

Planning/Environmental Dept,
South Dublin County Council,
County Hall,
Tallaght,
Dublin

Re: Conditions to Grant for the Planning Ref. No. SD21A/0246

Applicant: Beckett Developments Ltd.

Site Address: Palmyra, Whitechurch Road, Rathfarnham, Dublin 16

To Whom it Concerns,

This is to state that Hydrocare Environmental Ltd. has been retained by the applicant to issue a response to Item 7 of the conditions to grant planning permission for the proposed development, ref. no. SD21A/0246. The proposed development will consist of the construction of 8 houses, all associated on and off development works, landscaping, boundary treatments, removal of existing street boundary screen wall and the provision of vehicular and pedestrian access to an infill site of ca. 0.226Ha. at Grangebrook Avenue, Palmyra, Whitechurch Road, Rathfarnham, Dublin 16.

This is an update to a previously lodged response to Condition 7 for this development under the reference number SD21A/0246/C7-1. The previous response to Condition 7 was deemed non-compliant for the reason outlined below.

"The site should be evaluated as a whole, not as 8 individual sites. In particular the discharge rates of below 2l/s (low discharge rates) cause problems with flow control operation and silting up of pipes.

-The run off rate from permeable paving should be taken as 0.9 if the attenuation below the permeable paving is being counted as total attenuation. Reducing run off rate to 0.6 and counting the attenuation provided by permeable paving is double counting.

-Q-bar should be taken as a minimum of 2l/s, if the site area is under 1hectare (this should assist in calculations);"

In response to this it has been proposed to install a 225mm DIA collector drain along the front of the development site. Each permeable paving system will discharge to the collector drain via non-return valve. At the lowest point in the network, the collector drain will discharge to the public stormwater drain via flow control device restricted to 2l/s.

The proposed attenuation system will manage the surface water runoff which arises from this development for the peak rainfall event during the 1 in 100-year return period. This includes a 20% allowance for climate change.

Environmental Consultants
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The runoff rate coefficient has been amended to 0.9 as the attenuation is below the permeable paving.

Please see appended herewith the Stormwater Drainage Report detailing surface water attenuation calculations for the proposed development.

We hope the above is to your satisfaction.

Yours sincerely,

Daniel Nolan, BA BAI, Msc Environmental Engineering, FETAC Site Assessor, MIEI

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Prepared By:

Date of Report: 11th December 2023

Palmyra, Whitechurch Road, Rathfarnham, Co. Dublin

Site Location:

Applicant: Beckett Developments Ltd.

Stormwater Drainage Proposal

Document Control Sheet

Project No.: 23-397

Project Title: Beckett Developments Ltd., Palmyra, Whitechurch Road, Rathfarnham,
Dublin 16

Revision: A

Status: FINAL

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1.1 Introduction

Hydrocare Environmental Ltd, has been retained by the applicant to revise and design a new surface water drainage proposal for a development site at Palmyra, Whitechurch Road, Rathfarnham, Dublin 16 in response to Items 7(a), 7(b), & 7(c) of the Conditions to Grant, Planning Ref. No. SD21A/0246.

The proposed development will consist of the construction of 8 houses comprising of 1 three-bedroom two storey detached, Type B1 (c. 122sq.m) Site 1, 1 four bedroom 2 storey detached type B2 (c.134sq.m) Site 2, 6 four bedroom 2 storey semidetached Type A1 (c.148sq.m) Sites 3-8 inclusive, all associated on and off site development works, landscaping, boundary treatments, removal of existing street boundary screen wall and the provision of vehicular and pedestrian access to Grangebrook Avenue on infill site of circa 0.226Ha.

1.2 Stormwater Design Parameters & Considerations

At present the proposed development is a greenfield site which consists largely of trees and open grass areas.

Soakaways could not be designed to cater for the surface water runoff from the impermeable site areas. Due to the constrained nature of this development site and the BRE Digest 365 requirement for a 5m separation distance from foundations, discharge to the ground via soakaways could not be achieved. Additionally, soil infiltration tests carried out by Ground Investigations Ireland Ltd. shows that "At all locations the water level dropped too slowly to allow calculation of 'f' the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction." The ground investigation report has been attached herewith.

The Reg. Ref. SD21A/0246/C7-1 letter received from South Dublin County Council on 26-10-2023 recommends:

"Consider a collector drain gathering surface water overflow from all 8 permeable paving attenuation areas, with a single flow controller of 2l/s, and one connection point to the public surface water sewer for the entire development."

To cater for the surface water runoff from this proposed development, it is proposed to install surface water drainage systems sized to cater for the runoff from impermeable surfaces of each of the 8 no. dwellings. Each dwelling will have surface water drainage system discharging to a collector drain running along the front of the development site.

At the lowest point in the network, the collector drain will discharge to the public stormwater drain via flow control device. In line with the recommendations of the SDCCLetter Reg. Ref. SD21A/0246/C7-1, the outfall flow rate from this development will be restricted to 2l/s. As there is no open green area available at this development site, the flow control device for the entire development site will be located within the front garden of Dwelling Site 1.

This is significantly less than the outfall flow rate for each site compared to the surface water drainage system previously designed by others for this development under the ref. no. SD21A/0246.

Based on the CIRIA C753 SuDS Manual 2015, the following Runoff Coefficient will be applied.

- Pitched Roof with Tiles: 0.90
- Road/Pavement: 0.75
- Permeable Pavement: 0.90

The permeable paving will form part of the attenuation system for this development. In order to avoid double counting, a 0.9 runoff coefficient was applied for the permeable paving instead of the 0.6 recommended in the CIRIA C753 SuDS Manual 2015.

Applying a runoff coefficient will reduce the effective impermeable areas for the purposes of calculating the rainwater runoff from each individual site.

TABLE 11.4 Suggested initial runoff coefficients for RWH yield analysis (from BS 8515:2009+A1:2013)

Surface type	Runoff coefficient
Pitched roof with profiled metal sheeting	0.95
Pitched roof with tiles	0.90
Flat roof without gravel	0.80
Flat roof with gravel	0.60
Green roof, intensive ¹	0.30
Green roof, extensive ¹	0.60
Permeable pavement (concrete blocks) ²	0.60
Road/pavement	0.75

Note

- ¹ Green roof runoff yield is particularly uncertain and varies with season. There may also be negative colouration impacts.
- ² This reflects the portion of rainfall that finds its way through the overlying surface to subsurface collection points for RWH.

Figure 1 - Runoff Coefficients per CIRIA C753 SUDS Manual 2015

1.3 Site Characteristics

1.3.1 Breakdown of Impermeable Surfaces

Dwelling Site 1:

- Total Site Area: 273m²
- Total Roof Area: 79.2m²
- Impermeable Footpath Area: 29.4m²
- Permeable Paving Area: 76.6m²
- Remaining Permeable Green Area: 87.8m²
- Effective Total Impermeable Area: 162.27m²

Dwelling Site 2:

- Total Site Area: 315.8m²
- Total Roof Area: 99.3m²
- Impermeable Footpath Area: 28.1m²
- Permeable Paving Area: 62.5m²
- Remaining Permeable Green Area: 125.9m²
- Effective Total Impermeable Area: 166.7m²

Dwelling Site 3:

- Total Site Area: 261.2m²
- Total Roof Area: 92.8m²
- Impermeable Footpath Area: 23.9m²
- Permeable Paving Area: 67.4m²
- Remaining Permeable Green Area: 77.1m²
- Effective Total Impermeable Area: 162.11m²

Dwelling Site 4:

- Total Site Area: 271.3m²
- Total Roof Area: 92.8m²
- Impermeable Footpath Area: 24m²
- Permeable Paving Area: 74.1m²
- Remaining Permeable Green Area: 80.4m²
- Effective Total Impermeable Area: 168.21m²

Dwelling Site 5:

- Total Site Area: 269.8m²
- Total Roof Area: 93.3m²
- Impermeable Footpath Area: 19.9m²
- Permeable Paving Area: 56.6m²
- Remaining Permeable Green Area: 100m²
- Effective Total Impermeable Area: 149.84m²

Dwelling Site 6:

- Total Site Area: 269.7m²
- Total Roof Area: 92.2m²
- Impermeable Footpath Area: 25.5m²
- Permeable Paving Area: 53.1m²
- Remaining Permeable Green Area: 98.9m²
- Effective Total Impermeable Area: 149.9m²

Dwelling Site 7:

- Total Site Area: 303.1m²
- Total Roof Area: 80.2m²
- Impermeable Footpath Area: 27.9m²
- Permeable Paving Area: 77.7m²
- Remaining Permeable Green Area: 117.3m²
- Effective Total Impermeable Area: 163.04m²

Dwelling Site 8:

- Total Site Area: 280.2m²
- Total Roof Area: 80.6m²
- Impermeable Footpath Area: 37.1m²
- Permeable Paving Area: 60.4m²
- Remaining Permeable Green Area: 102.1m²
- Effective Total Impermeable Area: 154.73m²

1.4 Design Proposal

Soakaways could not be designed to manage the surface water runoff from this development. It is proposed to install permeable paving with an underlying gravel attenuation blanket at each proposed new dwelling house. The permeable paving will be a Kilsaran Climate-Pave System A Load Category 2 or similar approved system. This system will have a 0.65m(D) underlying gravel bed with a permeable geotextile at the base allowing some infiltration to the ground during regular rainfall events.

Each permeable paving system will discharge to a collector drain via non-return valve. The non-return valve will ensure that the lower permeable paving systems will not become surcharged.

The collector drain will then outfall to the public surface water drainage system at a controlled outfall flow rate restricted to 2l/s. The calculations for the gravel attenuation blanket underlying the permeable paving conservatively assume that no surface water will infiltrate to the ground through the base of the system.

The proposed attenuation system will manage the surface water runoff which arises from this development for the peak rainfall event during the 1 in 100-year return period. This includes a 20% allowance for climate change.

Additionally, it is proposed to install nature based above ground SUDS features in the form of rainwater harvesting systems. It is proposed that each dwelling will have two rainwater harvesting systems located at the rear of the development. The rainwater harvesting systems will be composed of water butts with an overflow to a planter box which in turn will have an overflow to the proposed gravel attenuation blanket underlying the permeable paving. This will cater for the surface water arising from the roof areas of this development during regular rainfall events, thus limiting the outfall to the public storm drain.

However, it must be assumed that the rainwater harvesting systems are full during the critical storm event and that they will have limited attenuation volume capacity. Therefore, the gravel filled attenuation blanket underlying the permeable paving will be sized to cater for the surface water runoff from all impermeable surfaces during the peak rainfall event during the 100-year return period. This includes the roof areas, footpaths, and the permeable paving. The base of the underlying attenuation gravel blanket will be permeable, allowing for some infiltration to the ground within the site boundary thus also providing additional source control and nature-based SUDS.

1.5 Design Calculations

The surface water drainage is to include:

- Total attenuation of runoff waters will be for the critical 100-year rainfall return period with 20% allowance for climate change.
- Each outfall to the collector drain must include a non-return valve to ensure that the lower permeable paving systems do not become surcharged from higher ground.
- The total outfall flow control from this development will be restricted to 2l/s.
- Each dwelling is to include 2 rainwater harvesting systems comprised of a water butt and planter box each, for additional storage, drainage, and source control. The additional storage volume afforded by these systems is not included in the attenuation volume calculations.

1.5.1 Greenfield Runoff Rate

IH124 Greenfield Runoff Rate Calculation

Friday 10 March 2023

Client: Beckett Developments Ltd.

Site Location: Palmyra, Whitechurch Road, Rathfarnham, Co. Dublin

Agent: Terry & O'Flanagan Ltd, F1, Centrepoint Business Park, Oak

Road, Dublin 12

The IH124 method was specifically introduced as an update to the original Flood Studies Report (1975) to address the runoff from small catchments (CIRIA C697 and IH124)

$$Q_{BAR}^{RURAL} (m^3/s) = 0.00108 AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$$

• Q_{BAR}^{RURAL} is the mean annual flood flow from a rural catchment (43% AEP or 2.3 year return period).

• AREA is the area of the catchment (km^2)

• SAAR is the standard average annual rainfall

• SOIL is the Soil Index, SOIL = 0.1 SOIL1 + 0.3 SOIL2 + 0.37 SOIL3 + 0.47 SOIL4 + 0.53 SOIL5

• The soil type is selected based on the Flood Studies or the Wallingford Procedure WRAP maps.

Inputs

AREA: 0.2265 Ha
Site AREA is 0.2265Ha. As site is <50Ha, use 50Ha
SAAR: 907 mm
Grid Reference E:314473 N:226367 - Met Eireann Mean Annual Rainfall Data
Soil: 0.47
FSR SPR value for SOIL type 4 is 0.47

Outputs

Q_{BAR}^{RURAL} (l/s/ha) - 6.54
Site Area (Ha) - 0.2265
 Q_{BAR}^{RURAL} (l/s) - 1.48

l/s	$Q_1 =$	1.26
	$Q_{30} =$	3.11
	$Q_{100} =$	3.86

Growth Curve Factors (GDSFS)	
Return Period (years)	Growth Curve Factor
1	0.85
Q_{ave}	1
10	1.7
30	2.1
100	2.61
200	2.9