

This response is provided on behalf of Canmoor Developments Ltd. To a second set of comments provided by the LLFA during the planning consultation period. The intention is to prevent a pre-commencement condition or negate the need for a condition if possible.

The LLFAs comments have been included as Appendix A.

INFILTRATION

Extracts from two intrusive ground investigations have been included as Appendix B. This includes locations of investigatory logs, sections on groundwater and logs. Original, full copies can be obtained via this link [Havant SI](#). In summary:

Top of River Terrace Deposits (RTD) strata 17.40m AOD (lowest reading)

Base of soakaway tank 16.40m AOD (based on lowest inlet at base and full depth of tank within RTD).

TRC report end 2023 (wet season). Investigatory log CP102 (centre of west boundary) standing ground water 13.49m AOD

TRC report start 2025 (wet season). Investigatory log WS205 (north of proposed yard) standing ground water 16.01m AOD

Latest readings confirm a standing groundwater level of 16.01m AOD which is less than 1m below the base of the soakaway 16.40m AOD. This appears to be an isolated case which is also not reflected within the logs. Regardless, based on the investigations a 1m unsaturated zone beneath the base of the tank is not achievable.

DETAILED STRATEGY

As a result of the above findings an updated strategy drawing has been included as Appendix C. This is based on discharge into the public surface water sewer and illustrates proposed site and drainage levels plus exceedance flows. Associated hydraulic calculations have also been included that can easily be cross referenced to the drawing.

WATER QUALITY

Table 26.2 of the CIRIA C753 SuDS Manual identifies the pollution hazard level associated with industrial roof and car parks as low, but service yards as medium. An interceptor has been included as a single level of treatment to surface water runoff from the service yard and car parking areas. A downstream defender can be added as a second level of treatment if required.

MAINTENANCE

A maintenance report has been included as Appendix D.

APPENDIX A



Hampshire County Council

Universal Services
The Castle
Winchester, Hampshire SO23 8UD

Tel: 0300 555 1375
Fax 01962 847055
www.hants.gov.uk

Enquiries to	Sarah Reghif	My reference	SWM/2025/0083
Direct Line		Your reference	APP/24/00606
Date	2 April 2025	Email	SWM.consultee@hants.gov.uk

Dear Sir/Madam,

**Demolition of existing buildings and redevelopment of the industrial site comprising of a single industrial building, split into three units having a flexible set of mixed industrial uses. This includes use classes E(g) (iii), B2 and B8 along with ancillary offices, car parking, yard areas, soft landscaping and associated infrastructure. at 8 Downley Road, Havant, PO9 2JD
(Application No. APP/24/00606**

Hampshire County Council as Lead Local Flood Authority has provided comments in relation to the above application in our role as statutory consultee on surface water drainage for major developments.

This response does not reflect the position of Hampshire County Council as the Highway Authority. If there is a potential for the drainage features to be offered for adoption, this will need to be discussed separately with Highways development planning as they might not be considered acceptable by the Highway Authority.

In order to assist applicants in providing the correct information to their Local Planning Authority for planning permission, Hampshire County Council has set out the information it requires to provide a substantive response at <https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/planning>

The County Council has reviewed the following documents relating to the above application:

- Flood Risk Assessment + Drainage Strategy dated 08/07/24

Director of Universal Services
Patrick Blogg

The drainage strategy has been amended following site specific infiltration testing which demonstrates that infiltration is feasible.

Testing has been undertaken in accordance with BRE365 however the rates applied to the design have utilised an average figure rather than the worst case figure so the calculations will need to be updated. The $\frac{1}{2}$ drain time will need to be confirmed to ensure it meets with current guidance.

No groundwater monitoring has been undertaken so further evidence is required to demonstrate that any infiltration systems will have a 1m unsaturated area beneath their base.

In relation to water quality, the simple index approach has been utilised but this fails to demonstrate that sufficient treatment measures are included. This will need to be revised and the groundwater assessment considered.

The Environment Agency should be consulted given the groundwater source protection zone.

Limited information has been provided in relation to site levels, drainage levels and exceedance flows however due to the nature of the site and available space, we would be willing to accept further information to be provided by condition.

Given that a previous design was provided identifying a discharge point to the surface water sewer, if the above information identifies elements such as high water tables preventing the proposals to function as required, an alternative is available. As such, we would be willing for additional information to be provided by condition and would recommend that the following is applied:

1. No development shall begin until a detailed surface water drainage scheme for the site has been submitted and approved in writing by the Local Planning Authority. The submitted details should include:
 - a. A technical summary highlighting any changes to the design from that within the Flood Risk Assessment.
 - b. Groundwater monitoring / assessment to demonstrate that there will be a 1m unsaturated zone.
 - c. Detailed drainage plans to include type, layout and dimensions of drainage features including references to link to the drainage calculations.
 - d. Detailed drainage calculations to demonstrate $\frac{1}{2}$ drain time, worst case infiltration rates and sufficient attenuation for storm events up to and including 1:100 + climate change.
 - e. Confirmation that sufficient water quality measures have been included to satisfy the methodology in the Ciria SuDS Manual C753.
 - f. Exceedance plans demonstrating the flow paths and areas of ponding in the event of blockages or storms exceeding design criteria.

2. Details for the long term maintenance arrangements for the surface water drainage system shall be submitted to and approved in writing by the Local Planning Authority prior to the first occupation of any of the dwellings. The submitted details shall include;

- a. Maintenance schedules for each drainage feature type and ownership
- b. Details of protection measures

As a statutory consultee, the County Council has a duty to respond to consultations within **21 days**. The 21 day period will not begin until we have received sufficient information to enable us to provide a meaningful response.

Please ensure all data is sent to us via the relevant Local Planning Authority.

If you require additional guidance on providing the correct information, we recommend you use our **Surface Water Management Pre-application service** which will enable discussions with the reviewing engineer and scope out works that would address the points raised. For full details, please visit: <https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/planning> and click on [pre-application advice request form](#).

This response has been provided using the best knowledge and information submitted by the applicant as part of the planning application at the time of responding and is reliant on the accuracy of that information.

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Yours faithfully,



Flood and Water Management Team
Hampshire County Council,
The Castle, Winchester, Hampshire SO23 8UD
Web:

<https://www.hants.gov.uk/landplanningandenvironment/environment/flooding>

General guidance for the application

It is important to ensure that the long-term maintenance and responsibility for Sustainable Drainage Systems is agreed between the Local Planning Authority and the applicant before planning permission is granted. This should involve discussions with those adopting and/or maintaining the proposed systems, which could include the Highway Authority, Planning Authority, Parish Councils, Water Companies and private management companies.

For SuDS systems to be adopted by Hampshire Highways it is recommended that you visit the website at:

<https://www.hants.gov.uk/transport/developers/constructionstandards> for guidance on which drainage features would be suitable for adoption.

Where the proposals are connecting to an existing drainage system it is likely that the authorities responsible for maintaining those systems will have their own design requirements. These requirements will need to be reviewed and agreed as part of any surface water drainage scheme.

Works in relation to ordinary watercourses

*PLEASE NOTE: If the proposals include works to an ordinary watercourse, under the Land Drainage Act 1991, as amended by the Flood and Water Management Act 2010, prior consent from the Lead Local Flood Authority is required. **This consent is required as a separate permission to planning.***

Information on ordinary watercourse consenting can be found at the following link

<https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/c/hangewatercourse>

It is strongly recommended that this information is reviewed before Land Drainage consent application is made.

*For guidance on providing the correct information, we recommend you use our **Ordinary Watercourse Consents Pre-application service** and help avoid delays occurring at the formal application stage. A Pre-application service for Ordinary Watercourse Consents is available, allowing consents to go through in a smoother, often more timely manner. For full information please visit:*

<https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/c/hangewatercourse>

APPENDIX B



NOTES	COPYRIGHT NOTES Google Imagery June 2018	REVISIONS	 WorkLife 20 Red Lion Street, London, WC1R 4PS	TITLE EXPLORATORY HOLE LOCATION PLAN		STATUS FINAL						
				TRC PROJECT NO. 562241	SCALE 1:850 at A3							
				PURPOSE OF ISSUE SUITABLE FOR INFORMATION			REVISION PO1					
				DRAWING NO FIGURE 03								
		REV.	Initials	REVISION NOTES/COMMENTS	PROJECT DOWNLEY ROAD, HAVANT	PROJECT ROYAL LONDON PROPERTY GROUP	CLIENT					
								P01	Initials	JE	LS	24/03/2025

Extract from TRC report dated December 2023

4.4 Groundwater

Water strikes observed during the Site works and the results of the monitoring visits are summarised in the table below.

Table 4.2: Groundwater Observations

Downley Road, Havant
562241.0000.0000

Page 15



Exploratory Hole	Water Strikes				Standing Water Level During Monitoring			
	Struck		Rose to		Shallowest		Deepest	
	m bgl	m aOD	m bgl	m aOD	m bgl	m aOD	m bgl	m aOD
CP102	5.00	13.83	ND	-	-	-	-	-
CP102	9.00	9.83	7.50	11.33	5.34	13.49	5.88	12.95
CP103	ND	-	ND	-	ND	-	ND	-
WS101	ND	-	ND	-	-	-	-	-
WS103	ND	-	ND	-	ND	-	ND	-
WS104	ND	-	ND	-	ND	-	ND	-
WS105	ND	-	ND	-	ND	-	ND	-

ND = Not Detected

During the ground investigation, groundwater was encountered within the deep borehole CP102 at 5.00m bgl and at 9.00m bgl rising to 7.50m bgl within the River Terrace Deposits.

During subsequent monitoring, groundwater was encountered within the deep borehole CP102 at between 5.34m and 5.88m bgl within River Terrace Deposits. Dry conditions were encountered within the remaining shallower boreholes.

According to the ground investigation and monitoring data, groundwater is anticipated within the River Terrace Deposits at around 5.35m bgl. Groundwater may be subject to seasonal variations especially after periods of prolonged rain or drought.

Historical BGS boreholes in the surrounding area indicate the presence of groundwater within the River Terrace Deposits between 1.40m and 6.00m bgl.

The groundwater monitoring data are presented in Annex D.

Extract from TRC Report dated April 2025



4.5 Groundwater

Water strikes observed during this ground investigation works and the results of the monitoring visits are summarised in the table below.

Table 4.2: Groundwater Observations

Exploratory Hole	Water Strikes				Standing Water Level During Monitoring			
	Struck		Rose to		Shallowest		Deepest	
	m bgl	m aOD	m bgl	m aOD	m bgl	m aOD	m bgl	m aOD
SOAK01	ND	-	ND	-	NA	-	NA	-
SOAK02	ND	-	ND	-	NA	-	NA	-
TP201	ND	-	ND	-	NA	-	NA	-
WS201	ND	-	ND	-	ND	-	ND	-
WS202	ND	-	ND	-	ND	-	ND	-
WS203	ND	-	ND	-	ND	-	ND	-
WS204	ND	-	ND	-	ND	-	ND	-
WS205	ND	-	ND	-	2.93	16.01	3.39	15.55

ND = Not Detected, NA = Not Applicable

During this ground investigation phase, groundwater was not encountered. During the previous ground investigation, groundwater was encountered within the deep borehole CP102 at 5.00m bgl and at 9.00m bgl rising to 7.50m bgl while the drilling was paused for 20 minutes, within the River Terrace Deposits.

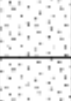
During subsequent monitoring, groundwater was typically not encountered. Groundwater was only recorded in WS205 between 2.93mbgl (16.01m aOD) and 3.39 (15.55m aOD) within River Terrace Deposits. During the previous phase of investigation and during subsequent monitoring, groundwater was encountered within the deep borehole CP102 at between 5.34m and 5.88m bgl within River Terrace Deposits. Dry conditions were encountered within the remaining shallower boreholes during the previous investigation phase.

According to the previous and current ground investigations and monitoring data, groundwater is anticipated sporadically within the River Terrace Deposits at depths generally greater than 2.90m bgl. Groundwater may be subject to seasonal variations especially after periods of prolonged rain or drought.

The groundwater monitoring data are presented in Annex D.

4.6 Visual and Olfactory Evidence of Contamination

No visual or olfactory evidence of contamination was encountered during the ground investigation.

TRC		Percussion Drilling Log									
Project Name: Downley Road, Havant				Client: Canmoor Projects				Date: 09/10/2023 - 10/10/2023			
Location: Former Dunham-Bush site, Havant				Contractor: TRC Companies Ltd				Co-ords: E472770.04 N107645.48			
Project No.: 562241				Crew Name: Southeastern Drilling Services				Drilling Equipment: Dando 4000			
Borehole Number CP102		Hole Type CP		Level 18.83m AOD		Logged By Tim Singer		Scale 1:50		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.20	ES	PID=0.00	0.50	18.33		MADE GROUND: Brown sandy very gravelly clay. Sand is medium to coarse. Gravel is very angular to sub-angular, fine to coarse grained. Gravel consists of brick and flint. Medium cobble content of brick and flint.	1		
	0.30	B									
	0.30	ES									
	0.30	PID									
			1.00	D	PID=0.00	1.20	17.83		MADE GROUND: Brown slightly clayey sandy gravel. Sand is fine to coarse. Gravel is very angular to sub-rounded, fine to coarse grained. Gravel consists of flint, brick and sandstone. High cobble content of flint.	1	
	1.30	B									
	1.30	PID									
	1.50	B									
			1.50	SPT	N=44 (7.9/9.9, 12, 14)	2.00	18.83		Dense brown clayey silty sandy GRAVEL. Sand is fine to coarse. Gravel is very angular to sub-angular, fine to coarse grained. Gravel consists of flint and sandstone. Low cobble content of flint.	2	
			1.50	PID							PID=0.60
			2.30	PID	PID=0.00	2.50	18.83		Dense becoming very dense brownish grey sandy GRAVEL. Sand is medium to coarse. Gravel is very angular to rounded, fine to coarse grained. Gravel consists of flint and sandstone. High cobble content of flint. (RIVER TERRACE DEPOSITS)	3	
			2.50	B							
			2.50	SPT							
			2.50	SPT							
			3.50	B	N=50 (25 for 85mm/50 for 90mm)	3.60	18.83		Dense becoming very dense brownish grey sandy GRAVEL. Sand is medium to coarse. Gravel is very angular to rounded, fine to coarse grained. Gravel consists of flint and sandstone. High cobble content of flint. (RIVER TERRACE DEPOSITS)	4	
			3.50	SPT							
			3.60	ES	N=32 (25 for 130mm/10,9,6,7)	4.50	18.83		Dense becoming very dense brownish grey sandy GRAVEL. Sand is medium to coarse. Gravel is very angular to rounded, fine to coarse grained. Gravel consists of flint and sandstone. High cobble content of flint. (RIVER TERRACE DEPOSITS)	5	
			4.50	B							
			4.50	SPT							
			4.50	SPT							
		5.50	PID	PID=0.00	6.00	18.83		Medium dense orangeish brown slightly silty, slightly clayey, very sandy GRAVEL. Sand is fine to coarse. Gravel is very angular to subrounded, fine to coarse grained. Gravel consists of flint and sandstone. Medium cobble content of flint. (RIVER TERRACE DEPOSITS)	6		
		6.00	B								
		6.00	D								
		6.00	SPT								
		7.00	D	N=50 (11, 13/50 for 215mm)	7.50	18.83		Medium dense orangeish brown slightly silty, slightly clayey, very sandy GRAVEL. Sand is fine to coarse. Gravel is very angular to subrounded, fine to coarse grained. Gravel consists of flint and sandstone. Medium cobble content of flint. (RIVER TERRACE DEPOSITS)	7		
		7.00	SPT								
		7.50	B	PID=0.40	8.00	10.83		Medium dense orangeish brown slightly silty, slightly clayey, very sandy GRAVEL. Sand is fine to coarse. Gravel is very angular to subrounded, fine to coarse grained. Gravel consists of flint and sandstone. Medium cobble content of flint. (RIVER TERRACE DEPOSITS)	8		
		8.50	D								
		8.50	PID								
		8.50	PID								
		9.00	D	N=19 (2.3/4.5, 5.5, 5)	9.00	10.83		Gravely CLAY band	9		
		9.00	SPT								
		9.00	PID	PID=0.00	9.50	10.83		Gravely CLAY band	10		
		9.50	B								
		9.50	PID								
		9.50	PID								
		10.00	SPT	N=13 (2.4/4.3, 3, 3)	10.00	8.83	End of Borehole at 10.000m				
Hole Diameter		Casing Diameter		Chiselling		Inclination and Orientation					
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
10.00	150	10.00	150								
Remarks 1. Utility survey carried out prior to excavation. 2. Hand pried up to 1.2m bgl. 3. Groundwater was encountered at 5m bgl whilst drilling before draining. Groundwater was encountered again at 9m bgl whilst drilling, rising to 7.5m bgl. 4. Response zone of standard piezometer installation between 2.0m and 10m bgl.											

Windowless Sample Log											
Project Name: Downley Road, Havant				Client: Royal London Property Group				Date: 19/02/2025			
Location: Downley Road, Havant, PO9 2JD				Subcontractor: Oaklands Site Investigation Ltd				Co-ords: E472793.58 N107578.56			
Project No. : 562241.0000.0004				Crew Name: JH, SL				Drilling Equipment: Dando Terrier			
Borehole Number WS205		Hole Type WS		Level 18.94m AoD		Logged By Martin Dorfling		Scale 1:30		Page Number Sheet 1 of 1	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.50	ES		1.50	17.44		MADE GROUND: Light brown slightly sandy gravelly CLAY. Sand is fine to coarse grained. Gravel is angular to rounded fine to coarse of brick and flint.	1		
		1.20 1.20	D SPT	N=7 (1,2/2,2,1,2)							
		1.80	ES		4.10	14.84		Medium dense reddish brown clayey very sandy GRAVEL. Sand is fine to coarse grained. Gravel is angular to sub-rounded fine to coarse of flint. [RIVER TERRACE DEPOSITS].	2		
		2.00	SPT	N=13 (2,3/3,4,3,3)							
		2.40	D		5.45	13.49		Very stiff light brown silty slightly sandy slightly gravelly CLAY. Sand is fine grained. Gravel is angular to rounded fine and medium of flint. [RIVER TERRACE DEPOSITS]	3		
		3.00	SPT	N=22 (5,5/3,4,7,8)							
		3.80	D		5				4		
		4.00	SPT	N=33 (8,4/5,10,8,10)							
		4.50	D		6				5		
		5.00	SPT	N=25 (3,4/5,7,7,8)							
		End of Borehole at 5.450m							6		
Hole Diameter		Casing Diameter		Drilling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
1.20	102										
2.00	87										
3.00	75										
4.00	67										
5.00	56										
Remarks 1. Borehole scanned for utilities prior to excavation. 2. Location was hand-pitted to 1.2m bgl. 3. Groundwater was not encountered. 4. Borehole terminated at target depth. 5. Monitoring well installed; response zone between 2.0 to 6.0mbgl.											

APPENDIX C

DRAINAGE

1. REFER TO CIVIL AND STRUCTURAL SPECIFICATION REPORT - PART R.
2. CONTRACTOR SHOULD ENSURE THE LOCAL PLANNING AUTHORITY HAVE APPROVED THE DRAINAGE PROPOSALS PRIOR TO ORDERING MATERIAL OR INSTALLATION.

HYDRAULIC DESIGN:
3. THE SURFACE WATER NETWORK, FLOW CONTROL AND ATTENUATION HAS BEEN DESIGNED USING DRAINAGE SOFTWARE WITH FSR RAINFALL DATA.

- STRATEGY:
4. DISCHARGE RATE RESTRICTED AT 5.8 l/s SUBJECT TO LLFA APPROVAL. THIS IS BASED ON A RURAL RATE CALCULATED USING ICP SUDS.
5. TOTAL ATTENUATION FOR 100YR-45% CLIMATE CHANGE BELOW GROUND = 1,237m³.

- FINAL DRAINAGE CONNECTIONS:
6. WHERE THIRD PARTY APPROVAL IS REQUIRED THESE ARE NOTED AGAINST EACH DISCHARGE POINT ON THE DRAWING.
7. NO CONNECTION OR DISCHARGE SHOULD BE MADE UNTIL APPROVAL HAS BEEN RECEIVED. CHECK STATUS OF APPLICATION WITH ENGINEER.
8. CONTRACTOR SHOULD INVESTIGATE AND INSTALL FINAL DRAINAGE CONNECTIONS PRIOR TO INSTALLING ANY UPSTREAM DRAINAGE TO AVOID POTENTIAL LEVEL ISSUES.
9. EVERY EFFORT HAS BEEN MADE TO PROVIDE ACCURATE INFORMATION. HOWEVER, THE CONTRACTOR IS ADVISED TO CHECK ACTUAL CONDITIONS. I.E. THE LOCATION, ACCESSIBILITY, UNDERGROUND ROUTE, LEVELS, SIZES, CONDITION OF EXISTING SEWERS TO BE RE-USED AND/OR CONNECTED INTO.

- GENERALLY:
10. DO NOT SCALE FROM THIS DRAWING. WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED.
11. REPORT CONFLICTS TO ENGINEER IMMEDIATELY.
12. EVERY EFFORT HAS BEEN MADE TO ASCERTAIN TYPE, LOCATION AND DEPTH OF BURIED SERVICES AND/OR OBSTRUCTIONS. HOWEVER, THE CONTRACTOR IS ADVISED TO CARRY OUT OWN INVESTIGATIONS TO ENSURE THERE ARE NO CLASHES WITH THE PROPOSED WORKS.
13. CONTRACTOR IS RESPONSIBLE FOR PROTECTING RETAINED SERVICES AND MAKING CONTACT WITH OWNERS OF APPARATUS TO OBTAIN NECESSARY CONSENT FOR EXCAVATION, PROTECTION AND/OR DIVERTING.
14. BURIED OBSTRUCTIONS ENCOUNTERED DURING EXCAVATION THAT CONFLICT WITH PROPOSED WORKS SHOULD BE BROKEN OUT AND REMOVED. RESIDUAL VOIDS TO BE BACKFILLED AND COMPACTED AS PER SPECIFICATION.

- NEW DRAINAGE:
15. INTERNAL FOUL POINTS ARE LOCATED AND SET OUT BY THE ARCHITECT.
16. TRADITIONAL RAINWATER DOWNPIPES ARE PROVIDED BY THE CLADDING CONTRACTOR AND COORDINATED WITH THE ARCHITECT.
17. DESIGN ASSUMES THAT ALL WORKS ARE NOT TO BE ADOPTED.
18. GRADIENTS OF PIPES ARE AVERAGED. PIPE CONNECTIONS SHOULD BE INSTALLED TO THE STATED INVERT LEVELS.
19. COVER LEVELS OF THE MANHOLES ARE AVERAGED. COVER AND FRAME SHOULD BE SET TO SUIT FINISHED GROUND LEVELS.
20. ALL PIPEWORK WITHIN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT (U.N.O), INCLUDING BACKDROP PIPEWORK, WHERE THE RODDING ACCESS LEVEL IS SPECIFIED.
21. FLAT LATERAL CONNECTION TO BE 135° Y" JUNCTIONS (IE 45° OBLIQUE JUNCTIONS) RELATIVE TO MAIN RUN. TO BE USED ON FOUL OR SURFACE WATER RUNS. 90° OR 87½° SQUARE JUNCTIONS SUITABLE FOR SURFACE WATER CONNECTIONS ONLY.
22. SADDLE CONNECTIONS TO LARGER PIPES SHOULD BE MADE SO THAT THE INVERT LEVEL OF THE SMALLER PIPE DOES NOT ADJOIN BELOW MID HEIGHT OF THE LARGER PIPE.
23. PIPES CROSSING WITHIN 200MM OF EACH OTHER ARE TO BE ISOLATED BY CONCRETE FOR A MINIMUM DISTANCE OF 1M BEYOND CROSSING POINT IN ALL DIRECTIONS.
24. A CCTV DRAINAGE SURVEY TO BE CARRIED OUT ON COMPLETION TO PROVE THE INTEGRITY OF THE AS-BUILT DRAINAGE SYSTEMS.

- ANCILLARY ITEMS:
25. WHERE PROPOSED CONTRACTOR MUST PROVIDE PROPOSALS FOR SUPPLY OF LINEAR DRAINAGE CHANNELS, KERB DRAINS, INTERCEPTORS, ATTENUATION, PUMPS, HYDROBRAKE, FILTER UNITS.
26. WHERE PROPOSED ALLOWANCE SHOULD BE MADE FOR POWER SUPPLY TO INTERCEPTORS AND PUMPS AND FOR INSTALLING CONTROL PANELS.

LEGEND

- EXISTING PUBLIC FOUL WATER PIPE
EXISTING PRIVATE FOUL WATER PIPE
NEW FOUL WATER PIPE
NEW FOUL WATER INSPECTION CHAMBER
NEW FOUL WATER MANHOLE
EXISTING PUBLIC STORM WATER PIPE
EXISTING PRIVATE STORM WATER PIPE
NEW STORM WATER PIPE
NEW STORM WATER INSPECTION CHAMBER
NEW STORM WATER MANHOLE
NEW STORM WATER CATCHPIT MANHOLE
NEW STORM WATER VENTED MANHOLE
SYPHONIC DOWN PIPE
NEW PUMP
PETROL INTERCEPTOR
GULLY
LINEAR DRAINAGE CHANNEL (ACCESS BOX/ OUTLET BOX)
PROPOSED CELLULAR STORAGE
SITE BOUNDARY

P3	09.04.25	ISSUED FOR PLANNING	MS	IL
P2	12.03.25	REVISED WITH INFILTRATION TEST	RM	IL
P1	03.06.24	PRELIMINARY ISSUE	SH	IL
Rev.	Date	Description	Technician	Reviewer

PROPOSED DRAINAGE PLAN



Project
**DOWNLEY ROAD,
HAVANT**

Drawing Set
DRAINAGE

Drawing Status
PRELIMINARY

Scale
**1:250 @ A1
1:500 @ A3**

Project Number
24-011-I&L

Drawing Number
D00

Revision
P3

- FOUL WATER DISCHARGE**
- FORM NEW Ø150 CONNECTIONS TO EXISTING FOUL MANHOLE.
 - LOCATION AND LEVELS OF CONNECTION POINT BASED ON SOUTHERN WATER SEWER RECORDS. TO BE SURVEYED.
 - S106 REQUIRED FOR DIRECT CONNECTION PRIOR TO MAKING CONNECTION.

EXCEEDANCE OVERLAND FLOWS
EXCEEDANCE ROUTE IN THE EVENT OF FAILURE OF THE DRAINAGE SYSTEM OR STORM EVENT IN EXCESS OF 1 IN 100-45% CC

PETROL INTERCEPTOR

CONTRACTOR TO OBTAIN DESIGN/QUOTE FROM SUPPLIER BASED ON FOLLOWING PARAMETERS

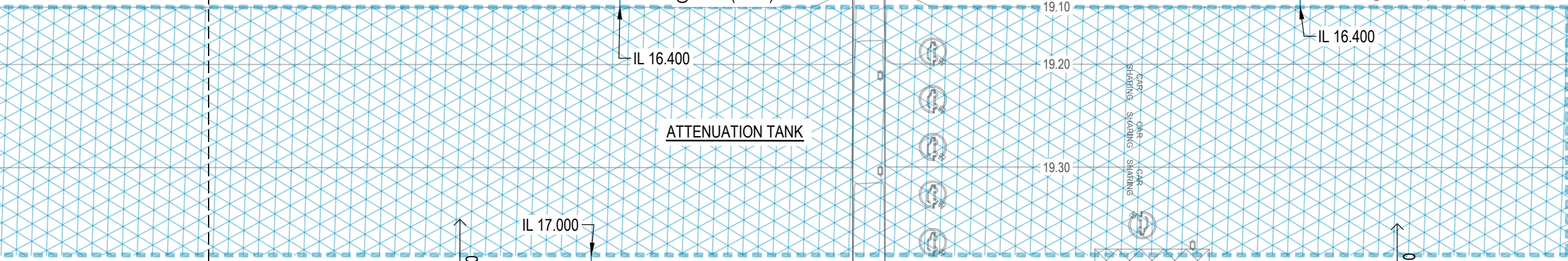
AREA DRAINED 6,070m²
MAX FLOW RATE 380l/s
IL IN Ø450 @ 16.526m
IL OUT Ø450 @ 16.426m

ALLOW FOR CONCRETE SURROUND, POWER SUPPLY, CONTROL PANEL, VENTING AND HIGH LEVEL ALARM.

- STORM WATER DISCHARGE**
- FORM A NEW Ø225 CONNECTION TO EXISTING SW MANHOLE.
 - LOCATION AND LEVELS OF CONNECTION POINT BASED ON SOUTHERN WATER SEWER RECORDS. TO BE SURVEYED.
 - S106 REQUIRED FOR DIRECT CONNECTION PRIOR TO MAKING CONNECTION.

EXCEEDANCE OVERLAND FLOWS
EXCEEDANCE ROUTE IN THE EVENT OF FAILURE OF THE DRAINAGE SYSTEM OR STORM EVENT IN EXCESS OF 1 IN 100-45% CC

DOWNLEY ROAD



ATTENUATION TANK

CONTRACTOR TO OBTAIN DESIGN/QUOTE FROM SUPPLIER BASED ON FOLLOWING PARAMETERS

AREA DRAINED 14,990m²
SIZE 83.5x13x1.2m (1,303m³)
WATER VOLUME 1,237m³
GROUND LEVEL 19.375m-19.100m
TANK TOP 17.600m
TANK BASE 16.400m

ALLOW FOR VENTING, BEDDING & SURROUND, MEMBRANE WITH WELDED JOINTS
ALL CONNECTIONS INTO TANKS TO BE VIA MANIFOLD/REDUCERS TO SUIT MIN. 150 PIPE CONNECTION.

SURFACE WATER PUMP

CONTRACTOR TO OBTAIN DESIGN/QUOTE FROM SUPPLIER BASED ON FOLLOWING PARAMETERS

CHAMBER DIA 1.80m PCC RING OR GRP CHAMBER
CHAMBER CL 18.965m
LOWEST INLET LEVEL 16.373m
DISCHARGE RATE 5.80 l/s
PUMP TYPE DUTY/STANDBY
RISING MAIN L11m FROM 17.765m TO 17.426m. DIAMETER TO BE CONFIRMED BY SUPPLIER.

CONTRACTOR TO ALLOW FOR BACKUP PUMP, CONCRETE SURROUND, POWER SUPPLY, CONTROL PANEL, VENTING, HIGH LEVEL ALARM AND GSM CONNECTIVITY.

LINEAR DRAINAGE CHANNEL (LDC) SCHEDULE.

CHANNELS TO BE DESIGNED BY SPECIALIST BASED ON 50mm/hr RAINFALL INTENSITY, A 5yr RETURN PERIOD AND THE FOLLOWING PARAMETERS:

CHANNEL REFERENCE	LOCATION	AREA DRAINED	LENGTH	GROUND LEVEL BOX	OUTLET	PIPE	DUTY	PREFERENCE
A	FOOTPATH	175m ²	61.50m	19.450	1NO. END	Ø150	B125	NARROW
B	FOOTPATH	185m ²	75.00m	19.450	1NO. END	Ø150	B125	NARROW
C	ACCESS ROAD	192m ²	9.28m	18.308-18.258	1NO. END	Ø150	D400	SLOT
D	CAR PARKING	490m ²	16.00m	18.878	1NO. END	Ø150	C250	GRATED
E	CAR PARKING	220m ²	15.00m	18.514-18.368	1NO. END	Ø150	C250	GRATED
F	CAR PARKING	225m ²	17.50m	18.542	1NO. END	Ø150	C250	GRATED
G	ACCESS ROAD	1,160m ²	49.10m	18.870-18.724	2NOS.	Ø150/Ø225	D400	SLOT
H	CAR PARKING	200m ²	15.00m	18.542	1NO. END	Ø150	C250	GRATED
I	ACCESS ROAD	295m ²	10.30m	18.237-18.079	1NO. END	Ø225	D400	SLOT
J	CAR PARKING	495m ²	16.00m	18.741	1NO. END	Ø150	C250	GRATED
K	CAR PARKING	235m ²	15.00m	18.542-18.469	2NOS.	Ø150	C250	GRATED
L	CAR PARKING	182m ²	12.50m	18.542	1NO. END	Ø150	C250	GRATED
M	CAR PARKING	175m ²	12.50m	18.542	1NO. END	Ø150	C250	GRATED

NUMBER & SPACING OF ACCESS BOXES TO BE SPECIFIED BY SUPPLIER OUTLET BOXES TO BE SILT TRAP DEEP HEAVY DUTY. OUTFALL BOXES TO HAVE SUMP AS FIRST STAGE OF TREATMENT

SYPHONIC ROOF DRAINAGE TO MIDDLE AND BACK OF THE UNIT. TRADITIONAL RAINWATER DRAINAGE TO THE FRONT. SUBJECT TO SPECIALISTS DESIGN.

SSL/FFL = 19.550

SSL/FFL = 19.550

S101 Ø1.50
CL:19.490
IL:18.165

ICP SUDS Mean Annual Flood

Input

Return Period (years) 2 SAAR (mm) 707 Urban 0.750
Area (ha) 1.697 Soil 0.400 Region Number Region 7

Results 1/s

QBAR Rural 5.8
QBAR Urban 16.5

Q2 years 16.7

Q1 year 14.0
Q30 years 28.6
Q100 years 33.3

Nodes

Name	Area (ha)	Cover Level (m)	Diameter (mm)	Depth (m)
S101	0.613	19.497	1500	1.350
S102	0.123	19.425	1500	1.725
S103	0.156	19.425	1200	1.500
S104	0.000	19.465	1500	2.341
OB1	0.019	18.271	600	0.712
OB2	0.049	18.872	600	0.694
S105	0.070	18.711	1200	1.481
OB3	0.022	18.546	600	0.704
OB4	0.116	18.864	600	0.694
S106	0.020	18.814	1350	1.853
OB5	0.029	18.094	600	0.765
OB6	0.049	18.732	600	0.691
S107	0.041	18.539	1200	1.456
OB7	0.016	18.550	600	0.708
OB8	0.140	18.870	600	0.700
S108	0.018	18.814	1350	1.964
OB9	0.018	18.550	600	0.708
S109		18.814	1350	2.269
PI		18.893	1	2.467
S110		19.033	1350	2.620
TANK		19.100	1	2.700
PS		18.965	1500	2.592
S111		18.741	1200	1.298
EX.MH		18.619	1200	1.379

Links (Input)

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S101	S102	35.389	0.600	18.147	17.700	0.447	79.2	525	5.23	50.0
1.001	S102	S104	86.400	0.600	17.700	17.124	0.576	150.0	525	6.02	50.0
2.000	S103	S104	58.729	0.600	17.925	17.349	0.576	102.0	300	5.63	50.0
1.002	S104	TANK	5.270	0.600	17.124	17.000	0.124	42.5	525	6.05	50.0
3.000	OB1	S105	11.350	0.600	17.559	17.380	0.179	63.4	150	5.15	50.0
4.000	OB2	S105	7.751	0.600	18.178	17.380	0.798	9.7	150	5.04	50.0
3.001	S105	S106	29.115	0.600	17.230	17.036	0.194	150.1	300	5.53	50.0
5.000	OB3	S106	9.167	0.600	17.842	17.186	0.656	14.0	150	5.06	50.0
6.000	OB4	S106	2.012	0.600	18.170	17.111	1.059	1.9	225	5.00	50.0
3.002	S106	S109	51.175	0.600	16.961	16.620	0.341	150.1	375	6.11	50.0
7.000	OB5	S107	10.096	0.600	17.329	17.158	0.171	59.0	225	5.10	50.0
8.000	OB6	S107	7.291	0.600	18.041	17.233	0.808	9.0	150	5.04	50.0
7.001	S107	S108	23.684	0.600	17.083	16.925	0.158	149.9	300	5.41	50.0
9.000	OB7	S108	9.059	0.600	17.842	17.075	0.767	11.8	150	5.05	50.0
10.000	OB8	S108	2.245	0.600	18.170	17.000	1.170	1.9	225	5.00	50.0
7.002	S108	S109	34.484	0.600	16.850	16.620	0.230	149.9	375	5.80	50.0
11.000	OB9	S109	9.056	0.600	17.842	16.845	0.997	9.1	150	5.04	50.0
3.003	S109	PI	2.922	0.600	16.545	16.526	0.019	153.8	450	6.14	50.0
3.004	PI	S110	2.000	0.600	16.426	16.413	0.013	153.8	450	6.16	50.0
3.005	S110	TANK	2.000	0.600	16.413	16.400	0.013	153.8	450	6.18	50.0
1.003	TANK	PS	4.066	0.600	16.400	16.373	0.027	150.6	300	6.23	50.0
1.004	PS	S111	8.000	0.600	16.373	17.443	-1.070	-7.5	225	6.36	50.0
1.005	S111	EX.MH	4.067	0.600	17.443	17.240	0.203	20.0	225	6.39	50.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	35.389	79.2	525	Circular	19.497	18.147	0.825	19.425	17.700	1.200
1.001	86.400	150.0	525	Circular	19.425	17.700	1.200	19.465	17.124	1.816
2.000	58.729	102.0	300	Circular	19.425	17.925	1.200	19.465	17.349	1.816
1.002	5.270	42.5	525	Circular	19.465	17.124	1.816	19.100	17.000	1.575
3.000	11.350	63.4	150	Circular	18.271	17.559	0.562	18.711	17.380	1.181
4.000	7.751	9.7	150	Circular	18.872	18.178	0.544	18.711	17.380	1.181
3.001	29.115	150.1	300	Circular	18.711	17.230	1.181	18.814	17.036	1.478
5.000	9.167	14.0	150	Circular	18.546	17.842	0.554	18.814	17.186	1.478
6.000	2.012	1.9	225	Circular	18.864	18.170	0.469	18.814	17.111	1.478
3.002	51.175	150.1	375	Circular	18.814	16.961	1.478	18.814	16.620	1.819
7.000	10.096	59.0	225	Circular	18.094	17.329	0.540	18.539	17.158	1.156
8.000	7.291	9.0	150	Circular	18.732	18.041	0.541	18.539	17.233	1.156
7.001	23.684	149.9	300	Circular	18.539	17.083	1.156	18.814	16.925	1.589
9.000	9.059	11.8	150	Circular	18.550	17.842	0.558	18.814	17.075	1.589
10.000	2.245	1.9	225	Circular	18.870	18.170	0.475	18.814	17.000	1.589

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
1.000	S101	1500		Manhole	Adoptable	S102	1500		Manhole	Adoptable
1.001	S102	1500		Manhole	Adoptable	S104	1500		Manhole	Adoptable
2.000	S103	1200		Manhole	Adoptable	S104	1500		Manhole	Adoptable
1.002	S104	1500		Manhole	Adoptable	TANK	1	1	Manhole	Adoptable
3.000	OB1	600	600	Manhole	Adoptable	S105	1200		Manhole	Adoptable
4.000	OB2	600	600	Manhole	Adoptable	S105	1200		Manhole	Adoptable
3.001	S105	1200		Manhole	Adoptable	S106	1350		Manhole	Adoptable
5.000	OB3	600	600	Manhole	Adoptable	S106	1350		Manhole	Adoptable
6.000	OB4	600	600	Manhole	Adoptable	S106	1350		Manhole	Adoptable
3.002	S106	1350		Manhole	Adoptable	S109	1350		Manhole	Adoptable
7.000	OB5	600	600	Manhole	Adoptable	S107	1200		Manhole	Adoptable
8.000	OB6	600	600	Manhole	Adoptable	S107	1200		Manhole	Adoptable
7.001	S107	1200		Manhole	Adoptable	S108	1350		Manhole	Adoptable
9.000	OB7	600	600	Manhole	Adoptable	S108	1350		Manhole	Adoptable
10.000	OB8	600	600	Manhole	Adoptable	S108	1350		Manhole	Adoptable

Pipeline Schedule

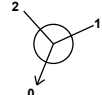
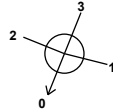
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
7.002	34.484	149.9	375	Circular	18.814	16.850	1.589	18.814	16.620	1.819
11.000	9.056	9.1	150	Circular	18.550	17.842	0.558	18.814	16.845	1.819
3.003	2.922	153.8	450	Circular	18.814	16.545	1.819	18.893	16.526	1.917
3.004	2.000	153.8	450	Circular	18.893	16.426	2.017	19.033	16.413	2.170
3.005	2.000	153.8	450	Circular	19.033	16.413	2.170	19.100	16.400	2.250
1.003	4.066	150.6	300	Circular	19.100	16.400	2.400	18.965	16.373	2.292
1.004	8.000	-7.5	225	Circular	18.965	16.373	2.367	18.741	17.443	1.073
1.005	4.067	20.0	225	Circular	18.741	17.443	1.073	18.619	17.240	1.154

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
7.002	S108	1350		Manhole	Adoptable	S109	1350		Manhole	Adoptable
11.000	OB9	600	600	Manhole	Adoptable	S109	1350		Manhole	Adoptable
3.003	S109	1350		Manhole	Adoptable	PI	1	1	Manhole	Adoptable
3.004	PI	1	1	Manhole	Adoptable	S110	1350		Manhole	Adoptable
3.005	S110	1350		Manhole	Adoptable	TANK	1	1	Manhole	Adoptable
1.003	TANK	1	1	Manhole	Adoptable	PS	1500		Manhole	Adoptable
1.004	PS	1500		Manhole	Adoptable	S111	1200		Manhole	Adoptable
1.005	S111	1200		Manhole	Adoptable	EX.MH	1200		Manhole	Adoptable

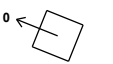
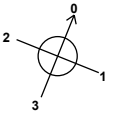
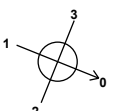
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)	
S101	472860.039	107693.344	19.497	1.350	1500						
							0	1.000	18.147	525	
S102	472827.194	107706.518	19.425	1.725	1500			1	1.000	17.700	525
							0	1.001	17.700	525	

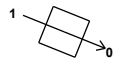
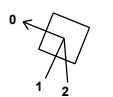
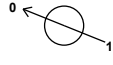
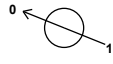
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)	
S103	472773.045	107571.869	19.425	1.500	1200			0	2.000	17.925	300
S104	472794.957	107626.357	19.465	2.341	1500			1 2 0	2.000 1.001 1.002	17.349 17.124 17.124	300 525 525
OB1	472791.848	107719.497	18.271	0.712	600	600		0	3.000	17.559	150
OB2	472806.508	107714.321	18.872	0.694	600	600		0	4.000	18.178	150
S105	472799.466	107711.083	18.711	1.481	1200			1 2 0	4.000 3.000 3.001	17.380 17.380 17.230	150 150 300
OB3	472780.098	107687.491	18.546	0.704	600	600		0	5.000	17.842	150
OB4	472790.554	107683.579	18.864	0.694	600	600		0	6.000	18.170	225
S106	472788.603	107684.070	18.814	1.853	1350			1 2 3 0	6.000 5.000 3.001 3.002	17.111 17.186 17.036 16.961	225 150 300 375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
OB5	472738.183	107585.677	18.094	0.765	600	600	 0	7.000	17.329	225
OB6	472750.777	107575.965	18.732	0.691	600	600	 0	8.000	18.041	150
S107	472747.806	107582.623	18.539	1.456	1200		1	8.000	17.233	150
							2	7.000	17.158	225
							0	7.001	17.083	300
OB7	472748.238	107607.977	18.550	0.708	600	600	 0	9.000	17.842	150
OB8	472758.726	107603.760	18.870	0.700	600	600	 0	10.000	18.170	225
S108	472756.643	107604.597	18.814	1.964	1350		1	10.000	17.000	225
							2	9.000	17.075	150
							3	7.001	16.925	300
							0	7.002	16.850	375
OB9	472761.107	107639.970	18.550	0.708	600	600	 0	11.000	17.842	150
S109	472769.509	107636.591	18.814	2.269	1350		1	11.000	16.845	150
							2	7.002	16.620	375
							3	3.002	16.620	375
							0	3.003	16.545	450

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)	
PI	472772.220	107635.500	18.893	2.467	1	1		1	3.003	16.526	450
								0	3.004	16.426	450
S110	472776.146	107633.922	19.033	2.620	1350			1	3.004	16.413	450
								0	3.005	16.413	450
TANK	472791.692	107667.218	19.100	2.700	1	1		1	3.005	16.400	450
								2	1.002	17.000	525
								0	1.003	16.400	300
PS	472787.920	107668.735	18.965	2.592	1500			1	1.003	16.373	300
								0	1.004	16.373	225
S111	472780.498	107671.720	18.741	1.298	1200			1	1.004	17.443	225
								0	1.005	17.443	225
EX.MH	472776.725	107673.237	18.619	1.379	1200			1	1.005	17.240	225

Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Additional Storage (m³/ha)	0.0
Rainfall Events	Singular	Winter CV	0.840	Starting Level (m)	
FSR Region	England and Wales	Analysis Speed	Detailed	Check Discharge Rate(s)	x
M5-60 (mm)	20.000	Skip Steady State	✓	Check Discharge Volume	x
Ratio-R	0.400	Drain Down Time (mins)	10080		

Storm Durations										
	15	60	180	360	600	960	2160	4320	7200	10080
	30	120	240	480	720	1440	2880	5760	8640	
Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)							
1	0	0	0							
30	0	0	0							
Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)			
				100	45	0	0			

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	16.400
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	1455

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	1085.5	0.0	1.200	1085.5	0.0	1.201	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S101	10	18.289	0.142	86.4	0.2514	0.0000	OK
15 minute winter	S102	10	17.884	0.184	102.9	0.3247	0.0000	OK
15 minute winter	S103	11	18.015	0.090	22.0	0.1019	0.0000	OK
15 minute winter	S104	11	17.305	0.181	123.3	0.3205	0.0000	OK
15 minute winter	OB1	10	17.595	0.036	2.7	0.0129	0.0000	OK
15 minute winter	OB2	10	18.215	0.037	6.9	0.0132	0.0000	OK
15 minute winter	S105	10	17.326	0.096	19.4	0.1086	0.0000	OK
15 minute winter	OB3	10	17.869	0.027	3.1	0.0096	0.0000	OK
15 minute winter	OB4	10	18.207	0.037	16.4	0.0134	0.0000	OK
15 minute winter	S106	11	17.090	0.129	41.1	0.1845	0.0000	OK
15 minute winter	OB5	10	17.368	0.039	4.1	0.0139	0.0000	OK
15 minute winter	OB6	10	18.077	0.036	6.9	0.0130	0.0000	OK
15 minute winter	S107	10	17.172	0.089	16.7	0.1009	0.0000	OK
15 minute winter	OB7	10	17.864	0.022	2.3	0.0079	0.0000	OK
15 minute winter	OB8	10	18.211	0.041	19.7	0.0147	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S101	1.000	S102	85.6	1.500	0.157	2.0257	
15 minute winter	S102	1.001	S104	102.0	1.537	0.258	5.7346	
15 minute winter	S103	2.000	S104	21.3	1.211	0.193	1.0317	
15 minute winter	S104	1.002	TANK	123.5	2.191	0.166	0.2981	
15 minute winter	OB1	3.000	S105	2.6	0.835	0.118	0.0359	
15 minute winter	OB2	4.000	S105	6.9	2.124	0.119	0.0251	
15 minute winter	S105	3.001	S106	18.9	1.008	0.208	0.5489	
15 minute winter	OB3	5.000	S106	3.1	1.494	0.064	0.0188	
15 minute winter	OB4	6.000	S106	16.4	4.371	0.043	0.0076	
15 minute winter	S106	3.002	S109	40.6	1.202	0.249	2.2286	
15 minute winter	OB5	7.000	S107	4.0	0.919	0.060	0.0443	
15 minute winter	OB6	8.000	S107	6.9	2.177	0.115	0.0230	
15 minute winter	S107	7.001	S108	16.3	0.963	0.180	0.4025	
15 minute winter	OB7	9.000	S108	2.3	1.454	0.044	0.0141	
15 minute winter	OB8	10.000	S108	19.7	4.594	0.052	0.0096	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S108	11	16.979	0.129	40.7	0.1852	0.0000	OK
15 minute winter	OB9	10	17.863	0.021	2.5	0.0077	0.0000	OK
15 minute summer	S109	9	16.824	0.279	78.9	0.3990	0.0000	OK
15 minute summer	PI	9	16.811	0.385	92.6	0.0000	0.0000	OK
15 minute summer	S110	9	16.805	0.392	94.8	0.5605	0.0000	OK
600 minute winter	TANK	465	16.598	0.198	21.8	204.6478	0.0000	OK
600 minute winter	PS	465	16.598	0.225	5.8	0.3979	0.0000	SURCHARGED
180 minute winter	S111	140	17.480	0.037	5.8	0.0417	0.0000	OK
180 minute winter	EX.MH	140	17.274	0.034	5.8	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S108	7.002	S109	40.0	1.181	0.245	1.5079	
15 minute winter	OB9	11.000	S109	2.5	1.640	0.042	0.0137	
15 minute winter	S109	3.003	PI	93.8	1.329	0.360	0.2849	
15 minute winter	PI	3.004	S110	95.3	1.129	0.366	0.2837	
15 minute summer	S110	3.005	TANK	97.8	2.246	0.376	0.1480	
360 minute winter	TANK	1.003	PS	5.8	0.351	0.065	0.2133	
180 minute winter	PS	Pump	S111	5.8				
180 minute winter	S111	1.005	EX.MH	5.8	1.453	0.050	0.0162	223.4

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S101	10	18.391	0.244	212.1	0.4305	0.0000	OK
15 minute winter	S102	10	18.013	0.313	252.8	0.5522	0.0000	OK
15 minute winter	S103	10	18.075	0.150	54.0	0.1693	0.0000	OK
15 minute winter	S104	11	17.440	0.316	302.1	0.5577	0.0000	OK
15 minute winter	OB1	10	17.617	0.058	6.6	0.0210	0.0000	OK
15 minute winter	OB2	10	18.239	0.061	17.0	0.0218	0.0000	OK
15 minute winter	S105	10	17.391	0.161	47.6	0.1824	0.0000	OK
15 minute winter	OB3	10	17.884	0.042	7.6	0.0152	0.0000	OK
15 minute winter	OB4	9	18.231	0.061	40.1	0.0220	0.0000	OK
15 minute winter	S106	10	17.176	0.215	101.2	0.3081	0.0000	OK
15 minute winter	OB5	10	17.389	0.060	10.0	0.0217	0.0000	OK
15 minute winter	OB6	10	18.101	0.060	17.0	0.0214	0.0000	OK
15 minute winter	S107	10	17.233	0.150	41.1	0.1698	0.0000	OK
15 minute winter	OB7	10	17.876	0.034	5.5	0.0123	0.0000	OK
15 minute winter	OB8	9	18.235	0.065	48.4	0.0235	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S101	1.000	S102	210.2	1.811	0.386	4.1051	
15 minute winter	S102	1.001	S104	249.8	1.869	0.632	11.5486	
15 minute winter	S103	2.000	S104	52.3	1.535	0.475	2.0087	
15 minute winter	S104	1.002	TANK	304.3	2.694	0.408	0.5950	
15 minute winter	OB1	3.000	S105	6.5	1.065	0.291	0.0694	
15 minute winter	OB2	4.000	S105	16.9	2.683	0.295	0.0489	
15 minute winter	S105	3.001	S106	46.7	1.267	0.516	1.0777	
15 minute winter	OB3	5.000	S106	7.6	1.918	0.158	0.0361	
15 minute winter	OB4	6.000	S106	40.1	5.207	0.105	0.0179	
15 minute winter	S106	3.002	S109	99.5	1.281	0.610	4.0139	
15 minute winter	OB5	7.000	S107	9.9	1.084	0.147	0.1015	
15 minute winter	OB6	8.000	S107	16.9	2.750	0.284	0.0449	
15 minute winter	S107	7.001	S108	40.6	1.176	0.448	0.8403	
15 minute winter	OB7	9.000	S108	5.5	1.867	0.105	0.0265	
15 minute winter	OB8	10.000	S108	48.4	5.282	0.128	0.0238	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S108	10	17.077	0.227	100.6	0.3243	0.0000	OK
15 minute winter	OB9	10	17.875	0.033	6.2	0.0118	0.0000	OK
15 minute winter	S109	7	16.920	0.375	205.0	0.5365	0.0000	OK
15 minute winter	PI	7	16.907	0.481	206.5	0.0000	0.0000	SURCHARGED
600 minute winter	S110	585	16.905	0.492	18.9	0.7035	0.0000	SURCHARGED
600 minute winter	TANK	585	16.905	0.505	46.8	520.3784	0.0000	SURCHARGED
600 minute winter	PS	585	16.904	0.531	5.9	0.9389	0.0000	SURCHARGED
30 minute winter	S111	20	17.480	0.037	5.8	0.0417	0.0000	OK
30 minute winter	EX.MH	20	17.274	0.034	5.8	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S108	7.002	S109	99.4	1.237	0.609	2.7770	
15 minute winter	OB9	11.000	S109	6.2	1.850	0.104	0.0484	
15 minute winter	S109	3.003	PI	206.5	1.672	0.793	0.4153	
15 minute winter	PI	3.004	S110	207.1	1.591	0.796	0.3169	
15 minute winter	S110	3.005	TANK	208.0	2.863	0.799	0.1606	
30 minute winter	TANK	1.003	PS	6.7	0.488	0.074	0.2851	
15 minute summer	PS	Pump	S111	5.8				
30 minute winter	S111	1.005	EX.MH	5.8	1.453	0.050	0.0162	309.4

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S101	11	18.751	0.604	399.1	1.0669	0.0000	SURCHARGED
15 minute winter	S102	11	18.461	0.761	454.8	1.3452	0.0000	SURCHARGED
15 minute winter	S103	10	18.161	0.236	101.6	0.2668	0.0000	OK
15 minute winter	S104	11	17.617	0.493	558.4	0.8719	0.0000	OK
15 minute winter	OB1	11	18.032	0.473	12.4	0.1701	0.0000	FLOOD RISK
15 minute winter	OB2	11	18.290	0.112	31.9	0.0405	0.0000	OK
15 minute winter	S105	11	17.964	0.734	85.5	0.8296	0.0000	SURCHARGED
15 minute winter	OB3	11	17.907	0.065	14.3	0.0233	0.0000	OK
15 minute winter	OB4	10	18.263	0.093	75.5	0.0336	0.0000	OK
15 minute winter	S106	11	17.744	0.783	182.9	1.1208	0.0000	SURCHARGED
15 minute winter	OB5	11	17.754	0.425	18.9	0.1530	0.0000	SURCHARGED
15 minute winter	OB6	11	18.138	0.097	31.9	0.0351	0.0000	OK
15 minute winter	S107	11	17.735	0.652	74.3	0.7369	0.0000	SURCHARGED
15 minute winter	OB7	10	17.887	0.045	10.4	0.0164	0.0000	OK
15 minute winter	OB8	10	18.271	0.101	91.1	0.0363	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S101	1.000	S102	379.4	1.953	0.696	7.6452	
15 minute winter	S102	1.001	S104	460.4	2.132	1.165	18.4349	
15 minute winter	S103	2.000	S104	100.2	1.678	0.910	3.6186	
15 minute winter	S104	1.002	TANK	559.6	3.078	0.751	0.9326	
15 minute winter	OB1	3.000	S105	14.4	1.152	0.643	0.1998	
15 minute winter	OB2	4.000	S105	31.2	2.915	0.543	0.1231	
15 minute winter	S105	3.001	S106	85.8	1.294	0.947	2.0503	
15 minute winter	OB3	5.000	S106	13.8	2.106	0.288	0.1141	
15 minute winter	OB4	6.000	S106	75.1	5.185	0.198	0.0557	
15 minute winter	S106	3.002	S109	183.9	1.668	1.128	5.6445	
15 minute summer	OB5	7.000	S107	19.4	1.087	0.286	0.4015	
15 minute winter	OB6	8.000	S107	31.3	2.989	0.525	0.1083	
15 minute winter	S107	7.001	S108	74.8	1.096	0.826	1.6678	
15 minute winter	OB7	9.000	S108	10.4	1.892	0.199	0.1001	
15 minute winter	OB8	10.000	S108	90.8	5.235	0.240	0.0640	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S108	11	17.594	0.744	183.6	1.0647	0.0000	SURCHARGED
15 minute winter	OB9	10	17.887	0.045	11.7	0.0162	0.0000	OK
960 minute winter	S109	945	17.461	0.916	24.3	1.3101	0.0000	SURCHARGED
960 minute winter	PI	945	17.461	1.035	23.6	0.0000	0.0000	SURCHARGED
960 minute winter	S110	945	17.461	1.048	23.6	1.4990	0.0000	SURCHARGED
960 minute winter	TANK	945	17.461	1.061	67.0	1093.6250	0.0000	SURCHARGED
960 minute winter	PS	945	17.460	1.087	5.9	1.9211	0.0000	SURCHARGED
30 minute winter	S111	16	17.480	0.037	5.8	0.0417	0.0000	OK
30 minute summer	EX.MH	17	17.274	0.034	5.8	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S108	7.002	S109	182.8	1.657	1.120	3.8035	
15 minute winter	OB9	11.000	S109	11.7	1.582	0.196	0.0999	
15 minute winter	S109	3.003	PI	378.2	2.387	1.453	0.4630	
15 minute winter	PI	3.004	S110	378.4	2.388	1.454	0.3169	
15 minute winter	S110	3.005	TANK	378.5	3.131	1.454	0.3068	
15 minute summer	TANK	1.003	PS	8.6	0.563	0.095	0.2863	
15 minute summer	PS	Pump	S111	5.8				
30 minute summer	S111	1.005	EX.MH	5.8	1.453	0.050	0.0163	525.3

APPENDIX D

1.0 PREAMBLE

Regular inspections and maintenance of both the foul and surface water drainage systems is important to ensure the effective and efficient operation of the system and to reduce the likelihood of blockages and flooding on and off site.

Responsibility for maintaining and managing the drainage system on completion of the 12-month maintenance period will be by the landowner, through their site management company and/or tenants occupying the units. Principle contact is the landowner:

Canmoor,
34 Dover Street,
London W1S 4NG
020 7495 4115

this plan should be read in conjunction with the drainage design drawings and an up-to-date CCTV survey report.

The Operation and Maintenance (O&M) manuals and/or Health & Safety (H&S) files must contain copies of:

- This Drainage Maintenance Plan
- Record Copy of drainage design drawings
- Manufacturers information for ancillary items
- Pump supplier contact and service agreements
- Post construction CCTV survey report

The post construction CCTV report acts as a physical record of the drainage system at handover, as installed running at full efficiency. Any further CCTV surveys should be inserted and replace previous where appropriate.

Sewers, manholes and drainage channels are unlikely to require maintenance other than periodic inspections, unless a blockage occurs.

2.0 DESIGN

Below ground drainpipes for both the surface and foul water networks have been designed to achieve self-cleansing velocity and in accordance with:

Approved Document H: Drainage and waste disposal
BS 8301: 1985 Code of practice for Building Drainage

3.0 GUIDANCE

If **sudden failure** occurs inspections should be carried out at the earliest opportunity by a specialist. Blockages must be cleared, and remediation works undertaken to ensure the effective operation of the drainage system.

The following should be carried out on an annual basis:

- Inspection chambers, manhole chambers and drainage channel outlets noted as **silt traps, sump pits, downstream defenders** or **filter units** must be inspected and cleared.
- **Drainage channels** and **gully's** must be inspected and cleared.

The following should be carried out every two years:

- The gully traps should be plunged and thoroughly flushed out with clean water.
- Covers of inspection chambers and manholes should be removed and the sides, benching and channels cleaned.
- Main and branch drains should be rodded, jetted, and then flushed with clean water.
- Note that correct ends of rods should be used to avoid damage to pipes and them becoming detached.

Reference should be made to the manufacturer's information and maintenance requirements for recommended intervals and safe methods of cleaning for the following proprietary systems which are located on the record drawings:

- storm water storage system
- drainage channels
- petrol interceptors
- flow controls such as hydrobrakes, orifices
- downstream defenders

A full CCTV survey will also be carried out at 10 yearly intervals to assess the condition of the drainage system.

Jetting should be carried out downstream to suit the flow of effluent but should not be attempted to push through an attenuation tank, interceptor, or flow control. A vacuum tanker should be used upstream of each inlet into the tank or other ancillary item noted.

4.0 PUMPS

A service contract agreement will be in place with the supplier of the package pump. Routine maintenance will form part of the agreement with provision for emergency situations. General inspections will generally include the following:

- The plant is visually checked, working tests are undertaken to ensure correct functioning of each item of equipment and minor adjustments made, as necessary.
- The level control equipment is cleaned as far as is practicable from ground level, chamber de-sludged by hand control of the pumps.

5.0 SAFETY

Petrol interceptors are designed to trap and store hydrocarbon contamination which may emanate from the yards and as such, should only be cleaned out by a suitable qualified and licensed specialist Contractors.

In all instances, inspection and cleaning is to be carried out by a suitable Specialist Contractor, following the guidelines given in BE EN 752 Part 7 1998 "Maintenance and Operations" and "Safe Working in Sewers and at Sewage Works", published by the National Joint Health and Safety Committee for the Water Services.

All underground and under-floor drains and manholes (including oil interceptors) represent confined spaces. Appropriate precautions will be taken before entering drains and manholes. Access will only be undertaken by appropriately trained personnel.

PROPRIETARY SYSTEMS		
Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

ATTENUATION STORAGE		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action	Annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	Remove sediment from pre-treatment structures and/or internal forbays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every five years or as required