1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for EX Data Centre Eastern Conection

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
E1.000	E1	15 Winter	1	+0%	100/15 Summer				28.042
E1.001	E2	15 Winter	1	+0%	100/15 Summer				27.204
E2.000	E3	1440 Winter	1	+0%	1/15 Summer				27.632
E1.002	E3	15 Winter	1	+0%					27.060

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
E1.000	E1	-0.088	0.000	0.35			16.8	OK	
E1.001	E2	-0.176	0.000	0.35			23.0	OK	
E2.000	E3	27.482	0.000	0.04			0.2	SURCHARGED	
E1.002	E3	-0.200	0.000	0.25			23.1	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for EX Data Centre Eastern Conection

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
E1.000	E1	15 Winter	30	+0%	100/15 Summer				28.089
E1.001	E2	15 Winter	30	+0%	100/15 Summer				27.309
E2.000	E3	240 Winter	30	+0%	1/15 Summer				27.767
E1.002	E3	15 Winter	30	+0%					27.135

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
E1.000	E1	-0.041	0.000	0.87			41.3	OK	
E1.001	E2	-0.071	0.000	0.90			59.2	OK	
E2.000	E3	27.617	0.000	1.40			6.2	SURCHARGED	
E1.002	E3	-0.125	0.000	0.64			60.1	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for EX Data Centre Eastern Conection

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
E1.000	E1	15 Winter	100	+0%	100/15 Summer				28.351
E1.001	E2	15 Winter	100	+0%	100/15 Summer				27.392
E2.000	E3	60 Winter	100	+0%	1/15 Summer				28.017
E1.002	E3	15 Winter	100	+0%					27.155

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
E1.000	E1	0.221	0.000	1.03			48.7	SURCHARGED	
E1.001	E2	0.012	0.000	1.08			70.9	SURCHARGED	
E2.000	E3	27.867	0.000	3.88			17.1	SURCHARGED	
E1.002	E3	-0.105	0.000	0.76			70.8	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for EX Data Centre Northern Outfall

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
E1.000	E1	15 Winter	1	+0%	1/15 Winter	100/15 Summer			28.223
E1.001	E2	15 Winter	1	+0%					27.919

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
E1.000	E1	0.008	0.000	1.01			26.9	SURCHARGED	4
E1.001	E2	-0.136	0.000	0.33			26.8	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for EX Data Centre Northern Outfall

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
E1.000	E1	15 Winter	30	+0%	1/15 Winter	100/15 Summer			28.937
E1.001	E2	15 Winter	30	+0%					27.975

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
E1.000	E1	0.722	0.000	2.26			60.2	FLOOD RISK	4
E1.001	E2	-0.080	0.000	0.74			60.2	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for EX Data Centre Northern Outfall

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
E1.000	E1	15 Winter	100	+0%	1/15 Winter	100/15 Summer			29.024
E1.001	E2	15 Winter	100	+0%					27.985

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
E1.000	E1	0.809	3.868	2.47			65.9	FLOOD	4
E1.001	E2	-0.070	0.000	0.81			65.9	OK	

Appendix E

Thames Water PPE Response

Jamie Temple

ARUP
4 Central Square
Forth Street
Newcastle Upon Tyne
NE1 3PL

Wastewater pre-planning
Our ref DS6085964

26th Augst 2021

Pre-planning enquiry: Confirmation of sufficient capacity

Site Address: London 4, Beaconsfield Road, Hayes, London, UB4 0SL

Dear Mr Temple,

Thank you for providing information on your development for a 34,540m^2 data hall, 3290m^2 of office space and a 12,585m^2 gantry replacing the existing 8940m^2 data hall, 3345m^2 of office space and 5735m^2 of industrial space at the above site.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewer capacity within the existing Thames Water sewer network.

Foul Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent foul water sewer network to serve your development.

This is based on the foul water flows gravitating from the site and discharging to the 225mm dia. foul water sewer to the South of the site

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

Please note that you must keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient sewerage capacity.

Surface Water

Please note that discharging surface water to the public sewer network should only be considered after all other methods of disposal have been investigated and proven to not be viable. In accordance with the Building Act 2000 Clause H3.3, positive connection to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. The disposal hierarchy being: 1st Soakaways; 2nd Watercourses; 3rd Sewers.

Only when it can be proven that soakage into the ground or a connection into an adjacent watercourse is not possible would we consider a restricted discharge into the public surface water sewer network.

If the peak surface water run-off discharge is then restricted to a maximum of 7.5 l/s under the 1 in 1 year, 20.33 l/s for the 1 in 30 year and 28.19 l/s for the 1 in 100 year storm condition and is discharged to the 525mm dia. surface water sewer to the South of the site, as your drainage strategy indicates, then we would have no objections to the proposals.

We would encourage techniques such as green roofs and/or permeable paving that restricts surface water discharge from your site.

Please note that the Local Planning authority may comment on surface water discharge under the planning process.

Please Note

All connection requests are subject to a full Section 106 (Water Industry Act 1991) application before the Company can confirm approval to the connection itself. Please also note that capacity in the public sewerage system cannot be reserved. Please make sure you submit your connection application giving us at least 21 days' notice of the date you wish to make your new connection/s.

The discharge of non-domestic effluent is not permitted until a valid trade effluent consent has been issued by Thames Water. If anything other than domestic sewage is discharged into the public sewers without the above agreement an offence is committed and the applicant will be liable to the penalties contained in Section 109(1) (WIA 1991).

Applicants should contact Trade Effluent prior to seeking a connection approval, to discuss trade effluent consent and conditions of discharge. For Trade Effluent queries and to apply for Discharge Consents please call 0203 577 9200 or email trade.effluent@thameswater.co.uk.

The views expressed by Thames Water in this letter are in response to this pre-planning enquiry at this time and do not represent our final views on any future planning applications made in relation to this site.

Yours sincerely,

Jonathan Shildrick BSc
Development Engineer
Developer Services

Appendix F

SuDS Management and Maintenance

SuDS maintenance requirements

Maintenance of the drainage system should be planned in accordance with CIRIA C609. Maintenance can be split by frequency into the following categories.

a) Regular day to day care - litter collection, grass cutting and checking the inlets and outlets where water enters or leaves the network.

b) Occasional tasks - removing any silt that builds up in the system.

c) Remedial work - repairing damage where necessary.

A typical maintenance task and schedule list has been provided below. The frequency of the maintenance requirements will be dependent on the site, its usage, seasonal weather etc. The frequency noted below is indicative only. Where found to be required, more frequent visits may be necessary.

	Maintenance	Action	Frequency
Regular maintenance & inspections	Litter management	Collect and remove from site all extraneous rubbish that is detrimental to the operation of the SUDS and the appearance of the site, including paper, packaging materials, bottles, cans, and similar debris.	12 visits / monthly and during any other maintenance action
	Grass cutting	Mow grass and remove cuttings.	As required or monthly
	Weeds	Hand-pull, or spot treat with an approved herbicide, perennial weeds such as nettles, docks, thistle and ragwort that have become established. Avoid blanket spraying of weed killer, which may inhibit bioremediation of organic pollutants and contribute to pollution load.	As required or monthly
	Brushing and Vacuuming	Pervious pavements need to be regularly cleared of silts and sediments	Annually after autumn leaf fall of as required.
	Inspection chambers, storage tanks, inlets, outlets and control chambers.	Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn	Annually and following poor performance
	Rainwater harvesting	Clean the tank inlets, outlets, gutters, withdrawal device and rood drain filters of silts and debris.	Annually and following poor performance
	Filter trenches	Inspections to identify any areas not operating correctly, infiltration surfaces that	As required or monthly

		have become compacted, silt-laden or ineffective for any reason. Record any areas that are ponding and where water is lying for more than 48 hours.	
	Green roof	Inspect underside of roof for evidence of leakage	Annually and after severe storms
		Inspect drain inlets to ensure unrestricted runoff from the drainage layers	
		Inspect the soil substructure for evidence of erosion channels and identify and sediment source	
		Inspect all components including soil substructure, vegetation, drain, irrigation systems (if applicable) membranes and roof structure for proper operation, integrity and waterproofing.	
		Replace dead plants as required	Annually in Autumn
		Mow grass/manage planting. Clippings to be removed	Six monthly or as required.
Occasional tasks	Inspection and control of all elements	Annual inspection, remove silt and check free flow	1 visit / yearly
	Rainwater harvesting tank	Clean and/or replace any filters	Three monthly or as required
	Attenuation Tank	Inspection and maintenance to be to the manufacturer's specification. Contractor to add the manufactures maintenance specification and installation requirements to the health and safety file.	
	Oil Interceptor Tank		
	Hydro brake		
Remedial work	Repair	Inspect drainage system regularly to check for damage or failure. Undertake remedial work as required.	As required
	Siltation at surface of filter trenches	Remove all stone and perforated pipe replacing as original spec.	As required
	Green roof	If erosion is evident the area should be stabilised with extra soil similar to the original material. Cause of erosion should be identified and controlled.	As required
		If the inlets have settled, cracked or moved investigate and repair.	
	Permeable paving	Remedial work to any depressions rutting and cracked or broken blocks consider detrimental to	As required

		performance of hazard to users.	
		Rehabilitation of surface and upped substructure by remedial sweeping	Every 10 to 15 years or as required

Maintenance and Management Responsibilities During the Construction Phase

In addition to the carrying out the maintenance requirements set out in the section above the contractor will also be responsible for the following elements during the construction phase:

- For ensuring the drainage is constructed to the Arup design and specification. All assets are to be installed in line with the manufacturer's details.
- Liaising with the client and Thames Water to inform them of defects to their assets and facilitating any remedial works.
- Providing the client with an inventory of all materials used for the permanent works, for inclusion in the Health and Safety File. This shall include details of the manufacturer, make/model, sizes etc and their maintenance requirements.
- The Contractor will be responsible for procuring designs for the attenuation tanks. The Contractor shall ensure that the access and maintenance of the systems is considered within the designs and that the tanks are constructed in accordance with CIRIA Report C737.
- All pipes shall be flushed and tested in accordance with the requirements of Appendix 90/1 and Clause 509 of the Specification for Highway Works. Any material flushed through to the existing sewer network shall, where practicable, be removed on completion of the drainage works.
- The Contractor shall be responsible for all temporary drainage required to manage surface water flows during the construction phase. The Contractor will be responsible for obtaining any discharge agreements and management of surface water quality.
- The Contractor shall provide detailed As-Built Records for the Works.

Appendix G

Proposed Drainage Layout and Details