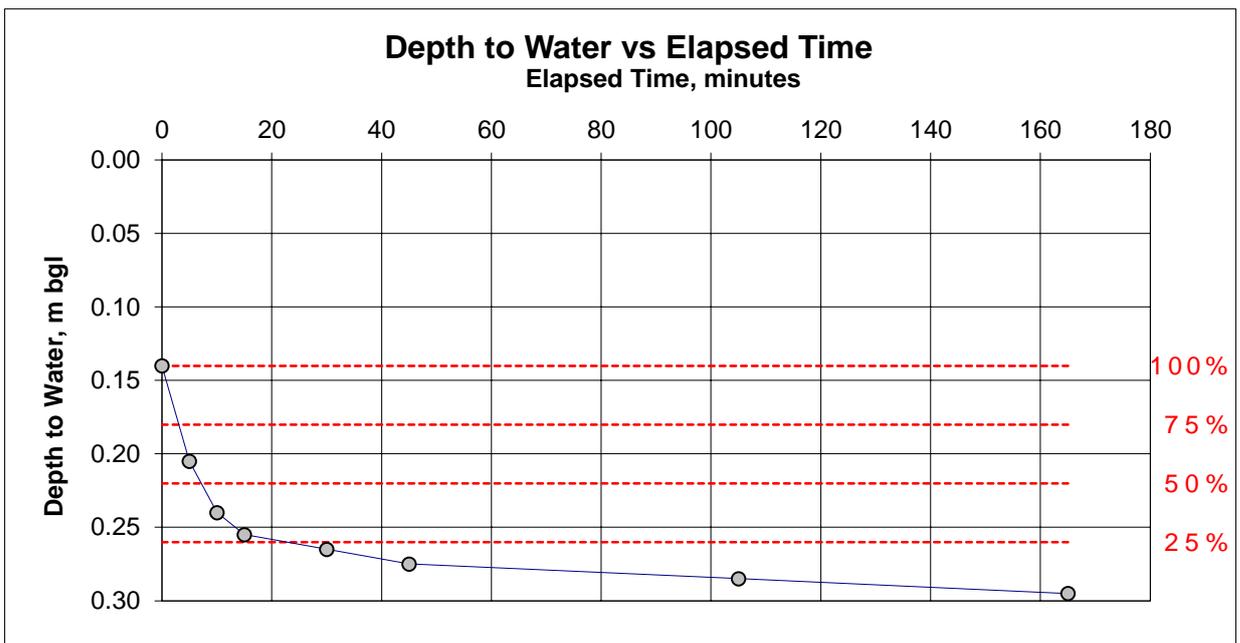
t_{p75-25} = time for the water level to fall from 75% to 25% effective depth

time at 75% effective depth (mins) 4

time at 25% effective depth (mins) 30

(from graph)

Calculated Soil Infiltration Rate = 2.5E-05 m/sec





Test Location:

Pit 1

Test No: 3

Date: 16 Sep 2025

Water level during test

Time mins	Depth m bgl
0	0.140
5	0.205
10	0.240
15	0.255
45	0.265
75	0.275
185	0.285
245	0.295

Trial pit dimensions

depth (m)	0.30
length (m)	0.30
width (m)	0.30

$$f = \frac{V_{p75-25}}{a_{s50} \times t_{p75-25}}$$

f = soil infiltration rate

V_{p75-25} = volume of water from 75% to 25% effective depth

a_{s50} = internal surface area at 50% effective depth

t_{p75-25} = time for the water level to fall from 75% to 25% effective depth

time at 75% effective depth (mins)

3

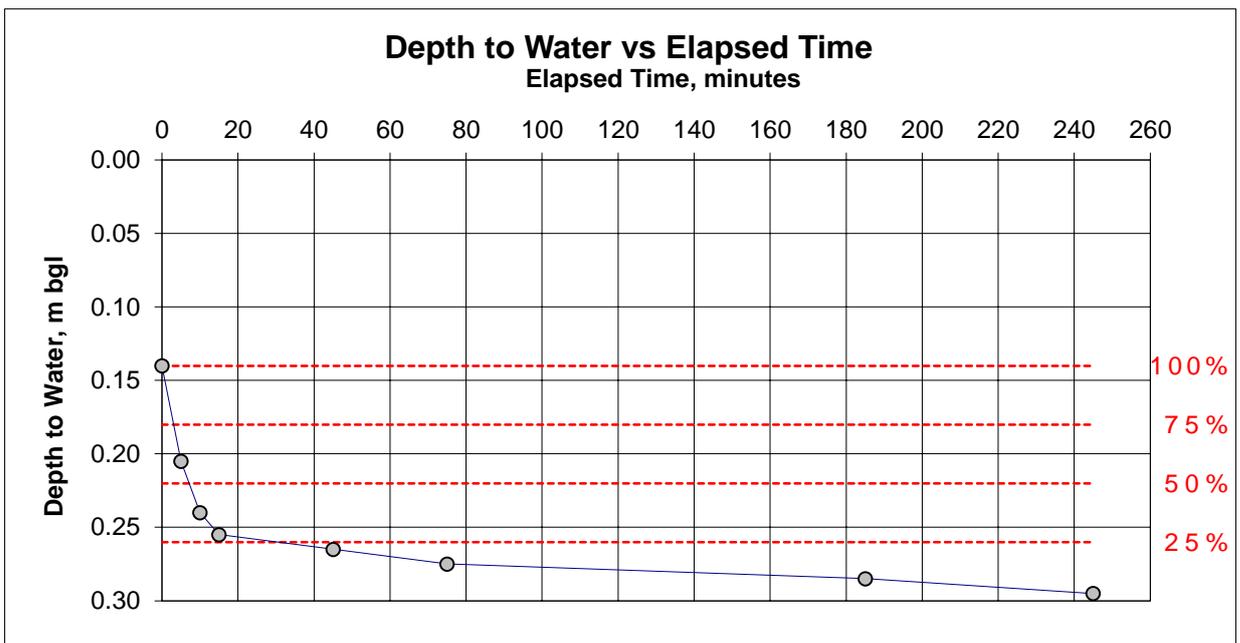
time at 25% effective depth (mins)

28

(from graph)

Calculated Soil Infiltration Rate =

2.6E-05 m/sec



Drainage field

	Time to drop 75% > 25% (min)	Time to drop 75% - > 25% (sec)	Vp
Test 1	26	1560	19.5
Test 2	26	1560	19.5
Test 3	25	1500	18.75
Depth of water in the pit = 160mm			