Moravian Union

Development at Greenside Road and Wellhouse Lane, Mirfield

Site 1 – Greenside Road

FRA & Drainage Strategy

D4917-FRA-01

July 2026

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Document Control Sheet

Development at Greenside Road and Wellhouse Lane, Mirfield

Site 2 – Greenside Road

FRA & Drainage Strategy

Job	Date	Issue	Copy
D4917	July 2026	Original	

Originator…… G Sanderson ……..

Checker…….. D Wallbank ……..……...

Approver…… G Sanderson ……..……...

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1. Introduction

1.1. Background

1.1.1. PSA Design Ltd have been commissioned by Moravian Union to provide a Flood Risk Assessment (FRA) and Drainage Strategy to support a Full planning application submitted for a development at Greenside Road and Wellhouse Lane, Mirfield.

1.1.2. The planning application concerns two site areas divided by a small burial yard. Site 1 fronts onto Greenside Lane and Site 2 fronts onto Wellhouse Lane.

1.1.3. In terms of drainage, the sites are effectively two sperate sites as they are separated by an existing burial yard. This makes amalgamating drainage between the two sites impossible.

1.1.4. This document deals with SITE 1. A separate report addresses the issues relating to Site 2.

1.2. Planning History

1.2.1. This application follows pre-application enquiries, undertaken in 2020 (2020/20116 & 2020/20117) and 2025 (2025/20522).

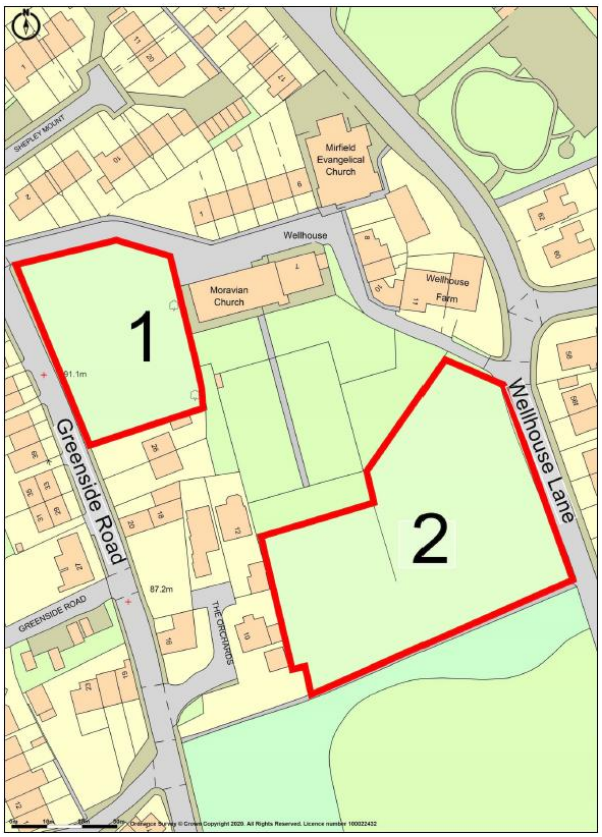
1.2.2. Results of the pre-app concluded “officers would conclude that based on the information available, and taking into account identified constraints, both of the sites may have the potential to support residential development.”

1.3. Site Description

1.3.1. Site 1 is located off Greenside Road, Mirfield, WF14 0AN.

1.3.2. A site location plan is included at **Appendix A** with extract below.

1.3.3. The grid reference for the site is 420630E, 421115N.



1.3.4. The above plan shows “Site 1” to the northwest and “Site 2” to the southeast. The boundaries are transferred and illustrated on the aerial extract below showing the sites in more context.



1.3.5. Site 1 is bound to the west by Greenside Road, to the north by Wellhouse Lane, to the east by an existing church with associated burial yard and an existing residential dwellings to the south.

1.3.6. The site occupies an area of land of approximately 0.21ha, essentially comprising of grassland with some mature trees along the north and east boundaries. Current access is via a field gate off Wellhouse Lane

1.4. **Site Proposals (Site 1)**

1.4.1. The Proposed Site Layout Plan reproduced at **Appendix A**.

1.4.2. The proposed development is entirely residential made up of the following housing mix.

6No. 1-bed town houses
1No. 3-bed semi-detached

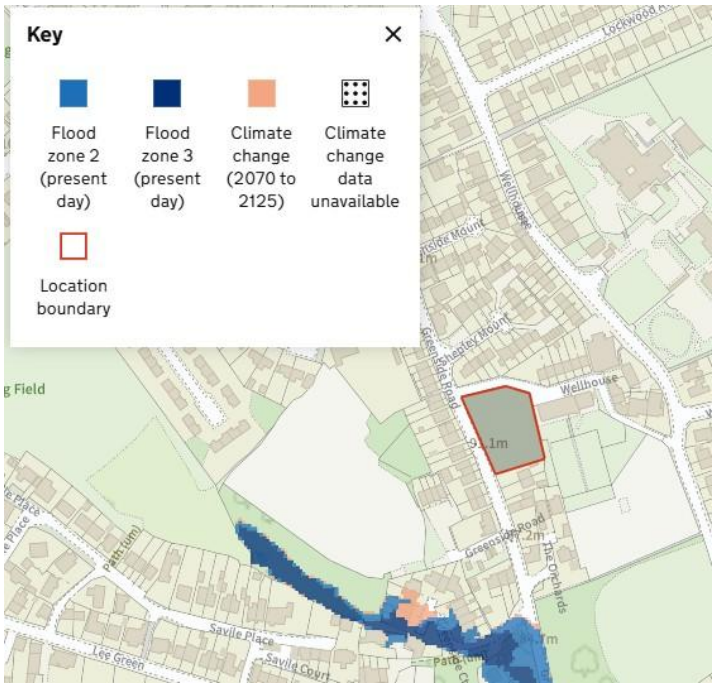
1.4.3. A new vehicular access is proposed directly off Greenside Road.

2. Flood Risk Assessment

The Environment Agencies' flood map for planning has been acquired and is included as **Appendix B**. Site specific flood risk is assessed in detail below.

2.1. **Flood Map for Planning (Fluvial and Coastal Flood Risk)**

As can be seen from the flood mapping (extract below), the site is shown to be located within Flood Zones 1. Flood Zone 1 comprises land that has a low annual probability of flooding (less than 1 in 1000 (<0.1%) from rivers in any year.



2.1.1. Levels vary significantly within the site boundary from circa 93.7mAOD in the northeast to 90.6mAOD in the southwest. To put that in context to the flood risk zone on the map above, levels in the flooded area are circa 85mAOD.

Planning Policy Guidance (PPG) has been reviewed and assessed as below.

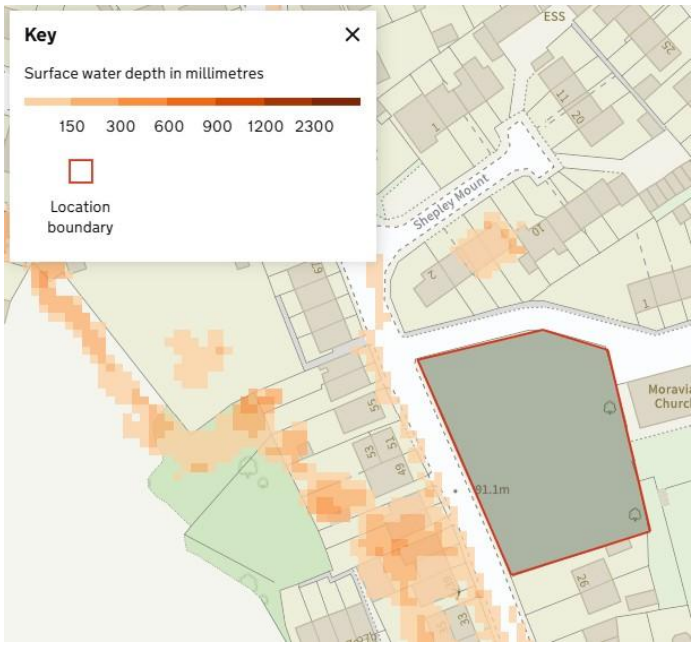
2.2. **Vulnerability**

With reference to NPPF, residential use would fall within the “More Vulnerable” category. With reference to Table 2 from PPG, if the site lies within Flood Zones 1 it would be deemed “appropriate”.

2.2.1. **There will therefore be no requirement for the Sequential or Exception Test to be carried out for this development**.

2.3. **Surface Water Flood Risk**

2.3.1. Reference to online surface water flood risk mapping (extract below) shows the lies outside an area at risk of surface water flooding from the 1 in 100yr AEP climate change design flood event.



2.4. **Groundwater Flood Risk**

Reference to online groundwater flood risk mapping indicates flooding from groundwater is unlikely in this area. In support of this conclusion the Strategic Flood Risk Assessment does not identify north-east Mirfield as an area at risk of groundwater emergence.

2.5. **Reservoir Flood Risk**

Flooding from reservoirs is not expected in this area.

2.6. **Sewer Flood Risk**

An existing combined sewer runs through the site to the north (refer to Section 3.1 below). There are no associated manholes within the site so any emergence would likely be south of the site (lowest lying area along the drainage run). In the unlikely event of the sewer surcharging upstream, it would be via the manhole within Wellhouse Lane. Discharge would naturally follow Wellhouse Lane down to Greenside Road, bypassing the development site. Any flood flows into the site would naturally be intercepted by the new access road, and again, directed on to Greenside Road.

2.7. The risk of flooding directly related to the increase in surface water run-off resulting from the new development is discussed in detail below in Section 3

2.8. **Summary of Flood Risk**

Source	Interpreted Risk Classification	Justification
Fluvial	Very Low	The developable area of the site is some 5m above the nearest area shown to be at risk of flooding.
Surface Water	Very Low	Surface water flood maps shows the site not at risk during the 1 in 1000yr cc AEP event.
Groundwater	Very Low	Groundwater flooding is very unlikely on the site
Reservoirs	Very Low	Flood from reservoirs is generally considered very unlikely
Tidal	N/A	Area Unaffected
Sewer	Very Low	Flood risk from existing sewers surrounding the site is considered negligible.

3. Drainage Strategy

3.1. **Existing Drainage Situation**

3.1.1. As noted above, the existing site currently comprises a predominantly greenfield site.

3.1.2. Yorkshire Water (YW) records have been acquired, and these are included in **Appendix C**

3.1.3. The mapping shows that there is an adopted 375mm dia. surface water sewer running down Greenside Road which appears to end outside number 39. At this point it connects into a culverted watercourse (discussed in further detail below).

3.1.4. An adopted combined sewer also runs under Greenhouse Road. This is shown as 300mm dia. on the YW records.

3.1.5. There is also an adopted combined sewer serving the existing Church and properties on Wellhouse Lane that runs through the north of the application site.

3.1.6. To gain further understanding of the existing sewer network (location, depths and diameters) a survey was undertaken by Site Surveying Services. The results of the survey identified that YW sewer records (pertinent to our site) are generally in the same location to those illustrated except for one sewer. The combined sewer running through the north of the application site is 100mm dia and is actually located further north than is illustrated on the YW sewer records. This sewer is measured at circa 1m deep.

3.1.7. The surveyed drains are illustrated on Drawing D4917-OD-01, included at **Appendix D**

3.1.8. A 6m easement (3m either side of the pipe) is highlighted on the drawing D4917-OD-01. This area must be kept free from permanent structures and deep-rooted planting. YW should be consulted at detailed design stage to approve any proposed landscaping within this easement.

3.1.9. Consultation was also sought from Kirklees LLFA, the results of which are included at **Appendix E**. The information provided included a culverted watercourse map. The map shows a culverted watercourse running down Greenside Road (from outside No.39). The culverted watercourse picks up the YW surface water sewer and continues south down Greenside Road

3.2. **Run-off Rates**

3.2.1. With respect to dealing with surface water from new developments, National Planning Policy Framework (NPPF, 2025), requires that, for the range of annual flow rate probabilities, up to and including the 1% annual probability (1 in 100-year event) the developed rate of run-off from a proposed site should be no greater than the undeveloped rate of run-off for the same event. Even when the site is brownfield, the site should be treated as greenfield

3.2.2. HR Wallingford's Greenfield Estimation tool has been used to estimate the existing greenfield run-off rate from the developable area of the site (900m^2). It estimates a QBAR rate of 1.3l/s.

3.2.3. Restricting surface water run-off rates to such parameters would inherently increase flood risk on site due to the size of the orifice that would be required to deliver a compliant solution, thus outweighing its benefits. Typically, water authorities and councils request an minimum orifice diameter of 100mm is recommended, with an absolute minimum of 75mm, equating to a minimum discharge rate of 3l/s.

3.2.4. This is reflected in advice from Kirklees LLFA (**Appendix E**) which sets out similar.

3.2.5. Therefore, for the purpose of the surface water discharge rate, flows from the proposed development will be restricted to a maximum of **3l/s** with an orifice no smaller than **75mm**. This will be up to and including the 1 in 100yr AEP event.

3.3. **Proposed Surface Water Management Strategy**

3.3.1. It is important to account for climate change (CC) when making assessment of surface water run-off. As the development site is located within the Calder Management Catchment area, reference to the peak rainfall allowance map sets out the allowances below:

Scenario	Event	Central Allowance	Upper End Allowance
3.3% annual exceedance rainfall event	2050s	20%	35%
	2070s	25%	40%
1% annual exceedance rainfall event	2050s	25%	40%
	2070s	30%	45%

Catchment Peak Rainfall Allowances - Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

3.3.2. Therefore CC should be taken into account by increasing the proposed rainfall intensity by 40% when assessing against the 3.3% (1 in 30) storm event and 45% when assessing against the 1% (1 in 100) storm event.

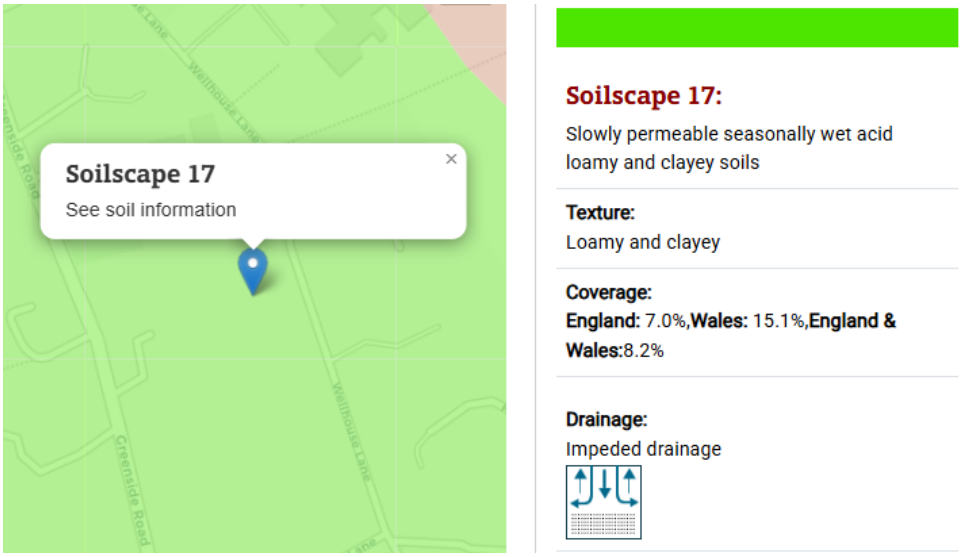
3.3.3. Urban Creep (UC) should also be catered for by adding an additional 10%. This accounts for future extensions / patio areas that may fall under permitted development and thus not require specific planning permission.

Hierarchical Approach – Soakaways

3.3.4. The first option to be considered for surface water disposal for all proposed development must be infiltration into the ground. Even when there are alternative sewer connections or watercourses available, infiltration must still be utilised unless it is proved unfeasible. Normally to identify the suitability of the ground for infiltration, percolation testing is carried out to

calculate the infiltration rate. Where the underlying soil conditions are relatively impermeable, for example clay, the infiltration rate may be too low for soakaways to be designed to adequately cope with large storm events from the entire site

3.3.5. "Soilscapes Mapping" indicates the soil is "slowly permeable seasonally wet, loamy and clayey soils with impeded drainage". An extract of the map is included below.



3.3.6. The lack of drainage infiltration potential is supporting by pre-app advice from Kirklees Council which states "The site is located in British Geological Survey area 3 which means that infiltration is not likely to work".

3.3.7. **It is therefore be concluded that soakaways are not a feasible solution for dealing with surface water at this site, there may however be bespoke opportunities such as permeable driveways (discussed later in this report). Following detailed ground investigation, should soakaways prove a viable solution (contrary to expectation) then the delivery of a compliant solution will no doubt be covered by planning condition.**

Hierarchical Approach – Watercourse

3.3.8. The next preferred hierarchical solution for dealing with surface water run-off from a development is discharge to a watercourse. As noted in Section 3, there is an existing culverted watercourse running down Greenside Road.

3.3.9. The manhole outside No. 39 would appear to offer a logical connection point.

Surface Water SuDS Approach and Storage requirements

3.3.10. To restrict surface water run-off from the proposed development it will be necessary to provide some form of attenuation storage on site. There are numerous ways of providing this, however, in this instance the intention would be to utilise cellular storage crates. As already established, the design of the system should ensure that run-off is limited to 3.0l/s and that there is no flooding of the site up to and including the 1 in 100yr storm + 50% CC + 10% UC AEP Event.

3.3.11. Flow rates are to be controlled to a peak discharge rate of 3l/s by a Hydro-Brake Flow Control Manhole.

3.3.12. An outline design based on the above criteria has been modelled and illustrated on Drawing No. D4917-OD-01 reproduced at **Appendix D**.

3.3.13. The proposed contributing areas are shown on Drawing No. D4917-OD-02, totalling 900m^2

3.3.14. The SW drainage system has been modelled in Causeway's drainage design software "Flow". The supporting calculations are included as **Appendix F**. The following design parameters have been used:

- Summer and Winter Volumetric Run-off Coefficient (Cv) = 1
- Storm scenarios run for 1 in 1yr + 40%CC, 1 in 30yr + 40%CC, 1 in 100yr + 45%CC, all including an additional uplift of 10% UC allowance.

3.3.15. The calculations demonstrate that during all the above storm scenarios, based on a 3.0l/s (75mm orifice) restriction are adequately contained and maintained within the sub-surface drainage system.

3.3.16. The system can discharge via gravity.

Other Design Considerations

3.3.17. All driveways and parking bays will be permeable and if at all possible drained by high level infiltration. At this stage, in order to provide a robust assessment (and prior to detailed ground investigation) we have assumed all driveways contribute to the drainage network. Regardless

of infiltration potential, the driveways will be permeable, but if necessary utilise sub-surface collection chambers in the form of permavoid diffuser units or similar.

3.3.18. Each property will include the installation of a rainwater butt to assist with grey water recycling and reduce volume of run-off.

3.3.19. Land drainage consent will likely be required to formally approve the proposed manhole connection. If a manhole connection is not feasible then, given the outfall pipe is 100mm dia., a saddle connection onto the YW adopted surface water sewer could be applied for (via s106 agreement) with YW.

Water Quality

3.3.20. The SuDS design should seek to provide an appropriate management train of SuDS components to effectively mitigate the pollution risks associated with the different site uses.

3.3.21. The first step of the simple index approach is to identify the pollution hazard indices for the proposed land use. Table 26.2 of The SuDS Manual states the following

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential Roofs	Very Low	0.20	0.20	0.05
Individual property driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change (i.e. <300 movements/day)	Low	0.50	0.40	0.40
Total		**0.70**	**0.60**	**0.45**

Total Pollution Hazard Indices

Table 26.3 of The SuDS Manual sets out the indices for proposed SuDS features. Those features included on the proposed design presented are listed in the table below. Where treatment components are used together in series a factor of 0.5 is used to account for the reduced performance of the secondary components.

Type of SuDS Component	Total suspended solids (TSS)	Metals	Hydro-carbons
Permeable Pavement	0.7	0.6	0.7
Total	**0.7**	**0.6**	**0.7**

Total Pollution Hazard Indices – Proposed SuDS Features

It can be seen that the total mitigation index for the proposed SuDS features is greater or equal to the required pollution hazard index for the proposed land use. Therefore, the proposed system meets the water quality requirements.

Exceedance Flow Routes

3.3.22. As set out above, the system is well designed to accommodate the requisite storm events. In the unlikely event of a system failure or storm in excess of the design criteria, all buildings are to be built 150mm above surrounding ground levels allowing suitable flow routes around the detached properties. This follows the existing natural overland flow routes prior to the development.

3.3.23. The natural topography and thus overland flow routes will remain from north to south both prior to and following the proposed development.

3.3.24. **It has therefore been demonstrated that a SuDS solution that meets with the requirements of current legislation is deliverable within the constraints of the site. Detail of the final solution will be developed in finite detail post planning and no doubt secured by condition.**

3.4. Maintenance of Proposed SuDS Systems

3.4.1. It is important during any development process to consider the long-term maintenance of the proposed drainage system. The way this is processed will largely depend on how the system is taken forward at detailed design, however, at this stage the applicant intends to keep the drainage system private.

3.4.2. The SuDS will be reviewed and approved by the Local Planning Authority (LPA) in consultation with the Lead Local Flood Authority (LLFA) and Yorkshire Water, to ensure it meets the relevant standards. Under the assumption the SuDS would remain private, they will

ultimately be maintained and managed by the landowner or designated management company in accordance with an approved SuDS management plan. This plan could also be secured through planning condition or legal agreement if necessary.

3.4.3. A typical SuDS maintenance regime for the various drainage elements is included in **Appendix G** for reference.

4. Foul Drainage

4.1. Section 3 above noted that there is an adopted combined sewer running through the north of the site, However, it would not be viable to connect into this pipe without pumping due to the site topography. Therefore, similar to the surface water drainage above, a connection into the combined sewer within Greenside Road would appear to be the optimum solution.

4.2. The proposed outline solution is presented on Drawing D4917-OD-01, contained within **Appendix D**.

4.2.1. Given the proposed outfall pipe will be 100mm dia, connecting into the existing 300mm dia pipe, a saddle connection is proposed.

4.3. **Subject to YW formal approval, it is clear that there is a means of dealing with foul sewage from the proposed development.**

5. Summary

5.1. The planning application concerns two site areas divided by a small burial yard. Site 1 fronts onto Greenside Lane and Site 2 fronts onto Wellhouse Lane. This report deals with flood risk and drainage relating to **Site 1**.

5.2. The site lies outwith an area at risk of flooding from all sources.

5.3. The site is greenfield with no established drainage. Run-off rates will therefore be restricted to a maximum of 3l/s with the orifice size being a minimum of 75mm.

5.4. Climatic change will be accounted for by applying a 50% allowance.

5.5. Urban Creep will be accounted for by applying a further 10% increase.

5.6. The system has been designed not to flood during the 1 in 100yr AEP event including the above allowances.

5.7. Summer and Winter Volumetric Run-off Coefficient (Cv) have been set at 1.

5.8. The system has been design following the hierarchical approach, utilising the most effective means of disposal that is deliverable on the site. Subject to detailed design, surface water will connect into the culverted watercourse within Greenside Road.

5.9. A 6m easement is provided covering the existing combined sewer running through the north of the site. No permeant structures or deep-rooted planning should be located within the easement. Any proposed landscaping works must be approved with YW prior to construction.

5.10. Permeable driveways and water butts will be provided for each property which in turn meets with the water quality criteria for a residential development.

5.11. Exceedance flood flow pathways will be assessed in more detail following detailed design of the drainage system. Properties will however be set a minimum of 150mm above surrounding ground levels, and therefore, existing overland flow routes will be unaffected by the proposed development.

5.12. Future maintenance of the system can be secured in perpetuity, through the use of a planning condition to establish a maintenance and management plan.

5.13. The delivery of a SuDS surface water system can also be secured through planning condition.

5.14. The connections into YW sewer will be secured via s106 agreement during the detailed design process.

5.15. Land drainage consent will be required prior to constructing the outfall into the culverted watercourse manhole.

6. Conclusion

6.1. **It has been demonstrated, that the proposed development would be deemed appropriate development in terms of flood risk and a SuDS solution that meets with the requirements of current legislation is deliverable within the constraints of the site and will ensure that flood risk both on and off site will not be exacerbated.**

6.2. **Accordingly, there should be no flood risk or drainage related reasons why the proposals should not be granted planning consent.**

Appendix A

Architects Proposed Plans and Site Layout

© matt wood: architect ltd 2021

NOTES:



Site Location Plan
[Scale = 1:1250]

0 10 20 30 40 50 75 100 125

project:
Development @ Greenside Road + Wellhouse Lane, Mirfield. The Moravian Union

client:

drawing title:
Existing
Site Location Plan

scale @ A3: 1:1250
date: March2026
drawn by: MW
checked by: MW

drawing number: 344SAA08-01
revisions: .

purpose of issue: PLANNING

rev	date	by	description

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Use figured dimensions only. Scale drawing only when a scale bar is present. All dimensions to be checked by user and any discrepancies, error or omissions to be reported to the architect before work commences. Read this drawing with all relevant materials.

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NOTES:

Legend;

-Applicant ownership boundary

-Car parking space

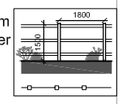
-Refuse / recycling bins store

-Pumping stations prior to discharge to mains sewers

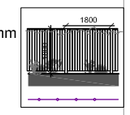
-Tree root protection areas

Boundary notes :

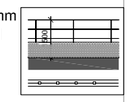
-As indicated, being 1500mm high vertical post + rail timber fence.



-As indicated, being 1800mm closed board timber fence.



-As indicated, being 1500mm high [overall] low brick wall with galvanized steel powder-coated railings.



Highways:

- Visibility splays in accordance with Kirklees Council highways requirements.

- All highways + parking arrangements designed in accordance with Manual for Streets, Joint Lancashire Structure Plan and Lancs County Council Residential Road Design Guide.

-Refer to Stantec UK Ltd drawings for visibility splays and vehicle tracking details.

-min. parking space numbers met to each dwelling, in line with LA guidance.

-Refuse / recycling bin stores provided.

Drainage:

-Refer to PSA Design Ltd drawings for drainage strategy + site layout.

-Access road and driveways to have porous material surface, such as Marshalls Drivesett Tegula Priora.

Landscaping:

-Existing trees retained. Negligible impact - pruning and tree care works only, where required. Refer to RJones Arboriculture

-Proposed new fence as indicated to create new plot boundary between dwellings / gardens / perimeter boundary.

-Indigenous planting, native shrubs and trees, to encourage foraging and visual screening to boundary.

Proposed

0 5 10 15 20 25m Scale = 1:500

project: Development @ Greenside Road + Wellhouse Lane, Mirfield.
client: The Moravian Union
drawing title: Proposed Site Layout Plan
scale @ A3: 1:500
date: March2026
drawn by: MW
checked by: MW
drawing number: 344SAA08-05
revision: .
purpose of issue: PLANNING

rev date by description

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Use figured dimensions only. Scale drawing only when a scale bar is present. All dimensions to be checked by user and any discrepancies, error or omissions to be reported to the architect before work commences. Read this drawing with all relevant materials.

Appendix B

EA Flood Mapping

Appendix C

Yorkshire Water Sewer Records

Registered Office: Yorkshire Water Services Limited
Western House, Halifax Road, Bradford BD6 2SZ. Registered in England and Wales No. 2366682

CONFIDENTIAL

safe-move
A part of YorkshireWater

Green Side Estate

NORTHORPE

Football Ground

Cricket Ground

Crossley Fields Junior & Infants School

Mirfield Evangelical Church

Moravian Church

Wellhouse Farm

Northorpe Hall

Croft House Farm

Primrose Farm

Primrose Barn

Balderstone Hall

Ryedale Court

Shilbank House

Gordon Court

Deankirk

Sewer Network features are not shown above a scale of 1:25,000

	420467 : 420760	Map Name : SE2020NW	Title
	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : Ms H Webster Contact Tel :	Notes	Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS

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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 connection

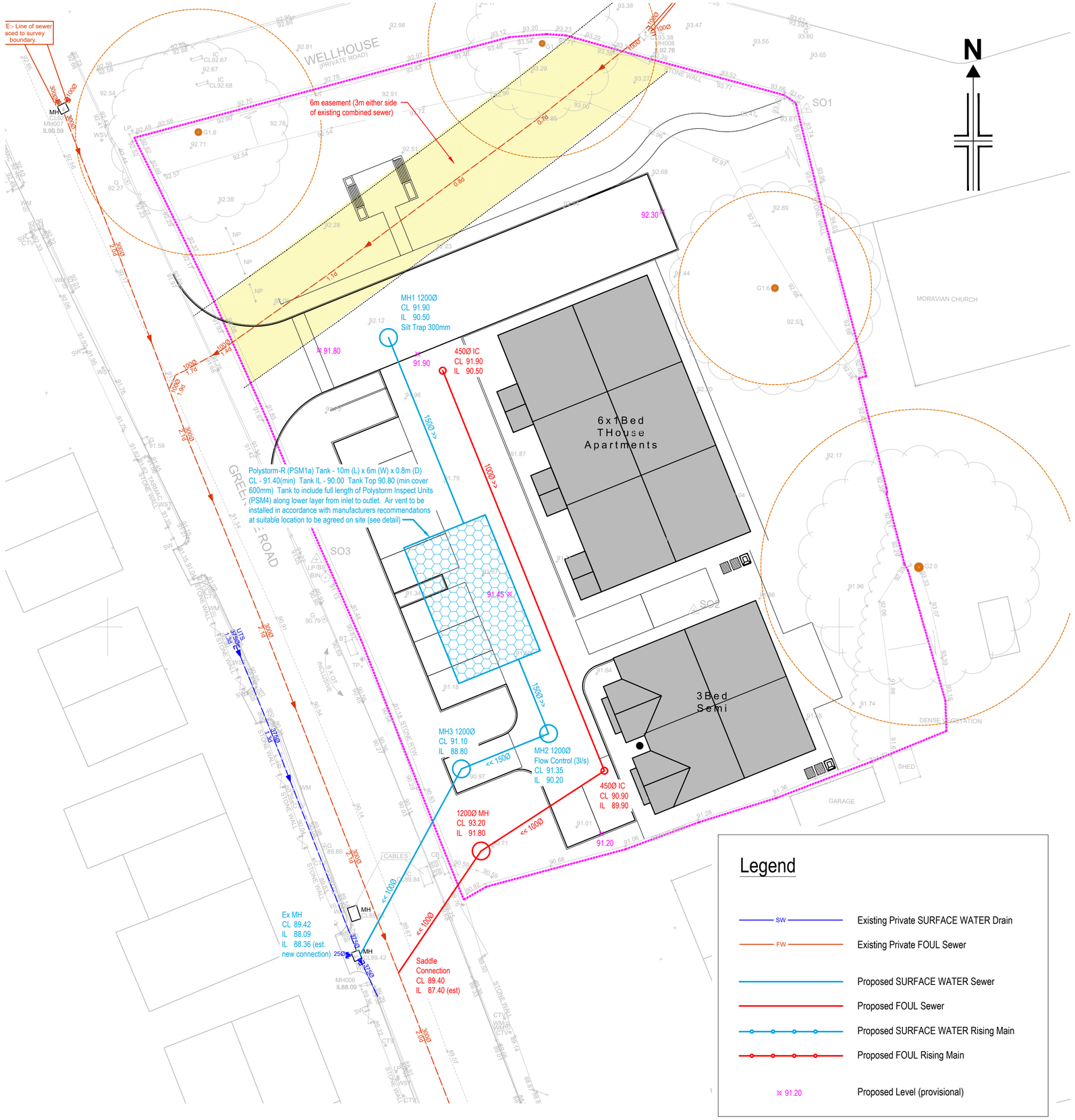
Date Req :	16/08/2012, 09:16:59
Date Gen :	16/08/2012, 09:17:03
Source :	Sewer Network Enquiry

UPN: Undefined

Originator: H Webster, Safe Move,

Appendix D

Outline Drainage Strategy Drawing



Legend

- Existing Private SURFACE WATER Drain
- Existing Private FOUL Sewer
- Proposed SURFACE WATER Sewer
- Proposed FOUL Sewer
- Proposed SURFACE WATER Rising Main
- Proposed FOUL Rising Main
- Proposed Level (provisional)

Notes

1. Do not scale from this drawing, work to levels and dimensions shown, if not available refer to notes, if in doubt, refer to Engineer.
2. The Engineer shall be notified immediately, in writing, should any errors or discrepancies be found prior to to be commencement or continuation of any works.
3. Drawing to be read in conjunction with all other scheme drawings and relevant specifications.
4. Contractor to be responsible for the location and protection of all existing services.
5. Work to be undertaken in accordance in accordance with Design and Construction Guidance for foul and surface water sewers (App Ver 2.3) and Building Regulations - Document H.
6. All existing land drains encountered on site during construction are to be re-connected/diverted as necessary (not connected into the new system without prior approval)
7. All drains to be laid soffit to soffit unless otherwise indicated.
8. Steeper gradients may be used instead of backdrops.
9. Cover levels shown are approximate only and should be altered to suit finished surface levels.
10. Minimum depth of cover to crown of pipe without protection should be as follows:
    0.35m - Gardens and Pathways with no vehicular loading
    0.50m - Driveways, Parking Areas and Narrow Accesses with height restrictions to prevent entry by vehicles with a gross weight in excess of 7.5 tonnes
    0.9m - Driveways, Parking Areas and Narrow Accesses with limited access to vehicles with a gross weight in excess of 7.5 tonnes. Agricultural land and public open space.
    1.2m - Other Highways and Parking Areas with unrestricted access to vehicles with a gross weight in excess of 7.5 tonnes
11. All rainwater pipes (RWP) to be terminated at roddable gullies connected to a minimum 100mm dia. drain.
12. Unless stipulated otherwise or invert levels are provided, all surface water pipes to be minimum 100mm dia. laid at 1 in 100. Foul sewers to be minimum 100mm dia laid at 1 in 80 (1 in 40 if no WC connected).
13. Proposed PCC Manholes & Inspection Chambers and access points are to be as those defined in Design and Construction Guidance for foul and surface water sewers (App Ver 2.3). MH & IC diameters specified are minimum diameters and if necessary should be increased to accommodate minimum benching widths.
14. <600Ø diameter IC's > 1.0m deep to include reducing ring to reduce opening to max 350mm Ø
15. Drainage subject to vehicle loading - Pipes up to 300mmØ to be structured walled PVCu (comply with the relevant provisions of BS EN 13476-1 and WIS 4-35-01 and BS EN 13476-2 or BS EN 13476-3) or Clay (complying with the relevant requirements of BS EN 295-1 and BS 65). Pipes greater than 300Ø to be Concrete (complying with BS 5911-1 and BS EN 1916). All pipes to be in accordance with Design and Construction Guidance for foul and surface water sewers (App Ver 2.3).
15. All MH and IC chamber covers to be suitable for intended vehicle loading (i.e. D400 in areas subject to heavy vehicle loading, C250 standard vehicle loading, B125 light vehicle loading and A15 pedestrian only loading).
16. All plot drainage to be in accordance with Building Regulations - Document H.
17. Road gullies shall be trapped 450Ø x 900mm deep with Class D 400 frame and grating to BS EN 124 (unless otherwise approved. Outlets to be minimum 150mm diameter.
18. All drains in the vicinity of existing or proposed trees to be constructed in accordance with the requirements of NHBC.
19. All outfall levels and existing pipe levels should be checked prior to construction to ensure the design is deliverable and no clashes occur. Contractor to report any discrepancies to Engineer immediately.

Attenuation and Flow Control

1. Attenuation tank(s) to be a Polystorm-R (PSM1a) system (or similar approved) suitable for installation at depths indicated (check with manufacturer prior to ordering). Tank to be encapsulated in an impermeable geosynthetic and include a single width Polystorm Inspect Unit (PSM4) laid along entire length of lower layer, from inlet to outlet. Minimum cover should be checked with manufacturer when ordering to ensure unit is capable of withstanding proposed loading requirements at depths shown. Formation level to achieve CBR of 3-5%. **System to be fitted with all necessary vents** and constructed strictly in accordance with manufacturers guidelines.
2. Upstream MH's to include minimum 300mm silt trap
3. Flow Control Manhole immediately downstream of storage tank to be fitted with Hydro-Brake Optimum® Flow Control Unit "SHE-0081-3000-1100-3000" based on maximum flow of 3l/s at 1.1m head. Manhole to be pre-cast or constructed in accordance with manufacturers guidelines.

Scheme specific notes

1. All driveways to be permeably paved with sub-surface outlets (subject to infiltration testing).
2. Water butts to be provided to all households
3. Drainage scheme shown is for planning purposes only and subject to detailed design.

REV	DATE	AMENDMENT DETAILS	DRAWN	CHECKED	APPROVED
P1	30/06/26	For Planning	GS	DLW	GS

John Forrester Limited

Development at Greenside Road and Wellhouse Lane, Mirfield

Outline Foul & Surface Water Drainage Strategy

Drwg No. **D4917-OD-01** | Rev. **P1**

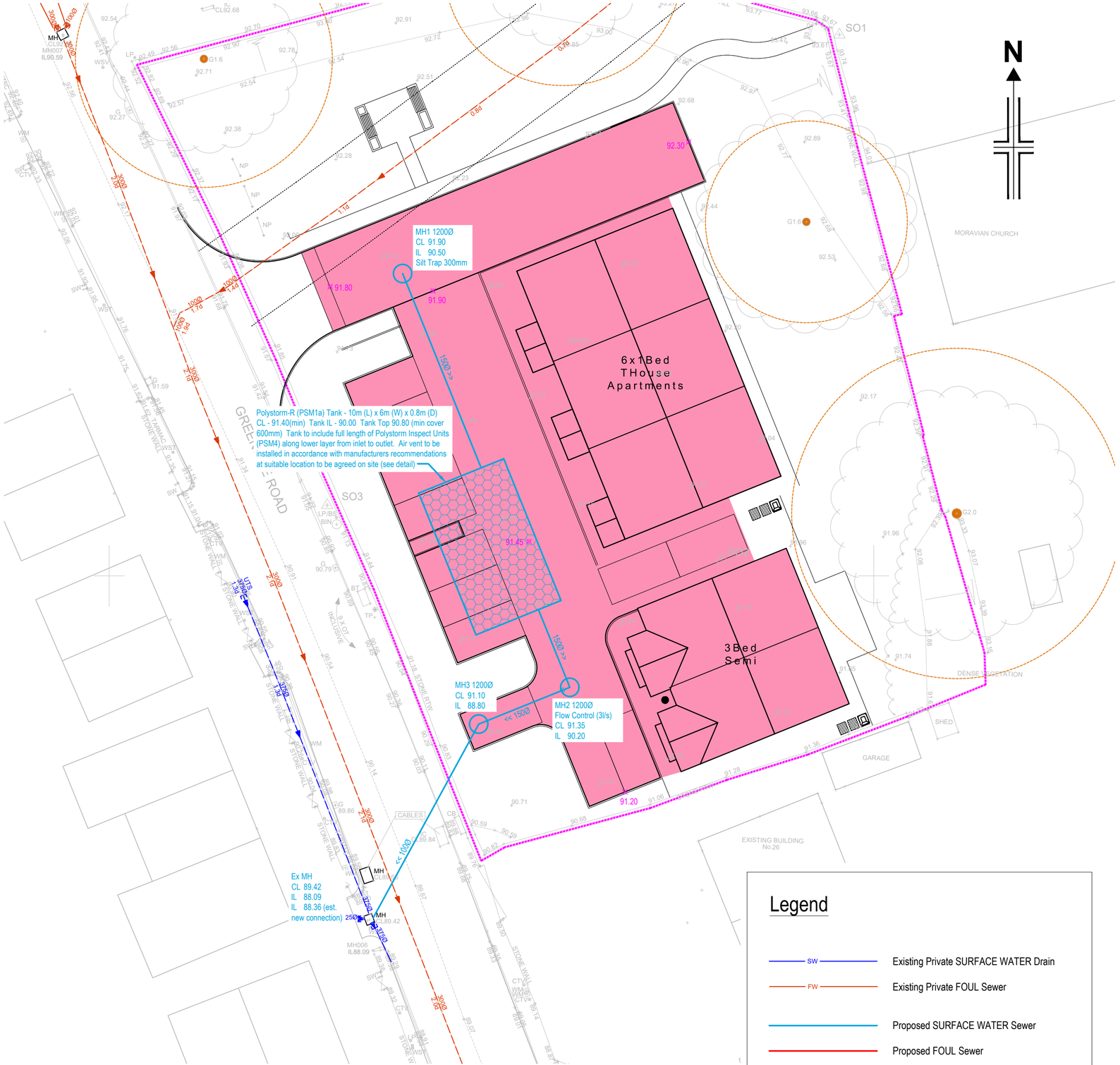
Scale **1:500** | Sheet Size **A1**

Date **30th June 2026**

Drawn **GS** | Checked **DW** | Approved **GS**

PSA DESIGN
PSA Design Ltd
The Old Bank House, 6 Berry Lane, Longridge, Preston, PR3 3JA
Tel. 01772 786066
www.psadesign.co.uk
mail@psadesign.co.uk

P:\Jobs\Development\D4917 - Mirfield, Kirklees - FRA\CAD\Drawings\D4917-D-01 - Outline Foul and Surface Water Design.dwg



Node	Contributing Area (m^2)
MH1	900m^2

Legend

- Existing Private SURFACE WATER Drain
- Existing Private FOUL Sewer
- Proposed SURFACE WATER Sewer
- Proposed FOUL Sewer
- Proposed SURFACE WATER Rising Main
- Proposed FOUL Rising Main
- Proposed Level (provisional)

REV	DATE	AMENDMENT DETAILS	DRAWN	CHECKED	APPROVED
P1	30/06/26	For Planning	GS	DLW	GS

John Forrester Limited

Development at Greenside Road and Wellhouse Lane, Mirfield

Contributing Areas - SITE 2

Drwg No. **D4917-OD-02** | Rev. **P1**

Scale **1:500** | Sheet Size **A1**

Date **30th June 2026**

Drawn **GS** | Checked **DW** | Approved **GS**

PSA DESIGN
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P:\Jobs\Development\D4917 - Mirfield, Kirklees - FRA\CAD\Drawings\D4917-D-01 - Outline Foul and Surface Water Design.dwg

Appendix E

Kirklees LLFA Consultation

From: Paul Farndale <Paul.Farndale@kirklees.gov.uk>
Sent: 18 May 2026 23:27
To: Graham Sanderson <graham.sanderson@psadesign.co.uk>
Subject: RE: 26-04-24 - GS to Kirklees LLFA - New Site(s) at Mirfield, off Greenside Road and Wellhouse Lane

Hellon Graham,

Please see the attached plan showing a culverted watercourse available in Greenside Road. In addition, there is a public surface water sewer adjacent to the southern boundary of the plots that almost certainly provides an indirect connection to watercourse. I would look to amalgamate the 2 site's drainage and attenuate to the critical 1 in 100 + 45% climate change event.

We are happier if the orifice of a flow control is nearer 100mm but an absolute minimum of 75mm will be imposed. To this effect 3l/s is also our minimum discharge rate.

Kind regards,

Paul Farndale

Strategic Partnership Lead

Flood Management & Drainage (LLFA)

Kirklees Council

Tel. 01484 221000

From: Floodmanagement <Floodmanagement@kirklees.gov.uk>
Sent: 24 April 2026 11:19
To: Paul Farndale <Paul.Farndale@kirklees.gov.uk>
Subject: FW: 26-04-24 - GS to Kirklees LLFA - New Site(s) at Mirfield, off Greenside Road and Wellhouse Lane

From: Graham Sanderson <graham.sanderson@psadesign.co.uk>
Sent: 24 April 2026 11:03
To: Floodmanagement <Floodmanagement@kirklees.gov.uk>
Subject: 26-04-24 - GS to Kirklees LLFA - New Site(s) at Mirfield, off Greenside Road and Wellhouse Lane

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

Hello,

We have been instructed to prepare a flood risk and SuDS drainage strategy for a scheme in Mirfield. The site(s) can be seen on the attached pre-app document (Page 3), located off Greenside Road and Wellhouse Lane.

I am just touching base as early as possible in the process to enable us to prepare a fully compliant submission.

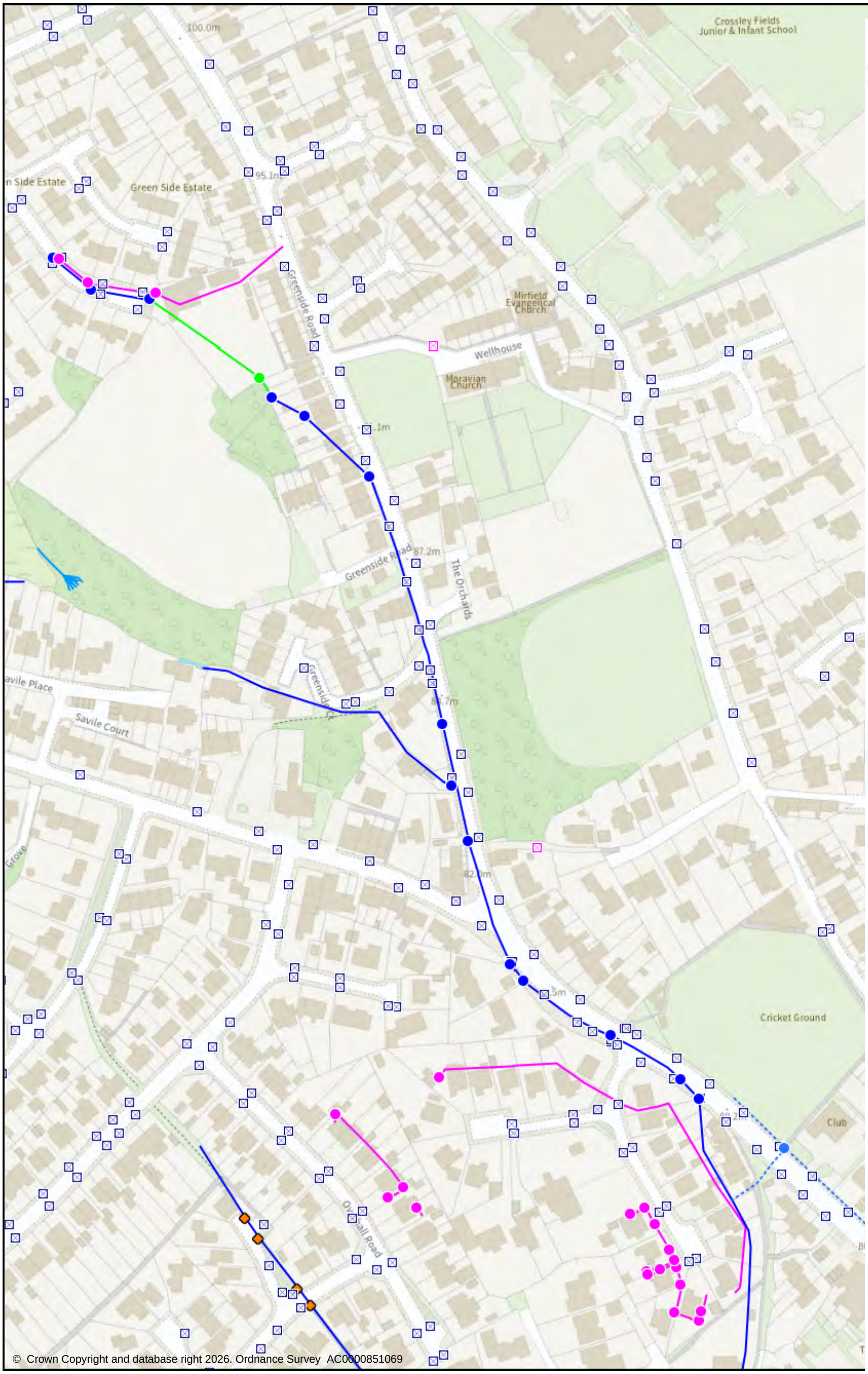
In the first instance, could you please advise on the presence of any watercourses in the area which may be suitable to drain surface water from either of the proposed plots?

Could you also please advise on council SW run-off policy for greenfield developments (such as minimum flow rates or orifice diameters.)

Many thanks in advance.

Graham Sanderson

PSA DESIGN



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Kirklees Council

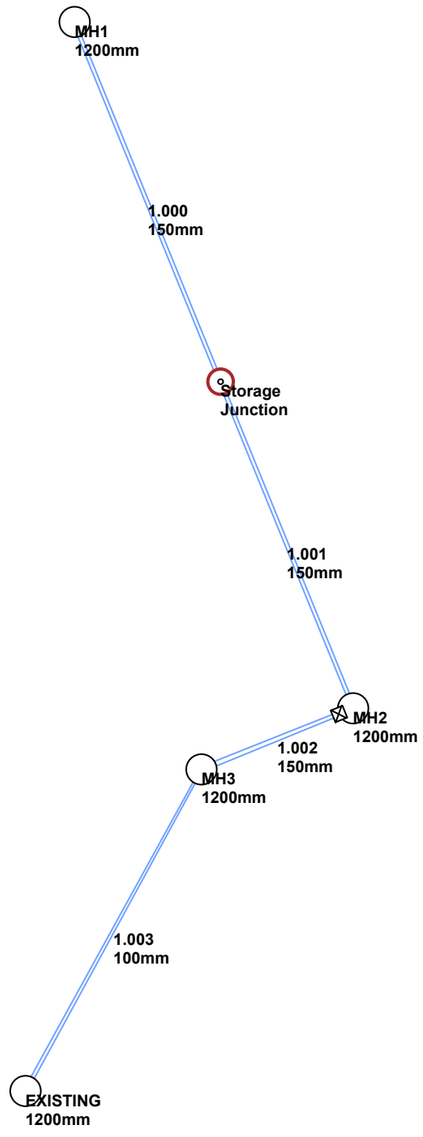
Kompass
Kirklees Mapping Service

Greenside Road
Scale = 1:1905.120
maps@kirklees.gov.uk

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Appendix F

Surface Water System Hydraulic Calculations



Flow v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	1	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	4.00	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)
MH1	0.045	4.00	91.900	1200	420619.193	421119.765	1.400
Storage			91.400		420624.925	421105.587	1.400
MH2	0.045	4.00	91.350	1200	420630.129	421092.714	1.550
MH3			91.100	1200	420624.174	421090.306	2.300
EXISTING			91.350	1200	420617.264	421077.630	2.950

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	MH1	Storage	15.293	0.600	90.500	90.000	0.500	30.6	150	4.14	32.4
1.001	Storage	MH2	13.885	0.600	90.000	89.800	0.200	69.4	150	4.33	32.4
1.002	MH2	MH3	6.423	0.600	89.800	88.800	1.000	6.4	150	4.36	32.4
1.003	MH3	EXISTING	14.437	0.600	88.800	88.400	0.400	36.1	100	4.54	32.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.827	32.3	4.0	1.250	1.250	0.045	0.0	35	1.245
1.001	1.208	21.4	4.0	1.250	1.400	0.045	0.0	44	0.925
1.002	4.001	70.7	7.9	1.400	2.150	0.090	0.0	34	2.653
1.003	1.288	10.1	7.9	2.200	2.850	0.090	0.0	67	1.425

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	15.293	30.6	150	Circular	91.900	90.500	1.250	91.400	90.000	1.250
1.001	13.885	69.4	150	Circular	91.400	90.000	1.250	91.350	89.800	1.400
1.002	6.423	6.4	150	Circular	91.350	89.800	1.400	91.100	88.800	2.150
1.003	14.437	36.1	100	Circular	91.100	88.800	2.200	91.350	88.400	2.850

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	MH1	1200	Manhole	PCC	Storage		Junction	
1.001	Storage		Junction		MH2	1200	Manhole	PCC
1.002	MH2	1200	Manhole	PCC	MH3	1200	Manhole	PCC
1.003	MH3	1200	Manhole	PCC	EXISTING	1200	Manhole	PCC

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
MH1	420619.193	421119.765	91.900	1.400	1200	 0	1.000	90.500	150
Storage	420624.925	421105.587	91.400	1.400		1  0	1.000	90.000	150
							1.001	90.000	150
MH2	420630.129	421092.714	91.350	1.550	1200	1  0	1.001	89.800	150
							1.002	89.800	150
MH3	420624.174	421090.306	91.100	2.300	1200	1  0	1.002	88.800	150
							1.003	88.800	100
EXISTING	420617.264	421077.630	91.350	2.950	1200	1 	1.003	88.400	100

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	20.0		

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 %)
1	40	10	0
30	40	10	0
100	45	10	0

Node MH2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	89.800	Product Number	CTL-SHE-0081-3000-1100-3000
Design Depth (m)	1.100	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.0	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	90.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	156

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	60.0	60.0	0.800	60.0	82.0	0.801	0.0	82.0

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Results for 1 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH1	9	90.558	0.058	8.2	0.1073	0.0000	OK
120 minute summer	Storage	76	90.089	0.089	5.2	5.0868	0.0000	OK
120 minute summer	MH2	76	90.088	0.288	4.2	0.5105	0.0000	SURCHARGED
120 minute summer	MH3	76	88.838	0.038	3.0	0.0432	0.0000	OK
120 minute summer	EXISTING	76	88.437	0.037	3.0	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)
15 minute summer	MH1	1.000	Storage	8.3	2.196	0.259	0.0751	
120 minute summer	Storage	1.001	MH2	2.5	0.202	0.115	0.1980	
120 minute summer	MH2	1.002	MH3	3.0	1.213	0.042	0.0161	
120 minute summer	MH3	1.003	EXISTING	3.0	1.102	0.294	0.0390	15.8

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Results for 30 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.78%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH1	11	90.698	0.198	32.7	0.3634	0.0000	SURCHARGED
120 minute winter	Storage	116	90.561	0.561	14.6	31.9504	0.0000	SURCHARGED
15 minute summer	MH2	11	90.587	0.787	32.7	1.3923	0.0000	SURCHARGED
15 minute summer	MH3	89	88.838	0.038	3.0	0.0434	0.0000	OK
15 minute summer	EXISTING	89	88.437	0.037	3.0	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)
15 minute summer	MH1	1.000	Storage	31.6	2.257	0.977	0.2692	
120 minute winter	Storage	1.001	MH2	-5.6	-0.318	-0.262	0.2444	
15 minute summer	MH2	1.002	MH3	3.0	1.475	0.042	0.0162	
15 minute summer	MH3	1.003	EXISTING	3.0	1.105	0.297	0.0392	25.1

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Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH1	11	91.112	0.612	43.2	1.1248	0.0000	SURCHARGED
120 minute winter	Storage	116	90.937	0.937	20.4	45.6285	0.0000	SURCHARGED
15 minute summer	MH2	11	90.937	1.137	43.2	2.0117	0.0000	SURCHARGED
15 minute summer	MH3	11	88.839	0.039	3.0	0.0437	0.0000	OK
15 minute summer	EXISTING	11	88.438	0.038	3.0	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)
15 minute summer	MH1	1.000	Storage	38.0	2.373	1.178	0.2692	
120 minute winter	Storage	1.001	MH2	-8.6	-0.486	-0.401	0.2444	
15 minute summer	MH2	1.002	MH3	3.0	1.618	0.043	0.0164	
15 minute summer	MH3	1.003	EXISTING	3.0	1.108	0.300	0.0395	33.2

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Appendix G

Typical SuDS Maintenance Regime

SuDS Maintenance

This section is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy. Where proprietary products are specified, the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

The recommended operations and frequencies are typical and should be more frequent initially to ensure that there are no unforeseen issues with the operation. They should then adjusted to suit the site requirements.

The surface water network has been designed to accommodate the 1 in 100-year storm rainfall event plus an allowance for climate change particular to the requirements of the site. It may be that the exceedance flows above the 1 in 30-year storm rainfall event are stored within the site partially above ground, on non-habitable external landscaping, parking or other space. As the flows are generally being attenuated on site and within SuDS features, there will be a period after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs, appropriate action should be taken as noted in this section.

Components

The typical SuDS components are highlighted below. This is not an exhaustive list and reference should be made to the SuDS Manual (Ciria C753) for any items not listed.

- Pipes
- Drainage Channels and Gullies
- Permeable Pavements
- Soakaways & Infiltration Trenches
- Attenuation / Infiltration Basins
- Attenuation Storage Tanks
- Oil Separators

A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.

It is assumed that the maintenance of the drainage network will be the responsibility of an on-site facilities management team.

A copy of the final construction drainage layout should be provided in the final Operations and Maintenance Manual.

It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event.

Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

Long-term management practices include monthly sweeping of external paved areas. The sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilised during storm events and transported to the drainage system.

During the winter months, drainage features such as gullies and channels should be cleared of ice, snow, debris or litter

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the filter drains and the upstream/downstream chambers.

Pipes

Pipes are proprietary products and the materials can vary across the site and as such where used the manufacture's recommendations should be followed.

Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleaning where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.

Access for maintenance is provided through access chambers and manholes.

Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk.

Maintenance Schedule	**Required Action**	**Frequency**
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection should be provided as post construction CCTV survey.	N/A
Regular maintenance\ inspection	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Check and remove large vegetation growth near pipe runs.	Monthly or as required
Remedial Action	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.

Drainage Channels and Gullies

Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned through the use of a high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.

Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers are allowed to move within their frame, this may cause damage to the frame or seating.

Sediment\material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the car park channels.

Maintenance Schedule	**Required Action**	**Frequency**
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection including channel outlet boxes.	Half yearly and after large storms.
Regular maintenance\ inspection	Litter and debris removal	Monthly or as required.
	Check and remove large vegetation growth near channel runs.	Monthly or as required
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	3-monthly, 48 hours after large storms.
Remedial Action	Inspect access/outlet boxes and rod through poorly performing channels and outlets as initial remediation.	As required.

Permeable Pavements

Permeable pavements contain proprietary products and as such where used the manufacturer's recommendations should be followed.

The permeable pavements are intended to be water quality and attenuation storage features. These features are intended to be dry except during rainfall events.

The surface has been designed to contain gaps where rain can flow through the upper construction layers in to the voided stone which makes up the subbase. Where these features are intended to be used as infiltration devices or soakaways any capping also needs to be permeable to permit the flows to the formation.

Access for maintenance is provided by inspection/access pipes, although access will be limited as this is a surface feature only.

Regular inspection and maintenance is important for the effective operation of the pervious pavement.

Maintenance Schedule	**Required Action**	**Frequency**
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	3-monthly, 48 hours after large storms.
Regular maintenance\ inspection	Brushing and Vacuuming	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required and as per landscape architect's specification.
	Removal of weeds	As required.
Remedial Action	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure. This could include replacement of the jointing and bedding material. The upper geotextiles layer may also need replacing if clogged and Terram 1000 has a life span of 25 years.	As required (if infiltration performance is reduced as a result of significant clogging).

Attenuation Tanks

Regular inspection and maintenance is important for the effective operation of infiltration and attenuation basins. Attenuation tanks contain proprietary products and as such where used the manufacturer's recommendations should be followed

Access points should be established to allow for visual inspection and jetting as appropriate.

Silt traps must be installed prior to all inlets.

Maintenance Schedule	**Required Action**	**Frequency**
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets, outlets and overflows for blockages and clear if required. If faults persist rodding may be required.	Monthly for three months after installation then annually
	Survey inside of tank for sediment build up and remove if necessary	After 1 year and then every 5 years or as required
Remedial Actions	Repair/rehabilitation of inlets/outlets.	As required.
Regular Maintenance	Inspect and identify any areas that are not operation correctly and if necessary take remedial action	Monthly for three months after installation then annually
	Remove debris from catchment surface (where it may cause risk to performance)	As required
	Remove sediment from pre-treatment structures & silt traps	Annually or as required