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SYMMETRY PARK OXFORD NORTH

Surface Water Management Strategy

21 November 2023

Version 1.1



DOCUMENT CONTROL

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Project Engineer :	Phil Barlow
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1. Introduction

- 1.1. The following surface water management Strategy has been compiled in order to demonstrate that the surface water drainage design and associated SUDs complies with the "Oxfordshire County Council (OCC) Local Standards and Guidance for Surface Water Drainage on Major Developments".
- 1.2. The site is situated west of the village of Wendlebury, west of the A41 Oxford Road and immediately north of the M1 Motorway (Junction 9).
- 1.3. Wendlebury Brook (ordinary watercourse) passes through the site running from a southwest to north-easterly direction before passing beneath the A41 (via a culvert) into Wendlebury Village.
- 1.4. Site location plan outlining the extent of the development can be observed within **Appendix A**.
- 1.5. Under the Oxfordshire Local Authority lead local Flood Authority guidance notes, the proposed development is classified as "Major Development" as it exceeds 1,000 square metres of building footprint; with the overall development area exceeding one hectare.

2. Surface Water Drainage

Drainage Hierarchy :-

- 2.1. The surface water discharge/disposal hierarchy has been fully assessed and following negative infiltration test data, in accordance with BRE Digest (365), discharge to the ordinary watercourse is deemed to satisfy the recommendations outlined within the Oxfordshire County Council (OCC) guidance document.
- 2.2. Infiltration tests noted above can be observed within **Appendix B** and demonstrate that the soil conditions are unsuitable for SUDs infiltration techniques such as filter drains and soakaways.
- 2.3. Site Investigation data also demonstrates that groundwater level is greater than 1.0m below the soffit of any SUDs feature at the peak seasonal groundwater.
- 2.4. The discharge rate from the development site is and is outlined within Tier Consult Flood Risk Assessment, Version 1.5 and provides an additional 20% betterment on the Q bar rate for the development based on the Institute of Hydrology IH 124 method of determining greenfield run off.
- 2.5. A 1:100 year plus 40% climate change has been adopted as a peak storm event which is greater than the 30% climate change figure quoted within the OCC guidance.



- 2.6. Hydraulic flow control devices have been specified within the design proposals for the discharge rate specified.
- 2.7. The reduced discharge rate generates additional attenuation requirements within the development which has been agreed, following consultation with the Lead Local Flood Authority.
- 2.8. In order to accommodate the development, Wendlebury Brook (ordinary watercourse) is to be diverted and hydraulic modelling has been undertaken using the Environment Agency baseline modelling data. The development discharges into the section of the watercourse that is to be diverted.

3. Sustainable Urban Drainage Features

- 3.1. Three specific SUDs features have been provided within the surface water drainage design, namely :-
 - Attenuation Basins (2 No)
 - Permeable Paving to lightly trafficked areas
 - Below-ground cellular storage units
- 3.2. The road serving the development is attenuated by an individual detention basin as recommended by the guidance.
- 3.3. Cellular storage cells have been used to accommodate the additional storage generated by the 20% reduction in the greenfield run off rate.
- 3.4. Drainage calculations provided demonstrate that none of the site area floods in the 1:30 year rainfall event, as outlined within the OCC guidance.
- 3.5. The surface water drainage strategy including SUDs features **can be observed within Appendix C on Tier Consult Drawing Number SPO1-TIER-300-BG-D-C-5103 P20 Drainage Layout.**

4. Designing for Maintenance Considerations

- 4.1. None of the arterial surface water drainage is pumped, therefore adhering to recommended within the National Standards.
- 4.2. All internal branch connection pipework is equal or greater than 100mm in diameter, with all arterial drainage being 150mm or more where the risk of blockage would put the development at risk of localised flooding.



4.3. A SUDs Maintenance Manual has been prepared that can be observed within **Appendix D**. This is fully funded by the Developer and will be managed by the incumbent tenant as part of the tenancy agreement. Where the SUDs features fall outside the demise of the tenancy, these shall be maintained by the Estate Management Company which has been incorporated by the Developer.

4.4. All SUDs features have been assessed for ease of access for maintenance and inspection.

5. Water Quality

5.1. The permeable paving and the attenuation basins have been deployed to improve the water quality from the development, prior to discharging to the watercourse.

5.2. Ground Water quality is protected by the soffit of the SUDs features being greater than 1.0metre above the highest ground water level. It should be noted that infiltration tests deem the soils to be impermeable, further protecting any below ground water sources.

6. Conclusion

6.1. The Surface Water Drainage strategy, Surface Water Management and the SUDs Maintenance Plan are compliant with the recommendations outlined within the "Oxfordshire County Council Local Standards and Guidance for Surface Water Drainage on Major Developments in Oxfordshire", in respect of both Local and National Standards.

-----End-----

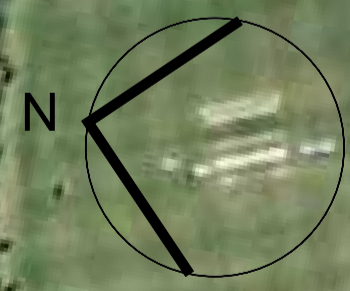


APPENDIX A
SITE LOCATION PLAN





Redline Area
19.350 Ha / 47.746 Ac





APPENDIX B

INFILTRATION TEST RESULTS





Tier Environmental

Chadwick House
 Birchwood Park
 Warrington Rd
 WA3 6AE

Client:

Tritax Symmetry

Site:

Oxford North, Symmetry Park

Test ID:

SA06

Job Number:

TE1585

Technician:

Lee Hogg

Test Date:

30/09/2021

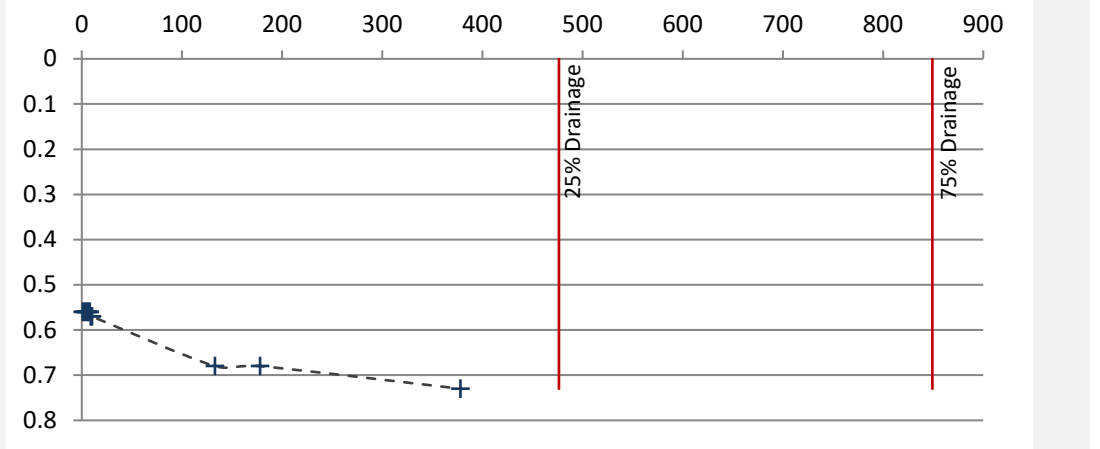
Test Number:

1 of 6

Comments:

Soakage Pit Width [m]	0.5
Soakage Pit Length [m]	2.7
Soakage Pit Depth [m]	2
Depth to water at start of test bgl [m]	0.56
Effective Storage Depth [m]	1.44
Free Volume [%]	100

Effective Depth at 25% Drainage	0.92
Effective Depth at 75% Drainage	1.64
Time to Drain From 25% to 75% [s]	N/A
Internal Surface Area [m ²]	5.958
Effective Storage Volume [m ³]	0.972
Test Completion [%]	12%



Soil infiltration rate(m/s)

Soakaway failed. Estimated to take at least 66.97 hours to drain 75%

SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS

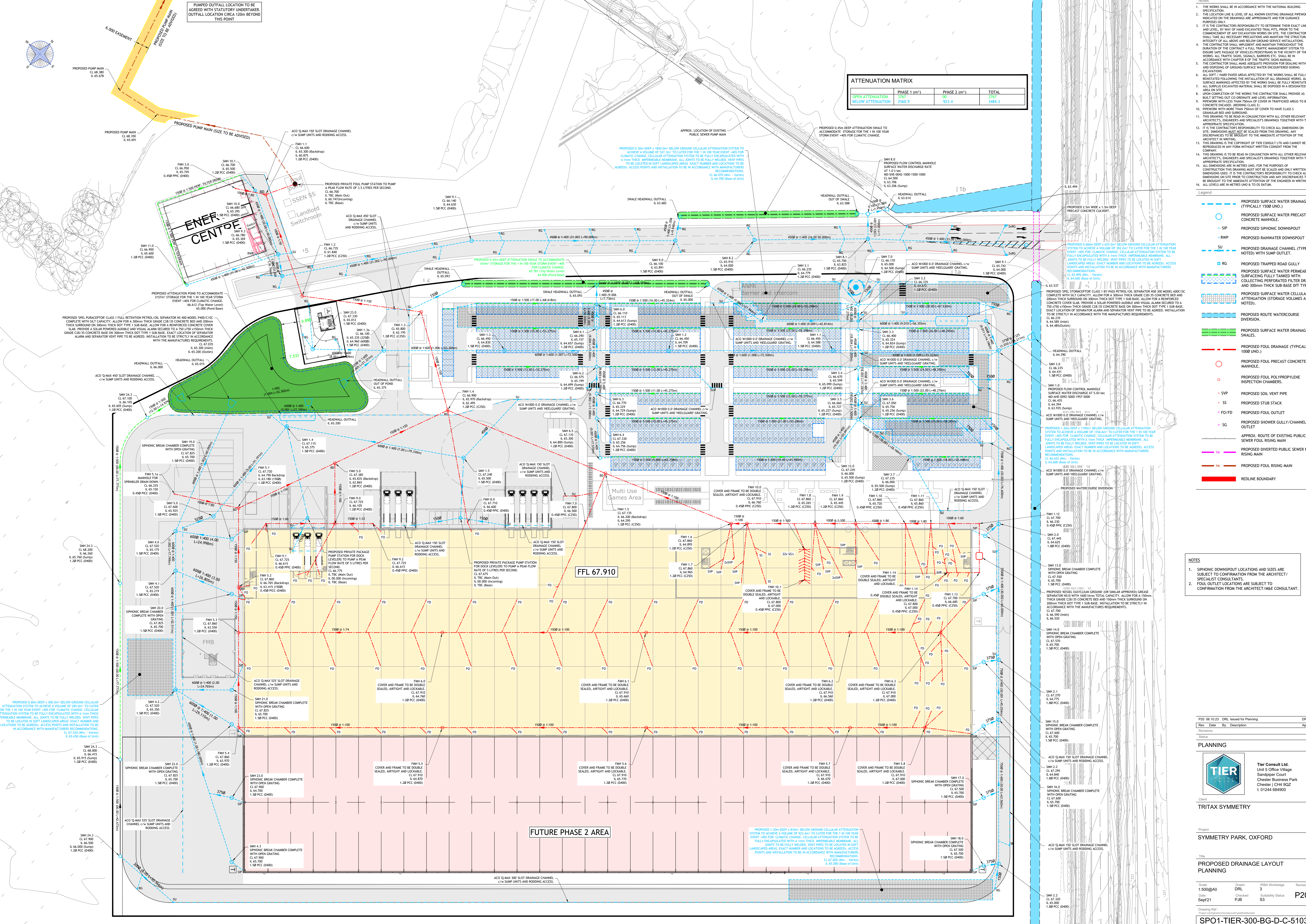
Measurement N°	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Time [min]	1	2	3	4	5	6	7	8	9	10	133	178	378							
Depth to water [m]	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.57	0.57	0.68	0.68	0.73							



APPENDIX C

**SURFACE WATER DRAINAGE
STRATEGY DRAWING**





ATTENUATION MATRIX			
	PHASE 1 (m ³)	PHASE 2 (m ³)	TOTAL
OPEN ATTENUATION	3767	00	3767
BELOW ATTENUATION	2560.9	923.4	3484.3

- NOTES**
- THE WORKS SHALL BE IN ACCORDANCE WITH THE NATIONAL BUILDING SPECIFICATION.
 - THE LOCATION LINE & LEVEL OF ALL KNOWN EXISTING DRAINAGE WORK INDICATED ON THE DRAWINGS ARE APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY.
 - IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THEIR EXACT LINE AND LEVEL BY WAY OF HAND INDICATED TRAIL PITS. PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE, THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASUREMENTS AND MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE INSTALLATIONS.
 - THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN THROUGHOUT THE DURATION OF THE CONTRACT A FULL TRAFFIC MANAGEMENT SYSTEM TO ENSURE SAFE PASSAGE OF VEHICLES/PEDESTRIANS IN THE VICINITY OF THE WORKS. ALL TRAFFIC SIGNS, SIGNALS, BARRIERS ETC. SHALL BE IN ACCORDANCE WITH CHAPTER 8 OF THE TRAFFIC SIGNS MANUAL.
 - THE CONTRACTOR SHALL MAKE ADEQUATE PROVISION FOR SEALING WITH AND DISPOSING OF GROUND/SURFACE WATER ENCOUNTERED DURING EXCAVATIONS.
 - ALL SOFT / HARD PAVED AREAS AFFECTED BY THE WORKS SHALL BE FULLY REGENERATED FOLLOWING THE INSTALLATION OF ALL DRAINAGE WORKS. ALL SURFACE MARKINGS AFFECTED BY THE WORKS SHALL BE FULLY REGENERATED.
 - ALL SURFACE EXCAVATED MATERIAL SHALL BE DEPOSITED IN A DESIGNATED AREA ON SITE.
 - UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL PROVIDE AS BUILT SETTING OUT CO-ORDINATE AND LEVEL INFORMATION.
 - PROVISION WITH LESS THAN 750mm OF COVER IN TRAFFICED AREAS TO BE CONCRETE ENCASED. (BEDDING CLASS 2)
 - THE CONTRACTOR SHALL MAKE ADEQUATE PROVISION FOR SEALING WITH AND DISPOSING OF GROUND/SURFACE WATER ENCOUNTERED DURING EXCAVATIONS.
 - ALL SOFT / HARD PAVED AREAS AFFECTED BY THE WORKS SHALL BE FULLY REGENERATED FOLLOWING THE INSTALLATION OF ALL DRAINAGE WORKS. ALL SURFACE MARKINGS AFFECTED BY THE WORKS SHALL BE FULLY REGENERATED.
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 - ALL SURFACE EXCAVATED MATERIAL SHALL BE DEPOSITED IN A DESIGNATED AREA ON SITE.
 - UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL PROVIDE AS BUILT SETTING OUT CO-ORDINATE AND LEVEL INFORMATION.
 - PROVISION WITH LESS THAN 750mm OF COVER IN TRAFFICED AREAS TO BE CONCRETE ENCASED. (BEDDING CLASS 2)
 - THE CONTRACTOR SHALL MAKE ADEQUATE PROVISION FOR SEALING WITH AND DISPOSING OF GROUND/SURFACE WATER ENCOUNTERED DURING EXCAVATIONS.

- Legend**
- PROPOSED SURFACE WATER DRAINAGE (TYPICALLY 1500 UNO.)
 - PROPOSED SURFACE WATER PRECAST CONCRETE MANHOLE.
 - SIP PROPOSED SIPHONIC DOWNSPOUT
 - RWP PROPOSED RAINWATER DOWNSPOUT
 - SU PROPOSED DRAINAGE CHANNEL (TYPE AS NOTED) WITH SUMP OUTLET.
 - RG PROPOSED TRAPPED ROAD GULLY
 - PROPOSED SURFACE WATER PERMEABLE SURFACING FULLY TANNED WITH COLLECTING PERFORATED FILTER DRAIN AND 300mm THICK SUB-BASE DFT TYPE 3.
 - PROPOSED SURFACE WATER CELLULAR ATTENUATION (STORAGE VOLUMES AS NOTED).
 - PROPOSED ROUTE WATERCOURSE DIVERSION.
 - PROPOSED SURFACE WATER DRAINAGE SWALES.
 - PROPOSED FOU PRECAST CONCRETE MANHOLE.
 - PROPOSED FOUL POLYPROPYLENE INSPECTION CHAMBERS.
 - SVP PROPOSED SOIL VENT PIPE
 - SS PROPOSED SUB STACK
 - FO/FO PROPOSED FOUL OUTLET
 - SG PROPOSED SHOWER GULLY/CHANNEL OUTLET
 - APPROX. ROUTE OF EXISTING PUBLIC SEWER FOU RISING MAIN
 - PROPOSED DIVERTED PUBLIC SEWER FOU RISING MAIN
 - PROPOSED FOU RISING MAIN
 - REDLINE BOUNDARY

- NOTES**
- SIPHONIC DOWNSPOUT LOCATIONS AND SIZES ARE SUBJECT TO CONFIRMATION FROM THE ARCHITECT/SPECIALIST CONSULTANTS.
 - FOUL OUTLET LOCATIONS ARE SUBJECT TO CONFIRMATION FROM THE ARCHITECT/ME CONSULTANT.

P20 06.10.23 DRL Issued for Planning DRL

Rev	Date	Description	Appd

Revisions

Drawn

PLANNING

TIER

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Client
TRITAX SYMMETRY

Project
SYMMETRY PARK, OXFORD

Title
PROPOSED DRAINAGE LAYOUT PLANNING

Scale	Drawn	RIBA Workstage	Revision
1:500@AD	DRL	3	

Drawn
Sep21

Checked
PJB

Availability Status
S3

Revision
P20

Drawing Ref
Project ref: sp01-tier-300-bg-d-c-101

SP01-TIER-300-BG-D-C-1013



APPENDIX D

SUDS MANAGEMENT PLAN



STORM WATER / SUDs MAINTENANCE PLAN SYMMETRY PARK, OXFORD NORTH

1. Introduction

This drainage maintenance proposal is to be read in conjunction with the following documents:

- Drainage drawing Ref Nos. SPO1-TIER-300-BG-D-C-5103

The considered drainage solution comprises of two attenuated networks with restricted discharge rates via vortex flow control devices to an arterial drainage system prior to discharging into an existing watercourse to the eastern boundary of the proposed development.

The proposed surface water networks are designed to accommodate all storm events up to the 1 in 100 year storm plus an additional 40% to cater for climatic change.

A plan of routine inspection maintenance should be adopted and adhered to in order to prevent failure due to inadequate maintenance. This document describes the drainage systems used and provides a framework for future maintenance procedures.

2. Site Drainage Components

The site drainage network is shown on Tier Consult drawing reference SPO1-TIER-300-BG-D-C-5103. The main drainage components are;

1. Roof water from the building is collected into a gravity fed drainage system and routed to the surface water drains. The gutters and downspouts require periodic inspection and de-silting as required.
2. Surface water runoff from external paved areas is discharged into trapped gullies and linear channel. Gullies and channels require periodic inspection and de-silting as required.
3. The pavement areas which consist of service yards, roads and car parks require periodic sweeping as this will remove silt and contaminants directly from the paved surfaces before they become mobilised during rainfall events and transported into the drainage system.
4. Porous paved surfaces receive rainwater run-off from the carpark areas of development. Surface water infiltrates through to the subbase where a perforated collection pipe conveys surface water flows into the wider drainage system. This system requires periodic inspection and cleaning to remove litter, dust and leaf fall.



5. Oil separators remove oil-based pollutants before the flow is discharged from the site. Requires routine de-sludging.
6. The storage tank is formed with a modular crate system wrapped with an impermeable membrane to prevent escape of water and ingress of soil particles. The storage tank requires periodic inspection and possible de-silting if required.
7. The vortex flow control unit limits the discharge of surface water to the receiving drain at a predetermined rate. The chamber housing the control unit requires periodic inspection to check for any siltation and the vortex flow control unit should be checked for any blockages and to ensure it is working correctly.

3. Maintenance Schedule

The rate of build up of silt and debris within a drainage system varies from site to site and is dependent upon individual site characteristics. Therefore, the frequency of actions below should be adopted as a minimum standard for a period of 24 months after the completion of the development. This period will be sufficient to assess the system performance over 2 complete seasonal cycles after which the maintenance activity schedule may be reviewed accordingly.

Action	Frequency
Clear external areas of litter including bin and recycling enclosures	Monthly
Clear guttering of leaves and debris.	Twice yearly. Spring and Autumn after leaf fall
Permeable Surfaces	3 times per year to remove debris, dust and leaves. See recommendations above.
Inspect all storage tank access points for sediment.	6 Monthly and after heavy rainfall. Remove debris /silt as required.
Petrol/oil Separator	Inspect bi-annually and also when alerted by the audible/visual alarms. Remove oil and contaminants
Inspect all manholes chambers for siltation and debris	6 monthly and after every major storm event. Remove debris/silt as encountered.
Vortex Flow Control Unit	3 monthly inspect and remove debris.
Catch pits	Minimum 6 monthly and after every major storm event. Remove debris/silt as encountered.
Storage Tank	6 monthly to check for blockages and after every main storm event. The tank can be inspected via the access points and CCTV cameras and high pressure jetting equipment can be deployed if required.



4. Management Company

The majority of the maintenance for the drainage features on each plot will be the responsibility of Tritax Symmetry, Grange Park Court, Roman Way, Northampton Tel; 01604 330630. However, an overall management company will be appointed to manage the maintenance regime for the wider drainage features such as ponds and outfalls. Personnel will be site based and where specialised contractors are required the work will be undertaken through a series of written RAMS.