



LAND AT RHOSROBIN, WREXHAM.

INFILTRATION SYSTEM PRELIMINARY PROPOSAL

CLIENT:-

Liberty Properties
5th Floor HQ
Nicholas Street
Chester
CH1 2NP

CONSULTING ENGINEER:-

Tier Consult Ltd
Richmond House
Sandpiper Court
Chester Business Park
Chester
CH4 9QZ

Tel: 01244 684900

Prepared By:

S Jones

Date:

22 July 2016

Report No:

T/14/1400-DS1/SGJ

INTRODUCTION

This report is to be read as supplementary information to the site permeability report by Tier Environmental ref T/14/1400/L01 dated 20 July 2016

Tier Environmental was appointed by Liberty Properties to undertake permeability tests for the land between New Road and Plas Acton Road, Rhosrobin in order to determine the suitability for Sustainable Urban Drainage Systems (SuDS) to serve proposed future residential development.

The Permeability Testing Report concluded that areas of the site are suitable for infiltration based drainage systems

This report supplements the findings of the site investigation with preliminary calculations to estimate the size for the SuDS facility.

SURFACE WATER DRAINAGE OPTIONS

The Building Regulations Part H prescribes a hierarchical approach to surface water discharge. In order of preference, surface water should be discharged to:

- a) Infiltration systems / soakaways
- b) To a watercourse
- c) To a public sewer.

The infiltration test report indicates that areas of the site are suitable for infiltration

There are no watercourses evident either on, or within near vicinity of the site, to which a suitable drainage discharge can be made.

The water authority (Welsh Water) has objected to connection of surface water to the public sewer.

Therefore the only technically viable option to consider is an infiltration based SuDS drainage system. This option also meets with planning policy guidance.

PERMEABILITY VALUE

The site investigation report details the soil permeability at various test locations and depths. Where permeable soils were encountered the infiltration rates ranged from a low value of 5.18×10^{-6} m/s to the highest value of 3.52×10^{-6} m/s

Considering the site plan and topography we have selected a suitable location for an infiltration basin between test pits WS3 and WS4. The lowest infiltration value recorded in these pits is 3.78×10^{-6} m/s at WS3. This value is to be used in the calculation to ensure a conservative design based on worst case values.

DESIGN DATA

Gross development area is 6.31 Ha

Assuming 70% impermeable run-off the effective drainage area = $6.31 \times 70\% = 4.417$ Ha

Drainage systems to be designed to accommodate run-off from worst case storm of 100 year return period plus 30% allowance for climate change.

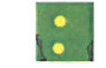
DESIGN SUMMARY

The preliminary calculations and infiltration pond location plan are appended with this report.

The calculations demonstrate that a pond profiled to provide a storage volume of 2086 m^3 will be adequate to serve the proposed development without flooding either on or off site for all storm events up to 100 year + 30%

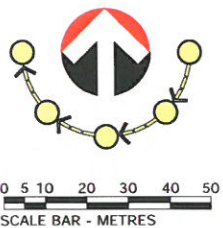


KEY

-  SITE BOUNDARY; 15.78ha (39acres)
-  MAIN ACCESS / VEHICLE ACCESS
-  ACCESS IMPROVEMENT TO EXISTING HIGHWAY
-  PUBLIC RIGHT OF WAY
-  LINE OF WAT'S DYKE
-  DEVELOPMENT BOUNDARY
-  KEY SETTING - EXISTING LONG DISTANCE VIEWS TO HORIZON & SETTING OF WAT'S DYKE PERMANENTLY MAINTAINED
-  STREETS
-  URBAN DESIGN FOCAL POINTS
-  GATEWAY NODE
-  ACOUSTIC ATTENUATION
-  INDICATIVE RESIDENTIAL FRONTAGE
-  DEVELOPMENT AREA
MEDIUM LEVEL DENSITY; UPTO 30no. Units pha
2 - 2.5 STOREY HEIGHT
DEVELOPMENT AREA; 6.31ha
UPTO 189NO. DWELLINGS
-  NO BUILD BUFFER ZONE FOR SCHEDULED ANCIENT MONUMENT
ENHANCEMENT / IMPROVEMENT OF WAT'S DYKE BY AGREEMENT WITH L.A
-  MAINTAINED LAND (PERMANENT GREEN BARRIER)
-  LANDSCAPING (PERMANENT GREEN BARRIER)
POS AREA; 2.6ha

TOTAL UPTO 189NO. DWELLINGS

PROPOSED LOCATION OF SURFACE WATER INFILTRATION POND, APPROX PLAN SIZE 2600 SQ M. (STORAGE VOLUME 2086 m³)



NEW ROAD - RHOSROBIN, WREXHAM

INDICATIVE MASTERPLAN / DEVELOPMENT FRAMEWORK

C3429 - P01A
SCALE: 1:2000 @ A2

Cassidy+Ashton

www.cassidyashton.co.uk

ARCHITECTURE BUILDING SURVEYING TOWN PLANNING

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<u>Summary of Results for 100 year Return Period (+30%)</u> Half Drain Time : 358 minutes. <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>82.442</td><td>0.442</td><td>43.2</td><td>845.9</td><td>O K</td></tr><tr><td>30 min Summer</td><td>82.579</td><td>0.579</td><td>46.1</td><td>1130.1</td><td>O K</td></tr><tr><td>60 min Summer</td><td>82.713</td><td>0.713</td><td>49.0</td><td>1419.4</td><td>O K</td></tr><tr><td>120 min Summer</td><td>82.828</td><td>0.828</td><td>51.5</td><td>1673.8</td><td>O K</td></tr><tr><td>180 min Summer</td><td>82.872</td><td>0.872</td><td>52.4</td><td>1772.3</td><td>O K</td></tr><tr><td>240 min Summer</td><td>82.884</td><td>0.884</td><td>52.7</td><td>1801.3</td><td>O K</td></tr><tr><td>360 min Summer</td><td>82.880</td><td>0.880</td><td>52.6</td><td>1791.5</td><td>O K</td></tr><tr><td>480 min 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Micro Drainage		Source Control 2016.1			
<u>Summary of Results for 100 year Return Period (+30%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	82.646	0.646	47.5	1273.5	O K
60 min Winter	82.798	0.798	50.8	1606.0	O K
120 min Winter	82.931	0.931	53.7	1908.0	O K
180 min Winter	82.986	0.986	54.9	2036.0	O K
240 min Winter	83.007	1.007	55.4	2086.0	O K
360 min Winter	83.007	1.007	55.3	2084.9	O K
480 min Winter	82.992	0.992	55.0	2051.2	O K
600 min Winter	82.975	0.975	54.7	2009.3	O K
720 min Winter	82.952	0.952	54.2	1957.0	O K
960 min Winter	82.903	0.903	53.1	1844.2	O K
1440 min Winter	82.801	0.801	50.9	1612.5	O K
2160 min Winter	82.652	0.652	47.7	1286.9	O K
2880 min Winter	82.518	0.518	44.8	1003.2	O K
4320 min Winter	82.298	0.298	40.2	559.9	O K
5760 min Winter	82.139	0.139	36.9	255.0	O K
7200 min Winter	82.051	0.051	35.1	92.6	O K
8640 min Winter	82.044	0.044	30.6	79.4	O K
10080 min Winter	82.039	0.039	27.4	70.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	72.470	0.0	33		
60 min Winter	47.182	0.0	62		
120 min Winter	29.707	0.0	120		
180 min Winter	22.334	0.0	176		
240 min Winter	18.110	0.0	232		
360 min Winter	13.388	0.0	338		
480 min Winter	10.808	0.0	382		
600 min Winter	9.146	0.0	458		
720 min Winter	7.975	0.0	536		
960 min Winter	6.417	0.0	692		
1440 min Winter	4.715	0.0	982		
2160 min Winter	3.456	0.0	1408		
2880 min Winter	2.768	0.0	1812		
4320 min Winter	2.021	0.0	2552		
5760 min Winter	1.614	0.0	3224		
7200 min Winter	1.356	0.0	3680		
8640 min Winter	1.176	0.0	4408		
10080 min Winter	1.044	0.0	5048		
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Richmond House Chester Bus. Park CH4 9QZ	RHOSROBIN WREXHAM	
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Micro Drainage		Source Control 2016.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Shortest Storm (mins)	15
Ratio R	0.327	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 4.417

Time (mins)	Area
From:	To: (ha)

0	4 4.417
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Micro Drainage Source Control 2016.1		

Model Details

Storage is Online Cover Level (m) 83.500

Infiltration Basin Structure

Invert Level (m) 82.000 Safety Factor 2.0

Infiltration Coefficient Base (m/hr) 0.13600 Porosity 1.00

Infiltration Coefficient Side (m/hr) 0.13600

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1800.0	1.000	2350.0	1.500	2600.0

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