

Project Name : Horton Heath, Eastleigh

Job No : 19-367

Note Title : Flood Risk Assessment and Drainage Strategy - Addendum 2

Author : JW

Checked : GG

Approved : GG

Date : May 2021

1.0 INTRODUCTION

1.1 *Background*

1.1.1 Odyssey was commissioned by Eastleigh Borough Council (EBC) to undertake a Flood Risk Assessment (FRA) and Water Management Strategy to be submitted in association with a planning application in support of a proposed development for a site at Horton Heath, Eastleigh.

1.1.2 The wider One Horton Heath development has obtained planning permission via two separate applications. The new composite outline planning permission for the wider site would increase the number of proposed dwellings from circa 1,500 to 2,500. The FRA and Water Management Strategy relates to the First Residential Parcel (FRP) of the development for 393 of the 2,500 dwellings.

1.1.3 The FRA and Water Management Strategy were submitted to EBC as part of the full planning application (reference F/20/89500) for the proposed FRP development.

1.1.4 Following the submission of the application, comments were received regarding whether the Water Management Strategy meets Points i and ii of Policy DM6 of the Eastleigh Local Plan (2016 to 2036). Policy DM6 regards sustainable surface water management and watercourse management.

1.1.5 This technical note presents that the proposed Water Management Strategy meets the requirements of Points i and ii of Policy DM6.

2.0 POLICY REQUIREMENTS

2.1.1 Policy DM6 of the Eastleigh Local Plan (ELP) states:

“New development in areas at risk of flooding or development of more than 10 dwellings or employment facilities, facilities with a site area of 0.5 hectares or more that drain into a waterway within the Itchen or Hamble catchment or drain directly to coastal waters will only be permitted if they include Sustainable Urban Drainage systems (SuDS). Within smaller developments mechanized systems will be considered.

In order to reduce flooding and maintain water quality (in accordance with DM8).

SuDS schemes should:

- i. Manage surface water runoff as close to its source as possible and include at least three forms of naturalized filtration within the treatment train wherever feasible;***
- ii. Be designed in accordance with the CIRIA C697 SuDS Manual or equivalent national or local guidance;***
- iii. Ensure that discharge rates at least mirror greenfield rates before development;*
- iv. Where discharge is to a wetland or wet woodland habitat, flows off site must mirror the natural hydrological pathways;*
- v. Include clear arrangements for their whole life management and maintenance.*

Where a watercourse is present on a development site, it should be retained or restored into a natural state and enhanced where possible. The culverting of any watercourse will not generally be permitted and development should wherever possible remove any existing culverts and increase on-site flood storage. Development should be laid out to enable maintenance of the watercourse.

Where development drains into a water way connected to the Natura 2000 or Ramsar network a site specific Construction Environment plan must be prepared before construction.”

2.1.2 The comments received concern the implementation of three forms of naturalised filtration as described in Point i in **Section 2.1.1**.

2.1.3 CIRIA C697 SuDS Manual was superseded in November 2015 by The SuDS Manual (C753), henceforth referred to as C753. C753 is considered the relevant guidance for this development.

3.0 PROPOSED WATER MANAGEMENT STRATEGY

3.1.1 The proposed Water Management Strategy is presented in the FRA (report reference 19-367-01B) and FRA Addendum 1 (report reference 19-367-04). The Water Management Strategy drawing is presented in **Appendix A** of this technical note for reference.

3.1.2 The Water Management Strategy shows that runoff from some areas of the site flow through two forms of naturalised filtration, including a combination of permeable paving, swales and enhanced basins before, discharging to the ditch.

3.1.3 Surface water from some areas of the site would only be conveyed through one form of naturalised filtration. All surface water runoff would be conveyed through at least one enhanced basin at minimum.

3.1.4 The enhanced basins include the following features:

- Nitrogen reducing native marginal and aquatic species (including evergreen plants).
- The incorporation of distinct zones in the large basins providing the water quality and quantity volume storage in a number of independent cells. These features create increased attenuation, longer pollutant removal pathways (and therefore enhanced pollution removal), easier maintenance regime and more varied ecology.
- Basin Zones include a sediment forebay, permanent micro pools, attenuation storage volume above permanent pool water level, and aquatic benches surrounding the permanent micro pools, which support wetland planting, acting as a biological filter and providing ecology amenity and safety benefits. Around the micro pools, shallow wet and marshy grassland areas provide further filtration.

3.1.5 There are also some areas adjacent to the highways which would include rain gardens and bioretention areas which are separate to the enhanced basins.

3.1.6 A schematic showing the water treatment through the site, sets out the features that are proposed and is presented in **Appendix B**.

3.1.7 It is proposed that achieving conveyance through three forms of naturalised filtration for the site would not be feasible. Constructing permeable paving over the whole of the road network would not be practical, as the roads without permeable paving would be offered for adoption. It would not be possible to convey all of the water through swales, as the locations for swales are limited, owing to the site layout and topography. The site topography and layout also limit the use of cascading basins.

3.1.8 **Section 4** sets out the ways in which the Water Management Strategy complies with C753 regarding the level of water quality treatment being provided.

4.0 WATER QUALITY

4.1 *Pollution Hazard Indices*

4.1.1 The “*pollution hazard indices for different land use classifications*” table has been extracted from C753 and applied to the development proposals, as shown in **Table 4-1**.

Table 4-1: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements per day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads or motorways	Medium	0.7	0.6	0.7

4.2 Individual SuDS Mitigation Indices

4.2.1 The proposed permeable paving, swales and enhanced attenuation basins would provide treatment for the surface water runoff from the site. The individual SuDS mitigation indices have been extracted from C753 and are set out in **Table 4-2**.

Table 4-2: Pollution Mitigation Indices

Land Use	Mitigation Indices		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7
Swale	0.5	0.6	0.6
Wetlands (Enhanced Basin)	0.8	0.8	0.8

4.2.2 The indices for the enhanced basins have been shown as equivalent to wetlands.

4.3 Combined SuDS Mitigation Indices

4.3.1 As per C753, the mitigation indices for multiple features are calculated using the following equation:

$$\text{Total SuDS Mitigation Index} = \text{mitigation index}_1 + 0.5 (\text{mitigation index}_2)$$

Scenario One – Two Forms of Naturalised Filtration (Permeable Paving and an Enhanced Basin)

4.3.2 As stated in **Section 3**, some of the surface water from the site would be treated through permeable paving and an enhanced basin. The combined mitigation indices for this scenario are set out in **Table 4-3**.

Table 4-3: SuDS Mitigation Indices for Scenario One

Total Suspended Solids (TSS)	Metals	Hydrocarbons
1.1	1.0	1.1

4.3.3 Comparing the pollution indices with the mitigation indices for Scenario One shows that the level of treatment provided is significantly above the level of treatment required in C753.

Scenario Two – Two Forms of Naturalised Filtration (a Swale and an Enhanced Basin)

4.3.4 Some of the surface water from the site would be treated through a swale and an enhanced basin. The combined indices for this scenario are set out in **Table 4-4**.

Table 4-4: SuDS Mitigation Indices for Scenario Two

Total Suspended Solids (TSS)	Metals	Hydrocarbons
0.9	1.0	1.0

4.3.5 Comparing the pollution indices with the mitigation indices for Scenario Two shows that the level of treatment provided is significantly above the level of treatment required in C753.

Scenario Three – Two Forms of Naturalised Filtration (two consecutive Enhanced Basins)

4.3.6 Some of the surface water from the site would be treated through two consecutive enhanced basins. The combined indices for this scenario are set out in **Table 4-5**.

Table 4-5: SuDS Mitigation Indices for Scenario Three

Total Suspended Solids (TSS)	Metals	Hydrocarbons
1.2	1.2	1.2

4.3.7 Comparing the pollution indices with the mitigation indices for Scenario Three shows that the level of treatment provided is significantly above the level of treatment required in C753.

Scenario Four – One Form of Naturalised Filtration (an Enhanced Basin)

4.3.8 All of the surface water would, as a minimum, be conveyed through one enhanced basin. The mitigation indices presented in **Table 4-2** show that one enhanced basin alone provides higher levels of treatment than required in C753.

5.0 CONCLUSION

5.1.1 Odyssey was commissioned by EBC to undertake an FRA and Water Management Strategy to be submitted in association with a planning application in support of a proposed development for a site at Horton Heath, Eastleigh.

5.1.2 Following the submission of the application, comments were received regarding whether the Water Management Strategy meets Points i and ii of Policy DM6 of the ELP.

5.1.3 This technical note proposes that provision of three forms of naturalised filtration on site would not be feasible. The Water Management Strategy implements two forms of naturalised filtration where feasible, and the minimum provision is one form of naturalised filtration. Water quality treatment standards as required by C753 would be exceeded for all scenarios on site. Therefore, it is proposed that the proposed Water Management Strategy satisfies Point i and ii of Policy DM6 of the ELP.

APPENDIX A

Water Management Strategy



- NOTES**
1. DO NOT SCALE FROM THIS DRAWING. WORK FROM FIGURED DIMENSIONS ONLY.
 2. ALL DIMENSIONS SHOWN ON THIS DRAWING ARE IN METRES.
 3. CULVERTED DITCH LEVELS HAVE BEEN INTERPOLATED FROM SURVEY UNDERTAKEN BY LIGHTSOURCE SURVEYS LTD IN APRIL 2018.
 4. PROPOSALS ARE INDICATIVE ONLY TO DEMONSTRATE DRAINAGE STRATEGY AND ARE SUBJECT TO EVOLVE THROUGH DETAILED DESIGN.
 5. THE LEVELS SHOWN ON THIS DRAWING ARE PRELIMINARY AND SUBJECT TO CHANGE.
 6. LIGHTING DESIGN IS INDICATIVE AND SUBJECT TO CHANGE AT DETAILED DESIGN.
 7. IN COMPLIANCE WITH CDM REGULATIONS 2015, ODYSSEY HAS FOLLOWED ITS DESIGN RISK MANAGEMENT PROCESS FOR HAZARD ELIMINATION AND RISK REDUCTION IN DEVELOPING THE ODYSSEY DESIGNS SHOWN ON THIS DRAWING.
 8. ABNORMAL OR UNUSUAL RESIDUAL RISKS MAY BE INDICATED BY USE OF HEALTH AND SAFETY SYMBOLS WHERE IT IS CONSIDERED THAT SUCH RISK MAY NOT NORMALLY BE EXPECTED BY COMPETENT PERSONS OR CONTRACTORS WITH NECESSARY SKILLS, KNOWLEDGE AND EXPERIENCE TO BE ENGAGED ON WORK OF THIS NATURE OR TYPE.
- LEGEND**
- SITE BOUNDARY
 - PROPOSED FOUL SEWER & MANHOLE
 - PROPOSED SURFACE WATER SEWER & MANHOLE
 - VORTEX FLOW CONTROL
 - PROPOSED PERMEABLE PAVING
 - PROPOSED HEADWALL
 - INDICATIVE ATTENUATION BASIN
 - BASIN EARTHWORKS EXTENT
 - INDICATIVE RAIN GARDEN
 - PROPOSED SWALE

P:19-367 - Horton Heath, EastleighTechAcadDrawings000 Series19-367-001 Preliminary Engineering Layout.dwg

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C	UPDATED TO SUIT NEW LAYOUT	NA	JH	GS	24.05.21
B	UPDATED TO INCLUDE CDM INFORMATION	NA	JH	GS	12.02.21
A	UPDATED TO CLIENT COMMENTS	NA	JH	GS	15.12.20
Rev	Amendments	Des	Dra	App	Date

ODYSSEY

Technical Services
Water Drain Law
Planning
Highways RCT

Telephone: 01256 331144
Fax: 01256 251144
E: info@odysseyconsult.co.uk
W: www.odysseyconsult.co.uk

Job Title:
HORTON HEATH, EASTLEIGH

Drawing Title:
DRAINAGE STRATEGY

Client:
EASTLEIGH BOROUGH COUNCIL

Scale: 1:500 @A0	Date: NOV 20	Designed: NA
Drawn: JA	Checked: JW	Approved: JH
Job No: 19-367	Drawing No: 19-367/001	Rev: C

APPENDIX B

Water Treatment Schematic



Dwellings
Very low Pollution Hazard Level



Car Parks
Low Pollution Hazard Level

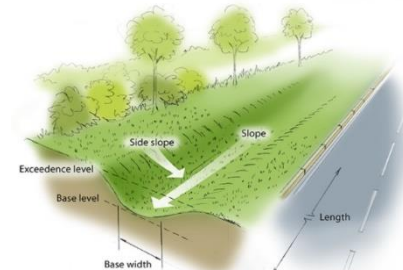


Roads
Medium Pollution Hazard Level

Very Low
pollution
risk

Low
pollution
risk

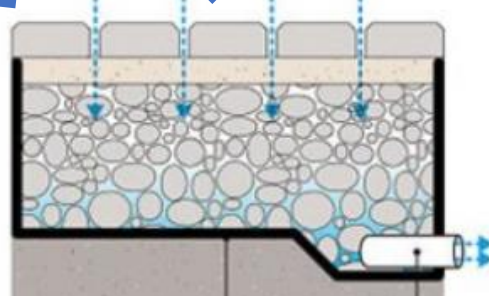
Medium
pollution
risk



**Rain Gardens and Bioretention
Swales**

Water Treatment sufficient to
reduce pollution risk

Very Low
pollution
risk



Permeable Paving

(image from
<https://www.midlandbrick.com.au/Products/Pavers/Permeable-Paving>)

Water Treatment sufficient to treat Medium,
Low and Very Low pollution risk

No
pollution
risk

Low
pollution
risk

Medium
pollution
risk

Enhanced Basins

(Image from
https://www.essexdesignguide.co.uk/media/2404/suds_design_guide_2020.pdf)

The enhanced basins incorporate:

- ✓ Nitrogen reducing native marginal and aquatic species
- ✓ Distinct zones in the large basins providing water quality in a number of independent cells which creates longer pollutant removal pathways
- ✓ Basins Zones include a sediment forebay, permanent micro pools, permanent water level and aquatic benches which support wetland planting which acts as a biological filter
- ✓ Around the micro pools, shallow wet and marshy grass land areas provide further filtration

Water Treatment sufficient to treat Very Low
and Low and medium pollution risk

Secondary Enhanced Basins

(Image from
https://www.essexdesignguide.co.uk/media/2404/suds_design_guide_2020.pdf)

- ✓ Secondary enhanced basins have the same features described above

Water Treatment sufficient to treat Very Low
and Low and medium pollution risk



No
pollution
risk



Surface Water
Flow Path
(piped)



Discharge to water
course through flow
control device

No pollution risk

No pollution risk

Discharge to water
course through flow
control device

Existing
watercourse on
site

