Eastwood
CONSULTING ENGINEERS



Drainage Assessment

WOODWARD COURT, MIRFIELD

BELLWAY HOMES LTD (YORKSHIRE)

03/07/2026

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DRAINAGE ASSESSMENT

WOODWARD COURT, MIRFIELD

FOR

BELLWAY HOMES LTD (YORKSHIRE)



49653-ECE-XX-XX-RP-C-0002

03 July 2026

Eastwood Consulting Engineers is a trading name of Eastwood and Partners (Consulting Engineers) Limited
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Job No.	:	49653
Report Status	:	Issue 4
Document Date	:	03 July 2026
Approved	:	

Chris Hodge

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Issue 1:15 October 2025	
Issue 2: 13 November 2025	*Updated with revised site layout (Rev: F).*
Issue 3: 26 November 2025	*Proposed SuDS features updated.*
Issue 4: 03 July 2026	*Updated with revised site layout (Rec: 23.06.2026) and drainage appraisal.*

EXECUTIVE SUMMARY

The project comprises the development of a 4.73-hectare greenfield site for residential use.

Surface water disposal is considered in accordance with the drainage hierarchy in Building Regulations Part H 2015 and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 080 reference ID 7-080-20150323.

Surface water disposal will be via gravity to an infiltration basin in the southern portion of the site, subject to approval from the Lead Local Flood Authority.

In line with the Lithos Geoenvironmental Appraisal (Ref: 1668/1F) and subsequent email correspondence, the development should ensure that no dwelling is built within 10 m of the basin crest due to potential ground stability issues as a result of focussed sustained water flows in shallow mine workings. The Kirklees Council Lead Local Flood Authority pre-application advice also notes a hydro-geological study is required to confirm the suitability of an infiltration basin.

The infiltration basin has been sized using the lowest recorded infiltration rate on site of 3.87×10^{-5} m/s. The basin has been sized for the 1 in 100 year plus 45% climate change rainfall event. An approximate basin volume of 1,400 m^3 will be required, subject to detailed design.

The proposed infiltration basin will provide water quality treatment and attenuation as well as adding biodiversity and amenity value to the site. The proposed SuDS features are subject to approval by the Lead Local Flood Authority and detailed design.

Foul effluent should discharge via gravity to the 225 mm public combined sewer south of the site in Hepworth Lane. This is subject to formal approval from Yorkshire Water.

Maintenance of the surface water drainage system will be in accordance with the recommendations provided by suppliers and product specifications. Maintenance of the potential SuDS systems for this site will also be in accordance with the recommendations within The SuDS Manual.

Method statements will be provided prior to construction. These will include details on how contaminated water, erosion and sediment control will be dealt with during construction

Both the surface and foul water drainage systems will be offered for adoption to Yorkshire Water or a NAV (New Appointments and Variations).

1.0 THE DEVELOPMENT

1.1 Introduction

This Drainage Assessment has been prepared on the instruction of Bellway Homes Ltd (Yorkshire). This Drainage Assessment is to be read in conjunction with the Flood Risk Assessment (Ref:49653-ECE-XX-XX-RP-C-0001).

The project comprises the development of a 4.73-hectare greenfield site for residential use.

1.2 Site Location and Description

The site is located within Mirfield and is centred on coordinates 444080, 432740 (Appendix 1).

The site is bounded by residential properties to the south and west, Woodward Court to the north-west, Hepworth Lane to the south, a school and playing fields to the north, with agricultural fields and a building to the east. The site is currently occupied by open ploughed farmland boarded by hedgerows and wooden fences.

The site falls from approximately 98.34 mAOD in the north-east to approximately 84 mAOD in the south at an average gradient of 1 in 24 (Appendix 2).

Proposals are for 75 household properties with access from Woodward Court in the north-west (Appendix 3).

2.0 DRAINAGE STRATEGY

2.1 Consultation with Statutory Bodies

2.1.1 Kirklees Council (LLFA)

Kirklees Council were contacted to discuss options for surface water disposal (Appendix 5) given that the Geoenvironmental appraisal conducted by Lithos (Ref: 1668/1F) noted there is potential for ground stability issues if soakaways are used.

A response received from the LLFA on 12th May 2025 notes that soakaways were previously tested and used in a design. A competent person would need to rule this out by critiquing the previous submission and identify why the proposal has changed. It is noted that there is a 150 mm surface water sewer near the site, therefore Yorkshire Water would need to provide a statement with a recommended connection point if proposals are to discharge to a sewer.

A further response was received from the LLFA on 21st May 2025 noting that the depth of the closest surface water sewer should be examined and pre-application advice should be requested from Yorkshire Water. Discharge to a surface water sewer would be the more favourable option as opposed to smaller combined sewers closer to the site.

A copy of the Kirklees Council LLFA pre-application advice received on 12th August 2025 is included in Appendix 5.

2.1.2 Yorkshire Water

Pre-planning advice has been received from Yorkshire Water; their reference A007933 dated 9th May 2025 (Appendix 4). The main points of the advice are summarised below.

Foul water:

- Development should take place with separate systems for foul and surface water.
- The closest practicable point of discharge for foul water will be the 225 mm public combined sewer in Hepworth Lane south of the site. At present, it does not have adequate capacity available to accommodate the anticipated foul water discharge from the proposed site. Subject to the submission of a formal planning application, a robust build plan and start date, Yorkshire Water will carry out a feasibility study to determine

suitable foul connection points, any available capacity in the public sewer network and timescales for any potential upgrading works required.

- The cost for any feasibility / modelling / update works will be at Yorkshire Water's cost up-front and recouped via the site's eventual infrastructure charges.

Surface water:

- Surface water disposal should follow the discharge hierarchy.
- The public sewer network does not have capacity available to accept any discharge of surface water from the proposed development. If SuDS are not viable, the developer is advised to contact the Environment Agency / Local Land Drainage Authority with a view to establish a suitable watercourse for discharge.
- Further restrictions on surface water disposal from the site may be imposed by other parties.

2.2 Ground Conditions

The British Geological Survey map shows the bedrock geology across the site as Sandstone-Falhouse Rock. There is no online record available for the superficial deposits on site.

A Geoenvironmental Appraisal was conducted by Lithos (Ref: 1668/1F) in December 2022. Localised areas of made ground were encountered. The site is underlain by Falhouse Rock a Lower Coal Measures sandstone. Most trail pits encountered topsoil to depths of around 0.4 m, underlain by sandstone. No significant groundwater was encountered during excavations. Groundwater monitoring was undertaken over a 3 month period and it was noted at depths in excess of 3.5 m.

A British Geology Survey historical borehole record located within the northern portion of the site (Ref: SE22SW790) notes 0.2 m topsoil over sandstone. Another historical borehole log within the northern portion of the site (Ref: SE22SW792) records 0.2 m topsoil, 8 m sandstone overlying mudstone. No groundwater was recorded on these borehole logs.

2.3 Greenfield Calculations

The greenfield runoff for the site is calculated using the FEH statistical rainfall run-off method on the UKSuDS greenfield runoff estimation tool (Appendix 7).

Table 1 below summarises the runoff rates for varying return periods. These figures relate to the 2.64 ha developable area and runoff per unit area.

Greenfield runoff				
Catchment	**Return period**			
	1 in 1 yr	**1 in 2 yr**	**1 in 30 yr**	**1 in 100 yr**
Calder Lower Operational Catchment	9.9 l/s	10.8 l/s	20.1 l/s	23.9 l/s
	3.8 l/s/ha	4.1 l/s/ha	7.6 l/s/ha	9.1 l/s/ha

Table 1: Greenfield runoff rates

2.4 Drainage Hierarchy

Surface water disposal should be in accordance with the drainage hierarchy in Building Regulations Part H 2015[1] and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 080. Disposal via SuDS methods should be considered as the first option. Disposal to the public sewer should be considered only when SuDS methods and disposal to the watercourse are shown to be unsuitable.

2.4.1 Sustainable Drainage Systems (SuDS)

SuDS methods include water infiltration systems such as soakaways, basins and filter strips, together with swales, pervious pavements, detention basins, ponds and other wetland solutions. The various methods are considered in detail in The SuDS Manual (CIRIA C753).

Infiltration tests have been undertaken by Lithos (Ref: 1668/1F) and BRE365 infiltration rates were recorded on site between 5.66 x 10^{-4} to 3.87 x 10^{-5} m/s. The report notes that due to the potential impact on ground stability as a result of focussed sustained water flows in shallow

[1]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/442889/BR_PDF_AD_H_2015.pdf

mine workings, it is recommended that soakaways are restricted to public open space (POS) only where an alternative is not available.

Following correspondence with the Lead Local Flood Authority (Section 2.1.1) regarding the viability of soakaway testing, further information was provided by Lithos (Appendix 6). Lithos note that they do not see a problem with proposals for the infiltration basin to be located within the POS in the southern portion of the site as the site investigation suggests that coal lies at about 15 m below ground level in this area. The development should ensure that no dwelling is built within 10 m of the basin crest.

Based on the advice from Lithos, infiltration type SuDS in the POS within southern portion of the site are deemed to be viable. Infiltration type SuDS across the remaining areas of the site are not deemed to be viable due to potential ground stability issues.

The Kirklees Council pre-application advice response (Appendix 5) notes that the Lead Local Flood Authority expects a competent person to assess the contribution of previous coal mining works on soakaway tests and any remediation such as grouting that could affect infiltration. Re-emergence where there is shallow bedrock should also be assessed. The Kirklees Council Lead Local Flood Authority pre-application advice also notes a hydro-geological study is required to confirm the suitability of an infiltration basin.

An assessment of SuDS methods and their applicability to this site is included in Appendix 7.

For the development to achieve the benefits noted in the National Standards for SuDS[2], an infiltration basin is proposed to provide water quality treatment and attenuation as well as adding biodiversity and amenity value to the site. The proposed SuDS features are subject to approval by the Lead Local Flood Authority and detailed design.

2.4.2 Watercourse

The nearest watercourse is an unnamed watercourse located approximately 300 m east of the northern portion of the site. This is a tributary of Canker Dyke which ultimately discharges to the River Calder (main river) at a point 2.4 km south-east of the site. Discharge to watercourse would require crossing third party land and is therefore discounted.

[2] https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems/national-standards-for-sustainable-drainage-systems-suds

2.4.3 Public Sewer

There is a 150 mm public surface water sewer located in Hepworth Lane south of the site. Discharge to the sewer will require approval from Yorkshire Water.

2.5 Proposals for Surface Water Disposal

The final design will need the approval of the relevant statutory bodies but will broadly follow these principles:-

- Surface water disposal will be via gravity to an infiltration basin in the southern portion of the site, subject to approval from the Lead Local Flood Authority.
- In line with the Lithos Geoenvironmental Appraisal (Ref: 1668/1F) and subsequent email correspondence, the development should ensure that no dwelling is built within 10 m of the basin crest due to potential ground stability issues as a result of focussed sustained water flows in shallow mine workings.
- The infiltration basin has been sized using the lowest recorded infiltration rate of 3.87 x 10^{-5} m/s.
- The basin has been sized for the 1 in 100 year plus 45% climate change rainfall event. An approximate basin volume of 1,400 m^3 will be required, subject to detailed design. Calculations and the drainage layout are provided in Appendix 7.
- The proposed infiltration basin will provide water quality treatment and attenuation as well as adding biodiversity and amenity value to the site. The proposed SuDS features are subject to approval by the Lead Local Flood Authority and detailed design.
- The surface water drainage system will be offered for adoption to Yorkshire Water or a NAV (New Appointments and Variations).

2.6 SuDS Maintenance

Maintenance of the SuDS systems proposed for this site will be in accordance with the recommendations within The SuDS Manual (CIRIA C753, 2015) as stipulated in Table 2, along with any recommendations provided by suppliers and product specifications.

Table 2 summarises maintenance actions and frequency for each component of the drainage system. Additional maintenance to that scheduled will also be required after a flood event.

Maintenance access requirements such as vehicle and machinery access (where applicable) will also need consideration.

Features adopted by authorities, such as drainage authorities, will be maintained under their normal regime of inspection and maintenance.

The maintenance schedules below should be followed to ensure flood risk on site does not increase through system blockages or poor maintenance and the drainage features remain functional for the lifetime of the development.

Method statements will be provided prior to construction. These will include details on how contaminated water, erosion and sediment control will be dealt with during construction.

SuDS SYSTEM	**ACTION**	**FREQUENCY***
Infiltration basin	Remove litter and debris	Monthly
	Cut grass - for landscaped areas and access routes	Monthly or as required
	Cut grass – meadow grass in and around basin	Half yearly: spring (before nesting season) and autumn
	Manage other vegetation and remove nuisance plants.	Monthly at start, then as required
	Reseed areas of poor vegetation growth	Annually, or as required
	Prune and trim trees and remove cuttings	As required
	Remove sediment from pre-treatment system when 50% full	As required

Infiltration basin	Repair erosion or other damage by reseeding or re-turfing	As required
	Repair or rehabilitate inlets, outlets and overflows	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates.	As required
	Relevel uneven surface and reinstate design levels.	As required
	Inspect inlets, outlets and overflows for blockages and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical barriers.	Monthly
	Inspect inlets and pre-treatment systems for silt accumulations; establish appropriate silt removal frequencies.	Half yearly
	Inspect infiltration surfaces for compaction and ponding.	Monthly
Guttering, gullies and piped drainage system	General removal of litter and debris.	6 monthly, after autumn leaf fall (or as required)
	Cleaning of gullies, drainage channel and drainage channel sump units to remove debris and silt.	6 monthly, after autumn leaf fall (or more frequently if necessary)
	Cleaning of manholes to remove debris and silt.	Annually, after autumn leaf fall (or more frequently if necessary)
	If the system allows rainfall infiltration from above, check filter surface for blockages. Remove and replace infiltration material if deemed necessary.	Annually
	Remove sediment from pre-treatment structures.	Annually or as required
	Inspection of all access chambers, inspection chambers, manholes and proprietary storage units to identify and make good any defects as necessary.	Annually
	Inspect inlets, outlets, vents and overflows to ensure they are operating as designed.	Annually
Inlets	Inspection for debris and sediment build up.	Annually (and following poor performance)
	Inspect inlets for blockages and clear if required.	Monthly

Inlets	Inspect inlet pipework for blockages, clogging, standing water and structural damage.	Monthly
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate.	As required

Table 2: SuDS Maintenance

2.7 Proposals for Foul Water Disposal

Foul effluent should discharge via gravity to the 225 mm public combined sewer south of the site in Hepworth Lane. This is subject to formal approval from Yorkshire Water.

The foul drainage system may be offered for adoption to Yorkshire Water or a NAV (New Appointments and Variations).

2.8 Residual Flood Risk

There is a potential flood risk to site occupiers and to others from surface water runoff as a result of developing the site. The residual risk can be managed by the general flood mitigation measures outlined below.

2.9 Mitigation Measures

The proposed surface water drainage system is designed to current best practice and to the standards laid out in the publication ‘Design and Construction Guidance for foul and surface water sewers’ and Building Regulations Part H 2015.

In the event of surface water exceedance during extreme rainfall events or blockage scenarios, the site is laid out so that surface water runoff is directed away from buildings, including those on neighbouring streets.

3.0 CONCLUSIONS

1. Surface water disposal is considered in accordance with the drainage hierarchy in Building Regulations Part H 2015 and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 080 reference ID 7-080-20150323.

2. Surface water disposal will be via gravity to an infiltration basin in the southern portion of the site, subject to approval from the Lead Local Flood Authority.

3. In line with the Lithos Geoenvironmental Appraisal (Ref: 1668/1F) and subsequent email correspondence, the development should ensure that no dwelling is built within 10 m of the basin crest due to potential ground stability issues as a result of focussed sustained water flows in shallow mine workings. The Kirklees Council Lead Local Flood Authority pre-application advice also notes a hydro-geological study is required to confirm the suitability of an infiltration basin.

4. The infiltration basin has been sized using the lowest recorded infiltration rate on site of 3.87×10^{-5} m/s. The basin has been sized for the 1 in 100 year plus 45% climate change rainfall event. An approximate basin volume of 1,400 m^3 will be required, subject to detailed design.

5. The proposed infiltration basin will provide water quality treatment and attenuation as well as adding biodiversity and amenity value to the site. The proposed SuDS features are subject to approval by the Lead Local Flood Authority and detailed design.

6. Foul effluent should discharge via gravity to the 225 mm public combined sewer south of the site in Hepworth Lane. This is subject to formal approval from Yorkshire Water.

7. Maintenance of the surface water drainage system will be in accordance with the recommendations provided by suppliers and product specifications. Maintenance of the potential SuDS systems for this site will also be in accordance with the recommendations within The SuDS Manual.

8. Method statements will be provided prior to construction. These will include details on how contaminated water, erosion and sediment control will be dealt with during construction

9. Both the surface and foul water drainage systems will be offered for adoption to Yorkshire Water or a NAV (New Appointments and Variations).

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APPENDICES

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APPENDIX 1


Wellhouse Ln
Wellhouse Ln
Hepworth Ln
Hepworth Ln
Hepworth Dr
Balderstone Hall Ln


Crossley
Primrose
Dismantled R
Sch
Sch
87
Primrose
Farm
100
Recn
Gd
Balderstone
Hall
Northorp
21
82
85
irfield
21
Towngate
Castle Hall
Hill
Motte
77
65
50

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APPENDIX 2

HADDOCK & TODD

Land Surveyors & Civil Engineers
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SITE SURVEY

WOODWARD COURT
MIRFIELD.

Sheet 1 of 1	Surveyed by DK DB
Drawn	Drawn by DK DB
Date of Survey	September 2012
Scale	1:500
Survey Job No.	S7770

CODE
Mains Water Cover
Mains Water Valve
Mains Water Hydrant
Mains Gas Valve
Mains Gas Governor
Mains Gas Cover
Mains Gas Vent
Mains Gas Marker Post
Mains Gas Test Point
Mains Gas Valve Cover
Mains Gas Valve Riser
Mains Gas Valve Box
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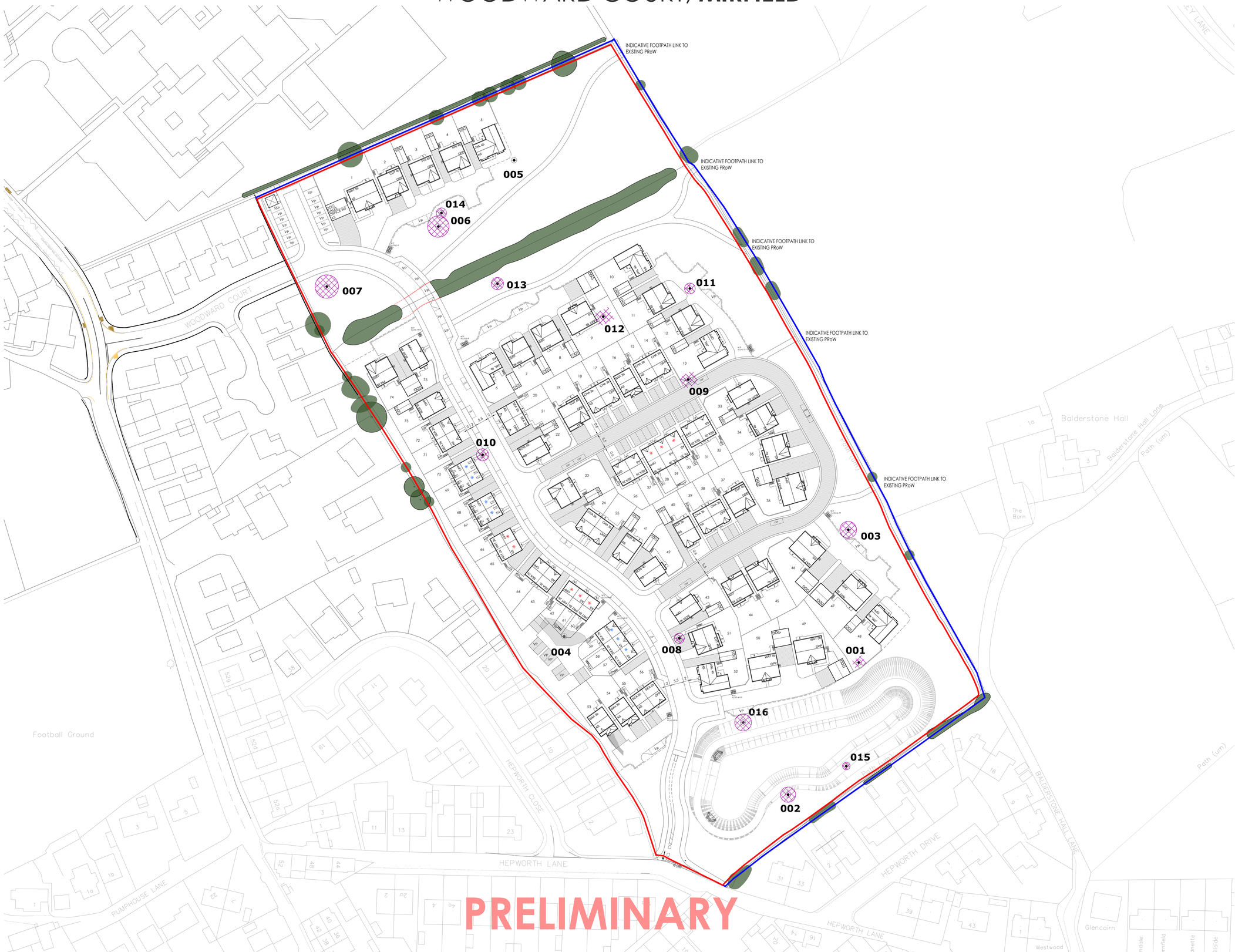
Mains Gas Valve Key Box Key
Mains Gas Valve Key Box
Mains Gas Valve Key Box Cover
Mains Gas Valve Key Box Riser
Mains Gas Valve Key Box

Eastwood
CONSULTING ENGINEERS

APPENDIX 3

WOODWARD COURT, **MIRFIELD**

Bellway



DRAWING LEGEND:

- RED LINE BOUNDARY
- OWNERSHIP BOUNDARY
- AFFORDABLE UNITS - RENT
- AFFORDABLE UNITS - INTERMEDIATE
- EXISTING TREES/HEDGEROWS TO BE RETAINED
- EXISTING TREES/PLANTING TO BE REMOVED
- VISITOR PARKING BAY
- ON STREET VISITOR PARKING SPACE
- BIN COLLECTION POINTS FOR SHARED DRIVES
- BIN STORAGE POINT
- CYCLE STORE

WOODWARD COURT, MIRFIELD
SCHEDULE OF ACCOMMODATION

House Type	Bed No/Storey	Building Regs	Type	Parking	Sq.ft	No. Units	Total Sq.ft	%
Freesale								
Seamstress	2B/2	M4(2)	End	PS	824	12	9888	20%
Chandler	3B/2	M4(2)	End	PS	963	8	7704	13%
Baxter	3B/2	M4(2)	Det	IG	1015	3	3045	5%
Schweiner	3B/2	M4(2)	Det	SG	1223	3	3669	5%
Bowyer	4B/2	M4(2)	Det	SG	1334	5	6670	8%
Philosopher	4B/2	M4(2)	Det	SG	1457	8	11656	13%
Cutler	4B/2	M4(2)	Det	IG	1360	8	10880	13%
Jeweller	4B/2	M4(2)	Det	SG	1666	6	10116	10%
Watchmaker	5B/2	M4(2)	Det	DG	1880	7	13160	12%
			Freesale Total			**60**	**77,028**	**100%**
Affordable								
Printer	2B/2	M4(2)	End	PS	762	4	3048	27%
Printer	2B/2	M4(2)	Mid	PS	762	1	762	7%
Seamstress	2B/2	M4(2)	End	PS	824	2	1648	13%
Seamstress	2B/2	M4(2)	Mid	PS	824	1	824	7%
Tilman	3B/2	M4(2)	End	PS	1015	2	2030	13%
Tilman	3B/2	M4(2)	Mid	PS	1015	1	1015	7%
Bailster	3B/2.5	M4(1)	End	PS	1188	4	4752	27%
			Affordable Total			**15**	**14,079**	**100%**
			Affordable Site Percentage					**20%**

			Total	**75**	**91,107**
Gross Area				**11.70 acres**	**4.73 ha**
Nett Area				**6.54 acres**	**2.65 ha**
Open Space (Exc. Attenuation and BNG habitat zone)				**3.42 acres**	**1.38 ha**

Nett Density	**28**	**dph**	**Nett Coverage**	**13,931**	**sq.ft/acre**		
Single Garage	20	Double Garage	7	Twin Garage	1		
Visitor Parking Bay	29	On Street Visitor Parking	11				

0m 10m 20m 30m 40m 50m

L	Layout updated to client comments.	Jul 26
K	Layout updated to client comments.	Jul 26
J	Layout updated to consultee comments and to include FHS house type range.	Jun 26
H	Existing trees/planting to be removed identified and knee rails amended around shared drives.	Nov 25
G	Fences adjusted at plot 6, 23 & 56. Mineshafts hidden from layout	Nov 25
F	Road alignment adjusted infront of plots 37-40. Additional space for soft landscaping in front of plots 26-32. Footpath links shown indicatively to PRoW on eastern boundary.	Nov 25
E	Plot 12 garage pulled forward.	Nov 25
D	Garages to plots 3,5 and 48 moved forward. Plot 5 and 48 moved to accommodate.	Nov 25
C	Garages to plots 5 and 48 moved forward.	Nov 25
B	Layout updated to clients markup.	Oct 25

SITE LAYOUT - 2520-SI-02L
WOODWARD COURT, MIRFIELD
BELLWAY HOMES
SCALE:1:500@A0 - OCTOBER 2025

PRELIMINARY

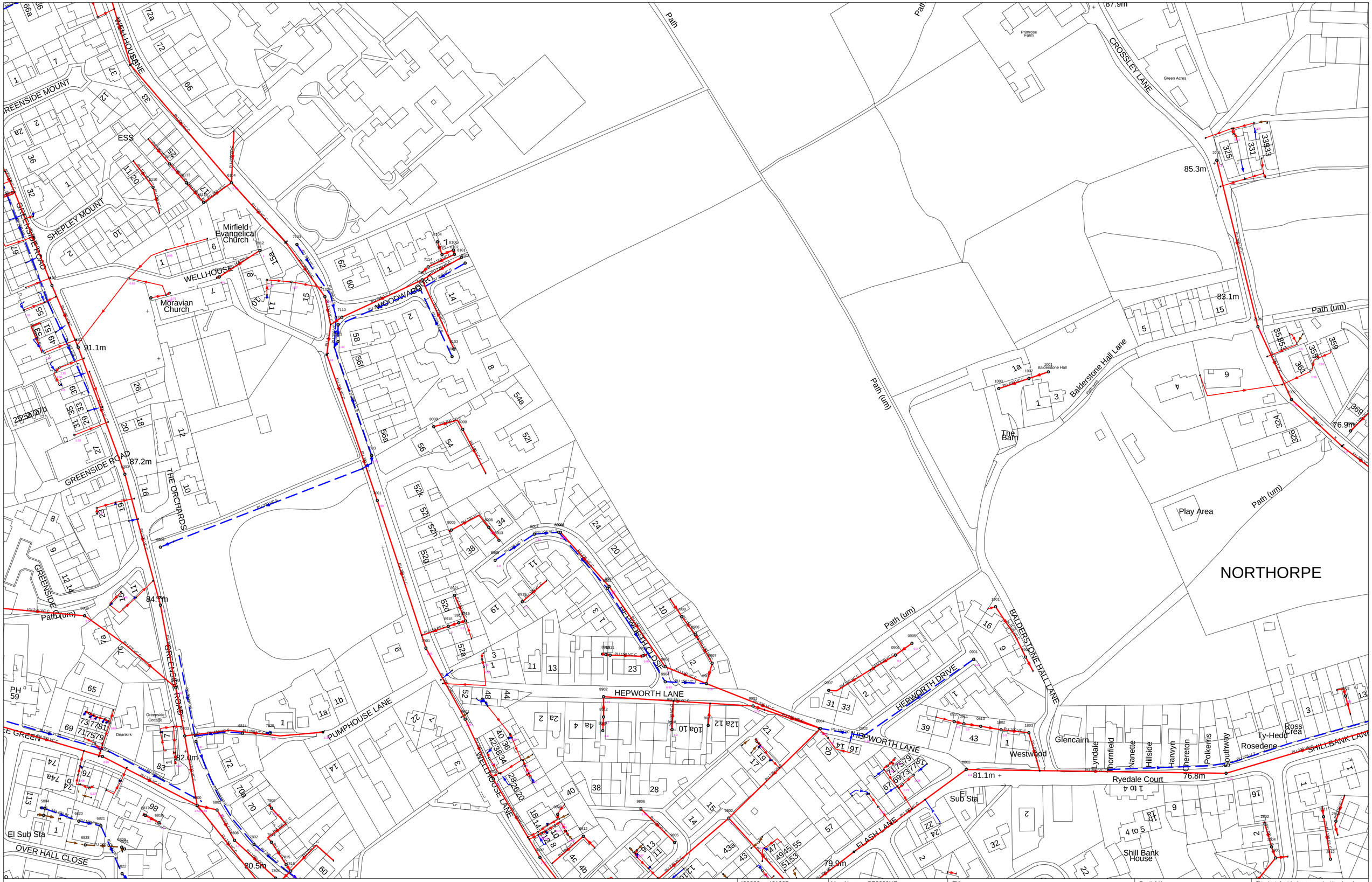
PARKER PEEL ARCHITECTURAL
e info@parkerpeel.co.uk w www.parkerpeel.co.uk t 01924 921 860

PRELIMINARY

SITE LAYOUT PLAN - 1:500

Eastwood
CONSULTING ENGINEERS

APPENDIX 4



420862 : 421005	Map Name : SE2020NE	Title	Partial Key
Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : G Mullaney Contact Tel :	Notes		Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS
		(Oty) 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 : 09/05/2025, 14:08:35
			Source : Sewer Network Enquiry

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.

Date Gen : 09/05/2025, 14:15:32

UPN: Undefined Originator: G Mullaney, ,

Yorkshire Water Services
Land and Property
Western House
Western Way
Halifax Road
Bradford
BD6 2SZ

Tel: 0345 120 8482
Fax:

Email:
technical.sewerage@yorkshirewater.co.uk

Eastwood Consulting Engineers
St Andrew's House; 23 Kingfield Road
Sheffield
S11 9AS

Your Ref:
Our Ref: A007933

For telephone enquiries ring:
George Mullaney on 0345 120 8482

9th May 2025

Dear Ms Stevenson-Steels,

Woodward Court (land off) Mirfield WF14 0PY - Pre-Planning Sewerage Enquiry V881026

Thank you for your recent enquiry. Our charge of £488.00 plus VAT will be added to your account with us, reference EPL039. You will receive an invoice for your account in due course.

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:

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate systems should extend to the points of discharge to be agreed.

The closest practicable point of discharge for foul will be the 225mm diameter combined public sewer in Hepworth Lane, to the south of the site, but at present it does not have

adequate capacity available to accommodate the anticipated foul water discharge from the proposed site. Subject to the submission of a Formal Planning Application and robust build plan and start date, Yorkshire Water will carry out a feasibility study to determine suitable foul connection points, any available capacity in the public sewer network, together with timescales for any potential upgrading works required.

The cost for any feasibility/modelling/upgrade works will be at Yorkshire Waters cost up-front and recouped via the sites eventual infrastructure charges.

What are infrastructure charges?

We levy infrastructure charges for all newly connected properties that have not been connected to our water or sewer network before. The charges are calculated to recover the cost of reinforcing our existing water and sewer networks needed to serve new developments. The charges are set to recover the costs over the whole of the Yorkshire Water area to increase capacity.

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.

The public sewer network does not have any capacity available to accept any discharge of surface water from the proposal. If SuDS are not viable, the developer is advised to contact the Environment Agency/local Land Drainage Authority with a view to establishing a suitable watercourse for discharge.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

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 or 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.

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for Code for Adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Code for Adoption, pursuant to an agreement under Section 104 of the Water Industry Act 1991. We are happy to offer pre-development technical advice on any prospective sites that you would like to put forward for adoption, prior to submission of your adoption application.

An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Sewer Adoption, Diversion and Requisition (telephone 0345 120 84 82) or email technical.sewerage@yorkshirewater.co.uk or visit - https://www.yorkshirewater.com/developers/sewerage/sewer-adoptions/ for further information.

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 sincerely

George Mullaney
Town Planning Technician

Eastwood
CONSULTING ENGINEERS

APPENDIX 5

From: Paul Farndale
Sent: 12 May 2025 09:33
To:
Subject: RE: 49653- Woodward Court, Mirfield - Drainage Strategy

Please be aware that soakaways were previously tested and the applicant went ahead with a design. If you are going to have 'a competent person' rule it out, can I politely suggest the look at the previous submission and critique it, for any omission on their part. This will be picked up in an official response and I suspect town or district Councillors will want to know why it has changed.

I think the sewer in the area is 150mm so I would get try and get a statement from YW as to which point of connection they would recommend. You may well have to upsize for some distance or chase a larger diameter sewer to a suitable connection point.

Kind regards,

Paul Farndale
Team Leader (Acting)
Flood Management & Drainage (LLFA)
Kirklees Council

From: J
Sent: 12 May 2025 09:27
To: Paul Farndale
Subject: RE: 49653- Woodward Court, Mirfield - Drainage Strategy

CAUTION: External email. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good morning Paul,

Please can you advise when we should expect to receive a response to the email below.

Kind regards,

Eastwood CONSULTING ENGINEERS

Eastwood Consulting Engineers is a trading name of Eastwood and Partners (Consulting Engineers) Limited
Registered Office: St Andrew's House, 23 Kingfield Road, Sheffield, S11 9AS

Company No: 1835021, VAT Registration No: 738 2114 44, Web: www.eastwoodce.com Tel: 0114 255 4554

Email confidentiality notice: This message is private and confidential. If you have received this message in error, please notify us and remove it from your system.

From:
Sent: 02 May 2025 13:54
To:
Subject: 49653- Woodward Court, Mirfield - Drainage Strategy [Filed 02 May 2025 13:54]

Good afternoon Paul,

I hope you are well.

It is understood that there have been previous discussions regarding the drainage strategy for a site off Woodward Court, Mirfield (location plan attached).

Following a Site Investigation (Lithos report, ref: 1668/1F), surface water discharge via infiltration has been discounted due to potential ground stability issues as a result of focussed sustained water reaching shallow mining workings.

Given that there are no watercourses nearby, revised proposals are for surface water to discharge to a public sewer near the site.
Please can you confirm that this is acceptable in principle. Feel free to call should you wish to discuss the revised proposals further.

Kind regards,

Eastwood
CONSULTING ENGINEERS

Eastwood Consulting Engineers is a trading name of Eastwood and Partners (Consulting Engineers) Limited
Registered Office: St Andrew's House, 23 Kingfield Road, Sheffield, S11 9AS
Company No: 1835021, VAT Registration No: 738 2114 44, Web: www.eastwoodce.com Tel: 0114 255 4554

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From: Paul Farndale
Sent: 21 May 2025 10:33
To: Jessica Stevenson-Steels
Subject: RE: 49653- Woodward Court, Mirfield - Drainage Strategy
Attachments: Woodward Ct.pdf

Hello Jessica,

Further to my previous email regarding previous approval of soakaways and how you are going to counter their findings (coal mine presence - with official response from relevant authority?), please find attached a plan of the public sewer network with watercourses over. I would suggest you examine the depth of the closest surface water system and apply for pre-application advice at Yorkshire Water. This would appear favourable as opposed to smaller combined sewers closer to the site.

Kind regards,

Paul Farndale
Team Leader (Acting)
Flood Management & Drainage (LLFA)
Kirklees Council

From:
Sent: 02 May 2025 13:54
To: Paul Farndale
Subject: 49653- Woodward Court, Mirfield - Drainage Strategy

CAUTION: External email. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Good afternoon Paul,

I hope you are well.

It is understood that there have been previous discussions regarding the drainage strategy for a site off Woodward Court, Mirfield (location plan attached).

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Given that there are no watercourses nearby, revised proposals are for surface water to discharge to a public sewer near the site.
Please can you confirm that this is acceptable in principle. Feel free to call should you wish to discuss the revised proposals further.

Kind regards,

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Kirklees Council
Planning and Development Service
PO Box 1720
Huddersfield

Pre-Application Consultation Request

Town and Country Planning Act 1990

Observations By:	**KC, Lead Local Flood Authority**

Application No.	**2025/20746**
Proposed Development:	**Pre application for residential development**
Location:	**Land off, Woodward Court, Mirfield, WF14 0PY**
Applicant/Agent:	**Paul Butler PB Planning Ltd**
Planning Officer	**Katie Chew**

Your comments on the above proposal are requested. Please e-mail your comments to the DC Admin in either a Microsoft Word or PDF Document to DC.Admin@kirklees.gov.uk by 26-Aug-2025.

The submitted plans and documents for the application can be viewed using Documents from Anite or Anite, please use the application number above.

If I do not receive your response by 26-Aug-2025 then the application may be decided without the benefit of your views.

Dated: 12-Aug-2025

Mathias Franklin
Head of Planning and Development

Kirklees Council
Planning and Development Service
PO Box 1720
Huddersfield

Consultation Response from KC, Lead Local Flood Authority		
2025/20746 at Land off, Woodward Court, Mirfield, WF14 0PY		
Pre application for residential development		
Date Responded: 19th September 2025	**Responding Officer: Paul Farndale**	**Responding Ref:**

Contours

The site falls roughly north to south with a gradient of 1 in 20 to 1 in 23.

Main River Flood Risk

This site is in main river flood zone 1 – low risk.

Sequential Test/Flood Risk Assessment

A sequential test is not necessary. The site is greater than 1 hectare and therefore an official 'full' flood risk assessment is required. We expect this will concentrate on the use of infiltration techniques (see comments in later sections) and flood routing.

Water Features

There are no known watercourses or ponds etc shown on site and in the immediate vicinity of the site.

Surface Water Flood Risk

3rd generation surface water flood risk mapping does not identify any concerns for the site in the 1 in 30 and 1 in 100 return periods which are relevant to lifespan of a site for housing development. The 1 in 1000-year return period does show a linear pattern north to south which suggests a shallow valley that may collect run off from an undeveloped site. The FRA should examine flood routing before a layout is designed so that it can manage blockage scenarios and exceedance events by routing water along roads and open space, avoiding property curtilage.

4th generation surface water flood risk mapping shows some ponding of water at the southern border. Given previous applications on this site we believe that some protection to existing properties along the boundaries of the site to hold exceedance flows and blockage scenarios in safe places on site and any overspill onto Hepworth Lane is expected.

Flood Incidents

Although we have no significant flood incidents recorded on our database. The LLFA is aware of water ingress at a property on Hepworth Lane that we believe was caused by flows along the highway adjacent to the property and not the development site.

Kirklees Council
Planning and Development Service
PO Box 1720
Huddersfield

Surface Water Disposal

In line with the hierarchy of disposal, infiltration techniques should be examined before a direct or indirect connection to watercourse. Only when these have been discounted and agreed with the LLFA can a connection to public sewer be considered.

Infiltration Techniques

This site is shown as category 1 in the British Geological Survey (highly likely to be suitable). The indicative layout provided shows and attenuation basin, so we assume soakaways are not intended.

However previous application on this site had extensive soakaway testing using triple test techniques with bowsers at several locations and submitted information that demonstrated soakaways were viable in accordance with recognised testing procedures.

The above application is available to view on planning portal. We expect these test results to be analysed in the new flood risk assessment and a demonstration alongside any new testing that has taken place as to why conclusions are different and a robust defence of said conclusion.

Due to the age of the previous testing and other such projects in the district subsequently, Kirklees LLFA would also seek a competent person to assess the contribution of previous coal mining works on soakaway tests and any remediation such as grouting that could affect infiltration techniques testing on the undeveloped site to the developed site.

We also expect a competent person to look at re-emergence where there is shallow bedrock. There is a possibility that testing runs laterally along bedrock but may not re-emerge, whereas the volumes of water on a fully developed site may re-emerge if fissures are relied upon rather than free draining strata. Cross sections of strata based on boreholes and trial pits are now expected to be presented and analysed by a geo-hydrologist. Where fissures are relied upon and given experience within the district, soakaways should consist of wide linear trenches where practicable or manhole styled soakaways with linear spokes to spread flows over a wide area. This could also be achieved by connecting individual soakaways.

We are aware that for the statutory undertaker to adopt soakaways there need to be accessible and therefore those in back gardens would remain private. For the long-term viability of soakaways, a management company must be set up to with a maintenance/management and replacement programme under section 106 of the Town and Country Planning Act. Any such agreement can be null and void upon adoption.

Highway drainage soakaways may need to be separated. Early discussion with Yorkshire Water or NAV and the Highways Authority are necessary as space will be required that is not considered in the indicative layout plan.

Watercourse

There are no known watercourses in the immediate vicinity of the site.

Kirklees Council
Planning and Development Service
PO Box 1720
Huddersfield

Public Sewers

Although there are surface water sewers located in Hepworth Close and Hepworth Drive, these appear to be transitional sewers, i.e. they connect to a combined system downstream.

A 150mm and a 225mm public combined sewer is located immediately to the site's southern border with Hepworth Lane. We advise the applicant to contact Yorkshire Water for pre-planning advice to see if these sewers are suitable for a restricted 3.5l/s connection from site given they are small diameter. A 300mm combined sewer is located 100m from the site in Flash Lane and maybe Yorkshire Water's preferred connection point. A 225mm surface water sewer is also located in Flash Lane. This is shown 170m from the site but there is a possibility that unmapped section may run closer. This surface water sewer appears to connect to a 300mm combined sewer in Shillbank Lane but I would suggest this is verified as another surface water sewer is positioned metres away from the connection point shown.

Flood Routing

We expect the layout to be designed with flood routing in mind. This could be an exceedance event or blockage scenario where water is surcharging the drainage system and running overland. Main flow routes should avoid property curtilage and use roads and open space. Where water would go if a storm event hit a saturated undeveloped field needs to be considered in this design, i.e. the southern border. Where existing houses can be better protected without making it worse for others, as safe off-site route into the highway should be considered.

Section 106 – Management Company

Under NPPF there is an obligation for the LPA to ensure the adequate management of SUDS (surface water drainage) for the lifetime of the site. This includes from installation. A management company should be set up under Section 106 of the Town and Country Planning Act 1990 with a maintenance and management plan based on the latest CIRIA guide to SUDS but bespoke to the site, agreed by condition. The Section 106 agreement will have a breakout clause for when surface water infrastructure is adopted by Highways Authority, Statutory Undertaker and/or NAV equivalent.

Eastwood
CONSULTING ENGINEERS

APPENDIX 6

From:
Sent: 15 May 2025 09:33
To:
Subject: 1668, Balderstone Hall, Mirfield - Queries

ALERT: This message originated outside of Bellway's network. **BE CAUTIOUS** before clicking any link or attachment.

We've recommended proof drilling (and grouting) of Plots 5, 10 to 12, 20, 42, 50, 56 (assuming layout hasn't been revised since our Report issue) which are located close to 6 of the mine entries. It would be sensible (from a cost perspective) to drill all the mine entries in 'one hit'.

We could draft a Specification for investigation & treatment of the entries (& affected plots) to enable you to obtain prices. When do you anticipate these works will be required?

With respect to the infiltration basin in POS in the SW corner, our PH4 suggests coal lies at about 15m bgl . So, we don't see a problem with this strategy, although it would be prudent to ensure no dwelling is built within 10m of the basin crest.

Regards

Mark Perrin
Director
Lithos Consulting Ltd

LITHOS CONSULTING
www.lithos.co.uk

From:
Sent: Thursday, May 15, 2025 8:42 AM
To:
Subject: RE: 1668, Balderstone Hall, Mirfield - Queries

Thanks for the below.

Please could you provide a quotation for the drilling investigation required? I have asked the architect to try and avoid the entries being beneath the highway to reduce complications but could do with firming everything up really.

Re soakaways, if restricting to POS it would make sense to me to limit this to an infiltration basin in the South of the site, would you be happy that this would not have any detrimental effect on workings beneath the site?

Kind Regards

Bellway Homes Limited (Yorkshire)

2150 Century Way
Thorpe Park
Leeds
West Yorkshire
LS15 8ZB
www.bellway.co.uk

Bellway | 5 for 25 Giving to build better lives Help raise £5million for 2025 | Supporting CANCER RESEARCH UK

From:
Sent: 14 May 2025 17:10
To:
Subject: 1668, Balderstone Hall, Mirfield - Queries

So, we think **MF003** is likely a partly collapsed bell pit. When the Report was written, this feature was shown in POS, but now it is expected to underlie a new highway. We've already recommended (in Section 15.2), that all 12 mine entries be drilled to confirm their depth and that they are completely infilled (not blocked several meters below ground levels with open voids below).

Section 15.2 also includes recommendations for treatment. For highways I'd ordinarily expect a cap at rockhead to suffice but given the large diameter here (c. 5m), it'd probably be better to grout on say a 2m grid. Geogrid could also be incorporated within the road construction locally. Treatment proposals will need to be agreed with the highway adopting authority (best done after drilling).

With respect to **LLFA** comments in their e-mail of 12th May, it is true that in 2018 (followed some further testing) we suggested that soakaways "do provide a suitable drainage solution for the discharge of surface water run-off at the site". However, CIRIA C758D (Abandoned mine workings manual) was issued in 2019 and this noted that "*Conventional SuDS often involve soakaways, meaning careful assessment of impacts on workings' stability or of extra flows reaching a conducting void are required*."

Partly as a consequence of this, but also on review of our updated report by a Director who joined Lithos in 2022, we felt it prudent to refine our advice wrt soakaways. Our latest Report (1668/1F, Dec. '22) now states "due to the potential impact on ground stability as a result focused sustained water flows reaching shallow mine workings, it is recommended that where an alternative is not available, and soakaways have to be used, that they are restricted to POS only". We believe refinement of our advice regarding soakaways is prudent and justified.

Hope the above helps.

Regards

Mark Perrin
Director
Lithos Consulting Ltd

LITHOS CONSULTING
www.lithos.co.uk

From: L
Sent: 14 May 2025 15:12
To:
Subject: Balderstone Hall, Mirfield - Queries

As discussed, having difficulty with the zone of influence for MF003 due to not reaching rockhead in the SI, appears to also be the case for MF004.

It looks like we will be having a good go at this site now, could you therefore please provide a quotation for:

- Any further proof drilling required to firm up requirements for shafts and entries. Appreciate this may be subject to the layout but if you could provide a budget that would be appreciated.
- Specification for treatment of shafts/workings

In addition, Eastwoods have contacted the LLFA officer regarding SW disposal, and he has provided a response pushing soakaways, I'll forward the correspondence separately so you have the attachments etc, but may need a bit more of a steer here and/or letter report with a bit more detail on what we can/can't do.

Kind Regards

Bellway Homes Limited (Yorkshire)
2150 Century Way
Thorpe Park
Leeds
West Yorkshire
LS15 8ZB
www.bellway.co.uk

Eastwood
CONSULTING ENGINEERS

APPENDIX 7

SUDS Type	SUDS Technique	Description	Suitable	Comments
Source Control	Green roof	Vegetated roof that reduces runoff volume and rate	No	Expected planning requirement for traditional pitched roofs to match neighbouring housing.
	Rain garden/ bio retention area	Small depressions in the ground that can act as infiltration points.	No	Limited space for rain gardens to be developed.
	Rainwater harvesting/rainwater butts	Rainwater is stored and re-used	Possible	Low volumes of water are likely to be required by the development. Individual water butts can be used for garden watering.
	Permeable paving	Paving which allows inflow of rainwater into underlying construction/soil	No	Permeable paving is not proposed due to the site topography. Other SuDS features are proposed.
Infiltration	Soakaway	Pit or trench which stores and disposes of water to the ground	No	Infiltration type SuDS across the majority of the site is not viable due to potential ground stability as a result of focussed sustained water flows in shallow mine workings.
	Filter Drain	Trench which conveys and/or disposes of water to the ground.	No	
	Infiltration Basin	Shallow basin which stores and disposes of water to the ground	Yes	An infiltration basin is proposed in the south-western portion of the site in POS. It should be ensured that no dwelling is built within 10 m of the basin crest due to potential ground stability issues.
Conveyance	Swale	Shallow vegetated depression which conducts and retains water	No	Lack of suitable space.
Detention	Subsurface storage	Traditional underground pipes, tank storage, or modular systems	Yes	Area available on the site for an attenuation tank/ crates.
	Detention Basin	Normally dry but may have small permanent water pools at the inlet and outlet. They can function as POS	No	Inefficient use of POS.

Detention	Pond	Permanent body of water	No	Lack of suitable public open space.
	Wetland	Permanent body of shallow water or marsh	No	

General Information			
Site ID			
Site Location and co-ordinates			
Elements forming the SUDs scheme		Approved drawing reference	
Inspection Frequency		Approved specification reference	
Type of Development		Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
General Inspection Items								
Evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance								
Evidence of poor water quality								

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
Silt/Sediment Accumulation								
Id there any sediment accumulation at inlets/outlets								
If yes, state the depth in mm								
Removal required? State waste disposal requirements have been compiled with environmental regulator								
Is surface clogging visible								

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
Blockages/Litter Build up								
Is there evidence of litter build up (if yes, has this been removed)								
Is there evidence of clogging or blockages (if yes, has this been removed)								
Vegetation								
Is vegetation in the basin/swales satisfactory (density, weed growth, coverage)								
Does any area need weeding, mowing or pruning (if yes, has this been undertaken)								
Is there evidence of invasive species becoming established (state action required								

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
Infrastructure								
Is the flow control in good condition (silt, damages, evidence of tampering) – if yes, please provide details								
Is there evidence of unauthorised inflows?								
Is the inflow/outflow structures in a suitable condition – please provide information								
Are there any other matters that could affect the performance of the system – if yes give details								

Inspection Date								
	Details	**Y/N**	**Action Required**	**Date Completed**	**Details**	**Y/N**	**Action Required**	**Date Completed**
Other Observations								
Information appended (photos etc)								
Suitability of current maintenance regime								
Continue as current Increase maintenance Decrease maintenance								
Next Inspection								
Proposed date for next inspection								

Further Comments	

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

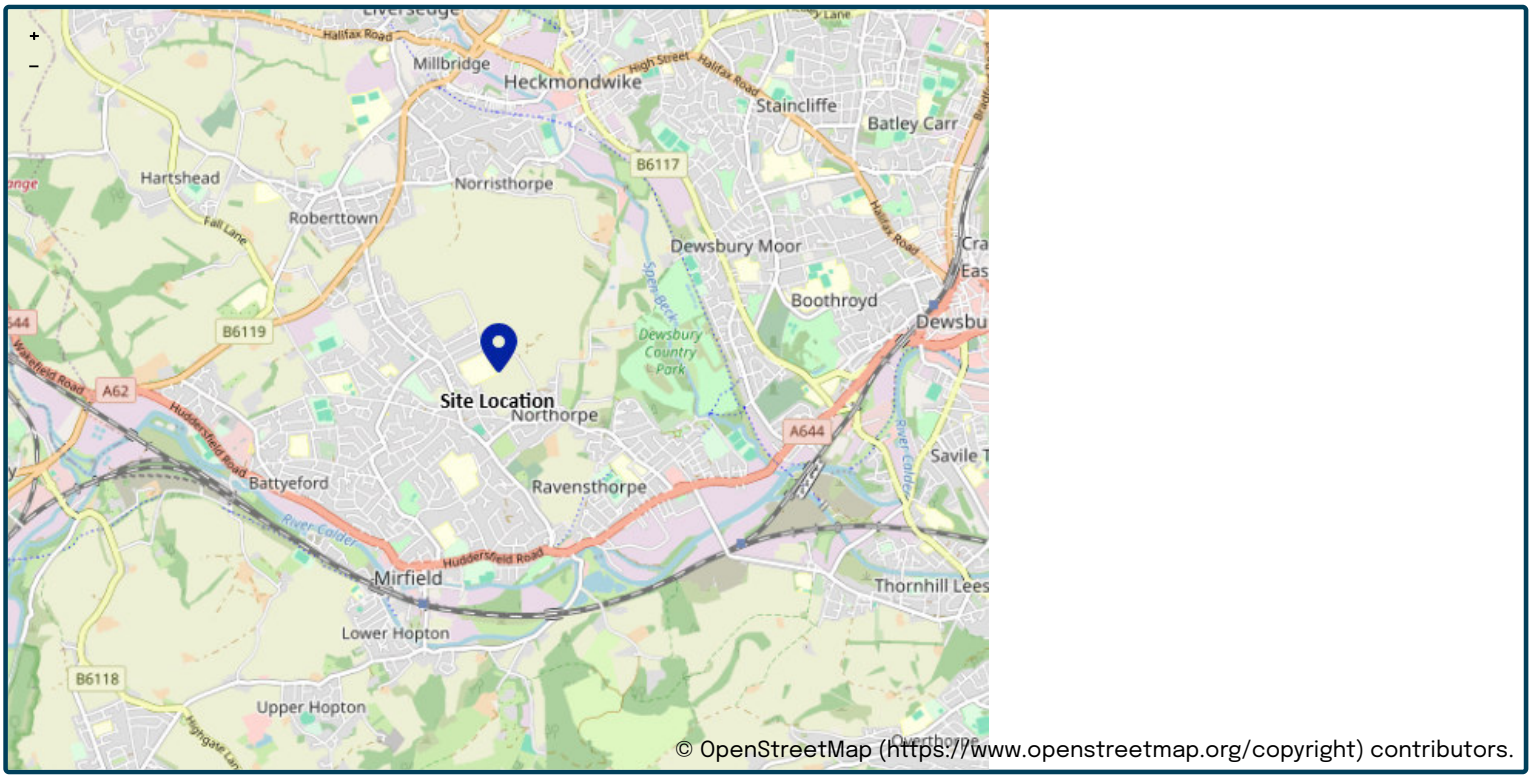
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	13/10/2025
Calculated by	
Reference	
Model version	2.2.1

Location

Site name	Woodward Court
Site location	Mirfield



Site easting (British National Grid)	420959
Site northing (British National Grid)	421089

Site details

Total site area (ha)	2.64 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	737 mm		
BFIHOST19scaled	0.41		
QMed-QBar conversion	1.064		1.064
QMed (l/s)	10.8 l/s		
QBar (FEH statistical 2025) (l/s)	11.5 l/s		

Growth curve factors

	My value		Map value
Hydrological region	3		3
1 year growth factor	0.86		
2 year growth factor	0.94		
10 year growth factor	1.45		
30 year growth factor	1.75		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	9.9 l/s
Flow rate 2 year (l/s)	10.8 l/s
Flow rate 10 years (l/s)	16.6 l/s
Flow rate 30 years (l/s)	20.1 l/s
Flow rate 100 years (l/s)	23.9 l/s
Flow rate 200 years (l/s)	27.2 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.1) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.



Exceedance flow route

REV	DESCRIPTION	SIG	CHK	DATE
P01	First issue.	JSS	IH	15.10.2025
P02	Updated to suit latest site layout (Rev: F)	JSS	CH	13.11.2025
P03	Updated to suit latest site layout (Rec 23.06.2026) and drainage appraisal.	JSS	GH	03.07.2026
P04	Revised to suit latest site layout.	RJ	CH	06.07.2026

BELLWAY HOMES LTD (YORKSHIRE)

WOODWARD COURT, MIRFIELD

FLOOD ROUTING PLAN

Eastwood CONSULTING ENGINEERS
St Andrew's House
23 Kingfield Road
Sheffield, S11 9AS
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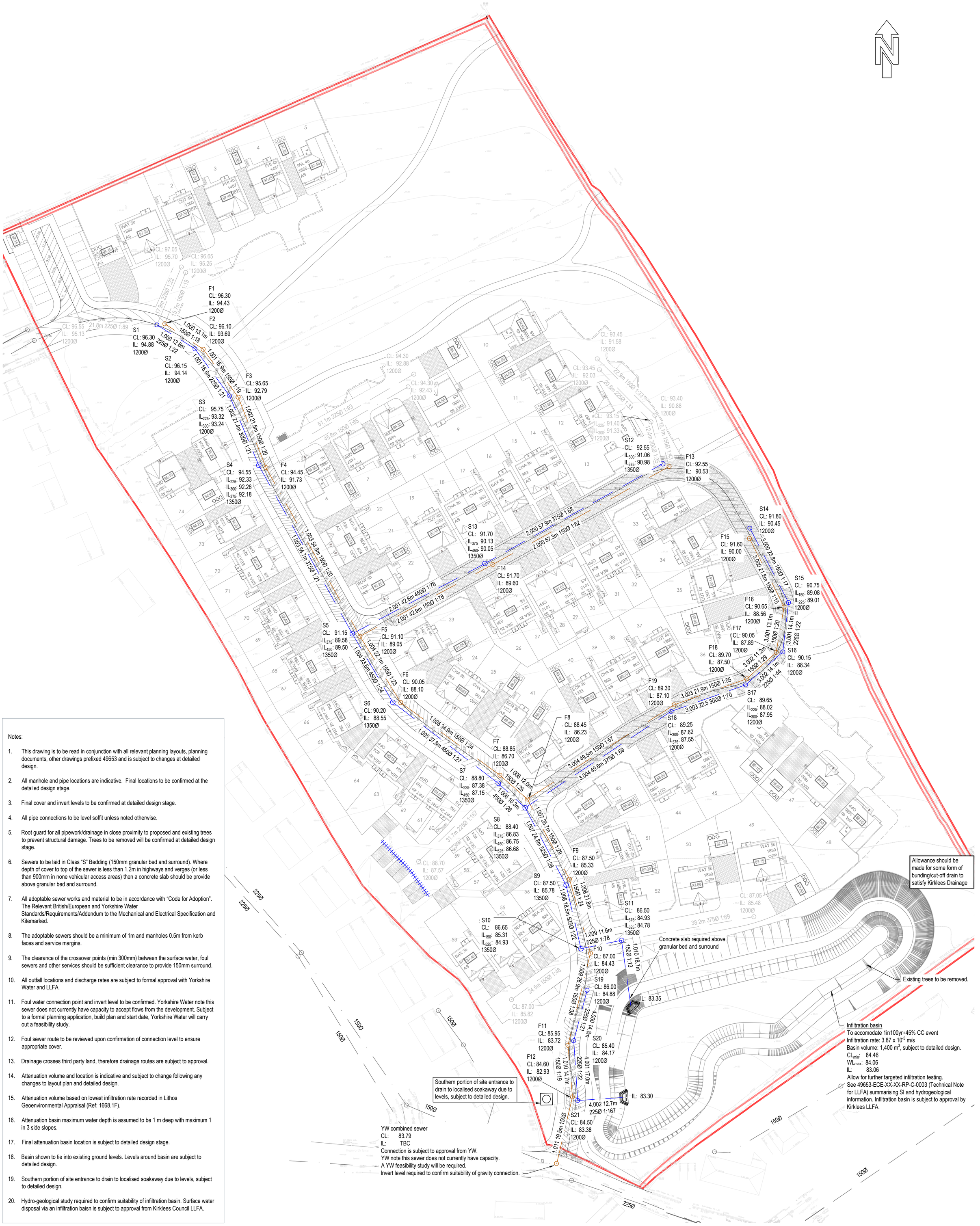
E: mail@eastwoodce.com
eastwoodce.com

ECE PROJECT No	SCALE AT A1	STATUS	SUITABLE FOR
49653	1:500	S0	Initial

DRAWING NUMBER: **49653** - ECE - XX - XX - DR - C - **0008** REV P04
(Project - Originator - Zone - Level - Type - Role - Number)



Notes:

1. This drawing is to be read in conjunction with all relevant planning layouts, planning documents, other drawings prefixed 49653 and is subject to changes at detailed design.
2. All manhole and pipe locations are indicative. Final locations to be confirmed at the detailed design stage.
3. Final cover and invert levels to be confirmed at detailed design stage.
4. All pipe connections to be level soffit unless noted otherwise.
5. Root guard for all pipework/drainage in close proximity to proposed and existing trees to prevent structural damage. Trees to be removed will be confirmed at detailed design stage.
6. Sewers to be laid in Class "S" Bedding (150mm granular bed and surround). Where depth of cover to top of the sewer is less than 1.2m in highways and verges (or less than 900mm in none vehicular access areas) then a concrete slab should be provide above granular bed and surround.
7. All adoptable sewer works and material to be in accordance with "Code for Adoption". The Relevant British/European and Yorkshire Water Standards/Requirements/Addendum to the Mechanical and Electrical Specification and Kitemarked.
8. The adoptable sewers should be a minimum of 1m and manholes 0.5m from kerb faces and service margins.
9. The clearance of the crossover points (min 300mm) between the surface water, foul sewers and other services should be sufficient clearance to provide 150mm surround.
10. All outfall locations and discharge rates are subject to formal approval with Yorkshire Water and LLFA.
11. Foul water connection point and invert level to be confirmed. Yorkshire Water note this sewer does not currently have capacity to accept flows from the development. Subject to a formal planning application, build plan and start date, Yorkshire Water will carry out a feasibility study.
12. Foul sewer route to be reviewed upon confirmation of connection level to ensure appropriate cover.
13. Drainage crosses third party land, therefore drainage routes are subject to approval.
14. Attenuation volume and location is indicative and subject to change following any changes to layout plan and detailed design.
15. Attenuation volume based on lowest infiltration rate recorded in Lithos Geoenvironmental Appraisal (Ref: 1668.1F).
16. Attenuation basin maximum water depth is assumed to be 1 m deep with maximum 1 in 3 side slopes.
17. Final attenuation basin location is subject to detailed design stage.
18. Basin shown to tie into existing ground levels. Levels around basin are subject to detailed design.
19. Southern portion of site entrance to drain to localised soakaway due to levels, subject to detailed design.
20. Hydro-geological study required to confirm suitability of infiltration basin. Surface water disposal via an infiltration baisn is subject to approval from Kirklees Council LLFA.

- Surface water drainage
- Linear drainage channel (ACO OSA)
- Infiltration basin
- Foul water drainage
- Existing combined water sewer (YW)
- Existing surface water sewer (YW)
- Foul water drainage included for feasibility check only. Drainage in these areas likely to be in plot drainage.
- Surface water drainage included for feasibility check only. Drainage in these areas likely to be in plot drainage.
- Mine shaft location with zone of influence.
- Ring soakaway

NOTES

APPROPRIATE TREATMENT TO MINESHAFTS/ADDITS ARE REQUIRED IN THE VICINITY OF THE INFILTRATION BASIN TO PREVENT DIRECT DISCHARGE

MANHOLES WITHIN ADOPTABLE HIGHWAYS WILL REQUIRE DESIGN CHECK CERTIFICATE ALONG WITH APPROPRIATE SITE INSPECTIONS/SIGN OFF.

DRAINAGE DESIGN WILL REQUIRE APPROVAL FROM KIRKLEES LLFA

ADDITIONAL SUD'S MEASURE COULD BE REQUIRED AS PART OF PLANNING APPROVAL

REV	DESCRIPTION	SIG	CHK	DATE
P01	First issue.	JSS	CH	23.10.2025
P02	Updated to suit latest site layout (Rev: F)	EL	JSS	13.11.2025
P03	Proposed SuDS features updated.	JSS	CH	26.11.2025
P04	Basin adjusted to accommodate additional mine entry surveyed features.	JSS	CH	05.06.2026
P05	Updated to suit latest site layout (Rec 23.06.2026).	JSS	GH	03.07.2026
P06	Revised to suit latest site layout.	RJ	CH	06.07.2026

BELLWAY HOMES LTD (YORKSHIRE)

WOODWARD COURT, MIRFIELD

DRAINAGE APPRAISAL

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eastwoodce.com

ECE PROJECT No	SCALE AT A1	STATUS	SUITABLE FOR
49653	1:500	S0	Initial

DRAWING NUMBER: 49653 - ECE - XX - XX - DR - C - 0016 REV P06
(Project - Originator - Zone - Level - Type - Role - Number)

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S1	0.202	5.00	96.350	1200	420853.952	421152.788	1.475	94.875
S2			96.150	1200	420864.765	421146.005	2.010	94.140
S3	0.096	5.00	95.750	1200	420874.572	421132.649	2.510	93.240
S4	0.261	5.00	94.550	1350	420882.873	421112.936	2.365	92.185
S5	0.086	5.00	91.150	1350	420909.431	421065.107	1.650	89.500
S6	0.101	5.00	90.200	1350	420920.496	421045.654	1.650	88.550
S7	0.084	5.00	88.800	1350	420950.863	421022.635	1.650	87.150
S8	0.071	5.00	88.400	1350	420958.506	421015.703	1.725	86.675
S9	0.045	5.00	87.500	1350	420970.131	420993.743	1.725	85.775
S10	0.240	5.00	86.650	1350	420974.346	420975.695	1.725	84.925
S11			86.500	1350	420985.868	420978.064	1.725	84.775
S12	0.237	5.00	92.550	1350	420997.572	421113.376	1.575	90.975
S13	0.055	5.00	91.700	1350	420947.075	421085.055	1.650	90.050
S14	0.083	5.00	91.800	1200	421022.294	421095.084	1.350	90.450
S15			90.750	1200	421033.275	421073.983	1.745	89.005
S16	0.039	5.00	90.150	1200	421031.651	421059.957	1.810	88.340
S17	0.086	5.00	89.650	1200	421021.086	421050.595	1.705	87.945
S18	0.037	5.00	89.250	1200	420999.920	421043.050	1.701	87.549
S19	0.036	5.00	86.000	1200	420976.093	420963.880	1.125	84.875
S20			85.400		420972.300	420949.559	1.230	84.170
S21	0.015	5.00	84.500	1200	420973.455	420931.893	1.125	83.375
Atten	0.379	5.00	84.460	1350	421025.380	420958.495	1.161	83.299
Outfall			85.000	1350	421028.086	420944.092	0.990	84.010

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	15.820	0.600	94.875	94.140	0.735	21.5	225	5.09	48.9
1.001	S2	S3	16.570	0.600	94.140	93.320	0.820	20.2	225	5.19	48.5
1.002	S3	S4	21.389	0.600	93.240	92.260	0.980	21.8	300	5.29	48.2
1.003	S4	S5	54.708	0.600	92.185	89.575	2.610	21.0	375	5.52	47.4
2.000	S12	S13	57.897	0.600	90.975	90.125	0.850	68.1	375	5.44	47.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	2.832	112.6	35.7	1.250	1.785	0.202	0.0
1.001	2.924	116.2	35.4	1.785	2.205	0.202	0.0
1.002	3.379	238.9	51.9	2.210	1.990	0.298	0.0
1.003	3.972	438.7	95.7	1.990	1.200	0.559	0.0
2.000	2.198	242.7	40.8	1.200	1.200	0.237	0.0

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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)
2.001	S13	S5	42.603	0.600	90.050	89.500	0.550	77.5	450	5.75	46.6
1.004	S5	S6	22.594	0.600	89.500	88.550	0.950	23.8	450	5.84	46.0
1.005	S6	S7	38.105	0.600	88.550	87.150	1.400	27.2	450	6.00	45.7
1.006	S7	S8	10.318	0.600	87.150	86.750	0.400	25.8	450	6.04	45.6
3.000	S14	S15	23.787	0.600	90.450	89.080	1.370	17.4	150	5.16	48.6
3.001	S15	S16	14.120	0.600	89.005	88.340	0.665	21.2	225	5.25	48.3
3.002	S16	S17	14.116	0.600	88.340	88.020	0.320	44.1	225	5.36	47.9
3.003	S17	S18	22.471	0.600	87.945	87.624	0.321	70.0	300	5.56	47.2
3.004	S18	S8	49.628	0.600	87.549	86.825	0.724	68.5	375	5.94	45.9
1.007	S8	S9	24.847	0.600	86.675	85.775	0.900	27.6	525	6.14	45.3
1.008	S9	S10	18.534	0.600	85.775	84.925	0.850	21.8	525	6.20	45.1
1.009	S10	S11	11.763	0.600	84.925	84.775	0.150	78.4	525	6.28	44.8
1.010	S11	Atten	18.700	0.600	84.775	83.353	1.422	13.2	525	6.33	44.7
4.000	S19	S20	14.815	0.600	84.875	84.170	0.705	21.0	225	5.09	48.9
4.001	S20	S21	17.704	0.600	84.170	83.375	0.795	22.3	225	5.19	48.5
4.002	S21	Atten	12.700	0.600	83.375	83.299	0.076	167.0	225	5.40	47.8
1.011	Atten	Outfall	5.000	0.600	84.060	84.010	0.050	100.0	150	6.41	44.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
2.001	2.311	367.6	49.2	1.200	1.200	0.292	0.0
1.004	4.182	665.1	155.8	1.200	1.200	0.937	0.0
1.005	3.908	621.6	171.5	1.200	1.200	1.038	0.0
1.006	4.015	638.5	184.9	1.200	1.200	1.122	0.0
3.000	2.429	42.9	14.6	1.200	1.520	0.083	0.0
3.001	2.852	113.4	14.5	1.520	1.585	0.083	0.0
3.002	1.975	78.5	21.1	1.585	1.405	0.122	0.0
3.003	1.881	133.0	35.5	1.405	1.326	0.208	0.0
3.004	2.191	242.0	40.7	1.326	1.200	0.245	0.0
1.007	4.274	925.2	235.3	1.200	1.200	1.438	0.0
1.008	4.811	1041.5	241.6	1.200	1.200	1.483	0.0
1.009	2.531	547.8	279.2	1.200	1.200	1.723	0.0
1.010	6.199	1341.9	278.2	1.200	0.582	1.723	0.0
4.000	2.868	114.0	6.4	0.900	1.005	0.036	0.0
4.001	2.784	110.7	6.3	1.005	0.900	0.036	0.0
4.002	1.009	40.1	8.8	0.900	0.936	0.051	0.0
1.011	1.005	17.8	345.5	0.250	0.840	2.153	0.0

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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	15.820	21.5	225	Circular	96.350	94.875	1.250	96.150	94.140	1.785
1.001	16.570	20.2	225	Circular	96.150	94.140	1.785	95.750	93.320	2.205
1.002	21.389	21.8	300	Circular	95.750	93.240	2.210	94.550	92.260	1.990
1.003	54.708	21.0	375	Circular	94.550	92.185	1.990	91.150	89.575	1.200
2.000	57.897	68.1	375	Circular	92.550	90.975	1.200	91.700	90.125	1.200
2.001	42.603	77.5	450	Circular	91.700	90.050	1.200	91.150	89.500	1.200
1.004	22.594	23.8	450	Circular	91.150	89.500	1.200	90.200	88.550	1.200
1.005	38.105	27.2	450	Circular	90.200	88.550	1.200	88.800	87.150	1.200
1.006	10.318	25.8	450	Circular	88.800	87.150	1.200	88.400	86.750	1.200
3.000	23.787	17.4	150	Circular	91.800	90.450	1.200	90.750	89.080	1.520
3.001	14.120	21.2	225	Circular	90.750	89.005	1.520	90.150	88.340	1.585
3.002	14.116	44.1	225	Circular	90.150	88.340	1.585	89.650	88.020	1.405
3.003	22.471	70.0	300	Circular	89.650	87.945	1.405	89.250	87.624	1.326
3.004	49.628	68.5	375	Circular	89.250	87.549	1.326	88.400	86.825	1.200
1.007	24.847	27.6	525	Circular	88.400	86.675	1.200	87.500	85.775	1.200
1.008	18.534	21.8	525	Circular	87.500	85.775	1.200	86.650	84.925	1.200
1.009	11.763	78.4	525	Circular	86.650	84.925	1.200	86.500	84.775	1.200
1.010	18.700	13.2	525	Circular	86.500	84.775	1.200	84.460	83.353	0.582
4.000	14.815	21.0	225	Circular	86.000	84.875	0.900	85.400	84.170	1.005
4.001	17.704	22.3	225	Circular	85.400	84.170	1.005	84.500	83.375	0.900
4.002	12.700	167.0	225	Circular	84.500	83.375	0.900	84.460	83.299	0.936
1.011	5.000	100.0	150	Circular	84.460	84.060	0.250	85.000	84.010	0.840

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1350	Manhole	Adoptable
1.003	S4	1350	Manhole	Adoptable	S5	1350	Manhole	Adoptable
2.000	S12	1350	Manhole	Adoptable	S13	1350	Manhole	Adoptable
2.001	S13	1350	Manhole	Adoptable	S5	1350	Manhole	Adoptable
1.004	S5	1350	Manhole	Adoptable	S6	1350	Manhole	Adoptable
1.005	S6	1350	Manhole	Adoptable	S7	1350	Manhole	Adoptable
1.006	S7	1350	Manhole	Adoptable	S8	1350	Manhole	Adoptable
3.000	S14	1200	Manhole	Adoptable	S15	1200	Manhole	Adoptable
3.001	S15	1200	Manhole	Adoptable	S16	1200	Manhole	Adoptable
3.002	S16	1200	Manhole	Adoptable	S17	1200	Manhole	Adoptable
3.003	S17	1200	Manhole	Adoptable	S18	1200	Manhole	Adoptable
3.004	S18	1200	Manhole	Adoptable	S8	1350	Manhole	Adoptable
1.007	S8	1350	Manhole	Adoptable	S9	1350	Manhole	Adoptable
1.008	S9	1350	Manhole	Adoptable	S10	1350	Manhole	Adoptable
1.009	S10	1350	Manhole	Adoptable	S11	1350	Manhole	Adoptable
1.010	S11	1350	Manhole	Adoptable	Atten	1350	Manhole	Adoptable
4.000	S19	1200	Manhole	Adoptable	S20		Manhole	Adoptable
4.001	S20		Manhole	Adoptable	S21	1200	Manhole	Adoptable
4.002	S21	1200	Manhole	Adoptable	Atten	1350	Manhole	Adoptable
1.011	Atten	1350	Manhole	Adoptable	Outfall	1350	Manhole	Adoptable

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Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	20.0		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	45	0	0

Node Atten Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.13932	Safety Factor	2.0	Invert Level (m)	83.060
Side Inf Coefficient (m/hr)	0.13932	Porosity	1.00	Time to half empty (mins)	400

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1065.0	1065.0	1.000	1731.0	1743.9	1.001	0.0	1743.9

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Results for 1 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 summer	S1	33	94.931	0.056	14.5	0.2179	0.0000	OK
60 minute summer	S2	33	94.196	0.056	14.5	0.0628	0.0000	OK
60 minute summer	S3	33	93.302	0.062	21.4	0.1183	0.0000	OK
60 minute summer	S4	33	92.262	0.077	40.1	0.2808	0.0000	OK
60 minute summer	S5	33	89.599	0.099	66.9	0.2446	0.0000	OK
60 minute summer	S6	33	88.654	0.104	73.9	0.2764	0.0000	OK
60 minute summer	S7	33	87.270	0.120	79.6	0.2946	0.0000	OK
60 minute summer	S8	34	86.800	0.125	101.7	0.2807	0.0000	OK
60 minute summer	S9	34	85.886	0.111	105.0	0.2163	0.0000	OK
60 minute summer	S10	34	85.117	0.192	121.5	0.8101	0.0000	OK
60 minute summer	S11	34	84.889	0.114	121.9	0.1630	0.0000	OK
60 minute summer	S12	33	91.042	0.067	17.0	0.2986	0.0000	OK
60 minute summer	S13	33	90.121	0.071	20.8	0.1499	0.0000	OK
60 minute summer	S14	33	90.489	0.039	6.0	0.0911	0.0000	OK
60 minute summer	S15	33	89.040	0.035	6.0	0.0397	0.0000	OK
60 minute summer	S16	33	88.393	0.053	8.8	0.0822	0.0000	OK
60 minute summer	S17	33	88.015	0.070	15.0	0.1494	0.0000	OK
60 minute summer	S18	33	87.618	0.068	17.6	0.1073	0.0000	OK
60 minute summer	S19	33	84.899	0.024	2.6	0.0421	0.0000	OK
60 minute summer	S20	33	84.194	0.024	2.6	0.0000	0.0000	OK
60 minute summer	S21	33	83.422	0.047	3.7	0.0660	0.0000	OK
360 minute summer	Atten	232	83.218	-0.081	73.3	176.5656	0.0000	OK
60 minute summer	Outfall	1	84.010	0.000	0.0	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)
60 minute summer	S1	1.000	S2	14.5	1.890	0.129	0.1214	
60 minute summer	S2	1.001	S3	14.5	1.960	0.125	0.1227	
60 minute summer	S3	1.002	S4	21.4	2.073	0.090	0.2208	
60 minute summer	S4	1.003	S5	40.0	2.490	0.091	0.8794	
60 minute summer	S5	1.004	S6	66.7	2.496	0.100	0.6034	
60 minute summer	S6	1.005	S7	73.6	2.392	0.118	1.1746	
60 minute summer	S7	1.006	S8	79.5	2.554	0.124	0.3213	
60 minute summer	S8	1.007	S9	101.9	2.828	0.110	0.8966	
60 minute summer	S9	1.008	S10	105.2	2.043	0.101	0.9697	
60 minute summer	S10	1.009	S11	121.9	2.333	0.223	0.6233	
60 minute summer	S11	1.010	Atten	122.1	3.747	0.091	0.6093	
60 minute summer	S12	2.000	S13	16.9	1.275	0.069	0.7651	
60 minute summer	S13	2.001	S5	20.6	0.994	0.056	0.8915	
60 minute summer	S14	3.000	S15	6.0	1.696	0.140	0.0841	
60 minute summer	S15	3.001	S16	6.0	1.104	0.053	0.0775	
60 minute summer	S16	3.002	S17	8.8	1.281	0.112	0.0967	
60 minute summer	S17	3.003	S18	14.9	1.233	0.112	0.2719	
60 minute summer	S18	3.004	S8	17.4	1.284	0.072	0.6735	
60 minute summer	S19	4.000	S20	2.6	1.167	0.023	0.0330	
60 minute summer	S20	4.001	S21	2.6	0.652	0.023	0.0732	
60 minute summer	S21	4.002	Atten	3.7	0.621	0.091	0.0747	
360 minute summer	Atten	1.011	Outfall	0.0	0.000	0.000	0.0000	0.0
360 minute summer	Atten	Infiltration		22.1				

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S1	33	95.000	0.125	58.9	0.4833	0.0000	OK
60 minute summer	S2	33	94.263	0.123	58.9	0.1396	0.0000	OK
60 minute summer	S3	33	93.375	0.135	86.9	0.2550	0.0000	OK
60 minute summer	S4	33	92.348	0.163	163.1	0.5947	0.0000	OK
60 minute summer	S5	33	89.721	0.221	273.4	0.5466	0.0000	OK
60 minute summer	S6	33	88.777	0.227	302.8	0.6041	0.0000	OK
60 minute summer	S7	33	87.443	0.293	327.2	0.7190	0.0000	OK
60 minute summer	S8	33	86.954	0.279	418.4	0.6291	0.0000	OK
60 minute summer	S9	33	86.042	0.267	431.2	0.5215	0.0000	OK
60 minute summer	S10	33	85.391	0.466	500.4	1.9619	0.0000	OK
60 minute summer	S11	33	85.036	0.261	498.8	0.3731	0.0000	OK
60 minute summer	S12	33	91.115	0.140	69.2	0.6208	0.0000	OK
60 minute summer	S13	33	90.195	0.145	85.1	0.3045	0.0000	OK
60 minute summer	S14	33	90.534	0.084	24.2	0.1988	0.0000	OK
60 minute summer	S15	33	89.075	0.070	24.2	0.0795	0.0000	OK
60 minute summer	S16	33	88.456	0.116	35.6	0.1805	0.0000	OK
60 minute summer	S17	33	88.098	0.153	60.7	0.3264	0.0000	OK
60 minute summer	S18	33	87.692	0.143	71.5	0.2244	0.0000	OK
60 minute summer	S19	33	84.922	0.047	10.5	0.0841	0.0000	OK
60 minute summer	S20	33	84.217	0.047	10.5	0.0000	0.0000	OK
180 minute winter	S21	176	83.591	0.215	4.8	0.3013	0.0000	OK
180 minute winter	Atten	176	83.590	0.291	205.5	660.9946	0.0000	OK
60 minute summer	Outfall	1	84.010	0.000	0.0	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)
60 minute summer	S1	1.000	S2	58.9	2.624	0.523	0.3552	
60 minute summer	S2	1.001	S3	58.9	2.793	0.507	0.3494	
60 minute summer	S3	1.002	S4	86.9	2.993	0.364	0.6212	
60 minute summer	S4	1.003	S5	163.1	3.646	0.372	2.4485	
60 minute summer	S5	1.004	S6	273.3	3.465	0.411	1.7820	
60 minute summer	S6	1.005	S7	302.7	3.184	0.487	3.6161	
60 minute summer	S7	1.006	S8	326.5	3.463	0.511	0.9711	
60 minute summer	S8	1.007	S9	418.1	3.693	0.452	2.8179	
60 minute summer	S9	1.008	S10	430.4	2.683	0.413	2.8985	
60 minute summer	S10	1.009	S11	498.8	3.136	0.910	1.8201	
60 minute summer	S11	1.010	Atten	497.9	5.221	0.371	1.7868	
60 minute summer	S12	2.000	S13	69.1	1.892	0.285	2.1163	
60 minute summer	S13	2.001	S5	85.1	1.407	0.232	2.5896	
60 minute summer	S14	3.000	S15	24.2	2.442	0.564	0.2357	
60 minute summer	S15	3.001	S16	24.2	1.566	0.213	0.2196	
60 minute summer	S16	3.002	S17	35.6	1.835	0.453	0.2739	
60 minute summer	S17	3.003	S18	60.7	1.775	0.456	0.7686	
60 minute summer	S18	3.004	S8	71.2	1.894	0.294	1.8670	
60 minute summer	S19	4.000	S20	10.5	1.748	0.092	0.0890	
60 minute summer	S20	4.001	S21	10.5	0.935	0.095	0.2756	
180 minute winter	S21	4.002	Atten	4.9	0.670	0.122	0.5012	
180 minute winter	Atten	1.011	Outfall	0.0	0.000	0.000	0.0000	0.0
180 minute winter	Atten	Infiltration		27.3				

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S1	33	95.223	0.348	110.8	1.3481	0.0000	SURCHARGED
60 minute summer	S2	34	94.352	0.212	108.0	0.2392	0.0000	OK
60 minute summer	S3	33	93.440	0.200	158.8	0.3794	0.0000	OK
60 minute summer	S4	32	92.417	0.232	301.0	0.8442	0.0000	OK
60 minute summer	S5	35	90.226	0.726	507.7	1.7958	0.0000	SURCHARGED
60 minute summer	S6	35	89.508	0.958	546.2	2.5454	0.0000	SURCHARGED
60 minute summer	S7	34	88.223	1.073	565.1	2.6277	0.0000	SURCHARGED
60 minute summer	S8	34	87.583	0.908	723.3	2.0464	0.0000	SURCHARGED
60 minute summer	S9	34	86.752	0.977	744.4	1.9077	0.0000	SURCHARGED
60 minute summer	S10	34	86.016	1.091	866.5	4.5993	0.0000	SURCHARGED
60 minute summer	S11	34	85.168	0.393	865.8	0.5617	0.0000	OK
60 minute summer	S12	33	91.177	0.202	130.0	0.8991	0.0000	OK
60 minute summer	S13	35	90.299	0.249	160.2	0.5223	0.0000	OK
60 minute summer	S14	34	90.767	0.317	45.5	0.7487	0.0000	SURCHARGED
60 minute summer	S15	32	89.100	0.095	42.7	0.1079	0.0000	OK
60 minute summer	S16	32	88.518	0.178	64.3	0.2778	0.0000	OK
60 minute summer	S17	32	88.179	0.234	111.8	0.5015	0.0000	OK
60 minute summer	S18	35	87.774	0.225	130.9	0.3521	0.0000	OK
60 minute summer	S19	33	84.941	0.066	19.7	0.1171	0.0000	OK
60 minute summer	S20	33	84.234	0.064	19.7	0.0000	0.0000	OK
360 minute winter	S21	344	84.060	0.685	5.4	0.9573	0.0000	SURCHARGED
360 minute winter	Atten	344	84.060	0.761	227.6	1403.6390	0.0000	OK
60 minute summer	Outfall	1	84.010	0.000	0.0	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)
60 minute summer	S1	1.000	S2	108.0	2.809	0.959	0.6212	
60 minute summer	S2	1.001	S3	107.9	3.067	0.928	0.5874	
60 minute summer	S3	1.002	S4	158.2	3.403	0.662	0.9940	
60 minute summer	S4	1.003	S5	300.3	3.868	0.684	4.8957	
60 minute summer	S5	1.004	S6	490.9	3.670	0.738	3.5799	
60 minute summer	S6	1.005	S7	522.1	3.322	0.840	6.0375	
60 minute summer	S7	1.006	S8	563.2	3.610	0.882	1.6348	
60 minute summer	S8	1.007	S9	723.4	3.713	0.782	5.3678	
60 minute summer	S9	1.008	S10	745.5	3.451	0.716	4.0040	
60 minute summer	S10	1.009	S11	865.8	4.152	1.580	2.2892	
60 minute summer	S11	1.010	Atten	865.5	5.735	0.645	2.8304	
60 minute summer	S12	2.000	S13	130.0	2.213	0.536	3.4012	
60 minute summer	S13	2.001	S5	160.2	1.515	0.436	5.2913	
60 minute summer	S14	3.000	S15	42.7	2.631	0.995	0.4187	
60 minute summer	S15	3.001	S16	43.0	1.760	0.379	0.3507	
60 minute summer	S16	3.002	S17	64.6	2.044	0.823	0.4499	
60 minute summer	S17	3.003	S18	110.6	1.996	0.832	1.2426	
60 minute summer	S18	3.004	S8	130.0	1.969	0.537	4.4481	
60 minute summer	S19	4.000	S20	19.7	2.075	0.173	0.1407	
60 minute summer	S20	4.001	S21	19.7	1.065	0.178	0.4272	
360 minute winter	S21	4.002	Atten	5.1	0.596	0.127	0.5051	
360 minute winter	Atten	1.011	Outfall	0.0	0.000	0.000	0.0000	0.0
360 minute winter	Atten	Infiltration		33.7				

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