
Project: **Barns Court, Copthorne** Job No.: **10427658**

Subject: **Drainage Technical Note for Phase 1B.**

Prepared by: **MFP/SA** Checked by: **WG** Approved by: **WG** Date: **10.09.25**

Introduction

The purpose of this Technical Note is to address the comments received by Mid Sussex District Council Flood Risk and Drainage Team related to the planning application DM/24/2622.

This report will address the following requirements from Mid Sussex District Council

Flood Risk and Built Footprint

- ***Overlay required:*** The applicant must overlay the proposed built footprint onto the updated EA surface water flood risk mapping.
- ***Demonstration needed:*** Evidence that no increase in built footprint or land raising occurs within:
 - *Flood Zone 3b (functional floodplain),*
 - *The 1:100 year + climate change extent.*
- ***Flow path preservation:*** Evidence that:
 - *The natural surface water flow routes across the site (especially east to west) are preserved, or*
 - *Suitable alternative routes are provided if blocked by the development.*
- ***Ditch connectivity:*** Demonstrate the onward connectivity of the existing ditch on site and how flow will be managed if the ditch is removed.

Surface Water Drainage

- ***Climate change consideration:*** Confirm that the drainage system accounts for latest climate change allowances from EA (e.g., 1:100-year + latest CC).
- ***Outfall/ponds:*** Provide:
 - *Plans showing wider connectivity of ponds (to show onward flow), or*
 - *Infiltration testing results demonstrating adequate pond half-drain times*

The site is located west of Turners Hill Road and south of Copthorne Common Road. The site is part of a wider development and has now been split into different phases, Phase 1A, Phase 1B and Phase 2. This part of the site is called Phase 1B, formally known as Phase 2. This site comprised a mix of open grass covered field and a ditch extends through the site which denotes a field boundary. Phase 1B of the scheme comprises of two small commercial units (referred to as Unit M and Unit N), new HGV parking, a storage yard and an access road.

The proposed drainage strategy discharges surface water from the proposed commercial building and hardstanding area into a below ground cellular storage system and then into an existing basin to the south of the site at the controlled greenfield rate of 2.0 l/s, this can be found in Appendix A.

Flood Risk and Built Footprint

There may be a natural flow path to the north of the site, but outside of the parking area and building footprint, the levels are anticipated to remain at exiting levels, therefore there is no change to the existing condition. The natural flow of the ponds located to the south of the site are shown in Appendix B. It is anticipated that the south north oriented ditch to the west of these ponds receive outflows from them and then are directed westwards via the regional ditch network towards Copthorne.

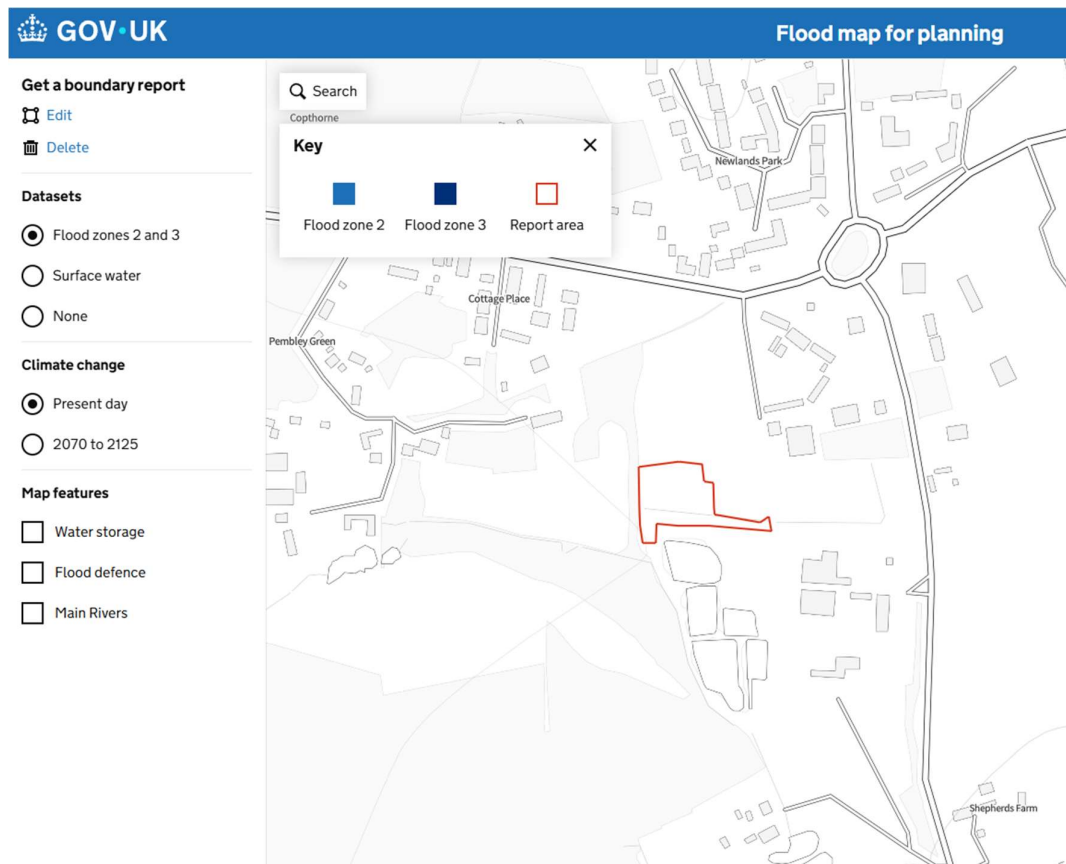


Figure 1 – Flood zone mapping

Figure 1 above shows that the site is not located in a flood zone 3 area and the latest Level 2 SFRA by Mid Sussex District Council does not indicate that the site is located within the functional floodplain. Class B1c (now Class E) is classified as less vulnerable, with flood resilience measure easily incorporated if required, although it appears on the latest maps this will not be required. This class of building is easily returned to a functional state following a flood event however as shown above this appears a very low risk.

The latest surface water and fluvial flood risk maps indicate the site as being at very low risk of both / either, the proposed building has been overlain onto these maps, this can be seen in Appendix C. There may be a natural flow path to the north of the site, but outside of the parking area and building footprint, the levels are anticipated to remain at existing. Therefore, no change to the existing condition.

Referring to the topographical survey Appendix D, the identified ditch in the Mid Sussex drainage team's planning response, is a bunded fence line, therefore the overland flows are directed away from this feature rather than towards it, because of this it is anticipated that no further measures are required to this feature.

It also appears that since the date of this survey (June 2020), the bunds have been now levelled due to a change in tenancy on the site. The on-site levels design will be such that overland flows are directed away from any buildings (See Appendix E).

Surface Water Drainage

Phase 1B is being developed in accordance with an earlier approved strategy. The runoff generated by the development is attenuated on site in the tank and / or subbase of the permeable paving for storm events up to and including the 1:100 plus the 25% climate change event. It will then discharge to the ponds at Greenfield rate of 2.0 l/s which mimics the existing condition. The proposed development provides a betterment to the existing condition by controlling and improving surface water flows from this phase of the development. Drainage calculation can be found in Appendix F.

The site is mapped to be underlain by solid geology of the Upper Tunbridge Wells Sand. This lithology is described as thinly bedded silty mudstones, siltstones, silty sandstones and fine-grained sandstones. These soils are anticipated to be of relatively low permeability with an insufficient infiltration coefficient, into which it will not be feasible to install functioning soakaways.

Conclusion

The proposed drainage strategy for Barns Court Phase 1B demonstrates compliance with local flood risk and drainage requirements. The site lies outside designated flood zone 3 and maintains existing ground levels, ensuring no adverse impact on natural flow paths or floodplain function.

Surface water is attenuated on-site and discharged at a controlled greenfield rate of 2.0 l/s, with design provisions for 1:100-year + 25% climate change events. Infiltration is not viable due to low permeability soils. The proposed strategy provides a robust and sustainable solution and complies with local flood risk and climate resilience requirements.

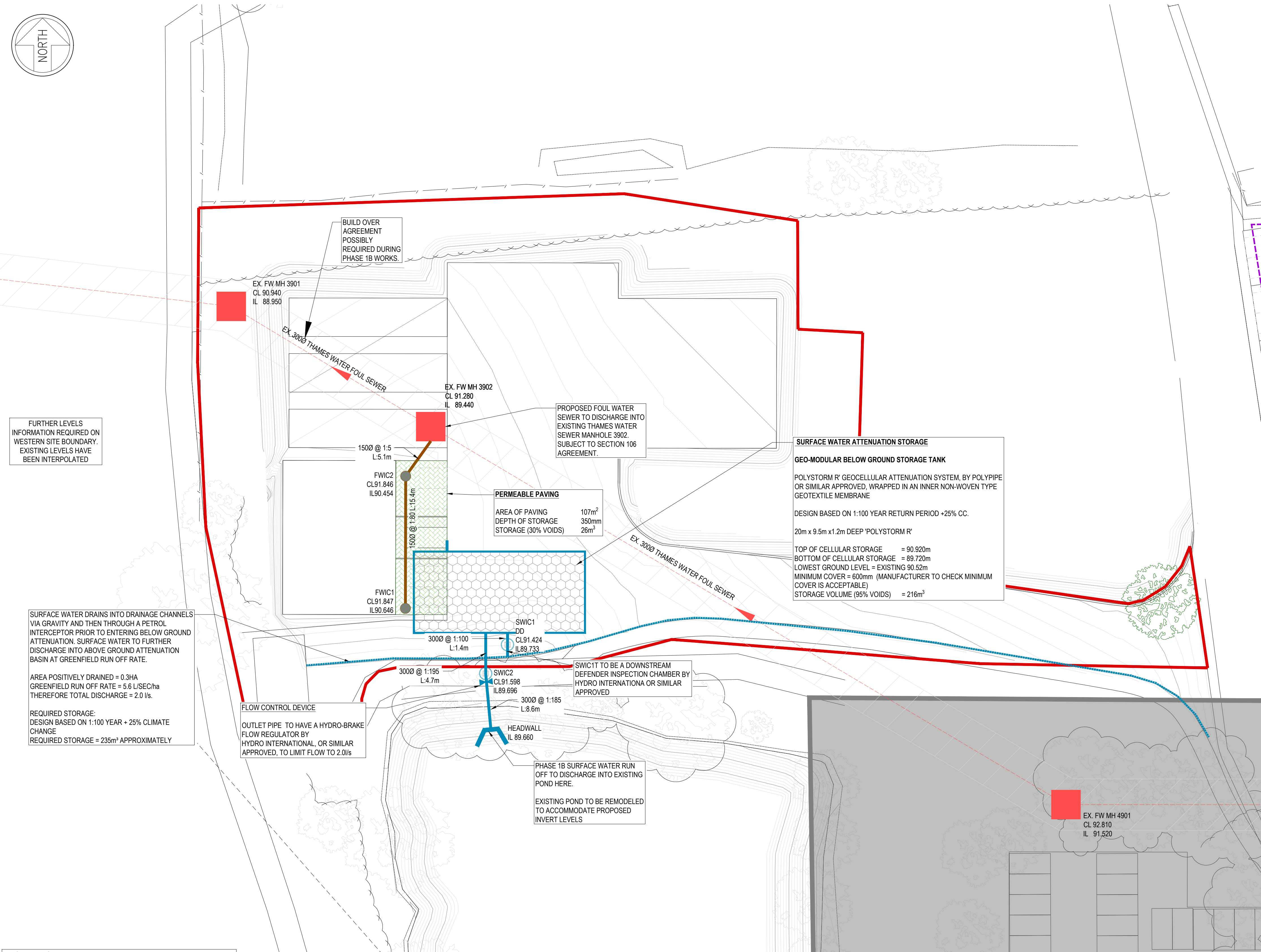
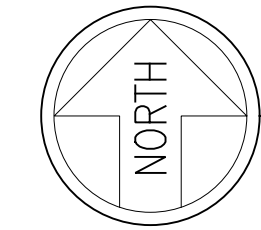
Supporting Appendices

- A: Drainage Strategy
- B: Onward Flow Drawing
- C: Surface Water Flood Risk Mapping
- D: Historical Topographical Survey
- E: Flood Exceedance Plan
- F: Drainage Calculations

Appendix A – Drainage Strategy

DRAINAGE NOTES

1. ALL PRIVATE DRAINAGE WORKS ARE TO BE CARRIED OUT IN ACCORDANCE WITH BS EN 752:2008 AND BUILDING REGULATIONS PART H.
2. ALL DRAINAGE WORKS WITHIN ADOPTABLE AREAS ARE TO COMPLY WITH THE REQUIREMENTS OF THE WATER UK/WATER RESEARCH CENTRE PUBLICATION 'SEWERS FOR ADOPTION' (CURRENT EDITION).
3. ALL CONNECTIONS TO EXISTING PUBLIC SEWERS TO BE IN ACCORDANCE WITH AND TO THE SATISFACTION OF THE LOCAL AUTHORITY.
4. CONCRETE PROTECTION (BEDDING CLASS 'Z') TO PIPEWORK TO BE PROVIDED AS FOLLOWS:
(i) ALL PIPEWORK WITHIN SOFT AREAS WITH A COVER OF LESS THAN 600mm.
(ii) ALL PIPEWORK BENEATH ROADS, CAR PARKS AND ALL OTHER TRAFFICKED HARDSTANDING AREAS WITH A COVER LESS THAN 1200mm.
(iii) ALL PIPEWORK ADJACENT TO EXISTING AND PROPOSED TREES/DENSE VEGETATION IN LANDSCAPED AREAS. AN EXPANSION JOINT SHALL BE PROVIDED AT ALL JOINT LOCATIONS.
5. ALL BELOW GROUND FOUL DRAINAGE FROM WITHIN BUILDING FOOTPRINT TO BE 100mm DIA. UNLESS STATED OTHERWISE. REFER TO SEPARATE NOTE FOR RECOMMENDED MINIMUM GRADIENTS.
ALL BELOW GROUND SURFACE WATER DRAINAGE FROM RWP LOCATIONS TO MAIN CARRIER DRAINS TO MATCH THE DIAMETER OF THE DOWNPIPE (TO ARCHITECT'S AND SPECIALIST CONTRACTOR'S DETAILS) UNLESS STATED OTHERWISE.
ALL BELOW GROUND DRAINAGE FROM ROAD GULLIES TO BE 150mm DIA. UNLESS STATED OTHERWISE.
6. ALL PIPEWORK IN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT UNLESS NOTED OTHERWISE. ALL CHAMBER INVERT LEVELS, SHOWN ON THE DRAWING, ARE FOR THE OUTGOING PIPE.
7. ALL MANHOLES LOCATED WITHIN BLOCK PAVED AREAS TO HAVE RECESSED MANHOLE COVERS.
8. ALL INTERNAL DRAINAGE TO BE TO THE ARCHITECT'S AND M & E ENGINEER'S DRAWINGS AND DETAILS.
9. THE POSITION AND INVERT LEVELS OF ALL EXISTING DRAINS, SEWERS AND MANHOLES TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF THE PROPOSED WORKS AND ANY DISCREPANCIES REPORTED IMMEDIATELY TO HDR CONSULTING.
10. ALL PIPES ARE TO HAVE A CLASS 'S' BED AND SURROUND UNLESS NOTED OTHERWISE (SEE NOTE 4 ABOVE).
11. ALL CONCRETE PIPES ARE TO BE HIGH STRENGTH AND TO BE IN ACCORDANCE WITH BS EN 1916 AND BS 5911.
12. ALL VITRIFIED CLAY PIPES ARE TO BE IN ACCORDANCE WITH BS EN 295.
13. FOR SETTING OUT OF FOUL AND RAINWATER OUTLETS REFER TO THE ARCHITECT'S DRAWINGS.
14. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEER'S AND ARCHITECT'S DRAWINGS, SPECIFICATIONS AND DOCUMENTATION.
15. THE CONTRACTOR IS TO ALLOW FOR GREASE TRAPS IN THE KITCHEN AND OTHER APPROPRIATE AREAS.
16. DRAINAGE CHANNELS AND SILT PITS TO BE DESIGNED BY A SPECIALIST MANUFACTURER FOR CRITICAL STORMS OF 1:5 YEAR RETURN PERIOD, TO SUIT SITE CONDITIONS AND IN ACCORDANCE WITH LOAD CLASS REQUIREMENTS AS SHOWN ON THE PLAN.
DESIGN TO BE SUBMITTED FOR COMMENT TO HDR CONSULTING. PRIOR TO ORDERING.
17. ALL EXTERNAL FINISHED LEVELS AND MANHOLE COVER LEVELS SHOWN ON THIS DRAWING ARE INDICATIVE AND SUBJECT TO ADJUSTMENT ON SITE TO SUIT THE FINISHED GROUND LEVELS. FOR FINAL LEVELS REFER TO THE ARCHITECT'S DRAWINGS.
18. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
19. ANY COORDINATES PROVIDED FOR MANHOLES OR INSPECTION CHAMBERS ARE RELEVANT TO THE MAIN DRAINAGE RUN INTERSECTION AND NOT THE CENTRE OF THE MANHOLE.
20. CHALK AND LIMESTONE ARE NOT TO BE USED AS BEDDING OR BACKFILLING MATERIAL IN SOILS WITH A PH VALUE LESS THAN 7.
21. A CCTV DRAINAGE SURVEY IS TO BE CARRIED OUT BOTH AT THE PRE-COMMENCEMENT OF CONSTRUCTION AND AT THE COMPLETION OF THE CONTRACT TO PROVE THE INTEGRITY OF THE AS-BUILT DRAINAGE SYSTEMS. AT THE COMPLETION OF THE CONTRACT THIS IS TO BE CARRIED OUT PRIOR TO THE ISSUE OF THE PRACTICAL COMPLETION CERTIFICATE.
22. DURING CONSTRUCTION SEWERS ARE TO BE INSPECTED AND TESTED IN LINE WITH 'CONSTRUCTION AND TESTING OF DRAINS AND SEWERS' BS EN 1610 LATEST EDITION. VISUAL INSPECTION FOLLOWED BY A LEAKTIGHTNESS INSPECTION TO BE CARRIED OUT. LEAKTIGHTNESS TESTING CAN BE CARRIED OUT USING THE AIR OR WATER METHODS.
23. SEWERS, MANHOLES, GULLIES, DRAINAGE CHANNELS AND SILT PITS SHOULD BE INSPECTED AT 6 MONTHLY INTERVALS AND CLEANED OUT AT 12 MONTHLY INTERVALS. A FULL CCTV SURVEY SHOULD ALSO BE CARRIED OUT AT 10 YEARLY INTERVALS. REFER ALSO TO SPECIALIST DRAINAGE CHANNEL AND PETROL INTERCEPTOR MANUFACTURER'S INFORMATION AND MAINTENANCE REQUIREMENTS IN ALL INSTANCES, INSPECTION AND CLEANING SHOULD BE CARRIED OUT ONLY BY A SPECIALIST CONTRACTOR AND IN ACCORDANCE WITH THE GUIDELINES GIVEN IN 'SAFE WORKING IN SEWERS AND AT SEWAGE WORKS' PUBLISHED BY NATIONAL JOINT HEALTH AND SAFETY COMMITTEE FOR THE WATER SERVICES.



FURTHER LEVELS INFORMATION REQUIRED ON WESTERN SITE BOUNDARY. EXISTING LEVELS HAVE BEEN INTERPOLATED

SURFACE WATER DRAINS INTO DRAINAGE CHANNELS VIA GRAVITY AND THEN THROUGH A PETROL INTERCEPTOR PRIOR TO ENTERING BELOW GROUND ATTENUATION. SURFACE WATER TO FURTHER DISCHARGE INTO ABOVE GROUND ATTENUATION BASIN AT GREENFIELD RUN OFF RATE.

AREA POSITIVELY DRAINED = 0.3HA
GREENFIELD RUN OFF RATE = 5.6 L/SEC/ha
THEREFORE TOTAL DISCHARGE = 2.0 l/s.

REQUIRED STORAGE:
DESIGN BASED ON 1:100 YEAR + 25% CLIMATE CHANGE
REQUIRED STORAGE = 235m³ APPROXIMATELY

IMPORTANT NOTE:
THE CONTRACTOR IS TO EXERCISE EXTREME CARE WHEN EXCAVATING FOR DRAINAGE PIPES AND MANHOLES AND NOT TO UNDERMINE EXISTING OR NEW COLUMN BASES AND/OR STRIP FOOTINGS ALREADY CAST. REFER ALSO TO NOTE 4 ON THIS DRAWING AND 'CONCRETING OF DRAINS LAID NEAR FOUNDATIONS' DETAIL ON DRAWING 20-089D / xxx.

FOR NEW CONSTRUCTION, COLUMN FOUNDATIONS/STRIP FOOTINGS MUST BE TAKEN DOWN TO BELOW INVERT LEVEL OF ANY NEARBY, ADJACENT SERVICES (DRAINAGE, GAS, WATER, ETC.)

USE OF THERMOPLASTIC PIPES
IF THERMOPLASTIC PIPES ARE TO BE USED THEY ARE TO BE OF THE STRUCTURED WALL TYPE AND SHALL COMPLY WITH WIS 4-35-01 AND BS EN 13476 AND MUST BE BSI KITEMARKED (E.G. POLYSEWER/RIDGISEWER BY POLYPIPE CIVILS, ULTRARIB BY WAVIN OR SIMILAR). PIPES ARE TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS. NOTE: ALL INSTALLATION MUST BE IN ACCORDANCE WITH BUILDING REGULATIONS PART: H, BS EN 752:2008, SPECIFICATION FOR HIGHWAY WORKS AND ALL RELEVANT BRITISH AND EUROPEAN CODES OF PRACTICE.

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

- LEGEND
- SITE BOUNDARY
 - EXISTING THAMES WATER FOUL WATER DRAIN WITH MANHOLE
 - PROPOSED PROPRIETARY DRAINAGE CHANNEL
 - PROPOSED FOUL WATER DRAIN WITH MANHOLE
 - PROPOSED SURFACE WATER DRAIN WITH MANHOLE
 - PROPOSED BELOW GROUND ATTENUATION TANK
 - PROPOSED PERMEABLE PAVING

P02	INVERT LEVELS UPDATED	03.09.25
P01	FIRST ISSUE	09.04.25
Rev	Description	Date
Drawing Status: PRELIMINARY		Suitability:

BOURNE HOUSE
PRINCE EDWARD STREET
BERKHAMSTED,
UK HP4 3EJ
UNITED KINGDOM
t: +44 (0) 203 696 1903
e: info@hdrinc.com
w: www.hdrinc.com

Client:
THE SURVEY CORPORATION PLC

Architect:
DUNTHORNE PARKER ARCHITECTS

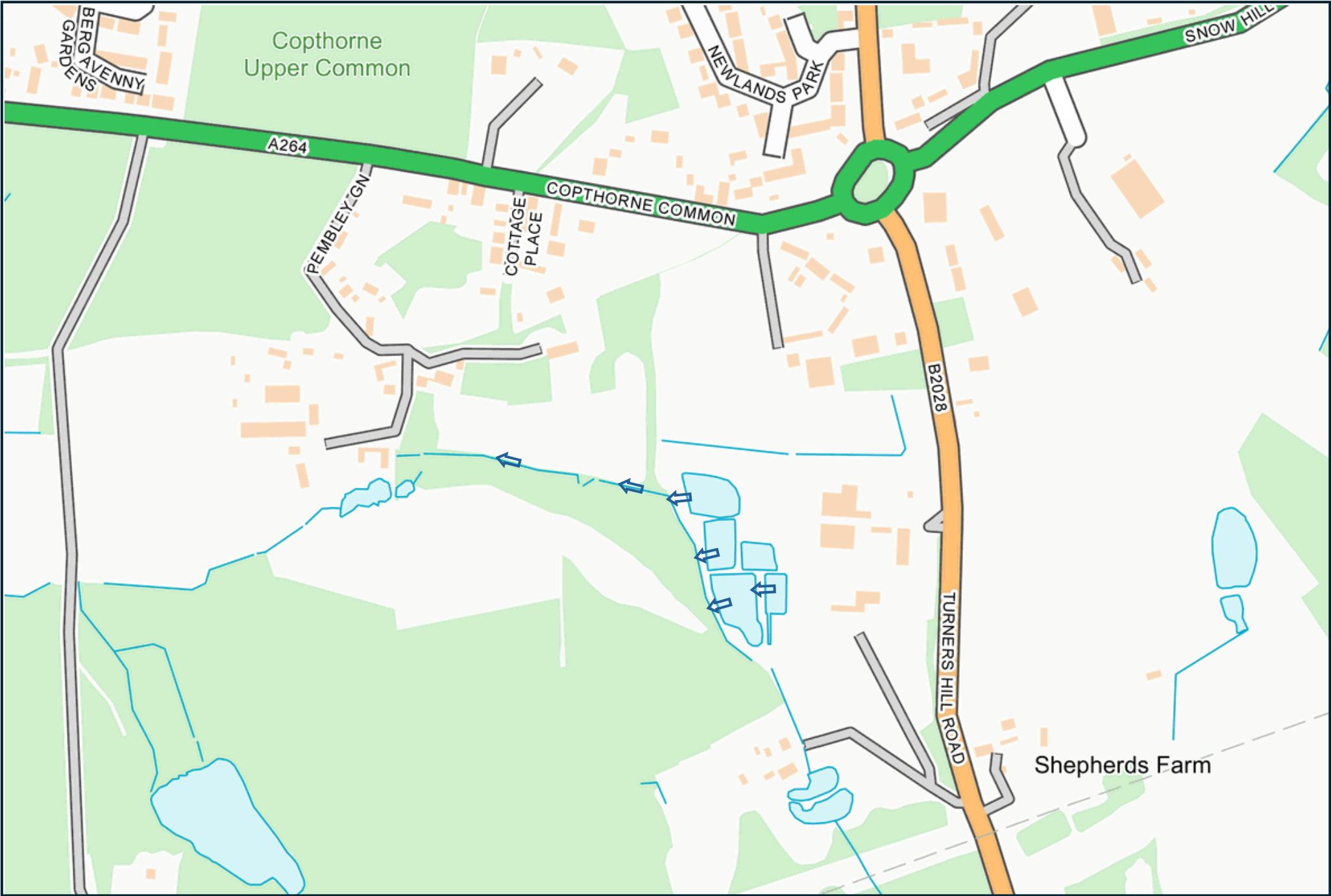
Project:
BARNES COURT AND FRIDAY FARM
COPTHORNE

Title:
PHASE 1B DRAINAGE LAYOUT

HDR Project Number: 10427658			
Cad File Name: BRC-HDR-XX-XX-DR-C-000303.dwg			
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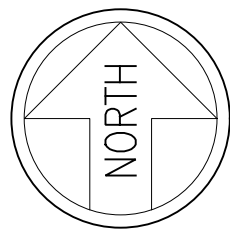
Appendix B – Onward Flow Drawing

10427658 BARNS COURT
ONWARD FLOW PATHS



LEGEND
← FLOW DIRECTION

Appendix C – Surface Water Flood Risk Mapping



RISK OF SURFACE WATER FLOODING DATA TAKEN FROM DEFRA WMS SERVICE
[HTTPS://ENVIRONMENT.DATA.GOV.UK/SPATIALDATA/NAFRA2-RISK-OF-FLOODING-FROM-SURFACE-WATER/WMS](https://environment.data.gov.uk/spatialdata/nafra2-risk-of-flooding-from-surface-water/wms)

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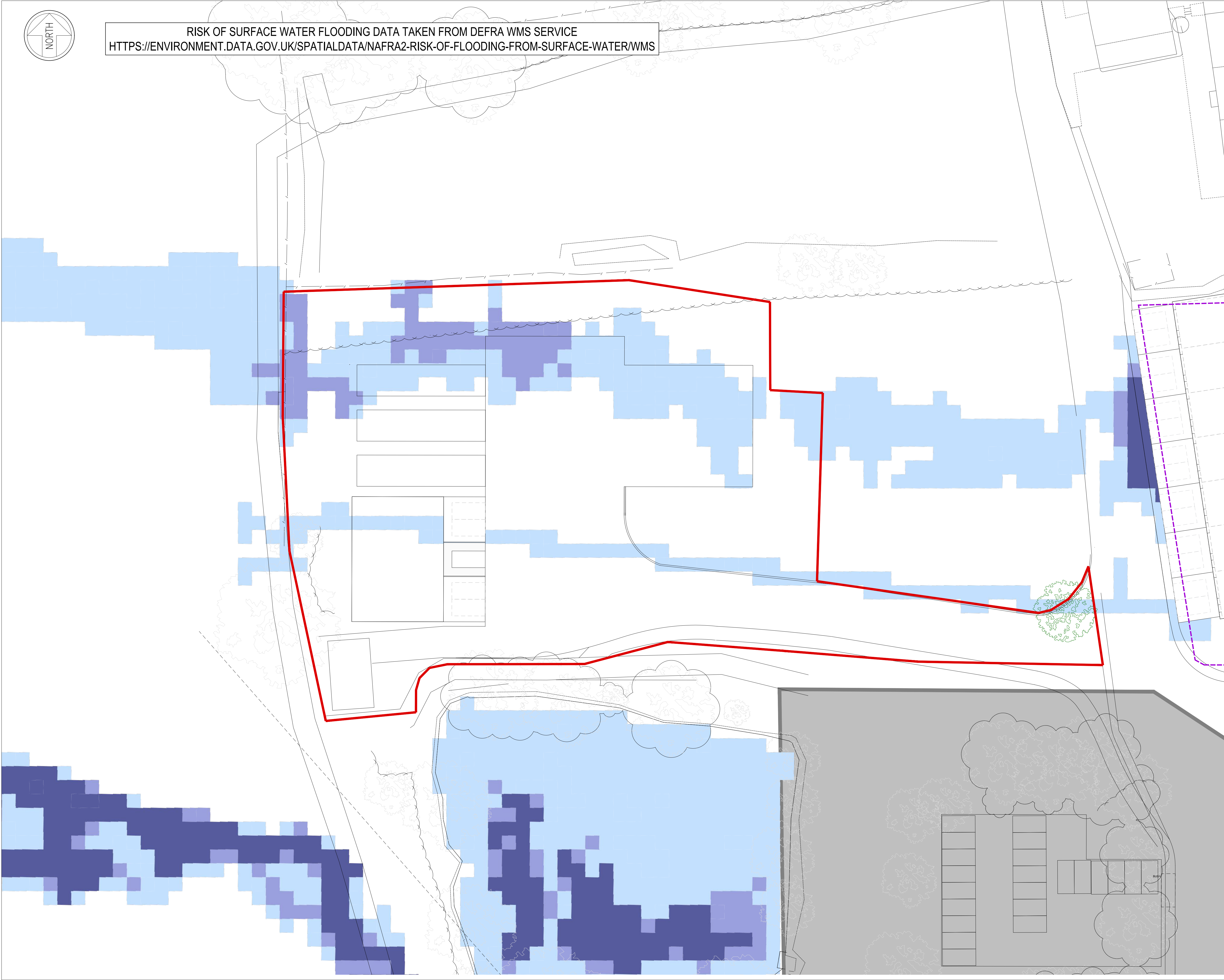
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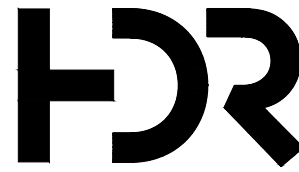
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P01	ISSUED FOR INFORMATION	03.09.25
Rev	Description	Date
Drawing Status:		Suitability:
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BOURNE HOUSE
PRINCE EDWARD STREET
BERKHAMSTED,
UK HP4 3EZ
UNITED KINGDOM
t: +44 (0) 203 696 1903
e: info@hdrinc.com
w: www.hdrinc.com

Client:

THE TURVEY CORPORATION PLC

Architect:

DUNTHORNE PARKER ARCHITECTS

Project:

BARNES COURT AND FRIDAY FARM
COPTHORNE

Title:

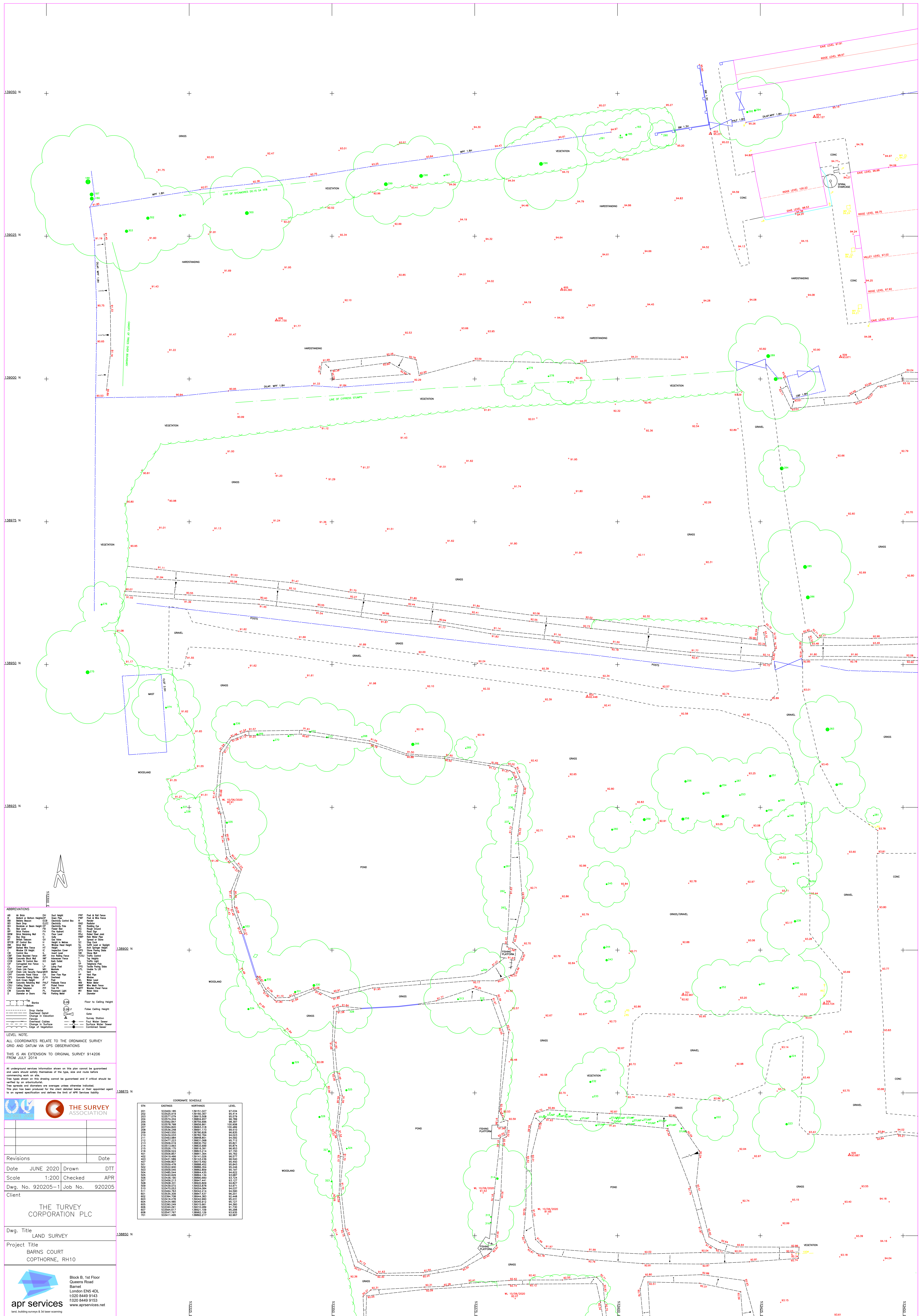
RISK OF SURFACE WATER FLOODING &
PROPOSED PHASE 1B DEVELOPMENT

HDR Project Number:
10427658

Cad File Name:
BRC-HDR-XX-XX-DR-C-000304.dwg

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Appendix D – Historical Topographical Survey



Appendix E – Flood Exceedance Plan



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Appendix F – Drainage Calculations

Barns Court Phase 1b: 1:100+CC	Date: 02/09/2025			
	Designed by: MFP	Checked by: IJM	Approved By:	
Report Details: Type: Junctions Storm Phase: Phase	HDR : 240 Blackfriars Road London SE1 8NW			

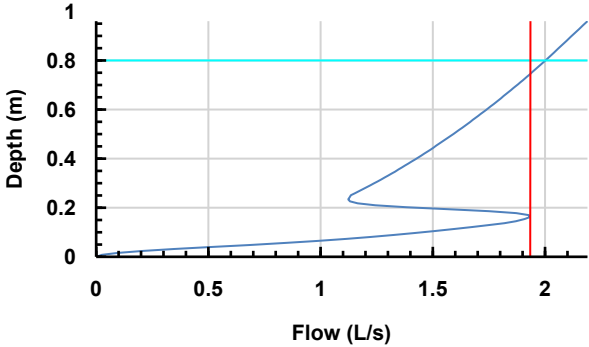
Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SWIC1	Manhole	533344.603	138945.319	91.424	1.691	89.733	Circular	1.200
SWIC2	Manhole	533342.088	138941.940	91.598	1.902	89.696	Circular	1.200
Headwall	Manhole	533342.610	138935.242	90.160	0.500	89.660	Circular	1.200

Name	Lock
SWIC1	None
SWIC2	None
Headwall	None

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SWIC1	Inlet	Catchment Area	(None)	No Restriction
SWIC2	Inlet	2.001	(None)	No Restriction
Headwall	Inlet	2.002	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SWIC1	Outlet	1.001	Free Discharge
	Outlet	2.002	Hydro-Brake®
	Invert Level (m)	89.696	
	Design Depth (m)	0.800	
	Design Flow (L/s)	2.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0068-2000-0800-2000	
			
SWIC2			

Barns Court Phase 1b: 1:100+CC	Date: 02/09/2025		
	Designed by: MFP	Checked by: IJM	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	HDR : 240 Blackfriars Road London SE1 8NW		



Porous Paving

Type : Porous Paving

Dimensions	
Exceedance Level (m)	91.834
Depth (m)	0.350
Base Level (m)	91.484
Paving Layer Depth (mm)	80
Membrane Percolation (m/hr)	500.0
Porosity (%)	30
Length (m)	6.000
Long. Slope (1:X)	23.00
Width (m)	18.000
Total Volume (m³)	8.748

Inlets	
Inlet	
Inlet Type	Lateral Inflow
Incoming Item(s)	Catchment Area (1)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets	
Outlet	
Outgoing Connection	3.001
Outlet Type	Free Discharge

Advanced	
Conductivity (m/hr)	500.0

Barns Court Phase 1b: 1:100+CC	Date: 02/09/2025		
	Designed by: MFP	Checked by: IJM	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	HDR : 240 Blackfriars Road London SE1 8NW		



Cellular Storage

Type : Cellular Storage

Dimensions

Exceedance Level (m)	90.920
Depth (m)	1.200
Base Level (m)	89.720
Number of Crates Long	20
Number of Crates Wide	19
Number of Crates High	3
Porosity (%)	95
Crate Length (m)	1
Crate Width (m)	0.5
Crate Height (m)	0.4
Total Volume (m³)	216.600

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	3.001
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	1.001
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	2.001
Outlet Type	Free Discharge

Barns Court Phase 1b: 1:100+CC	Date: 02/09/2025		
	Designed by: MFP	Checked by: IJM	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	HDR : 240 Blackfriars Road London SE1 8NW		

HDR



FSR: 100 years: Increase Rainfall (%): +25: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SWIC1	FSR: 100 years: +25 %: 480 mins: Winter	91.42 4	89.73 3	90.538	0.805	16.0	0.911	0.000	16.1	181.591	Surcharged
SWIC2	FSR: 100 years: +25 %: 480 mins: Winter	91.59 8	89.69 6	90.538	0.842	2.0	0.953	0.000	2.0	93.194	Surcharged
Headwall	FSR: 100 years: +25 %: 480 mins: Winter	90.16 0	89.66 0	89.700	0.040	2.0	0.000	0.000	2.0	93.151	OK

Barns Court Phase 1b: 1:100+CC	Date: 02/09/2025			
	Designed by: MFP	Checked by: IJM	Approved By:	
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	HDR : 240 Blackfriars Road London SE1 8NW			



**FSR: 100 years: Increase Rainfall (%): +25: Critical Storm Per Item: Rank By:
Max. Avg. Depth**

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residant Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Porous Paving	FSR: 100 years: +25 %: 30 mins: Winter	91.793	91.502	0.048	0.018	4.0	1.021	0.000	0.000	3.0	3.574	88.329	OK
Cellular Storage	FSR: 100 years: +25 %: 480 mins: Winter	90.538	90.538	0.818	0.818	16.7	147.719	0.000	0.000	2.0	94.012	31.801	OK