

212026  
Banbury 200,  
Southam Road,  
Banbury,  
OX16 2FW

## Foul and Surface Water Drainage and Flood Risk Planning Report

Document Control:

Revision	Status	Date	Prepared	Checked	Approved
PL1	For Planning	20/01/21	JC	ED	JL
PL2	For Planning	27/01/21	JC	ED	JL

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## 1.0 Introduction

This report forms part of a Planning Application for refurbishment works to an existing industrial site located on Southam Road, Banbury.

The development will involve the use of the site for the storage of operational vehicles, elevational alterations, associated parking, vehicle barriers, guard hut and associated infrastructure.

This report addresses the surface water drainage, foul water drainage and flood risk for the proposed development.

The layout of the proposed development is detailed in the series of planning drawings by S+SA Architects submitted with this application.

## 2.0 Site Layout and Location

### 2.1 Site Location

The location of the proposed development is identified in red in Figure 1 below.



*Figure 1 - Subject Site Location*

The site is located on Southam Road, Banbury, OX16 2FW. The site is bounded on the north and east by existing industrial units, on the west by an existing car park and on the south by a cemetery.

The proposed development involves the use of the site for the storage of operational vehicles, elevational alterations, associated parking, vehicle barriers, guard hut and associated infrastructure.

### 3.0 Surface Water Drainage

The existing surface water drainage network for the site consists of a series of rainwater downpipes, gullies and channel drains which collect surface water runoff from the existing building and hardstanding areas.

Surface water runoff from the site is ultimately conveyed via the existing site surface water drainage network to a predominately culverted stream located along the northern boundary of the site which flows west to east.

In July 2018 planning permission was granted to change the use of premises from Class B8 to B1c/B2/B8, including internal and external alterations, demolition of ancillary structures and new access to Southam Road (Application No. 18/01246/F). Part of these works included recladding the building and extending the existing hardstanding areas.

These new hardstanding areas were collected in a new separate surface water drainage network and attenuated to a greenfield runoff rate of 2.3 l/s. An attenuation volume of 319m<sup>3</sup> was provided along the southern site boundary to cater for the 1 in 100 year rainfall event with a 30% allowance for climate change. The attenuation tank outfalls to a duty/assist surface water pump station which locally lifts the flows via a rising main to the car parking area on the eastern boundary of the site. The rising main then discharges into the existing site surface water drainage network, where flows fall via gravity to the existing culverted stream located on the northern site boundary.

As part of the works proposed in this planning application there will be no increase in hardstanding areas on site, or changes to the existing hardstanding extents. The existing surface water network will remain in place and will be entirely unaltered by the proposed works.

As such as there will be no increased surface water runoff from the site the existing surface water drainage network is considered to be appropriate for the works proposed in this planning application. The record site drainage network drawing is included in Appendix A for reference. The record Thames Water public drainage network drawings are included in Appendix B for reference.

## 4.0 Foul Water Drainage

The existing foul water drainage network for the site consists of a gravity pipe network which collects foul flows from the existing warehouse and conveys them to the public sewer network.

Foul flows are collected along the southern and northern building elevations via the site foul water drainage network that ultimately discharges to the 225mm/300mm public foul sewer located in Southam Road.

As part of the works proposed in this planning application and the associated daily operations of the facility, it is anticipated that there will be no significant increase in foul flows from the site.

As such as it is anticipated that there will be no significant increase in foul flows from the site the existing foul water drainage network is considered to be appropriate for the works proposed in this planning application. The record site drainage network drawing is included in Appendix A for reference. The record Thames Water public drainage network drawings are included in Appendix B for reference.

## 5.0 Flood Risk

As part of the granted July 2018 planning application (Application No. 18/01246/F) for the change of use of the premises and additional hardstanding areas, a Flood Risk Assessment (FRA) was carried out for the whole site by T.R. Collier & Associates. The FRA has been included in Appendix C for reference.

The FRA was carried out in accordance with the National Planning Policy Framework (NPPF) and determined that the site is located entirely within Flood Zone 1 (Low Probability) and that the development type is classified as less vulnerable and therefore is considered appropriate.

Along the northern site boundary where a section of the stream crossing the site is not culverted and along the access road onto Southam Road and the car park area there is a medium to high risk of surface water flooding. Surface water flooding occurs during intense rainfall events when the surface water drainage network becomes inundated. In order to mitigate against this flood risk a freeboard should be provided between the building finished floor level and peak flood level, and an overland flow route should be provided away from the building.

As detailed in the FRA there is approximately 1m freeboard between the peak flood level (95.8m AOD) and the finished floor level of the building (96.8m AOD). All areas at risk of surface water flooding also have an overland flow route away from the building.

The FRA also noted that as there were no proposed changes to the external levels there was no increased risk of flooding to adjacent/downstream sites.

In conclusion the site is located entirely within Flood Zone 1, the development is considered appropriate, there are passive flood mitigation measures in place to address the surface water flood risk and there is no increased risk to adjacent/downstream sites.

As the works proposed in this planning application will not alter the existing site hardstanding extents or levels the findings of the previous FRA are considered appropriate and relevant for this planning application.



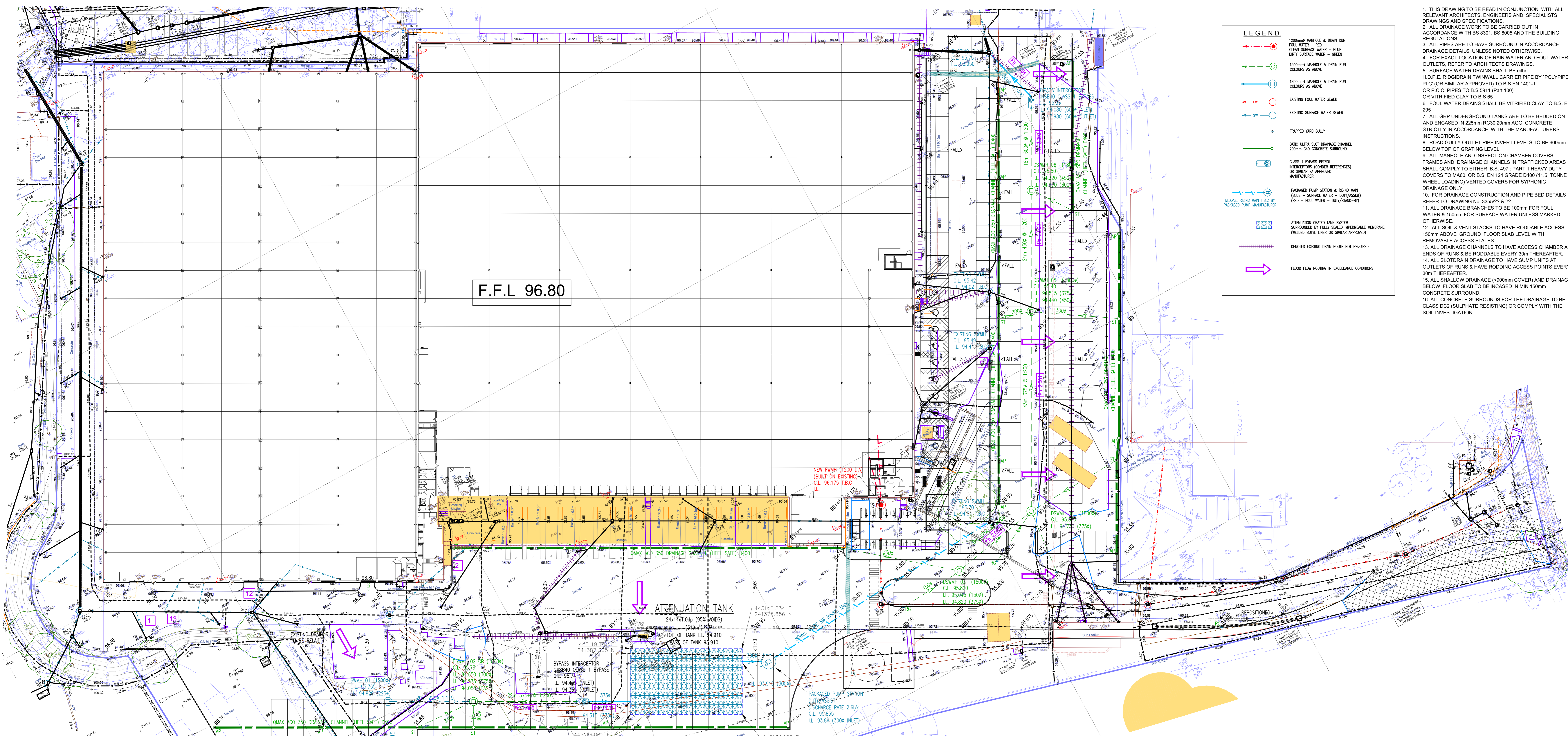
## Appendix A – Record Site Drainage Network Drawing

**DRAINAGE NOTES**

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
2. ALL DRAINAGE WORK TO BE CARRIED OUT IN ACCORDANCE WITH BS 8301, BS 8005 AND THE BUILDING REGULATIONS.
3. ALL PIPES ARE TO HAVE SURROUND IN ACCORDANCE WITH ARCHITECTS DRAWINGS.
4. FOR EXACT LOCATION OF RAIN WATER AND FOUL WATER OUTLETS, REFER TO ARCHITECTS DRAWINGS.
5. SURFACE WATER DRAINS SHALL BE EITHER H.D.P.E. RIDGIDRAIN TWINWALL CARRIER PIPE BY POLYPIPE PLC (OR SIMILAR APPROVED) TO B.S EN 1401-1 OR P.C.C. PIPES TO B.S 5911 (Part 100) OR VITRIFIED CLAY TO B.S 85.
6. FOUL WATER DRAINS SHALL BE VITRIFIED CLAY TO B.S. EN 295.
7. ALL GRP UNDERGROUND TANKS ARE TO BE BEDDED ON AND ENCASED IN 225mm RC30 20mm AGG. CONCRETE STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
8. ROAD GULLY OUTLET PIPE INVERT LEVELS TO BE 600mm BELOW TOP OF GRATING LEVEL.
9. ALL MANHOLE AND INSPECTION CHAMBER COVERS, FRAMES AND DRAINAGE CHANNELS IN TRAFFICED AREAS SHALL COMPLY TO EITHER B.S. 497 - PART 1 HEAVY DUTY COVERS TO M40, OR B.S. EN 124 GRADE D400 (11.5 TONNE WHEEL LOADING) VENTED COVERS FOR SYPHONIC DRAINAGE ONLY.
10. FOR DRAINAGE CONSTRUCTION AND PIPE BED DETAILS REFER TO DRAWING No. 355577 & ??.
11. ALL DRAINAGE BRANCHES TO BE 100mm FOR FOUL WATER & 150mm FOR SURFACE WATER UNLESS MARKED OTHERWISE.
12. ALL SOIL & VENT STACKS TO HAVE RODDABLE ACCESS 150mm ABOVE GROUND FLOOR SLAB LEVEL WITH REMOVABLE ACCESS PLATES.
13. ALL DRAINAGE CHANNELS TO HAVE ACCESS CHAMBER AT ENDS OF RUNS & BE RODDABLE EVERY 30m THEREAFTER.
14. ALL SLOTDRAIN DRAINAGE TO HAVE SUMP UNITS AT OUTLETS OF RUNS & HAVE RODDING ACCESS POINTS EVERY 30m THEREAFTER.
15. ALL SHALLOW DRAINAGE (<900mm COVER) AND DRAINAGE BELOW FLOOR SLAB TO BE INCASED IN MIN 150mm CONCRETE SURROUND.
16. ALL CONCRETE SURROUNDS FOR THE DRAINAGE TO BE CLASS DC2 (SULPHATE RESISTING) OR COMPLY WITH THE SOIL INVESTIGATION.

**LEGEND.**

- 1200mm MANHOLE & DRAIN RUN  
FOUL WATER - RED  
CLEAN SURFACE WATER - GREEN
- 1500mm MANHOLE & DRAIN RUN  
CLEAN SURFACE WATER - BLUE
- 1500mm MANHOLE & DRAIN RUN  
FOUL WATER - RED
- EXISTING FOUL WATER SEWER
- EXISTING SURFACE WATER SEWER
- TRAPPED VARD GULLY
- GATE ULTRA SLOTDRAIN CHANNEL  
300mm x 400 CONCRETE SURROUND
- CLASS 1 BYPASS PETROL  
INTEGRATED (COVER REFERENCES)  
OR SIMILAR APPROVED  
MANUFACTURER
- PACKAGED PUMP STATION & RISING MAIN  
(BLUE - SURFACE WATER - DWT/ASST)  
(RED - FOUL WATER - DWT/STAND-BY)
- ATTENUATION CHAMBER TANK SYSTEM  
SURROUNDED BY FULLY SEALED IMPERMEABLE MEMBRANE  
(WELDED BUTY LNER OR SIMILAR APPROVED)
- DENOTES EXISTING DRAIN ROUTE NOT REQUIRED
- FLOOD FLOW ROUTING IN EXCESSIVE CONDITIONS

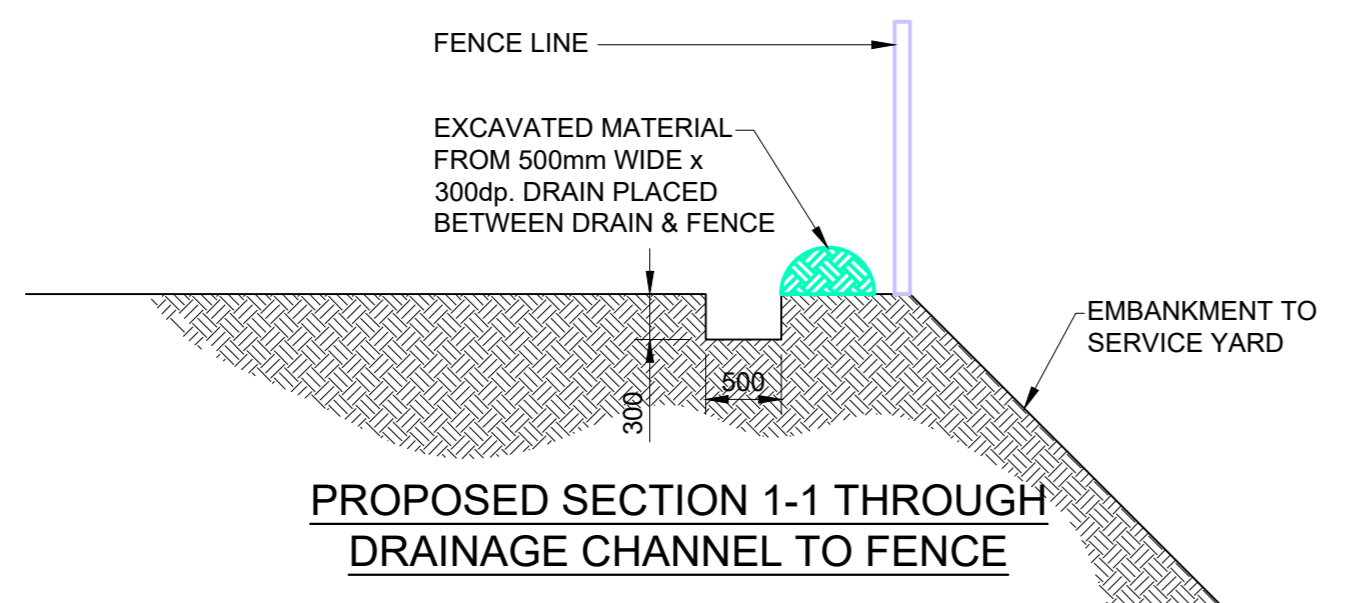


F.F.L 96.80

**SURFACE WATER DESIGN CRITERIA**  
DISCHARGE RATE = 2.3 l/s)  
BASED ON 5 l/s/Ha (Greenfield Run-off)  
Soakaway designed for 1:100 year return  
storm + 30% climate change  
using FEH Rainfall Figures

**AS BUILT**

- 5 DENOTES DRAINAGE REPAIR REFERENCES**
- 1 - MANHOLE COVERS TO BE RE-USED AND RE-SET
  - 2 - CEMENT BLOCKAGE
  - 3 - CEMENT BLOCKAGE
  - 4 - CEMENT BLOCKAGE
  - 5 - CEMENT BLOCKAGE
  - 6 - CRACKED PIPE - REPLACE 4m LENGTH
  - 7 - REPLACE CRACKED PIPE
  - 8 - CEMENT BLOCKAGE
  - 9 - CRACKED PIPE - REPLACE 3m
  - 10 - CRACKED PIPE - REPLACE 3m
  - 11 - CEMENT BLOCKAGE
  - 12 - CRACKED PIPE - REPLACE 5m
  - 13 - CRACKED PIPE - REPLACE 3m



**SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION**

IN ADDITION TO THE HAZARDS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, NOTE THE ADDITIONAL RISKS:

**CONSTRUCTION**  
IT IS CONSIDERED THAT THE PROPOSED WORKS ARE WITHIN THE SCOPE OF A COMPETENT CONTRACTOR AND AS SUCH NO UNUSUAL HAZARDS HAVE BEEN IDENTIFIED, WITH THE EXCEPTION OF THE FOLLOWING:  
THE CONTRACTOR TO PROVIDE METHOD STATEMENTS TO HIGHLIGHT & MINIMISE RISKS FOR ELEMENTS OF WORK INDICATED ON THIS DRAWING MAINLY WORKING AT DEPTH & THE REQUIRED TEMPORARY SUPPORT FOR EARTHWORKS.

**MAINTENANCE/CLEANING/OPERATION**  
JETTING OF PIPEWORK/MANHOLES TO BE BY UNDERTAKEN AT REGULAR INTERVALS (APPROX 6 MONTHS) BY SPECIALIST.

**DECOMMISSIONING/DEMOLITION**  
NO SPECIAL REQUIREMENTS

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

REV	DATE	DESCRIPTION	CHK	DRN
AB1	30.07.19	AS BUILT ISSUE	TC	DW
M	12.06.19	SECTION 1-1 ADDED	TC	DW
L	31.05.19	ADDITIONAL LEVELS ADDED	TC	DW
K	30.04.19	SSL UNDER CANOPY REVISED	TC	DW
J	11.04.19	MOVED DOOR LEVELS ADDED	TC	DW
H	04.04.19	ADDITIONAL ENTRANCE LEVELS ADDED	TC	DW
G	25.03.19	MANHOLE ADDED	TC	DW
F	18.02.19	PIPE NUMBERS AND EXCEEDANCE ARROWS ADDED	TC	CE
E	15.02.19	ATT. TANK CO-ORDS ADDED	TC	DW
D	14.02.19	ATT. TANK I.L. REVISED	TC	DW
C	22.01.19	CHANNEL DETAILS ADDED	TC	CE
B	21.01.19	DRAINAGE CHANNEL REVISED	TC	DW
A	19.11.18	CONSTRUCTION ISSUE	TC	LD
T1	26.09.18	TENDER ISSUE	TC	LD
P1	26.07.18	PRELIMINARY ISSUE	TC	LD

**T. R. COLLIER & ASSOCIATES.**  
CONSULTING ENGINEERS

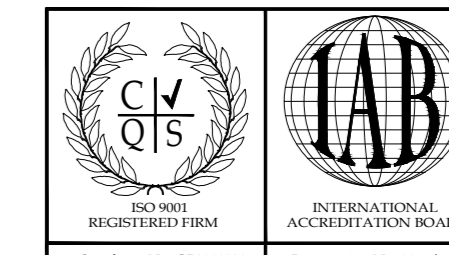
Rochester House 275 Belslow Road  
Chesham Bucks MK37 7QA  
Telephone 01295 502000  
Facsimile 01295 502000  
Email: admin@trcollier.co.uk

PROJECT  
**UNIT 200**  
**RUSHCOTE AVENUE, BANBURY**

TITLE  
**DRAINAGE LAYOUT**

ARCHITECT  
**UMC ARCHITECTS**

DRAWN	DESIGNED	CHECKED
LD	TC	TC
DATE	SCALE	STATUS
June 18	1:300	AS BUILT



3852/50

## Appendix B – Record Thames Water Public Drainage Network Drawings



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 445250,241750

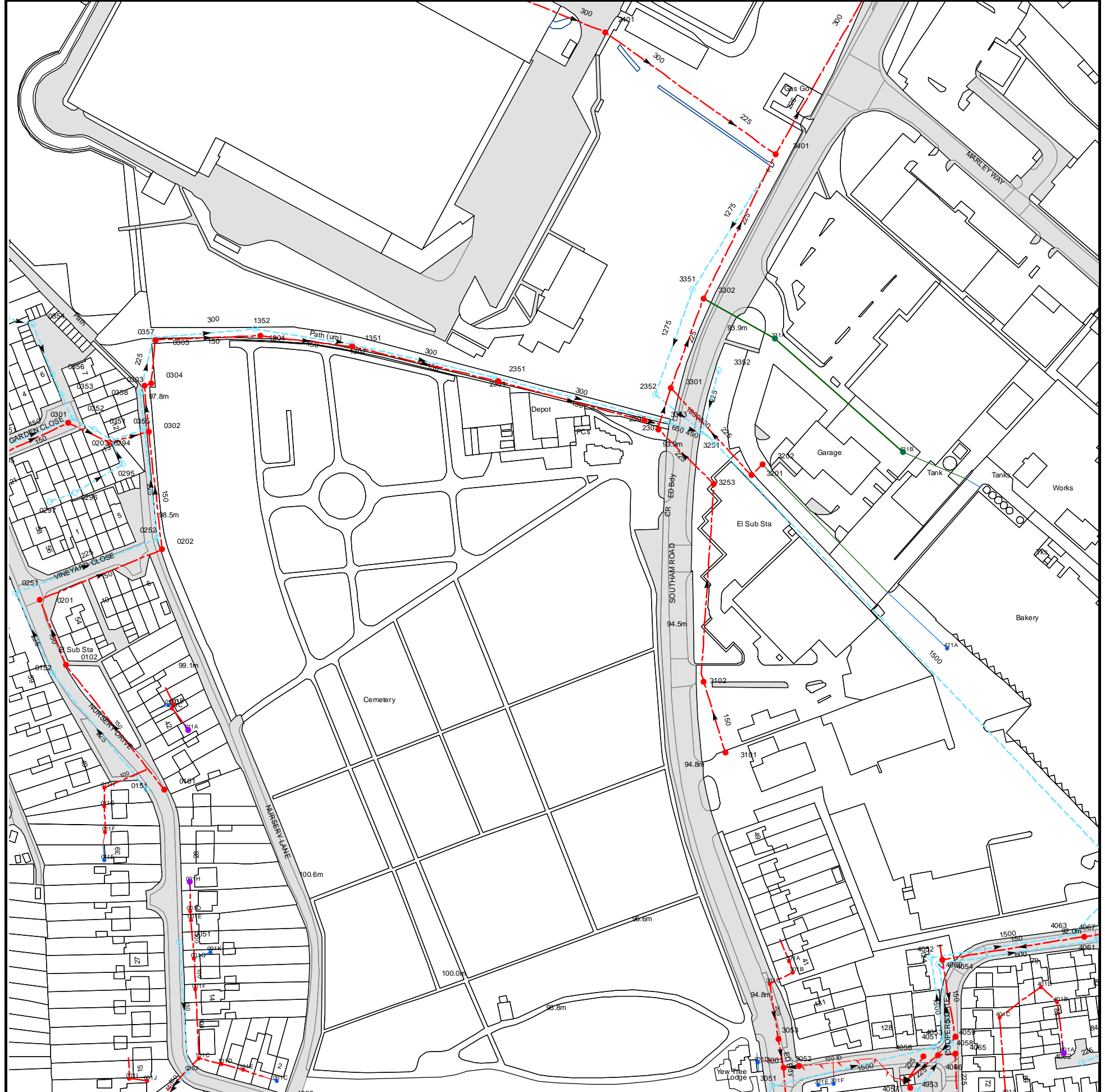
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
391A	n/a	n/a
491A	n/a	n/a
491B	n/a	n/a
1752	102.43	100.37
1753	101.52	99.34
2501	96.93	91.58
1501	96.79	92.39
0501	97.04	93.23
0602	99.03	97.18
0652	99.04	97.49
0651	100.65	98.86
0601	100.78	98.61
1751	102.73	101.35
0701	102.44	100.55
3501	94.07	89.35
451C	n/a	n/a
451B	n/a	n/a
4501	93.98	88.96
451A	n/a	n/a
4502	93.74	88.42
4754	93.01	91.91
4753	93.76	91.92
4794	92.829	n/a
471A	n/a	n/a
471B	n/a	n/a
4752	93.99	91.84
4751	93.67	91.14
3891	99.18	96.23
2850	n/a	n/a

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The width of the displayed area is 500m and the centre of the map is located at OS coordinates 445250,241250

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NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3401	94.57	89.69
2401	95.85	90.83
0252	98.37	97.5
0202	98.31	97.2
0101	101.26	99.97
011D	n/a	n/a
011C	n/a	n/a
011B	n/a	n/a
011A	n/a	n/a
1352	n/a	n/a
1301	96.68	94.87
1351	95.55	94.31
1302	95.52	93.66
2351	94.48	93.56
2301	94.23	93.08
2302	93.93	92.5
2352	94.45	91.1
2303	94.07	90.7
3353	94.17	92.71
3301	94.47	90.56
3351	95.15	91.77
3302	95.03	90.43
3102	n/a	n/a
3253	n/a	n/a
3251	93.89	90.1
3352	93.99	93.16
3101	94.39	91.81
3201	93.41	91.14
3202	93.27	91.15
331A	n/a	n/a
0251	101.17	99.62
0354	99.09	98.61
0201	101.09	98.74
0297	n/a	n/a
0356	99.17	98.49
0152	101.49	99.94
0353	99.12	97.97
0102	101.44	99.1
0301	99.31	97.85
0352	99.21	97.71
0296	n/a	n/a
0351	98.93	97.29
011E	n/a	n/a
011G	n/a	n/a
011H	n/a	n/a
011F	n/a	n/a
0203	98.53	97.17
0294	n/a	n/a
0295	n/a	n/a
0358	n/a	n/a
0355	97.77	96.75
0303	97.58	96.18
0151	101.22	100.14
0302	97.77	96.53
0304	97.52	96.01
0357	97.5	96.27
0305	97.51	95.85
001I	n/a	n/a
001J	n/a	n/a
0051	101	99.83
0052	100.72	98.85
001H	n/a	n/a
001D	n/a	n/a
001E	n/a	n/a
001G	n/a	n/a
001F	n/a	n/a
101C	n/a	n/a
001K	n/a	n/a
101D	n/a	n/a
101E	n/a	n/a
001C	n/a	n/a
301D	n/a	n/a
301C	n/a	n/a
301E	n/a	n/a
301F	n/a	n/a
4056	92.72	89.44
4066	92.7	89.34
4065	92.57	n/a
401A	n/a	n/a
4051	92.77	90.11
4058	92.6	90.71
3053	n/a	n/a
4053	92.72	90.1
4059	92.55	89.43
401C	n/a	n/a
401B	n/a	n/a
401D	n/a	n/a
301B	n/a	n/a
4054	92.56	90.57
301A	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
4060	n/a	89.86
4052	92.34	90.66
4061	n/a	n/a
4067	92.15	90.19
4063	91.03	n/a
421A	n/a	n/a
421B	n/a	n/a
4953	93.32	90.82
4057	93.43	92.1
3051	94.71	90.46
3001	94.63	93.42
3052	94.33	93.58
4062	92	91



















The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.










# ALS Sewer Map Key

## Public Sewer Types (Operated & Maintained by Thames Water)

-  **Foul:** A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
-  **Surface Water:** A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
-  **Combined:** A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
-  Trunk Surface Water
-  Trunk Foul
-  Storm Relief
-  Trunk Combined
-  Vent Pipe
-  Bio-solids (Sludge)
-  Proposed Thames Surface Water Sewer
-  Proposed Thames Water Foul Sewer
-  Gallery
-  Foul Rising Main
-  Surface Water Rising Main
-  Combined Rising Main
-  Sludge Rising Main
-  Proposed Thames Water Rising Main
-  Vacuum





## Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

-  Air Valve
-  Dam Chase
-  Fitting
-  Meter
-  Vent Column




## Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

-  Control Valve
-  Drop Pipe
-  Ancillary
-  Weir





## End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

-  Outfall
-  Undefined End
-  Inlet






## Other Symbols

Symbols used on maps which do not fall under other general categories








-  Public/Private Pumping Station
-  Change of characteristic indicator (C.O.C.I.)
-  Invert Level
-  Summit

## Areas

Lines denoting areas of underground surveys, etc.

-  Agreement
-  Operational Site
-  Chamber
-  Tunnel
-  Conduit Bridge

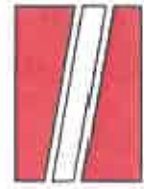
## Other Sewer Types (Not Operated or Maintained by Thames Water)

-  Foul Sewer
-  Surface Water Sewer
-  Combined Sewer
-  Gully
-  Culverted Watercourse
-  Proposed
-  Abandoned Sewer

### Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.
- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

## Appendix C – July 2018 Flood Risk Assessment



## **Flood Risk Assessment**

**Graftongate Developments Ltd**

**Banbury 200 Unit,  
Southam Road,  
Banbury**

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## **1. INTRODUCTION**

T.R. Collier & Associates Ltd have been commissioned by Graftongate Developments Ltd to carry out a Flood Risk Assessment report (FRA) for an existing development of a site at Southam Road, Banbury, OX16 2NL. A site location plan is enclosed in Appendix A.

With reference to the indicative flood maps published by the Environment Agency, the site is shown to lie within Flood Zone 1, 2 and 3.

The building is at a level to be in Flood Zone 1 with the external area's, car parking and service yards in Zones 2 and 3.

The proposed development is to renovate an existing building by changing the cladding with the external area's to remain generally as is but replacing the wearing course, all existing drainage is to remain.

There is a marginal increase in external area's which will require new drainage and reduced discharge.

This FRA report has been prepared in accordance with the requirements contained within National Planning Policy Framework (NPPF, March 2012) and the associated Technical Guidance. The guidance refers to the Environment Agency's "standing advice" on flood risk. Based on requirements set by the Environment Agency, a Flood Risk assessment is needed to support the planning application.

This report has been prepared in accordance with (i) National Planning Policy Framework (NPPF), (Department for Communities and Local Government, March 2012) and the accompanying (ii) Technical Guidance to the National Planning Policy Framework (Department for Communities and Local Government, March 2012); and (iii) Strategic Flood Risk Assessment (SFRA) undertaken on behalf of Cherwell District Council and West Oxfordshire County Council (Scott Wilson, 2009) (iv) and other statutory laws and local bylaws and rules.

It is stated in Paragraph 9 of the Technical Guidance to the National Planning Policy Framework that "...local planning authorities should only consider development in flood risk areas appropriate where informed by a site-specific flood risk assessment. This should identify and assess the risks of all forms for flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account".



This report has been based on readily available existing information, as listed below, and the aim is to identify any flood issues and outline a strategy to reduce and mitigate the flood risk to the proposed development and adjacent properties in accordance with the NPPF and its supporting Technical Guidance:

- Information published or explicitly provided by the Environment Agency;
- Information published by the Local Planning Authority, including the SFRA;
- A site specific topographical survey.
- Existing sewer records from Thames Water - June 2017
- Existing and Proposed site plan UMC Architects.



## **2 EXISTING SITE CONDITIONS**

### **2.1 Site description**

The proposed development is located at National Grid Reference (NGR) [444981;241514] at Southam Road, Banbury, OX16 2QU. This 2.20 ha site is bound to the North-West by Ruscote Ave, to the North and East by a Factory and to the South and South-West by houses and Nursery Drive. Refer to Appendix A for the Site Location Plan.

The site is currently occupied by existing buildings, service yard and parking. The northern portion includes a large surface water ditch running West to East which currently drains the site.



**Figure 2.1 - Aerial View of the existing development site**

### **2.2 Topography**

Based on the topographical survey, the low point of the site is in the western corner at 96.47m AOD. The existing service yards around the building are generally at approximately 96.5 m AOD.



A major feature of the site is a ditch running West to East in the northern portion of the site. This ditch is approximately 2.5m deep with the top of the ditch between 97.9 - 96.9 m AOD and the bottom between 95.3 - 94.8 m AOD. A short section of the ditch has been culverted to facilitate access to the northern most portion of the site.

Details of existing site levels are enclosed in Appendix B. The slab level to the building is at 96.80m AOD and the external levels are generally 95.6m AOD.

### 2.3 Geological Ground Conditions

Geological conditions at the site are detailed below and are based on the borehole logs from the site investigation report (Hydrock, July 2016). The focus of an FRA study on geology is on the potential movement of water through Made Ground, Drift Geology and Solid Geology.

These strata are depicted in Figure 2.2 & 2.3 and outlined in Table 2.1.

Formation	Description
Artificial ground/ Topsoil (Made ground)	As a result of the site's historic development, the depth of made ground/ topsoil varies between 0.3-0.9m.
Superficial Deposits (Drift Deposits)	Alluvium was encountered across the northern portion of the site at depths between 0.3-2.8m bgl. The remainder of the site is underlain by River Terrace formation, to a depth between 0.3 - 8.0m bgl.
Bedrock	The entire site is underlain by the Charmouth Mudstone Formation. The borehole logs indicate a layer of stiff grey clay transitioning to a weak laminated grey mudstone from a depth of 0.55m bgl to a depth at least 20m bgl.

Table 2.1 - Geological Ground Conditions

Ground water was mostly encountered at the transition from the superficial deposits to the Charmouth Mudstone formation, with water depths in groundwater monitoring pipes varying between 0.36 - 5.00 m bgl.



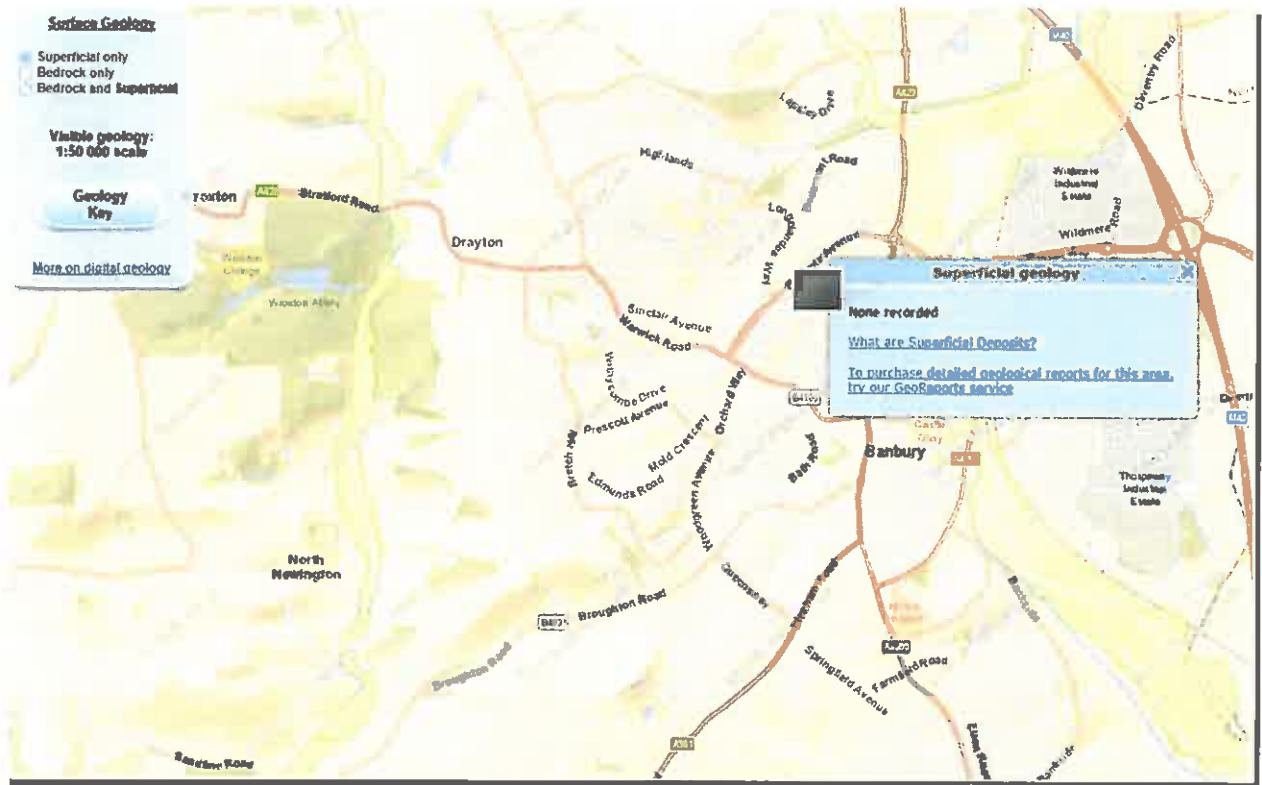
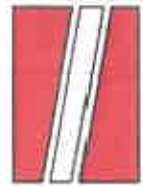


Figure 2.2 - BGS map showing superficial surface geology (approximate site boundary edged red).

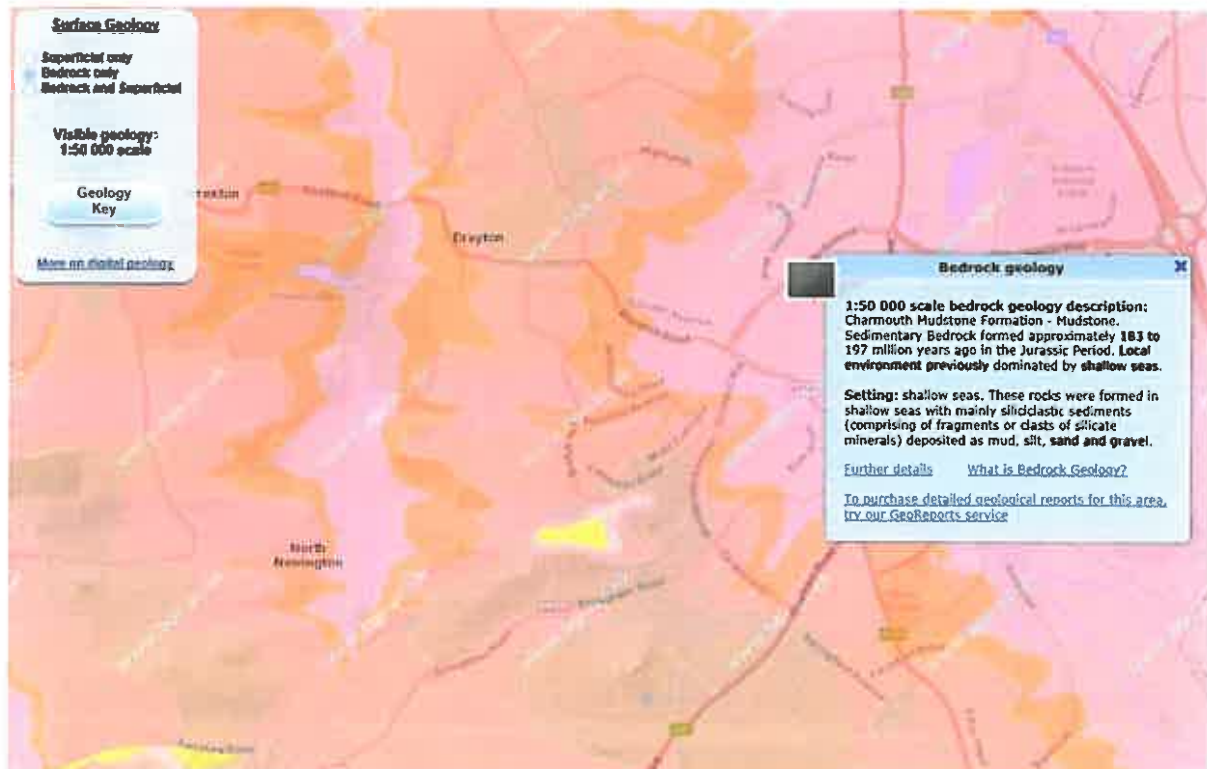


Figure 2.3 - BGS map showing bedrock surface geology (approximate site boundary edged red).



## 2.4 Hydrology

Groundwater details are depicted in Figure 2.4 & 2.5.

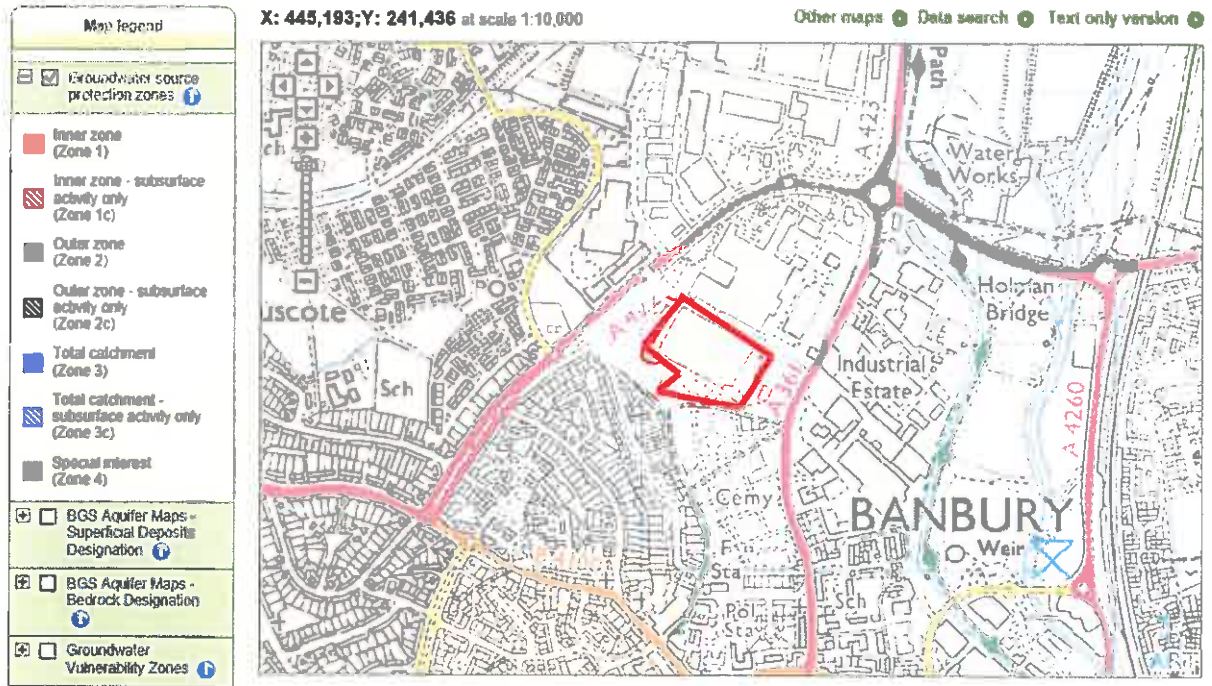


Figure 2.4 - EA Groundwater source protection zone (approximate site boundary edged red).

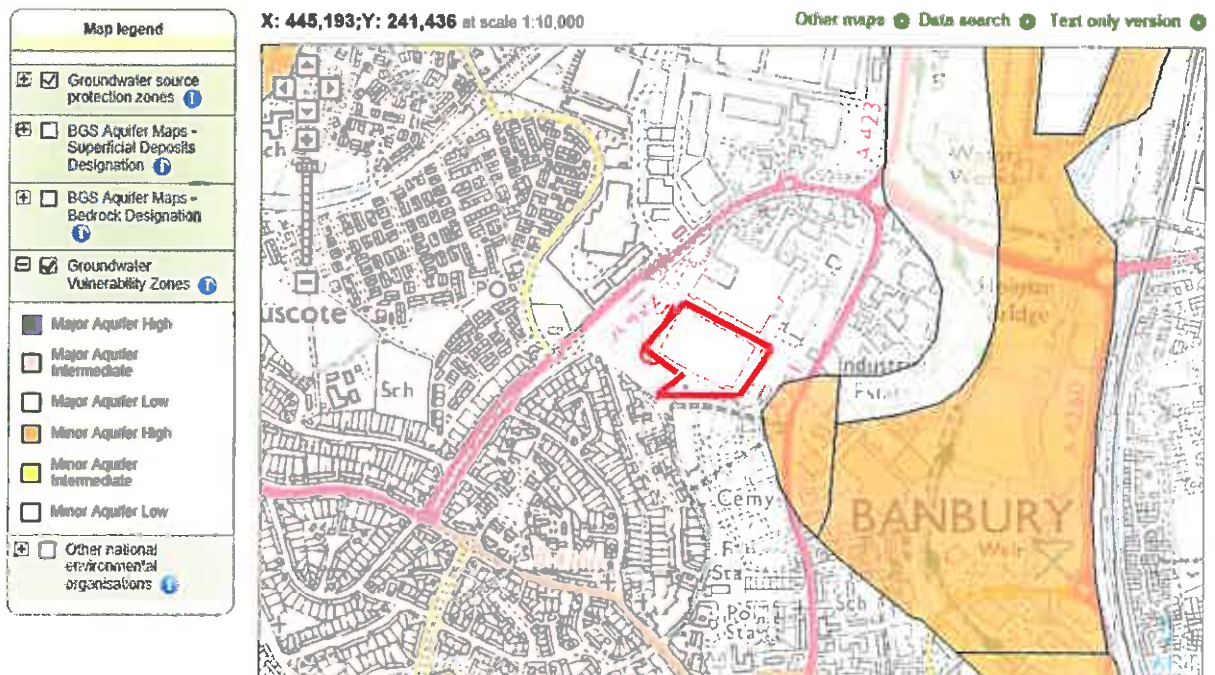


Figure 2.5 - EA Groundwater Map showing groundwater vulnerability zones (approximate site boundary edged red).



## 2.5 Hydrogeology

The site Hydrogeology is depicted in Figures 2.6, 2.7 and outlined in Table 2.2.

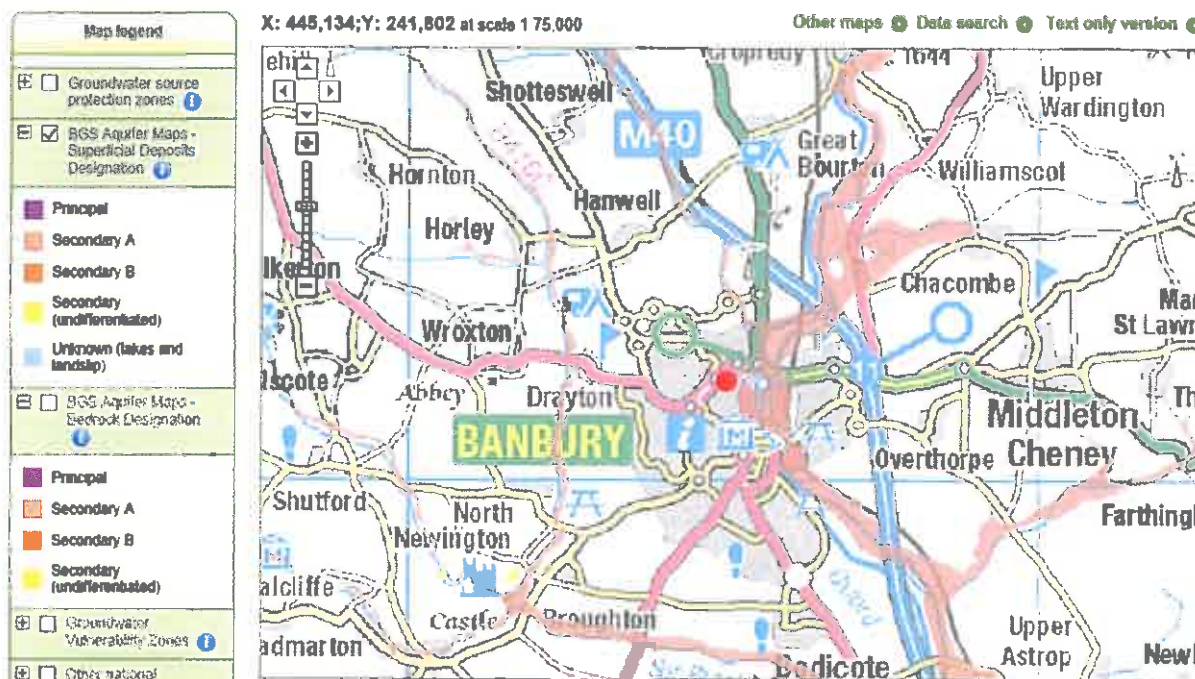


Figure 2.6 - EA Groundwater Map showing superficial deposit designations (approximate site location identified as a red dot).

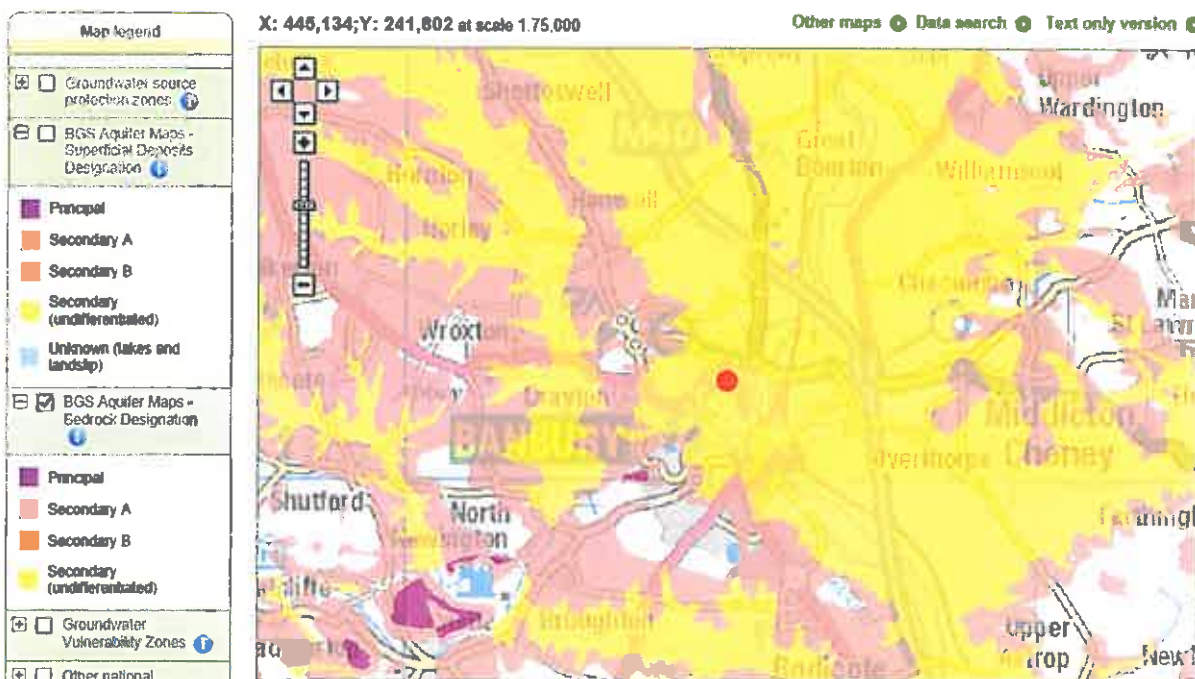


Figure 2.7 - EA Groundwater Map showing groundwater bedrock designations (approximate site location identified as a red dot).



Map Dataset	Designation	Comment
Groundwater source protection zone	None	<p>These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk.</p> <p>No designation means: no groundwater source zone is present.</p>
Aquifer Maps: Superficial deposits designation	None	<p>This identifies the type of aquifer present in the permeable unconsolidated (loose) deposits.</p> <p>None is defined as: unproductive strata. These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.</p>
Aquifer Maps: Bedrock deposits designation	Secondary (undifferentiated)	<p>This identifies the type of aquifer present in solid permeable formations.</p> <p>Secondary (undifferentiated) is defined as: unproductive strata. It is assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.</p>
Groundwater vulnerability zone	None	<p>This describes the vulnerability of the underlying groundwater body from activities carried out on the surface.</p> <p>A none designation indicate that groundwater will be affected by activities on the surface.</p>

Table 2.2 - Hydrology Conditions



## 2.6 Existing water management

Subject to detailed CCTV survey, the site's existing drainage system discharges surface water runoff to a ditch running across the northern portion of the site. Evidence of existing drainage is shown on Thames Water's Sewer Record Plan enclosed as Appendix C. Two surface water sewers run into the site from the West under Ruscote Avenue, before combining and discharge into the ditch. The ditch then flows eastward into a series of ditches and culverts to the East of the site. It is unknown if the site has existing attenuation structures or Sustainable Drainage Systems (SuDS). Details of the existing drainage system will need to be identified by a CCTV survey.

Existing impermeable area's already drained = 29611m<sup>2</sup>. Proposed impermeable area's = 34482m<sup>2</sup>.

An assessment of the existing impermeable areas has been conducted (refer to Appendix D) which shows a total increase in impermeable area of 0.4871 ha.

Peak existing flows from the site have been established using the existing catchment areas and the Modified Rational Method.

The existing impermeable area is drained adequately.

### Modified Rational Method:

$$Q = 2.78 \times C \times I \times A$$

$$Q = 2.78 \times 1 \times 50 \times 2.9611 \quad Q = 411.6 \text{ l/s}$$

Assuming no attenuation, the above indicates that the existing site contributes a maximum of l/s to the existing ditch.

Thames Water's Sewer Record Plan indicates a 300mm diameter public foul water sewer running parallel to the ditch within the site boundary, with a manhole 9501 (CL: 25.3m, IL: 22.84m AOD, depth: 2.46m) in the West of the site and manhole 0501 (CL: 24.79m, IL: 22.26m AOD, depth: 2.53 m) to the East.



### **3 PROPOSED DEVELOPMENT**

#### **3.1 Proposed Scheme**

The proposed scheme comprises the re-cladding of the existing building and extending the hardstanding area.

The proposed development plans are enclosed as Appendix E.

The proposed permeable catchment is approximately 29611m<sup>2</sup> and it is proposed to increase this to 34482m<sup>2</sup>.

This increase in impermeable area will be restricted to Greenfield run-off rate of 5l/s/ha which for the increase of 0.487ha will restrict the discharge to 2.3l/s.

The attenuation required for the increase in impermeable area will be 328m<sup>3</sup> for the 100yr event + 30% for c.c. Discharge from the attenuation will be a hydrobrake into the existing drainage system restricted to 2.3l/s.



## 4 POLICY STATUS FOR PROPOSED DEVELOPMENT

### 4.1 Vulnerability classification

The proposed development can be classified as follows:

- The proposed development lies within Flood Zone.
- The proposed development is classified as 'Less Vulnerable' in accordance with Table 2 of the NPPF (reproduced as Table 4.1 below).

<p><b>Essential Infrastructure</b></p>	<p>Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk</p> <p>Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood</p> <p>Wind Turbines</p>
<p><b>Highly Vulnerable</b></p>	<p>Police stations, Ambulance stations, Fire stations, Command Centres and telecommunications installations required to be operational during flooding</p> <p>Emergency dispersal points</p> <p>Basement dwellings</p> <p>Caravans, mobile homes and park homes intended for permanent residential use</p> <p>Installations requiring hazardous substances consent</p>
<p><b>More Vulnerable</b></p>	<p>Hospitals</p> <p>Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels</p> <p>Buildings used for dwelling houses; student halls of residence, drinking establishments, nightclubs and hotels.</p> <p>Non-residential uses for health services, nurseries and educational establishments.</p> <p>Landfill and sites used for waste management facilities for hazardous waste.</p>



	<p>Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.</p>
<p>Less Vulnerable</p>	<p>Police, ambulance and fire stations which are not required to be operational during flooding.</p> <p>Buildings used for shops; financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable", and assembly and leisure.</p> <p>Land and buildings used for agriculture and forestry.</p> <p>Waste treatment (except landfill and hazardous waste facilities).</p> <p>Minerals working and processing (except for sand and gravel working).</p> <p>Water treatment plants and sewage treatment plants (if adequate pollution control measures are in place).</p> <p>Sewage treatment works (if adequate measures to control pollution and manage sewage during flood events are in place).</p>
<p>Water-compatible  Development</p>	<p>Flood control infrastructure.</p> <p>Water transmission infrastructure, pumping stations.</p> <p>Sewage transmission infrastructure and pumping stations.</p> <p>Sand and gravel workings.</p> <p>Docks, marinas, wharves</p> <p>Navigation facilities.</p> <p>MOD defence installations.</p> <p>Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.</p> <p>Water-based recreation (excluding sleeping accommodation).</p> <p>Lifeguard and coastguard stations.</p> <p>Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.</p> <p>Essential ancillary sleeping or residential accommodation for</p>





	staff required by uses in this category, subject to a specific warning and evacuation plan.
<p>Notes</p> <p>1 - This classification is based partly on Defra/Environment Agency research on Flood Risks to People (FD2321/TR2)21 and also on the need of some uses to keep functioning during flooding.</p> <p>2 - Buildings that combine a mixture of uses should be placed into the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.</p> <p>3 - The impact of a flood on the particular uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore, the flood risk management infrastructure and other risk mitigation measures needed to ensure the development is safe may differ between uses within a particular vulnerability classification.</p>	

**Table 4.1 - Flood Risk Vulnerability Classification**

Vulnerability Classification		Essential Infrastructure	Water-compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	
	Zone 2	✓	✓	Exception Test	✓	✓
	Zone 3a	Exception Test	✓	x	Exception Test	✓
	Zone 3b	Exception Test	✓	x	x	x
<p>Key</p> <p>✓ Development is appropriate</p> <p>x Development should not be permitted</p>						

**Table 4.2 - Flood Risk Vulnerability and Flood Zone 'Compatibility'**

The proposed development is appropriate in accordance with Table 3 of the NPPF, reproduced in Table 4.2 above.

#### 4.2 Sequential Test & Exception Test

The NPPF requires that all development is sequential tested to steer new development to areas at the lowest probability of flooding (Flood Zone 1). The Sequential Test would normally be completed by the Local Planning



Authority (LPA) to inform the preparation of the Local Development Framework (LDF), where one exists. However, where this process has not

yet been completed the onus for the provision of evidence demonstrating successful application of the Sequential Test falls on the developer, or promoter of the site. The NFFP also requires the layout of a site to be sequentially tested to locate the most vulnerable land uses in the areas at lowest risk of flooding.

The NPPF acknowledges that in some circumstances it may not be possible to locate development in areas of low or appropriate (considering development vulnerability) flood risk, or that there may be other valid reasons for a development to take place within a floodplain. In these circumstances, it is necessary to apply the Exception Test to clearly demonstrate that the benefits for development of a site outweigh the flood risks to the development and its occupants. Table 3 of the NPPF (reproduced in Table 4.2 above) indicates when the Exception Test is required.

The proposed development site falls entirely within Flood Zone 1, and therefore the Sequential Test is deemed to be passed and the Exception Test is not required.

#### **4.3 Local Policy**

Oxfordshire County Council and Cherwell District Council have produced the following Flood Risk Management documents:

##### *Preliminary Flood Risk Assessment*

As the Lead Local Flood Authority (LLFA) the Oxfordshire County Council was required to undertake a preliminary flood risk assessment as the first part of the Flood Risk Regulations (2009). The aim of this document was to provide a high-level overview of all potential sources of flood risk.

##### *Surface Water Management Plan*

This document from the Oxfordshire County Council outlines the strategy for managing surface water within the borough. Surface Water flooding refers to flooding caused by rivers, sewers, groundwater and any runoff which is caused by heavy rainfall.



*Strategic Flood Risk Assessment*

The SFRA from Cherwell District Council builds upon the findings made in previous reports, and offers a general assessment of flood risk across the whole borough. Appendix B of this report provides a detailed analysis of areas where there is a significant risk of flooding.

*Local Flood Risk Management Strategy*

This document from Oxfordshire County Council aims to provide guidance and information for residents, business and developers within the borough. It outlines the responsibilities of the LLFA, evaluates the risk of flooding and then reviews flood management measures within the borough.



## **5 PROBABILITY OF FLOODING**

The NPPF identifies six potential sources of flooding:

- Flooding from rivers (fluvial flooding);
- Flooding from the sea (tidal flooding);
- Flooding from land;
- Flooding from sewers;
- Flooding from groundwater; and
- Flooding from reservoirs, canals, and other artificial sources.

These are considered below.

### **5.1 Flooding from rivers (fluvial flooding) & sea (tidal flooding)**

The assessment of flood risk in this report is based on the definitions in Table 1 of the Technical Guidance to the National Planning Policy Framework, which recognises the following Flood Zones:

- Flood Zone 1 - little or no risk, with annual probability of flooding from rivers and the sea of less than 0.1% (1 in 1000-year)
- Flood Zone 2 - low to medium risk, with annual probability of flooding between 0.1% and 1.0% from rivers and between 0.1% and 0.5% from the sea
- Flood Zone 3a - high risk of flooding with an annual probability of flooding of 1.0% or greater from rivers, and 0.5% or greater from the sea.
- Flood Zone 3b - the 'Functional Floodplain' with an annual probability of flooding of 5% or greater.

An extract from the Environment Agency's online flood map published on their website is shown in Figure 5.1 below, with Flood Zone 3a & 3b denoted by a dark blue hatch and Flood Zone 2 by a light blue hatch. The site is located within a Flood Zone 1 'Low Probability' area and therefore lies outside an area at risk of fluvial/tidal flooding.



Figure 5.1 - Environment Agency Online Flood Map Extract (Approximate Site Extents Edged Red) - Flood Risk from rivers or the sea.

## 5.2 Flooding from land & sewers

From the environmental agency's online flood map in Figure 5.2 below, the site has a low risk of flooding across to the building although there is a medium risk to flooding to the car park and service yard around the building area. However, there is a medium to high risk of flooding in the landscaped area in the North of the site, in the vicinity of the existing ditch. A high risk of flooding is also noted along the western boundary around the Kraft factory, as well as in Southam Road.



**Figure 5.2 - Environment Agency Online Flood Map Extract (Approximate Site Extents Edged Red) - Flood Risk from surface water.**

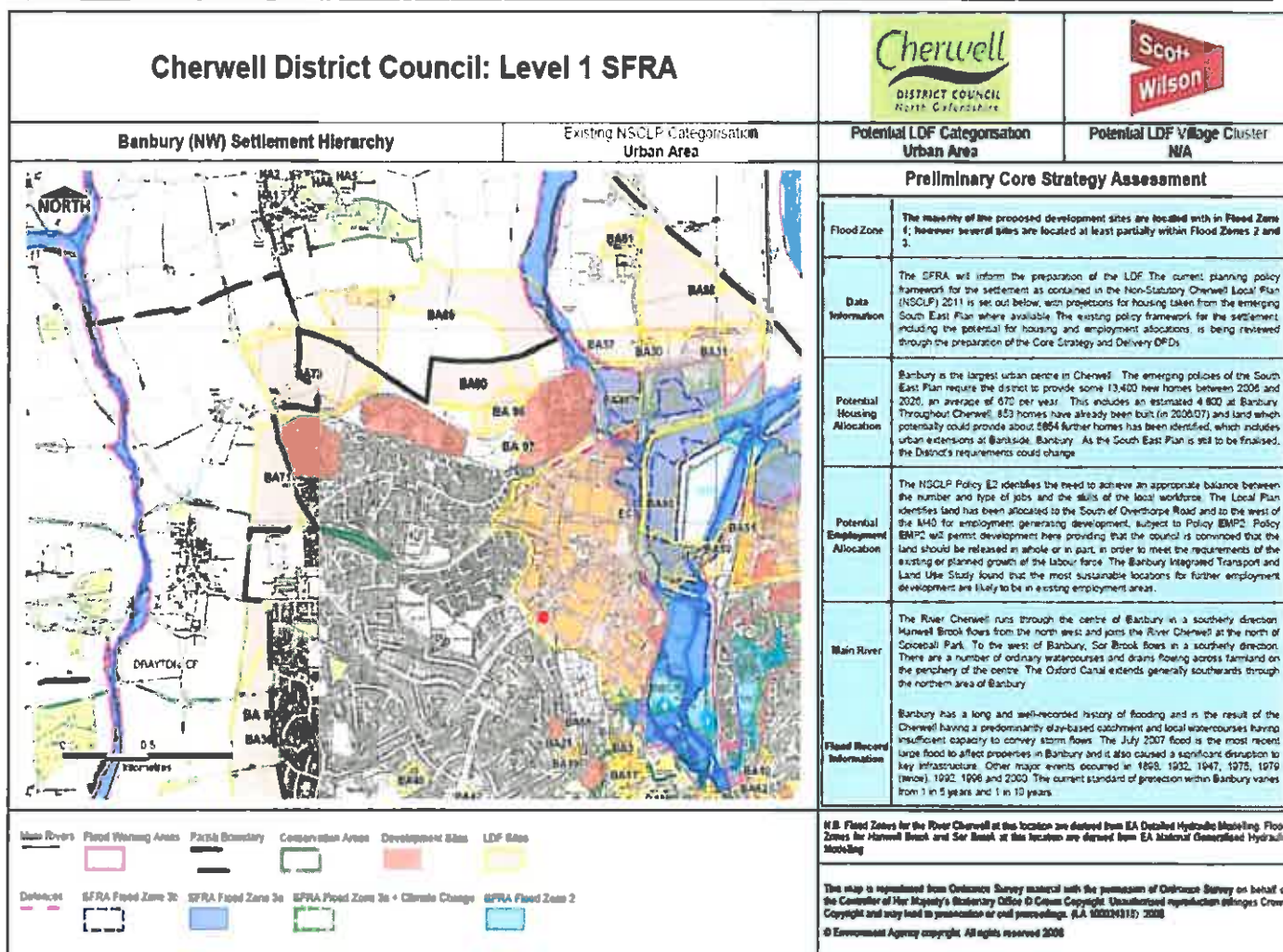
The external flood area's achieves an approximate level of 95.8m AOD against a building slab level of 96.8m AOD.

### **5.3 Flooding from groundwater**

With reference to Figure 5.3 below, there is a long history of groundwater flooding in the surrounding area due to the Charmouth Mudstone Formation, the most recent of these being in July 2007. The groundwater monitoring pipes installed to a depth of 5 m below ground level (bgl) indicate that the groundwater levels vary between 1 and 5 m bgl.



Cherwell District Council  
Level 1 Final SFRA



Scott Wilson - April 2009

Appendix B

B-2

Figure 5.3 - Cherwell District Council SFRA, Appendix B, Figure B-2 (Approximate Site Location represented by red dot) - Flood Risk from groundwater.

### 5.4 Flooding from reservoirs, canals, and other artificial sources

Based on the information from the environmental agency's online flood maps in Figure 5.4, the site and the area around it is not at risk of flooding due to reservoirs, canals or other artificial sources.

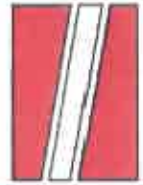


Figure 5.4 - Environment Agency Online Flood Map Extract (Approximate Site Extents Edged Red) - Flood Risk from reservoirs.





## **6 FLOOD RISK MANAGEMENT STRATEGY**

### **6.1 Flood mitigation measures**

NPPF guidance advises that an FRA should take into account the flood risk to people in terms of 'public safety issues', access/egress to/from and evacuation/rescue from the site.

The building itself has a low flood risk as it lies within Flood Zone 1. However, as evidenced in Figure 5.2, the exit onto Southam Road has a low to medium flood risk due to surface water.

Additionally, the flood risk across the North of the site will be directed away from the buildings into the landscaped areas to minimise the impact of flood water on the development. There will be no change in external levels consequently there will be no increase in risk off site.

#### **6.1.1 Public Safety Issues**

The SuDS design criteria control onsite flood risk arising from the surface water runoff management system.

Given the relatively low/medium risk of flooding across the entire site, it is not deemed appropriate to develop a Flood Evacuation Plan to address public safety issues, nor are flood resilient construction methods deemed necessary.

#### **6.1.2 Safe Access/Egress**

The access/ egress from the site will be through the exit onto Southam Road. As mentioned above, to minimise the risk of surface water flooding in this area, the discharge from the increased area will be limited and associated storage will be provided within the site.

However, to ensure pedestrian access/egress to the site, alternative exit routes are required. This can be guaranteed by a footpath along the southern boundary of the site leading to Nursery Drive.



### **6.1.3 Flood risk elsewhere**

Currently the site does not pose a flood risk to its surroundings, as it is considered that all rainfall falling onto the site is already being collected by the local sewer system or into the ditch onsite. Mitigation measures for the proposed development to prevent any impact to neighbouring property should be implemented. It is therefore recommended:

- To restrict the flow to the increase in impermeable area a certain discharge rate and provide an appropriate attenuation to control runoff from increased area during a 100 year, with 30% Climate change, event.
- Ensure managed surface water and exceedance flood flows are diverted away from the surrounding buildings.
- Exceedance flood flows should be guided into the existing car park area's and service yards. No change in levels will be required.

### **6.2 Surface water management strategy**

The NPPF guidance states that developers and local authorities should not increase flood risk elsewhere due to site development. Additionally, developers should aim to reduce the overall risk of flooding for the area with the appropriate application of SUDS.

This can be achieved by using tanks to attenuate the flows and a Hydro-brake, or other flow control device, to restrict the discharge rate.

#### **6.2.1 Discharge strategy**

Given the history of groundwater flooding in the area, as well as the information in the site investigation report regarding soil strata & groundwater levels, the site is deemed to be unsuitable for infiltration systems (soakaways).

The nearest watercourse is an unnamed ditch running through the North of the site. To facilitate the redevelopment of the site, it is proposed to fill in the ditch and divert the public surface and foul sewers around the proposed B&M store as shown in Appendix F.



### **6.2.2 Drainage Strategy design**

The buildings' roof water runoff is collected around the buildings at various points. Runoff from the remaining impermeable areas is collected using existing gullies, draining into this same network.

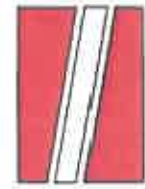
The existing drainage includes appropriate petrol interceptors, deep silt trapped gullies and silt boxes to all channel drains.

As mentioned in section 3.1 the existing discharge rate, for the existing impermeable area of 29.6 ha, is 411.6 l/s and this discharge rate is to remain.

The increase in impermeable area of 0.487 ha will be attenuated to 2.3l/s.

### **6.3 Foul water management strategy**

It is proposed to collect all foul flows from the buildings into existing network before discharging into existing public sewer manhole 0501 in the North East of the site. The existing connections will remain within a similar discharge rate.



## **7 FUTURE FLOOD RISK**

By the 2080s, the latest UK Climate Impacts Programme (UKCP09) predict around three times as many days in winter with heavy rainfall (defined as more than 25mm in a day). It is plausible that the amount of rain in extreme storms (with a 1 in 5 annual chance or rarer) could increase locally by 40%.

### **7.1 Key climate change projections**

The UK Climate Projections science report: Climate change projections. Version 3 (DRFRA & DECC, December 2010) summarises the central estimate of change in climate likely to be experienced in the region based on UKCP09 data for the thirty year 2050 time period under the medium emissions scenarios, compared to the baseline time period (1961 to 1990).

Generally, for precipitation this indicates drier summers, heavy rainfall being more common, significant decrease in snowfall, and greater contrast between summer and winter seasons. Extreme river and coastal flooding events are expected to be more severe and frequent.

### **7.2 Effects of climate change**

The detailed design of the drainage system will make an appropriate allowance for climate change as agreed with the LLFA. With an appropriate climate change allowance and given that the site is entirely within Flood Zone 1, no increased flood risk to the site should be expected due to climate change.



## **8 CONCLUSION**

With reference to the indicative flood map published by the Environmental Agency, the development site is located entirely within Flood Zone 1 "Low Probability". This has been confirmed by a site-specific flood risk assessment in section 4 of this report.

The site is non-tidal and has no record of flood history. However, the northern portion of the site in and surrounding the existing ditch is shown to be at a medium to high risk of flooding due to surface water. This localised surface water flooding within the site will be addressed as a part of the detailed sustainable design for the site.

From Table 4.1, the development is classified as 'Less Vulnerable' (Flood Risk Vulnerability Classification) and therefore, from Table 4.2 classified as 'appropriate'.

The ground investigation reports indicate that the soil strata under the site are inadequate for infiltration. Additionally, the report indicates high groundwater levels. This is confirmed by the history of groundwater flooding in the area indicated in the Cherwell District Council SFRA. Therefore, the preferred method of discharge of surface water from the site is into the watercourse running across the North of the site.

The increase in impermeable is 0.487 ha. The increased run-off from impermeable areas will be collected and controlled using attenuation tanks and Hydrobrakes prior to being discharged into the existing culvert in the North-east corner of the site via the existing drainage network.

To allow the detailed drainage design for the site to be completed, the following is recommended:

- Finalised development layout, with confirmed permeable and impermeable areas.
- Consulting with Thames Water with regards to the existing public foul sewer and ditch across the North of the site.
- A CCTV survey of the site drainage for sizes and falls



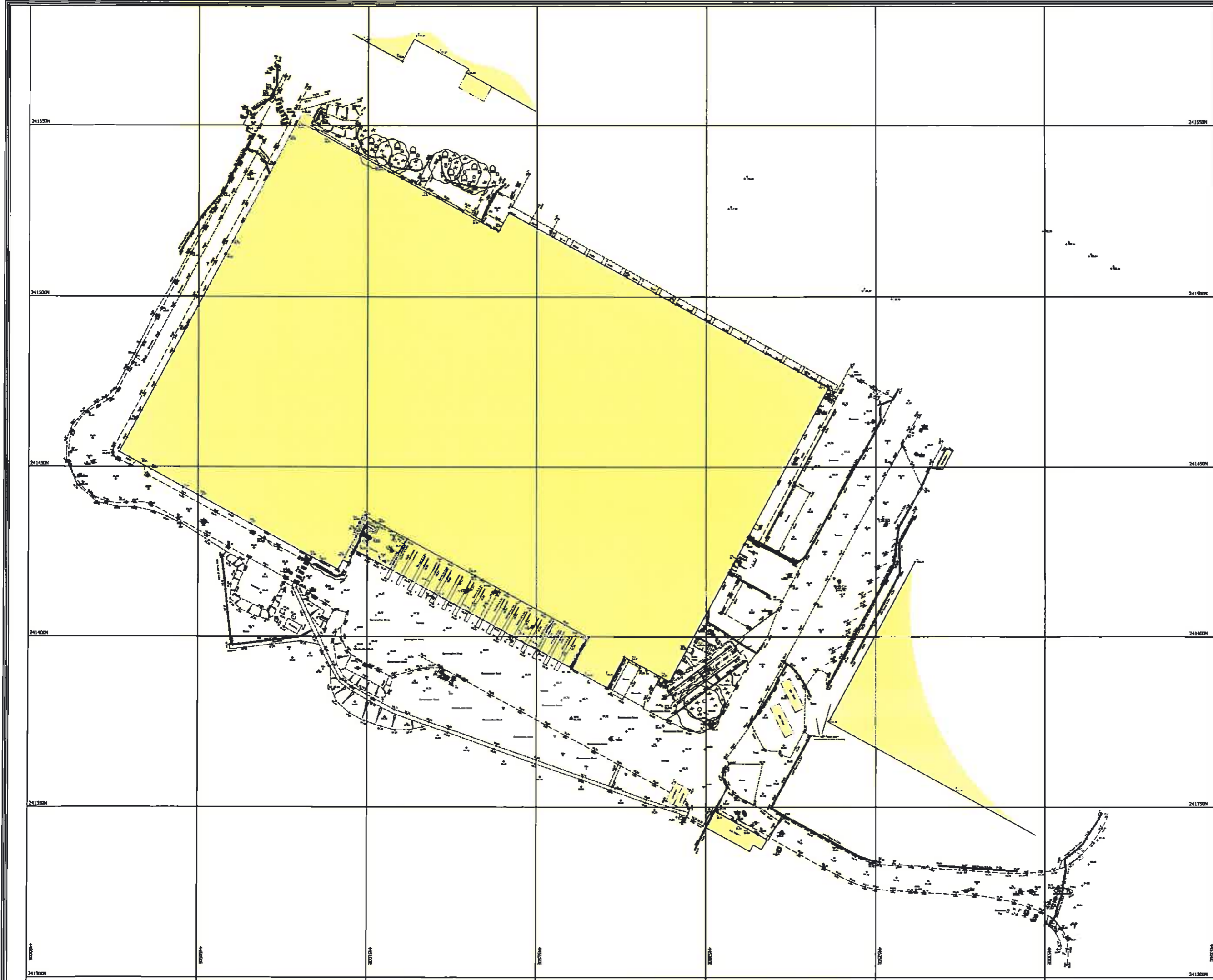
## **Appendix A - Site Location Plan**





**Appendix B - Existing Site Layout and Topographical survey**





**Station Information:**

Station	Easting (m)	Northing (m)	Level (m)
GH1	443243.026	241476.821	98.048
GH2	443190.899	241378.812	98.817
GH3	443180.311	241378.083	98.728
GH4	443069.630	241428.958	98.480
GH5	443024.707	241454.194	98.618
GH6	443077.813	241552.888	98.888
GH7	443115.224	241533.004	98.841
GH8	443281.870	241325.089	94.858
GH9	443303.489	241326.180	94.304
GB	443222.226	241410.468	98.441

**OS Note:**  
Some services may have been omitted due to partial visibility.  
The Ordnance Survey file is to be used as a guide only.

**OS Buildings:** Surveyed Buildings

This survey has been performed to the Ordnance Survey (OS) National Grid (OSGBID) (2) via Global Navigation Satellite System (GNSS) and the O.S. Active Network (CAN) file.  
A new OSGBID coordinate has been established near to the site centre via a combination of the OS771/2008 & OSGBID/2008 Interpolation models.  
The survey has been completed to this point and a further area or areas OSGBID (2) points established to create a full O.S. boundary for angle orientation.  
No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not the O.S. Coordinates which have a scale factor applied.  
Please refer to Survey Station Table to enable establishment of the site grid and station.

**Legend:**

Boundary	Proposed	Proposed	Proposed
...	...	...	...

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**TITLE**  
Topographical  
Survey

SCALE	DATE
A1@ 1:500	20.10.17
DRAWN	QUALITY REP
CQ	GH1830

Level datum: AOD  
Grid projection: UTM  
Job number: 28419  
Drawing No: 28419\_T Rev: 0

**Disclaimer:**  
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.  
All dimensions should be checked on site prior to design and construction.  
Design information (where applicable) has been clearly prepared from the surface and therefore should be treated as approximate only.



**Appendix C - Sewer Record Plan**

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no survey information is available.

Manhole Reference	Manhole Cover Level	Manhole Invert Level
9451	103.66	102.03
9401	104.23	102.4
8451	103.67	101.14
2501	96.93	91.58
1501	96.79	92.39
9554	100.44	95.39
9503	100.35	95.54
8551	100.66	95.46
9551	99.82	95.42
0501	97.04	93.23
8504	100.41	95.74
9502	98.53	94.97
8502	101.31	95.74
9504	99.79	95.19
9501	97.89	95.44
8503	100.62	95.92
9553	98.11	96.55
9651	98.39	96.51
0602	99.03	97.18
0652	99.04	97.49
0651	100.65	98.86
0601	100.78	98.61
2401	95.85	90.83

Manhole Reference	Manhole Cover Level	Manhole Invert Level
8354	106.56	105.52
8352	n/a	n/a
8353	111.01	110.12
831A	n/a	n/a
8258	107.98	103.7
8356	105.68	103.89
8260	n/a	n/a
8351	105.72	104.74
9254	106.66	103.73
931D	n/a	n/a
9206	106.68	104.06
9253	106.58	104.97
921B	n/a	n/a
921A	n/a	n/a
931C	n/a	n/a
931B	n/a	n/a
921C	n/a	n/a
931A	n/a	n/a
9452	103.14	102.4
9402	103.01	101.58
9453	102.78	101
9301	102.36	101.08
9403	102.51	101.7
9302	102.08	100.7
9307	102.57	101.75
9353	102.09	100.3
9404	102.51	101.97
9203	102.5	101.64
9306	101.91	101.11
9351	102.25	100.64
9303	101.94	100.17
9202	102.72	101.38
9304	101.52	100.71

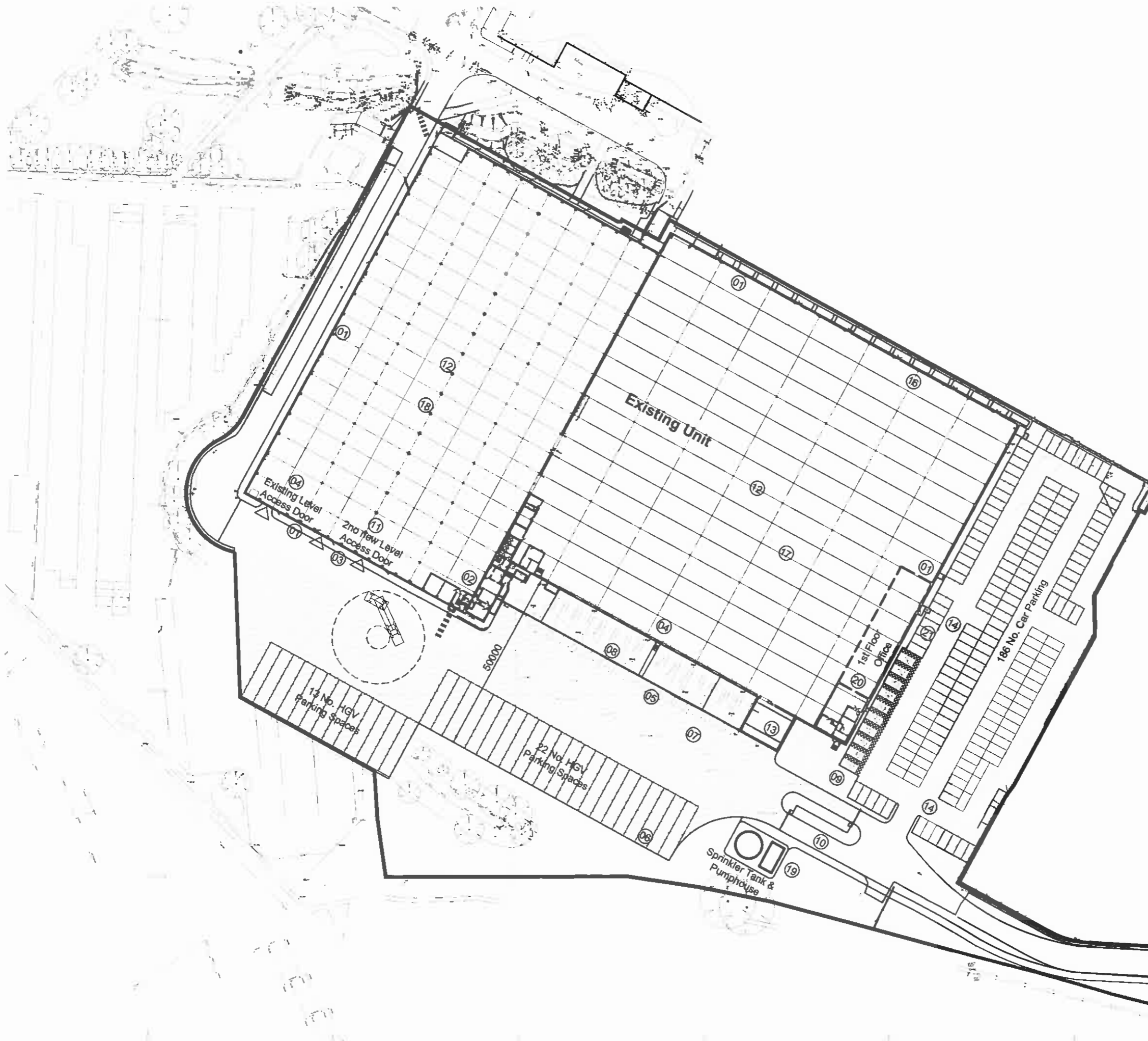
Manhole Reference	Manhole Cover Level	Manhole Invert Level
9309	101.41	100.76
9305	101.56	100.86
9352	101.82	99.8
9308	101.42	100.41
9310	n/a	n/a
9204	101.69	99.89
9252	101.72	99.53
9311	n/a	n/a
9251	101.43	99.19
9205	101.46	99.43
9312	n/a	n/a
9313	n/a	n/a
8253	109.15	107.57
8201	108.59	105.16
8218	n/a	n/a
921E	n/a	n/a
9201	102.71	102.18
921D	n/a	n/a
821A	n/a	n/a
8202	109.21	103.39
8252	106.34	104.8
8259	108.25	103.66
0252	98.37	97.5
0202	98.31	97.2
1352	n/a	n/a
1301	96.68	94.87
1302	95.52	93.66
1351	95.55	94.31
2351	94.48	93.56
2301	94.23	93.08
2302	93.93	92.5
2352	94.45	91.1
2303	94.07	90.7

Manhole Reference	Manhole Cover Level	Manhole Invert Level
3301	94.47	90.56
3353	94.17	92.71
3351	95.15	91.77
3302	95.03	90.43
3253	n/a	n/a
3251	93.89	90.1
3352	93.99	93.16
3201	93.41	91.14
3202	93.27	91.15
0251	101.17	99.62
0354	99.09	98.61
0201	101.09	98.74
0297	n/a	n/a
0356	99.17	98.49
0353	99.12	97.97
0301	99.31	97.85
0352	99.21	97.71
0296	n/a	n/a
0351	98.93	97.29
0203	98.53	97.17
0294	n/a	n/a
0295	n/a	n/a
0358	n/a	n/a
0355	97.77	96.75
0303	97.58	96.18
0302	97.77	96.53

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.



## **Appendix D - Existing & Proposed Impermeable Areas**



- 1) Full height over-clad façade. Existing glazing to warehouse will be replaced with translucent panels. Guarantee to be confirmed. Engineer to assess the capability of existing structure.
- 2) Existing offices to be refurbished. (hatched area to be made good only)
- 3) External Cat ladder to be replaced (roof access strategy to be reviewed)
- 4) Existing Loading Doors & dock levelers to be removed & replaced.
- 5) Existing Canopy to be over-clad & made good
- 6) External concrete hardstanding to be extended. Existing landscape bund to be repositioned
- 7) External yard to be made good. Hatched area denoted extent of concrete yard to be cut back and replaced. (Jockey Wheel damage)
- 8) Existing wheel guides to be removed. Not to be replaced.
- 9) Existing Vehicle wash and housing to be removed. Adjacent landscaping to be removed and replaced with hardstanding.
- 10) Gatehouse island only to be installed. Services to gatehouse to be reviewed.
- 11) Remove existing landscape and replace with hardstanding to 2 no. new Level Access Doors.
- 12) Existing internal slab to be made good.
- 13) Existing windows to the pod to be removed and over-clad.
- 14) Extend hard surfacing and alter levels to create car park area.
- 15) Temporary construction traffic entrance.
- 16) Option for white masonry paint to internal blockwork walls
- 17) Roof to be assessed to ensure a watertight facility. Eastern warehouse roof to have Receive a new layer of membrane & bitumen. Contractor to provide options for guarantees.
- 18) Western Warehouse Roof to be over-clad to provide a guarantee.
- 19) Sprinkler tank and pump house to be installed if required.
- 20) Existing Offices to be demolished. New first floor offices to be installed.
- 21) Existing dock levelers to be removed and over clad, external levels adjusted to suit new car park.

Surfaces Key

- Concrete
- Tarmac
- Soft Landscaping

E	Entrance hatching clarified	DG	GH	26.03.18
D	Yard area changed to concrete	DG	GH	02.02.18
C	BW red line boundary amended. Parking and yard updated to suit	AS	GH	22.02.18
B	Revised road, footway added as required and HGV parking spaces updated to suit	DG	GH	12.02.18
A	Proposed surfacing types amended to allow consistency	DG	GH	30/01/18
rev	amendments		by	chd / date

**Banbury 200 Unit,**  
 Southam Road, Banbury  
 Proposed Site Plan

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**umc**  
architects

Heaven's Gate - Industrial Units, Cotswold Way, Newark, Nottinghamshire NG24 2TH  
 Tel: 01637 851277 Fax: 01637 851277 Email: info@umcarchitects.co.uk

Drawing Status	Planning
Drawn / Checked	AS / GH
Date	13/10/17
Scale	1:500 A1
Drawing no	Revision:
16083 P003	E

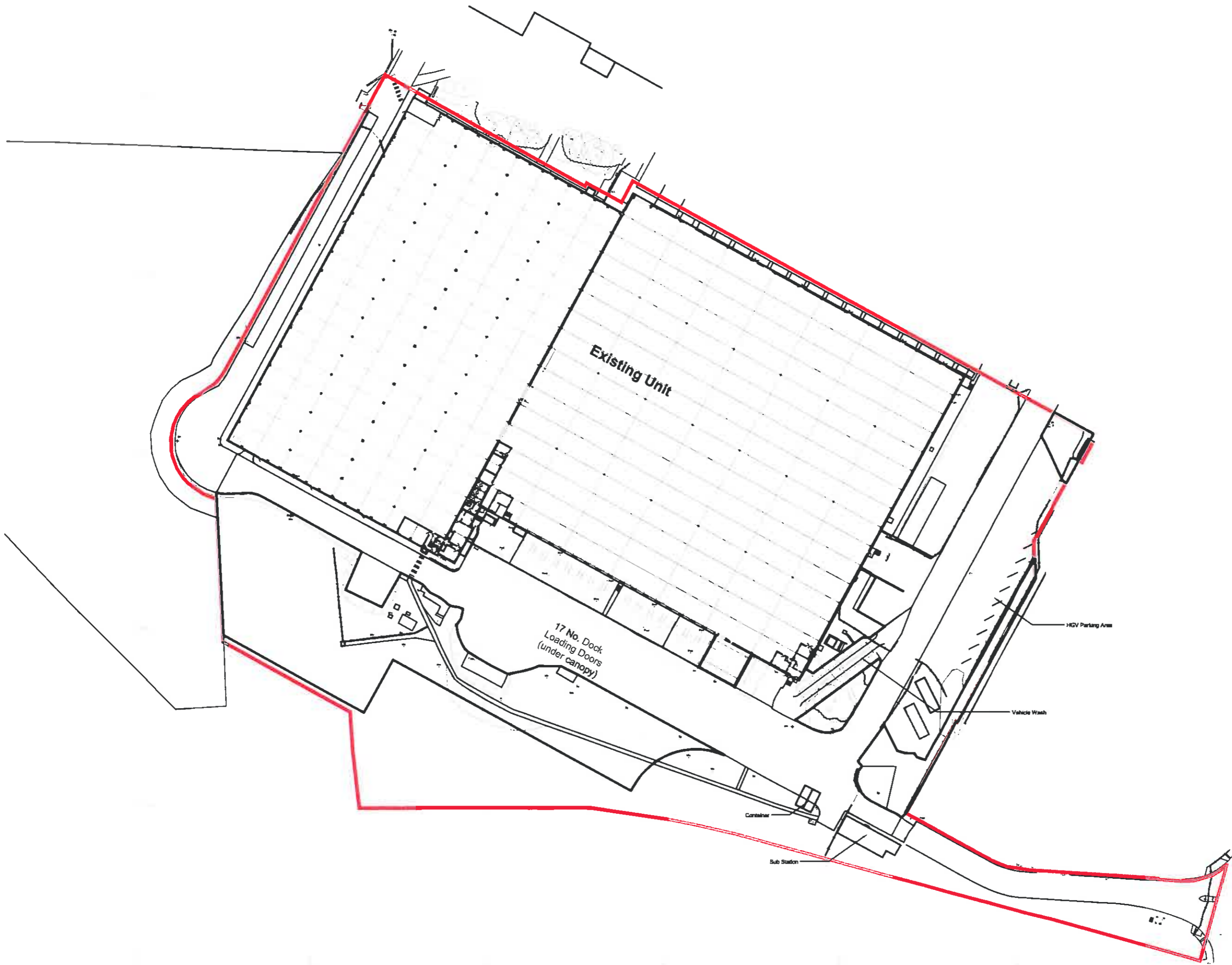






## **Appendix E – Proposed Development Plans**

Dimensions are in millimeters unless stated otherwise  
Scaling of this drawing is not recommended  
It is the recipient's responsibility to print this document to the correct scale  
All relevant drawings and specifications should be read in conjunction with this drawing



A Radline boundary adjustments out DG GH 26.07.16  
rev amendments by cld date

**Banbury 200 Unit,  
Southam Road, Banbury**  
Existing Site Plan

£1\UMC Marketing\Logos\Client logos\Grahampier logo.jpg



Newbury, Banbury, Henley-on-Thames, Oxford, Reading, Southam, Thame, Witney, Woodstock, York  
+44 (0)1235 816077 +44 (0)1235 816078 +44 (0)1235 816079

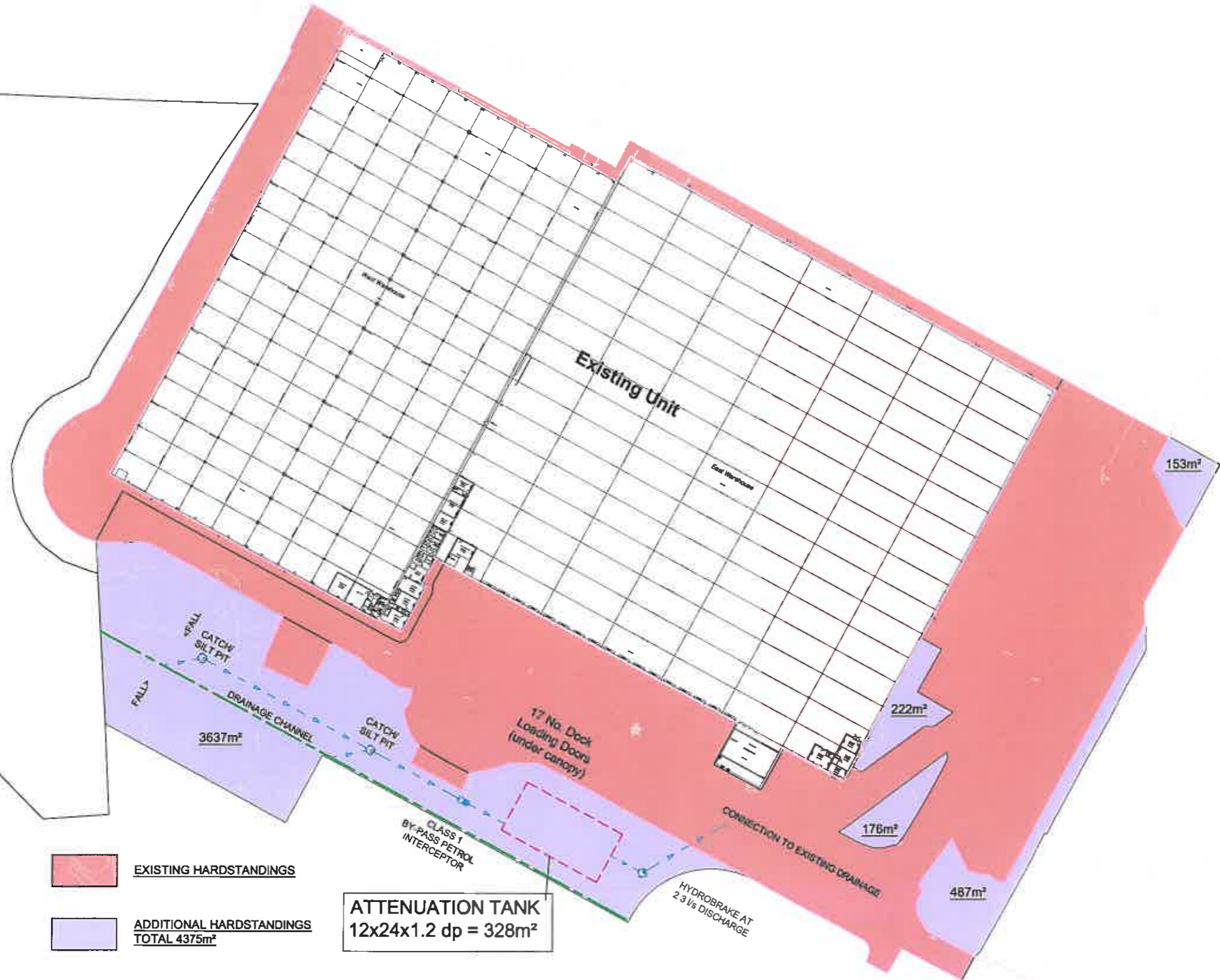
Drawing Status	Planning
Drawn / Checked	AS / GH
Date	13/10/17
Scale	1:500 A1

Drawing No	Revision
16083 P002	A





## **Appendix F - Proposed Drainage Strategy**



- EXISTING HARDSTANDINGS
- ADDITIONAL HARDSTANDINGS  
TOTAL 4375m<sup>2</sup>

**ATTENUATION TANK**  
12x24x1.2 dp = 328m<sup>2</sup>

**SURFACE WATER DESIGN CRITERIA**

DISCHARGE RATE = 2.3 l/s)  
BASED ON 5 l/s/Ha (Greenfield Run-off)  
Soakaway designed for 1:100 year return  
storm + 30% climate change  
using FEH Rainfall Figures

**DRAINAGE STRATEGY DRAWING**  
Scale 1:750

REV	DATE	DESCRIPTION	CHK	DRN
P1	11.06.18	PRELIMINARY ISSUE	TC	CE

NOTE: Where a "P" revision applies, this drawing is NOT to be used for construction

**T. R. COLLIER & ASSOCIATES.**  
CONSULTING ENGINEERS

Rochester House 275 Baddow Road  
Chelmsford Essex CM2 7QA  
Telephone 01245 500360  
Facsimile 01245 500390  
Email admin@collierassociates.co.uk

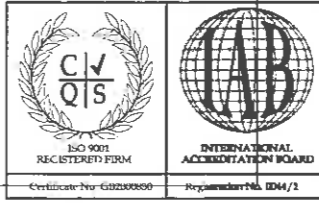
PROJECT  
**UNIT 200**  
**RUSCOTE AVENUE, BANBURY**

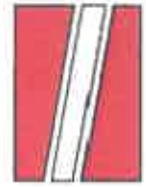
TITLE  
**DRAINAGE STRATEGY**

ARCHITECT  
**UMC**


DRAWN CE	DESIGNED TC	CHECKED TC
DATE July 2018	SCALE 1:750	STATUS Preliminary

**3852-02** P1





**Appendix G - Quick Storage Estimate**

T.R. Collier & Associates Ltd		Page 1
Rochester House 275 Baddow Road Chelmsford CM2 7QA	Ruscote Avenue Banbury (Additional Areas Only)	
Date 01/06/2018 File 3852 Additional Areas O...	Designed by CE Checked by TRC	
Micro Drainage		Source Control 2018.1

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 1361 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	8.449	0.449	0.0	2.0	2.0	122.8	O K
30 min Summer	8.585	0.585	0.0	2.0	2.0	160.1	O K
60 min Summer	8.724	0.724	0.0	2.0	2.0	198.0	O K
120 min Summer	8.833	0.833	0.0	2.0	2.0	228.0	O K
180 min Summer	8.899	0.899	0.0	2.0	2.0	245.9	O K
240 min Summer	8.943	0.943	0.0	2.1	2.1	257.9	O K
360 min Summer	8.995	0.995	0.0	2.1	2.1	272.2	O K
480 min Summer	9.018	1.018	0.0	2.1	2.1	278.6	O K
600 min Summer	9.024	1.024	0.0	2.1	2.1	280.3	O K
720 min Summer	9.020	1.020	0.0	2.1	2.1	279.1	O K
960 min Summer	8.992	0.992	0.0	2.1	2.1	271.3	O K
1440 min Summer	8.920	0.920	0.0	2.0	2.0	251.8	O K
2160 min Summer	8.828	0.828	0.0	2.0	2.0	226.5	O K
2880 min Summer	8.755	0.755	0.0	2.0	2.0	206.6	O K
4320 min Summer	8.639	0.639	0.0	2.0	2.0	174.7	O K
5760 min Summer	8.531	0.531	0.0	2.0	2.0	145.2	O K
7200 min Summer	8.446	0.446	0.0	2.0	2.0	122.0	O K
8640 min Summer	8.383	0.383	0.0	2.0	2.0	104.8	O K
10080 min Summer	8.335	0.335	0.0	2.0	2.0	91.7	O K
15 min Winter	8.504	0.504	0.0	2.0	2.0	137.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	142.617	0.0	125.0	23
30 min Summer	93.363	0.0	161.6	38
60 min Summer	58.389	0.0	204.9	68
120 min Summer	34.403	0.0	241.3	126
180 min Summer	25.279	0.0	266.0	186
240 min Summer	20.302	0.0	284.9	246
360 min Summer	14.863	0.0	312.8	364
480 min Summer	11.861	0.0	328.2	484
600 min Summer	9.922	0.0	330.9	602
720 min Summer	8.556	0.0	330.8	722
960 min Summer	6.737	0.0	327.6	956
1440 min Summer	4.768	0.0	316.3	1174
2160 min Summer	3.348	0.0	422.8	1560
2880 min Summer	2.607	0.0	439.2	1964
4320 min Summer	1.845	0.0	466.1	2808
5760 min Summer	1.457	0.0	491.0	3584
7200 min Summer	1.231	0.0	518.3	4320
8640 min Summer	1.082	0.0	547.0	5024
10080 min Summer	0.978	0.0	576.9	5752
15 min Winter	142.617	0.0	140.0	23

Rochester House  
275 Baddow Road  
Chelmsford CM2 7QA

Ruscote Avenue  
Banbury  
(Additional Areas Only)



Date 01/06/2018  
File 3852 Additional Areas O...

Designed by CE  
Checked by TRC

Micro Drainage Source Control 2018.1

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.657	0.657	0.0	2.0	2.0	179.8	O K
60 min Winter	8.814	0.814	0.0	2.0	2.0	222.6	O K
120 min Winter	8.939	0.939	0.0	2.1	2.1	256.9	O K
180 min Winter	9.015	1.015	0.0	2.1	2.1	277.8	O K
240 min Winter	9.067	1.067	0.0	2.2	2.2	292.1	O K
360 min Winter	9.132	1.132	0.0	2.2	2.2	309.6	O K
480 min Winter	9.163	1.163	0.0	2.3	2.3	318.3	O K
600 min Winter	9.176	1.176	0.0	2.3	2.3	321.7	O K
720 min Winter	9.176	1.176	0.0	2.3	2.3	321.8	O K
960 min Winter	9.155	1.155	0.0	2.3	2.3	316.0	O K
1440 min Winter	9.075	1.075	0.0	2.2	2.2	294.2	O K
2160 min Winter	8.962	0.962	0.0	2.1	2.1	263.1	O K
2880 min Winter	8.865	0.865	0.0	2.0	2.0	236.7	O K
4320 min Winter	8.701	0.701	0.0	2.0	2.0	191.9	O K
5760 min Winter	8.544	0.544	0.0	2.0	2.0	148.9	O K
7200 min Winter	8.407	0.407	0.0	2.0	2.0	111.4	O K
8640 min Winter	8.314	0.314	0.0	2.0	2.0	85.8	O K
10080 min Winter	8.245	0.245	0.0	2.0	2.0	67.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	93.363	0.0	164.2	37
60 min Winter	58.389	0.0	229.4	66
120 min Winter	34.403	0.0	270.3	124
180 min Winter	25.279	0.0	297.9	182
240 min Winter	20.302	0.0	319.1	242
360 min Winter	14.863	0.0	335.4	358
480 min Winter	11.861	0.0	337.6	474
600 min Winter	9.922	0.0	337.5	588
720 min Winter	8.556	0.0	336.6	702
960 min Winter	6.737	0.0	333.5	924
1440 min Winter	4.768	0.0	324.8	1330
2160 min Winter	3.348	0.0	473.6	1652
2880 min Winter	2.607	0.0	491.9	2112
4320 min Winter	1.845	0.0	522.1	3028
5760 min Winter	1.457	0.0	550.0	3920
7200 min Winter	1.231	0.0	580.7	4608
8640 min Winter	1.082	0.0	612.6	5272
10080 min Winter	0.978	0.0	646.1	5952

Rochester House  
 275 Baddow Road  
 Chelmsford CM2 7QA

Ruscote Avenue  
 Banbury  
 (Additional Areas Only)



Date 01/06/2018  
 File 3852 Additional Areas O...

Designed by CE  
 Checked by TRC

Micro Drainage Source Control 2018.1

Rainfall Details


Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
FEH Rainfall Version	2013	Cv (Winter)	0.840
Site Location	GB 445145 241449	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.468

Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:
0	4 0.234	4	8 0.234



T.R. Collier & Associates Ltd		Page 4
Rochester House 275 Baddow Road Chelmsford CM2 7QA	Ruscote Avenue Banbury (Additional Areas Only)	
Date 01/06/2018	Designed by CE	
File 3852 Additional Areas O...	Checked by TRC	
Micro Drainage		Source Control 2018.1

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.000 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.00000

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	288.0	288.0	1.300	0.0	374.4
1.200	288.0	374.4			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0068-2300-1250-2300  
 Design Head (m) 1.250  
 Design Flow (l/s) 2.3  
 Flush-Flo™ Calculated  
 Objective Minimise upstream storage  
 Application Surface  
 Sump Available Yes  
 Diameter (mm) 68  
 Invert Level (m) 7.950  
 Minimum Outlet Pipe Diameter (mm) 100  
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.250	2.3
Flush-Flo™	0.301	2.0
Kick-Flo®	0.610	1.7
Mean Flow over Head Range	-	1.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	1.200	2.3	3.000	3.4	7.000	5.1
0.200	2.0	1.400	2.4	3.500	3.7	7.500	5.3
0.300	2.0	1.600	2.6	4.000	3.9	8.000	5.4
0.400	2.0	1.800	2.7	4.500	4.2	8.500	5.6
0.500	1.9	2.000	2.9	5.000	4.4	9.000	5.8
0.600	1.7	2.200	3.0	5.500	4.6	9.500	5.9
0.800	1.9	2.400	3.1	6.000	4.8		
1.000	2.1	2.600	3.2	6.500	4.9		