DRAINAGE IMPACT ASSESSMENT

Commercial Development
Barnsley West

Reference	**4848-JPG-XX-XX-RP-D-0622-S2-P02**
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APPENDICES

CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

Strata Sterling Barnsley West Limited
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DOCUMENT HISTORY

Revision	Date	Revision Details	Status	Author(s)	Approved
P01	14.07.2023	First Issue	Preliminary	JDM	CPH
P02	10.10.2023	Second Issue	Preliminary	JDM	CPH

1.0 INTRODUCTION

JPG (Leeds) Limited has been instructed by Strata Sterling Barnsley West Limited to prepare a Drainage Impact Assessment for a proposed commercial development area at Barnsley West.

Drainage Impact Assessment for the residential development zones will be covered in separate reports commissioned by the residential developers via their appointed consultants.

The Drainage Impact Assessment (DIA) for the proposed commercial development considers the drainage implications of the proposed development.

This report should be read in conjunction with the site wide Flood Risk Assessment (FRA) which has been prepared for the development and covers the flood risk issues.

Flood Risk Assessment Report reference 4848-JPG-XX-XX-RP-0620.

2.0 THE SITE

The site is located approximately 3km to the west of Barnsley town centre. The approximate centre of the site is located at NGR 431800 407100.

The site is located between Higham and Gawber, with the M1 motorway located to the west and south of the site. The A635 Barugh Green Road is located to the north of the site.

A site location plan is provided in Appendix A.

The site predominantly consists of undulating arable and grazing farmland, which is separated into fields by hedgerows, fences, and small watercourses. Hermit Lane, aligned approximately east to west, bisects the site.

A steep sided valley with a watercourse at its base extends from the south-western boundary and trends towards Hermit Lane to the north. Another steep sided valley, with an associated watercourse, trends from the central-eastern half of the site to Redbrook Farm, north of Hermit Lane.

A raised plateau of arable farmland is present adjacent to the residential suburb of Pogmoor in the eastern extent of the site. To the west of this plateau, the topography falls steeply forming the valley in the centre east. Evidence of local landslide instability is noted in the central-eastern portion of the site, south of Hermit Lane, to the east of Hermit House Farm and alongside the steep sided valley.

The gradient of Hermit Lane undulates from west to east, with a steep gradient from the western boundary down into the valley bottom before rising steeply towards Hermit House Farm and again upwards to Gawber/Pogmoor to the east. The two watercourses within the two steep valleys are culverted below Hermit Lane and continue as streams and ponds to the north of Hermit Lane. The stream in the central part of the site is culverted in parts and joins the eastern stream close to Redbrook Farm. Both valleys are heavily wooded and overgrown to the north of Hermit Lane.

Adjacent to the culvert and a sharp bend in Hermit Lane, to the east of Hermit House Farm, an intact coal seam was noted within the watercourse.

Hermit House Farm is located to the south of Hermit Lane in the centre-east of the site. It consists of two single storey residential properties, several agricultural buildings and associated hard standing. The farm buildings are typically constructed with concrete blocks, timber, and roofing of possible asbestos cement sheeting.

Redbrook farm is located adjacent to the north-eastern boundary, with access gained from Redbrook Road. The farm is made up of a large dilapidated agricultural barn, containing livestock, several outbuildings, and a large silo.

The northern site boundary is formed by Barugh Green Road and, in part, adjacent grazing farmland, beyond which lies the Metro Trading Centre and Claycliffe Business Park. Redbrook Plantation and residential properties (Gawber and Pogmoor) are present beyond the eastern boundary. Residential properties (Hunters Farm and Cottages) are located adjacent to the southern tip of the site. The south-western boundary is formed by the M1 motorway, beyond which lies further farms and woodland. The residential areas of Higham and Barugh Green are located to the west and northwest, respectively.

A topographic survey is provided in Appendix B.

3.0 EXISTING DRAINAGE NETWORK

There are a number of visible existing water courses located within the site boundary or immediately outside the site adjacent to the boundary.

The nearest named water course is Silkstone Beck which is some 1.5km to the west of the site. This flows in a south to north direction out falling into Cawthorne Dike (located 2.2km northwest) before combining with the River Dearne (located 1.75km north).

There is no direct access to any of the above watercourses from the site.

The Environment Agency data shows watercourses located within the site; these can be seen on the topographical survey also. A series of smaller ditches combine into two watercourses south of Hermit Lane before being culverted underneath the highway and combining around the Craven Wood area. The watercourse then runs in a north easterly direction towards Redbrook Road where it enters a series of weirs before being culverted under the highway. Based on discussion with BMBC LLFA it is understood that this culverted watercourse then runs under the highway and through Zenith Park industrial estate (the route of which is unknown) before out-falling into a ditch to northeast of Zenith Park.

The exact route of this culvert is not known, and Barnsley LLFA highlighted that there are known issues with this culvert and suggested that the developer should carry out a survey of the culvert. A survey has been commissioned but at the time of writing this report the information was not available.

Watercourses/land drainage ditches are also indicated running parallel to the south of Barugh green Road within the hedge line. It is believed this ditch falls west to east before entering a chamber and then turning north in a culvert beneath Barugh Green Road just before Claycliffe Avenue. This culvert would appear to outfall at the rear of the Aldi supermarket into a ditch. There is limited access to this open ditch section.

From the culvert running in a westerly direction upstream the ditch looks to decrease in size and by the time this get to the garden centre and residential properties on Barugh Green Road it is pretty much non-existent. This in noted on the EA mapping as a drain.

This same ditch is also shown to exist to the west of the properties with a depression observed adjacent to the boundary wall of the last property. This was full of detritus and debris and there was no evidence of a culvert under the properties linking this with the ditch to the east of the properties.

Moving further west along the highway boundary the ditch has completely disappear by the time it gets to the next set of properties and the ground is higher than the back of highway.

Further investigation will be required into this land drainage ditch which will need to be cleaned out then a connectivity survey carried out.

In addition to the previously described drain/ditch there is a slight depression shown on the topographical survey running round the rear of the properties and the garden centre. This is also indicated as a drain on the EA mapping.

The upstream extent is unclear on the topographical survey, but it appears to extend beyond the first field boundary which is also the development site boundary.

While there are no public sewers shown within the site boundary, public sewer infrastructure and networks are indicated outside the site boundary and are shown on the public sewer record drawings.

An extract of the Yorkshire Water sewer record plans is provided in Appendix C.

From consultation with the Barnsley Council Highways department, it is believed Highway drains are located within Higham Common Road and Barugh Green Road, however no records of these sewers were available at the time of consultation.

Some limited survey work had been carried out on the drain in the vicinity of the proposed roundabout on Barugh Green Road (note works to the roundabout are outside of this planning application). Due to difficulties with access and the poor state of repair of the drains limited information was gained. Further investigation into the drainage system would be recommended in this location.

4.0 DEVELOPMENT PROPOSALS

It is proposed to develop the site for a mixed end use, comprising residential with school in the northern two thirds of the site, industrial/commercial land use including a pub/hotel in the southern third and residential in the east (land adjacent to Pogmoor). The development will also include attenuation basins (SUDS), public open space landscaping zones and associated road infrastructure network.

A detailed masterplan is currently unavailable and been worked up based on site constraints and other factors. However, included in this report is a site zoning plan identifying the residential and commercial development areas and is located in Appendix D.

- JPG drawing 4848-JPG-ZZ-ZZ-DR-C-1000.

5.0 PROPOSED SURFACE AND FOUL WATER DRAINAGE

5.1 Proposed Surface Water Drainage & Disposal Hierarchy

Requirements in document H3 of the Building Regulations establishes a preferred hierarchy for the disposal of surface water run off as follows: -

- Discharge to ground (infiltration).
- Discharge to a surface water body (Land drainage Ditch, Water Body, or Watercourse).
- Discharge to a surface water sewer.
- Discharge to a combined water sewer.
- Discharge to a foul water sewer.

All options for the disposal of the surface water have been considered in accordance with current legislation, recommendation, and good practice and further details can be found in Section 5.3.

The proposed infrastructure drainage located within the commercial development zone will be separate foul and surface water systems designed to CODES for adoption and the local Water Company specific requirement.

This will be put forward to the local Water Company (Yorkshire Water) for adoption via a Section 104 agreement should the developer what to go down this route and the design meets with the Water Company criteria.

Proposed on plot drainage to the commercial units will consist of a separate surface and foul water drainage system but will remain in private ownership.

Where possible to do so SUDs features will be incorporated into the design either within the infrastructure drainage or private plot drainage system.

Maintenance of the SuDs features will be by either the Water Company, Local Authority or Private Management company depending upon there designation.

Detailed design of all drain and levels including adoption/maintenance of SuDS features is outside the scope of this report.

The following assessment summarises the disposal of surface from the site.

5.2 Sustainable Urban Drainage Systems (SUDS)

Sustainable Urban Drainage System (SUDS) may be used in conjunction with conventional drainage systems to improve water quality as well as manage surface water discharge. These should be considered at the detailed design stage of the project.

Based on the hierarchy of disposal infiltration should be considered first.

On site ground investigation has been undertaken and confirmed the site is mixed underlaying material consisting of rock, cohesive and mining fill material and all would be unsuitable for infiltration drainage methods on this site.

For further details of the underlaying ground conditions which are complex and varied refer to the JPG Preliminary Geo-Environmental Ground Investigation "4848-JPG-SW-XX-RP-G-0603".

Based on the finding in the ground investigation report disposal of surface water via infiltration has been discounted as not been viable from this development.

The following SuDs audit has been carried out relating to suitability of SuDS features/systems for the proposed development. See table below.

As part of the audit consideration should be given to the adoption of SuDs features by the local Water Company as detailed in the "Design and Construction Guidance (DCG)" CODES document.

Yorkshire Water the local Water Company have been consulted on their policy for adoption of SuDs. Their current requirements state that where attenuation basins are proposed these should not be lined to allow some partial infiltration.

However, this would be subject to site specific factors for example the location of the basins to existing properties, existing and proposed batters and embankments etc.

Thus, the SUDS audit reflects this approach and as such does not completely discount infiltration.

Drainage Method	Description/Suitability	Proposal/Feasibility
1. Infiltration.	May be suitable subject to further infiltration testing and investigation and adoption strategy at detailed design stage.	No suitable a primer disposal method. Further investigation required.
2. Ponds and wetlands.	May be suitable – subject to detailed design and adoption strategy.	Applicable. Non-Infiltration.
3. Infiltration Basins.	May be suitable subject to further infiltration testing and investigation and adoption strategy at detailed design stage	Not Applicable.
4. Detention Basins.	Suitable – subject to detailed design and adoption strategy.	Applicable. Non-Infiltration (Note comments from YW above regarding omitting of liners)
5. Swale.	Suitable – subject to detailed design and adoption strategy.	Applicable. Non-Infiltration.
6. French/Filter drain.	May be utilised to convey water subject to detailed design and adoption strategy.	Applicable. Non-Infiltration.
7. Pervious/Permeable Pavement.	May be utilised - subject to detailed design.	Applicable non infiltration method. For infiltration method further infiltration testing required at detailed design stage. System would not be suitable for adoption.
8. Geocellular Systems/Tank systems.	May be utilised – subject to detailed design and adoption strategy.	Applicable.
9. Oversized pipes.	May be used as surface water attenuation subject to detailed design and adoption strategy.	Applicable.
10. Box culverts.	May be used as surface water attenuation subject to detailed design and adoption strategy.	Applicable.
11. Purpose designed tanks.	May be used as surface water attenuation subject to detailed design and adoption strategy.	Applicable.

5.3 Surface Water Drainage

Requirement H3 of the Building Regulations establishes a preferred hierarchy for the disposal of surface water. Consideration should firstly be given to soakaway/infiltration, watercourse, and sewer in that priority order.

On site ground investigation has been undertaken and confirm the site is mixed underlaying material consisting of rock, cohesive and fill material and would be unsuitable for infiltration drainage methods on this site.

For further details of the underlaying ground conditions which are complex and varied refer to the JPG Preliminary Geo Environmental Ground Investigation "4848-JPG-SW-XX-RP-G-0603".

Based on the above statement and drainage hierarchy connection to watercourse or land drainage ditch should be consider next.

There are a number of existing water courses located within the development site toward the east and existing greenfield run off from the site would generally discharge into these watercourses.

Based on drainage hierarchy the most logical place for disposal of surface water from the development is into the existing land drainage/water course network.

Preplanning enquiry and predevelopment discussions have been carried out with both the LLFA Barnsley MBC and Yorkshire Water the local water company.

Responses from the LLFA are located in Appendix E.

The LLFA have confirmed that the site can drain into the existing watercourse/land drainage network at a restricted rate equivalent to current greenfield run off levels.

Some off-site flooding issues on the existing drainage network have been highlighted by the LLFA in the Redbrook Road area. Here the site drainage catchment enters an existing culvert.

The approximate route of the culvert is shown on the sketch provided by the LLFA and is between points A and B. This sketch can be found in Appendix E.

The LLFA stated that should the development look to utilise the existing off-site culvert from Redbrook Road to the out fall to the north of Zenith Park a CCTV survey of the culvert from Redbrook Road to the outfall point would need to be carried out at the developer's expense. This is to establish the culverts condition and agree any necessary repairs, up sizing of existing assets and any developer contributions.

Refer to LLFA correspondence in Appendix E.

A survey of the culvert has been commissioned by the developer and now undertaken. This will need to be review by the local authority in conjunction with the developer to agree what remedial work maybe required.

The site surface water drainage principles were also discussed with Yorkshire Water the local Water Company and pre planning enquiry submitted. Response to this can be found in Appendix F.

Greenfield run off rates shall be calculated using a recognised method such as IH124 or ICPSUDs. Greenfield run off calculations is located in Appendix G and rates are detailed below.

Agreed greenfield run off rate is 3.900l/s/ha. Based on the preliminary calculations the greenfield run for the commercial development site would be in the order of 100.00 l/s subject to finalised plot impermeable areas.

The drainage strategy calculations plan 4848-JPG-ZZ-ZZ-DR-D-1451 is located in Appendix H.

Should the catchment areas change as the development progress then the restricted discharge shall be revised accordingly in line with the agreed discharge parameters and revised areas.

As a result of the restricted discharge, surface water attenuation would be required on site. This would be provided in attenuation basins and the piped network. The basins for the commercial development will be located to the northeast adjacent to the existing watercourses and to the east of the development plots.

The proposed on-site drainage system shall be designed in accordance with the requirements of CODES for Adoption and national non-statutory technical SuDS standards and shall demonstrate that:

- No surcharge of pipes occurs in the 1 in 2-year rainfall event.
- No surface flooding occurs in 1 in 30-year rainfall event.
- No flooding to buildings and adjacent properties occurs in 1 in 100-year rainfall event (including an allowance of for the effects of future climate change), as defined in NPPF Technical Guidance. The climate change allowance shall be 40%.

Exceedance routing from the attenuation basins will be provide for storm events above the design storm event of 1 in 100-year event plus climate change. Any flows generated above this event will be directed into the existing water course system at unrestricted rate but in a controlled manor.

For new developments, an additional allowance for climate change resulting from global warming must be applied.

The proposed allowance for climate change for this development is 40% for the 1 in 100-year event.

Where levels dictate the surface water infrastructure drainage will be a gravity system. However, some areas may need to be pumped due to proposed levels.

The proposed drainage infrastructure for the commercial zones will be put forward for adoption via a Section 104 agreement where local Water Company criteria is met.

Principles for adoption have been discussed with YW in a pre-design discussion meeting and minutes from this are located in Appendix F.

Note that the proposed drainage is subject to detailed design of both site levels and the drainage itself.

Preliminary proposed surface water drainage strategy drawings 4848-JPG-ZZ-ZZ-DR-D-1453 is located in Appendix I.

5.4 Land Drainage

A large proportion of the commercial development plot will remain permeable, in the form of unsurfaced landscaping and will not be positive drained.

To control the runoff from these areas a land drainage system is proposed which will also pick up any existing land drainage encountered during construction of the development plateaus.

Also identified in the ground investigation report are what appears to be a number of springs within the commercial development zone. These will be further investigated as part of the earthwork strategy and design. Where confirmed these will be diverted into the proposed land drainage system, as necessary.

It was agreed with the LLFA that discharge from the proposed land drainage system could be unrestricted into the existing water course system on the assumption it was spread out around the catchment and not all directed to one location where feasible to do so.

Preliminary proposed land drainage strategy drawing 4848-JPG-ZZ-ZZ-DR-D-1454 is located in Appendix J.

It was also agreed with the LLFA that once development plateaus have been formed a system of temporary drainage would need to be installed to deal with run off from undeveloped plateaus. This system should remain in place until such a time they are developed, and a permanent positive drainage system is installed.

Controlling the runoff and suitable silt collection would be required with final discharge connected into the proposed land drainage system or directly into the water course.

The appointed contractor would need to produce the detailed temporary plateau drainage design in conjunction with his proposed earthworks strategy, phasing, and method of working.

5.5 Water Quality and Pollution Control

It is a requirement of anyone undertaking development to ensure that the water quality of any receiving water body is not adversely affected by development.

SuDs guidance advocates the use of SuDs drainage features which can capture, retain, and treat pollutants depending upon the SuDs feature.

The simple index approach as detailed in the SuDs manual can be used to determine the pollution loading from various development types.

The pollution hazard level for surface water runoff from different types of development are detailed in Chapter 26 of the SuDs Manual Table 26.2.

Table 26.2 – Pollution hazard indices for different land use classifications

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

Notes:

1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

2 These should only be used if considered appropriate as part of detailed risk assessment – required for all these land use types. When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

Where a site land use falls outside the defined categories, the indices should be adapted (and agreed with the drainage approving body) or else the more detailed risk assessment method should be adopted.

Where nutrient or bacteria and pathogen removal is important for a particular receiving water, equivalent indices should be developed for these pollutants (if acceptable to the drainage approving body) or the risk assessment method adopted.

Based on table 26.2 for the SuDs manual the proposed commercial development would fall into the medium risk category.

Table 26.3 of the SuDs manual give the indicative SuDs mitigation indices for different SuDs features in order to mitigate the various pollution types and is shown.

Table 26.3 – Indicative SuDS mitigation indices for discharges to surface waters.

	Mitigation indices1		
Type of SuDS component	**TSS**	**Metals**	**Hydrocarbons**
Filter strip	0.4	0.4	0.5
Filter drain	0.42	0.42	0.42
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond4	0.73	0.7.	0.5
Wetland	0.83	0.8	0.8
Proprietary treatment systems 5,6	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Notes:

1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.

2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be considered in the design and Maintenance Plan.

3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.

4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.

5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: http://tinyurl.com/qf7yuj7.

6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

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

- First SuDs component take the full mitigation indices and for any subsequent SuDs components take half the mitigation indices.

The determination of all the proposed SuDs components will be confirmed at detailed design stage. However, it is likely that sufficient components can be incorporated into the drainage design to mee the required hazard indices as identified in table 26.2.

In addition to providing treatment correctly designed and sized SuDs features can also enhance a development by providing source control and amenity/green infrastructure.

Where possible and practical to do so SuDs features shall be incorporated into the design.

5.6 Volume Control

SuDs guidance advises that the run-off volume from development sites for the 1 in 100 year 6-hour rainfall event should not exceed the greenfield run-off volume for the same event.

If extra runoff volume cannot be retained on site and infiltrated it will be discharged from the site at a maximum restricted discharge of 2 l/s/ha or QBAR whichever is the higher value as detailed in the SuDS Manual Chapter 24, Section 24.4.

As discussed in previous sections of this report infiltration is unsuitable on this development site. Surface water runoff will be restricted to QBAR for all events up to and including the 1 in 100-year event plus climate change. This would meet the criteria detailed in the SuDs Manual.

In addition to the above and where possible to do so the first 5mm of rainfall should be retained on site to either infiltrate or evaporate.

The retention of the first 5mm will be reviewed as part of the detailed drainage design and once masterplans have been finalised and agreed by the developer.

5.7 Exceedance Event

For storm events above the design event of 1 in 100-year event plus climate change run off should be managed so that it would not affect the proposed buildings. Levels will be detailed such that water would be directed away from doors and other access openings.

This will all be reviewed as part of the detailed drainage design once masterplans have been finalised and agreed by the developer.

5.8 Foul Water Drainage

Preplanning enquiry and predevelopment discussions have been carried out with Yorkshire Water.

The responses from Yorkshire Water are located in Appendix F.

YW confirm the closest practicable point of discharge for foul will be the 600dia. combined public sewer in Barugh Green Road. At present this system does not have adequate capacity available to accommodate the anticipated foul water discharge from the proposed development site.

Subject to the submission of a Formal Planning Application Yorkshire Water will look to carry out a feasibility study to determine, any available capacity in the public sewer network, together with timescales for any potential upgrading works required.

All cost will be borne by Yorkshire Water up-front and recouped via the Infrastructure Charges at a later date.

Response from Yorkshire Water regarding the capacity study can be found in Appendix G.

Upgrading of the offsite existing foul water sewerage network will be managed by the residential developer as part of their site wide infrastructure design.

A detailed schedule of the build out programme including time scales and start dates when various element would come online will need to be provide by the developer when submitting the formal planning statement.

Based on Yorkshire Water comments discharge of foul water from the site would be unrestricted into the 600dia. combined public sewer.

Foul water discharge from the commercial development zone will discharge into the residential development on site adopted foul water sewer infrastructure at the agree handshake point (northwest corner of the commercial development zone).

The proposed drainage infrastructure for the commercial zones will be put forward for adoption via a Section 104 agreement where local Water Company criteria is met.

Principles for adoption have been discussed with YW in a pre-design discussion meeting and minutes from this are located in Appendix F.

Preliminary foul water drainage calculations for the commercial development zone are shown on the FW and SW Drainage Strategy Calculations Plan 4848-JPG-ZZ-ZZ-DR-D-1451 and is located in Appendix H.

A summary of the anticipated foul flow from the commercial development is detailed below.

Commercial development = 13.981 l/s design foul flow.

The calculation is based upon Sewer for Adoption methodology of 0.60l/s/ha design foul water flow 6xDWF+10%. Thus, 1xDWF would be 2.097 l/s.

A preliminary foul water drainage strategy drawing 4848-JPG-ZZ-ZZ-DR-D-1452 has been produced based on the above criteria and is located in Appendix K.

Where levels dictate the foul water infrastructure drainage will be a gravity system. However, some areas will need to be pumped due to the proposed levels.

On plot drainage will remain privately maintained by the end user.

The private plot drainage for the commercial development is outside of the scope of this report and would be detailed under separate planning application covering the detailed design of the individual development plots.

It is considered that the proposed foul water discharge would have minimal impact on the existing off-site foul drain/sewer network as the Yorkshire Water upgrades will accommodate the anticipated flows.

6.0 CONCLUSIONS

This assessment has looked at the detailed drainage strategy to support a planning application for the commercial element only of a proposed mixed-use development at Barnsley West.

This report should be read in conjunction with the Flood Risk Assessment report 4848-JPG-XX-XX-RP-D-0620-S2.

As confirmed in the accompanying Flood Risk Assessment the site falls in Flood Zone 1 (low flood risk) and is considered to be at a low risk from all flooding sources.

On site ground investigation has been carried out and confirm the site is mixed underlaying material consisting of rock, cohesive and fill material which would be unsuitable for infiltration drainage methods on this site.

Based on drainage hierarchy the most appropriate location for discharge of surface water from the development would be into an onsite watercourse and land drainage ditch system.

Where levels dictate the surface water infrastructure drainage will be a gravity system. However, some areas may need to be pumped due to the levels.

Surface Water Discharge from the site will be restricted to greenfield run off rate of 3.900 l/s/ha for all storms up to the 1 in 100-year event plus climate change.

Attenuation storage will be provided on site in attenuation basins and the piped network.

Allowance for climate change for this development is 40%.

Foul water drainage will discharge into the proposed residential foul water sewer infrastructure at the handshake point in the northwest corner. Discharge of foul water at this location will be unrestricted into the off-plot network.

A capacity study will be carried out by YW to assess the capacity of the existing public sewer network undertaken as part of the residential drainage design by their appointed consultants.

The existing of site public sewer network will be updated by YW to accommodate the anticipated foul water flows based on the findings of the capacity study.

Where levels dictate the foul water infrastructure drainage will be a gravity system. However, some areas will need to be pumped due to the levels.

The reports supporting calculations and drawings provide a robust case for justifying the means of foul and surface water drainage and that the site can be suitably, safely and sustainably drained.

Overall, this report demonstrates that the proposed foul and surface water drainage systems are reasonable and acceptable for the proposed development.

Appendix A Site Location Plan

DO NOT SCALE (A1)

NOTES

GENERAL NOTES

1. ALL MATERIALS AND WORKMANSHIP IS TO COMPLY WITH JPG CONSULTANTS STANDARD SPECIFICATION & ALL RELEVANT BRITISH & EUROPEAN STANDARDS.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, M & E CONSULTANTS AND JPG CONSULTANTS DRAWINGS.
3. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.

KEY:

DENOTES APPROXIMATE LOCATION OF SITE.

SITE INFORMATION

SITE ADDRESS - HERMIT HOUSE FARM, HERMIT LN, HIGHAM, BARNSLEY
NEAREST POSTCODE - S75 2RW
OS SHEET/TILE - SE317073
OS CO-ORDINATES - E431762, N407312

SITE LOCATION PLAN

SCALE 1:5000

REV	DESCRIPTION	DATE	CHK	BY
P02	PLAN UPDATED	03/04/23	CPH	LSG
P01	INITIAL ISSUE	27/03/20	CPH	LSG

Project
BARNSLEY WEST

Drawing Title
SITE LOCATION PLAN

INFORMATION

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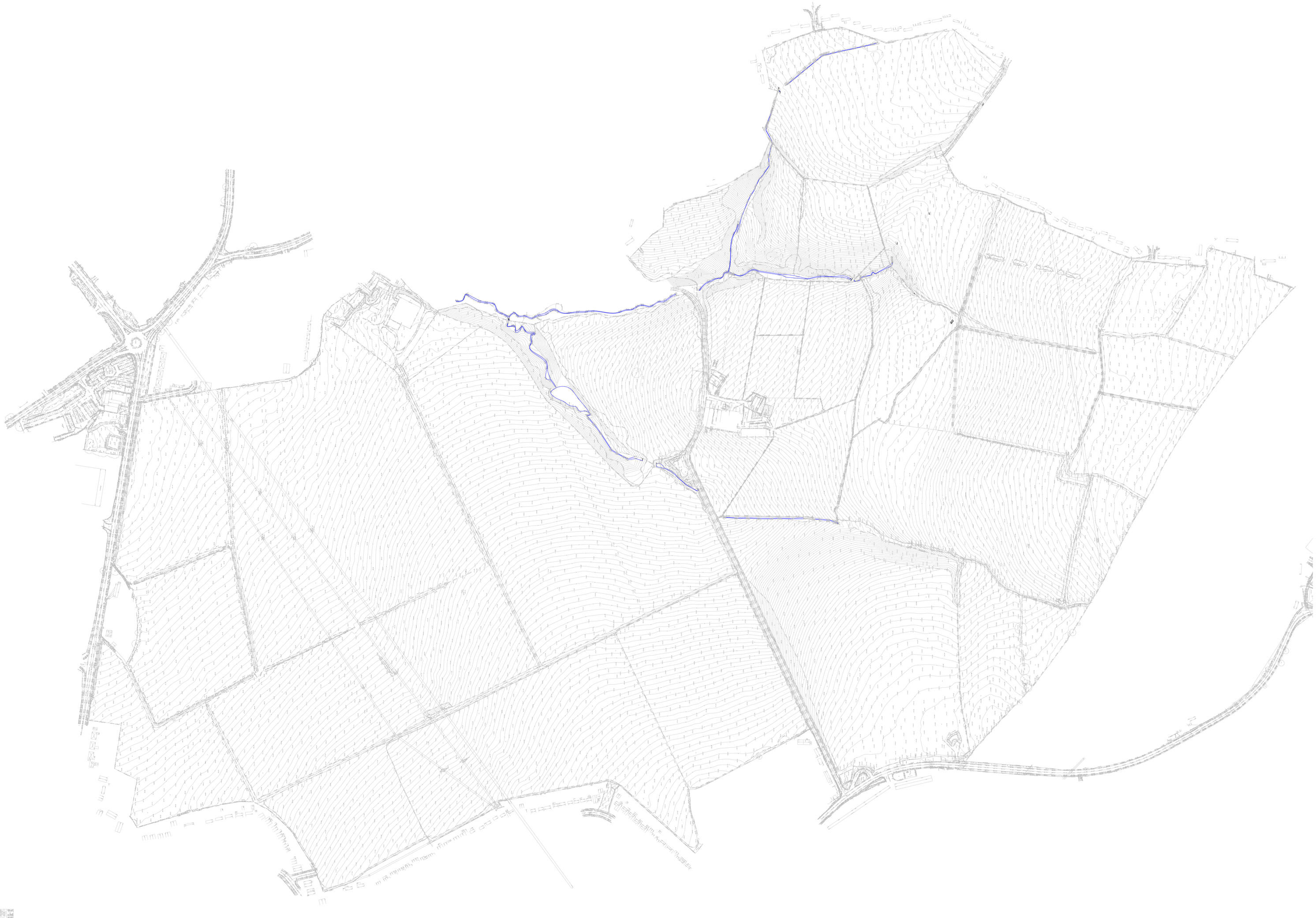
4848-JPG-SW-XX-DR-D-1450 | S2 | P02

Appendix B Topographic Survey



Appendix C Yorkshire Water Sewer Records

431603 : 406735	Map Name : SE3005NE	Title

Yorkshire Water,
PO Box 500,
Halifax Road,
Bradford BD6 2LZ
Contact Name :
YorMap Advisor C ROBERTS
Contact Tel : 87 2582

Notes

Partial Key
Foul Sewer = F
Combined Sewer = C
Surface Water Sewer = SW
Trade Sewer = TD
Partially Separate = PS

Date Req :	03/02/2021, 09:19:59	Date Gen :	03/02/2021, 09:21:07
Source :	Sewer Network Enquiry		

UPN: Undefined Originator: C ROBERTS, YorMap, 87 2582