

SHD Consulting Engineers
Nutgrove Enterprise Park
Rathfarnham
Dublin 14

21st July 2022

Re: Planning Register Reference: SD21A/0361, Additional Information Request Item No. 5

To whom it may concern,

SHD Consulting Engineers carried out a review of the planning application referenced above and the additional information requested by South Dublin County Council (SDCC), specifically the Additional Information Request Item No. 5.0 with regard to SDCC's requirement for the applicant to include Sustainable Urban Drainage Systems (SuDS) features for the proposed development.

The proposed development site area totals 0.0178ha and is bounded by residential properties and the roadway along Tara hill Road and the private access laneway at the rear of the site. It is understood that the area around the proposed development contains a below ground drainage network for the disposal of wastewater and surface water from the existing dwellings and hard surfaces. **NEED IRISH WATER MAPS.**

Sustainable Drainage Systems:

In accordance with the Greater Dublin Sustainable Drainage Strategy and the Sustainable Drainage Explanatory Design & Evaluation Guide 2022 it is proposed to use SuDS features for the development which will aim to:

- Attenuate and/or reduce storm water runoff
- Reduce pollution impact
- Introduce water back into the groundwater profile

The following two SuDS features are being proposed for the proposed development:

1. Rainwater Harvesting:

The area of roof for the proposed development is circa 60m². Using a coefficient of runoff of 1.0 for buildings this equates to an area of 60m² to be drained. Using a factor of 1.0 (100%) would be considered a conservative approach and ultimately lead to an efficient drainage system. In the interest of being conservative, the entire site area is considered hardstanding and 100% impervious when calculating the storage volume required, therefore an area of 0.0178ha is assumed when calculating the rainwater storage required.

Sustainable Drainage Explanatory Design & Evaluation Guide 2022 states that the permitted discharge rate to a surface water sewer for a 1-in-100 year rainfall event is “*Qbar or 2l/s/ha, whichever is greater.*”

It is our proposal to implement a rainwater harvesting unit which would allow for roof water runoff from a 1 in 100 year event plus 20% Climate change. Basing the calculations on the return period rainfall depth figures provided by Met Eireann (Figure 1) and applying the climate change factor of safety of 20% it is derived that in a 1 in 100 year rainfall event the maximum storage required is 3.0m³, which equates to 3,000L when an outflow rate of 2.0l/s is applied.

Sample Table Met Eireann
Return Period Rainfall Depths for sliding Durations

DURATION	Interval		Years														
	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,	
5 mins	2.3,	3.3,	3.8,	4.7,	5.2,	5.7,	7.2,	8.9,	10.0,	11.7,	13.1,	14.3,	16.1,	17.5,	18.6,	N/A,	
10 mins	3.1,	4.6,	5.3,	6.5,	7.3,	7.9,	10.0,	12.4,	14.0,	16.3,	18.3,	19.9,	22.4,	24.3,	25.9,	N/A,	
15 mins	3.7,	5.4,	6.3,	7.6,	8.6,	9.3,	11.8,	14.6,	16.5,	19.1,	21.6,	23.4,	26.3,	28.6,	30.5,	N/A,	
30 mins	4.8,	6.8,	7.9,	9.5,	10.6,	11.4,	14.1,	17.3,	19.3,	22.2,	24.8,	26.8,	29.8,	32.2,	34.2,	N/A,	
1 hours	6.3,	8.7,	9.9,	11.7,	13.0,	13.9,	17.0,	20.4,	22.6,	25.7,	28.5,	30.6,	33.8,	36.3,	38.3,	N/A,	
2 hours	8.3,	11.0,	12.5,	14.5,	15.9,	17.0,	20.4,	24.1,	26.5,	29.8,	32.7,	34.9,	38.3,	40.9,	43.0,	N/A,	
3 hours	9.6,	12.7,	14.2,	16.5,	18.0,	19.1,	22.7,	26.6,	29.1,	32.5,	35.5,	37.8,	41.2,	43.8,	45.9,	N/A,	
4 hours	10.8,	14.0,	15.6,	18.0,	19.6,	20.8,	24.5,	28.5,	31.1,	34.6,	37.6,	39.9,	43.4,	46.0,	48.2,	N/A,	
6 hours	12.6,	16.1,	17.9,	20.4,	22.1,	23.3,	27.3,	31.4,	34.1,	37.7,	40.8,	43.1,	46.7,	49.3,	51.5,	N/A,	
9 hours	14.7,	18.5,	20.5,	23.2,	24.9,	26.2,	30.3,	34.7,	37.4,	41.1,	44.3,	46.6,	50.2,	52.9,	55.0,	N/A,	
12 hours	16.4,	20.5,	22.5,	25.3,	27.1,	28.5,	32.7,	37.2,	40.0,	43.7,	46.9,	49.3,	52.9,	55.5,	57.7,	N/A,	
18 hours	19.2,	23.6,	25.7,	28.7,	30.6,	32.0,	36.4,	41.0,	43.9,	47.7,	50.9,	53.3,	56.9,	59.5,	61.7,	N/A,	
24 hours	21.5,	26.1,	28.3,	31.4,	33.3,	34.8,	39.3,	44.0,	46.8,	50.7,	53.9,	56.3,	59.9,	62.5,	64.7,	71.8,	
2 days	27.8,	33.1,	35.7,	39.2,	41.4,	43.1,	48.1,	53.2,	56.4,	60.6,	64.1,	66.6,	70.5,	73.3,	75.6,	83.1,	
3 days	33.3,	39.3,	42.1,	46.1,	48.5,	50.3,	55.8,	61.4,	64.9,	69.4,	73.1,	75.9,	80.0,	83.0,	85.4,	93.4,	
4 days	38.5,	45.0,	48.1,	52.4,	55.1,	57.0,	63.0,	69.0,	72.7,	77.5,	81.5,	84.4,	88.8,	91.9,	94.5,	102.9,	
6 days	48.0,	55.6,	59.2,	64.1,	67.1,	69.4,	76.1,	82.9,	87.0,	92.3,	96.8,	100.1,	104.8,	108.4,	111.2,	120.4,	
8 days	57.0,	65.6,	69.6,	75.0,	78.4,	80.9,	88.3,	95.7,	100.2,	106.1,	110.9,	114.5,	119.7,	123.5,	126.5,	136.4,	
10 days	65.7,	75.1,	79.5,	85.4,	89.1,	91.8,	99.9,	107.9,	112.8,	119.1,	124.3,	128.2,	133.7,	137.8,	141.0,	151.6,	
12 days	74.1,	84.3,	89.1,	95.5,	99.5,	102.4,	111.0,	119.7,	124.9,	131.6,	137.2,	141.2,	147.2,	151.5,	154.9,	166.1,	
16 days	90.5,	102.3,	107.7,	115.0,	119.5,	122.8,	132.5,	142.2,	148.0,	155.6,	161.8,	166.3,	172.8,	177.6,	181.4,	193.7,	
20 days	106.6,	119.7,	125.7,	133.8,	138.8,	142.5,	153.3,	163.9,	170.3,	178.5,	185.3,	190.2,	197.4,	202.6,	206.7,	220.1,	
25 days	126.4,	141.1,	147.9,	156.9,	162.5,	166.5,	178.5,	190.3,	197.3,	206.4,	213.8,	219.2,	227.0,	232.7,	237.2,	251.7,	

NOTES:

N/A Data not available

These values are derived from a Depth Duration Frequency (DDF) Model

For details refer to:

'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin', Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

Figure 1: Met Eireann Return Period Rainfall Depths
(source: <https://webapps.dublincity.ie/AnitePublicDocs/00885106.pdf>)

In the Sustainable Drainage Explanatory Design & Evaluation Guide 2022, within Section 7.4.8 “Method of discharge – how rainfall leaves the site” it is noted that rainwater harvesting is the preferential method of discharging rainfall from a site. It is our proposal to incorporate a rainwater harvesting tank at the front of the development, in the location noted on the attached plan; drawing XXX. Through the incorporation of a rainwater harvesting tank, it is understood that this will reduce the additional volume of rainfall runoff generated by the development when compared to the runoff generated on the site in it’s current state. It is proposed that the rainwater runoff from the roof of the proposed development be attenuated in the rainwater harvesting tank be utilised for domestic applications such as garden watering and/or discharged to the surface water sewer through flow-controlled discharge.

The Kingspan Klargester Gamma GRW110 Fully Integrated Rainwater Harvesting System (installed as per manufacturers guidelines is a gravity system that has capacity to hold 3,100L of rainwater taken from the roof of the proposed development and stored in an underground tank. A gravity rainwater system uses the elevated header tank to store filtered water after the main tank and avoids the need for a pumped system.

2. Permeable Paving:

In the Sustainable Drainage Explanatory Design & Evaluation Guide 2022, within section 7.4.4 Source control – managing runoff at source, it is stated that; “*Source control features include pervious surfaces (...)*”. Based on the information contained within the Sustainable Drainage Explanatory Design & Evaluation Guide 2022 it is our proposal to incorporate the permeable paving into the development.

The proposed development proposes for there to be circa 40m² of paved parking at the front of the dwelling and circa 12m² of paved terrace area at the side of the development. Installing these paved areas as permeable paving, i.e. a hard surfaced area that allows water to percolate through and into the ground at source, will provide circa 52m² of pervious surface to aid the SuDS features for the proposed development.

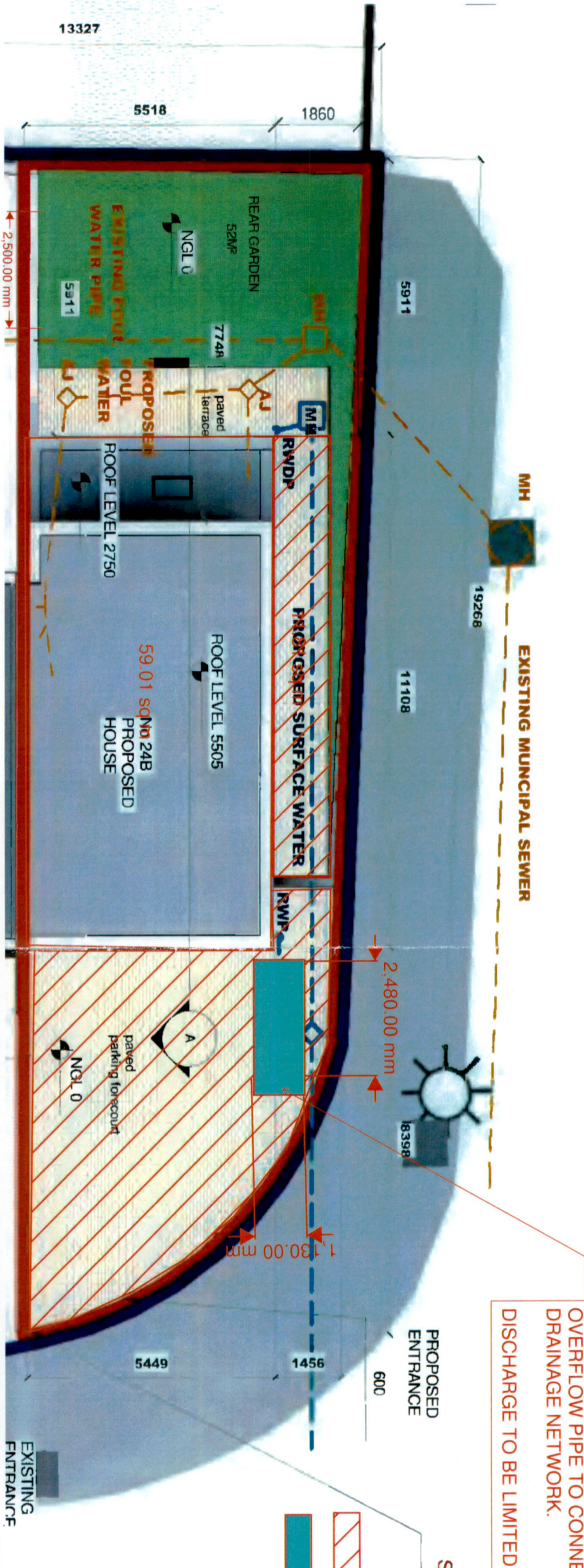
Based on the information contained within the Sustainable Drainage Explanatory Design & Evaluation Guide 2022 this feature should provide 0.05-0.15m³ of storage per m³ of SuDS structure. Therefore, a permeable paving build up that is at least 350mm deep will equate to a total of volume of 18m³ being available for attenuation through permeable paving within the confines of the proposed development site. This figure equates to 0.9m³ of water attenuation when taking the conservative approach and assuming permeable paving provides 0.05m³ of storage per m³. Incorporating this method of managing runoff at source helps to slow the flow of runoff and remove pollution at the beginning of the process

It is therefore our conclusion that through incorporating a rainwater harvesting tank and installing permeable paving into the proposed development, for the areas specified, the Client has demonstrated their intention to provide SuDS features for the development.

Regards,



Barra Kelly Meng, BEngTech CEng MIEI
Structural Chartered Engineer



PROPOSED LOCATION FOR KINGSPAN KLARGESTER GAMMA GRW110 FULLY INTEGRATED RAINWATER HARVESTING SYSTEM

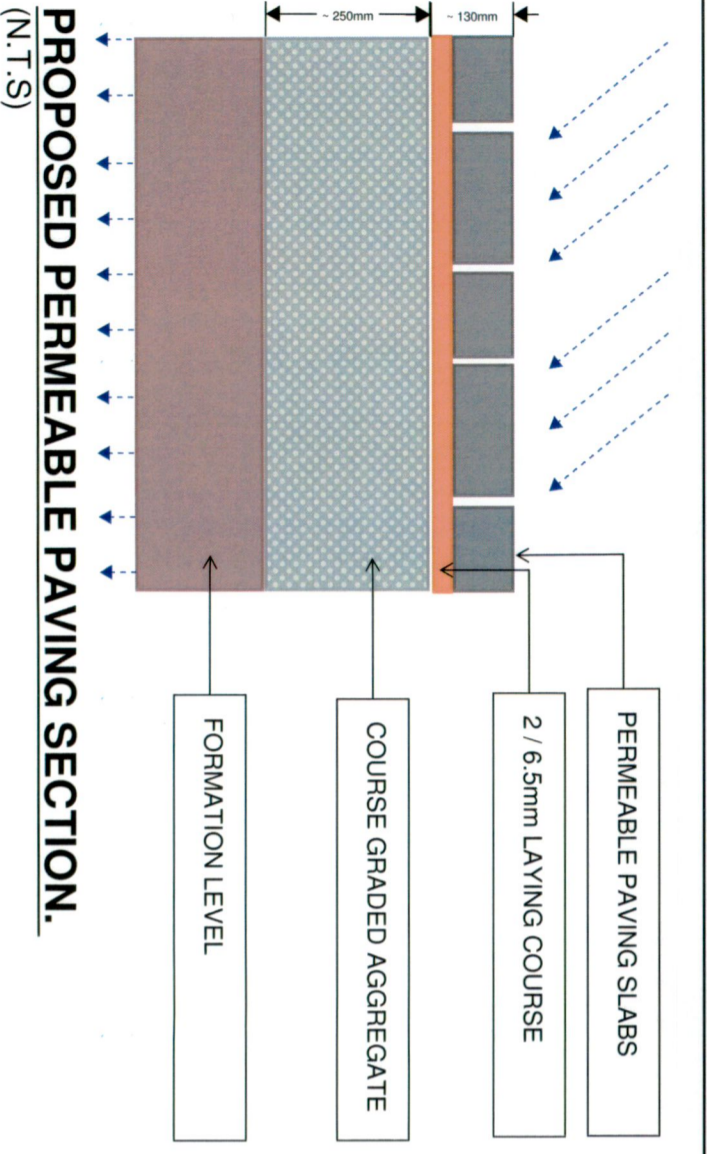
OVERFLOW PIPE TO CONNECT TO SURFACE WATER DRAINAGE NETWORK.

DISCHARGE TO BE LIMITED TO 2.0l/sec/ha

PERMEABLE PAVING

RAINWATER HARVESTING TANK

SITE NOTICE 600



PROPOSED PERMEABLE PAVING SECTION.

(N.T.S)

NOTE:
ADJACENT LANDSCAPE AREAS ARE TO BE SLOPED AWAY FROM PERMEABLE PAVING AREAS TO AVOID LOCALISED SURFACE CLOGGING THROUGH SILT WASH OFF



PROPOSED RAINWATER HARVESTING TANK.

(N.T.S)

NOTE:
IMAGE COURCED FROM: <https://www.tanks.ie/files/pdf/3521-59933.pdf>

- 1 Water main
- 2 Storage tank
- 3 Header tank (optional extn)
- 4 Pressure Vessel (not supplied)
- 5 In-line filter 120 micron
- 6 Internal rainwater filter
- 7 Euroflex Intelligent Pump-SBA 3-23M
- 8 Adjustable tank neck
- 9 External tap (not supplied)
- 10 Roof rainwater feed
- 11 Filtered rainwater feed

TARA HILL ROAD