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**SURFACE WATER DRAINAGE
& SuDS STRATEGY**

**PROPOSED HOTEL DEVELOPMENT
HOSIER STREET, READING**

MARCH 2019

REPORT REF: 2356-DS01-Rev B

CIVIL/STRUCTURAL ENGINEERS | DEVELOPMENT CONSULTANTS | PROJECT MANAGERS

PROPOSED HOTEL DEVELOPMENT HOSIER STREET, READING

PREPARED BY	CHECKED BY	DATE	REVISION
Ben Jagger MEng (Hons) Project Engineer	Basil Basray BEng (Hons), CEng, MStructE Managing Director	April 2019	B

SURFACE WATER DRAINAGE & SuDS STRATEGY

The new development will maintain the overall impermeable area of the site from the as-existing, as the site (approximately 0.1ha) is currently 100% impermeable. Following review of the various site investigation documents it was concluded that the use of soakaways and infiltration techniques on this site would not be suitable as the existing sub-strata is chalk (see typical borehole record contained in Appendix A).

The Environment Agency and local planning authority require Sustainable Drainage techniques to be incorporated within new developments where possible. However, as mentioned above, the proposed development is within an existing impermeable area which will not increase. The use of SuDS for the proposed development is not feasible due to the lack of areas for swales, ponds, attenuation tanks, permeable paving etc. Therefore, a more traditional gravity surface water system is to be utilized, including below ground surface water attenuation tanks.

Currently, both the existing foul and surface water drainage system serving the existing buildings and hardstandings are combined, and discharge into a public sewer in St Mary's Butts, from a manhole located in the north-east corner of the site. Refer to appendices B and C for the existing on-site drainage and surrounding public sewer layouts respectively.

The existing discharge rate for the site, based on 50l/h/m² and a site area of 0.1ha, is 13.9l/s, as per the below calculation. The comments received from Thames Water in response to a pre-development enquiry, note that for sites less than 1ha in area the discharge rate should be reduced by 95% of the existing flow rate. A reduction by 95% from 13.9 l/s would give a flow rate of 0.7 l/s, which is below the control capacity of a standard hydro-brake and will not achieve sufficient velocity for self-cleansing. Therefore, the proposed surface water drainage system will be designed to a minimum discharge flow rate equivalent to a greenfield runoff rate of 5 l/s, discharging into the existing public surface water sewer located in St Mary's Butts as required by Thames Water and confirmed in their email contained in Appendix D.

$$\frac{50 \text{ l/h/m}^2 \times 10,000 \text{ m}^2}{3600 \text{ s}} = 139 \text{ l/s/ha}$$

$$139 \text{ l/s/ha} \times 0.1 \text{ ha} = 13.9 \text{ l/s}$$

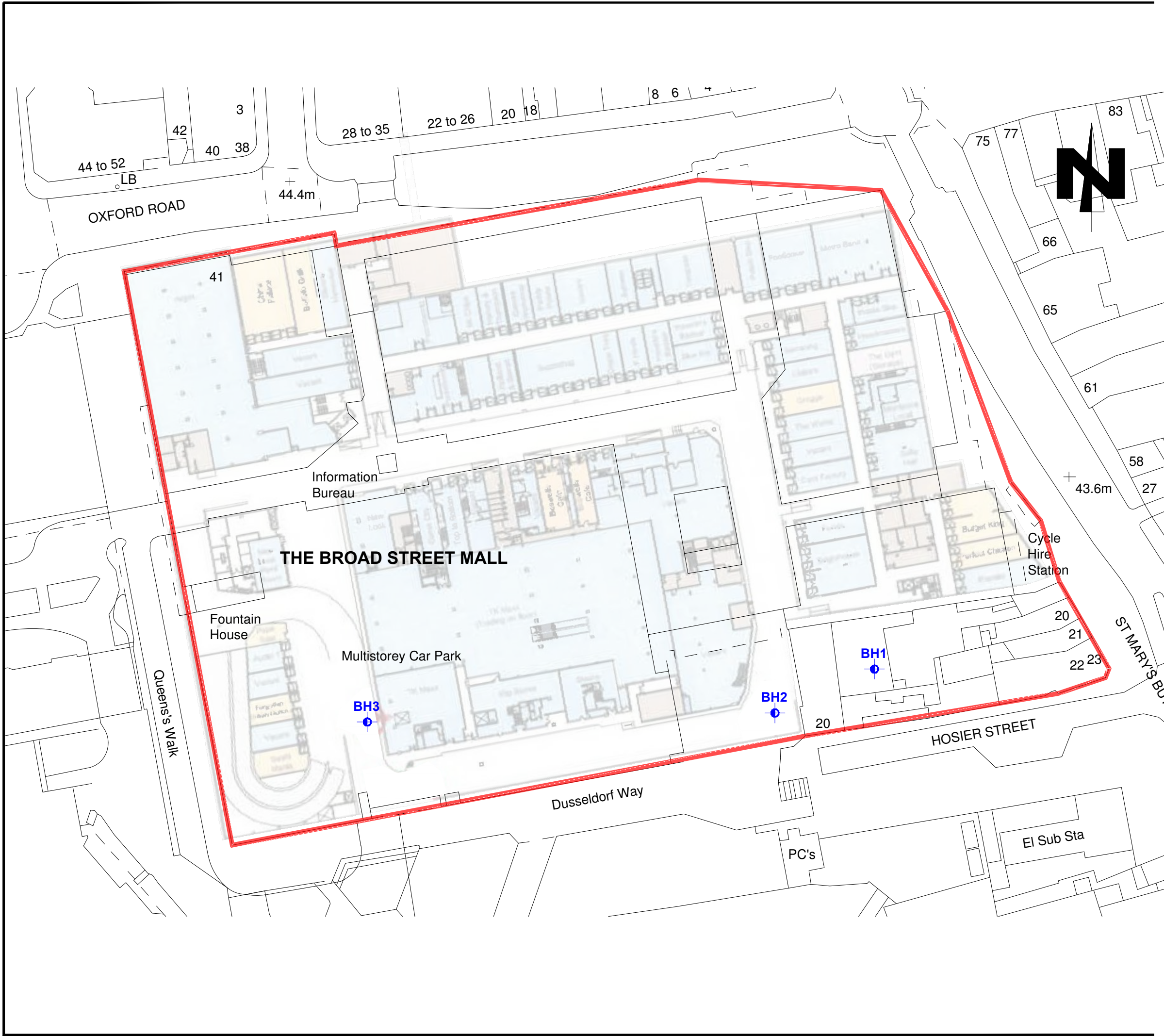
Therefore, as a result of the above, the proposed foul drainage system will be separate from the surface water system and utilise the existing connection. The new surface water drainage system is to be designed as a traditional gravity drainage system containing a flow control unit (prior to the final discharge into the existing public sewers) designed to limit the flow to 5 l/s. The resulting on-site attenuation will be designed to allow for an impermeable area of 0.1ha. The volume of attenuation will be calculated for the storm event, 1 in 100-year return period plus an allowance of 30% for climate change.

APPENDICES

Appendix A	On-Site Borehole Log
Appendix B	Plan of Existing On-Site Services & Drains
Appendix C	Extract of Existing Public Sewer Map
Appendix D	Thames Water Comments

APPENDIX A

On-Site Borehole Log



ARC ENVIRONMENTAL LTD

Solum House
Unit 1 Elliott Court
St. John's Road
Meadowfield
Durham, DH7 8PN
Tel: (0191) 378 6380
Fax: (0191) 378 0494
e-mail: admin@arc-environmental.com
web: www.arc-environmental.com

The contractor shall check all dimensions on site before commencement of any works. No dimensions to be scaled off this drawing.
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LEGEND	
	APPROXIMATE SITE BOUNDARY
	WINDOWLESS SAMPLING BOREHOLE POSITION

rev.	date	amendments	drawn	chckd

Client:
MOORGARTH GROUP LIMITED

Project Title:
Proposed Site Redevelopment

Broad Street Mall
Reading, RG1 7QE

Drawing Title:

Borehole Location Plan

Scale at A3:	Date:	Drawn by:	Approved by:
NTS @ A3	17.12.18	P.D	J.P.D

Job Ref:	Drg no:	Rev:
18-797	-	-



Solum House, Unit 1 Elliott Court
St Johns Road, Meadowfield
Durham, DH7 8PN
Telephone: 01913786380

BOREHOLE LOG

Project Broad Street Mall, Reading				BOREHOLE No BH1	
Job No 18-797	Date 06-11-18 07-11-18	Ground Level (m)	Co-Ordinates ()		
Contractor Arc Environmental Ltd				Sheet 1 of 2	

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.05-1.00	J/B					0.05	Tarmac (MADE GROUND)		
0.30	D					0.25	Broken concrete rubble (MADE GROUND)		
1.20-1.65	C	N=2				(2.25)	Soft to firm light brown clay with brick fragments (MADE GROUND)		
2.00-2.45	C/D	N=2				2.50			
2.50	D						Soft / firm brown silty gravelly CLAY		
3.00-3.45	C/B	N=9				(1.90)			
4.00-4.45	C	N=12				4.40			
4.40	D					4.90	Firm brown gravelly CLAY. Gravel comprises coarse sub-angular chalk		
4.90	D						Structureless CHALK composed of buff / white slightly gravelly to gravelly silt. Gravel is very weak low density white chalk with occasional medium to coarse subrounded to subangular flint gravel and cobbles (SEAFORD CHALK & NEWHAVEN CHALK FORMATION - UNDIFFERENTIATED) - Grade Dm		
5.00-5.45	C/B	N=17				(4.10)			
6.00-6.45	U	56 blows							
6.50	D								
7.00-7.45	S/B/D	N=13							
8.00-8.45	U	51 blows				9.00			
8.50	D								
9.00-9.45	S/D	N=14					Structureless CHALK composed of buff / white gravelly, locally very gravelly silt. Gravel is very weak low density white chalk with occasional medium to coarse subrounded to subangular flint gravel and cobbles (SEAFORD CHALK & NEWHAVEN CHALK FORMATION - UNDIFFERENTIATED) - Grade Dm		
10.00-10.45	U	NR							
10.50-10.95	S/D	N=15							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Water Observations: Water strike at 9.00m, SWL 8.20m after 20mins. SWL 16m at end of shift.
All dimensions in metres Scale 1:75			Client Moorgarth Group			Method/ Plant Used Cable Percussive			Logged By MH		

AGS3 UK BH LOGS.GPJ AGS3_ALL.GDT 19/11/18



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St Johns Road, Meadowfield
Durham, DH7 8PN
Telephone: 01913786380

BOREHOLE LOG

Project Broad Street Mall, Reading				BOREHOLE No BH1	
Job No 18-797	Date 06-11-18 07-11-18	Ground Level (m)	Co-Ordinates ()		
Contractor Arc Environmental Ltd				Sheet 2 of 2	

SAMPLES & TESTS			Water	STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
12.00-12.45	S/B/D	N=28	 			(11.00)	Structureless CHALK composed of buff / white gravelly, locally very gravelly silt. Gravel is very weak low density white chalk with occasional medium to coarse subrounded to subangular flint gravel and cobbles (SEAFORD CHALK & NEWHAVEN CHALK FORMATION - UNDIFFERENTIATED) - Grade Dm (<i>continued</i>) Becomes dense from c.12m to c.13m Flint gravel and cobbles noted at c.13m		
13.50-13.95	C/D	N=43							
15.00-15.45	S/D	N=38							
16.50-16.95	S/D	N=41							
18.00-18.38	C/B/D	N=75 for 380mm					Flint gravel and cobbles noted at c.13m		
19.50-19.89	S/D	N=68 for 390mm							
20.00	D					20.00	DAYWORKS: Breakout tarmac and service pit 1hr, intall standpipe 1hr, tidy spoil 2hrs.		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
06-11-18	00.00	19.00	19.00	150mm		14.4	14.70	45mins			
07-11-18	00.00	20.00	20.00	150mm							Water Observations: Water strike at 9.00m, SWL 8.20m after 20mins. SWL 16m at end of shift.
All dimensions in metres Scale 1:75		Client Moorgarth Group				Method/ Plant Used		Cable Percussive			Logged By MH

AGS3 UK BH LOGS.GPJ AGS3 ALL.GDT 19/11/18

APPENDIX B

Plan of Existing On-Site Services & Drains

APPENDIX C

Extract of Existing Public Sewer Map

Asset Location Search Sewer Map - ALS/ALS Standard/2016 3411896



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 471239,173352

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.



ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

	Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Trunk Surface Water
	Trunk Foul
	Storm Relief
	Trunk Combined
	Vent Pipe
	Bio-solids (Sludge)
	Proposed Thames Surface Water Sewer
	Proposed Thames Water Foul Sewer
	Gallery
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Sludge Rising Main
	Proposed Thames Water Rising Main
	Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Outfall
	Undefined End
	Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer
	Surface Water Sewer
	Combined Sewer
	Gully
	Culverted Watercourse
	Proposed
	Abandoned Sewer

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

APPENDIX D

Thames Water Comments

Ben Jagger

From: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
Sent: 28 February 2019 13:09
To: Ben Jagger
Cc: Basil Basray; Mark Knibbs
Subject: RE: RE: 2356 - Hosier Street Hotel - Pre-planning Enquiry Form -TW ref DS6058037:PDEV:RG1 7JL

Dear Sir/Madame

Following your Pre-Planning Enquiry for the above site, we have consulted our Planning Team and included their comments in an enclosed formal response:

Thames Water would advise that with regard to Foul Water sewage network infrastructure capacity, we would not have any objection to the above planning application, based on the information provided. With regard to surface water drainage, Thames Water would advise that if the developer follows the sequential approach to the disposal of surface water we would have no objection.

Thames Water request, that the surface water is discharged into surface water sewer on St Marry's Butts, under restricted rate. It would be sought to attenuate the flows to Greenfield run-off rates i.e. 5l/s/hectare of the total site area or if the site is less than hectare in size then the flows should be reduced by 95% of existing flows.

Please note, Thames Water is not a statutory consultee for discharging of the surface water, it is up to the developer to consult **Local Planning Authority**, to understand if they have any objection on the proposal. You will have to liaise with the LA to discuss your drainage strategy and receive their acceptance. Please note, Thames Water will be prepared to accept the agreed concept for surface water discharges, and if necessary undertake any preventing measures against hydraulic incapacity in the existing sewer network. Please contact us again, once the drainage strategy have been confirmed by the **Lead Local Flood Authority**.

Kind Regards

Artur Jaroma

Developer Services – Sewer Adoptions Engineer

Office: 0203 577 8082

artur.jaroma@thameswater.co.uk

Clearwater Court, Vastern Road, Reading, RG1 8DB

Find us online at developers.thameswater.co.uk

Original Text

From: Ben Jagger <Ben.Jagger@bjbconsult.co.uk>
To: DEVELOPER.SERVICES@THAMESWATER.CO.U <DEVELOPER.SERVICES@THAMESWATER.CO.UK>
CC: Basil Basray <Basil.Basray@bjbconsult.co.uk>; Mark Knibbs <Mark.Knibbs@dp9.co.uk>
Sent: 13.02.19 16:08:43
Subject: RE: 2356 - Hosier Street Hotel - Pre-planning Enquiry Form -TW ref DS6058037:PDEV:RG1 7JL

Hi Artur,

Please see the attached borehole log taken within the area of the proposed site. As you will note the sub-strata is primarily clay above chalk, and therefore soakaways will not be suitable.