

**FLOOD RISK ASSESSMENT**

**THE OVAL PLOT  
ROCKINGHAM**

**FOR**

**E. V. WADDINGTON LTD**



## FLOOD RISK ASSESSMENT

### THE OVAL PLOT ROCKINGHAM

### FOR

### E. V. WADDINGTON LTD

Job No. : 39724  
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Approved :



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## **EXECUTIVE SUMMARY**

The project comprises the proposed development of a 1.33 hectare former opencast site for light industrial/warehousing use, considered as greenfield for flood risk and surface water drainage assessment purposes.

The Environment Agency's Flood Map for Planning shows the site to lie within Zone 1. The site is not at significant risk of flooding from any source. In accordance with current Planning Practice Guidance 'Flood Risk and Coastal Change', sequential testing is not required.

Surface water disposal is considered in accordance with the drainage hierarchy in Building Regulations Part H 2010 and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 080.

Infiltration type SuDS, such as soakaways, will not be viable on the site due to the presence of impermeable ground and deep fill.

Surface water disposal will be to the existing surface water spur pipe from the adjacent Drive Thru' development. This connects to a culverted watercourse to the north east.

Surface water discharge from the overall site (current application site & existing Drive Thru' plot) will be attenuated with a staged discharge rate restricted to the 1 in 1 year greenfield run-off rate (3.4 litres/sec/Ha) for rainfall events up to and including the 1 in 30 year return period and to the 1 in 30 year greenfield run-off rate (8.6 litres/sec/Ha) for all other return period events

Attenuation storage will be accommodated within proprietary below ground voided storage units for the 1 in 100 year plus 30% climate change event.

Foul water disposal will be to the existing foul water spur pipe from the adjacent Drive Thru' development. This connects to a Yorkshire Water sewer to the north east.

The new drainage systems will be privately managed and maintained.

The level of risk and safeguards available are considered appropriate to this class of development.

## **1.0 THE DEVELOPMENT AND NATIONAL PLANNING POLICY**

### **1.1 Introduction**

This Flood Risk Assessment has been prepared in accordance with current National Planning Policy Framework<sup>1</sup> and Planning Practice Guidance 'Flood Risk and Coastal Change'<sup>2</sup> on the instruction of E. V. Waddington Ltd. Any other parties using the information in this report do so at their own risk, unless previously approved in writing.

The project comprises the development of a 1.33 hectare greenfield site for light industrial/warehousing use, with associated service yard and car parking areas.

### **1.2 Site location and description**

The site is located to the east of Dearne Valley Parkway (A6195) and the west of Sheffield Road near Hoyland Common, Barnsley, at Grid Reference 435094, 400579. (See Appendix 1).

The site is currently unoccupied and is surrounded by adopted highway on three sides, with a Drive Thru' coffee shop and electricity sub-station to the north.

The site currently falls from approximately 142.4m AOD at the south to 137.5m AOD at the north. (See Appendix 2).

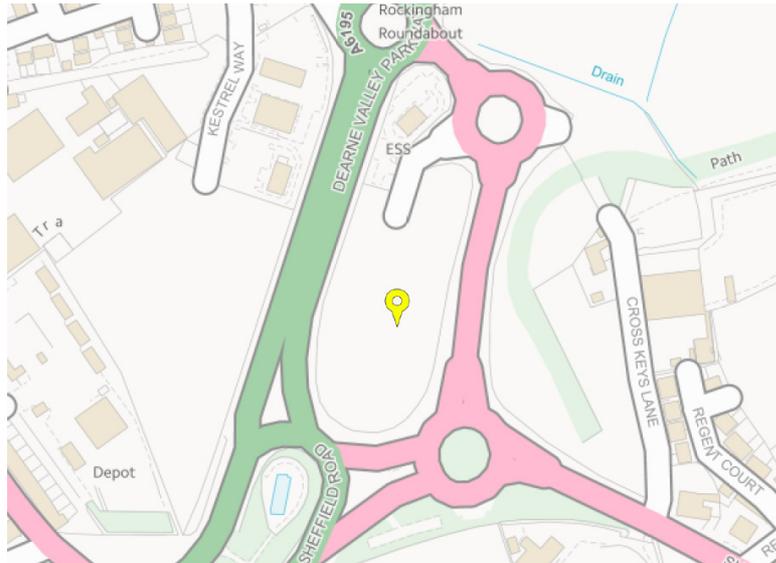
---

<sup>1</sup> <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

<sup>2</sup> <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

### 1.3 Environment Agency - Flood Maps for Planning

The Environment Agency's Flood Maps for Planning (See Appendix 4) shows that the site lies within Zone 1 (low risk); land having a less than 1 in 1,000 annual probability of river flooding. The surface water flooding map indicates a low risk immediately adjacent to the western boundary of the site.



*Environment Agency's long term flood risk – Extent of River Flooding*



*Environment Agency's long term flood risk – Extent of Surface Water Flooding*

## **1.4 Barnsley Metropolitan Borough Council Strategic Flood Risk Assessment**

Barnsley Metropolitan Borough Council's Strategic Flood Risk Assessment flood map records the site as not at risk of river flooding (i.e. Flood Zone 1) and not at risk of surface water flooding. (See Appendix 5).

## **1.5 National Planning Policy Framework**

The National Planning Policy Framework (February 2019) sets out the principles for assessing the suitability of sites for development, in relation to flood risk, as part of the planning process.

### **1.5.1 Sequential Test**

Initially a Sequential Test is applied to the allocation of land suitable for development. The test is required for any development proposed in Flood Zone 2 or 3 (and occasionally also in Flood Zone 1 where there are flood risks present which are not identified on the Environment Agency's Flood Maps for Planning).

The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites, appropriate for the proposed development, in areas with a lower probability of flooding.

The site lies within Zone 1 and this report confirms that the site is not at significant risk of potential flooding from any source, therefore the sequential test is not required.

## **1.5.2 Climate change**

An issue emphasised in the Planning Policy Guidance is the requirement to take account of potential climate change effects. New development is generally accepted as having a 100 year design life for flood risk purposes. The Environment Agency's report 'Flood risk assessments: climate change allowances'<sup>3</sup>, published in February 2016, recommends a 20 to 40% increase in peak rainfall intensity is taken into account for small and urban catchments for design horizons up to 2115. For the purposes of this Flood Risk Assessment, a 30% increase in peak rainfall intensity has been used for assessing storage requirements; 30% being an average between the 'central' and 'upper end' of the data range given in the report. It is recommended that the potential effects of a peak rainfall increase of 40% are considered in detailed design.

## **2.0 FLOOD RISK**

### **2.1 Potential sources of flooding**

The Environment Agency and Strategic Flood Risk Assessment maps are intended for general guidance on flood risk and it is also necessary to consider other, more detailed, sources in relation to local factors.

#### **2.1.1 Fluvial**

The nearest watercourse is an unnamed ditch, 250m to the north east of the site. The ditch feeds into a pond which has an outfall culverted beneath Dearne Valley Parkway. This leads to a large detention basin also serving other recent developments to the north of the site. The outfall from the detention basin runs to the north east and ultimately discharges into Short Wood Dike, around 1km from the site.

There are no main rivers within the local vicinity of the site. Flood risk from this source is assessed as negligible

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<sup>3</sup> <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-2>

### 2.1.2 Surface water

The Environment Agency surface water flood risk map shows the site is at very low risk of surface water flooding (See Appendix 4). There is an area adjacent to the western boundary which is shown to be at low risk of flooding. The topographical survey (see Appendix 2) shows a ditch in this area, which is lower than the development site and is the reason why a risk is identified. However, the risk to the site itself is assessed as negligible.



*Environment Agency – Risk of surface water flooding map*

### 2.1.3 Groundwater

Groundwater is a potential flood risk to areas which are low lying and on permeable ground or, occasionally, to areas of higher ground in the vicinity of springs. There are no public records of groundwater emergence on this site.

### 2.1.4 Sewerage

The surrounding public sewer network is owned and maintained by Yorkshire Water (See Appendix 6). There is no public record of any flood risk to the site associated with these sewers.

## 2.2 Historic Flooding

There are no public records of historic flood events on the site.

## **2.3 Residual flood risk**

The site is not at significant risk of flooding from any source.

## **2.4 Flood Mitigation Measures**

The building is to have stepped floor levels along its length, following the general slope of the current site. External areas around the building will be set to ensure any flooding is directed away from the buildings. Levels will generally be raised to be significantly higher than the existing ditch alongside the western boundary, removing the risk of flooding from this source.

## **3.0 DRAINAGE STRATEGY**

### **3.1 Existing drainage**

#### *Public Sewerage Network: Yorkshire Water*

The Yorkshire Water sewer plan (See Appendix 6) shows that they have no recorded apparatus within the site or immediately adjacent.

#### *Highway Drainage: Barnsley M.B.C*

Barnsley M.B.C's drainage layout for the recently completed highway works around the site (See Appendix 7) shows a system of highway drains. These incorporate small detention basins and below ground storage before discharging to a larger detention basin to the north of Dearne Valley Parkway.

#### *Private Drainage: E.V Waddington Ltd.*

The adjacent Drive Thru' plot has private foul and surface water drainage systems as shown on external drainage layout prepared for the development (See Appendix 8). These drains outfall beneath the highway, with further runs of private drainage taking the surface water to a culverted watercourse approximately 300m to the north and the foul water to a Yorkshire Water sewer approximately 500m to the north as shown on the off-site drainage works layout (See Appendix 8). Spur connections from both the foul and surface water drains have been installed as part of the Drive Thru' development to accept discharges from the current application site.

## **3.2 Ground conditions**

The site is a former opencast mine which has been restored for redevelopment. The British Geological Survey maps show the site bedrock to be Pennine Middle Coal Measures comprised of Mudstone, Siltstone and Sandstone, with a number of coal seams believed to have been mined below the site. There are no records of the soil composition overlying the bedrock.

Borehole logs across the site recorded varying thicknesses of made ground overlying the natural bedrock. The made ground was variable, consisting of topsoil, silt, clay, gravel and reworked natural rock. Groundwater was recorded in two of the borehole logs at depths of 3.5m and 4.5m.

## **3.3 Greenfield Run-off Rate**

Greenfield runoff rates for the adjacent Drive Thru' development were agreed with Barnsley M.B.C as 3.4 litres/second for 1 in 1 year events 8.6 litres/second for 1 in 30 year events. These rates are to be applied to the current application site.

## **3.4 Drainage hierarchy**

Surface water disposal should be in accordance with the drainage hierarchy in Building Regulations Part H 2010<sup>4</sup> and Planning Practice Guidance 'Reducing the causes and impacts of flooding', paragraph 080. Disposal via SuDS methods should be considered as the first option. Disposal to the public sewer should be considered only when SuDS methods and disposal to the watercourse are shown to be unsuitable.

### **3.4.1 Sustainable Drainage Systems (SuDS)**

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

The site is unsuitable for infiltration type SuDS due to impermeable ground conditions and the presence of deep fill. Other SuDS methods may be applicable and their use is summarised in the appended SuDS checklist (See Appendix 9).

---

<sup>4</sup> <https://www.gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h>

### **3.4.2 Watercourse**

The nearest watercourse is an unnamed ditch, 250m to the north east of the site. The ditch feeds into a pond which has an outfall culverted beneath Dearne Valley Parkway. This leads to a large detention basin also serving other recent developments to the north of the site. The outfall from the detention basin runs to the north east and ultimately discharges into Short Wood Dike, around 1km from the site.

### **3.4.3 Public sewer**

There are no public sewers within or immediately adjacent to the site.

## **3.5 Proposals for surface water disposal**

The final disposal strategy for surface water run-off requires detailed consideration and approval during the design phase of the project. The final design will need the approval of the relevant statutory bodies but will broadly follow these principles:

- Surface water will be discharged by gravity to the existing spur pipe from the adjacent Drive Thru' development which ultimately discharges to a culverted watercourse approximately 300m to the north of the site.
- The overall discharge from the current application site and the adjacent Drive Thru' plot will need to be considered as a whole. Flow will be attenuated with a staged discharge rate restricted to the 1 in 1 year greenfield run-off rate (3.4 litres/sec/Ha) for rainfall events up to and including the 1 in 30 year return period and restricted to the 1 in 30 year greenfield run-off rate (8.6 litres/sec/Ha) for all other return period events.
- Attenuation storage for rainfall events up and including the 1 in 100 year return period plus 30% climate change will be provided on site within proprietary below ground voided storage units.
- The surface water drainage system will be privately managed and maintained.

## **3.6 Proposals for foul disposal**

Foul effluent will be discharged by gravity to the existing spur pipe from the adjacent Drive Thru' development which ultimately discharges to a Yorkshire Water sewer approximately 300m to the north of the site.

### **3.7 Residual flood risk**

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

### **3.8 Mitigation measures**

The proposed surface water drainage system is designed to current best practice and to the standards laid out in the publication 'Sewers for Adoption (6<sup>th</sup> Edition)' and Building Regulations Part H 2010.

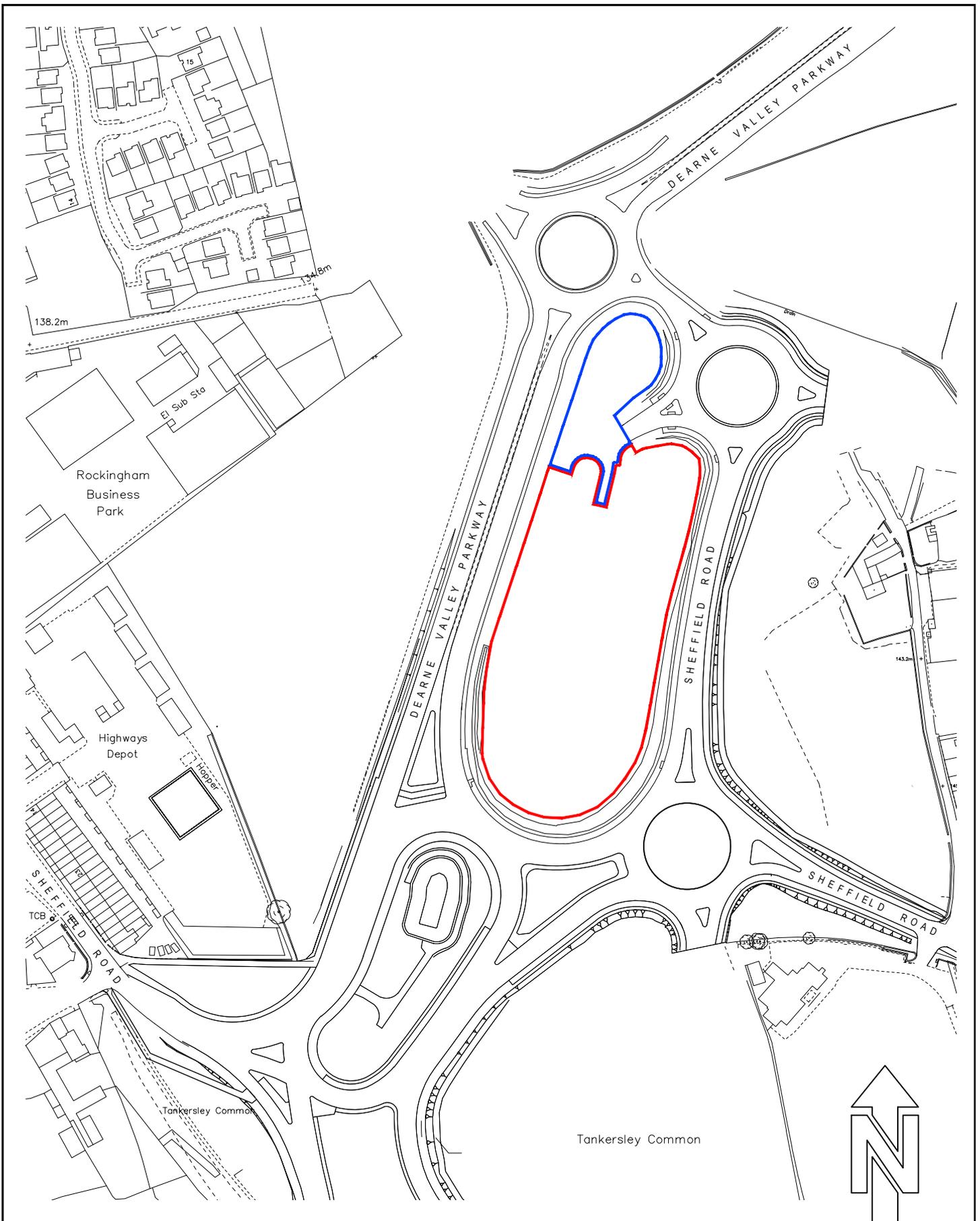
In the event of surface water exceedance during extreme rainfall events the site is laid out so that surface water runoff is directed away from the proposed buildings.

## **4.0 CONCLUSIONS**

1. The site is within Flood Zone 1 and is not at significant risk of flooding from any source.
2. Surface water disposal will be to the existing spur pipe from the adjacent Drive Thru' development.
3. Surface water discharge from the overall site (current application site & existing Drive Thru' plot) will be attenuated with a staged discharge rate restricted to 3.4 litres/sec/Ha for rainfall events up to and including the 1 in 30 year return period and 8.6 litres/sec/Ha for all other return period events.
4. Attenuation storage will be accommodated within proprietary below ground voided storage units for the 1 in 100 year plus 30% climate change event.
5. Foul disposal will be to the existing spur pipe from the adjacent Drive Thru' development.
6. The level of risk and safeguards available are considered appropriate to this class of development.

**APPENDICES**

**APPENDIX 1**



A First Issue.

**Eastwood & Partners**  
CONSULTING ENGINEERS



St. Andrew's House  
23 Kingfield Road  
Sheffield. S11 9AS

Tel 0114 255 4554  
Fax 0114 255 4330

DATE  
04-08-20

SCALE AT A4  
1:2500

E.V WADDINGTON LTD.  
ROCKINGHAM  
SITE LOCATION PLAN

CHECKED  
AP

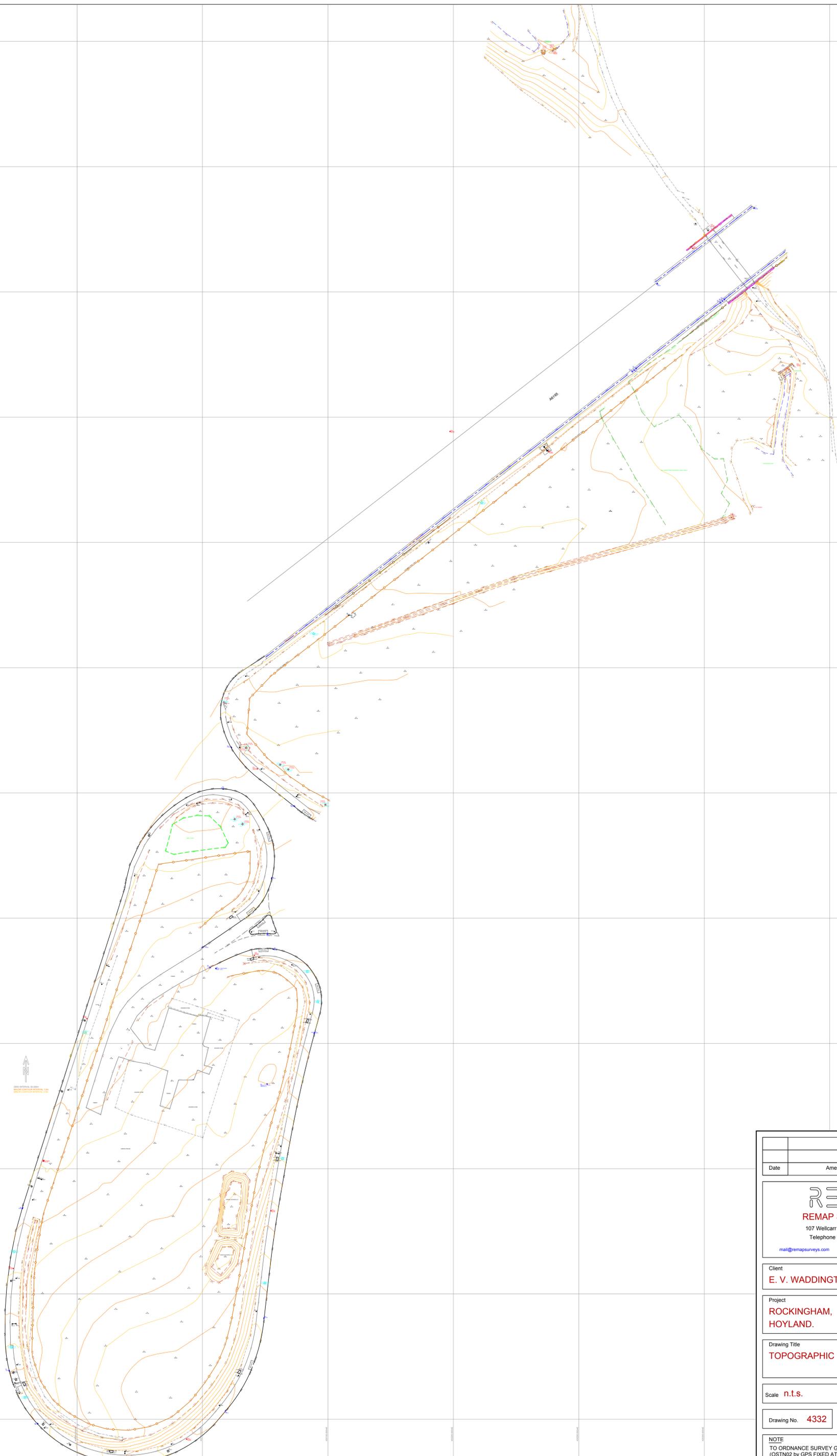
DRAWING STATUS  
**PRELIMINARY**

DRAWN  
MW

DRAWING NUMBER  
**39724/201**

REV  
**A**

**APPENDIX 2**



Date	Amendments	Rev.

  
**REMAP SURVEYS LTD.**  
 107 Welcarr Road, Sheffield, S8 8QP.  
 Telephone or fax. 0114 2747 626  
[mail@remapsurveys.com](mailto:mail@remapsurveys.com)      [www.remapsurveys.com](http://www.remapsurveys.com)

Client  
**E. V. WADDINGTON LTD.**

Project  
**ROCKINGHAM,  
 HOYLAND.**

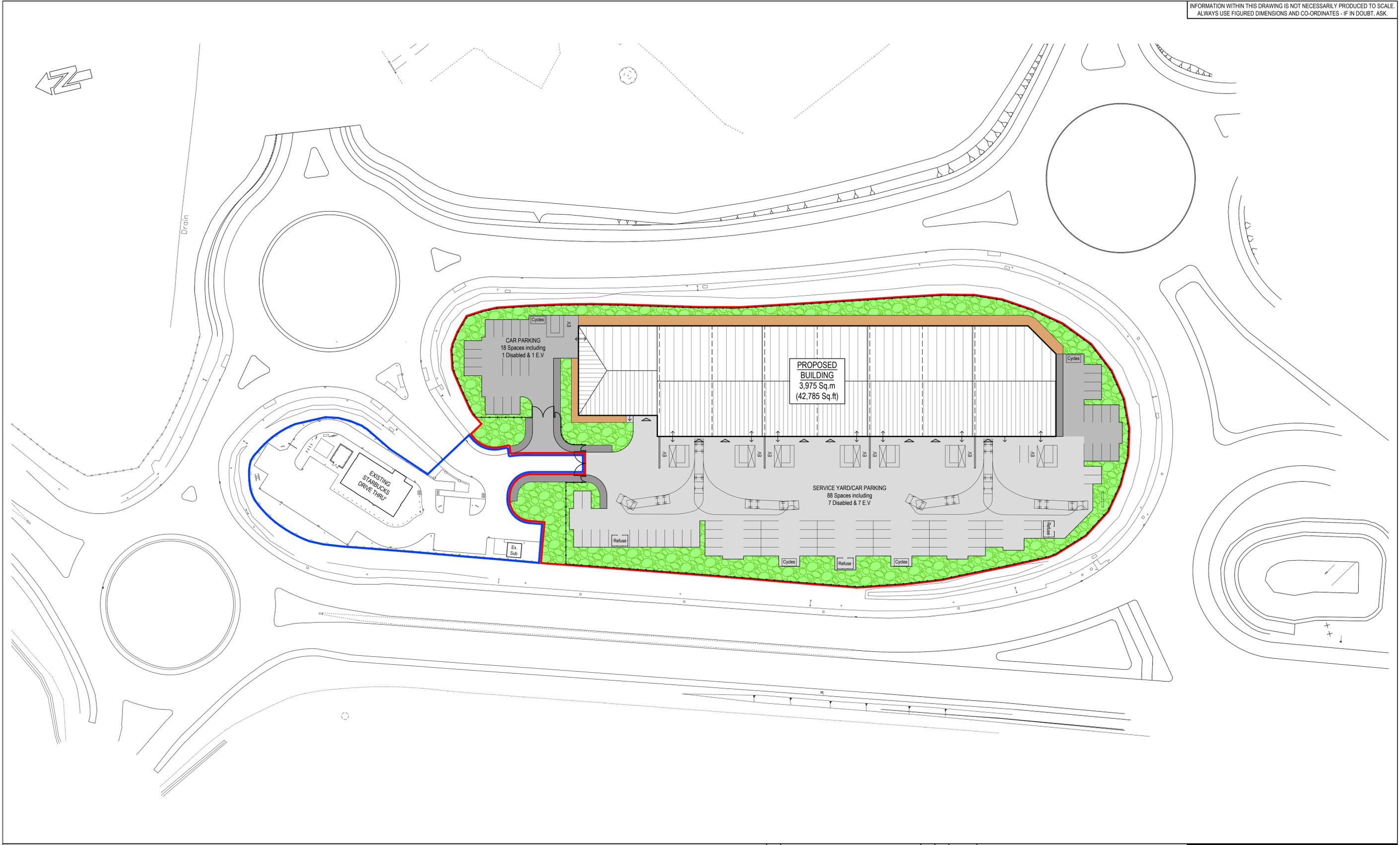
Drawing Title  
**TOPOGRAPHIC SURVEY**

Scale **n.t.s.**      Date **10.11.2017**

Drawing No. **4332**      Rev. **0**      File Ref.

**NOTE**  
 TO ORDNANCE SURVEY GRID AND DATUM  
 (OSTN02 by GPS FIXED AT RS4579, SF=1.00000000).  
 Semi-permanent Stations established.  
 Full Traverse not carried out.  
 For legend, CAD files, layer control or further information  
 please contact Remap Surveys.

**APPENDIX 3**



NOTES

-  Concrete Service Yard/Car Parking.
-  Tarmac Access Road.
-  Tarmac footway.
-  Gravel.
-  Landscaping.
-  New 2.4m high black weld mesh fencing with matching gates.

REV	DESCRIPTION	SIG	CHK	DATE
A	First Issue.			

E.V WADDINGTON LTD.

ROCKINGHAM

PROPOSED SITE LAYOUT

**Eastwood & Partners**  
CONSULTING ENGINEERS

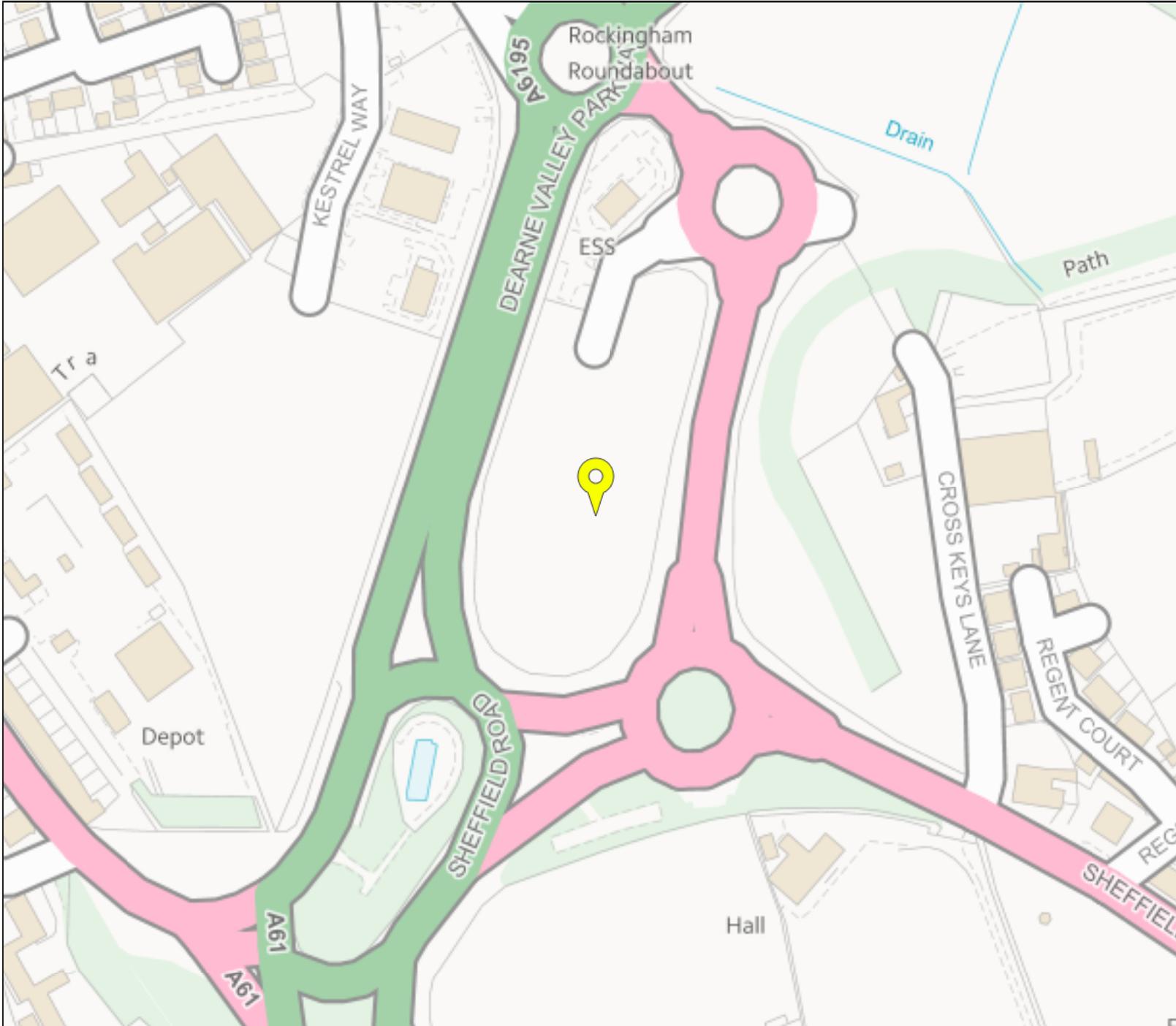
St. Andrew's House  
23 Kingfield Road  
Sheffield  
S11 9AS  
Tel 0114 255 4554  
Fax 0114 255 4330

mail@eastwoodandpartners.com  
www.eastwoodandpartners.com



SCALE WHEN PLOTTED AT A1			DRAWING STATUS		
1:500			PRELIMINARY		
DRAWN	CHECKED	DATE	DRAWING NUMBER	REV	
MW	AP	04-08-20	39724/202	A	

**APPENDIX 4**



**Flood map for planning**

Your reference  
**wol**

Location (easting/northing)  
**435087/400518**

Scale  
**1:2500**

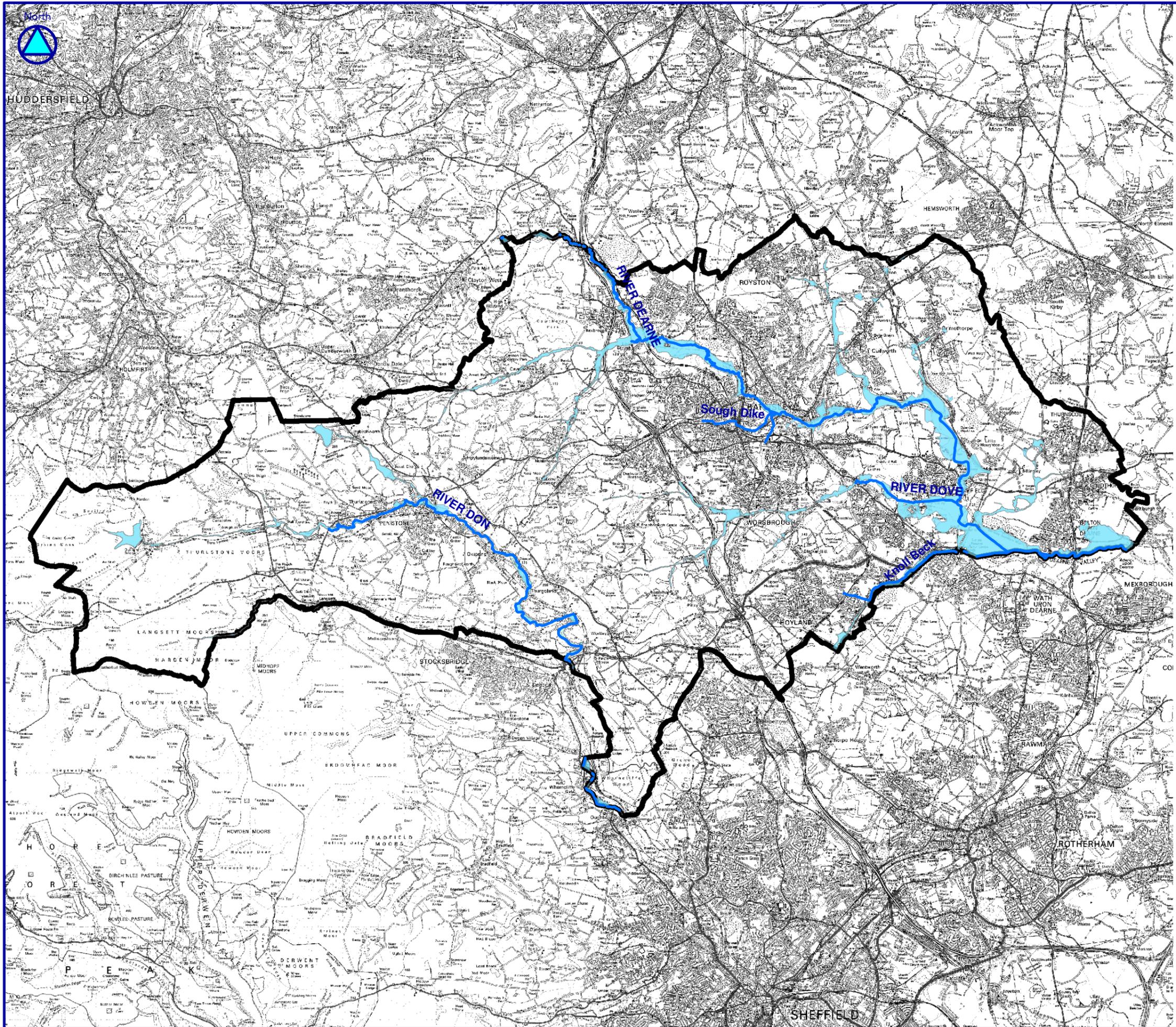
Created  
**27 Aug 2020 13:40**

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefiting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area





**APPENDIX 5**



**LEGEND**

1:120,000

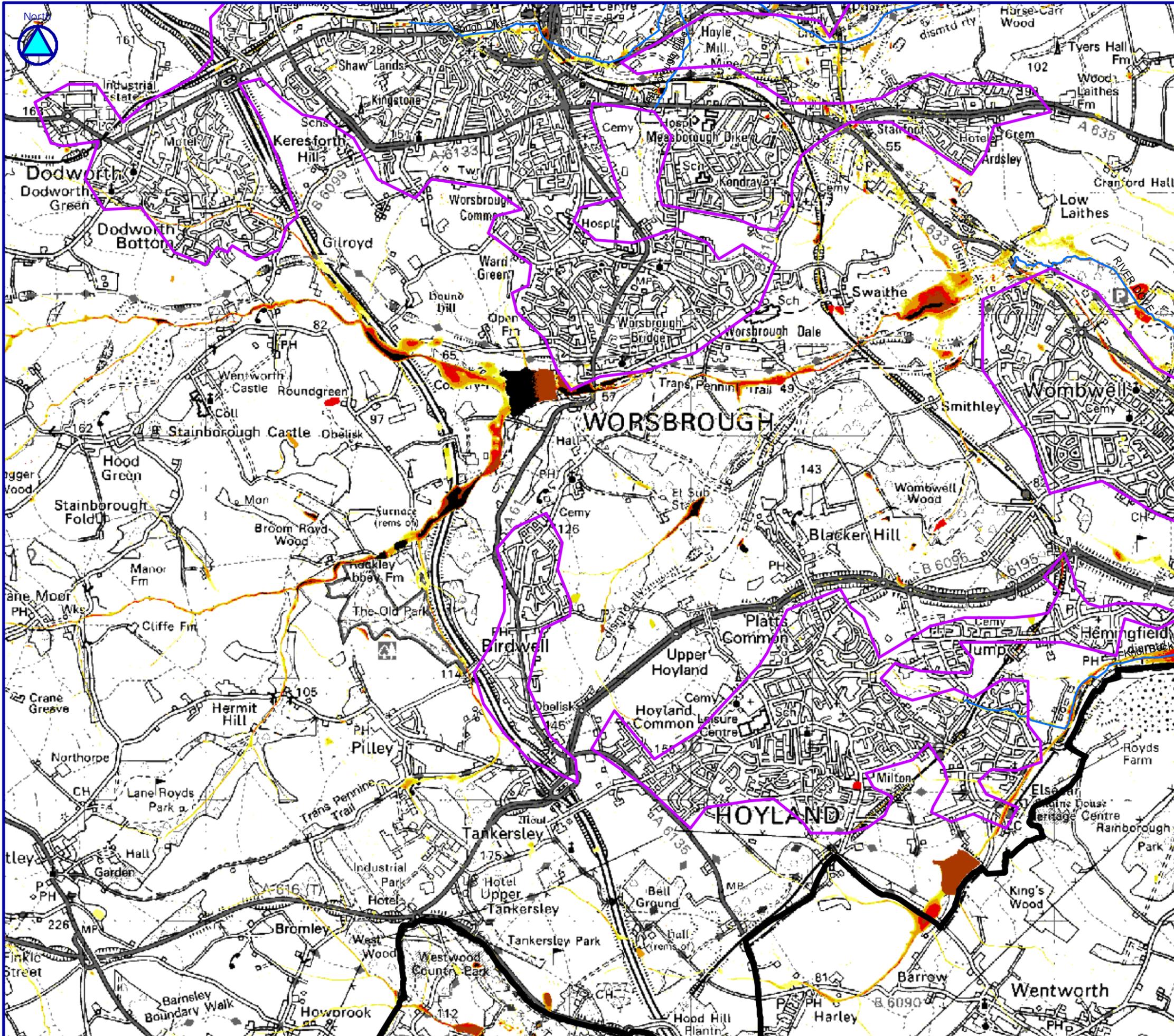
-  Main River
-  Flood Zone 2
-  Barnsley MBC Boundary

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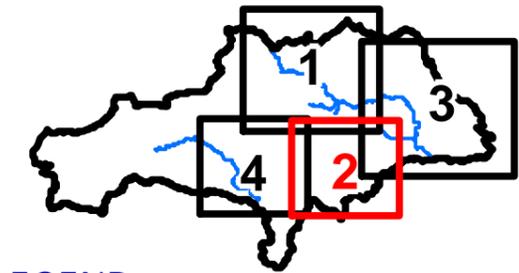


**MAP 4**

**FLOOD ZONE 2**

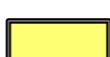


**KEYPLAN**



**LEGEND**

1:30,809

-  Barnsley MBC Boundary
-  Urban Areas
-  Main River
- Surface Water Flooding
- Flood Depth (m)
-  0.15 - 0.3
-  0.3 - 0.5
-  0.5 - 1
-  1 - 1.5
-  1 - 2
-  > 2

Note:  
Please see Section 5.8 of the SFRA  
for further details.

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**MAP C - 2**

**PLUVIAL FLOODING CAUSED BY  
100YEAR RAINSTORM**

**APPENDIX 6**



43497 / 40226

Map Name: DICKSONE

Yorkshire Water  
PO Box 900  
Harlow Road  
Blythburgh D12 2JZ  
Contact Name: YORKMAP ADVISOR © ROBERTS  
Contact Tel: 07 2592

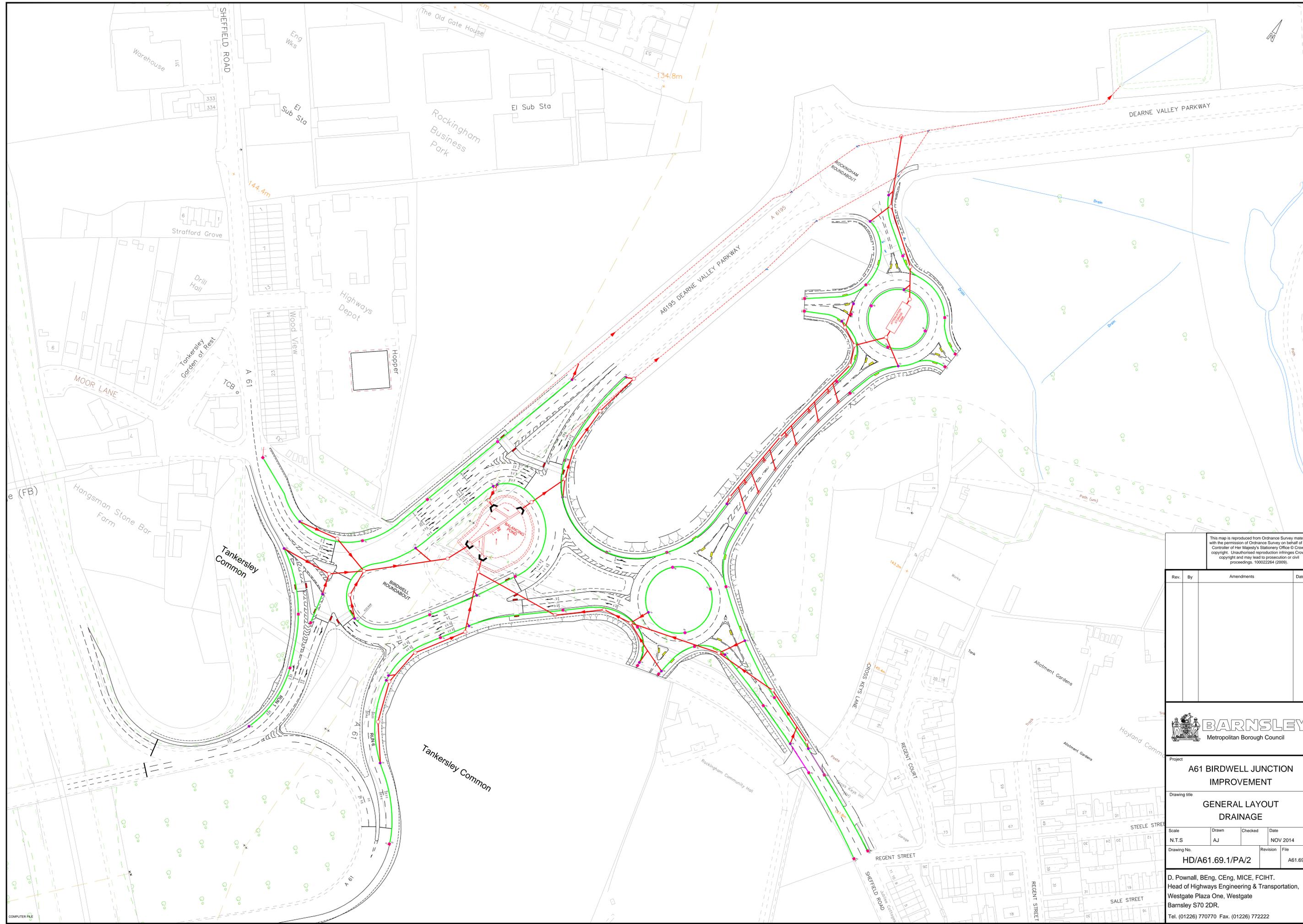
Title  
Notes

Partial Key  
For Scale = 1:1  
For Scale = 1:1  
For Scale = 1:1  
For Scale = 1:1  
For Scale = 1:1

Client Ref: 25020218, 10,3109 Date Gen: 25/09/2018, 10:48:30  
Source: Sewer Network Enquiry

This plan is intended as a general guide only and is not intended to be used as a basis for any legal proceedings. The plan is subject to the terms and conditions of the contract between the client and the contractor.

**APPENDIX 7**



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Rev.	By	Amendments	Date



**A61 BIRDWELL JUNCTION IMPROVEMENT**

**GENERAL LAYOUT DRAINAGE**

Scale	Drawn	Checked	Date
N.T.S	AJ		NOV 2014
Drawing No.	Revision	File	
HD/A61.69.1/PA/2		A61.69.1	

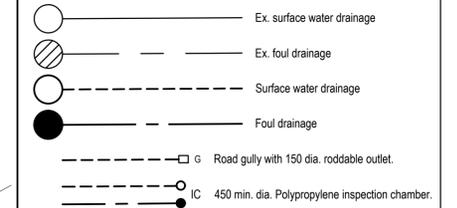
D. Pownall, BEng, CEng, MICE, FCIHT.  
 Head of Highways Engineering & Transportation,  
 Westgate Plaza One, Westgate  
 Barnsley S70 2DR.  
 Tel. (01226) 770770 Fax. (01226) 772222

**APPENDIX 8**

INFORMATION WITHIN THIS DRAWING IS NOT NECESSARILY PRODUCED TO SCALE. ALWAYS USE FIGURED DIMENSIONS AND CO-ORDINATES - IF IN DOUBT, ASK.

NOTES

- This drawing to be read in conjunction with Eastwood & Partners drawing number 39724/042.
- All pipes shall be either -
  - A - Vitrified clay to BS EN 295 with a minimum crushing strength as follows -  
150 dia. - 40 kN/m  
225 dia. - 45 kN/m  
300 dia. - 72 kN/m
  - OR
  - B - Class H concrete to BS 5911.
  - OR
  - C - PVC to have BSI kitemark status (certified to WIS 4-35-01) Wavin or similar approved. Maximum pipe length to be 3m.
- All pipes are to be laid soffit to soffit at manholes unless noted otherwise.
- Pipes entering manholes and road gullies shall have a flexible joint within 600 of the inside of the manhole or gully joining with a short Rocker pipe.
- All pipes to be 100 dia. unless noted otherwise.
- All works and materials to be in accordance with "Sewers for Adoption" (6th edition), bedded with a Class S granular bed and surround as a minimum requirement. Pipes within highways with cover less than 1200 to have a Class Z concrete bed and surround. Pipes within paved areas with cover less than 600 to have a Class Z concrete bed and surround. Pipes within landscaped areas with cover less than 300 to have a Class Z concrete bed and surround.
- All trenches in roads and paved areas shall be backfilled with Type 1 DOT granular sub-base material.
- All cover levels are indicative only. Covers to be set to suit camber/gradient of existing and proposed surfacings.
- The invert levels at the proposed points of connection to existing drains shall be checked before any new drains are constructed. Any variation to the levels shown on the drawing shall be notified to Eastwood & Partners.



F	As Built Issue.	GB	JEST	18.12.19
E	S5 repositioned & levels amended and underside of storage level amended, all to suit tank supplier's detail proposals.	MW	AP	03.06.19
D	Construction Issue	MW	AP	22.03.19
C	Foul drainage revised to suit required "pop-up" locations. S10 base levels lowered.	MW	AP	18.03.19
B	Waiting Bay and Staff Parking Bay repositioned.	MW	AP	17.02.19
A	First Issue.			
REV	DESCRIPTION	SIG	CHK	DATE

E.V WADDINGTON LTD.

ROCKINGHAM

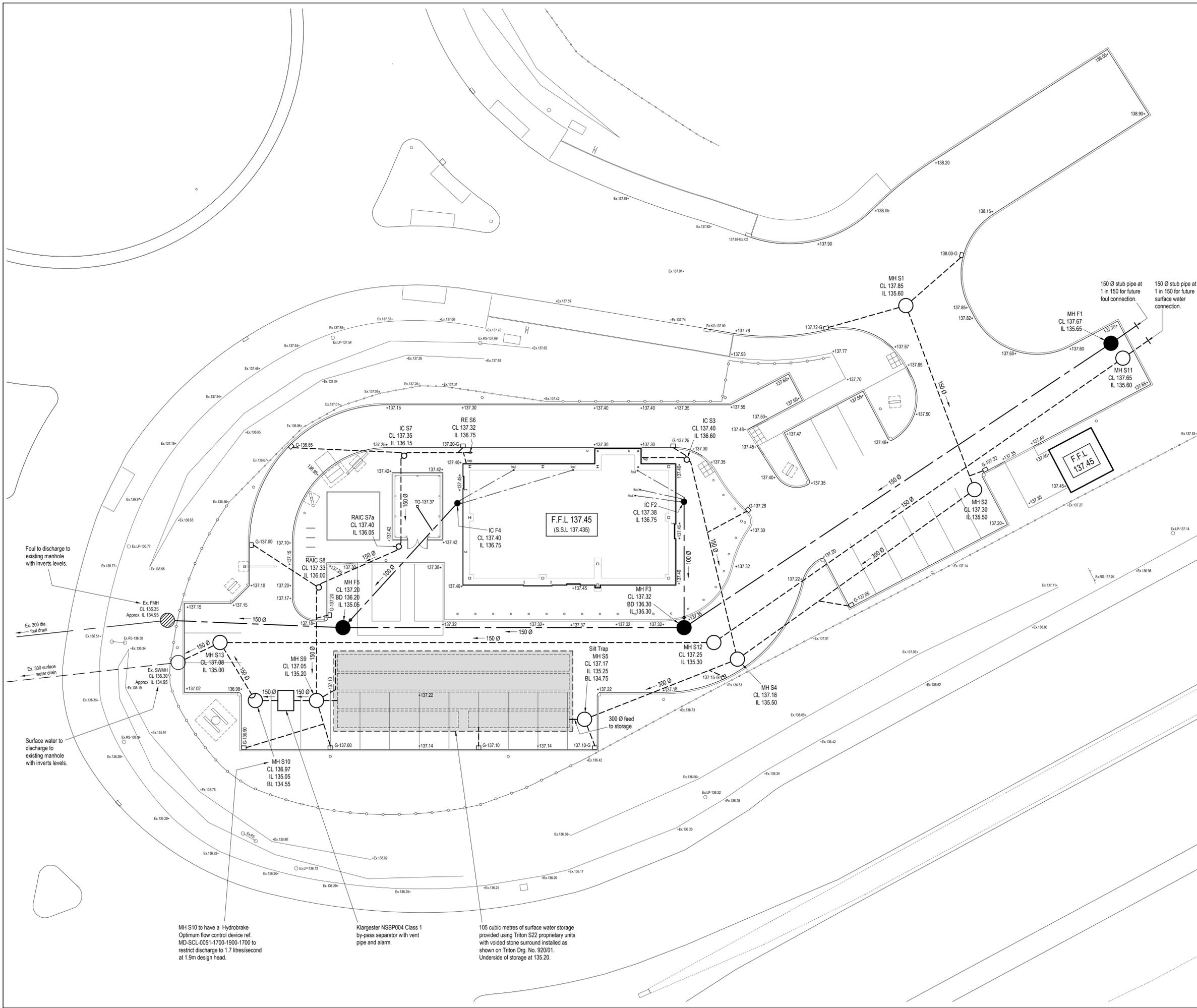
STARBUCKS  
EXTERNAL DRAINAGE LAYOUT

**Eastwood & Partners**  
CONSULTING ENGINEERS

St. Andrew's House  
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S11 9AS  
Tel 0114 255 4554  
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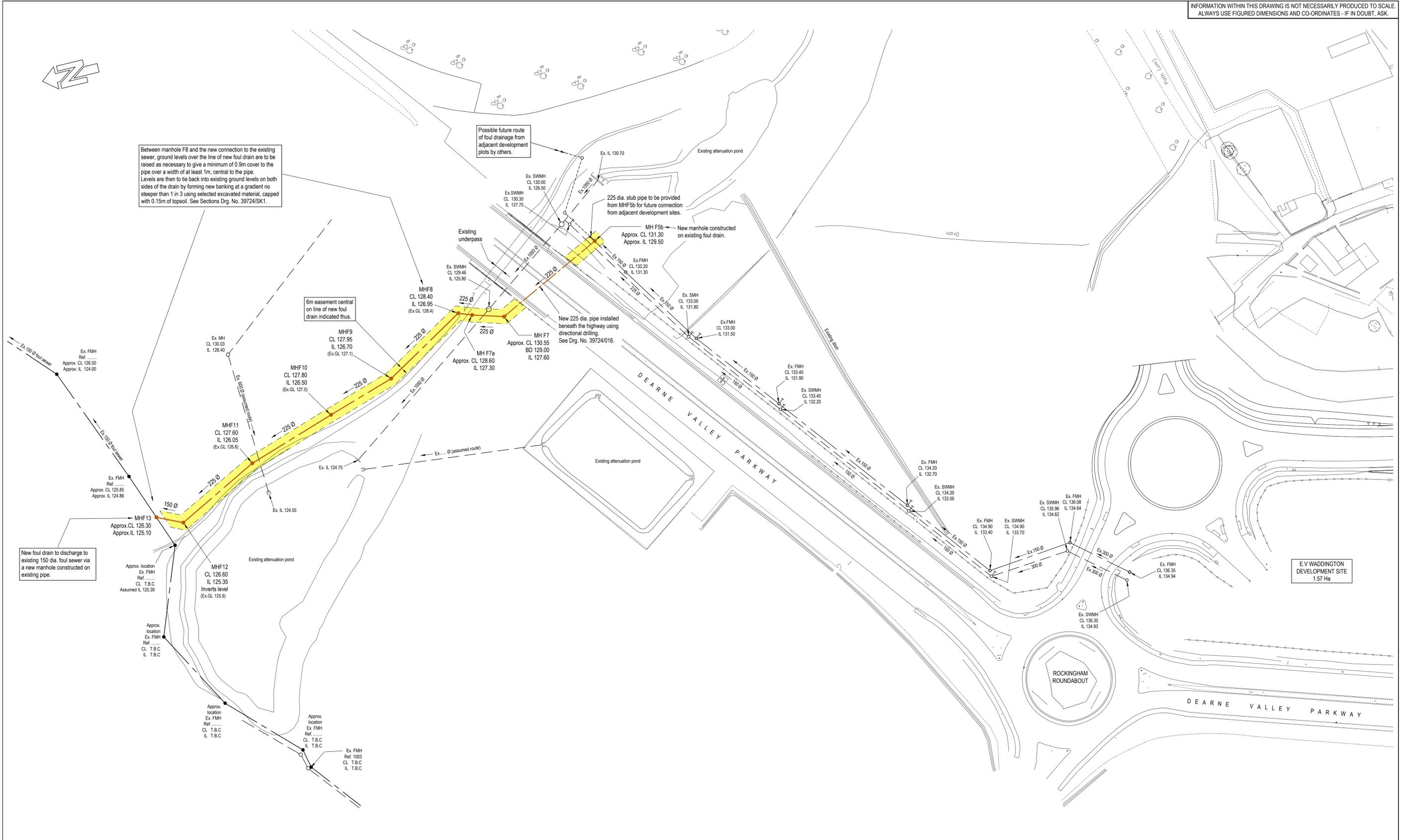
SCALE WHEN PLOTTED AT 1:150		DRAWING STATUS <b>AS BUILT</b>	
DRAWN MW	CHECKED AP	DATE 14-02-19	DRAWING NUMBER 39724/041
			REV F



MH S10 to have a Hydrobrake Optimum flow control device ref. MD-SCL-0051-1700-1900-1700 to restrict discharge to 1.7 litres/second at 1.9m design head.

Klargester NSBP004 Class 1 by-pass separator with vent pipe and alarm.

105 cubic metres of surface water storage provided using Triton S22 proprietary units with voided stone surround installed as shown on Triton Drg. No. 920/01. Underside of storage at 135.20.



NOTES

REV	DESCRIPTION	SIG	CHK	DATE
A	First Issue.			
B	Revised to take foul drain across Dearne Valley Parkway using directional drilling. Drawing re-titled.	MW	AP	03.07.19
C	Length of adoptable drainage updated.	MW	AP	15.04.20

**E.V. WADDINGTON LTD.**

**ROCKINGHAM**

**OFF-SITE FOUL DRAINAGE TAKEN BENEATH DEARNE VALLEY PARKWAY**

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SCALE WHEN PLOTTED AT A1  
1:750

DRAWING STATUS  
**CONSTRUCTION**

DRAWN	CHECKED	DATE	DRAWING NUMBER	REV
MW	AP	03-07-19	39724/010	C

**APPENDIX 9**

SUDS Type	SUDS Technique	Description	Suitable	Comments
Source Control	Green roof	Vegetated roof that reduces runoff volume and rate	No	Expected lightweight steel frame.
	Rainwater harvesting/rainwater butts	Rainwater is stored and re-used	No	Only very low volumes required.
	Permeable paving	Paving which allows inflow of rainwater into underlying construction/soil	Possible	May be suitable for car parking area. Private permeable paving areas could provide limited infiltration within the underlying construction material. Unsuitable for heavier vehicles in commercial yards.
Infiltration	Soakaway	Pit or trench which stores and disposes of water to the ground	No	Presence of impermeable ground and deep made ground.
	Filter Drain	Trench which conveys and/or disposes of water to the ground.	No	
	Infiltration Basin	Shallow basin which stores and disposes of water to the ground	No	
Conveyance	Swale	Shallow vegetated depression which conducts and retains water	No	Site topography prevents use.
Detention	Subsurface storage	Traditional underground pipes, tank storage, or modular systems	Yes	Insufficient open space.
	Detention Basin	Normally dry but may have small permanent water pools at the inlet and outlet. They can function as POS	No	
	Pond	Permanent body of water	No	
	Wetland	Permanent body of shallow water or marsh	No	