

# Flood Risk Assessment & Drainage Strategy

## 7270 – Proposed Commercial Development

Lindley Moor Road

Huddersfield

Prepared For

**Frank Marshall Estates**

Report: 7270-HJCE-ZZ-XX-RP-3000.v3

Date: 28.08.2024

**Document Revisions**

Revision	Date	Written by	Checked by
1	04.2023	D.Moffat	M.Holloway
2	08.08.2024	A.Fairburn	M.Holloway
3	28.08.2024	A.Fairburn	M.Holloway

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## 1. Introduction

- 1.1. This Flood Risk Assessment (FRA) has been produced by Holloway Jennings on behalf of Frank Marshall Estates. It supports the planning application for the proposed development at Lindley Moor Road, Huddersfield. The proposal will comprise the demolition/clearance of the site and redevelopment as four new units with mixed uses with associated infrastructure. For clarity in this report, the development shall be referred to as ‘the site’.
- 1.2. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) 2021 and the associated Planning Practice Guidance.
- 1.3. The key site details are below.
- |                              |                                   |
|------------------------------|-----------------------------------|
| - Site Name                  | Former Wappy Springs Public House |
| - Location                   | Lindley Moor Road                 |
| - Grid Reference             | SE 10367 18774                    |
| - Postcode (nearest)         | HD3 3TD                           |
| - Site Area (hectares)       | 0.70                              |
| - Development Type           | Commercial                        |
| - Flood Zone                 | Flood Zone 1                      |
| - NPPF Vulnerability         | Less vulnerable                   |
| - Surface Water Flood Risk   | Low                               |
| - Lead Local Flood Authority | Kirklees Council                  |
| - Local Planning Authority   | Kirklees Council                  |
- 1.4. The site is within Flood Zone 1. As the site area is less than one hectare and within Flood Zone 1 other sources of flooding need not considered.
- 1.5. This report is an FRA and, therefore, deals with environmental issues only in as much as they are impacted by flooding. The report is the property of Holloway Jennings Consulting Engineers (HJCE) and is produced for the exclusive use of the client, Frank Marshall Estates. The contents may not be made use of by any third party without the express written consent of HJCE. Without such consent HJCE can accept no responsibility to any third party. By receiving this report and acting on it, the client, or any third party relying on it, accepts that no individual is personally liable in contract, tort, or breach of statutory duty (including negligence).

## 2. Methodology

- 2.1. This is a desk-based study that utilises existing information in the form of mapping and previously undertaken work. Conclusions made about flooding have been made using our expert judgement and knowledge of similar events.
- 2.2. In preparing this report, information has been gathered and referenced from a number of sources. These are as follows:
- The Environment Agency's Flood Map for Planning
  - The Risk of Flooding from Surface Water (RoFfSW) Mapping
  - The 2021 NPPF
  - The Planning Practice Guidance to the 2021 NPPF
  - Risk of Flooding from Surface Water Data Download (RoFSW)

### 3. Site Details

#### 3.1. Site Location & Characteristics

3.1.1. The proposed development site is located approximately 4.5km to the northwest of Huddersfield Town Centre in the Metropolitan Borough of Kirklees.

3.1.2. The site currently comprises the existing Wappy Spring Inn Public House, a car park as well as areas of grazing/paddocks. The surrounding area predominantly comprises a mix of residential and commercial properties as well as road infrastructure and undeveloped land.

3.1.3. Access to the site is from Lindley Moor Road

3.1.4. The total development site covers approximately 0.70 hectares.

3.1.5. See Appendix A for a location map of the site.

#### 3.2. Geology

3.2.1. The Soilscales geology map identify the site to be situated on ground comprising 'freely draining slightly acid loamy soils'

3.2.2. A Phase 1 Desktop Study report was prepared by GEO Environmental Engineering in April 2021 which advises *'the presence of sandstone bedrock may allow for the use of soakaways if determined to be present at shallow depth below the site.'*

#### 3.3. Topography

3.3.1. The site has a general fall from south at a level of circa 256.00m AOD to the northern top of the site at circa 253.00m AOD. A topographic survey is provided in Appendix N.

#### 3.4. Surface Water Features

3.4.1. No surface water features can be identified on the publicly available Ordnance Survey maps.

3.4.2. The LLFA (Kirklees MBC) provided a plan which shows a culverted watercourse from the old Peat Ponds Farm (now a commercial development) passes through the site. The culvert crosses to a large catchpit manhole just inside National Highways land. Motorway drainage runs in a carrier drain parallel to your northern site boundary. The drainage features are identified on the plan included in Appendix B. A survey of the culverted watercourse is provided in Appendix M.

#### 3.5. Sewer Network

3.5.1. A copy of Yorkshire Water sewer records is included in Appendix B.

3.5.2. There are no public sewers in the vicinity of the site.

3.5.3. A CCTV drainage survey was undertaken on the site by DrainsAid during April 2021 which identifies foul from the existing property along with rainwater pipes on the front elevations

of the existing building discharge to a septic tank, which overflows to a soakaway. Rainwater pipes to the rear of the property discharge onto the ground surface. A copy of the drainage survey report is provided in Appendix C.

#### **4. The Proposed Development**

4.1. The development proposal will comprise the demolition/clearance of the site and redevelopment as four new units with mixed uses including the following:

- E(g) i Offices to carry out any operational or administrative functions,
- E(g) ii R&D
- E(g) iii Light industrial
- B2 industrial with ancillary offices
- B8 warehousing with ancillary offices

An indicative site layout is included in Appendix D.

## 5. Flood Risk Planning Policy

### 5.1. The Environment Agency Flood Map for Planning

5.1.1. The Environment Agency’s Flood Map for Planning gives an indicative prediction of areas at risk of fluvial and tidal flooding. The mapping is an amalgamation modelled flood levels and historical flood event outlines.

5.1.2. The Flood Map is split into ‘Flood Zones’, which demarcate the extent of flooding from rivers or the sea for different return periods. The Flood Map for Planning shows the extent of the natural floodplain if there were no defences or other man-made structures. They do not provide a definitive picture of where flooding would occur; rather, they provide an indicative prediction of areas at risk.

5.1.3. Table 5.1, below, lists the flood zone categories and explains the flood risk probabilities they represent.

Table 5.1 – Flood Zone Categories

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as ‘clear’ on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)

Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)
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## 6. The National Planning Policy Framework

6.1.1. The NPPF sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. The Planning Practice Guidance to the NPPF provides further information on the policies set out in the NPPF. It encourages development to be located in areas of lower flood risk wherever possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.

6.1.2. Within each Flood Zone, a key factor in determining planning applications for development is the flood risk vulnerability of a development. Table 2 of the Planning Practice Guidance to the NPPF categorises different development types according to their vulnerability to flooding. These categories are:

- Essential infrastructure;
- Highly vulnerable development;
- More vulnerable development;
- Less vulnerable development, and;
- Water-compatible development.

6.1.3. Within the different Flood Zones each of the above development categories are considered appropriate or not permissible. The Planning Practice Guidance to the NPPF lists these as:

- Flood Zone 1:

6.1.4. All the development categories listed above are appropriate

- Flood Zone 2:

6.1.5. Water-compatible, less vulnerable development, more vulnerable development and essential infrastructure is appropriate in this zone.

- Flood Zone 3a:

6.1.6. Water-compatible and less vulnerable development is appropriate in this zone. Highly vulnerable development should not be permitted in this zone.

- Flood Zone 3b:

6.1.7. Only water-compatible development and essential infrastructure that has to be there should be permitted in this zone.

6.1.8. The above information sets out the basis by which developments must be assessed in terms of flood risk. In Section 8, below, the vulnerability of the proposed development at Lindley Moor Road will be reviewed against the Flood Zone in which it is located. This will inform the appropriateness of the development as per the advice within the Planning Practice Guidance of the NPPF.

## 7. Flood Risk Assessment

- 7.1. Flooding can arise from a variety or combination of sources. These may be natural or artificial and may be affected by climate change. These are discussed, below, in detail and summarised in Table 7.1, which is at the end of this chapter.
- 7.2. This section will review and discuss each type of flooding and whether it is likely to impact the proposed development site.
- 7.3. Rivers and Seas (Fluvial) Flood Risk
- 7.3.1. The Environment Agency Flood Map for Planning (see Appendix E) indicates the site is located in flood zone 1. Therefore, the risk of flooding from rivers can predominantly be considered as low.
- 7.3.2. The site is not in an area at risk of tidal flooding.
- 7.3.3. As the site area is less than one hectare and within Flood Zone 1 other sources of flooding need not be considered.
- 7.4. Surface Water (Pluvial) Flood Risk
- 7.4.1. Pluvial flooding results from rainfall-generated overland flow, where rainwater has not yet reached a watercourse or sewer and where the local drainage systems become overwhelmed. Pluvial flooding often occurs during short, very intense storms, but can also occur during longer periods of rainfall when the ground is already saturated, or where land has low permeability due to development. Although pluvial flood events are usually short-term, they can be devastating with fast flows and deep waters occurring quickly.
- 7.4.2. In these conditions surface water can build up where the topography is flat. Where it gathers it will travel down prevailing gradients. Pluvial flooding then occurs at locations where significant surface water flow paths converge, at localised low points and/or due to overland obstructions. In urban areas pluvial flooding often occurs where the built environment channels overland flow routes (down roads that are bounded by kerbs, for example) or where there are obstacles to natural overland flow routes. Boundary walls and buildings are often the main culprits and, hence, the likelihood of pluvial flooding to impact property and gardens.
- 7.4.3. Pluvial flooding is exacerbated in many cases by the mistreatment or failure of the below ground infrastructure (including partial or full blockages of gullies and/or within the combined sewers and the accumulation of fats, oils and greases within the sewer networks).
- 7.4.4. The Environment Agency's Risk of Flooding from Surface Water (RoFSW) maps attempt to model the areas where pluvial flooding is likely to occur. The RoFSW map is a

national scale modelled output. It shows the flooding that could take place from the 'surface runoff' generated by rainwater (including snow and other precipitation) which:

- a. is on the surface of the ground (whether or not it is moving), and. has not yet entered a watercourse, drainage system or public sewer.

7.4.5. The RoFSW map predominantly follows topographical flow paths of existing watercourses, or dry valleys with some isolated ponding located in low lying areas.

7.4.6. The RoFSW maps are categorised into High, Medium and Low risk, and correlate to 1 in 30, 1 in 100 and 1 in 1000 chance of flooding in each year respectively.

7.4.7. The RoFSW flood maps identify the site is not at low risk of flooding from overland flows. A localised area of flooding is shown in the northeast corner of the site, this is as a consequence of a local low area of ground topography as identified on the topographic survey in Appendix N. As the site is developed with a formal drainage system this will significantly reduce any surface water flooding in this area. The proposed building and yard levels are circa 1.5m above the area of potential surface water flooding, therefore any residual ponding in this area will not impact the development.

7.4.8. In summary, the pluvial flood risk mapping show that the site is at low or not at risk.

## **8. Flood Risk Assessment Conclusion**

- 8.1. This Flood Risk Assessment (FRA) supports the planning application for the proposed site; at Lindley Moor Road. The proposal will comprise the demolition/clearance of the site and redevelopment as four new units with mixed uses with associated infrastructure
- 8.2. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) 2021 and the associated Planning Practice Guidance.
- 8.3. The Environment Agency's Flood Map for Planning indicates that the development site is within Flood Zone 1. Table 3 of the Planning Practice Guidance to the NPPF states that 'less vulnerable' development is appropriate in Flood Zones 1 and 2, which have the same level of probability as the surface water flooding occurring on site. Consequently, the development can be considered to be appropriate in this location, according to the NPPF.
- 8.4. Pluvial flood risk has also been reviewed and found to be low.

## 9. Drainage Strategy

- 9.1. The NPPF states that opportunities to reduce overall flood risk should be sought and achieved through sustainable development and careful drainage design. This can be achieved through the layout and form of development, including green infrastructure and the appropriate application of sustainable drainage systems (SUDS). SUDS are designed to control surface water runoff close to where it falls and mimic natural drainage as closely as possible. They provide opportunities to:
- Reduce the causes and impacts of flooding;
  - Remove pollutants from urban run-off at source;
  - Combine water management with green space with benefits for amenity, recreation and ecology.
- 9.2. The hierarchy of surface water discharge implemented by the NPPF demonstrates four methods of discharge, from most sustainable to least sustainable. The hierarchy is as follows:
- 9.2.1. To source, via infiltration to the ground;
  - 9.2.2. To a watercourse or water body;
  - 9.2.3. To a surface water sewer or drain;
  - 9.2.4. To a combined sewer.
- 9.3. A Phase 1 Desktop Study report was prepared by GEO Environmental Engineering in April 2021 which advises *'the presence of sandstone bedrock may allow for the use of soakaways if determined to be present at shallow depth below the site.'* Soakaways tests shall be undertaken in accordance with BRE Digest 365 (soakaway design) during the phase 2 geo-environmental survey.
- 9.4. The use of soakaway/infiltration drainage systems shall be confirmed following receipt of the Phase 2 geo-environmental survey reports.
- 9.5. Where the use of soakaway/infiltration drainage systems are not deemed appropriate, then an acceptable rate of discharge to the surface water watercourse/public sewer, must be agreed with the LLFA/water authority. Provided in Appendix H are HR Wallingford calculations to determine the greenfield run-off rate,  $Q_{bar}$ , with associated values for the 1 in 1 year, 30 year and 100 year. The run-off rates are summarised on the following page.

Greenfield run-off rates	Litres per second
Qbar	5.29
1 in 1 year	4.55
1 in 30 years	9.26
1 in 100 years	12.54

9.6. Water quality

9.6.1. To meet the requirement to maintain or improve water quality, surface water drainage from impermeable areas that serve vehicular traffic will need to receive treatment improvement in-line with CIRIA guidance.

9.6.2. Sustainable Drainage Systems (SUDSs) may be used in conjunction with conventional drainage systems to improve water quality as well as manage surface water discharge. The following audit has been carried out relating to the suitability of SUDs system. The implementation of SUDs shall be considered at the detailed design stage of the project.

SUDs Method	Comments
Infiltration	Subject to results of phase 2 geo-environmental survey
Ponds/Basins and wetlands	Suitable if space is available on site.
Swales, French/Filter Drains	Suitable if space is available on site. Swale can be used to increase water quality as well as convey surface water flows.

Proprietary Geocellular Systems/Tank systems.	To provide surface water attenuation
Oversized pipe/box culverts	To provide surface water attenuation
Purposed Designed Tanks	To provide surface water attenuation

9.7. SUDS infrastructure maintenance

9.7.1. A Surface Water Management Plan (SWMP) shall be developed when the detailed drainage design is undertaken. The plan shall be given to the site owner/Developer on completion of the development. The plan will provide details for inspection and maintenance specification for sustainable drainage systems (SuDS) maintained by a management company on behalf of the developer if they are not to be adopted by the Local Authority or Water Authority. The principles of the Surface Water Management Plan (SWMP) as set out above will ensure that surface water from the development site will be collected, attenuated, and conveyed in such a way that it manages the flows in accordance with best practice.

9.7.2. Note any proprietary system must have the manufacturer guidance followed.

9.8. Surface Water Disposal.

9.8.1. A discharge to watercourse has been considered, subject to confirmation infiltration type drainage is not suitable it is proposed to discharge surface water to the existing culverted watercourse passing through the east of the site. The discharge to watercourse shall be restricted to 3.5 litres/second as requested by Kirklees Council in their planning consultation response dated 6<sup>th</sup> December 2023.

9.8.2. On plot surface water attenuation shall be provided to attenuate surface water flows in excess of the restricted discharge. An initial calculation of the volumes of attenuation using Microdrainage is has been undertaken and is summarised below;

9.8.3. Attenuation Volume Estimate

- Restricted surface water discharge rate = 3.5 l/s
- Proposed Impermeable area = 0.474 Ha
- 1:100 Year Return + 45% climate change = between 363 & 517m<sup>3</sup>

9.8.4. Detailed surface water drainage calculations are provided in Appendix J, and drainage layout drawing is provided in Appendix I

9.8.5. The proposed drainage system shall be designed in accordance with the requirements of the Code for Adoption and shall demonstrate that:

- 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 45% for the effects of future climate change) as defined in NPPF.

9.8.6. All vehicle trafficked areas shall pass through a suitably designed bypass or full retention separator prior to discharge to the surface water drainage system.

## 9.9. Foul Water Disposal

9.9.1. Government guidance contained within Planning Policy Guidance and part H3 of Building Regulations 2010 provides a preferred hierarchy of drainage options for the disposal of foul water drainage, that must be considered and discounted in the following order:

- Connection to the public sewer.
- Connection to a private sewer, communicating with a public sewer.
- Either a septic tank or another wastewater treatment system.

9.9.2. There are no foul or combined water public sewers in the vicinity of the site. It is therefore not viable to connect the site to the public sewer network.

9.9.3. As there are no known private foul/combined sewers in the vicinity of the site the preferred option for the disposal of domestic foul water is using a 'Biodisk' type sewage treatment plant. Effluent from the treatment plant will be discharged to the culverted watercourse passing through the east of the site. An environmental permit may be required from the Environment Agency for use of a sewage treatment plant. This should be discussed with the Environment Agency. A foul water drainage layout is provided in Appendix I

9.9.4. Foul water from any canteen/kitchen areas shall be passed through a suitably design grease trap prior to connection to the foul water drainage system.

9.9.5. Foul water disposal shall be in accordance with the Building Regulations Part H “Drainage and Water Disposal”.

## 10. Kirklees Council (LLFA) Consultation Comments

The following notes are provided in response to Paul Farndale (Kirklees Council) planning consultation response dated 6<sup>th</sup> December 2023. The council comments are shown in italics with HJCE response in blue;

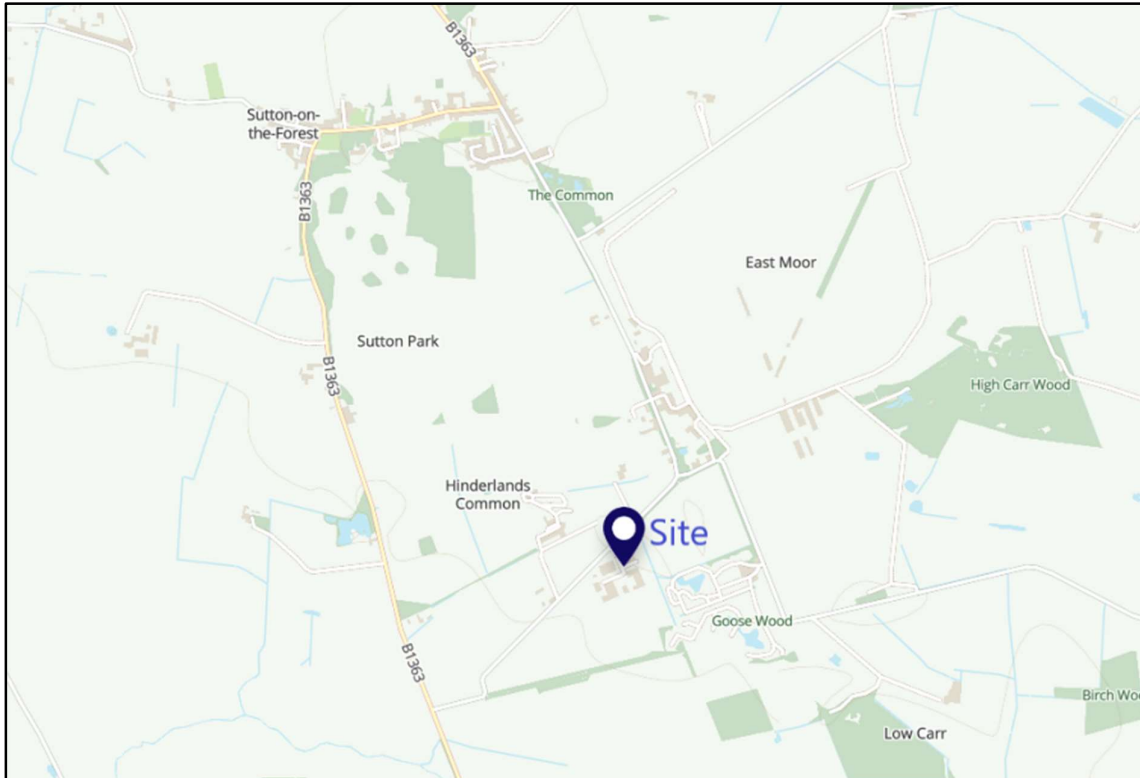
- It is understood from testing at the nearby Peat Ponds Farm site that soakaways are an unsuitable method of surface water disposal. BGS data suggests severe constraints on this site for infiltration techniques. A 3.5l/s restriction to watercourse should apply given the existing buildings drain to ground. *Surface water has been restricted to 3.5 litres/second as identified on HJCE drainage drawing no. 7270-HJCE-XX-XX-DR-C-3000 in Appendix I.*
- A culvert crosses the site from the Peat Ponds commercial site opposite, before travelling under the motorway and into Calderdale's boundary. The planning officer may choose to consult Calderdale LLFA on this basis. *A survey of the culvert was undertaken on 30th July 2024 to identify the route of the culvert through the site. A copy of the survey is included in Appendix L.*
- The layout must be shown to have 'made space for water' including conservative estimates for SUDS systems volumes for attenuation and treatment. This will be more demanding given the restriction imposed on the outflow and the culvert appears to clash with the area chosen to attenuate surface water. *Surface water attenuation is to be provided in a below ground cellular tank as identified on HJCE drainage drawing no. 7270-HJCE-XX-XX-DR-C-3000 in Appendix I. Surface water drainage calculations are provided in Appendix J.*
- Measurements in relation to invert levels on outfalls is required. An above ground feature has been shown indicatively but not measured. *Refer to culvert survey in Appendix M.*
- Suitable access will be required. A stand-off distance of 3 metres from the outside edge of any design is suggested as a minimum requirement but working space must be justified as a CDM assessment. *There is adequate open space over the existing culvert for maintenance access.*
- The LPA is obligated to ensure adequate maintenance and management of SUDS systems for the lifetime of the site and will need to secure this via an unilateral undertaking using section 106 to ensure a management company is set up to perform an agreed itinerary and schedule of works. *Refer to HJCE Drainage Management & Maintenance Plan in Appendix K.*
- Accommodation of the existing watercourse crossing site should be demonstrated, independent of the attenuation feature and not be built over, having a suitable standoff distance. *Refer to HJCE drainage drawing no. 7270-HJCE-XX-XX-DR-C-3000 in Appendix I for the location of the existing culvert and proposed drainage.*
- An assessment of deculverting the watercourse is expected in line with Kirklees Local Plan Policy. Layout could be affected as a result. *The culvert survey provided in Appendix M identifies only a short section of culvert traverses the eastern corner of the site. The culvert at this location is circa 3.2-3.5m deep. If the culvert was opened with 1:3 side batters this would require a width of circa 20m which could not be accommodate given the location of the culvert on the eastern tip of the site.*
- Suitable flood routing needs to be picked up in the flood risk assessment showing current flows

and future flows and whether the design may open a route from Lindley Moor Road that has to be managed. The FRA is incomplete in this respect. [Flood routing is indicated on HJCE drainage drawing no. 7270-HJCE-XX-XX-DR-C-3000 in Appendix I.](#)

- An analysis of the depth of potential surface water flooding in the northeast corner is required. Layout could be affected. An assessment of surface water flooding from the proposed drainage system is included on [HJCE drainage drawing no. 7270-HJCE-XX-XX-DR-C-3000 in Appendix I](#), there is a flooded volume of circa 3m<sup>3</sup> which will be accommodated on the yard surface. The Environment Agency flood maps indicate a localised area of flooding in the northeast corner of the site, this is as a consequence of a local low area of ground topography as identified on the topographic survey in Appendix N. As the site is developed with a formal drainage system this will significantly reduce any surface water flooding in this area. The proposed building and yard levels are circa 1.5m above the area of potential surface water flooding, therefore any residual ponding in this area will not impact the development.
- The site will need to accommodate a treatment works with an appropriate standoff distance and access provision. This also needs to be shown in any layout indicative or otherwise. [The foul treatment plant is indicated on HJCE drainage drawing no. 7270-HJCE-XX-XX-DR-C-3000 in Appendix I.](#)
- A petrol interceptor or SUDS alternative is advised where 50+ parking spaces are made available or car parking provision amounts to 800 square metres or more. [The petrol interceptor is indicated on HJCE drainage drawing no. 7270-HJCE-XX-XX-DR-C-3000 in Appendix I.](#)

Appendix A

### Site Location Plan



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Job Ref – 7467

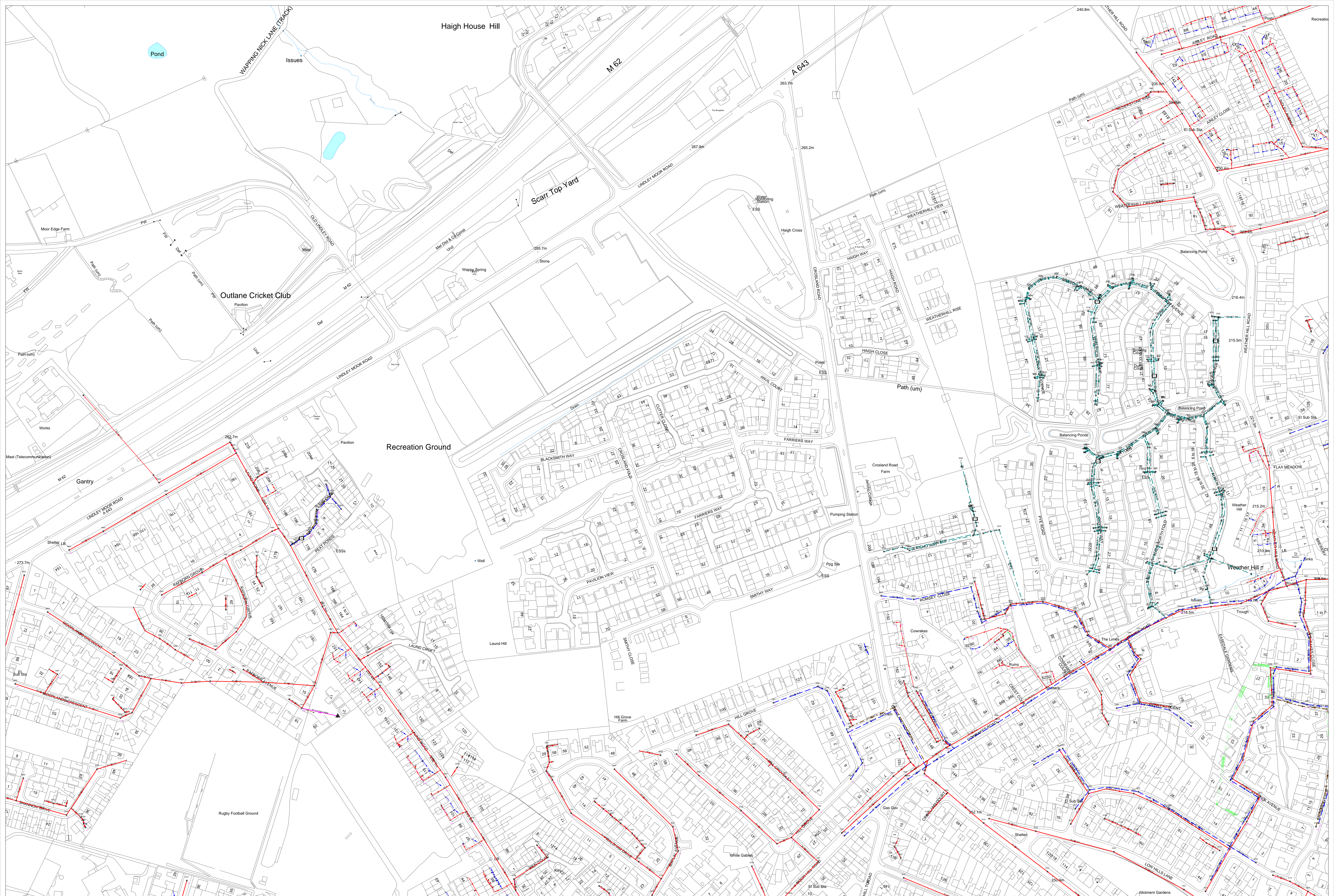
Job Name – Green Park Business Park - York

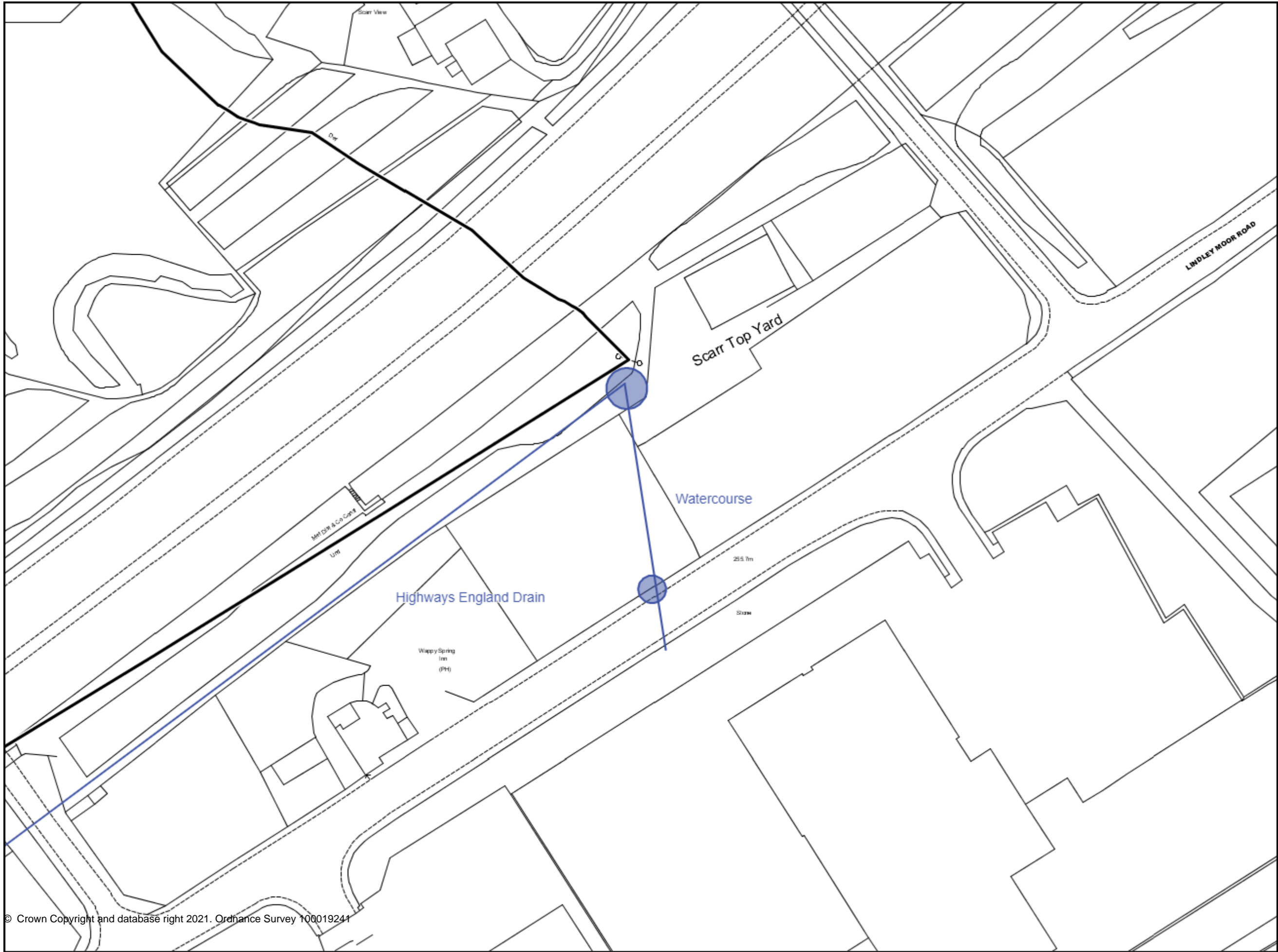
Site Address – Goose Lane – Sutton on the Forest

Post Code (Nearest) – YO61 1ET

NGR – SE 59457 62978

Appendix B





**Kompass**  
Kirklees Mapping Service

© Crown Copyright and  
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Ordnance Survey  
100019241

maps@kirklees.gov.uk



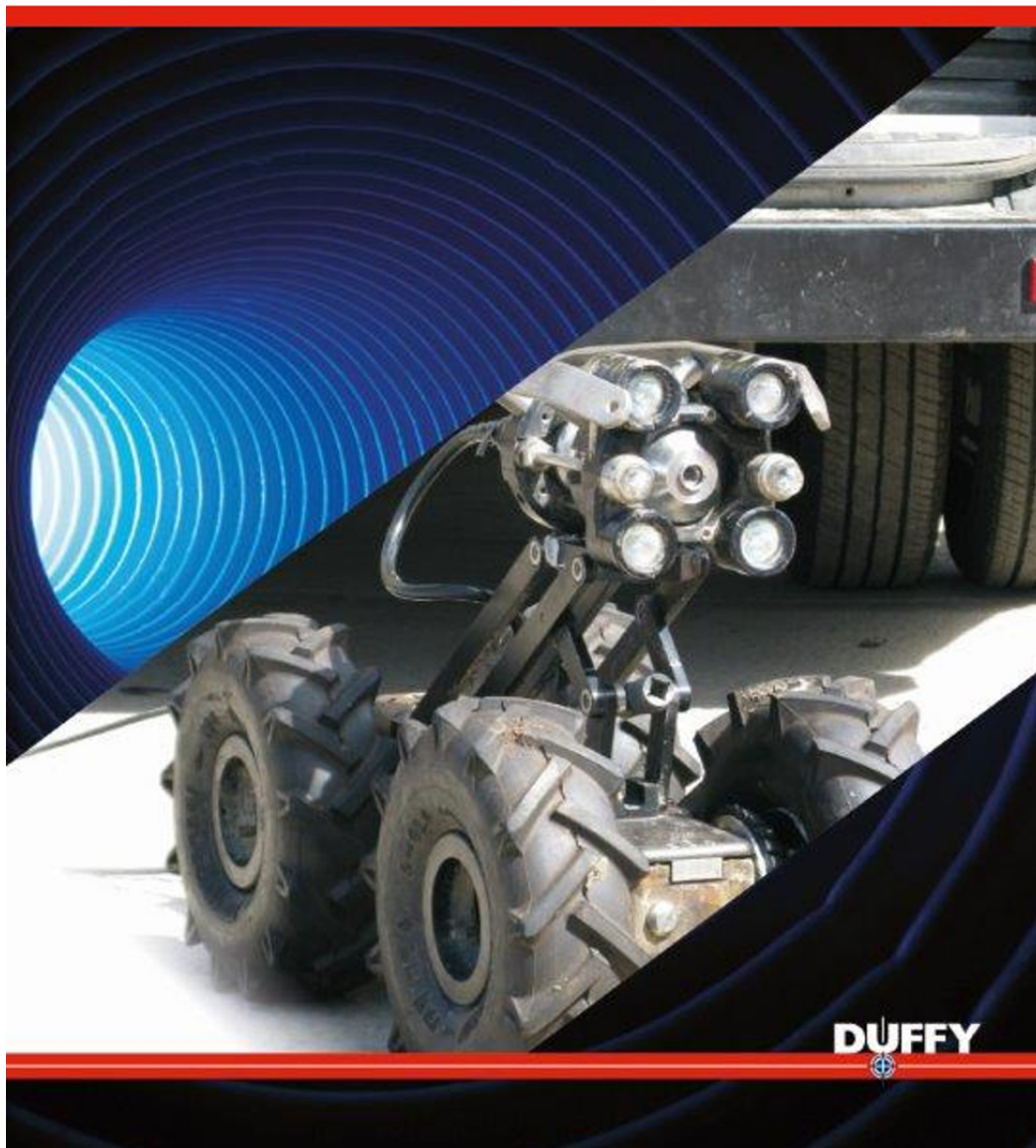
Appendix C



**Project**

**Project Name:** 10008506 - Whappy Springs Public House HD3 3TD  
**Project Date:** 06/04/2021  
**Inspection Standard:** MSCC5 Sewers & Drainage GB (SRM5 Scoring)

**CCTV Survey Report**





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10008506 - Whappy Springs Public House HD3 3TD		06/04/2021

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## Project Information

Project Name	Project Number	Project Date
10008506 - Whappy Springs Public House HD3 3TD		06/04/2021

### Client

**Company:**  
**Contact:**  
**Mobile:**

### Site

**Company:**  
**Contact:**  
**Department:** Whappy Springs Public House  
**Street:** Lindley Moor Road  
**Town or City:** Huddersfield  
**Post Code:** HD3 3TD  
**Mobile:** 07496 111048

### Contractor

**Company:** Drainsaid  
**Contact:** Matthew Marsden  
**Department:** CCTV and DESILT Supervisor  
**Street:** Connaught House, Park View  
**Town or City:** Wakefield  
**County:** West Yorkshire  
**Post Code:** WF3 3HA  
**Mobile:** 07852 915244  
**Email:** m.marsden@peterduffyLtd.com



## Scoring Summary

<b>Project Name</b>	<b>Project Number</b>	<b>Project Date</b>
10008506 - Whappy Springs Public House HD3 3TD		06/04/2021

### Structural Defects

Section	PLR	Grade	Description
All inspected pipes are in an acceptable structural condition (< grade 3).			

### Service / Operational Condition

- Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.
- Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.
- Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

Section	PLR	Grade	Description
1	CW1X	4	Settled deposits, fine, 30% cross-sectional area loss

### Abandoned Surveys

Section	PLR	Description
1	CW1X	Survey abandoned

### Information

These scoring summaries are based on the SRM grading from the WRc.

## Project Summary

<b>Project Name</b> 10008506 - Whappy Springs Public House HD3 3TD	<b>Project Number</b>	<b>Project Date</b> 06/04/2021
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### Pipe Summary

No.	Type	PLR	Upstream Node	Downstream Node	Road	Town	Use	Mat.	Profile	Length
1	SEC	CW1X	CW1	SEPTIC	Whappy Springs Public House	Huddersfield	C	VC	Circular 150mm	12.00 m
<b>Total:</b>										<b>12.00 m</b>

### Pipe Levels

No.	PLR	Upstream Node	Upstream C.L.	Upstream I.L.	Upstream I.D.	Downstream Node	Downstream C.L.	Downstream I.L.	Downstream I.D.
1	CW1X	CW1			0.470 m	SEPTIC			0.000 m

### Pipe Summary by Profile

Profile	Total Length	No. Pipes
Circular 150mm	12.00 m	
Circular 150mm =	12.00 m	1
<b>Total =</b>	<b>12.00 m</b>	<b>1</b>

### Inspection Summary

Pipe No.	Insp. No.	Upstream Node	Downstream Node	Dir.	Operator	Insp. Date	Insp. Time	Str	Ser	Final Observation	Length
1	1	CW1	SEPTIC	DS	C.Chilton	06/04/2021	10:09	1	5	SA, DES 30%	9.07 m
<b>Total:</b>											<b>9.07 m</b>

## Project Summary

<b>Project Name</b> 10008506 - Whappy Springs Public House HD3 3TD	<b>Project Number</b>	<b>Project Date</b> 06/04/2021
---	-----------------------	-----------------------------------


Inspection Summary by Profile		
Profile	Total Length	No. Inspections
Circular 150mm	9.07 m	
Circular 150mm =	9.07 m	1
<b>Total =</b>	<b>9.07 m</b>	<b>1</b>

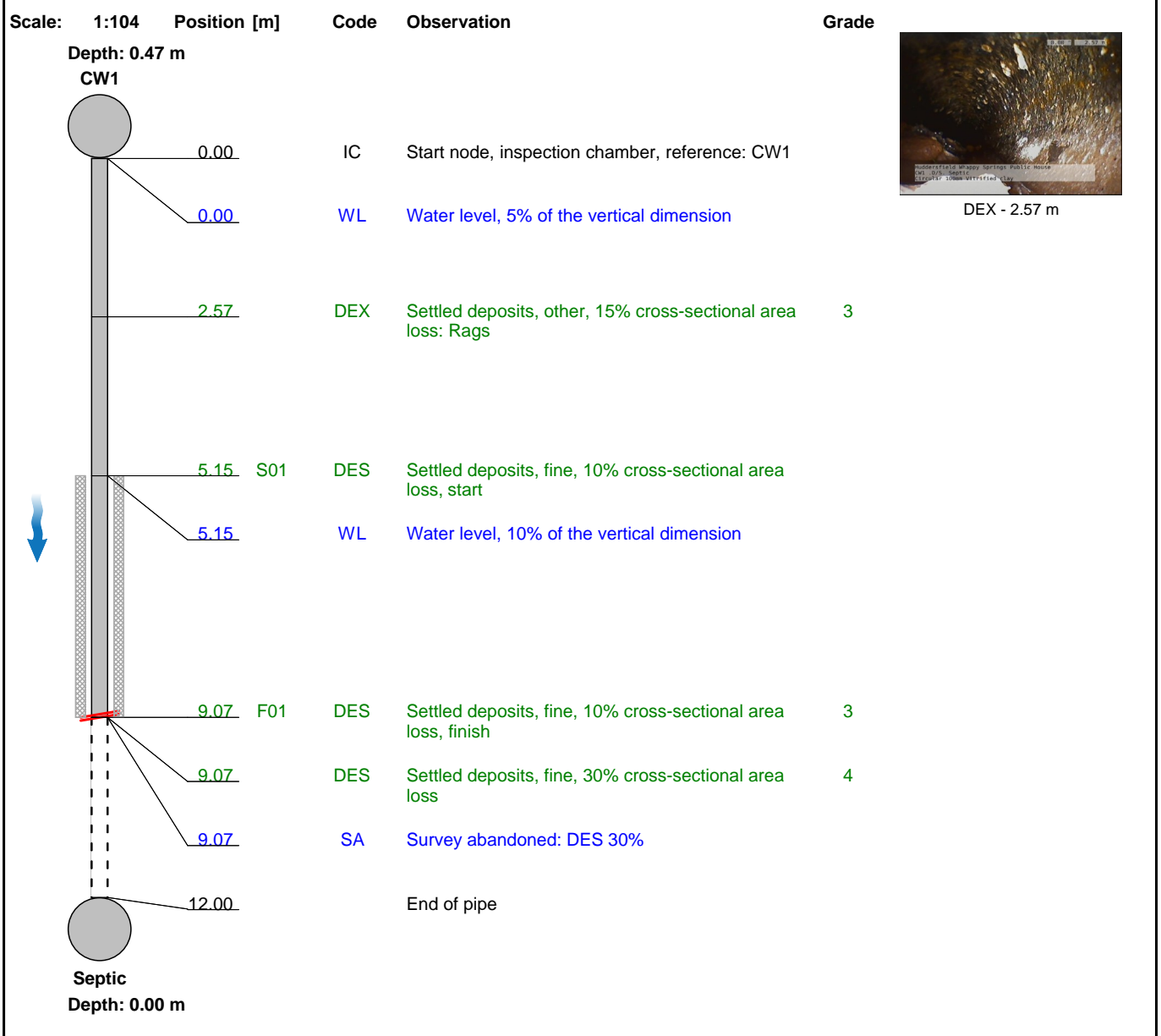
Defect Summary				CCTV Drainage Survey Observation Count																						
Sect. No.	Insp. No.	Upstream Node	Downstream Node	General				Structural Condition								Service Condition										
				Insp. Length (m)	No. Grade 4/5 Obs.	Survey Abandoned	Camera Under Water	Cracks	Fractures	Broken	Deformed	Collapsed	Holes	Surface Damage	Displaced Joints	Open Joints	Roots	Infiltration	Encrustation	Silt	Grease	Obstruction	Water Level	Line Deviates		
1	1	CW1	SEPTIC	9.1	1	1																3			2	
<b>Total:</b>				9.1	1	1																3			2	

## Section Inspection - 06/04/2021 - CW1X

Item No. 1	Insp. No. 1	Date 06/04/21	Time 10:09	Client's Job Ref Not Specified	Weather No Rain Or Snow	Pre Cleaned No	PLR CW1X
Operator C.Chilton		Vehicle YH70 WXD		Camera Pushrod	Preset Length 0.40 m	Legal Status Not Specified	Alternative ID Not Specified

Town or Village:	Huddersfield	Inspection Direction:	Downstream	Upstream Node:	CW1
Road:	Whappy Springs Public Hou	Inspected Length:	9.07 m	Upstream Pipe Depth:	0.470 m
Location:	Gardens (private)	Total Length:	12.00 m	Downstream Node:	SEPTIC
Surface Type:	Grass	Joint Length:	1.00 m	Downstream Pipe Depth:	0.000 m
Use:	Combined	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	150 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Sample condition survey	Lining Material:	No Lining		

Comments:   
Recommendations:



Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	3	5.0	5.8	15.0	5.0

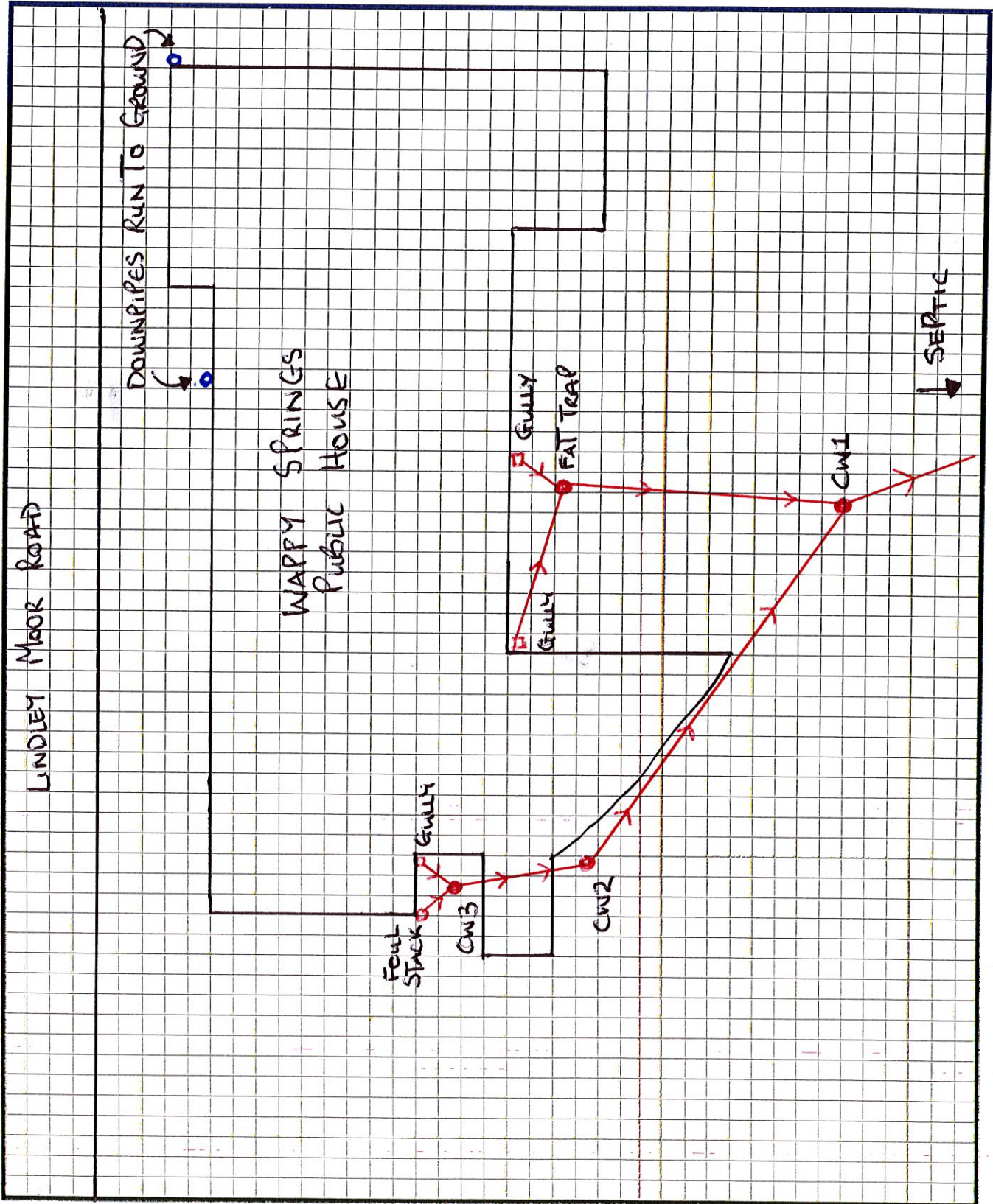
**Section Pictures - 06/04/2021 - CW1X**

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Downstream	CW1X		10008506



CW1-DSeptic-1-27853.jpg, 00:00:39, 2.57 m  
Settled deposits, other, 15% cross-sectional area loss, Rags

Date:	06/04/2021	Job No:	10008506
Address	WAPPY SPRINGS PH, HUDDERSFIELD HD3 3TD		
Engineer:	C. CHILTON		

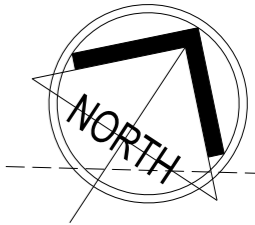




Appendix D

M62

Notes:  
 This drawing is the sole copyright of KPP Architects Ltd and reproduction in any form is forbidden unless permission is obtained in writing.  
 Do not scale from this drawing. Any discrepancies on site should be brought to the attention of KPP Architects Ltd.  
 Work and materials must comply with the current building regulations and codes of practice and be read in conjunction with building specifications and other sub-contractors information. All materials are to be installed in strict accordance with the recommendations of the manufacturers.



B	LAYOUT REVISED FOLLOWING PLANNING REVIEW	MH	11.07.24	
A	SITE UPDATED FOLLOWING PLANNING SUBMISSION	GK	08.12.22	
Rev	Description	By	Child	Date

Client  
**FRANK MARSHALL ESTATES**

Project Title  
**WAPPY SPRINGS  
 HUDDERSFIELD**

Drawing Title  
**PROPOSED SITE PLAN**

UNIT NUMBER	GROSS INTERNAL AREA	UNIT NUMBER	GROSS INTERNAL AREA
UNIT 1	915 SQ.FT PER FLOOR	UNIT 9	915 SQ.FT PER FLOOR
UNIT 2	915 SQ.FT PER FLOOR	UNIT 10	915 SQ.FT PER FLOOR
UNIT 3	915 SQ.FT PER FLOOR	UNIT 11	915 SQ.FT PER FLOOR
UNIT 4	915 SQ.FT PER FLOOR	UNIT 12	915 SQ.FT PER FLOOR
UNIT 5	915 SQ.FT PER FLOOR	UNIT 13	915 SQ.FT PER FLOOR
UNIT 6	915 SQ.FT PER FLOOR	UNIT 14	915 SQ.FT PER FLOOR
UNIT 7	915 SQ.FT PER FLOOR	UNIT 15	1830 SQ.FT
UNIT 8	915 SQ.FT PER FLOOR		

**KPP ARCHITECTS**  
 Lodge House  
 12 Town Street  
 Horsforth, Leeds LS184RJ  
 T : +44 (0) 113 2390460  
 E : architects@kpp-leeds.co.uk  
 W : www.kpp-leeds.co.uk

Scale	Site	Date	Drawn	Checked
1:500	A3	DEC'22	MH	.
Status				
<b>PLANNING</b>				
KPP Job No	Rev			
<b>2278</b>	<b>B</b>			
Number				
<b>2002</b>				

Appendix E

# Flood map for planning

Your reference  
I

Location (easting/northing)  
410370/418780

Created  
25 Feb 2023 10:43

**Your selected location is in flood zone 1, an area with a low probability of flooding.**

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

## Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>

## Flood map for planning

Your reference

I

Location (easting/northing)



**410370/418780**

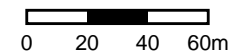
Scale

**1:2500**

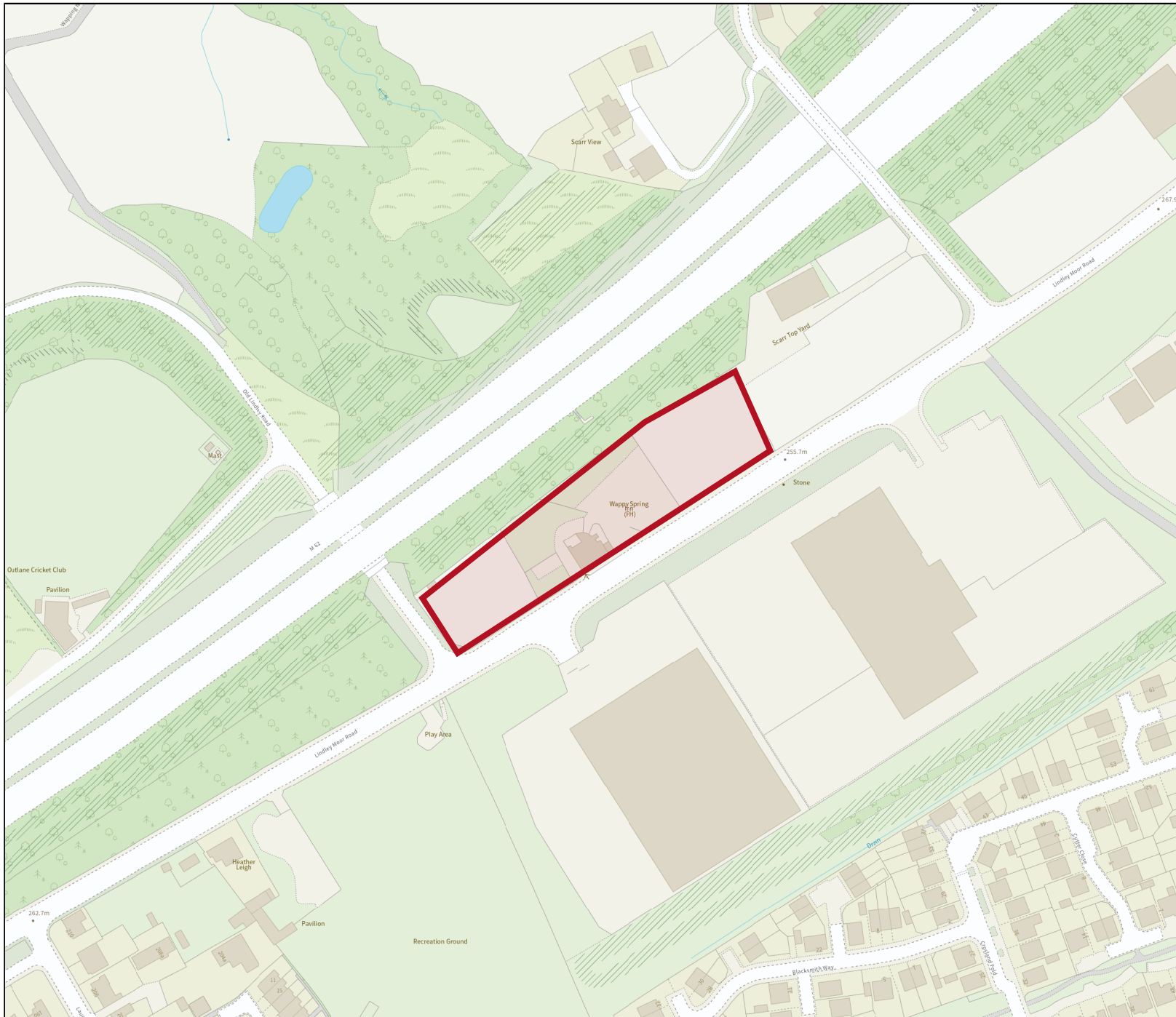
Created

**25 Feb 2023 10:43**

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

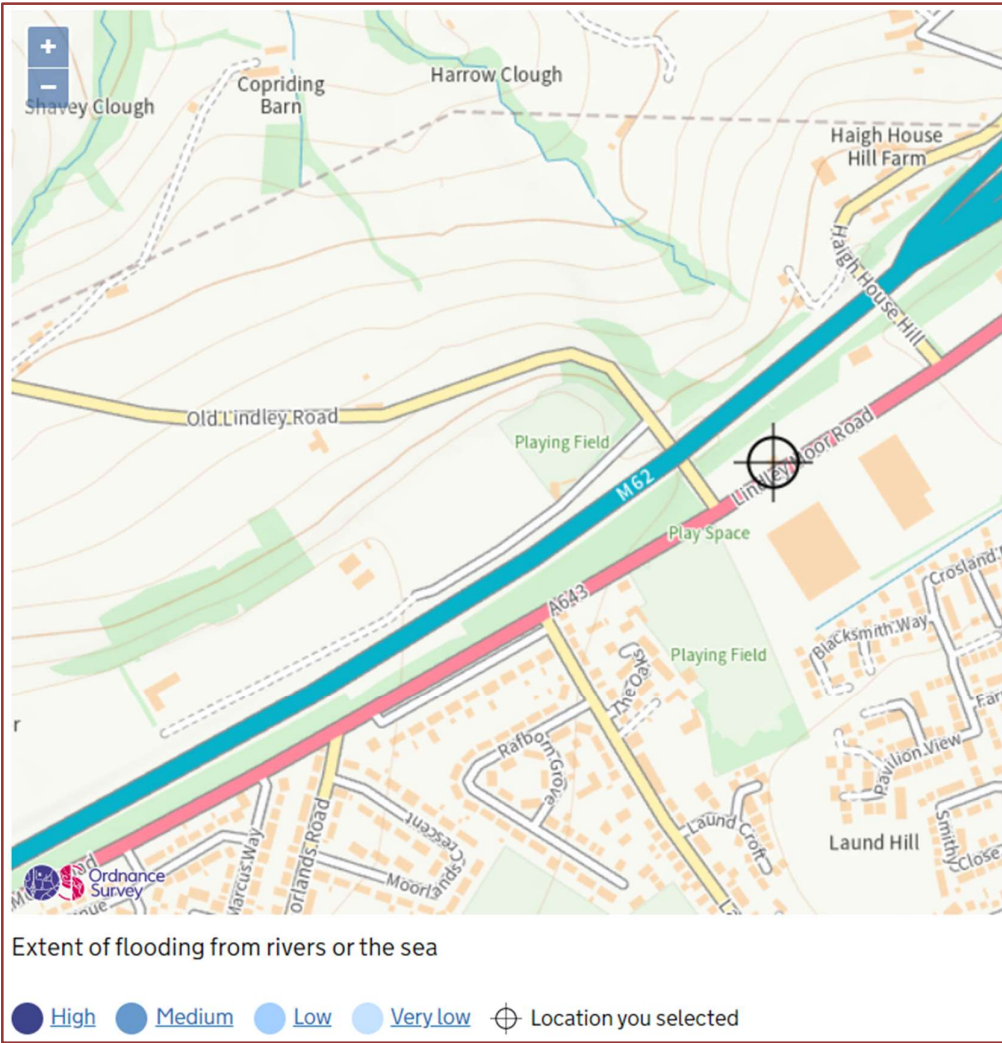


Page 2 of 2



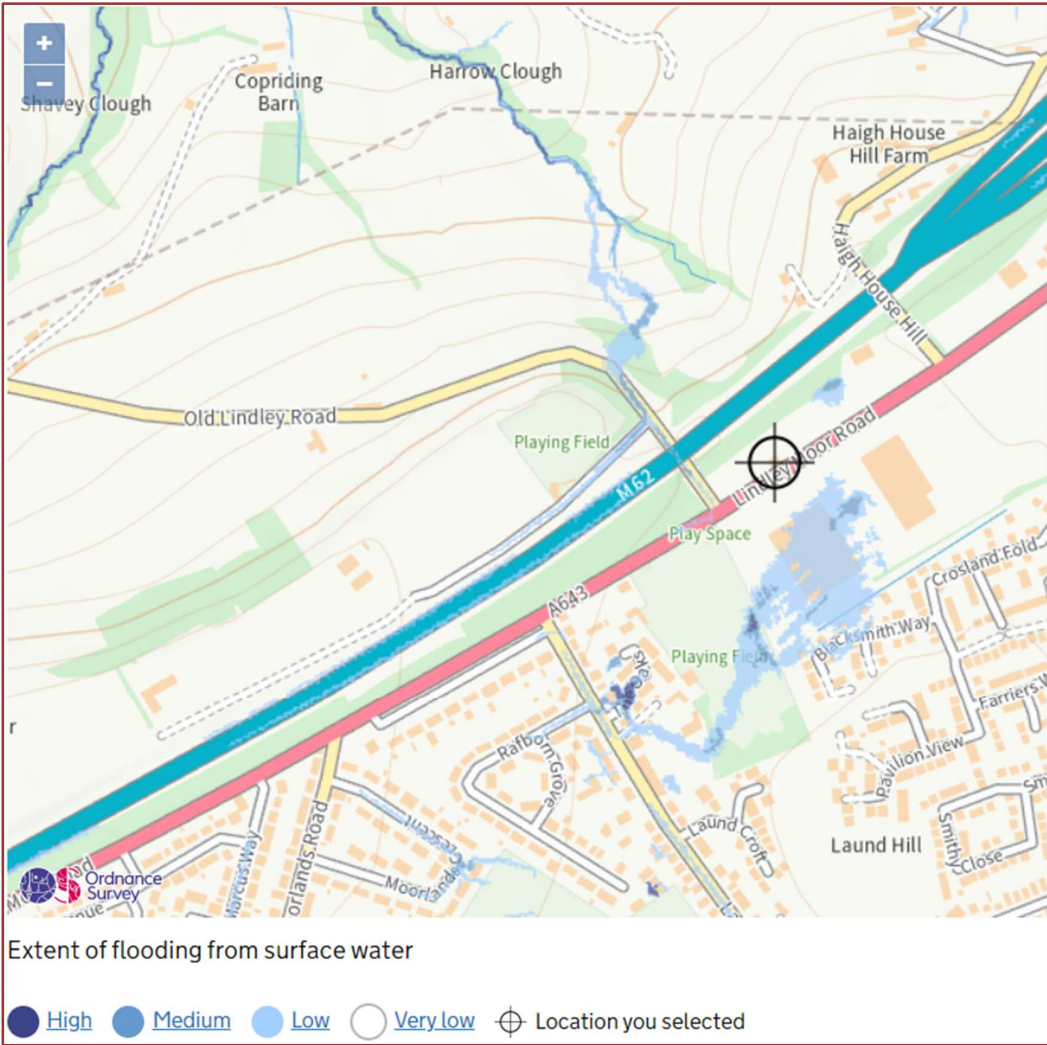
Appendix F

Environment Agency Fluvial Flood Map



**Appendix G**

Environment Agency Pluvial Flood Map



Appendix H

Print

Close Report



# Greenfield runoff rate estimation for sites

www.ukstds.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

### Site Details

Latitude:

Longitude:

Reference:

mayDate:

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.

Runoff estimation approach

### Site characteristics

Total site area (ha):

### Methodology

OBAR estimation method:

SPR estimation method:

### Soil characteristics

	Default	Edited
SOIL type:	<input type="text" value="4"/>	<input type="text" value="4"/>
HOST class:	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
SPR/SPRHOST:	<input type="text" value="0.47"/>	<input type="text" value="0.47"/>

### Hydrological characteristics

	Default	Edited
SAAR (mm):	<input type="text" value="1027"/>	<input type="text" value="1027"/>
Hydrological region:	<input type="text" value="3"/>	<input type="text" value="3"/>
Growth curve factor 1 year	<input type="text" value="0.86"/>	<input type="text" value="0.86"/>
Growth curve factor 30 years:	<input type="text" value="1.75"/>	<input type="text" value="1.75"/>
Growth curve factor 100 years:	<input type="text" value="2.08"/>	<input type="text" value="2.08"/>
Growth curve factor 200 years:	<input type="text" value="2.37"/>	<input type="text" value="2.37"/>

### Notes

#### (1) Is QBAR < 2.0 l/s/ha?

When QBAR is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

#### (2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

#### (3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

### Greenfield runoff rates

	Default	Edited
OBAR (l/s):	<input type="text" value="5.29"/>	<input type="text" value="5.29"/>
1 in 1 year (l/s):	<input type="text" value="4.55"/>	<input type="text" value="4.55"/>
1 in 30 years (l/s):	<input type="text" value="9.26"/>	<input type="text" value="9.26"/>
1 in 100 year (l/s):	<input type="text" value="11.01"/>	<input type="text" value="11.01"/>
1 in 200 years (l/s):	<input type="text" value="12.54"/>	<input type="text" value="12.54"/>

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at [www.uksuds.com](http://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 [www.uksuds.com/terms-and-conditions.htm](http://www.uksuds.com/terms-and-conditions.htm). The outputs from this tool are estimates of 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, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix I

This drawing should not be scaled. Dimensions to be verified on site. Any discrepancies should be referred to the Engineer prior to work commencing.

### NOTES

#### GENERAL NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT HJCE, ARCHITECTS AND M&E ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DRAWING NOT TO BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER AND FURTHER INSTRUCTIONS OBTAINED BEFORE WORK IS COMMENCED.
- EXISTING GROUND LEVELS BASED ON A TOPOGRAPHICAL SURVEY BY MET SURVEYS LTD DATED OCTOBER 2020.
- PLOT BOUNDARIES, BUILDING AND EXTERNAL WORKS FOOTPRINTS SHOWN ON THIS DRAWING ARE INDICATIVE ONLY, BASED ON THE LATEST MASTERPLAN DRAWING.
- ALL DRAINAGE CHANNELS SHALL BE PROVIDED WITH A RODDABLE ACCESS COVER AT THE UPSTREAM END AND A OUTFALL UNIT WITH SILT COLLECTION. LOAD CLASS AS INDICATED ON PLAN. CHANNELS INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
- FULL RETENTION/BYPASS SEPARATORS TO BE PROVIDED WITH OIL LEVELS MONITORS AND VISUAL ALARMS.
- CELLULAR ATTENUATION STRUCTURAL DESIGN
  - THE MANUFACTURER SHALL PROVIDE STRUCTURAL CALCULATIONS IN ACCORDANCE WITH CIRIA DOCUMENT C680 (SITE USE = LOW SPEED ROADS <15mph), INCLUDING LATERAL LOADS. DESIGNED FOR THE MAXIMUM AND MINIMUM DEPTHS OF COVER. DESIGNER TO NOTE RACKING IN GARDEN CENTRE OVER TANK.
  - MAXIMUM DEPTH OF COVER = 1200mm  
MINIMUM DEPTH OF COVER = 1000mm
  - FACTOR OF SAFETY (F.O.S.) FOR MATERIALS = 2.75, UNLESS SUBSTANTIATED BY THE SUPPLIER IN WHICH A F.O.S OF 1.5 MAY BE APPROPRIATE.
  - THE DESIGN LIFE OF THE ATTENUATION SYSTEM SHALL BE 50 YEARS. THE MANUFACTURER SHALL ADVISE OF ANY ONGOING MAINTENANCE
- THE CONTRACTOR SHALL PROVIDE SITE SPECIFIC DRAWINGS FOR THE CELLULAR TANK FOR HJCE APPROVAL PRIOR TO MANUFACTURE.
- THE ATTENUATION TANKS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
- CONSIDERATION SHALL BE GIVEN TO THE INSTALLATION PROGRAMME FOR THE ATTENUATION TANK AS CONSTRUCTION PLANT TRAFFICKING OVER THE TANKS MAY BE LIMITED. TANK MANUFACTURER TO ADVISE OF CONSTRUCTION TRAFFIC LIMITS OVER ATTENUATION TANK FOLLOWING INSTALLATION.
- NO SITE RUN-OFF SHOULD BE PASSED THROUGH THE CELLULAR ATTENUATION TANK FOLLOWING INSTALLATION.
- FULL RETENTION SEPARATORS TO BE PROVIDED WITH OIL LEVEL MONITOR & ALARMS.

PO2	28.08.24	UPDATED TO SUIT LATEST SITE PLAN	AF
P01	08.06.24	FIRST ISSUE	AF
REV	DATE	DESCRIPTION	BY

#### REVISIONS

PROJECT

## WAPPY SPRINGS HUDDERSFIELD

TITLE

## DRAINAGE LAYOUT

CLIENT

FRANK MARSHALL ESTATES

**HOLLOWAY JENNINGS**  
Consulting Civil & Structural Engineers

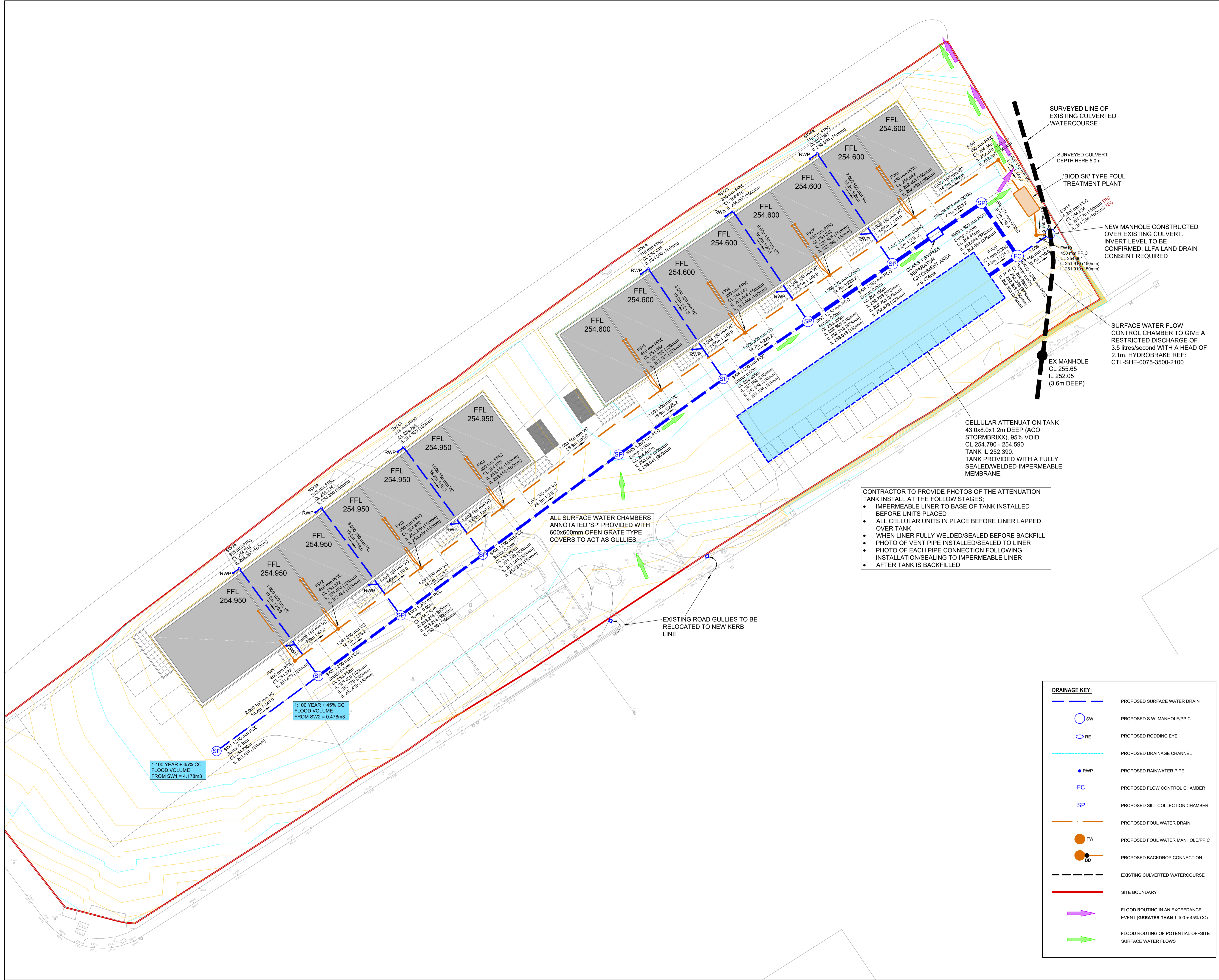
CONNAUGHT HOUSE, PARK VIEW, LOFTHOUSE  
WAKEFIELD, WF3 3HA  
T 01924 824 433  
admin@hjc.co.uk www.hjce.co.uk

STATUS

### PRELIMINARY

DESIGNED BY	AMF	CHECKED BY	MH	HJCE REF.	7270
DRAWN BY	AMF	DATE	08.08.24	SCALES @ A1	1:250

PROJECT - ORIGINATOR - VOLUME - LEVEL - TYPE - ROLE - NUMBER	REVISION
7270-HJCE-XX-XX-DR-C-3000	P02



**DRAINAGE KEY:**

- PROPOSED SURFACE WATER DRAIN
- SW PROPOSED S.W. MANHOLE/PPIC
- RE PROPOSED RODDING EYE
- PROPOSED DRAINAGE CHANNEL
- RWP PROPOSED RAINWATER PIPE
- FC PROPOSED FLOW CONTROL CHAMBER
- SP PROPOSED SILT COLLECTION CHAMBER
- PROPOSED FOUL WATER DRAIN
- FW PROPOSED FOUL WATER MANHOLE/PPIC
- BD PROPOSED BACKDROP CONNECTION
- EXISTING CULVERTED WATERCOURSE
- SITE BOUNDARY
- FLOOD ROUTING IN AN EXCEEDANCE EVENT (GREATER THAN 1:100 + 45% CC)
- FLOOD ROUTING OF POTENTIAL OFFSITE SURFACE WATER FLOWS

Appendix J

**Design Settings**

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

**Nodes**

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.059	5.00	254.750	1200	-59.188	24.709	1.200
2	0.027	5.00	254.752	1200	-12.984	34.808	1.398
3	0.033	5.00	255.039	1200	27.688	43.816	1.750
4	0.039	5.00	254.754	1200	65.085	53.097	1.605
5	0.043	5.00	254.467	1200	104.392	62.924	1.426
6	0.038	5.00	254.741	1200	145.883	74.116	1.783
7	0.033	5.00	254.741	1350	197.971	88.283	1.923
8	0.059	5.00	254.455	1350	239.918	99.843	1.702
9			254.706	1350	279.553	112.064	2.062
10			255.018	1500	290.998	74.411	2.650
11			254.483	1200	324.803	85.310	2.685
12	0.028	5.00	254.800	450	-21.005	72.647	0.450
13	0.018	5.00	254.800	450	19.113	80.928	0.450
14	0.028	5.00	254.794	315	55.823	88.008	0.444
15	0.028	5.00	254.446	315	134.748	109.771	0.446
16	0.018	5.00	254.415	315	187.043	123.256	0.415
17	0.028	5.00	254.261	315	228.620	134.831	0.361
18		5.00	255.018	1350	268.345	65.245	2.628

**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)
2.000	1	2	18.200	0.600	253.550	253.429	0.121	150.4	150	5.37	50.0
1.001	2	3	14.700	0.600	253.354	253.289	0.065	226.2	300	5.61	49.1
1.002	3	4	14.700	0.600	253.289	253.224	0.065	226.2	300	5.84	48.1
1.003	4	5	24.300	0.600	253.149	253.041	0.108	225.0	300	6.23	46.9
1.004	5	6	18.600	0.600	253.041	252.958	0.083	224.1	300	6.53	46.0
1.005	6	7	14.700	0.600	252.958	252.893	0.065	226.2	300	6.76	45.3
1.006	7	8	14.700	0.600	252.818	252.753	0.065	226.2	375	6.97	44.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
2.000	0.817	14.4	10.6	1.050	1.173	0.059	0.0	96	0.892
1.001	1.041	73.6	20.2	1.098	1.450	0.114	0.0	107	0.891
1.002	1.041	73.6	28.7	1.450	1.230	0.165	0.0	130	0.978
1.003	1.044	73.8	39.3	1.305	1.126	0.232	0.0	156	1.061
1.004	1.046	73.9	45.7	1.126	1.483	0.275	0.0	171	1.099
1.005	1.041	73.6	55.8	1.483	1.548	0.341	0.0	196	1.142
1.006	1.200	132.6	63.3	1.548	1.327	0.392	0.0	183	1.188

**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)
1.007	8	9	13.400	0.600	252.753	252.644	0.109	122.9	375	7.10	44.3
1.008	9	10	9.200	0.600	252.644	252.368	0.276	33.3	375	7.15	44.2
1.009	10	11	5.700	0.600	252.368	251.798	0.570	10.0	150	7.18	44.1
1.000	12	2	18.700	0.600	254.350	253.429	0.921	20.3	150	5.14	50.0
3.000	13	3	18.700	0.600	254.350	253.364	0.986	19.0	150	5.13	50.0
4.000	14	4	18.700	0.600	254.350	253.299	1.051	17.8	150	5.13	50.0
5.000	15	6	18.700	0.600	254.000	253.108	0.892	21.0	150	5.14	50.0
6.000	16	7	18.700	0.600	254.000	253.043	0.957	19.5	150	5.14	50.0
7.000	17	8	18.700	0.600	253.900	252.978	0.922	20.3	150	5.14	50.0
8.000	18	10	5.000	0.600	252.390	252.368	0.022	227.3	375	5.07	50.0

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)
1.007	1.633	180.3	76.7	1.327	1.687	0.479	0.0	170	1.568
1.008	3.147	347.6	76.5	1.687	2.275	0.479	0.0	119	2.546
1.009	3.204	56.6	76.3	2.500	2.535	0.479	0.0	150	3.264
1.000	2.245	39.7	5.0	0.300	1.173	0.028	0.0	36	1.545
3.000	2.323	41.1	3.3	0.300	1.525	0.018	0.0	29	1.408
4.000	2.399	42.4	5.1	0.294	1.305	0.028	0.0	35	1.621
5.000	2.209	39.0	5.1	0.296	1.483	0.028	0.0	37	1.535
6.000	2.289	40.4	3.3	0.265	1.548	0.018	0.0	28	1.370
7.000	2.246	39.7	5.1	0.211	1.327	0.028	0.0	36	1.546
8.000	1.197	132.3	0.0	2.253	2.275	0.000	0.0	0	0.000

**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)
2.000	18.200	150.4	150	Circular_Default Sewer Type	254.750	253.550	1.050	254.752	253.429	1.173
1.001	14.700	226.2	300	Circular_Default Sewer Type	254.752	253.354	1.098	255.039	253.289	1.450
1.002	14.700	226.2	300	Circular_Default Sewer Type	255.039	253.289	1.450	254.754	253.224	1.230
1.003	24.300	225.0	300	Circular_Default Sewer Type	254.754	253.149	1.305	254.467	253.041	1.126
1.004	18.600	224.1	300	Circular_Default Sewer Type	254.467	253.041	1.126	254.741	252.958	1.483
1.005	14.700	226.2	300	Circular_Default Sewer Type	254.741	252.958	1.483	254.741	252.893	1.548
1.006	14.700	226.2	375	Circular_Default Sewer Type	254.741	252.818	1.548	254.455	252.753	1.327
1.007	13.400	122.9	375	Circular_Default Sewer Type	254.455	252.753	1.327	254.706	252.644	1.687
1.008	9.200	33.3	375	Circular_Default Sewer Type	254.706	252.644	1.687	255.018	252.368	2.275
1.009	5.700	10.0	150	Circular_Default Sewer Type	255.018	252.368	2.500	254.483	251.798	2.535

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	1	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable
1.001	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.002	3	1200	Manhole	Adoptable	4	1200	Manhole	Adoptable
1.003	4	1200	Manhole	Adoptable	5	1200	Manhole	Adoptable
1.004	5	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
1.005	6	1200	Manhole	Adoptable	7	1350	Manhole	Adoptable
1.006	7	1350	Manhole	Adoptable	8	1350	Manhole	Adoptable
1.007	8	1350	Manhole	Adoptable	9	1350	Manhole	Adoptable
1.008	9	1350	Manhole	Adoptable	10	1500	Manhole	Adoptable
1.009	10	1500	Manhole	Adoptable	11	1200	Manhole	Adoptable

**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	18.700	20.3	150	Circular_Default Sewer Type	254.800	254.350	0.300	254.752	253.429	1.173
3.000	18.700	19.0	150	Circular_Default Sewer Type	254.800	254.350	0.300	255.039	253.364	1.525
4.000	18.700	17.8	150	Circular_Default Sewer Type	254.794	254.350	0.294	254.754	253.299	1.305
5.000	18.700	21.0	150	Circular_Default Sewer Type	254.446	254.000	0.296	254.741	253.108	1.483
6.000	18.700	19.5	150	Circular_Default Sewer Type	254.415	254.000	0.265	254.741	253.043	1.548
7.000	18.700	20.3	150	Circular_Default Sewer Type	254.261	253.900	0.211	254.455	252.978	1.327
8.000	5.000	227.3	375	Circular_Default Sewer Type	255.018	252.390	2.253	255.018	252.368	2.275

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	12	450	Manhole	Adoptable	2	1200	Manhole	Adoptable
3.000	13	450	Manhole	Adoptable	3	1200	Manhole	Adoptable
4.000	14	315	Manhole	Adoptable	4	1200	Manhole	Adoptable
5.000	15	315	Manhole	Adoptable	6	1200	Manhole	Adoptable
6.000	16	315	Manhole	Adoptable	7	1350	Manhole	Adoptable
7.000	17	315	Manhole	Adoptable	8	1350	Manhole	Adoptable
8.000	18	1350	Manhole	Adoptable	10	1500	Manhole	Adoptable

**Node 10 Online Hydro-Brake® Control**

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	252.368	Product Number	CTL-SHE-0076-3500-2000-3500
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.5	Min Node Diameter (mm)	1200

**Node 18 Depth/Area Storage Structure**

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	252.390
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf Area (m <sup>2</sup> )
0.000	344.0	0.0	1.200	344.0	0.0	1.201	0.0	0.0

**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.86%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	253.648	0.098	10.5	0.2066	0.0000	OK
15 minute summer	2	11	253.469	0.115	19.9	0.1743	0.0000	OK
15 minute summer	3	11	253.428	0.139	28.7	0.2093	0.0000	OK
15 minute summer	4	11	253.319	0.170	40.2	0.2755	0.0000	OK
15 minute summer	5	11	253.240	0.199	47.6	0.3445	0.0000	OK
15 minute summer	6	11	253.175	0.217	58.5	0.3361	0.0000	OK
15 minute summer	7	11	253.066	0.248	66.6	0.4412	0.0000	OK
15 minute summer	8	10	253.026	0.273	83.9	0.5790	0.0000	OK
15 minute summer	9	10	253.008	0.364	93.6	0.5207	0.0000	OK
15 minute summer	10	10	252.995	0.627	102.8	1.1077	0.0000	SURCHARGED
15 minute summer	11	1	251.798	0.000	2.7	0.0000	0.0000	OK
15 minute summer	12	10	254.386	0.036	5.0	0.0503	0.0000	OK
15 minute summer	13	10	254.379	0.029	3.3	0.0279	0.0000	OK
15 minute summer	14	10	254.385	0.035	5.0	0.0474	0.0000	OK
15 minute summer	15	10	254.036	0.036	5.0	0.0483	0.0000	OK
15 minute summer	16	10	254.029	0.029	3.2	0.0273	0.0000	OK
15 minute summer	17	10	253.936	0.036	5.0	0.0592	0.0000	OK
960 minute summer	18	645	252.650	0.260	8.8	85.3312	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	2.000	2	10.2	0.869	0.708	0.2141	
15 minute summer	2	1.001	3	19.8	0.700	0.269	0.4166	
15 minute summer	3	1.002	4	28.8	0.949	0.391	0.4462	
15 minute summer	4	1.003	5	40.3	0.890	0.547	1.1033	
15 minute summer	5	1.004	6	47.3	0.909	0.640	0.9670	
15 minute summer	6	1.005	7	57.8	1.148	0.786	0.7399	
15 minute winter	7	1.006	8	64.3	1.125	0.485	1.1036	
15 minute winter	8	1.007	9	85.8	1.845	0.476	1.2790	
30 minute summer	9	1.008	10	75.7	1.285	0.218	0.5668	
15 minute summer	10	Hydro-Brake®	11	2.7				26.7
15 minute winter	12	1.000	2	4.6	1.478	0.117	0.0588	
15 minute summer	13	3.000	3	3.3	1.200	0.080	0.0880	
15 minute summer	14	4.000	4	5.0	1.588	0.117	0.0584	
15 minute summer	15	5.000	6	5.0	1.461	0.127	0.1005	
15 minute summer	16	6.000	7	3.2	1.352	0.079	0.0439	
30 minute summer	17	7.000	8	4.6	1.484	0.116	0.0580	
15 minute summer	18	8.000	10	-114.2	-1.670	-0.864	0.2978	

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.86%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	1	12	253.903	0.352	19.7	0.7447	0.0000	SURCHARGED
15 minute summer	2	11	253.716	0.362	36.3	0.5485	0.0000	SURCHARGED
15 minute summer	3	11	253.691	0.402	48.2	0.6059	0.0000	SURCHARGED
15 minute summer	4	11	253.655	0.506	68.7	0.8189	0.0000	SURCHARGED
15 minute summer	5	11	253.536	0.495	82.9	0.8583	0.0000	SURCHARGED
15 minute summer	6	10	253.420	0.462	102.5	0.7168	0.0000	SURCHARGED
15 minute summer	7	10	253.294	0.476	119.4	0.8469	0.0000	SURCHARGED
15 minute summer	8	10	253.224	0.471	150.3	0.9998	0.0000	SURCHARGED
15 minute winter	9	9	253.157	0.513	151.4	0.7347	0.0000	SURCHARGED
15 minute winter	10	9	253.110	0.742	161.8	1.3105	0.0000	SURCHARGED
15 minute summer	11	1	251.798	0.000	2.7	0.0000	0.0000	OK
15 minute summer	12	10	254.399	0.049	9.3	0.0690	0.0000	OK
15 minute summer	13	10	254.389	0.039	6.1	0.0379	0.0000	OK
15 minute summer	14	10	254.398	0.048	9.4	0.0642	0.0000	OK
15 minute summer	15	10	254.050	0.050	9.4	0.0667	0.0000	OK
15 minute summer	16	10	254.039	0.039	6.0	0.0369	0.0000	OK
15 minute summer	17	10	253.950	0.050	9.4	0.0807	0.0000	OK
960 minute summer	18	750	252.938	0.548	19.2	179.9594	0.0000	SURCHARGED

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
15 minute summer	1	2.000	2	18.1	1.034	1.253	0.3204	
15 minute summer	2	1.001	3	34.6	0.764	0.470	1.0352	
15 minute summer	3	1.002	4	52.0	1.038	0.707	1.0352	
15 minute summer	4	1.003	5	71.6	1.017	0.971	1.7112	
15 minute summer	5	1.004	6	85.2	1.209	1.152	1.3098	
15 minute summer	6	1.005	7	104.9	1.499	1.425	1.0352	
15 minute summer	7	1.006	8	124.0	1.270	0.936	1.6214	
15 minute winter	8	1.007	9	151.4	1.845	0.840	1.4780	
15 minute summer	9	1.008	10	161.5	1.607	0.465	1.0147	
15 minute winter	10	Hydro-Brake®	11	2.7				37.1
15 minute winter	12	1.000	2	8.7	1.480	0.220	0.2084	
15 minute winter	13	3.000	3	5.8	1.196	0.140	0.1973	
15 minute summer	14	4.000	4	9.3	1.721	0.220	0.2099	
15 minute winter	15	5.000	6	8.7	1.463	0.224	0.2104	
30 minute summer	16	6.000	7	5.7	1.526	0.141	0.1101	
30 minute summer	17	7.000	8	8.8	1.775	0.222	0.0927	
15 minute summer	18	8.000	10	-164.9	-2.173	-1.247	0.3345	

**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.86%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m <sup>3</sup> )	Flood (m <sup>3</sup> )	Status
15 minute summer	1	10	254.750	1.200	36.7	2.5356	4.1784	FLOOD
15 minute summer	2	11	254.715	1.361	46.2	2.0650	0.0000	FLOOD RISK
15 minute summer	3	11	254.698	1.409	64.7	2.1248	0.0000	SURCHARGED
15 minute summer	4	11	254.636	1.487	95.7	2.4043	0.0000	FLOOD RISK
15 minute summer	5	11	254.411	1.370	118.5	2.3747	0.0000	FLOOD RISK
15 minute summer	6	11	254.125	1.167	155.4	1.8111	0.0000	SURCHARGED
15 minute summer	7	10	253.716	0.898	183.7	1.5971	0.0000	SURCHARGED
960 minute winter	8	930	253.591	0.838	23.8	1.7792	0.0000	SURCHARGED
960 minute winter	9	930	253.591	0.947	23.3	1.3544	0.0000	SURCHARGED
960 minute winter	10	930	253.591	1.223	40.2	2.1606	0.0000	SURCHARGED
15 minute summer	11	1	251.798	0.000	2.7	0.0000	0.0000	OK
15 minute summer	12	11	254.800	0.450	17.4	0.6296	0.4778	FLOOD
15 minute summer	13	12	254.764	0.414	11.4	0.4024	0.0000	FLOOD RISK
15 minute summer	14	12	254.787	0.437	17.5	0.5854	0.0000	FLOOD RISK
15 minute summer	15	11	254.290	0.290	17.5	0.3870	0.0000	FLOOD RISK
15 minute summer	16	10	254.054	0.054	11.2	0.0509	0.0000	OK
15 minute summer	17	10	253.979	0.079	17.5	0.1281	0.0000	OK
960 minute winter	18	930	253.590	1.200	39.5	393.8462	0.0000	SURCHARGED

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m <sup>3</sup> )	Discharge Vol (m <sup>3</sup> )
30 minute winter	1	2.000	2	23.8	1.355	1.652	0.3204	
15 minute winter	2	1.001	3	48.0	0.770	0.652	1.0352	
15 minute summer	3	1.002	4	75.0	1.066	1.020	1.0352	
15 minute summer	4	1.003	5	103.6	1.471	1.404	1.7112	
15 minute winter	5	1.004	6	122.0	1.733	1.651	1.3098	
15 minute summer	6	1.005	7	158.5	2.250	2.153	1.0352	
15 minute summer	7	1.006	8	188.8	1.712	1.424	1.6214	
15 minute summer	8	1.007	9	238.0	2.158	1.320	1.4780	
15 minute summer	9	1.008	10	239.8	2.175	0.690	1.0147	
960 minute winter	10	Hydro-Brake®	11	2.8				173.3
15 minute summer	12	1.000	2	15.0	1.492	0.378	0.3292	
60 minute summer	13	3.000	3	8.6	1.144	0.209	0.2082	
30 minute summer	14	4.000	4	15.6	1.683	0.369	0.3292	
15 minute summer	15	5.000	6	16.3	1.487	0.417	0.3292	
30 minute summer	16	6.000	7	10.7	1.567	0.265	0.2162	
30 minute summer	17	7.000	8	16.6	1.837	0.418	0.2367	
15 minute summer	18	8.000	10	-240.8	-2.848	-1.821	0.5484	

Appendix K

Drainage Asset Maintenance Schedule

■ Surface ■ Foul

Maintenance Activity	Drainage Component	Required Action	Typical Frequency
Visual Inspection	Gully Sump unit Catch pit / silt trap Attenuation structures, Flow control chamber	Inspect for sediment and debris	Monthly for first year and twice yearly thereafter, after severe storm
	Pipework		Twice yearly
	Full retention interceptor Bypass interceptor Forecourt interceptor		Twice yearly or after severe storm as a minimum, refer to manufacturer guidance. Forecourt interceptor requires emptying after fuel spillage
Monitoring	Attenuation structures	Check attenuation inspection points to ensure emptying is occurring (little to no water should be present after consecutive days of dry weather)	Twice yearly, once after heavy rainfall and once after consecutive dry weather
Litter and Debris Removal	All sump units (gullies and catch pits)	Remove all litter and debris	Twice yearly or after severe storm
	Access chambers, Flow control chamber		Twice yearly (spring, start of winter), or as required
Jet Wash	Pipework	High pressure jet-wash any pipe work which has silt accumulation. Care must be taken that any silts within the pipework are not unnecessarily flushed into the attenuation structures (use of bungs and jet-vac of chamber prior to removal of bungs)	Twice yearly, or as required
	Attenuation structures	High pressure jet-wash all perforated pipework and or access points. All water to be jet vac to	Five yearly, or as required

		remove any suspended silts within the water	
Sediment Management and Removal	ALL SUDS	Sediment accumulation should be monitored as part of the inspection regime, rate of sediment accumulation noted	Appropriate frequencies determined upon inspection
Inspection	Pipework Manhole	Check if functioning correctly	Once site is fully operational: twice yearly for 1 <sup>st</sup> year, annually after

Additional notes:

- Any defects (broken/misaligned pipes, root infestation, damage to soakaways, missing parts, etc.) that are identified during inspections/maintenance should be reported back to the property/site owner so that remedial actions can be undertaken promptly to repair these defects.
- SuDS maintenance based on CIRIA 2015 chapter 32 where further information can also be found.
- Refer to manufacturer guidance for maintenance schedules of all proprietary treatment systems.

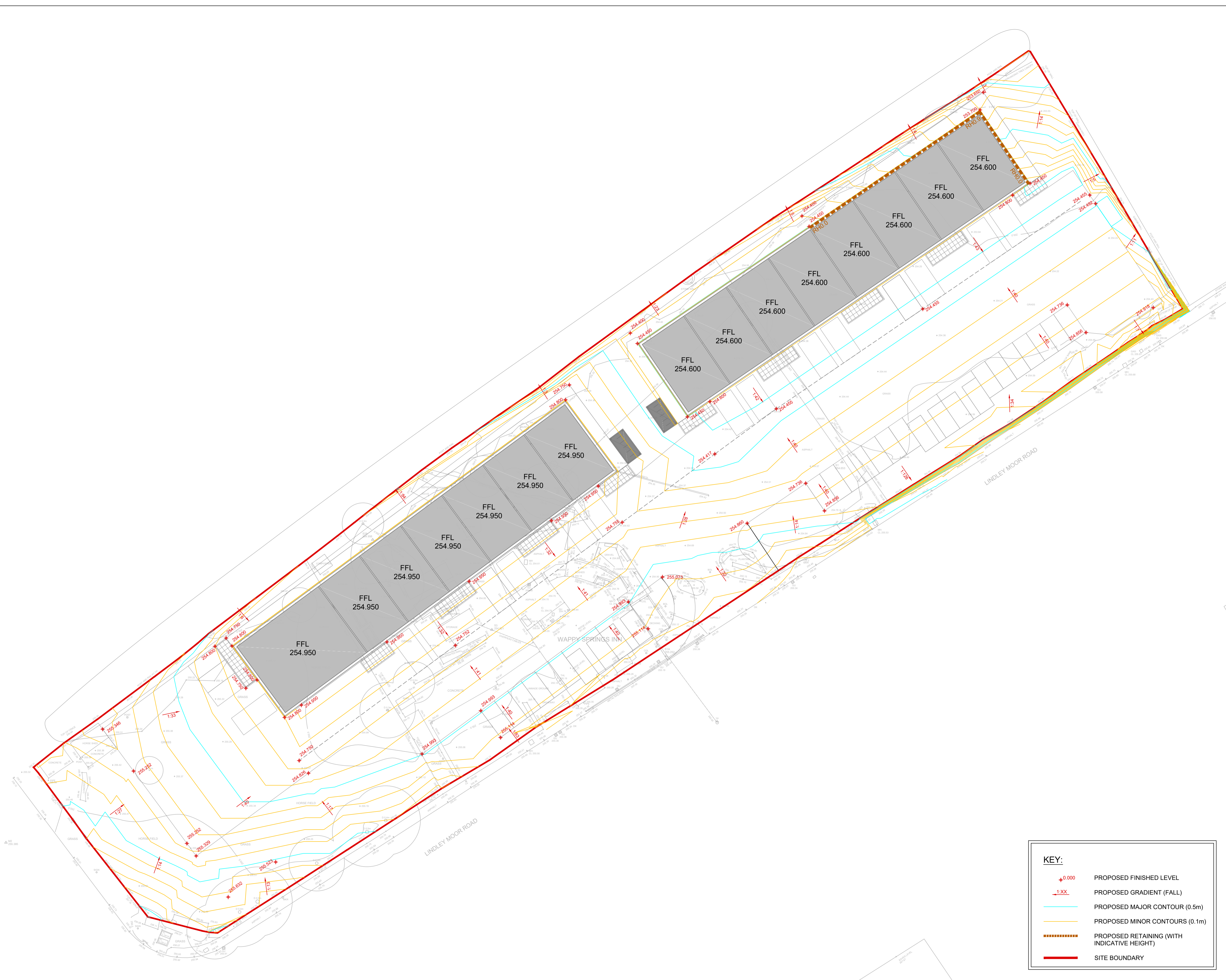
Appendix L

This drawing should not be scaled. Dimensions to be verified on site. Any discrepancies should be referred to the Engineer prior to work commencing.

**NOTES**

**GENERAL NOTES**

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT HJCE, ARCHITECTS AND M&E ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DRAWING NOT TO BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER AND FURTHER INSTRUCTIONS OBTAINED BEFORE WORK IS COMMENCED.
3. EXISTING GROUND LEVELS BASED ON A TOPOGRAPHICAL SURVEY BY MET SURVEYS DATED OCTOBER 2020.
4. PLOT BOUNDARIES, BUILDING AND EXTERNAL WORKS FOOTPRINTS SHOWN ON THIS DRAWING ARE INDICATIVE ONLY, BASED ON THE LATEST MASTERPLAN DRAWING.



P02	28.08.24	UPDATED TO SUIT LATEST SITE PLAN	AF
P01	08.08.24	FIRST ISSUE	AF
REV	DATE	DESCRIPTION	BY

REVISIONS

PROJECT  
**WAPPY SPRINGS  
HUDDERSFIELD**

TITLE  
**EXTERNAL LEVELS**

CLIENT  
**FRANK MARSHALL ESTATES**

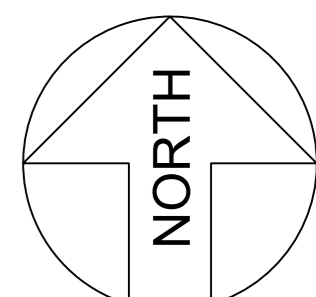
**HOLLOWAY  
JENNINGS**  
Consulting Civil & Structural Engineers  
CONNAUGHT HOUSE, PARK VIEW, LOFTHOUSE  
WAKEFIELD, WF3 3HA  
T 01924 824 433  
admin@hjce.co.uk www.hjce.co.uk

STATUS  
**PRELIMINARY**

DESIGNED BY	AMF	CHECKED BY	MH	HJCE REF.	7270
DRAWN BY	AMF	DATE	08.08.2024	SCALES @ A1	1:250

PROJECT	ORIGINATOR	VOLUME	LEVEL	TYPE	ROLE	NUMBER	REVISION
7270-HJCE-XX-XX-DR-C-2000							P02

Appendix M



**Topographic Legend**

Bottom of Bank	OH Electric
Top of Banking	Railway Line
Building	Road Centre
Building Canopy	Road Markings
Concrete Base	SC Hard/Hard
Contour Major	SC Hard/Soft
Contour Minor	SC Soft/Soft
Fences	Steps
General	Tree Canopy
Kerb Bottom	Vegetation
Kerb Drop	Visible Trench
Kerb Top	Walls
OH Comms	Water Edge

**Topographic Abbreviations**

AV	Air Valve	PB	Pedestrian Beacon
BH	Borehole	PBx	Post Box
BO(L)	Bollard (Illuminated)	PGR	Pedestrian Guard Rail
BS	Bus Stop	PM	Parking Meter
CB	Cabinet	Post	Post
CL	Cover Level	RE	Roading Eye
COL	Column	RS(L)	Road Sign (Illuminated)
Conc	Concrete	RWP	Rain Water Pipe
DC	Drainage Channel	SPL	Sign Post (Illuminated)
DFBin	Dog Foul Bin	SRCam	Speed Camera
DP	Down Pipe	ST	Stop Tap
EP	Electric Pole	SV	Sluice Valve
ER	Earth Rod	SVP	Soil Vent Pipe
FFL	Finished Floor Level	Tbox	Telephone Box
FH	Fire Hydrant	TL	Traffic Light
FP	Flag Pole	TOF	Top of Fence Level
GP	Gate Post	TOF	Top of Wall Level
GV	Gas Valve	TP	Telecoms Pole
GY	Gully	VP	Vent Pipe
IC	Inspection Cover	WB	Waste Bin
KO	Kerb Outlet	WBx	Window Bottom Level
LP	Lamp Post	WM	Water Meter
NH	Manhole	WO	Wash Out
Mr	Marker	WTL	Window Top Level
MP	Marker Post	WV	Water Valve
MW	Monitoring Well		

**Measured Building Legend**

External Building Line	Internal Building Line	Building Overheads	Stairs/Steps	Doors	Windows	Sanitaryware	Kitchen Furniture	Direction of Stairs (Arrow points up)	Direction of Sloped Ceiling (Arrow points down)	Window Sill and Head Height	Double door	CH=0.00	Ceiling Height	Single door	FCH=0.00	False Ceiling Height	Window	FFL=0.00	Finished Floor Level
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**Utility Legend**

Air Line	Alarm Cable	BT Cable	CATV Cable	Chamber Extent	Comms Cable	CWD Sewer	Earth Wire/Tape	Electric Cable	Fibre Optic Cable	Fuel Line	FWD Sewer	Gas Pipe	Band of Cables	Empty Service Duct	SWD Sewer	Survey Extents	Heating Pipe	HV Electric Cable	Kingston Comms	Oil Pipe	Rising Main	Traffic Control	Unexploded Ordnance	Vent Pipe	GPR Detection	Assumed Route	Records Route	Cable Riser	Drainage Backdrop
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**Utility Abbreviations**

CP	Cathodic Protection	LoS	Loss of Signal
CU	Disconnected Utility	MDPE	Middle Density PE
DI	Ductile Iron	SI	Span Ion
DoB	Depth of Bottom	TLC	Traffic Light Control
DoC	Depth of Cover	UDI	Unreliable Depth into
ED	Empty Duct	uPVC	Unplasticised
EOt	End of Trace	UPVC	Polyvinyl Chloride
PE	Polyethylene	UTR	Unable to Raise
HDPE	High Density PE	VC	Verified Clay

**Manufacturer Stated Depths**

- Detected Using Electromagnetic Location Methods  
e.g. Any metallic pipe/cable. Accuracy ± 2.5% of depth reading.
- Detected Using Electromagnetic Location Methods  
e.g. Using a Sonde to locate drainage pipework. Accuracy ± 2.5% of depth reading.
- Detected Using Ground Penetrating Radar  
e.g. A plastic pipe or service not located by other means. Accuracy depends on ground conditions.

**CAUTION - LIVE SERVICES PRESENT - EXTREME CARE SHOULD BE TAKEN WHEN EXCAVATING**

ZS Surveys Ltd, and their agents or partners, are not responsible for any situation, incident or loss resulting from actions or planning resulting from total reliance upon this drawing or accompanying information. The completeness of the underground network information cannot be wholly guaranteed and as such no guarantees or warranties are provided or implied. The location and/or identification of a service will not positively indicate whether it is live or dead. A service indicated from records that has not been located or identified on site does not necessarily imply that it does not exist or is dead, however, its presence should be anticipated. The results of Electro Magnetic and GPR detection techniques are not infallible and ground profiling for the actual position and depth of services should be established.

If this drawing and any associated drawings should be used in relation to works, we advise that the users of this information follow the principles detailed by the Health and Safety Executive guidance directive HSG 47, 'Avoiding Danger from Underground Services'. Further details of this directive are available at [http://www.hse.gov.uk/](http://www.hse.gov.uk/chttp://www.hse.gov.uk/)

**Notes**

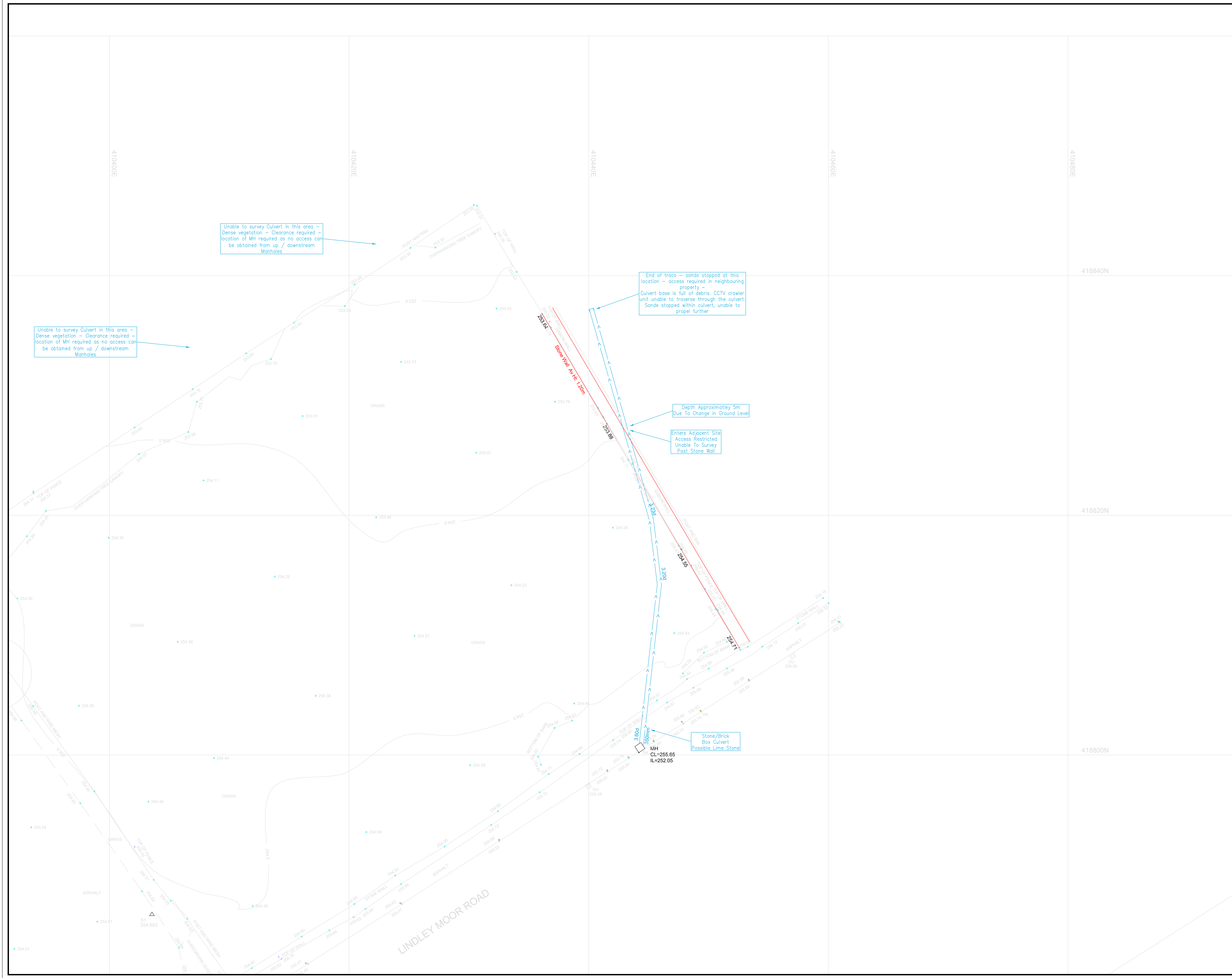
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ALL LEVELS RELATED OSTN15 GRID PROJECTION.

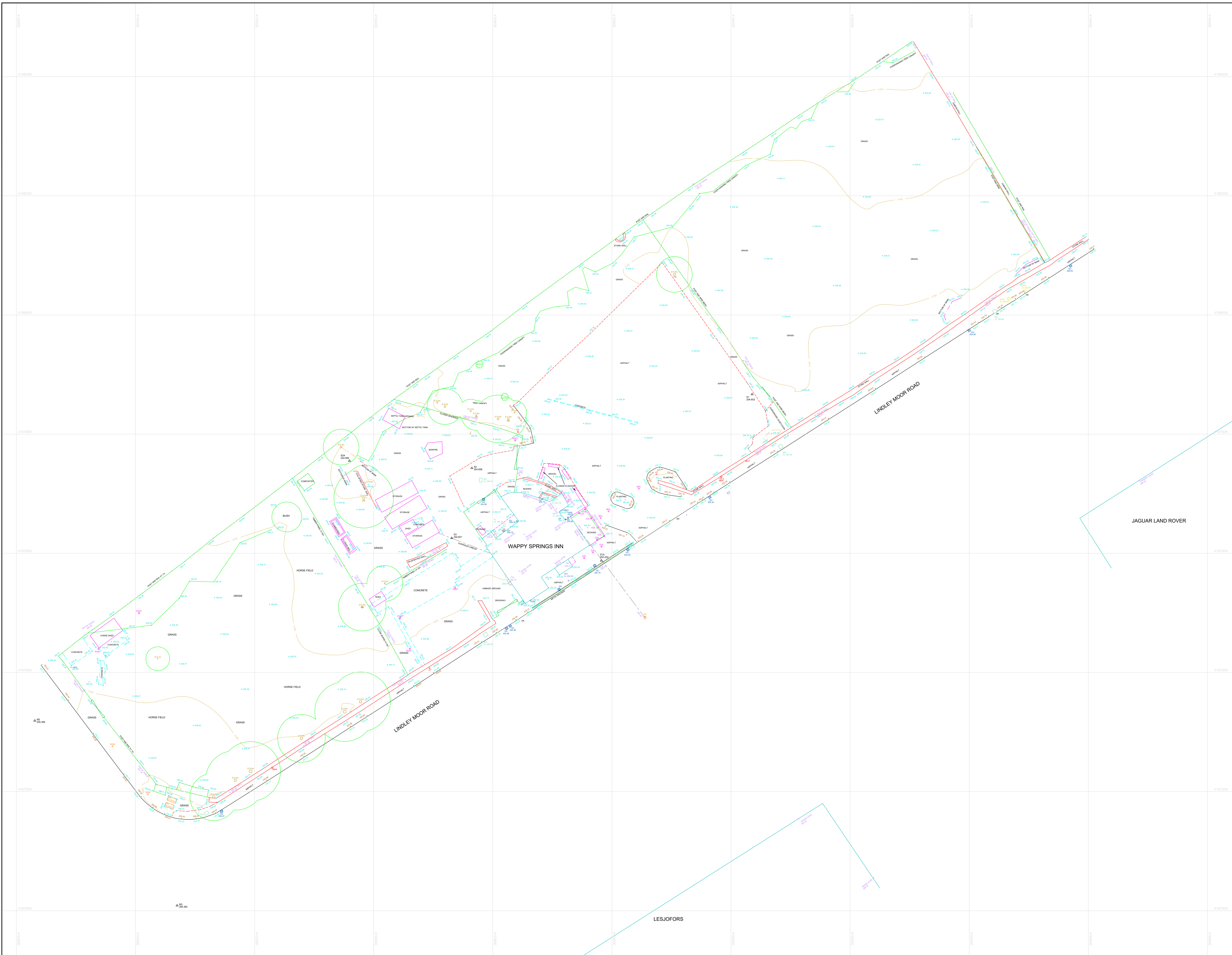
ALL DIMENSIONS SHOULD BE VERIFIED ON SITE PRIOR TO CONSTRUCTION.

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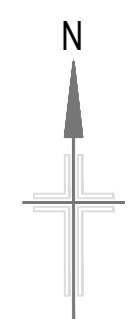
Client	<b>KPP</b>		
Site Location:	LINDLEY MOOR ROAD, HUDDERSFIELD, HD3 3TD		
Drawing Type:	Culvert information		
Surveyed:	SSE	Drawn:	SS
Checked:	ZH	Authorised:	ZS
Date:	30/07/2024	Scale:	1:100@A0
<b>ZS Surveys Ltd</b>			
Land, Building & Engineering Surveyors www.zssurveys.com info@zssurveys.com		Constructionline	
Project Number:	3964	Sheet Number:	A0



Appendix N



**Notes**  
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**Grid** : OS National Grid.  
 Using the OS GPS Network and applying OSTN15 transformation and then removing the scale factor for true distances with a one-step transformation centred on S1.

**Datum** : OS Level Datum.  
 Using the OS GPS Network and applying OSGM15 National Geoid Model to obtain local area corrections.

**Station Listing**

Station	Easting	Northing	Level
M2	410283.096	418731.897	255.385
M3	410306.594	418700.873	255.382
S1	410403.549	418786.694	254.653
S2	410356.491	418774.308	254.656
S3	410353.102	418762.551	254.621
S1A	410378.231	418758.765	255.252
S2A	410335.928	418775.518	254.956

**KEY**

MR VALVE	AV	HOSE OUTLET	HO
SEWER MANHOLE	SM	LAMP POST	LP
SN	SN	MANHOLE (CIRCULAR)	CS
BOLLARD	BL	MANHOLE (RECTANGULAR)	CR
BORE HOLE	BH	MANHOLE (TRIANGULAR)	CT
BRITISH TELECOM COVER	BT	MARKER POST	MP
BUS STOP	BS	SHULTY	SH
CABLE TV COVER	CTV	PRODING EYE	PE
CABLE TV SURVEY	CS	SON POST	SP
COLUMN	CL	TELECOM COVER	TC
DROPPED KERB	DK	TELEGRAPH POLE	TP
EARTHING POINT	EP	THRESHOLD LEVEL	TL
ELECTRICITY COVER	EC	TRAFFIC LIGHT	TR
ELECTRICITY POLE	EP	TRIAL PIT	TP
FIRE HYDRANT	FH	WASH OUT	WO
GAS VALVE	GV	WATER METER	WM
GATE	GT	WATER STOP COCK	WSC
INSPECTION COVER (CIRCULAR)	IC	WATER STOP VALVE	WSV
INSPECTION COVER (RECTANGULAR)	IR		
COVER LEVEL	CL	CHAMBER BASE LEVEL	CSL
INVERT LEVEL	IL	WATER SURFACE LEVEL	WSL
UNABLE TO RISE	UR	UNABLE TO MEASURE	UM
GIRTH OF TREE TRUNK	G	DIAMETER OF TREE TRUNK	D
HEIGHT TO TOP OF TREE CANOPY	H	MULTI BOLE TREE	MB

Rev	Date	Drawn	Description	Check

**Met**  
 GEO ENVIRONMENTAL

Southgate House  
 Pontefract Road T: +44 (0) 1132 008 900  
 Stourton F: +44 (0) 1132 008 901  
 Leeds E: admin@metgeoenvironmental.com  
 West Yorkshire W: www.metgeoenvironmental.com  
 LS10 1SW

**Client**  
 KILMARTIN PLOWMAN & PARTNERS LIMITED

**Site**  
 LINDLEY MOOR ROAD, HUDDERSFIELD  
 HD3 3TD

**Title**  
 TOPOGRAPHICAL SURVEY

Surveyed	TW:MR	Drawn	TW:MR
Check	DA	Date	13/10/2020
Scale	1:200	Job No	P20-01094
		Sheet Size	A0
		Rev	01

DWG Ref: P20-01094 | MET|EXT | XX | TOP | M2 | G | 001