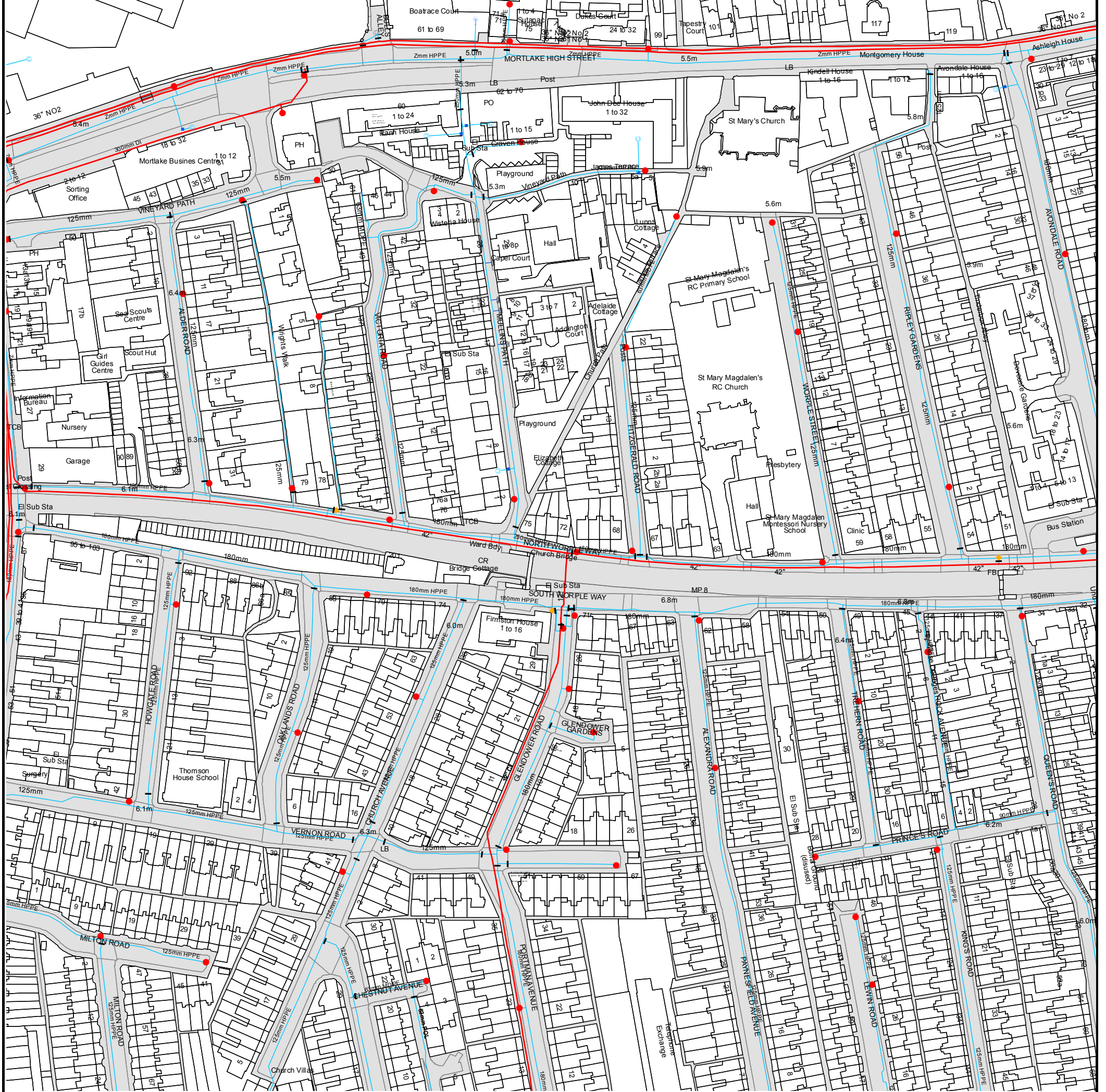


The width of the displayed area is 500m and the centre of the map is located at OS coordinates 520250,176250
 The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. 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.

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The width of the displayed area is 500m and the centre of the map is located at OS coordinates 520750,175750
 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.

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The width of the displayed area is 500m and the centre of the map is located at OS coordinates 520750,176250
 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.

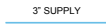



ALS Water Map Key


Water Pipes (Operated & Maintained by Thames Water)


- 
4" Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.


- 
16" Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

- 
3" SUPPLY Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

- 
3" FIRE Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.





- 
3" METERED Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

- 
Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.


- 
Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

-  General Purpose Valve
-  Air Valve
-  Pressure Control Valve
-  Customer Valve

Hydrants








-  Single Hydrant

Meters










-  Meter

End Items

Symbol indicating what happens at the end of a water main.

-  Blank Flange
-  Capped End
-  Emptying Pit
-  Undefined End
-  Manifold
-  Customer Supply
-  Fire Supply



Operational Sites

-  Booster Station
-  Other
-  Other (Proposed)
-  Pumping Station
-  Service Reservoir
-  Shaft Inspection
-  Treatment Works
-  Unknown
-  Water Tower

Other Symbols

-  Data Logger

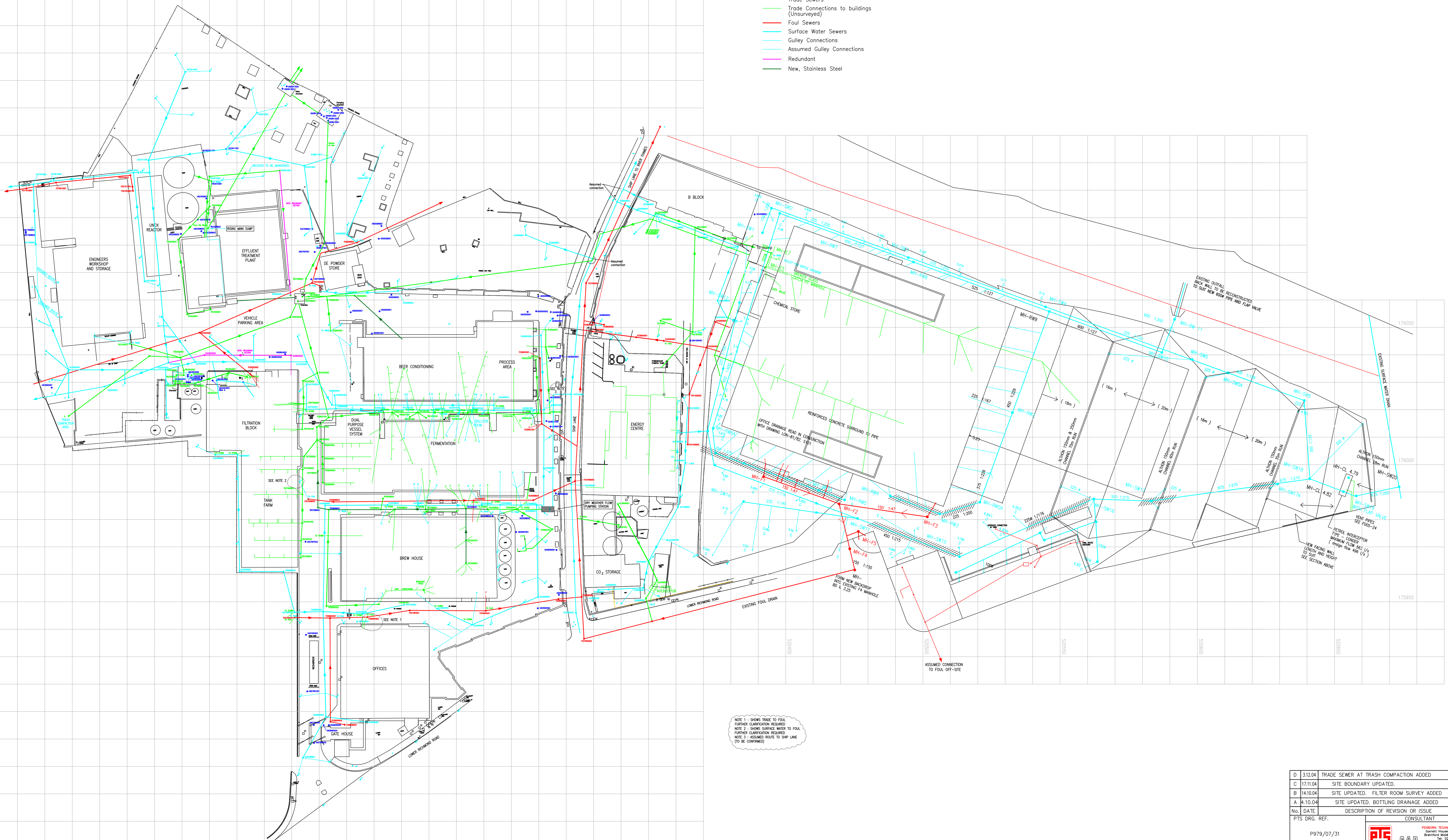
Other Water Pipes (Not Operated or Maintained by Thames Water)

-  **Other Water Company Main:** Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.
-  **Private Main:** Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.



C. Onsite Drainage Records

- LEGEND**
- Trade Sewers
 - Trade Connections to buildings (Unsurveyed)
 - Foul Sewers
 - Surface Water Sewers
 - Gully Connections
 - Assumed Gully Connections
 - Redundant
 - New, Stainless Steel



NOTE 1 - SHOWS TRADE TO FOUL FURTHER CLARIFICATION REQUIRED
 NOTE 2 - SHOWS SURFACE WATER TO FOUL FURTHER CLARIFICATION REQUIRED
 NOTE 3 - ASSUMED NOTE TO SHIP LANE (TO BE CONFIRMED)

D 11.10.04	TRADE SEWER AT TRASH COMPACTION ADDED	TR	ACJ	
C 17.11.04	SITE BOUNDARY UPDATED.	TR	ACJ	
B 14.10.04	SITE UPDATED. FILTER ROOM SURVEY ADDED	TR	ACJ	
A 4.10.04	SITE UPDATED. BOTTLING DRAINAGE ADDED	TR	ACJ	
No. DATE	DESCRIPTION OF REVISION OR ISSUE	BY	CHK.	PROJ. ENG. APPROVAL

PTS ORG. REF.	CONSULTANT	PPTS PROJ. REF.
P979/07/31	 RSE CONSULTING SERVICES 40001 House, Millwood Road Brentford, Middlesex, TW8 5GL Tel: 020-8999-7979 Fax: 020-8999-1621 E-mail: p979@rse.com	

ESR	DESIGNED	PROJ.
DRAWN	CHECKED	BID
SCALE 1:500 @ A0	ANHEUSER-BUSCH COMPANIES	
DATE	SITE PLAN SHOWING EXIST. SERVICES ALL SERVICES	
KEY PLAN		

BLDG. NAME	BLDG. No.			
ENGINEER APPROVED	OWNER APPROVED			
PLANT	BLDG. No.	DIV.	DWG. No.	REV.
STAG	O	M	1016	D

D. London Borough Richmond upon Thames (LBRuT) Correspondence

Appendices

Former Stag Brewery, Mortlake

Project Number: WIE10667

Document Reference: WIE10667-101-R-9-5-1-DS

O'Donovan, Donal

From: Brian Humphris <brian.humphris@richmond.gov.uk>
Sent: 03 March 2016 15:32
To: O'Donovan, Donal
Subject: RE: WIE10667 160122 DOBH Stag Brewery Flood Risk Enquiry
Attachments: Gully reports.xlsx

Donal

In response to your questions below:-

- 1 Not sure who would be the best contact but they have area teams, so any enquiry relating to Stag site would be referred to them.
- 2 I can find no record of a name either. OS plan indicates that the culvert is fed by open ditches along both sides of Sheen Common, but nothing is indicated south of the common, within Richmond Park.
- 3 Please see attached – reports as logged on our system.

Regards Brian

Brian Humphris
Highway Asset Co-ordinator

020 8891 7738

From: O'Donovan, Donal [mailto:donal.odonovan@watermangroup.com]
Sent: 03 March 2016 12:03
To: Brian Humphris
Subject: RE: WIE10667 160122 DOBH Stag Brewery Flood Risk Enquiry

Hi Brian,

Many thanks for the response, I have a few follow up queries that I hope you will be able to answer.

1. You mentioned that we would need to confirmed if the Site had passed the Sequential Test with the Planners. Do you have the contact details for the best person/team to contact in relation to this.
2. You provided plan showing a culverted watercourse that has an outlet adjacent to the Site. Do you know what this watercourse is called? I have had a look online but not had any luck.
3. You mentioned that there have been some records of flooding due to blocked gullies. Can you provide any further information in relation to these (ie. extent, date, location etc.).

If you have any queries please feel free to give me a call.

Cheers,

Donal

From: Brian Humphris [mailto:brian.humphris@richmond.gov.uk]
Sent: 24 February 2016 16:23
To: O'Donovan, Donal <donal.odonovan@watermangroup.com>
Subject: RE: WIE10667 160122 DOBH Stag Brewery Flood Risk Enquiry

Hi Donal

Please accept my apologies for the delay in responding to your enquiry. Unfortunately some of the information that you requested has taken some time to obtain. Please see comments below.

Regards Brian

Brian Humphris
Highway Asset Co-ordinator

020 8891 7738

From: O'Donovan, Donal [<mailto:donal.odonovan@watermangroup.com>]
Sent: 22 January 2016 14:34
To: Brian Humphris
Subject: WIE10667 160122 DOBH Stag Brewery Flood Risk Enquiry

Hi Brian,

Thanks for speaking to me earlier.

Stag Brewery – Flood Risk Enquiry

I'm writing regarding the proposed redevelopment of Stag Brewery, located within the London Borough of Richmond upon Thames. The Site is approximately 9ha in size, and is located at approximate postcode SW14 7ET, please find attached a location plan for your information. The proposals comprise construction of a residential led mixed use development.

We have been commissioned to investigate the risk of flooding to the proposed development. I would be grateful if you could provide information relating to the following:

1. The Environment Agency mapping shows that the Site lies within Flood Zones 2 and 3, and is generally shown as being defended. The River Thames defences are identified as being continuous in this location, please could you confirm that the Site is fully defended from tidal and fluvial flooding.
We do not have detailed records of River Defences. However photographs on pages 24 & 25 of the SPD show that there are no defences at Ship Lane. Street View images from the river appear to show river levels approx. 1m below the towpath level, although there is no way of knowing what the Tide Status was at that time. There are defences at Bulls Alley, as indicated on Page 13 of the SPD.
2. The Stag Brewery SPD sets out the planning brief for potential development at the Site. Please could you confirm that the Sequential Test has been passed.
This would need to be confirmed by our Planners.
3. As it is very early in the decision process it is currently unknown where development would be located. However, the design would ensure that appropriate mitigation steps would be incorporated. In line with other Sites within London we currently assume that commercial and retail ('less vulnerable') uses would be acceptable on the ground floor. We also assume that duplex residential uses would be acceptable on the ground and first floor (bedrooms location on the first floor), as a means of egress would be available to ensure safety. Please could you confirm this. We will further consult once the scheme plans have evolved.
This approach is reasonable but Planners would make final approval. At other developments within Flood Zones floor levels are usually raised to at least 300mm above ground level to reduce flood risk.
4. Could you please provide a map showing the location of any Ordinary Watercourses near the Site, and note any development restrictions that would therefore apply.

Please note plans attached. Watercourses plan shows a watercourse under the site, although the alignment is probably only indicative. OS plan is marked with the known extents of relevant section – ‘outlet’ is marked on the plan.

5. Please could you confirm whether or not there are any ‘lost rivers’ in the vicinity of the Site. Please could you provide any information you have relating to this, to include a map.
See above
6. Please could you provide your Risk of Flooding from Surface Water map in the vicinity of the Site, as the EA’s online version is difficult to interpret due to the scale.
Richmond does not have its own Flood risk maps, we use the EA plans.
7. Please provide us with details of any historic tidal, fluvial, groundwater, surface water or sewer flooding affecting or in the vicinity of the Site. Alternatively, please confirm that you have no records of flooding in the vicinity.
Our Highways Enquiry System has no record of any flooding reports at Mortlake High Street, Lower Richmond Road, Ship Lane or Williams Lane, other than blocked gully reports.
8. Please could you confirm the likely groundwater levels in the vicinity of the Site.
Unfortunately we do not have records of likely Groundwater Levels.
9. It is still very early in the design process and at this stage the drainage strategy is still being developed. We are currently looking at all options available to drain surface water runoff from the Site. Our approach will follow the drainage hierarchy where possible, with the preference of draining the site to the River Thames (unrestricted due to the tidal nature of the River). Should it not be possible to drain to the River Thames due to Site constraints, we would connect to the public sewer network. Following the requirements of the London Plan, we would limit surface water runoff from the Site to 50% of the existing rate, for the 1 in 100 year event, including for the predicted increase in rainfall intensity over the lifetime of the development due to climate change. Please could you confirm that this approach is acceptable.
This approach is acceptable.

We are also writing to the Environment Agency and Thames Water requesting details of recorded flooding incidents and relevant information. If you are aware of any other parties that may have useful information please let me know.

This information is required as soon as possible and we would be grateful if you could provide your written response by 5th February 2016. If this is unlikely to be achievable or you require any further information please feel free to get in contact.


Please feel free to give me a call if you wish to discuss the above.

Cheers,

Donal

C. Donal O’Donovan
Engineer
Waterman Infrastructure & Environment Ltd

Pickfords Wharf | Clink Street | London SE1 9DG
t +44 207 928 7888 | d +44 3300 602 316
www.watermangroup.com | [LinkedIn](#) | [Twitter](#)

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E. Port of London Authority (PLA) Tide Table

Appendices

CHART DATUMS & STANDARD LEVELS IN THE PORT OF LONDON

1. **Chart Datum** is set to approximately the level of Lowest Astronomical Tide (L.A.T.)
2. **Low Water levels** in the upper reaches of the tidal Thames are greatly affected by the land water flow at Teddington Weir. **They frequently fall below chart datum** when this flow is significantly reduced, typically during the summer months.
3. **Maintained level** and chart datum above Richmond half tide weir are both 1.72 metres above Ordnance Datum (Newlyn).
4. **Trinity High Water (T.H.W.)** is deemed, by the Port of London Act, 1968, to be a level having a value of 11.4 feet (**i.e. 3.475 metres**) above Ordnance Datum (Newlyn).

Tidal Station	Level of Chart Datum below Ordnance Datum (Newlyn) m	Standard levels above local C.D.				
		Mean Low Water Springs MLWS	Mean Low Water Neaps MLWN	Mean High Water Neaps MHWN	Mean High Water Springs MHWS	Highest Astronomical Tide (HAT)
WALTON	2.16	0.5	1.1	3.5	4.3	4.7
MARGATE	2.50	0.6	1.3	4.0	4.8	5.1
SHIVERING SAND	-	0.6	1.4	4.4	5.4	5.7
SOUTHEND	2.90	0.6	1.4	4.8	5.9	6.3
CANVEY	2.97	0.6	1.4	5.0	6.1	6.6
CORYTON	3.05	0.6	1.5	5.1	6.2	6.7
TILBURY	3.12	0.6	1.5	5.4	6.6	7.0
GREENHITHE	3.20	0.6	1.6	5.6	6.7	7.2
DAGENHAM	3.28	0.6	1.6	5.8	7.0	7.5
NORTH WOOLWICH	3.35	0.6	1.6	5.9	7.2	7.7
TOWER	3.20	0.5	1.5	5.9	7.1	7.6
BLACKFRIARS	3.05	0.5	1.4	5.8	7.0	7.5
WESTMINSTER	2.90	0.5	1.3	5.7	6.9	7.4
VAUXHALL	2.59	0.3	1.0	5.4	6.6	7.1
VICTORIA RAIL	2.44	0.3	0.9	5.3	6.5	6.9
ALBERT BRIDGE	2.29	0.3	0.9	5.1	6.3	6.8
WANDSWORTH	2.13	0.3	0.9	5.0	6.2	6.7
PUTNEY	1.98	0.3	0.8	4.9	6.1	6.6
HAMMERSMITH	1.68	0.3	0.7	4.7	5.8	6.4
BARNES	1.37	0.2	0.6	4.4	5.5	6.1
CHISWICK	1.22	0.2	0.5	4.3	5.3	6.0
KEW	1.07	0.2	0.5	4.2	5.2	5.9
BRENTFORD	0.91	0.1	0.4	4.0	5.0	5.7
RICHMOND	0.61	0.1	0.2	3.8	4.8	5.5
TWICKENHAM	Note 3	-		1.5	2.5	3.2

F. Tide Locking Calculations



CALCULATIONS


Company: WIE Office: London
 Sheet No: 1 of 1 Project No: WIE10667
 By: N Balboni Date: 27.09.2017
 Checked: D O'Donovan Date: 27.09.2017

Project Title: **Former Stag Brewery, Mortlake**
 Calculations Title: **Tide Locking Calculation**

CALCULATIONS						
The 'rule of twelfths' is a rule of thumb that allows the tide level to be estimated based on the high and low water levels. The rule is an approximation assuming six hours between high and low water, and does not take account of geographical location.						
Source: Port of London Authority, 2017. <i>Tide Tables and Port Information</i>						
Closest tidal stations: Barnes and Chiswick.						
Barnes MHWS (m AOD)	4.13					
Chiswick MHWS (m AOD)	4.08					
Inputs			Rule of Twelfths			
Mean High Water Spring	=	5.23 m AOD	Hour	Change	Water Level	
Mean Low Water Spring	=	-1.02 m AOD	0	-	-1.02	
			1	1/12	-0.50	
Invert Level of Outfall	=	2.60 m AOD	2	1/6	0.54	
			3	1/4	2.11	
			4	1/4	3.67	
			5	1/6	4.71	
			6	1/12	5.23	
			7	1/12	4.71	
			8	1/6	3.67	
			9	1/4	2.11	
			10	1/4	0.54	
			11	1/6	-0.50	
			12	1/12	-1.02	
Output						
Time that outfall becomes submerged (hrs)	=		3.3			
Time that outfall becomes unsubmerged (hrs)	=		8.6			
Total time that outfall is submerged (hrs)	=		5.3			

G. WINDES Microdrainage Network Calculations

Appendices

Waterman Infrastructure & Environment		Page 1
Pickfords Wharf Clink Street London SE1 9DG		
Date 29/09/2017 11:44 File 170926 CULVERT CHECK.MDX	Designed by CSNB2 Checked by	
Micro Drainage	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm





Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	1999
Site Location GB 520450 176000 TQ 20450 76000	
C (1km)	-0.024
D1 (1km)	0.322
D2 (1km)	0.262
D3 (1km)	0.219
E (1km)	0.306
F (1km)	2.539
Maximum Rainfall (mm/hr)	0
Maximum Time of Concentration (mins)	5
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	40
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	124.000	0.012	10333.3	0.300	5.00	0.0	0.600	[]	-1	Pipe/Conduit	
1.001	2.949	0.590	5.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.002	7.594	0.051	150.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.003	25.890	1.295	20.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	5.00	5.480	0.300	0.0	0.0	0.0	0.14	67.5	0.0
1.001	0.00	5.00	4.945	0.300	0.0	0.0	0.0	11.77	4211.0	0.0
1.002	0.00	5.00	4.355	0.300	0.0	0.0	0.0	2.14	765.0	0.0
1.003	0.00	5.00	4.305	0.300	0.0	0.0	0.0	5.88	2103.1	0.0

Pickfords Wharf
 Clink Street
 London SE1 9DG



Date 29/09/2017 11:44
 File 170926 CULVERT CHECK.MDX

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	[]	-1	1	6.030	5.480	0.400	Open Manhole	3000
1.001	o	675	2	6.030	4.945	0.410	Open Manhole	3000
1.002	o	675	3	6.030	4.355	1.000	Open Manhole	1500
1.003	o	675	3	6.030	4.305	1.050	Open Manhole	2100

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	124.000	10333.3	2	6.030	5.468	0.412	Open Manhole	3000
1.001	2.949	5.0	3	6.030	4.355	1.000	Open Manhole	1500
1.002	7.594	150.0	3	6.030	4.305	1.050	Open Manhole	2100
1.003	25.890	20.0		4.500	3.010	0.815	Open Manhole	675

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003		4.500	3.010	2.625	675	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
30	5.230	90	5.230	150	5.230	210	5.230	270	5.230	330	5.230
60	5.230	120	5.230	180	5.230	240	5.230	300	5.230	360	5.230

Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
 Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 2.000
 Hot Start (mins) 0 Inlet Coefficient 0.800
 Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000
 Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60
 Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1

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

Pickfords Wharf
Clink Street
London SE1 9DG



Date 29/09/2017 11:44
File 170926 CULVERT CHECK.MDX

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Micro Drainage Network 2017.1.2

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 520450 176000 TQ 20450 76000
C (1km)	-0.024
D1 (1km)	0.322
D2 (1km)	0.262
D3 (1km)	0.219
E (1km)	0.306
F (1km)	2.539
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Summary of Critical Results by Maximum Level (Rank 1) for Storm

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 Coefficient 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 FEH
 FEH Rainfall Version 1999
 Site Location GB 520450 176000 TQ 20450 76000
 C (1km) -0.024
 D1 (1km) 0.322
 D2 (1km) 0.262
 D3 (1km) 0.219
 E (1km) 0.306
 F (1km) 2.539
 Cv (Summer) 0.750
 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, 180, 240, 360, 480, 600,
 720, 960, 1440
 Return Period(s) (years) 100
 Climate Change (%) 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	100	+40%	100/15	Summer			5.824
1.001	2	60 Summer	100	+40%					5.274
1.002	3	60 Summer	100	+40%	100/30	Summer			5.267
1.003	3	60 Summer	100	+40%	100/30	Summer			5.254

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.194	0.000	1.29		285.9	FLOOD RISK	
1.001	2	-0.346	0.000	0.15		147.8	OK	
1.002	3	0.237	0.000	0.35		148.7	SURCHARGED	

Waterman Infrastructure & Environment		Page 5
Pickfords Wharf Clink Street London SE1 9DG		
Date 29/09/2017 11:44 File 170926 CULVERT CHECK.MDX	Designed by CSNB2 Checked by	
Micro Drainage		Network 2017.1.2

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Flooded		Pipe		Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)		
1.003	3	0.274	0.000	0.10	149.6	SURCHARGED	

H. Surface Water Calculations

Appendices

CALCULATIONS

Company: WIE
 Sheet No: 1 of 10
 By: N Balboni
 Checked: D O'Donovan
 Office: London
 Project No: WIE10667
 Date: 13/02/2018
 Date: 13/02/2018

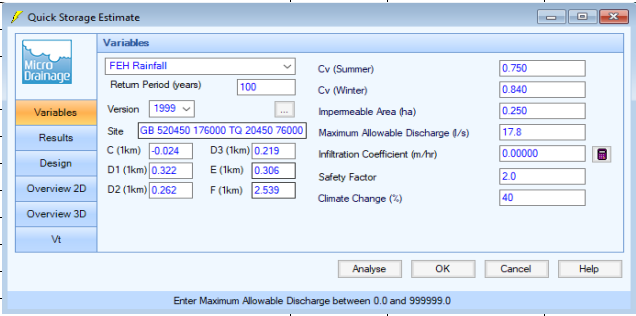
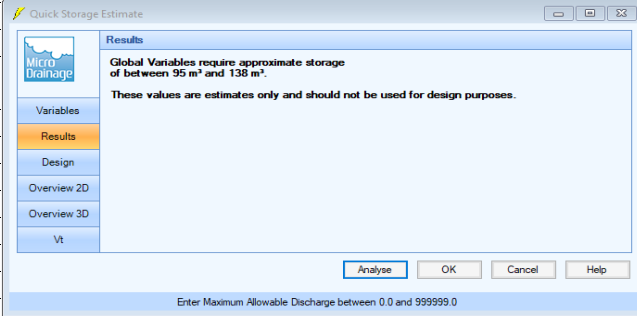
Project Title Former Stag Brewery, Mortlake
 Calculations Title Existing Discharge Rate - Modified Rational Method

LOCATION	CALCULATIONS	OPTIONS
	Calculations based on: Design and Analysis of urban storm drainage. The Wallingford Procedure, Volume 1 Principles methods and practice.	
	User Input Data	
	Total site area	5.69 ha
	SAAR (From FEH)	605
	Rainfall Intensity (From FEH)	51.80
	PIMP (% impervious)	100 %
	Soil Type	0.40
	Very Low Runoff (well drained sandy, loamy or earthy peat soils)	0.15
	Low Runoff (Very permeable soils (e.g. gravel, sand)	0.30
	Moderate (Very fine sands, silts and sedimentary clays)	0.40
	High Runoff (Clayey or loamy soils)	0.45
	Very High Runoff (Soils of the wet uplands)	0.50
Fig. 9.7	UCWI (From Figure 9.7 of Wallingford Method)	52
Eqn. 13	Q_p (peak discharge) = 2.78 C_v CR i A Where: Q_p (Peak Discharge) i = rainfall intensity A = Total Area	
From FEH	Average rainfall Intensity (i) M100_60 is: 51.80 mm	
Eqn 7.20	$C_v = PR/100$	
Eqn 7.3	$PR = (0.829 PIMP) + (25.0 SOIL) + (0.078 UCWI) - 20.7$ PIMP (Percentage of catchment which is impervious)	100 %
Page 52	Note: PIMP can not be less than 40% Thus value of PIMP to be used	40 % 100 %
	Soil: 0.40 UCWI: 52	
	PR =	76.26
	Thus C_v =	0.76
Sec 7.10	CR (Recommended for simulation and design)	1.3
	Q_p for 1 in 100 year 60 minute duration =	812.3 l/s or 142.8 l/s/ha
	50% of the existing runoff rate=	405.0 l/s 71.3 l/s/ha

CALCULATIONS

Company: WIE Office: London
 Sheet No: 4 of 10 Project No: WIE10667
 By: N Balboni Date: 13/02/2018
 Checked: O O'Donovan Date: 13/02/2018

Project Title Former Stag Brewery, Mortlake
 Calculations Title Surface water attenuation volume, London Plan 50% of existing rate

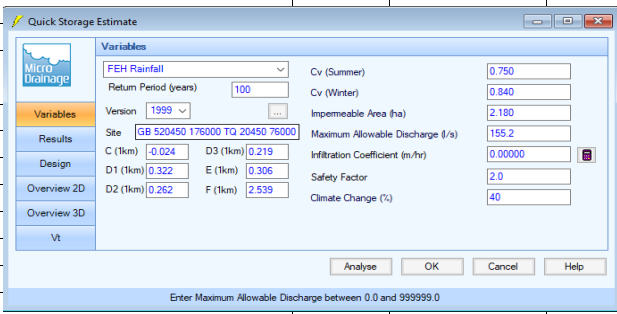
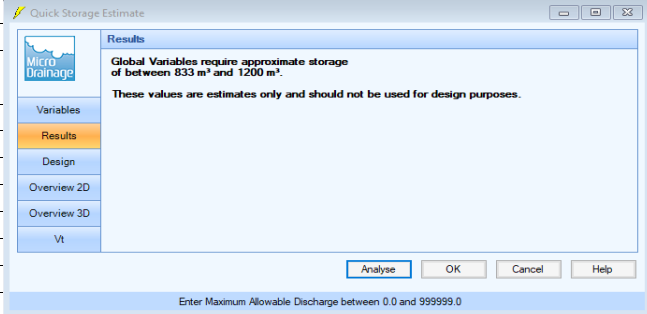
LOCATION	CALCULATIONS	OPTIONS
	In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2016.1, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;	
	Drainage Catchment - East 2	
	Area 0.25 ha	
	50% of existing discharge rate 71.3 l/s/ha	
	Maximum allowable discharge 17.83 l/s	
		
		
	Attenuation volume (m3) 117	



CALCULATIONS

Company: WIE Office: London
 Sheet No: 6 of 10 Project No: WIE10667
 By: N Balboni Date: 13/02/2018
 Checked: O O'Donovan Date: 13/02/2018

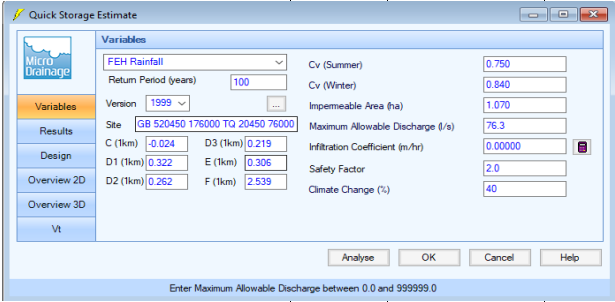
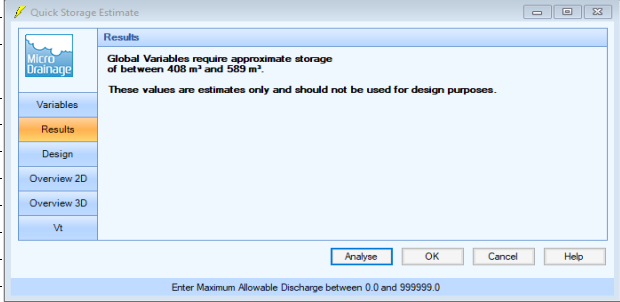
Project Title Former Stag Brewery, Mortlake
 Calculations Title Surface water attenuation volume, London Plan 50% of existing rate

LOCATION	CALCULATIONS	OPTIONS
	In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2016.1, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;	
	Drainage Catchment - School	
	Area 2.18 ha	
	50% of existing discharge rate 71.3 l/s/ha	
	Maximum allowable discharge 155.29 l/s	
		
		
	Attenuation volume (m3) 1017	

CALCULATIONS

Company: WIE Office: London
 Sheet No: 7 of 10 Project No: WIE10667
 By: N Balboni Date: 13/02/2018
 Checked: O O'Donovan Date: 13/02/2018

Project Title Former Stag Brewery, Mortlake
 Calculations Title Surface water attenuation volume, London Plan 50% of existing rate

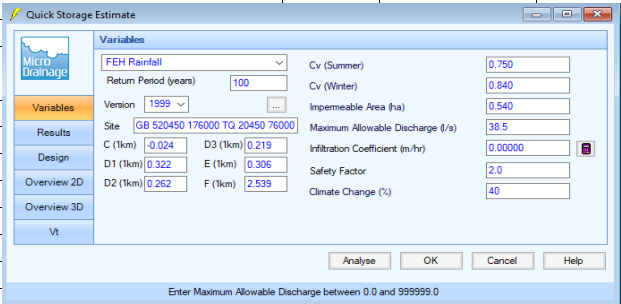
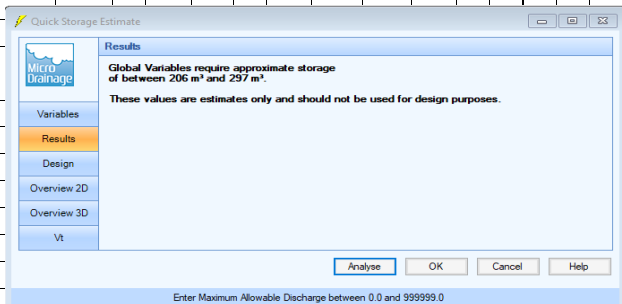
LOCATION	CALCULATIONS	OPTIONS
	In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2016.1, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;	
	Drainage Catchment - West 4	
	Area 1.07 ha	
	50% of existing discharge rate 71.3 l/s/ha	
	Maximum allowable discharge 76.29 l/s	
		
	Attenuation volume (m3) 499	



CALCULATIONS

Company: WIE Office: London
 Sheet No: 8 of 10 Project No: WIE10667
 By: N Balboni Date: 13/02/2018
 Checked: O O'Donovan Date: 13/02/2018

Project Title **Former Stag Brewery, Mortlake**
 Calculations Title **Surface water attenuation volume, London Plan 50% of existing rate**

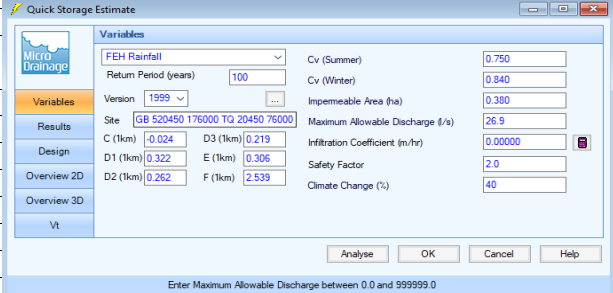
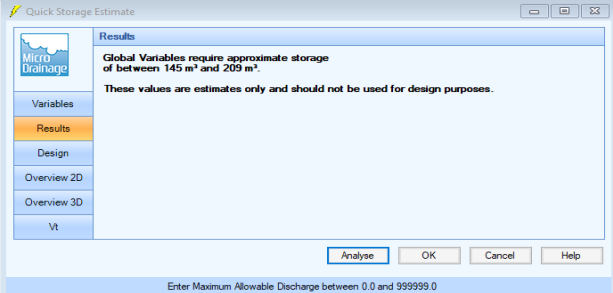
LOCATION	CALCULATIONS	OPTIONS
	In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2016.1, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;	
	Drainage Catchment - West 5	
	Area 0.54 ha	
	50% of existing discharge rate 71.3 l/s/ha	
	Maximum allowable discharge 38.50 l/s	
		
		
	Attenuation volume (m3) 252	



CALCULATIONS

Company: WIE Office: London
 Sheet No: 9 of 10 Project No: WIE10667
 By: N Balboni Date: 13/02/2018
 Checked: O O'Donovan Date: 13/02/2018

Project Title Former Stag Brewery, Mortlake
 Calculations Title Surface water attenuation volume, London Plan 50% of existing rate

LOCATION	CALCULATIONS	OPTIONS
	In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2016.1, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;	
	Drainage Catchment - West 6	
	Area 0.38 ha	
	50% of existing discharge rate 71.3 l/s/ha	
	Maximum allowable discharge 26.95 l/s	
		
	Attenuation volume (m3) 177	

CALCULATIONS

Company: WIE Office: London
 Sheet No: 10 of 10 Project No: WIE10667
 By: N Balboni Date: 13/02/2018
 Checked: O O'Donovan Date: 13/02/2018

Project Title Former Stag Brewery, Mortlake
 Calculations Title Surface water attenuation volume, London Plan 50% of existing rate

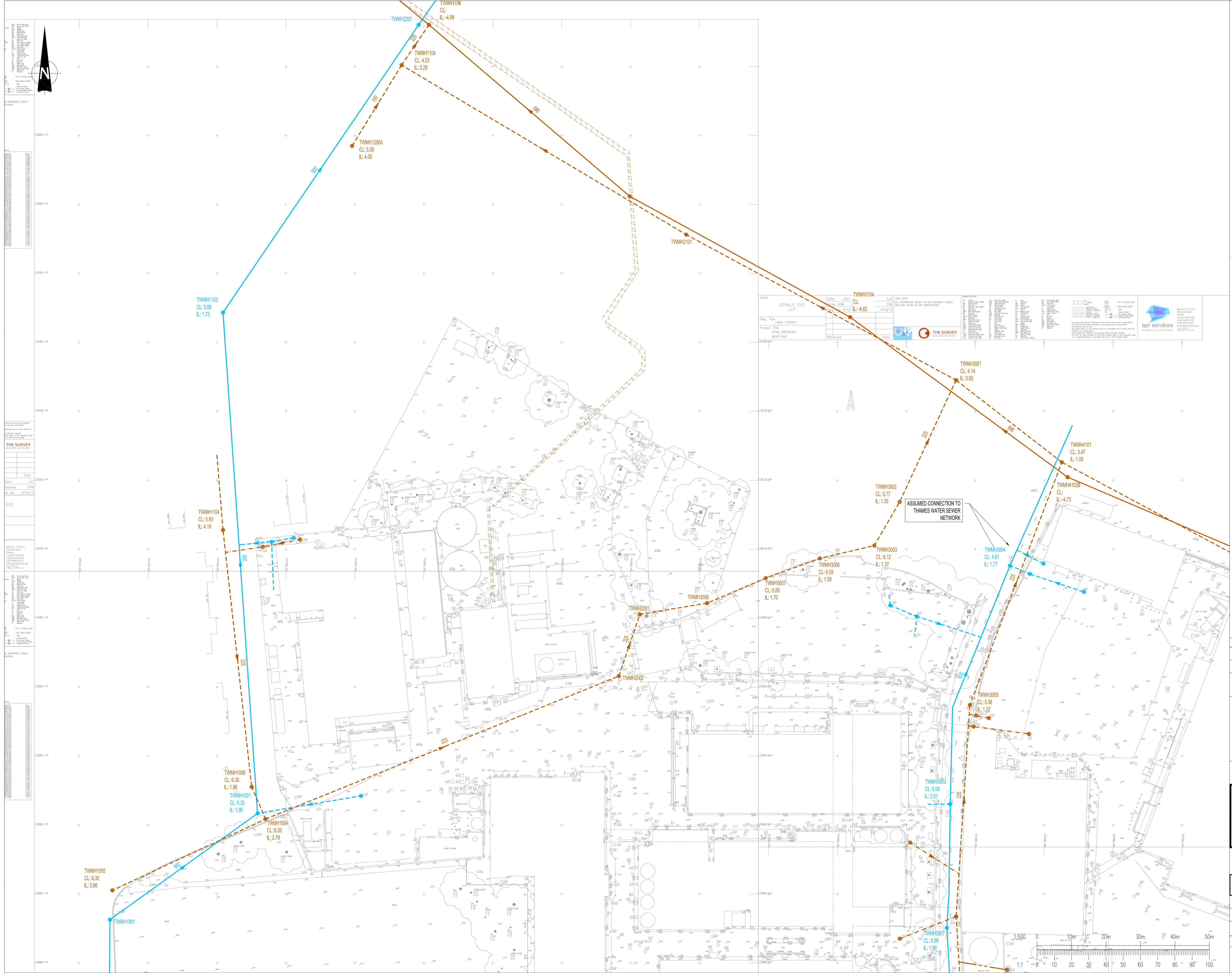
LOCATION	CALCULATIONS	OPTIONS
	In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2016.1, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;	
	Drainage Catchment - West 7	
	Area 0.79 ha	
	50% of existing discharge rate 71.3 l/s/ha	
	Maximum allowable discharge 56.33 l/s	
	Attenuation volume (m3) 369	



I. Existing and Proposed Drainage Plan

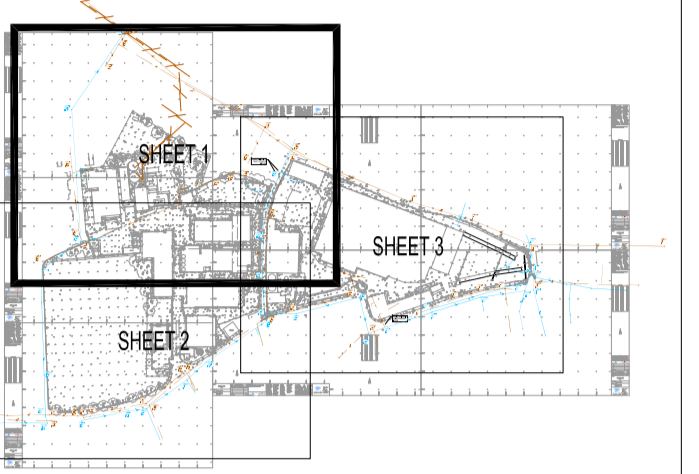
Appendices

Former Stag Brewery, Mortlake
Project Number: WIE10667
Document Reference: WIE10667-101-R-9-5-1-DS



- LEGEND**
- EXISTING PRIVATE SURFACE WATER SEWER
 - EXISTING PRIVATE FOUL SEWER
 - EXISTING PRIVATE COMBINED SEWER
 - EXISTING PUBLIC SURFACE WATER SEWER
 - EXISTING PUBLIC FOUL SEWER
 - EXISTING PUBLIC COMBINED SEWER
 - EXISTING PUBLIC RISING MAIN

NOTES
 1) EXISTING DRAINAGE LAYOUT BASED ON THAMES WATER SEWER RECORDS AND PENBORN TECHNICAL SERVICES DRAWING (REF: P979/07/31).



Client	GERALD EVE LLP	Date	JULY 2016	Drawn	ADG	Checked	ADG	Project Title	STAG BREWERY, MORTLAKE	Project No.	915213
Dwg. Title	LAND SURVEY	Scale	AS SHOWN	Drawn	ADG	Checked	ADG	Project Title	STAG BREWERY, MORTLAKE	Project No.	915213
Project Title	STAG BREWERY, MORTLAKE	Date	JULY 2016	Drawn	ADG	Checked	ADG	Project Title	STAG BREWERY, MORTLAKE	Project No.	915213

Rev	Date	Description	By
A01	20.10.16	PRELIMINARY ISSUE	DO

Amendments

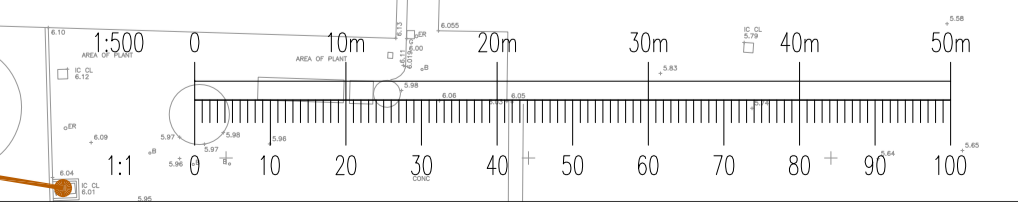
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STAG BREWERY

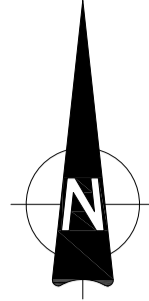
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EXISTING FOUL AND SURFACE WATER DRAINAGE LAYOUT SHEET 1 OF 3

Client
DARTMOUTH CAPITAL ADVISORS LIMITED



PRELIMINARY				
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Drawn by	DO	Date	OCTOBER 2016	Computer File No
Scales @ A1	1:500	WIE10667CSA2001.dwg		
Work to figure dimensions only				
Number	0001	Revision	A01	





Revisions	Date	Drawn	LC



Revisions	Date	Drawn	LC

Client: GERALD EVE LLP

Project Title: STAG BREWERY, MORTLAKE

Scale: A09 1:200

Drawn: JCP

Checked: CPU

Date: 2015

Job No: 915213

Client: GERALD EVE LLP

Project Title: STAG BREWERY, MORTLAKE

Scale: A09 1:200

Drawn: JCP

Checked: CPU

Date: 2015

Job No: 915213

Client: GERALD EVE LLP

Project Title: STAG BREWERY, MORTLAKE

Scale: A09 1:200

Drawn: JCP

Checked: CPU

Date: 2015

Job No: 915213

Client: GERALD EVE LLP

Project Title: STAG BREWERY, MORTLAKE

Scale: A09 1:200

Drawn: JCP

Checked: CPU

Date: 2015

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Client: GERALD EVE LLP

Project Title: STAG BREWERY, MORTLAKE

Scale: A09 1:200

Drawn: JCP

Checked: CPU

Date: 2015

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Client: GERALD EVE LLP

Project Title: STAG BREWERY, MORTLAKE

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Date: 2015

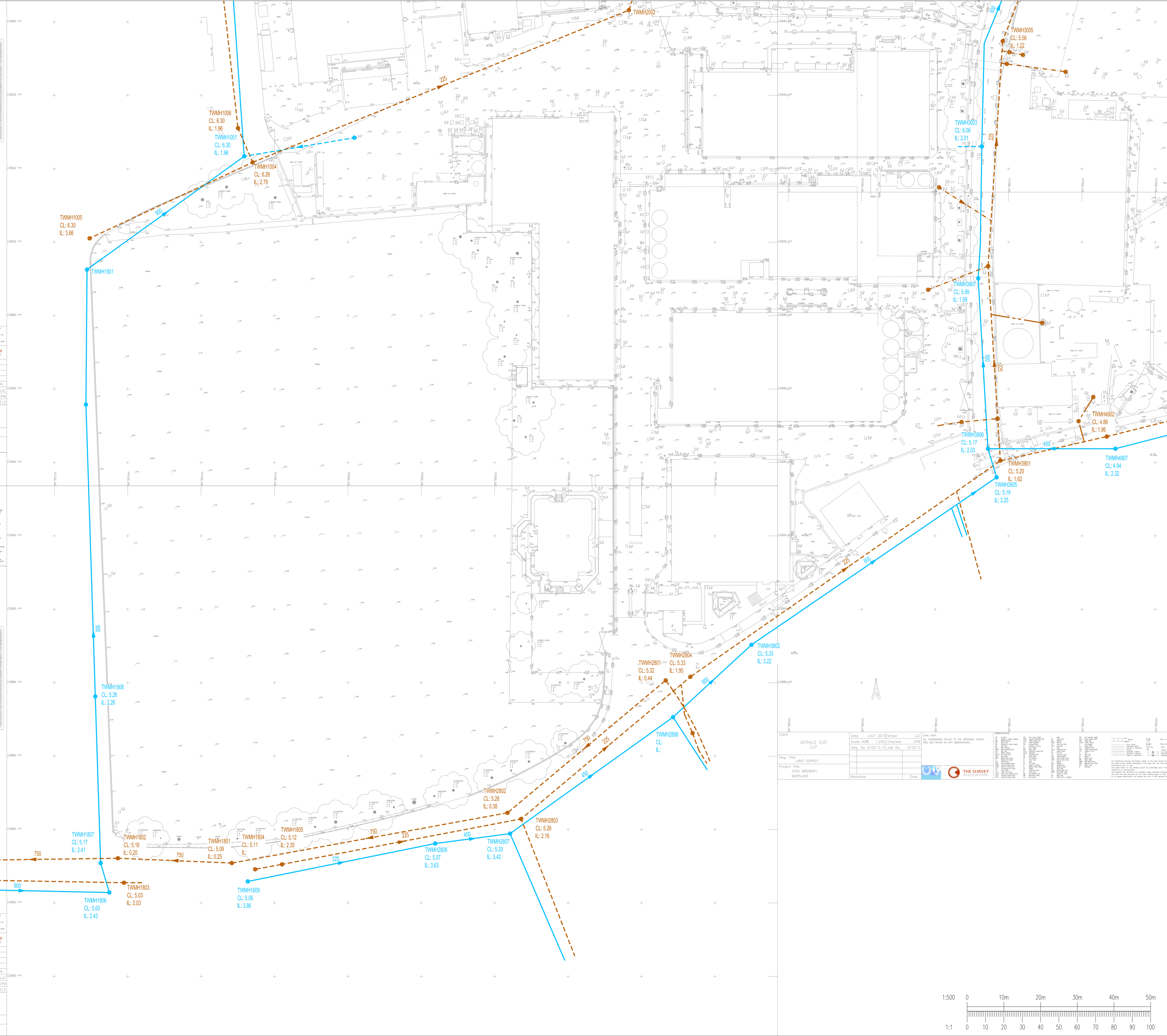
Job No: 915213

Client: GERALD EVE LLP

Project Title: STAG BREWERY, MORTLAKE

Scale: A09 1:200

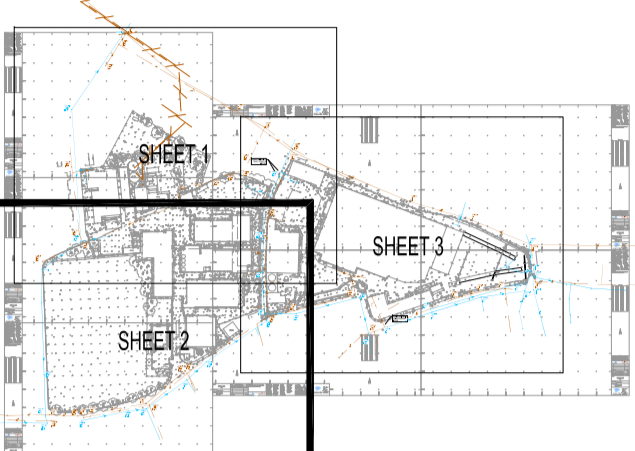
Drawn: JCP



LEGEND

- EXISTING PRIVATE SURFACE WATER SEWER
- EXISTING PRIVATE FOUL SEWER
- EXISTING PRIVATE COMBINED SEWER
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC FOUL SEWER
- EXISTING PUBLIC COMBINED SEWER
- EXISTING PUBLIC RISING MAIN

NOTES
 1) EXISTING DRAINAGE LAYOUT BASED ON THAMES WATER SEWER RECORDS AND PENBORN TECHNICAL SERVICES DRAWING (REF: P97907/31).



Rev	Date	Description	By
A01	20.10.16	PRELIMINARY ISSUE	DO

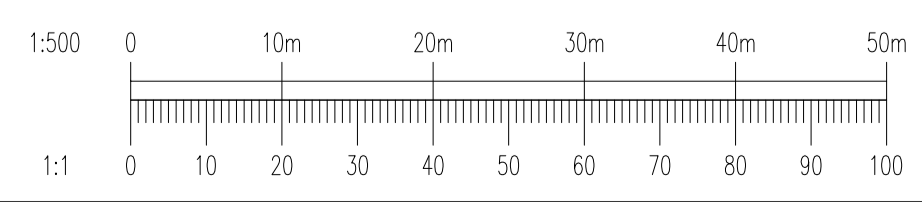
Project
 STAG BREWERY

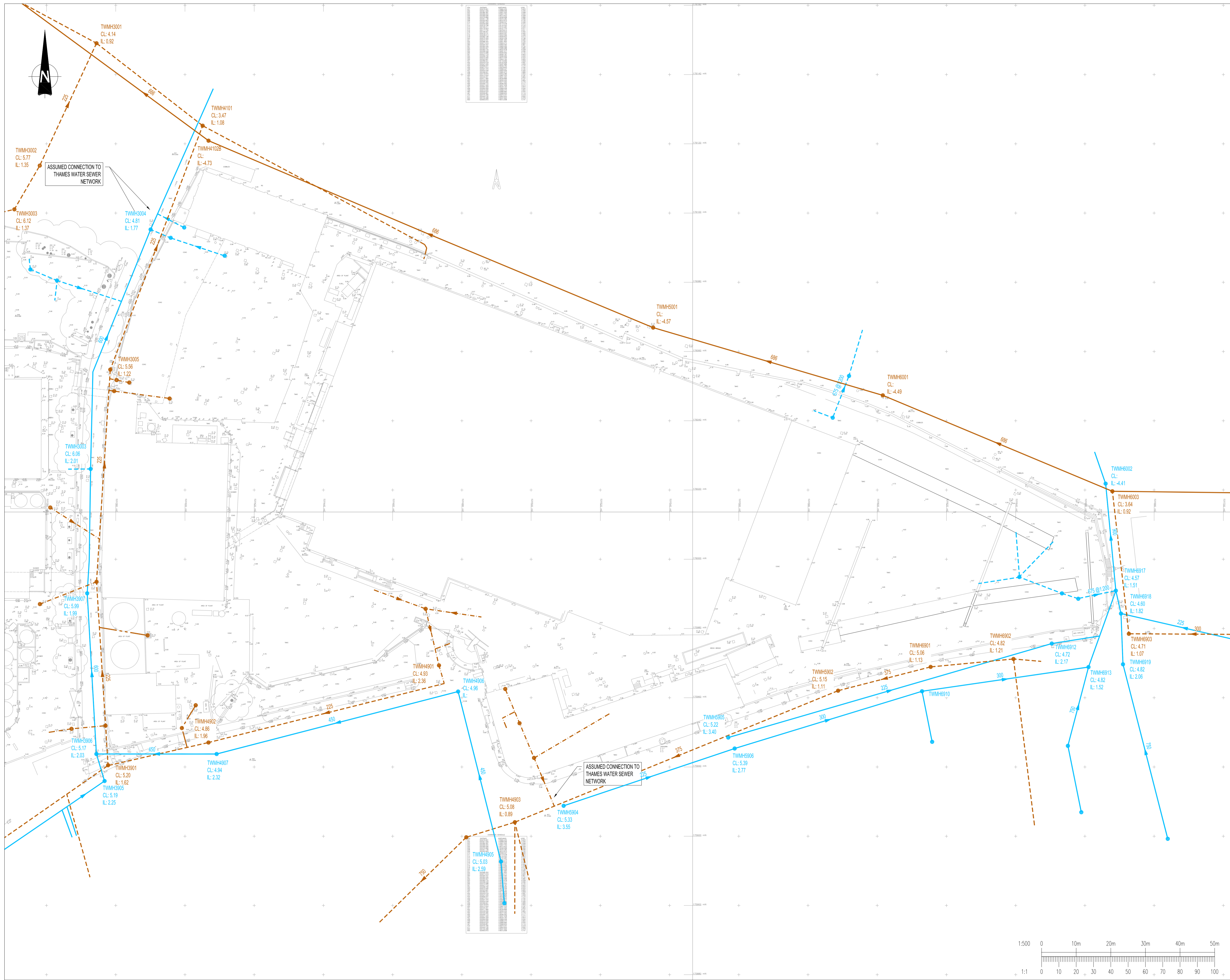
Title
 EXISTING FOUL AND SURFACE WATER DRAINAGE LAYOUT SHEET 2 OF 3

Client
 DARTMOUTH CAPITAL ADVISORS LIMITED



Drawing Status				
PRELIMINARY				
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Drawn by	DO	Date	OCTOBER 2016	Computer File No
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Computer File No	WIE10667CSA28002.dwg			
Publisher	Zone	Category	Number	Revision
WIE	SA	92	0002	A01

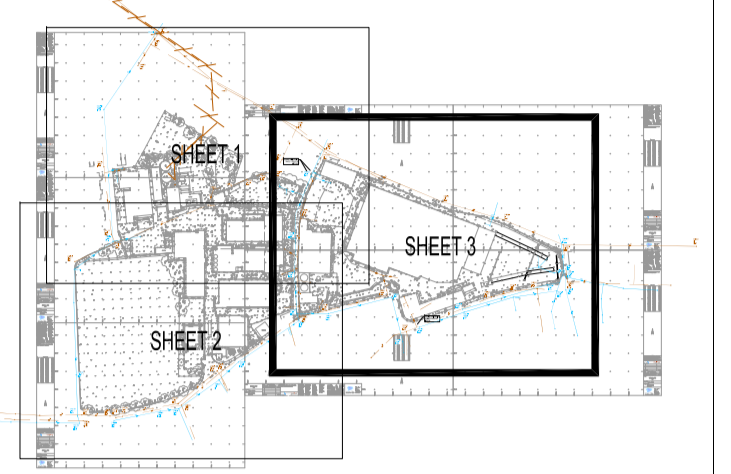




LEGEND

- EXISTING PRIVATE SURFACE WATER SEWER
- EXISTING PRIVATE FOUL SEWER
- EXISTING PRIVATE COMBINED SEWER
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC FOUL SEWER
- EXISTING PUBLIC COMBINED SEWER
- EXISTING PUBLIC RISING MAIN

NOTES
 1) EXISTING DRAINAGE LAYOUT BASED ON THAMES WATER SEWER RECORDS AND PENBORN TECHNICAL SERVICES DRAWING (REF: P979/07/31).

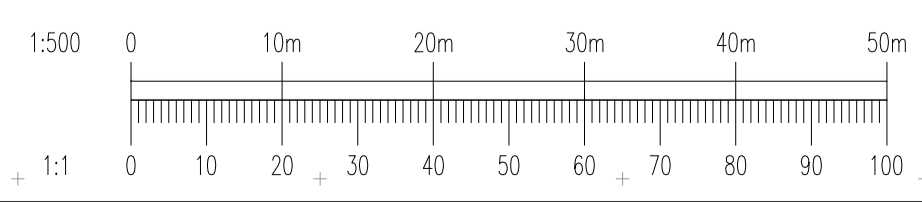


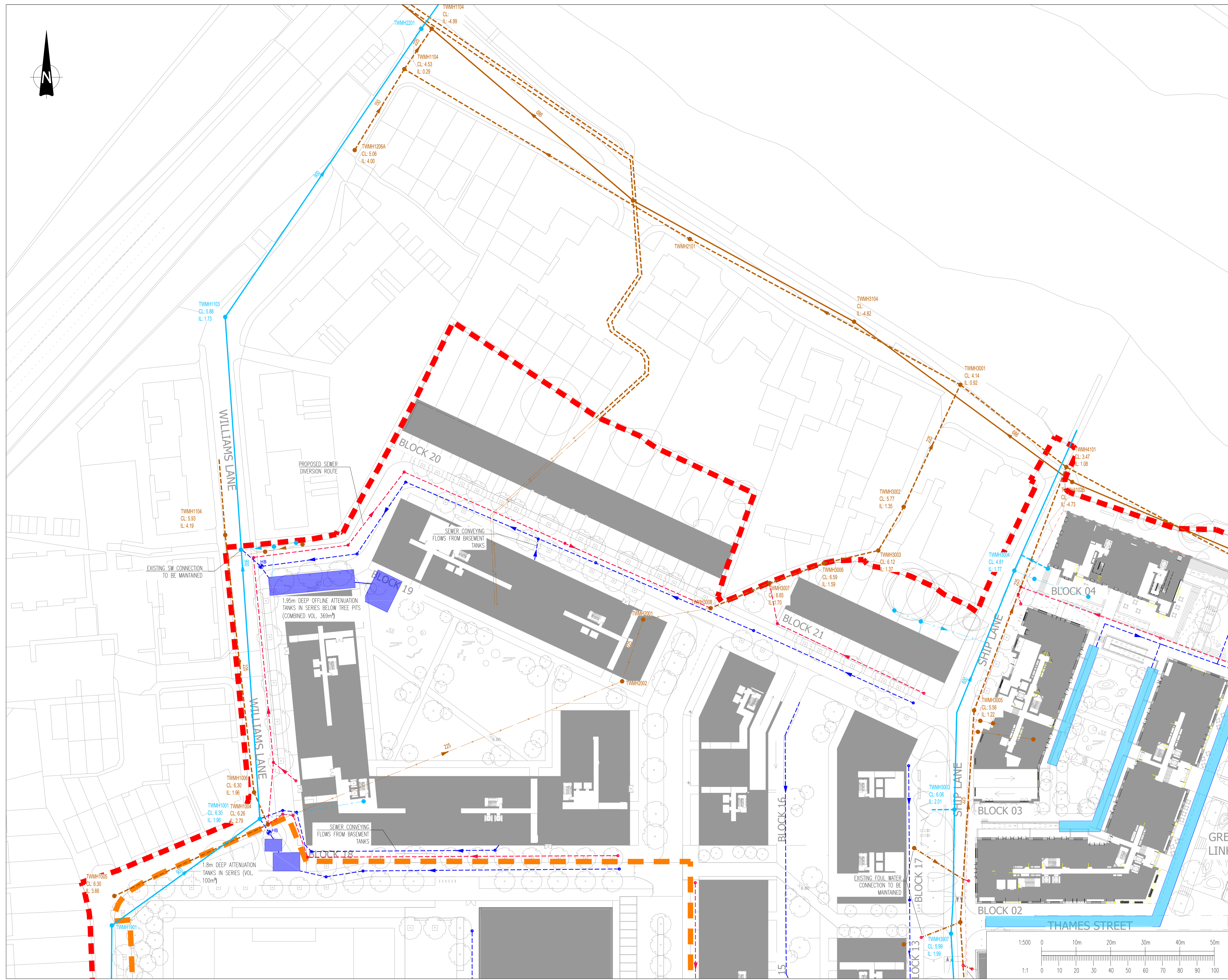
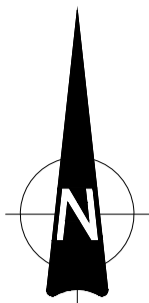
Rev	Date	Description	By
A03	21.11.16	INVERT/COVER LEVELS ADDED	DO
A02	24.10.16	VIEWPORT AMENDED	DO
A01	20.10.16	PRELIMINARY ISSUE	DO

Amendments	
Project	Title
STAG BREWERY	EXISTING FOUL AND SURFACE WATER DRAINAGE LAYOUT SHEET 3 OF 3
Client	DARTMOUTH CAPITAL ADVISORS LIMITED

Pickfords Wharf Clink Street London SE1 9DG
 t 020 7928 7888
 mail@watermangroup.com www.watermangroup.com

Drawing Status				
PRELIMINARY				
Designed by	Checked by	DO	Project No	WIE10667
Drawn by	DO	Date	OCTOBER 2016	Computer File No
Scales @ A1 work to figured dimensions only				1:500 WIE10667CSA282003.dwg
Revision	Number	Zone	Category	Revised
1	0003	SA	92	A03





LEGEND

- EXISTING PRIVATE SURFACE WATER SEWER
- EXISTING PRIVATE FOUL SEWER
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC FOUL SEWER
- EXISTING PUBLIC RISING MAIN
- EXISTING SEWER TO BE ABANDONED
- PROPOSED FOUL WATER SEWER
- PROPOSED SURFACE WATER SEWER
- PROPOSED ATTENUATION TANK
- PROPOSED CONVEYANCE CHANNEL
- APPLICATION A BOUNDARY
- APPLICATION B (SCHOOL) BOUNDARY

- NOTES**
- 1) EXISTING DRAINAGE LAYOUT BASED ON THAMES WATER SEWER RECORDS AND PENBORN TECHNICAL SERVICES DRAWING (REF: P97907031).
 - 2) THE PART OF THE DEVELOPMENT WEST OF SHIP LANE IS SUBMITTED AS AN OUTLINE APPLICATION. THE BASEMENT PLAN PROVIDED (REF: 16019_C645_ZZ_P_B1_001 - RECEIVED FROM SQUIRE & PARTNERS 29.01.2018) IS INDICATIVE ONLY AND SUBJECT TO THE PARAMETER PLANS SUBMITTED.
 - 3) DRAINAGE SUBJECT TO DETAILED DESIGN.



Rev	Date	Description	By
A05	13.02.18	UPDATED APPLICATION BOUNDARY	NB
A04	29.01.18	UPDATED ARCHITECT LAYOUT	NB
A03	01.11.17	TEAM ISSUE	NB
A02	23.10.17	SURFACE WATER ATTENUATION AMENDED	NB
A01	29.09.17	PRELIMINARY ISSUE	MAC

Project	STAG BREWERY
Title	PROPOSED FOUL AND SURFACE WATER DRAINAGE LAYOUT SHEET 1 OF 4
Client	RESELTON PROPERTIES LIMITED



Drawing Status		PRELIMINARY	
Designed by	NB	Checked by	DO
Drawn by	MAC	Date	SEPTEMBER 2017
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Work to figured dimensions only		Computer File No	WIE10667CSA82004.dwg
Publisher	Zone	Category	Number
WIE	SA	92	0004
			Revision
			A05

