Job name: Land off Marsh Lane, Shepley

Job No: B26074-JNP-XX-XX-RP-C-1002 P02

Date: 18/06/2025

Subject: Drainage Statement

1. Introduction

1.1 JNP Group was instructed by Halstead Homes (Yorkshire) Ltd to develop a drainage strategy for:

Land off Marsh Lane,
Shepley,
Huddersfield,
HD8 8AS

hereinafter referred to as 'the site'.

1.2 This document summarises the rationale supporting the drainage strategy.

1.3 The site is located off Marsh Lane, in Shepley, Huddersfield approximately 8.3 km southeast of Huddersfield town centre. The centre of the site is located at National Grid Reference 418729, 409411. The site covers an area of approximately 0.35 hectares (Appendix A).

1.4 The site has previously been used for farming and is a greenfield site (Appendix B).

2. Existing Drainage

2.1 The undeveloped (greenfield) development site does not benefit from a formal surface water or foul water drainage system. Surface water runoff generated within the site is expected to infiltrate into the ground or flow overland towards the south.

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

Table 6.1 Greenfield Run-off Rates (IH124 method)

Return Period	Growth Factor	Flow Rate (l/s)
Q1	0.86	0.6
Q_{BAR}	n/a	0.7
Q30	1.75	1.1
Q100	2.08	1.4

2.3 Greenfield runoff volumes of 56m^3 have been estimated for the 1.0% AEP and 6 hour duration event using the FSR/FEH Greenfield Runoff methodology.

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 the Grenoside Sandstone which is part of the Pennine Lower Coal Measures. Infiltration testing has been undertaken at the site as detailed in B26074-JNP-XX-XX-RP-G-1001-P01, dated April 2025, which identified in the following infiltration rates:

- WS04 (south west of site)
    - Test 1 5.8×10^{-6} ms
    - Test 2 4.5×10^{-6} ms
    - Test 3 4.5×10^{-6} ms
- WS09 (south east of the site)
    - Test 1 2.6×10^{-5} ms
    - Test 2 1.4×10^{-5} ms
    - Test 3 1.2×10^{-5} ms

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

Discharge to Surface Water Body

3.4 The Push Beck is located c. 275m to the south of the site. Access can be gained through the third-party land between the site and the watercourse. Therefore discharge of surface water to a watercourse is also considered viable.

Discharge to Sewer

3.5 As discharge to groundwater and / or surface water is proposed, discharge to sewer is not considered further.

4. Proposed 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 (0.235 ha). Refer to the drawing in Appendix D.

4.2 The proposed drainage strategy intends to collect runoff via a combination of rainwater pipes, permeable paving and gullies/drainage channels before discharging into a series of below ground drainage networks. A hybrid system is proposed, infiltrating some water into the underlying sandstone where possible and the remainder discharged to the watercourse as close to greenfield rates as practicable. Space limitations and the slope of the site have made this approach necessary.

4.3 Plot soakaways are proposed where space permits which is limited to plots 6, 7 and 8, allowing for the necessary offsets from buildings. These soakaways are designed to take only the runoff generated from each individual plot so not to introduce future complications and agreements between homeowners. The soakaway test results were variable. Therefore a conservative approach has been used and an average of the worst-case test location results have been adopted of 5×10^{-6}.

4.4 The main access roads are drained via permeable paving which again infiltrates to ground. Given the sloping nature of the site the paving is segmented using concrete check dams to maximise the storage potential of the paving. A 'dry corridor' is provided as indicated on the drawings to allow for services to be located within the roads to serve the plots.

4.5 The remaining plots and associated hardstanding areas are drained offsite via a flow control and attenuation tank towards the watercourse to the south. A new headwall outfall to the watercourse is required which will be subject to an Ordinary Watercourse Consent.

4.6 As the volume of runoff leaving the proposed development cannot be wholly reduced to greenfield values through infiltration, the proposed drainage strategy has been designed to limit off-site discharges as close to greenfield rates as practicable without increasing flooding through the possibility of blockage of the flow control. The minimum allowable orifice size for the flow control is 75mm diameter as required by Kirklees Council, which results in a flow rate of 3 l/s.

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 E 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 While the proposed drainage strategy is largely reliant on permeable paving and cellular tanks 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 6.2: Sustainable Drainage Systems (SuDS)

SuDS Component	Description and Opportunities
Green / Blue Roofs	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. Green roofs can improve the thermal performance of buildings, help combat the urban heat island effect and contribute to improved air quality. 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 a 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.
Pervious Pavements	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. 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. Permeable paving is proposed for the main access roads.
Attenuation Storage Tanks	Attenuation storage tanks are used to create a below-ground void space for the temporary storage of surface water before use, infiltration or controlled release. Attenuation storage tanks can help reduce flow rates from a site by providing significant attenuation storage. Storage tanks do not provide any form of treatment of surface water runoff and therefore need to be combined in a “management train” with other methods that do provide suitable treatment of all relevant pollutants (coarse sediment must always be removed upstream of a storage tank). The inherent flexibility in size and shape of the typical attenuation storage tank systems means that they can be tailored to suit the specific characteristics and requirements of any site. However, the lack of amenity and biodiversity benefits means that storage tanks should be a last resource in any surface water drainage strategy for a major development. An attenuation tank is proposed in the south west corner of the site and tanks are also proposed for the soakaways to the south-east of the site.

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 typically flow in a south-east direction towards the agricultural land to the south as currently occurs, thus not increasing flood risk from the pre-development conditions. Any plots located lower than the adjacent highway are provided with linear drainage channels to thresholds to provide further protection against ingress of surface water. An flood routing plan has been provided in the appendix.

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 6.3: 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
Driveways, residential car parks and low traffic roads	Low	0.5	0.4	0.4
SuDS Mitigation Indices				
Permeable pavement		0.7	0.6	0.7
Total SuDS Mitigation Index ≥ 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 6.4: Entities Responsible for SuDS Maintenance

SuDS Component	Location	Function	Responsible Entity
Pervious Pavement	Private & public parking areas, roads	Store, treat and discharge runoff	Landowner / Private management company
Attenuation Storage Tank	Public open spaces	Store runoff	Landowner / Private management company
Plot soakaways	Rear gardens of plots 6, 7 and 8	Store and discharge runoff	Homeowner

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 6.5: Typical Operation and Maintenance Requirements

Operation and Maintenance Activity	SuDS Component	
	Pervious Pavement	Attenuation Storage Tank
Inspection	■	■
Litter and debris removal	■	□
Grass cutting	□	□
Weed and invasive plant control	□	
Shrub management (including pruning)	□	
Sediment management	■	■
Vacuum sweeping and brushing	■	
Structure rehabilitation/repair	□	□
Infiltration surface reconditioning	□	
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. Runoff rates leaving the site should be managed so they do not exceed the proposed rates stated in this report, based on pre-development conditions.
- 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 does not benefit from a formal foul water drainage system, but in accordance with records obtained from Yorkshire Water (Appendix G), a public combined sewer crosses the site from the south-west corner before continuing north and joining the network in Marsh Lane.

10.2 It is proposed to discharge foul water from the site into this sewer, subject to agreement with YW. A gravity discharge will be made from Plots 1 – 3 but plots 4 – 8 are proposed to drain to a package pumping station located in the access road opposite the entrances to plots 6 and 7. This is intended as a small package pumping station that will pump up to a manhole adjacent to the combined sewer where it will discharge via gravity into the sewer, again subject to approval from Yorkshire Water.

10.3 Once planning consent has been granted, it is recommended that this is forwarded to the water company to ensure that they are aware of the additional capacity required for the development. A formal S106 application will then be required for each new connection proposed (2no. in total).

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	18/08/2025	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 Construction Phase Surface Water Management Layout

Appendix G Yorkshire Water Sewer Records

Appendix H Flood Routing Plan

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Appendix A

Proposed Site Layout



PROPOSED SITE PLAN
1:200

PLOT.	BEDROOM.	GROSS AREA.	NET AREA.
1	4	130M2 / 1399SQ/FT	130M2 / 1399SQ/FT
2	3	141M2 / 1561SQ/FT	141M2 / 1561SQ/FT
3	3	141M2 / 1561SQ/FT	141M2 / 1561SQ/FT
4	4	122M2 / 1313SQ/FT	122M2 / 1313SQ/FT
5	4	122M2 / 1313SQ/FT	122M2 / 1313SQ/FT
6	4	195M2 / 2099SQ/FT	159M2 / 1711SQ/FT
7	5	249M2 / 2680SQ/FT	211M2 / 2271SQ/FT
8	5	265M2 / 2852SQ/FT	228M2 / 2454SQ/FT

1:200
4m 0 4m 8m 12m 16m 20m

KEY:

Application Boundary

Proposed Buildings:
Refer to Architects details.

Existing Trees retained:
To be maintained and protected in accordance with BS5837

HARDWORKS
Surfaces and Finishes

Access Driveway:
Asphalt Concrete (Vehicular grade) with new kerb edging where required.

Shared Road:
Block Paving laid in herringbone pattern with soldier course edging. Buff mix 205x50x60mm laid on compacted sand bed with mortared edge course

Flagstone paving:
Locally sourced yorkstone paving flags laid on mortar bed. Random staggered coursing 300-600mm wide with mortar joints.

Stone Sett edging:
Locally sourced Yorkstone setts laid in stretcher bond across gateway and to edge of resin bound aggregate. 150mm wide x random lengths laid on mortar bed.

Brick Paths:
Clay paving bricks laid in herringbone pattern with soldier course edging. Grey mix 205x50x60mm laid on compacted sand bed with mortared edge course.

Gravel Terraces:
Permeable Resin bound aggregate in Gold Quartz or equal approved with buff resin

Steps:
Yorkstone paving 400mm long tread with 150mmm brick riser.

Walling:
300mm wide 1.2m high wall with flat stone coping. Stone and jointing to match building with 600mm square piers where shown. SEE (72)001

Water Feature:
600mm wide rill (min. 300mm deep) with naturalized marginal planting.

Fencing:
1.8m high close boarded timber fencing with min. 100x75mm timber posts set at 1.8m centres. All timber to be pressure treated FSC softwood. See (72)001

Estate Railing in Common Areas:
3.6m wide 1.8m high close boarded timber gates. All timber to be pressure treated FSC softwood and stained grey to match building detailing. See (72)001

LED Street Light
3.0m 60 Watt

EV — Electric Vehicle Charging point

SOFTWORKS

Proposed Trees:
Ornamental multi-stem see Xanthe Quayle Schedule. Min. 450mm approved topsoil to BS3882 over approved clean sub-soils from site.

Proposed Ornamental Planting:
Mix of Herbaceous perennials, grasses and shrub planting. see Xanthe Quayle Schedules 'Shrub Planting A'

Hedgerows:
Mix of hedgerow planting see Xanthe Quayle Schedule

Wildflower Meadow:
Reinstatement of wildflower meadow allowing existing soil bank to colonise and over seed with locally sourced flowering meadow seed mix 5g/m2 in swathes along contour lines and around orchard trees

Proposed Lawn:
Tillers Arena or similar approved. Min. 150mm of approved topsoil to BS3882

Proposed Road Signage
'Share Space' Sign
TSRGD 2016 Diag. 886

BAT — BAT BOX
ENCLOSED IBSTOCK TYPE C SMOOTH BUFF

TREE IDENTIFICATION KEY.

Tree root protection area (RPA)
Tree stem
Tree canopy (for retention categories see below)

Category A trees of high quality

Category B trees of moderate quality

Category C trees of low quality

Removed Tree

REVISION	DESCRIPTION	DATE
A	TREE SURVEY ADDED	7/6/24
B	OUTLINE OF PROJECTION OF 119 MARSH LANE AND NEW BUNGALOW AT 107A ADDED ALONG NORTH-EASTERN BOUNDARY	16/7/24
C	ALTERATION TO HIGHWAYS LAYOUT	26/7/24
D	ALTERATIONS TO PLANNERS COMMENTS	22/8/24
E	ALTERATIONS TO REMOVE DORMER ROOF WINDOWS ON PLOTS 1&2	12/09/24
F	ALTERATIONS TO HIGHWAYS & PLANNERS COMMENTS	19/09/24
G	ALTERATION TO HIGHWAYS LAYOUT	26/09/24
H	ALTERATION TO HIGHWAYS LAYOUT	30/09/24
I	FIRE ROUTE CONFIRMED AND PLOT 8 WATER MIST SYSTEM ADDED	4/10/24
J	DROPPED KERBS ADDED TO SITE FRONTAGE	7/10/24
-	-	-
-	-	-

NOTES

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2022 Best of Houzz Service
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DRAWING TITLE: PROPOSED SITE PLAN

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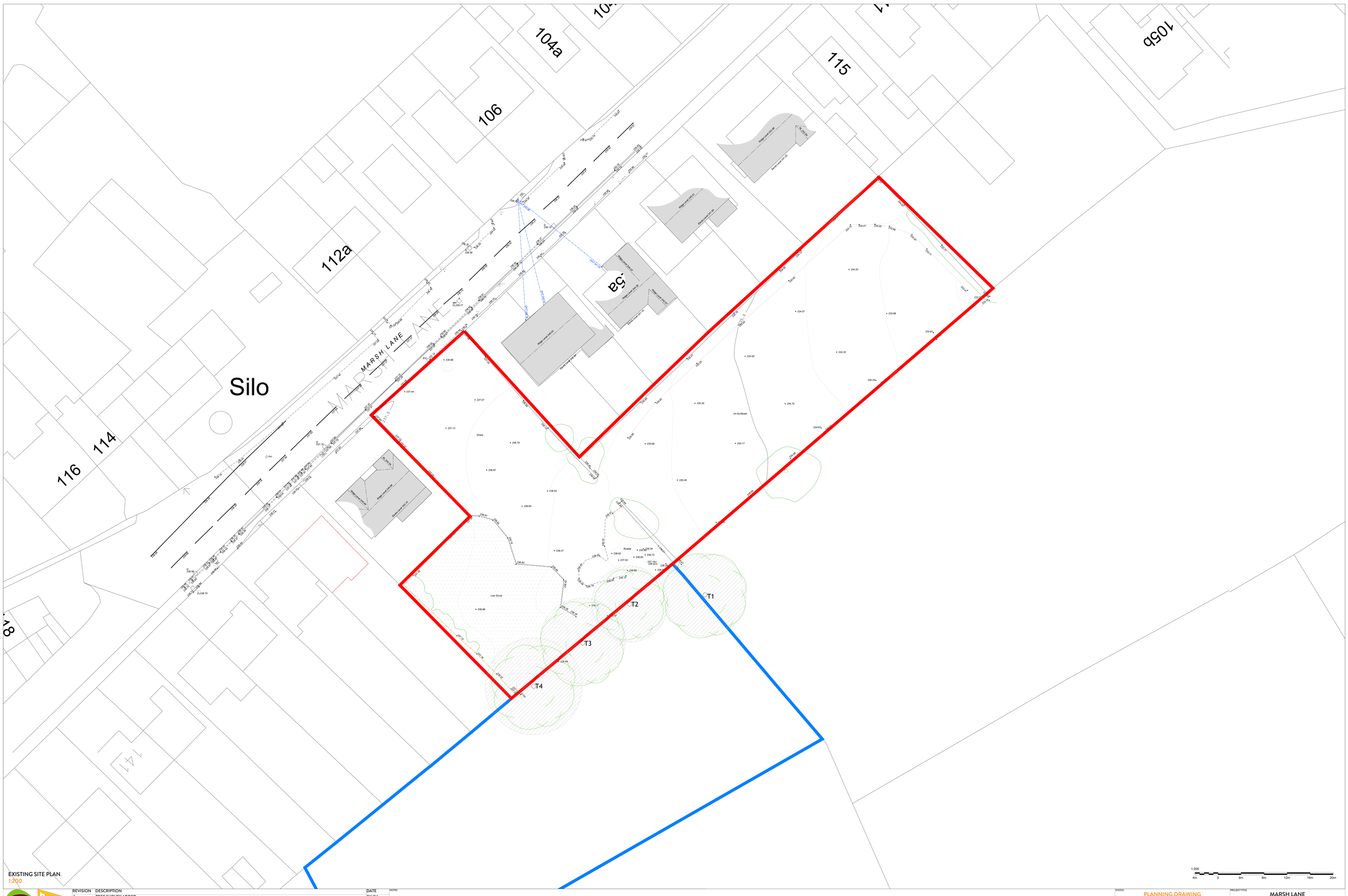
1:200	EG	JH	ODS_23/666

PAPER SIZE	DRAWING NUMBER	DATE	REVISION
A0	(20)008	1/3/24	J

CLIENT: HALSTEAD HOMES

Appendix B

Existing Site Layout



EXISTING SITE PLAN
1:200

REVISION	DESCRIPTION	DATE
A	TREE SURVEY ADDED	7/6/24
B	OUTLINE OF PROJECTION OF 119 MARSH LANE AND NEW BUNGALOW AT 107A ADDED ALONG NORTH-EASTERN BOUNDARY	16/7/24
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
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A0	(EX)002	1/3/24	B

CLIENT: HALSTEAD HOMES

Appendix C

Existing Runoff Rates

Existing Runoff Rates

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	IH124
Positively Drained Area (ha)	0.235
SAAR (mm)	1004
Soil Index	2
SPR	0.30
Region	3
Betterment (%)	0

Load

Calc

QBar (l/s) 0.7

Return Period (years)	Growth Factor	Q (l/s)
1	0.86	0.6
30	1.75	1.1
100	2.08	1.4

Pre-development discharge

Site Makeup	Greenfield
Greenfield Method	FSR/FEH
Positively Drained Area (ha)	0.235
Soil Index	2
SPR	0.30
Catchment Wetness Index	125.010
Return Period (years)	100
Climate Change (%)	0
Storm Duration (mins)	360
Betterment (%)	0

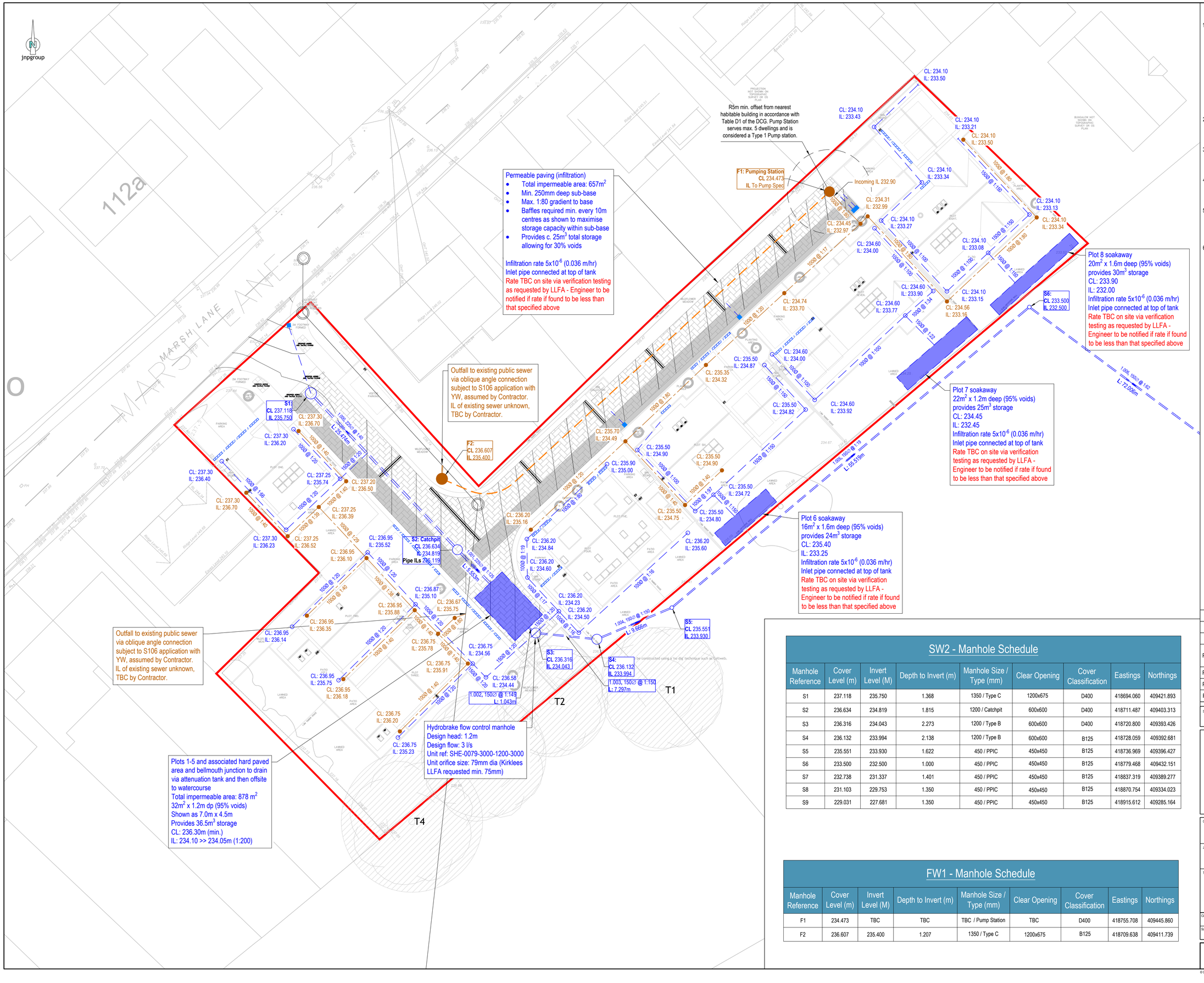
Calc

Calc

PR	0.347
Runoff Volume (m³)	56

Appendix D

Proposed Drainage Strategy



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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 (Construction/Maintenance/ Cleaning/Demolition/Adaptation)	Hazard Description	Mitigation Measures/ Residual Risk
1			

SW2 - Manhole Schedule

Manhole Reference	Cover Level (m)	Invert Level (M)	Depth to Invert (m)	Manhole Size / Type (mm)	Clear Opening	Cover Classification	Eastings	Northings
S1	237.118	235.750	1.368	1350 / Type C	1200x675	D400	418694.060	409421.893
S2	236.634	234.819	1.815	1200 / Catchpit	600x600	D400	418711.487	409403.313
S3	236.316	234.043	2.273	1200 / Type B	600x600	D400	418720.800	409393.426
S4	236.132	233.994	2.138	1200 / Type B	600x600	B125	418728.059	409392.681
S5	235.551	233.930	1.622	450 / PPIC	450x450	B125	418736.969	409396.427
S6	233.500	232.500	1.000	450 / PPIC	450x450	B125	418779.468	409432.151
S7	232.738	231.337	1.401	450 / PPIC	450x450	B125	418837.319	409389.277
S8	231.103	229.753	1.350	450 / PPIC	450x450	B125	418870.754	409334.023
S9	229.031	227.681	1.350	450 / PPIC	450x450	B125	418915.612	409285.164

FW1 - Manhole Schedule

Manhole Reference	Cover Level (m)	Invert Level (M)	Depth to Invert (m)	Manhole Size / Type (mm)	Clear Opening	Cover Classification	Eastings	Northings
F1	234.473	TBC	TBC	TBC / Pump Station	TBC	D400	418755.708	409445.860
F2	236.607	235.400	1.207	1350 / Type C	1200x675	B125	418709.638	409411.739

Rev.	Date	Description	Drn / Chk'd / App'd
P04	18/06/2025	Pump station location revised and foul drainage updated to suit. Hydrobrake discharge rate revised to provide minimum flow control orifice size of 75mm as requested by LLFA - tank size revised to suit. S2 specified as catchpit manhole.	LC / JTH / SLL
P03	30/04/2025	Manhole schedule provided. Foul Manhole references updated. CL and IL of Manhole F2 revised.	LC / JTH / SLL
P02	16/04/2025	Minor updates to levels	LC / JTH / SLL
P01	31/03/2025	First issue for comment	LC / JTH / SLL

Suitability: S3 - Suitable for Review & Comment

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Client: Halstead Homes (Yorkshire) Ltd

Job: Marsh Lane, Shepley

Title: Drainage Layout

Classification: FI_60_20

Scale @ A1: 1:250

Project - Originator - Volume/System - Level/Location - Type - Discipline - Number: B26074 - JNP - XX - XX - DR - C - 2001

Document/Drawing Number

Revision: P04

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JNP Group Internal Project Number: B26074

Appendix E

Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	5	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.500
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	2.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	500.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Road Perm Paving	0.004		234.400		29.925	60.845	0.380
Plot 8 Soakaway	0.029	5.00	233.900		57.587	51.620	1.900
Plot 7 Soakaway	0.025	5.00	234.450		80.207	41.085	2.000
Plot 6 Soakaway	0.024	5.00	235.400		103.601	27.296	2.000
Attenuation Tank	0.079	5.00	236.300		37.492	28.427	2.250
1			236.300	1350	47.236	21.255	2.257
Plots 1-5 Soakaway	0.079	5.00	236.400		22.870	35.921	2.800

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	Attenuation Tank	1	1.043	0.600	234.050	234.043	0.007	149.0	225	5.02	76.1

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	1.069	42.5	21.7	2.025	2.032	0.079	0.0	114	1.074

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	1.043	149.0	225	1 STANDARD	236.300	234.050	2.025	236.300	234.043	2.032

Link	US Node	Node Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Attenuation Tank	Junction	1	1350	Manhole	1 STANDARD

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Road Perm Paving	29.925	60.845	234.400	0.380		○			
Plot 8 Soakaway	57.587	51.620	233.900	1.900		○			
Plot 7 Soakaway	80.207	41.085	234.450	2.000		○			
Plot 6 Soakaway	103.601	27.296	235.400	2.000		○			

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Attenuation Tank	37.492	28.427	236.300	2.250		0	1.000	234.050	225
1	47.236	21.255	236.300	2.257	1350	1	1.000	234.043	225
Plots 1-5 Soakaway	22.870	35.921	236.400	2.800					

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	1 year (l/s)	0.6
Summer CV	1.000	Drain Down Time (mins)	240	30 year (l/s)	1.1
Winter CV	1.000	Additional Storage (m³/ha)	20.0	100 year (l/s)	1.4
Analysis Speed	Normal	Check Discharge Rate(s)	✓	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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	40	0	0
30	0	0	0				

Pre-development Discharge Rate

Site Makeup	Greenfield	SPR	0.30	Betterment (%)	0
Greenfield Method	IH124	Region	3	QBar	0.7
Positively Drained Area (ha)	0.235	Growth Factor 1 year	0.86	Q 1 year (l/s)	0.6
SAAR (mm)	1004	Growth Factor 30 year	1.75	Q 30 year (l/s)	1.1
Soil Index	2	Growth Factor 100 year	2.08	Q 100 year (l/s)	1.4

Node 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	234.043	Product Number	CTL-SHE-0079-3000-1200-3000
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.0	Min Node Diameter (mm)	1200

Node Road Perm Paving Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Invert Level (m)	234.020	Slope (1:X)	80.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	41	Depth (m)	0.250
Safety Factor	2.0	Width (m)	3.500	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node Plot 8 Soakaway Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Safety Factor	2.0	Invert Level (m)	232.000
Side Inf Coefficient (m/hr)	0.03600	Porosity	1.00	Time to half empty (mins)	1572

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	20.0	20.0	1.600	20.0	48.8	1.601	0.0	48.8

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Node Plot 7 Soakaway Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Safety Factor	2.0	Invert Level (m)	232.450
Side Inf Coefficient (m/hr)	0.03600	Porosity	1.00	Time to half empty (mins)	1301

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	22.0	22.0	1.200	22.0	53.2	1.201	0.0	53.2

Node Plot 6 Soakaway Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Safety Factor	2.0	Invert Level (m)	233.400
Side Inf Coefficient (m/hr)	0.03600	Porosity	1.00	Time to half empty (mins)	1405

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	16.0	16.0	1.600	16.0	47.5	1.601	0.0	47.5

Node Attenuation Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	234.050
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	124

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	32.0	0.0	1.200	32.0	0.0	1.201	0.0	0.0

Node Plots 1-5 Soakaway Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Safety Factor	2.0	Invert Level (m)	233.600
Side Inf Coefficient (m/hr)	0.03600	Porosity	0.95	Time to half empty (mins)	2915

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	65.0	65.0	1.600	65.0	70.0	1.601	0.0	70.0

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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
180 minute summer	Road Perm Paving	108	234.106	0.086	0.3	0.3311	0.0000	OK
1440 minute summer	Plot 8 Soakaway	960	232.348	0.348	0.6	7.0609	0.0000	OK
960 minute summer	Plot 7 Soakaway	645	232.697	0.247	0.7	5.4978	0.0000	OK
960 minute summer	Plot 6 Soakaway	645	233.757	0.357	0.6	5.7952	0.0000	OK
120 minute summer	Attenuation Tank	76	234.227	0.177	6.9	5.4976	0.0000	OK
120 minute summer	1	76	234.227	0.184	2.8	0.2628	0.0000	OK
1440 minute summer	Plots 1-5 Soakaway	990	233.898	0.298	1.6	18.5472	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	Road Perm Paving	Infiltration		0.1				
1440 minute summer	Plot 8 Soakaway	Infiltration		0.1				
960 minute summer	Plot 7 Soakaway	Infiltration		0.1				
960 minute summer	Plot 6 Soakaway	Infiltration		0.1				
30 minute summer	Attenuation Tank	1.000	1	2.9	0.367	0.068	0.0309	
120 minute summer	1	Hydro-Brake®		2.7				13.6
1440 minute summer	Plots 1-5 Soakaway	Infiltration		0.3				

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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
60 minute winter	Road Perm Paving	56	234.166	0.146	0.9	0.9123	0.0000	OK
960 minute winter	Plot 8 Soakaway	900	232.770	0.770	1.0	15.6267	0.0000	OK
600 minute winter	Plot 7 Soakaway	570	232.988	0.538	1.1	11.9752	0.0000	OK
1440 minute winter	Plot 6 Soakaway	1080	234.176	0.776	0.6	12.6017	0.0000	OK
60 minute winter	Attenuation Tank	58	234.594	0.544	17.3	16.9308	0.0000	SURCHARGED
60 minute summer	1	54	234.593	0.550	7.0	0.7875	0.0000	OK
1440 minute winter	Plots 1-5 Soakaway	1320	234.307	0.707	2.0	44.0755	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Road Perm Paving	Infiltration		0.2				
960 minute winter	Plot 8 Soakaway	Infiltration		0.2				
600 minute winter	Plot 7 Soakaway	Infiltration		0.2				
1440 minute winter	Plot 6 Soakaway	Infiltration		0.2				
240 minute summer	Attenuation Tank	1.000	1	9.0	0.236	0.211	0.0415	
30 minute summer	1	Hydro-Brake®		2.9				19.5
1440 minute winter	Plots 1-5 Soakaway	Infiltration		0.3				

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	Road Perm Paving	112	234.258	0.238	1.0	1.8942	0.0000	OK
1440 minute winter	Plot 8 Soakaway	1170	233.567	1.567	1.3	31.8102	0.0000	OK
1440 minute winter	Plot 7 Soakaway	1110	233.589	1.139	1.1	25.3408	0.0000	OK
1440 minute winter	Plot 6 Soakaway	1140	234.942	1.542	1.1	25.0429	0.0000	OK
120 minute winter	Attenuation Tank	114	235.219	1.169	19.0	36.3718	0.0000	SURCHARGED
120 minute winter	1	116	235.219	1.176	8.3	1.6834	0.0000	OK
1440 minute summer	Plots 1-5 Soakaway	1440	235.137	1.537	5.3	95.7957	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	Road Perm Paving	Infiltration		0.2				
1440 minute winter	Plot 8 Soakaway	Infiltration		0.2				
1440 minute winter	Plot 7 Soakaway	Infiltration		0.3				
1440 minute winter	Plot 6 Soakaway	Infiltration		0.2				
120 minute summer	Attenuation Tank	1.000	1	10.4	0.401	0.244	0.0415	
120 minute winter	1	Hydro-Brake®		3.0				53.9
1440 minute summer	Plots 1-5 Soakaway	Infiltration		0.3				

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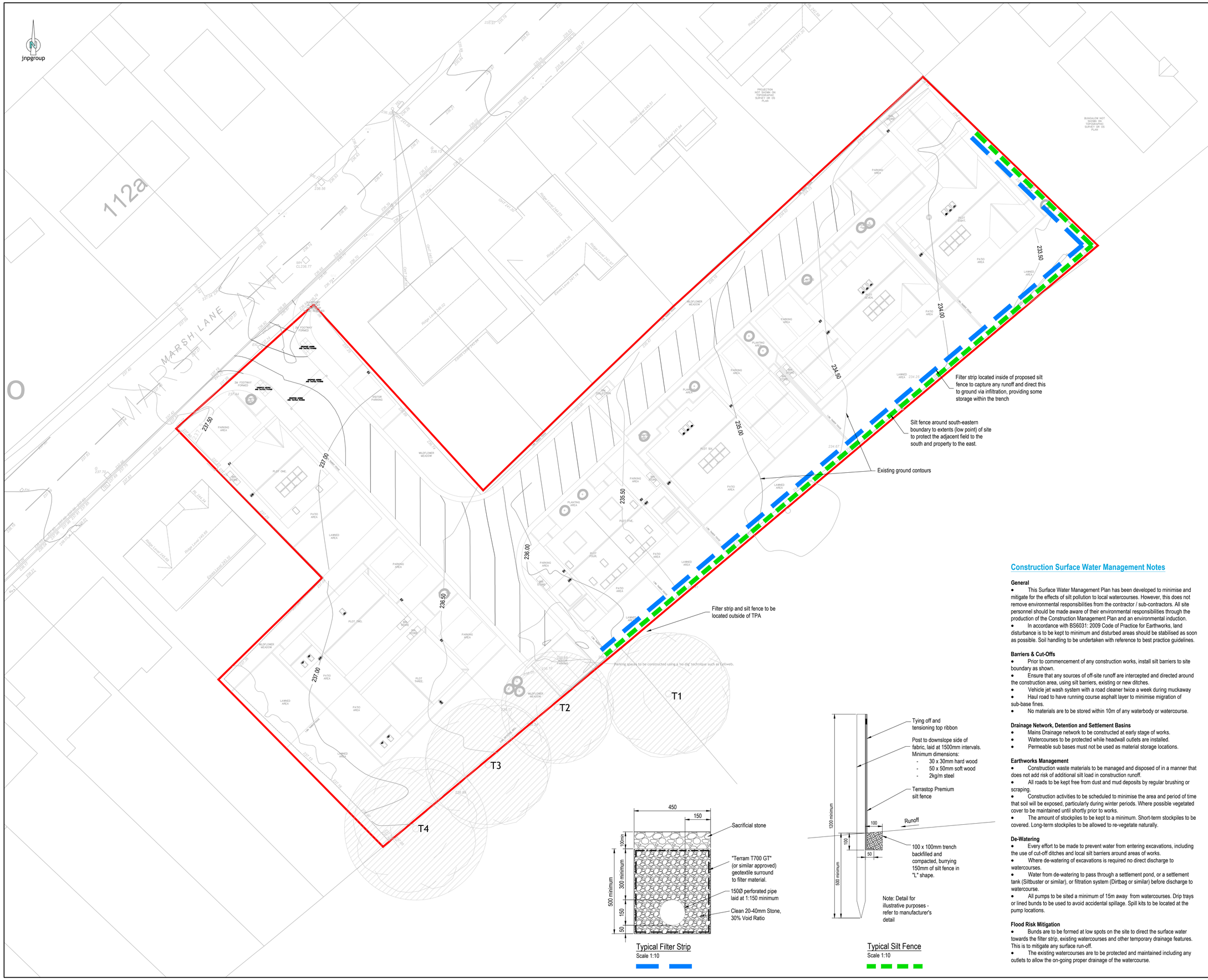
Appendix F

Construction Phase Surface Water Management Phase Layout



Typical Filter Strip
Scale 1:10

Typical Silt Fence
Scale 1:10

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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 (Construction/Maintenance/ Cleaning/Demolition/Adaptation)	Hazard Description	Mitigation Measures/ Residual Risk
1			

Construction Surface Water Management Notes

General

- This Surface Water Management Plan has been developed to minimise and mitigate for the effects of silt pollution to local watercourses. However, this does not remove environmental responsibilities from the contractor / sub-contractors. All site personnel should be made aware of their environmental responsibilities through the production of the Construction Management Plan and an environmental induction.
- In accordance with BS6031: 2009 Code of Practice for Earthworks, land disturbance is to be kept to minimum and disturbed areas should be stabilised as soon as possible. Soil handling to be undertaken with reference to best practice guidelines.

Barriers & Cut-Offs

- Prior to commencement of any construction works, install silt barriers to site boundary as shown.
- Ensure that any sources of off-site runoff are intercepted and directed around the construction area, using silt barriers, existing or new ditches.
- Vehicle jet wash system with a road cleaner twice a week during muckaway
- Haul road to have running course asphalt layer to minimise migration of sub-base fines.
- No materials are to be stored within 10m of any waterbody or watercourse.

Drainage Network, Detention and Settlement Basins

- Mains Drainage network to be constructed at early stage of works.
- Watercourses to be protected while headwall outlets are installed.
- Permeable sub bases must not be used as material storage locations.

Earthworks Management

- Construction waste materials to be managed and disposed of in a manner that does not add risk of additional silt load in construction runoff.
- All roads to be kept free from dust and mud deposits by regular brushing or scraping.
- Construction activities to be scheduled to minimise the area and period of time that soil will be exposed, particularly during winter periods. Where possible vegetated cover to be maintained until shortly prior to works.
- The amount of stockpiles to be kept to a minimum. Short-term stockpiles to be covered. Long-term stockpiles to be allowed to re-vegetate naturally.

De-Watering

- Every effort to be made to prevent water from entering excavations, including the use of cut-off ditches and local silt barriers around areas of works.
- Where de-watering of excavations is required no direct discharge to watercourses.
- Water from de-watering to pass through a settlement pond, or a settlement tank (Siltbuster or similar), or filtration system (Dirtbag or similar) before discharge to watercourse.
- All pumps to be sited a minimum of 15m away from watercourses. Drip trays or lined bunds to be used to avoid accidental spillage. Spill kits to be located at the pump locations.

Flood Risk Mitigation

- Bunds are to be formed at low spots on the site to direct the surface water towards the filter strip, existing watercourses and other temporary drainage features. This is to mitigate any surface run-off.
- The existing watercourses are to be protected and maintained including any outlets to allow the on-going proper drainage of the watercourse.

Rev.	Date	Description	Drn / Chk'd / App'd
P01	16/04/2025	First issue	LC / JTH / SLL

Suitability:
S3 - Suitable for Review & Comment

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Hartlepool ● Sheffield ● Warwick
www.jnpgroup.co.uk

Client:
Halstead Homes (Yorkshire) Ltd

Job:
Marsh Lane, Shepley

Title:
Construction Phase
Surface Water Management Plan

Classification: FI_60_20
Scale @ A1: 1:250

Project - Originator - Volume/System - Level/Location - Type - Discipline - Number: B26074 - JNP - XX - XX - DR - C - 2006
Revision: P01
Document/Drawing Number

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JNP Group Internal Project Number: B26074

Appendix G

Yorkshire Water Sewer Records

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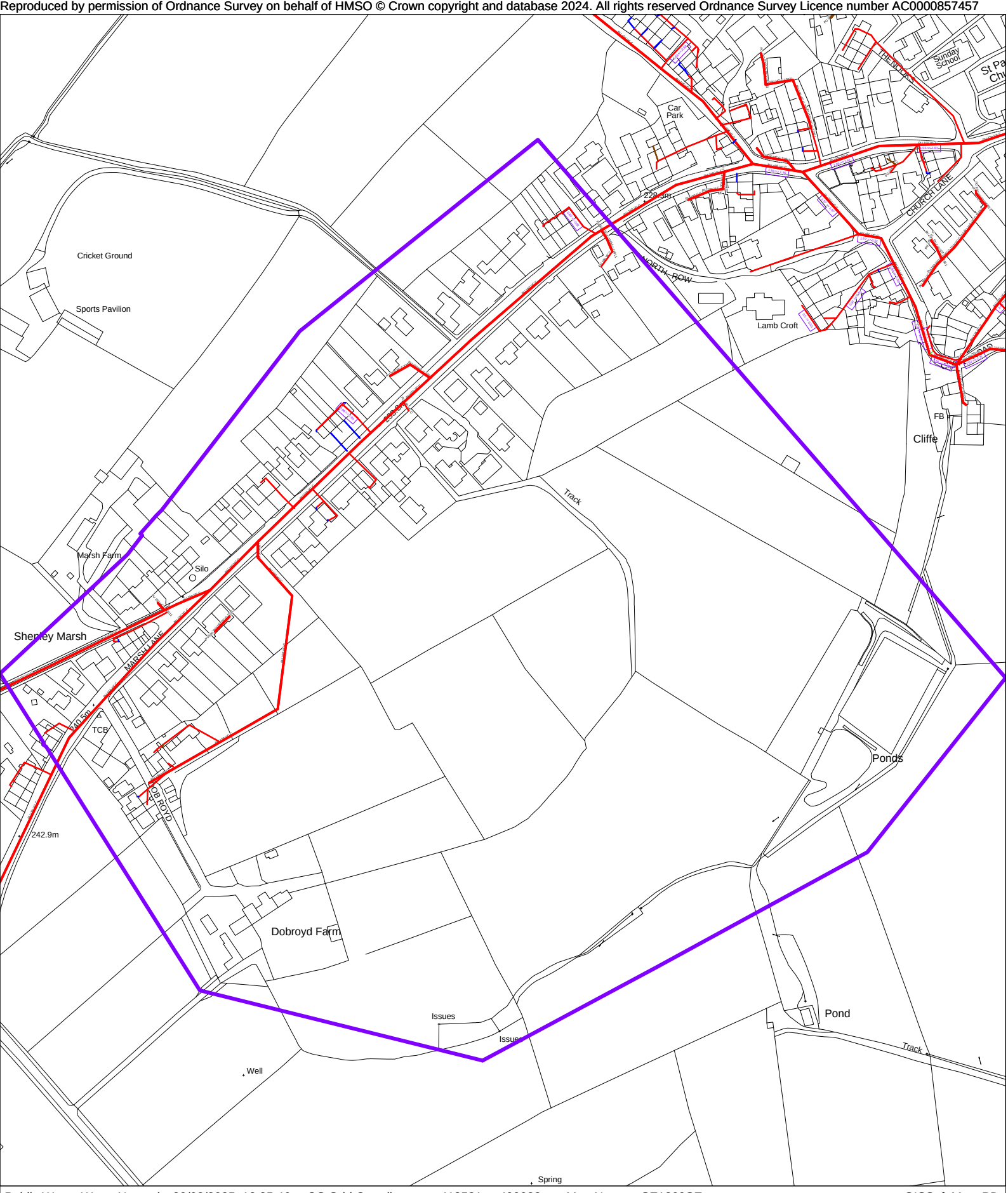

Public Waste Water Network 20/03/2025 12:35:46 OS Grid Coordinates: 418531 : 409038 Map Name : SE1809SE svcGISSafeMovePD

Registered office, Yorkshire water Services Limited. 1
Western House, Halifax Road, Bradford BD62SZ.
Registered in England and wales No. 2366682

SafeMove
A part of YorkshireWater

Appendix H

Flood Routing Plan

jnpgroup

112a

MARSH LANE

Linear drainage channels located at any threshold low point

Exceedance flow routes

Proposed road contours

Existing ground contours

Exceedance flow routes

234.10m

FFL: 234.25m

FFL: 234.75m

234.60m

235.50m

FFL: 235.65m

235.90m

FFL: 236.05m

FFL: 236.35m

236.20m

FFL: 237.10m

FFL: 236.90m

FFL: 237.45m

Parking spaces to be constructed using a 'no dig' technique such as Cellweb.

T1

T2

T3

T4

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1			

Rev.	Date	Description	Drn / Chk'd / App'd
P01	18/06/2025	First issue	LC / JTH / SLL

Suitability: S3 - Suitable for Review & Comment

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Client: Halstead Homes (Yorkshire) Ltd

Job: Marsh Lane, Shepley

Title: Flood Routing Plan

Classification: FI_60_20

Scale @ A1: 1:250

Project - Originator - Volume/System - Level/Location - Type - Discipline - Number: B26074 - JNP - XX - XX - DR - C - 2007

Document/Drawing Number

Revision: P01

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JNP Group Internal Project Number: B26074