

Brighton STM Developments Limited

Town Centre West, Uxbridge Drainage Conditions 68, 69

Rev 3 Updated for FEH data.

12.12.25

Project No.	2025-103	
Checked by:	Karl Pritchard	Pages: 6
Date:	1 st October 2025	
Issued to:	Brighton STM Developments Limited	
Issued by:	Matt Hayward	

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Introduction

Nolan Associates were appointed as the drainage engineer for the Town Centre West, Uxbridge which formed part of the wider Uxbridge development.

The approved outline site wide drainage strategy comprises the 'Uxbridge Drainage Strategy' and associated appendices prepared by Atkins dated November 2012 on behalf VSM Estates Limited. This forms part of the strategic infrastructure for the wider Uxbridge development.

The Town Centre West drainage is to be developed in accordance with the agreed Atkins site wide strategy, as required by conditions 68 and 69 attached to the St. Andrew's Park Hybrid Planning Permission.

Condition 68 states:

'Unless otherwise agreed in writing by the Local Planning Authority, prior to commencement of each phase of the outline element of the development, or any of the elements of development for which full planning permission is hereby approved, a drainage strategy detailing any on and/or off-site drainage works for the relevant phase/relevant component of the full planning element (including the adoption of sustainable urban drainage initiatives into the development), shall be submitted to and approved in writing by the Local Planning Authority in consultation with the sewerage undertaker. No discharge of foul or surface water from the site shall be accepted into the public system until the drainage works referred to in the strategy have been completed. Thereafter and prior to occupation of each phase/relevant component of the full planning element, the scheme shall be completed in accordance with the approved details and thereafter maintained for the life of the development, unless consent to any variation is first obtained in writing from the Local Planning Authority.'

Condition 69 states:

'Prior to commencement of each phase of the outline element of the development, or any of the elements of development for which full planning permission is hereby approved, a scheme to dispose of foul and surface water for the relevant phase/relevant component of the full planning element shall be submitted to and approved by the Local Planning Authority. Thereafter and prior to occupation of each phase/relevant component of the full planning element, the scheme shall be completed in strict accordance with the approved details and thereafter maintained for the life of the development, unless consent to any variation is first obtained in writing from the Local Planning Authority.'

This note has been prepared in order to demonstrate that the Town Centre West development meets the requirements of Conditions 68 and 69.

Site Wide Strategy

The 'Uxbridge Drainage Strategy' describes the surface water being discharged to the River Pinn via three catchments. Town Centre West sits within western catchment W1 and the strategy comprises a combination of pervious paving and positive drainage within the highways combining to collect development runoff in a single retention basin system prior to discharge to the River Pinn. Individual development plot, highway catchment areas and permitted discharge rates into the site wide drainage are detailed on Atkins drawing 5105977/UXB/SR/0511 Rev A06, the 'catchment plan'.

Town Centre West Drainage

Discharge Rates

Nolan Associates Drawing 2025-103 101 shows the extract from the Atkins drainage strategy catchment plan with the Town Centre West development overlaid. The Town Centre West development sits within catchments 3, 4 and 5 of the Atkins 'catchment plan'. The permitted impermeable areas discharge rates for these catchments are

Area 3: Impermeable Area: 5468m²; Discharge Rate 15 l/s

Area 4: Impermeable Area 5140m²; Discharge Rate 15 l/s

Area 5: Impermeable Area 9760m²; Discharge Rate; 30 l/s

The discharge rates for each block of the Town Centre West development are detailed below in relation to catchment areas 3,4 and 5.

Note: Areas 3,4 and 5 are also occupied by the separate Town Centre Extension development. The drainage strategy for which has been prepared by Conisbee consulting Engineers, ref 220131/J. Courtney dated 4th June 2024. The Town Centre Extension Development discharges 2.8 l/s to Area 2 (permitted 10 l/s) and 4.8 l/s to Area 5. The discharge rates for this development are also shown on drawing 101.

Town Centre West has 3 surface water drainage networks, one for each block.

The following sections demonstrate that Nolan Associates drainage design for Town Centre West complies with the approved Atkins drainage strategy, also considering the Town Centre Extension discharges. Refer also to the appended Drainage Layout 2021-189 100 and Microdrainage Calculations.

Block 1:

Block 1 predominantly sits in Area 3 of the approved 'catchment plan'. It has an impermeable area of 2590m². An attenuation tank is sized at 100m³ and located to the west of block 1 in a pedestrian area as per the attached drawing 2021-189 100. The surface water drainage discharges into the surface water drain located in St Andrews Road via manhole S1.2 at a pumped discharge rate of 13.4lts/sec. There is no contribution from the Town Centre Extension to Area 3.

The Atkins catchment plan allows 15lts/sec for area 3. The Nolan Associates design discharge rate of 13.4l/s is less than the permitted 15l/s and Block 1 complies with the overall strategy.

The foul drainage runs to the south of block 1 before discharging onto the existing stub for the Thames Water sewer in Churchill Road.

Block 2:

Block 2 predominantly sits in Area 4 of the approved 'catchment plan'. It has an impermeable area of 1760m². The attenuation tank is sized at 100m³ and located in the pedestrian / garden area to the south west of block 2 and the north of block 3 as per the attached drawing 2021-189 100. The surface water drainage is restricted by hydrobrake at 5 lts/sec, and discharges into the Thames Water sewer stub located to the north of the block before discharging into Churchill Road. There is no contribution from the Town Centre Extension to Area 4.

The Atkins catchment plan allows 15lts/sec for area 4. The Nolan Associates design discharge rate of 5 l/s is less than the permitted 15l/s and Block 2 complies with the overall strategy.

The foul drainage runs to the north of block 2 before discharging to the same stub as block 1 and discharging to the sewer in Churchill Road.

Block 3:

Block 3 predominantly sits in Area 5 of the approved 'catchment plan'. It has an impermeable area of 5990m². The attenuation tank is sized at 190m³ and located in the car park aisle to the south of block 3 as per the attached drawing 2021-189 100. The surface water drainage is restricted by hydrobrake to 15 l/s at MHS4.3A and discharges into the Thames Water sewer stub located to the south of the block before discharging into Churchill Road. This is based on the FSR data used at the time of the original design for the wider scheme. When FEH data is used the discharge rate increases to 18.4lts/sec however this is still less than the total 30lts/sec for area 5. There is also a contribution of 4.8 l/s from town centre extension into Area 5.

The Atkins catchment plan allows 30lts/sec for area 5. The Nolan Associates discharge rate of 15 l/s together with the contribution from Town Centre East of 4.8 l/s is less than the permitted 30l/s and Block 3 complies with the overall strategy.

The foul drainage runs to the south of the block before discharging into the Thames Water sewer in Churchill Road via a proposed manhole.

Summary

Overall, the total discharge rates for town centre west blocks 1, 2 and 3 are 36.8lts/sec and for town centre extension 7.6lts/sec. This is less than the total permitted discharge rates of 70lts/sec for areas 2, 3, 4 and 5 in the Atkins site wide strategy.

SuDS

The Atkins drainage strategy provides a SuDS strategy to be incorporated into the schemes and is included on drawing 2025-103 101. The Town Centre West development covers Areas 3, 4 and 5. These areas are to include "Permeable Paving / Cellular Storage".

The Town Centre West development incorporates the cellular storage as mentioned above, however permeable paving has been included where possible.

Block 1:

No permeable paving has been incorporated into block 1 due to the layout and design constraints. Block 1 has a basement and little external space therefore permeable paving has been deemed not feasible.

Block 2:

There is a small area of parking bays to the west of block 2 that are associated with the link road. These parking bays are being utilised for permeable paving.

Block 3:

There is a large basement for this block. The pedestrian / garden area has outlets in the slab that are taken down to basement level and therefore this area is not suitable for SUD's. The only other

external area where permeable paving is possible is in the car park to the south of block 3. The car parking bays in this area are being utilised as permeable paving.

Conclusions

This note has been prepared to discharge Conditions 68 and 69 of the St. Andrew's Park Hybrid Planning Permission. It sets out details of the Drainage Strategy and confirms how this aligns with the requirements of the site-wide strategy and outlines the scheme to dispose of foul and surface water.

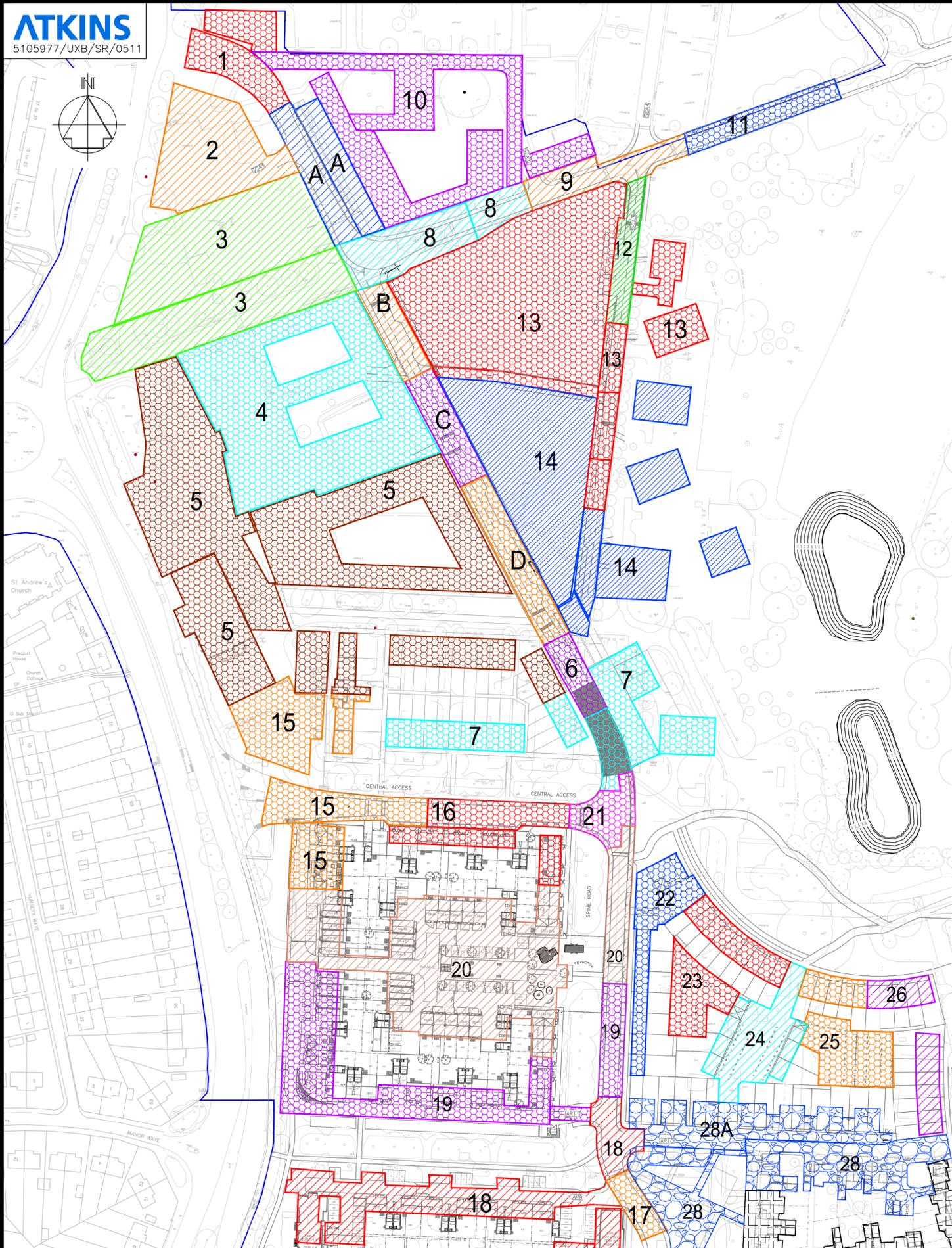
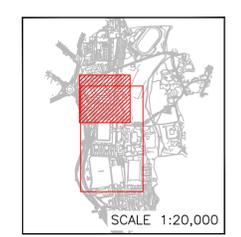
The above breakdown and summary table on the attached drawing demonstrates that Blocks 1, 2 and 3 of the Town Centre West Development comply with the overall strategy and that any outstanding drainage planning conditions can be discharged.

For and on behalf of Nolan Associates

Matt Hayward.

Appendices

Atkins drawing 5105977/UXB/SR/0511 Rev A06. Surface Water Drainage Catchment W1
Nolan Associates drawing 2025-103 101. Area Overlay
Nolan Associates drawing 2021-189 100 Drainage Layout
Microdrainage Calculations



KEY

OUTLINE PLANNING APPLICATION BOUNDARY	DRAINAGE INTO PIPE SYSTEM IMP AREA 2040m ² (AREA 1) (PN1.000 & PN1.001)	DRAINAGE INTO PIPE SYSTEM IMP AREA 410m ² (AREA 6) (PNs.010)	DRAINAGE INTO PIPE SYSTEM IMP AREA 2890m ² (AREA 15) (PN 23.000 & PN2.001 & PN24.000)	DRAINAGE INTO PIPE SYSTEM IMP AREA 1271m ² (AREA 25) (PN 25.003)
AREA 2 = IMP AREA 2040m ² Discharge Rate = 10/s Storage = 67m ³ (100yr + 30%) Permeable Paving/Cellular Storage (PN2.000 & PN2.001)	DRAINAGE INTO PIPE SYSTEM IMP AREA 2490m ² (AREA 7) (PNs.011 & PN17.000 & PN18.000)	DRAINAGE INTO PIPE SYSTEM IMP AREA 1290m ² (AREA 16) (PN 23.002)	DRAINAGE INTO PIPE SYSTEM IMP AREA 770m ² (AREA 26) (PN 25.004)	
AREA A = IMP AREA 1380m ² Discharge Rate = 5/s Storage = 46m ³ (100yr + 30%) SWALE (PNs.000 & PNs.001)	DRAINAGE INTO PIPE SYSTEM IMP AREA 1500m ² (AREA 8) (PN1.005)	DRAINAGE INTO PIPE SYSTEM IMP AREA 3350m ² (AREA 17) (PN 19.000)	DRAINAGE INTO PIPE SYSTEM IMP AREA 3340m ² (AREA 27) (PN 26.000)	
AREA 3 = IMP AREA 5468m ² Discharge Rate = 15/s Storage = 225m ³ (100yr + 30%) Permeable Paving/Cellular Storage (PN4.000 & PN4.001)	DRAINAGE INTO PIPE SYSTEM IMP AREA 830m ² (AREA 9) (PN1.006)	AREA 18 = IMP AREA 3340m ² Discharge Rate = 10/s Storage = 110m ³ (100yr + 30%) Permeable Paving/Cellular Storage (PN19.001 & PN20.000 & PN20.001)	DRAINAGE INTO PIPE SYSTEM IMP AREA 2890m ² (AREA 28) IMP AREA 1729m ² (AREA 28A) (PN 27.000)	
AREA B = IMP AREA 580m ² Discharge Rate = 5/s Storage = 38m ³ (100yr + 30%) SWALE (PN13.000 & PN13.001)	DRAINAGE INTO PIPE SYSTEM IMP AREA 3440m ² (AREA 10) Discharge Rate = 10/s Storage = 130m ³ (100yr + 30%) Permeable Paving/Cellular Storage (PNs.000 & PNs.001)	DRAINAGE INTO PIPE SYSTEM IMP AREA 3270m ² (AREA 19) (PN 21.000)		
AREA 4 = IMP AREA 5140m ² Discharge Rate = 15/s Storage = 205m ³ (100yr + 30%) Permeable Paving/Cellular Storage (PN14.000 & PN14.001)	DRAINAGE INTO PIPE SYSTEM IMP AREA 635m ² (AREA 11) (PN1.007)	DRAINAGE INTO PIPE SYSTEM IMP AREA 5760m ² (AREA 20) (PN 22.000)		
AREA C = IMP AREA 661m ² Discharge Rate = 5/s Storage = 24m ³ (100yr + 30%) SWALE (PN13.003)	DRAINAGE INTO PIPE SYSTEM IMP AREA 560m ² (AREA 12) (PNs.000)	DRAINAGE INTO PIPE SYSTEM IMP AREA 3300m ² (AREA 21) (PN 6.012)		
AREA D = IMP AREA 936m ² Discharge Rate = 5/s Storage = 32m ³ (100yr + 30%) SWALE (PN13.004)	AREA 13 = IMP AREA 7480m ² Discharge Rate = 10/s Storage = 210m ³ (100yr + 30%) Permeable Paving/Cellular Storage (PNs.002 & PNs.003 & PNs.004 & PNs.000 & PNs.000 & PN10.000 & PN10.001 & PN10.002)	DRAINAGE INTO PIPE SYSTEM IMP AREA 1000m ² (AREA 22) (PN 25.000)		
AREA 5 = IMP AREA 9760m ² Discharge Rate = 30/s Storage = 375m ³ (100yr + 30%) Permeable Paving/Cellular Storage (PNs.000 & PNs.007 & PN11.000 & PN11.001 & PN12.000 & PN12.001 & PN16.000)	DRAINAGE INTO PIPE SYSTEM IMP AREA 1350m ² (AREA 24) (PN 25.002)	DRAINAGE INTO PIPE SYSTEM IMP AREA 1300m ² (AREA 23) (PN 25.001)		

THIS MAP IS BASED ON ORDNANCE SURVEY MATERIAL WITH THE PERMISSION OF ORDNANCE SURVEY ON BEHALF OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE © CROWN COPYRIGHT. UNAUTHORISED REPRODUCTION INFRINGES CROWN COPYRIGHT AND MAY LEAD TO PROSECUTION OR CIVIL PROCEEDINGS. AL 100018595 (2012).

- NOTES**
- ALL DIMENSIONS ARE IN METRES.
 - TOPOGRAPHICAL SURVEY TAKEN FROM DRAWING NUMBER HAL125_2DT_RevE.dwg "RAF UXBRIDGE, MIDDLESEX UB10 ORZ - TOPOGRAPHICAL SURVEY 2D" BY MET SURVEYS LTD.
 - PROPOSED HOUSING LAYOUT TAKEN FROM DRAWING NUMBERS:
 - 3300-10-101 Rev O BY SHEPPARD ROBSON (MASTERPLAN)
 - PERS120807-SL01 Rev A (St Andrews Park, Uxbridge - Phase 1C - Site Layout) BY TETLOW KING.
 - PERS120903-SL03 Rev E (St Andrews Park, Uxbridge - Phase 1D - Site Layout) BY TETLOW KING.
 - FOR ROAD/SWALE CROSS SECTIONS, REFER TO DRAWING NUMBER 5105977/UXB/SR/0141 AND LANDSCAPE ARCHITECT DRAWINGS (BY ALLEN PYKE ASSOCIATES).
 - DRAWING SHALL BE REFERRED IN CONJUNCTION WITH DRAWING NO : 5105977/UXB/SR/0502-0506 - PROPOSED DRAINAGE LAYOUT
 - IMPERMEABLE ARE IS BASED ON 3300-10-101 Rev O BY SHEPPARD ROBSON (MASTERPLAN).

A06	CATCHMENT AREA B,C,D,2,3,10, 11,13,14,17,18,20 AMENDED PIPE LABELS UNDER THE CATCHMENTS AREAS AMENDED TO MATCH WITH THE WINDES MODEL	KT	LB/CN	25.08.16
A05	CATCHMENT AREA NO 24 AMENDED	CN	KMR	19.01.15
A04	CATCHMENT AREA AND STORAGE DISTRIBUTION,	JT	DR	31.10.14
A03	CATCHMENT AREA AND STORAGE DISTRIBUTION TO INCORPORATE THE DESIGN OF THE SCA	TL	AR	06.08.13
A02	CATCHMENT AREA AND STORAGE DISTRIBUTION AMENDED TO SUIT CLIENTS REQUEST	TL	KMR	10.07.13
A01	CATCHMENT AREA UPDATED TO SUIT NEW INFRASTRUCTURE DESIGN AMENDMENT TO THE DETENTION BASIN	TL	KMR	14.05.13
-	RESERVED MATTERS APPLICATION	TL	KMR	20.3.13

REVISIONS	Drawn By	Checked By	Date

FOR INFORMATION	A06	MR	25.08.16
FOR INFORMATION	A05	MR	19.01.15
FOR INFORMATION	A04	MR	31.10.14
FOR APPROVAL	A03	MR	06.08.13
FOR APPROVAL	A02	MH	10.07.13
FOR APPROVAL	A01	MH	14.05.13
RESERVED MATTERS APPLICATION	-	MH	20.03.13

PURPOSE OF ISSUE	Rev.	Authorised for issue	Date

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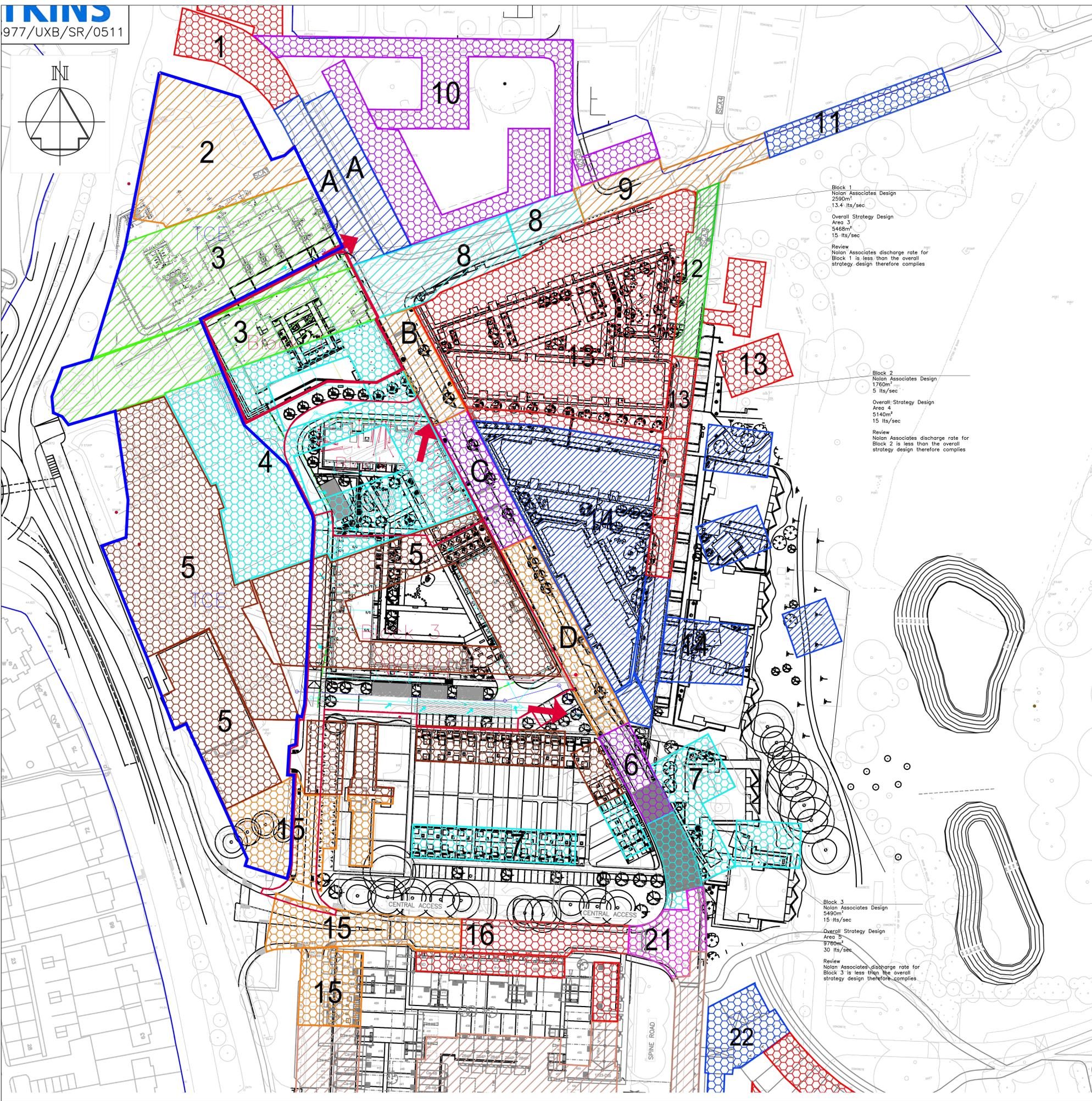
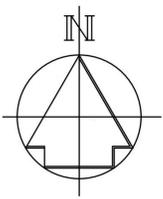
THIS DRAWING IS NOT TO BE SCALED

CLIENT
VSM ESTATES LTD

PROJECT
UXBRIDGE

DRAWING TITLE
SPINE ROAD SURFACE WATER DRAINAGE CATCHMENT W1

Scales	1:1000	DRAWN	RJM	CHECKED	TL	CO-ORD CHECK	KMR
DATE	19/03/13	DATE	19/03/12	DATE	19/03/12		
DRAWING NO	5105977/UXB/SR/0511			SHEET	A1	PLOT DATE	31/08/16
						REV	A06



Block 1
Nolan Associates Design
2590m²
13.4 lts/sec
Overall Strategy Design
Area 3
5468m²
15 lts/sec
Review
Nolan Associates discharge rate for Block 1 is less than the overall strategy design therefore complies

Block 2
Nolan Associates Design
1760m²
5 lts/sec
Overall Strategy Design
Area 4
5140m²
15 lts/sec
Review
Nolan Associates discharge rate for Block 2 is less than the overall strategy design therefore complies

Block 3
Nolan Associates Design
5490m²
15 lts/sec
Overall Strategy Design
Area 7
9760m²
30 lts/sec
Review
Nolan Associates discharge rate for Block 3 is less than the overall strategy design therefore complies

KEY

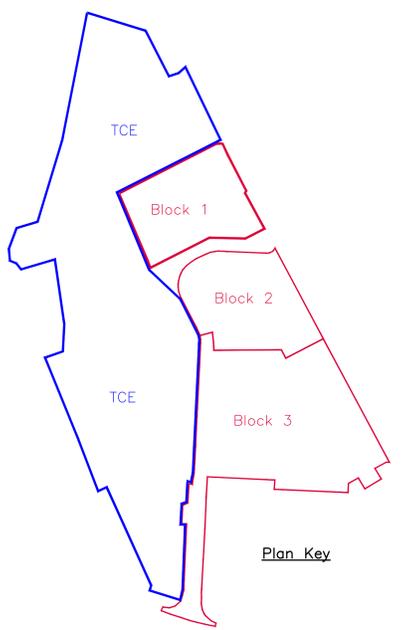
OUTLINE PLANNING APPLICATION BOUNDARY	DRAINAGE INTO PIPE SYSTEM MP AREA 1700m ² (AREA 1) (PN1.000 & PN1.001)	DRAINAGE INTO PIPE SYSTEM MP AREA 4100m ² (AREA 6) (PN6.010)	DRAINAGE INTO PIPE SYSTEM MP AREA 2800m ² (AREA 15) (PN 23.000 & PN3.001 & PN3.002)	DRAINAGE INTO PIPE SYSTEM MP AREA 1770m ² (AREA 25) (PN 25.003)
AREA 2 = MP AREA 2040m ² Discharge Rate = 10.0 lts/sec Storage = 67m ³ (100% + 30%) Permeable Paving/Collector Storage (PN2.000 & PN2.001)	DRAINAGE INTO PIPE SYSTEM MP AREA 1200m ² (AREA 16) (PN 23.002)	DRAINAGE INTO PIPE SYSTEM MP AREA 2400m ² (AREA 7) (PN 23.011 & PN17.000 & PN2.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1200m ² (AREA 18) (PN 23.002)	DRAINAGE INTO PIPE SYSTEM MP AREA 1700m ² (AREA 26) (PN 25.004)
AREA 3 = MP AREA 1380m ² Discharge Rate = 5.0 lts/sec Storage = 46m ³ (100% + 30%) SMALL (PN3.000 & PN3.001)	DRAINAGE INTO PIPE SYSTEM MP AREA 1500m ² (AREA 8) (PN 18.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1500m ² (AREA 9) (PN 18.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 330m ² (AREA 17) (PN 18.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1400m ² (AREA 27) (PN 25.000)
AREA 4 = MP AREA 1488m ² Discharge Rate = 10.0 lts/sec Storage = 22m ³ (100% + 30%) Permeable Paving/Collector Storage (PN4.000 & PN4.001)	DRAINAGE INTO PIPE SYSTEM MP AREA 800m ² (AREA 9) (PN 18.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 3400m ² (AREA 10) (PN 21.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 3200m ² (AREA 19) (PN 21.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 2900m ² (AREA 28) (PN 27.000)
AREA 5 = MP AREA 180m ² Discharge Rate = 5.0 lts/sec Storage = 20m ³ (100% + 30%) SMALL (PN1.000 & PN1.001)	DRAINAGE INTO PIPE SYSTEM MP AREA 500m ² (AREA 11) (PN 18.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 3400m ² (AREA 10) (PN 21.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 3200m ² (AREA 19) (PN 21.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 2900m ² (AREA 28) (PN 27.000)
AREA 6 = MP AREA 661m ² Discharge Rate = 10.0 lts/sec Storage = 24m ³ (100% + 30%) SMALL (PN3.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 500m ² (AREA 12) (PN 18.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 7400m ² (AREA 13) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)
AREA 7 = MP AREA 9700m ² Discharge Rate = 30.0 lts/sec Storage = 370m ³ (100% + 30%) Permeable Paving/Collector Storage (PN1.000 & PN1.001 & PN15.000 & PN15.001 & PN15.002)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)
AREA 8 = MP AREA 9700m ² Discharge Rate = 30.0 lts/sec Storage = 370m ³ (100% + 30%) Permeable Paving/Collector Storage (PN1.000 & PN1.001 & PN15.000 & PN15.001 & PN15.002)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)
AREA 9 = MP AREA 5140m ² Discharge Rate = 15.0 lts/sec Storage = 100m ³ (100% + 30%) Permeable Paving/Collector Storage (PN15.000 & PN15.001 & PN15.002)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)
AREA 10 = MP AREA 3400m ² Discharge Rate = 10.0 lts/sec Storage = 110m ³ (100% + 30%) Permeable Paving/Collector Storage (PN18.000 & PN2.000 & PN2.001)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)
AREA 11 = MP AREA 1500m ² Discharge Rate = 10.0 lts/sec Storage = 50m ³ (100% + 30%) SMALL (PN3.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)
AREA 12 = MP AREA 1500m ² Discharge Rate = 10.0 lts/sec Storage = 50m ³ (100% + 30%) SMALL (PN3.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)
AREA 13 = MP AREA 7400m ² Discharge Rate = 10.0 lts/sec Storage = 210m ³ (100% + 30%) Permeable Paving/Collector Storage (PN1.000 & PN1.001 & PN15.000 & PN15.001 & PN15.002)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)
AREA 14 = MP AREA 5140m ² Discharge Rate = 15.0 lts/sec Storage = 100m ³ (100% + 30%) Permeable Paving/Collector Storage (PN15.000 & PN15.001 & PN15.002)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 530m ² (AREA 21) (PN 25.000)	DRAINAGE INTO PIPE SYSTEM MP AREA 1300m ² (AREA 22) (PN 25.000)

➔ Drainage discharge location

Catchment and Run-off Table

	Atkins Catchment Area			
	2	3	4	5
TCW Block 1		13.4		
TCW Block 2			5	
TCW Block 3				15
TCE Outfall 1	2.8			
TCE Outfall 2				4.8
Total discharge Permitted	2.8	13.4	5	19.8
	10	15	15	30

All discharge rates in lts/sec



NOLAN ASSOCIATES
PRELIMINARY DRAWING
NOT TO BE USED FOR CONSTRUCTION

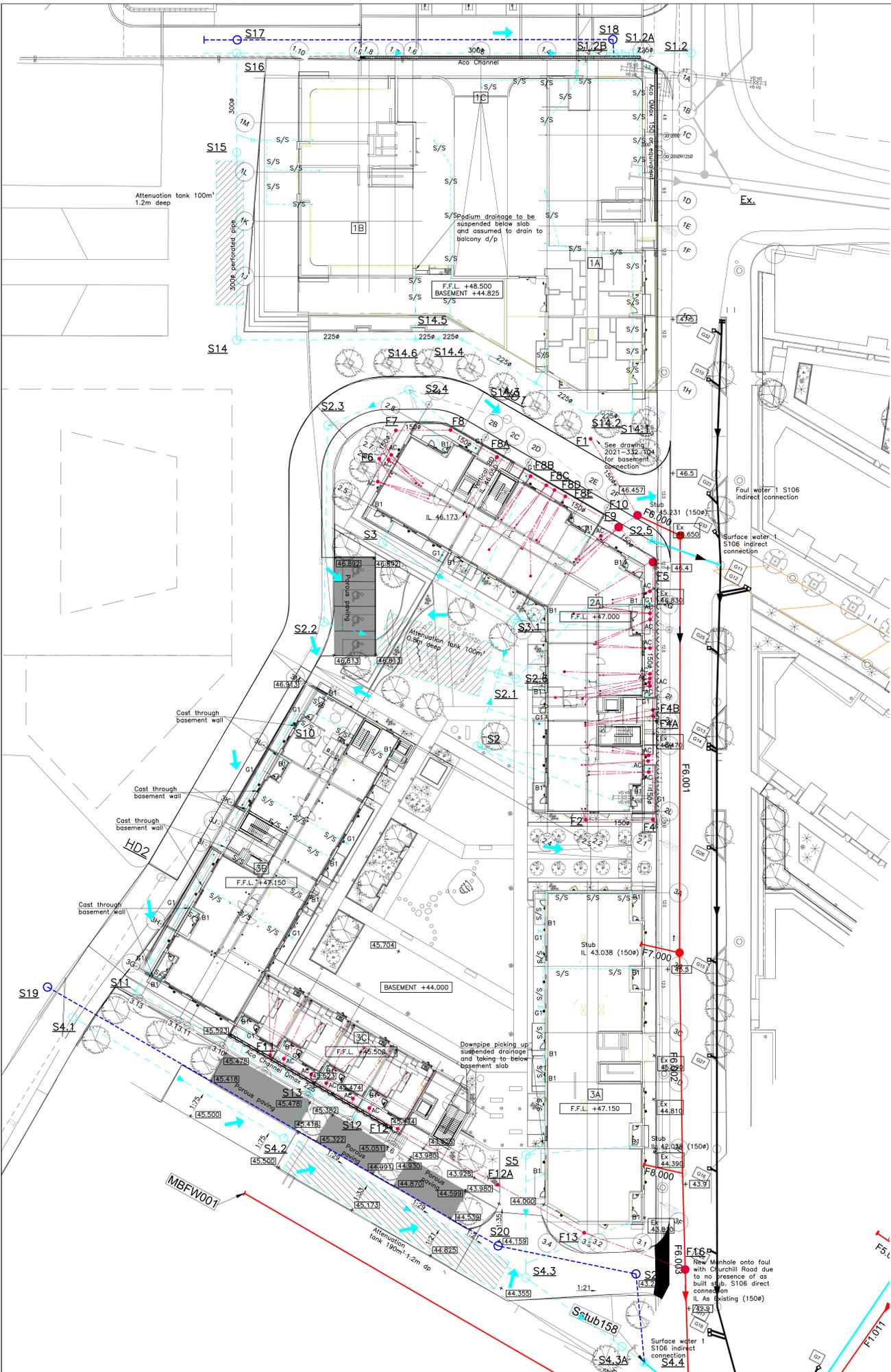
P1	Preliminary issue	MH	KAP	02.09.25
REV	DESCRIPTION	BY	CHKD	DATE

Uxbridge Restart Works

Area Overlay

NOLAN ASSOCIATES
CONSULTING CIVIL & STRUCTURAL ENGINEERS
5-6 GREENFIELD CRESCENT, EDGBASTON, BIRMINGHAM, B15 3BE
TEL: 0121-454 3099
E-MAIL: enquires@nolanassociates.co.uk

Drawn by	Date	Plot Date	Scale
MH	01.09.25	02.09.25	1:500@A1
Checked by	Project No	Dwg No	
KAP	2025-103	101	P1



Project Title: Town Centre West, Uxbridge
Project No.: 2016-201

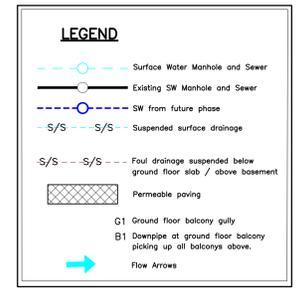
M.H. No.	Cover level	Invert level	Size	Type	Largest pipe	Cover type	Notes
S1	48.500	46.000	1200	CR	150	D400	
S1.1	48.500	45.600	1200	CR	225	D400	
S1.2	48.400	45.518	1200	CR	225	D400	Receiving chamber
S1.2A	48.400	45.547	1200	CR	150	D400	Stub (I.L. To Be Confirmed)
S1.2B	48.400	45.187	1200	CR	225	D400	Pumping station 13.4U/s
S1.3	48.600	T.B.C.	1200	CR	225	D400	
S2	47.000	45.131	600	Tegra	225	B125	
S2.1	47.000	45.378	1200	CRCP	300	B125	Hydrobrake 5Lts/sec
S2.2	46.810	45.429	1200	CR	300	D400	
S2.3	46.970	45.567	1200	CR	225	D400	
S2.4	46.900	45.705	1200	CR	225	D400	
S2.5	46.670	44.910	1200	CR	225	D400	As confirmed by OC
S2.6	47.000	45.353	600	Tegra	225	B125	
S3	47.000	46.000	600	Tegra	225	B125	
S3.1	46.900	45.850	600	Tegra	225	B125	
S4	46.600	45.500	1200	CR	225	D400	
S4.1	46.700	44.094	1200	CR	300	D400	
S4.2	45.445	41.780	1200	CR	450	D400	
S4.3	44.300	41.700	1200	CRCP	450	D400	
S4.3A	43.800	41.500	1200	CRCP	450	C250	Hydrobrake 15Lts/sec
S4.4	43.800	40.494	1500	CR	375	B125	Atkins Stub158
S5	43.850	42.036	1200	CR	225	D400	
S6	45.000	43.500	1200	CR	150	D400	
S6.1	44.100	42.600	1200	CR	150	D400	
S7	45.100	43.900	1200	CR	150	B125	
S7.1	44.200	42.200	1200	CR	150	B125	
S7.2	42.500	40.500	1200	CR	225	B125	
S7.3	41.800	40.200	1200	CR	225	B125	Stub (I.L. To Be Confirmed)
S8	45.100	44.000	600	PPIC	150	B125	
S8.1	42.700	41.700	600	PPIC	150	B125	
S8.2	42.600	41.500	600	PPIC	150	B125	
S9	45.100	44.000	600	PPIC	150	B125	
S10	47.130	45.700	600	Tegra	225	B125	
S11	46.713	45.355	600	Tegra	300	C250	
S12	45.430	44.500	475	PPIC	100	C250	
S13	45.500	41.982	600	Tegra	300	C250	
S14	47.550	45.600	1200	CRCP	300	C250	
S14.1	47.000	46.350	600	Tegra	225	C250	
S14.2	47.000	46.273	600	Tegra	225	C250	
S14.3	47.000	46.178	600	Tegra	225	C250	
S14.4	47.000	46.039	600	Tegra	225	C250	
S14.5	47.000	46.000	600	Tegra	225	C250	
S14.6	47.000	45.965	600	Tegra	225	C250	
S15	48.100	45.500	1200	CRCP	300	C250	
S16	48.500	45.445	1200	CR	300	D400	
S17	48.300	46.389	1200	CR	150	D400	
S18	48.400	45.913	1200	CR	150	D400	
S19	46.950	41.456	1200	CR	150	D400	
S20	44.160	40.929	1200	CR	150	D400	
S21	43.390	40.758	1200	CR	150	D400	

NOTES:
 C.R. Concrete ring manhole see std. detail D1 or D15.
 P.P.I.C. Polypropylene Inspection Chamber see std. detail D13.
 Tegra Tegra Inspection Chamber see std. detail D49.
 X 600 sq. Medium duty recessed, air-tight, screw-down cover and frame eg Broadstel.
 D400 600sq. Heavy duty, ductile iron, cover and frame to BS EN 124-D400.
 C250 600sq. Light duty, ductile iron, cover and frame to BS EN 124-C250.
 B125 600sq. Light duty, ductile iron, cover and frame to BS EN 124-B125.
 C proprietary light duty cover and frame.
 ALL COVER LEVELS ARE APPROXIMATE.

Project Title: Town Centre West
Project No.: 2021-189

M.H. No.	Cover level	Invert level	Size	Type	Largest pipe	Cover type	Notes
F1	46.900	45.550	1200	CR	150	C250	
F2	46.800	46.466	475	PPIC	150	C250	
F3	46.800	46.100	475	PPIC	150	C250	
F4	46.800	46.400	475	PPIC	150	C250	
F4A	46.900	46.299	475	PPIC	150	C250	
F4B	46.900	46.290	475	PPIC	150	C250	
F5	46.800	46.160	475	PPIC	150	C250	
F6	46.800	46.100	475	PPIC	150	C250	
F7	46.900	45.495	600	Tegra	150	C250	
F8	46.900	45.442	600	Tegra	150	C250	
F8A	46.950	45.390	600	Tegra	150	C250	
F8B	46.950	45.352	600	Tegra	150	C250	
F8C	46.950	45.334	600	Tegra	150	C250	
F9	46.850	45.355	600	Tegra	150	C250	
F8E	46.950	45.310	600	Tegra	150	C250	
F9	46.700	45.263	600	Tegra	150	C250	
F10	46.900	45.231	1200	CR	150	D400	Ex stub I. to be confirmed
F11	45.550	44.600	475	PPIC	150	C250	
F12	45.480	41.840	1200	CR	150	C250	
F12A	43.900	41.700	1200	CR	150	C250	
F13	44.200	41.580	1200	CR	150	C250	
F14	44.200	42.164	1200	CR	150	C250	
F16	44.675	43.026	475	PPIC	160	C250	
F16	44.100	41.247	1200	CR	150	D400	I.L. to be confirmed

NOTES:
 C.R. Concrete ring manhole see std. detail D1 or D15.
 P.P.I.C. Polypropylene Inspection Chamber see std. detail D13.
 A.C. Plastic Access Chamber
 Tegra Tegra Inspection Chamber see std. detail D49.
 X 600 sq. Medium duty recessed, air-tight, screw-down cover and frame eg Broadstel.
 D400 600sq. Heavy duty, ductile iron, cover and frame to BS EN 124-D400.
 C250 600sq. Medium duty, ductile iron, cover and frame to BS EN 124-C250.
 B125 600sq. Light duty, ductile iron, cover and frame to BS EN 124-B125.
 C proprietary light duty cover and frame.



- NOTES:**
- This drawing is to be read in conjunction with all relevant Architect's, Engineer's, Specialist's details and the Specification.
 - All surface water pipes sizes as stated.
 - All foul water pipes sizes as stated.
 - All drainage pipes to BS EN 295 (clayware) or BS EN 1401 (plastic) U.N.O. Other materials may be permitted subject to the approval of the Engineer.
 - Pipes to BS EN 295 with more than 900mm cover between pipe soffit and finished surface to be in 'Type B' bedding. Pipes to BS EN 1401 with more than 900mm between pipe soffit and finished surface to be in 'Type S' bedding.
 - All pipes under external paved areas with less than 900mm cover to be in 'Type A5' bedding.
 - All manholes, trenches, culverts etc to be backfilled with imported granular fill to Class 6F1 (capping material) compacted to a maximum of 95% of maximum dry density of BS-1377: Part 4 (Vibrating Hammer method).
 - The Contractor is responsible for ensuring that full and adequate temporary works are provided to maintain safety and stability of the existing structure whilst the new works are being carried out. The propping is to remain in position until such time that the new works can adequately sustain the intended loads. Details of the proposed temporary works are to be forwarded to the Engineer for comment prior to commencement of works being carried out. Reference should also be made to Nolan Associates Standard detail - Pipes near buildings. (D22)
 - Polypropylene Access Chambers (denoted A.C.) are to be no deeper than 600mm.
 - Pipe Gradients:
Pipes are to be laid to the levels and gradients shown. Pipe branches are to be laid no flatter than the following table:

Gullies, sinks and basins	1:40	1:50
Pipes draining 1 or more WC's	1:80	-
Pipes draining 5 or more WC's	1:80	1:150
 - For Manhole covers see schedule.
 - The Contractor is to enter into all necessary legal agreements with the drainage authority for all connections to the Public Sewer Network.
 - The Contractor is to survey all drainage outfalls and determine the levels of any Utility Apparatus that might affect the levels of drainage connections, prior to commencing any drainage works on site.
 - The Contractor is to obtain the consent of the Highway Authority to any works within the highway and enter into any necessary legal agreements.
 - Rising main to be BS EN 13244-2, all joints electrofusion welded to provide continuous joint.
- Stub levels are based on Atkins as-built drawings and to be confirmed prior to any works commencing.
 Pop-ups and RWP's to be confirmed by specialist design. Suspended drainage routes are shown inductively and to be confirmed by M&E consultant. All drainage routes, manholes and levels in-abeyance pending pop-up confirmation.

IMPORTANT NOTE:
 BLOCK 1, 2 AND HIGHWAY DRAINAGE ONLY ISSUED FOR CONSTRUCTION.
 THE HIGHWAY DRAINAGE HAS NOT BEEN APPROVED BY HILLINGDON COUNCIL AND ST MODWEN HOMES CAN PROCEED AT RISK. NOLAN ASSOCIATES CAN ACCEPT NO RESPONSIBILITY FOR ANY DISCREPANCIES WITH HILLINGDON COUNCIL BLOCK 3 IN-ABEYANCE AND TO BE CONFIRMED.

NOLAN ASSOCIATES
CONSTRUCTION DRAWING

REV	DESCRIPTION	BY	CHKD	DATE
C20	F12, F12a and F13 I.L. revised.	MH	KAP	09.06.23
C19	MH schedule updated. Channel added to block 1.	MH	KAP	01.06.23
C18	Footpath levels to block 3 revised	MH	KAP	18.05.23
C17	ACO Channel and gully added	LC	KAP	12.05.23
C16	Cover levels revised.	MH	KAP	02.05.23
C15	F16 revised.	MH	JUG	25.04.23
C14	Flow arrows added.	LC	JUG	22.03.23
C13	Block 3C drainage revised.	MH	JUG	13.09.22
C12	In-abeyance note removed as requested. Gully repositioned on Block 2.	MH	JUG	08.07.22
C11	Block 3 car park levels revised.	MH	JUG	05.07.22
C10	Block 3 issued in-abeyance.	MH	JUG	04.07.22
C9	Block 2 issued for construction.	MH	JUG	27.06.22
C8	S5 invert level revised.	MH	JUG	13.06.22
C7	Block 1 drainage revised. Block 2 outfall adjusted	MH	JUG	05.05.22

Uxbridge – Town Centre West

Drainage Layout

NOLAN ASSOCIATES
 CONSULTING CIVIL & STRUCTURAL ENGINEERS
 54 HAGLEY ROAD, EDGBASTON, BIRMINGHAM B16 8PE
 TEL: 0121-454 3099 FAX: 0121-454 3059
 E-MAIL: enquiries@nolanassociates.co.uk

Drawn by	Date	Plot Date	Scale
MH	09.07.21	09.06.23	1:2500A0
Checked by	Project No	Dwg No	
JUG	2021-189	100	C20

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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	2013
Site Location GB 506182 183886 TQ 06182 83886	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	5
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
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

Time Area Diagram for Storm at outfall S (pipe S1.009)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.141	4-8	0.108

Total Area Contributing (ha) = 0.249

Total Pipe Volume (m³) = 9.876

Time Area Diagram at outfall S (pipe S2.005)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.125	4-8	0.060

Total Area Contributing (ha) = 0.185

Total Pipe Volume (m³) = 8.861

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Time Area Diagram at outfall S (pipe S5.005)

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.346	4-8	0.204

Total Area Contributing (ha) = 0.550

Total Pipe Volume (m³) = 15.720

Network Design Table for Storm

« - Indicates pipe capacity < flow

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
S1.000	6.812	0.077	88.5	0.049	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	8.590	0.095	90.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	12.467	0.139	89.7	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	3.535	0.039	90.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	3.265	0.035	93.3	0.039	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.005	26.109	0.290	90.0	0.014	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	27.401	0.094	291.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.007	14.482	0.061	237.4	0.047	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	55.104	0.258	213.6	0.081	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.009	8.536	0.029	294.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	15.020	0.094	159.8	0.025	5.00	0.0	0.600	o	225	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)
S1.000	50.00	5.00	46.350	0.049	0.0	0.0	0.0	1.39	55.3	6.6
S1.001	50.00	5.00	46.273	0.049	0.0	0.0	0.0	1.38	54.7	6.6
S1.002	50.00	5.00	46.178	0.068	0.0	0.0	0.0	1.38	54.9	9.2
S1.003	50.00	5.00	46.039	0.068	0.0	0.0	0.0	1.37	54.6	9.2
S1.004	50.00	5.00	46.000	0.107	0.0	0.0	0.0	1.35	53.8	14.5
S1.005	50.00	5.00	45.965	0.121	0.0	0.0	0.0	1.38	54.8	16.4
S1.006	50.00	5.00	45.600	0.121	0.0	0.0	0.0	0.92	64.7	16.4
S1.007	50.00	5.00	45.506	0.168	0.0	0.0	0.0	1.02	71.8	22.7
S1.008	50.00	5.00	45.445	0.249	0.0	0.0	0.0	1.07	75.8	33.7
S1.009	50.00	5.00	45.187	0.249	0.0	0.0	0.0	0.91	64.4	33.7
S2.000	50.00	5.00	45.799	0.025	0.0	0.0	0.0	1.03	41.0	3.4

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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
S2.001	12.936	0.063	205.3	0.027	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.002	28.719	0.138	208.1	0.032	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.003	26.582	0.053	501.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S3.000	22.248	0.150	148.3	0.030	5.00	0.0	0.600	o	225	Pipe/Conduit	
S3.001	8.238	0.399	20.6	0.026	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	11.064	0.170	65.1	0.045	5.00	0.0	0.600	o	225	Pipe/Conduit	
S2.004	2.700	0.023	117.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.005	28.265	0.443	63.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S5.000	45.251	0.270	167.6	0.087	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.001	29.510	3.373	8.7	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
S6.000	7.438	2.318	3.2	0.029	5.00	0.0	0.600	o	100	Pipe/Conduit	
S5.002	7.780	0.080	97.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S7.000	35.580	2.014	17.7	0.137	5.00	0.0	0.600	o	300	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)
S2.001	50.00	5.00	45.705	0.052	0.0	0.0	0.0	0.91	36.1	7.0
S2.002	50.00	5.00	45.567	0.084	0.0	0.0	0.0	1.09	76.8	11.4
S2.003	50.00	5.00	45.429	0.084	0.0	0.0	0.0	0.70	49.1	11.4
S3.000	50.00	5.00	46.000	0.030	0.0	0.0	0.0	1.07	42.6	4.1
S3.001	50.00	5.00	45.850	0.056	0.0	0.0	0.0	2.89	115.0	7.6
S4.000	50.00	5.00	45.621	0.045	0.0	0.0	0.0	1.62	64.6	6.1
S2.004	50.00	5.00	45.376	0.185	0.0	0.0	0.0	1.45	102.5	25.1
S2.005	50.00	5.00	45.353	0.185	0.0	0.0	0.0	1.97	139.4	25.1
S5.000	50.00	5.00	45.700	0.087	0.0	0.0	0.0	1.01	40.0	11.8
S5.001	50.00	5.00	45.355	0.105	0.0	0.0	0.0	5.35	377.9	14.2
S6.000	50.00	5.00	44.500	0.029	0.0	0.0	0.0	4.35	34.2	3.9
S5.002	50.00	5.00	41.832	0.134	0.0	0.0	0.0	2.06	327.9	18.1
S7.000	50.00	5.00	44.094	0.137	0.0	0.0	0.0	3.76	265.7	18.6

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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
S5.003	40.801	0.080	510.0	0.043	0.00	0.0	0.600	o	450	Pipe/Conduit	
S8.000	17.317	0.166	104.3	0.236	5.00	0.0	0.600	o	225	Pipe/Conduit	
S5.004	17.252	0.200	86.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S5.005	4.042	0.876	4.6	0.000	0.00	0.0	0.600	o	225	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)
S5.003	50.00	5.00	41.752	0.314	0.0	0.0	0.0	0.89	142.1	42.5
S8.000	50.00	5.00	42.036	0.236	0.0	0.0	0.0	1.28	50.9	32.0
S5.004	50.00	5.00	41.570	0.550	0.0	0.0	0.0	1.41	56.0«	74.5
S5.005	50.00	5.00	41.370	0.550	0.0	0.0	0.0	6.13	243.9	74.5

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XP Solutions		

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	47.000	0.650	Open Manhole	1200	S1.000	46.350	225				
S2	47.000	0.727	Open Manhole	1200	S1.001	46.273	225	S1.000	46.273	225	
S3	47.000	0.822	Open Manhole	1200	S1.002	46.178	225	S1.001	46.178	225	
S4	47.000	0.961	Open Manhole	1200	S1.003	46.039	225	S1.002	46.039	225	
S5	47.000	1.000	Open Manhole	1200	S1.004	46.000	225	S1.003	46.000	225	
S6	47.000	1.035	Open Manhole	1200	S1.005	45.965	225	S1.004	45.965	225	
S7	47.550	1.950	Open Manhole	1200	S1.006	45.600	300	S1.005	45.675	225	
S8	48.100	2.594	Open Manhole	1200	S1.007	45.506	300	S1.006	45.506	300	
S9	48.500	3.055	Open Manhole	1200	S1.008	45.445	300	S1.007	45.445	300	
S10	48.400	3.213	Open Manhole	1200	S1.009	45.187	300	S1.008	45.187	300	
S	48.400	3.242	Open Manhole	0		OUTFALL		S1.009	45.158	300	
S11	46.900	1.101	Open Manhole	1200	S2.000	45.799	225				
S12	46.900	1.195	Open Manhole	1200	S2.001	45.705	225	S2.000	45.705	225	
S13	46.970	1.403	Open Manhole	1200	S2.002	45.567	300	S2.001	45.642	225	
S14	46.810	1.381	Open Manhole	1200	S2.003	45.429	300	S2.002	45.429	300	
S15	47.000	1.000	Open Manhole	1200	S3.000	46.000	225				
S16	46.900	1.050	Open Manhole	1200	S3.001	45.850	225	S3.000	45.850	225	
S17	47.000	1.379	Open Manhole	1200	S4.000	45.621	225				
S18	46.670	1.294	Open Manhole	1200	S2.004	45.376	300	S2.003	45.376	300	
								S3.001	45.451	225	
								S4.000	45.451	225	
S19	47.000	1.647	Open Manhole	1200	S2.005	45.353	300	S2.004	45.353	300	
S	46.670	1.760	Open Manhole	0		OUTFALL		S2.005	44.910	300	
S20	47.130	1.430	Open Manhole	1200	S5.000	45.700	225				
S21	46.173	0.818	Open Manhole	1200	S5.001	45.355	300	S5.000	45.430	225	
S22	45.430	0.930	Open Manhole	1200	S6.000	44.500	100				
S23	45.500	3.668	Open Manhole	1350	S5.002	41.832	450	S5.001	41.982	300	
								S6.000	42.182	100	
S24	46.700	2.606	Open Manhole	1200	S7.000	44.094	300				
S25	45.445	3.693	Open Manhole	1350	S5.003	41.752	450	S5.002	41.752	450	
								S7.000	42.080	300	178
S26	44.000	1.964	Open Manhole	1200	S8.000	42.036	225				
S27	44.300	2.730	Open Manhole	1350	S5.004	41.570	225	S5.003	41.672	450	327
								S8.000	41.870	225	300

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S28	43.800	2.430	Open Manhole	1200	S5.005	41.370	225	S5.004	41.370	225	
S	43.800	3.306	Open Manhole	0		OUTFALL		S5.005	40.494	225	

No coordinates have been specified, layout information cannot be produced.

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.049	0.049	0.049
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.019	0.019	0.019
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.039	0.039	0.039
1.005	-	-	100	0.014	0.014	0.014
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.047	0.047	0.047
1.008	-	-	100	0.081	0.081	0.081
1.009	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.025	0.025	0.025
2.001	-	-	100	0.027	0.027	0.027
2.002	-	-	100	0.032	0.032	0.032
2.003	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.030	0.030	0.030
3.001	-	-	100	0.026	0.026	0.026
4.000	-	-	100	0.045	0.045	0.045
2.004	-	-	100	0.000	0.000	0.000
2.005	-	-	100	0.000	0.000	0.000
5.000	-	-	100	0.087	0.087	0.087
5.001	-	-	100	0.018	0.018	0.018
6.000	-	-	100	0.029	0.029	0.029
5.002	-	-	100	0.000	0.000	0.000
7.000	-	-	100	0.137	0.137	0.137
5.003	-	-	100	0.043	0.043	0.043
8.000	-	-	100	0.236	0.236	0.236
5.004	-	-	100	0.000	0.000	0.000
5.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.984	0.984	0.984

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.009	S	48.400	45.158	45.148	0	0

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Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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S2.005	S	46.670	44.910	44.910	0	0
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Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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S5.005	S	43.800	40.494	40.494	0	0
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /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 Offline Controls 0 Number of Time/Area Diagrams 1
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

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Online Controls for Storm

Pump Manhole: S10, DS/PN: S1.009, Volume (m³): 7.4

Invert Level (m) 45.187

Depth (m)	Flow (l/s)						
0.100	13.4000	0.900	13.4000	1.700	13.4000	2.500	13.4000
0.200	13.4000	1.000	13.4000	1.800	13.4000	2.600	13.4000
0.300	13.4000	1.100	13.4000	1.900	13.4000	2.700	13.4000
0.400	13.4000	1.200	13.4000	2.000	13.4000	2.800	13.4000
0.500	13.4000	1.300	13.4000	2.100	13.4000	2.900	13.4000
0.600	13.4000	1.400	13.4000	2.200	13.4000	3.000	13.4000
0.700	13.4000	1.500	13.4000	2.300	13.4000		
0.800	13.4000	1.600	13.4000	2.400	13.4000		

Hydro-Brake® Optimum Manhole: S18, DS/PN: S2.004, Volume (m³): 3.9

Unit Reference MD-SHE-0107-5000-0900-5000
Design Head (m) 0.900
Design Flow (l/s) 5.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 107
Invert Level (m) 45.376
Minimum Outlet Pipe Diameter (mm) 150
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	5.0	Kick-Flo®	0.590	4.1
Flush-Flo™	0.271	5.0	Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)						
0.100	3.6	0.800	4.7	2.000	7.2	4.000	10.1
0.200	4.9	1.000	5.2	2.200	7.6	4.500	10.6
0.300	5.0	1.200	5.7	2.400	7.9	5.000	11.2
0.400	4.9	1.400	6.1	2.600	8.2	5.500	11.7
0.500	4.6	1.600	6.5	3.000	8.8	6.000	12.2
0.600	4.1	1.800	6.9	3.500	9.4	6.500	12.7

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Hydro-Brake® Optimum Manhole: S18, DS/PN: S2.004, Volume (m³): 3.9

Depth (m)	Flow (l/s)						
7.000	13.1	8.000	14.0	9.000	14.8		
7.500	13.6	8.500	14.4	9.500	15.2		

Hydro-Brake® Optimum Manhole: S27, DS/PN: S5.004, Volume (m³): 10.8

Unit Reference	MD-SHE-0172-1500-1200-1500
Design Head (m)	1.200
Design Flow (l/s)	15.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	172
Invert Level (m)	41.570
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	15.0	Kick-Flo®	0.805	12.4
Flush-Flo™	0.364	15.0	Mean Flow over Head Range	-	12.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)						
0.100	6.1	1.200	15.0	3.000	23.2	7.000	34.9
0.200	14.1	1.400	16.1	3.500	25.0	7.500	36.1
0.300	14.9	1.600	17.2	4.000	26.6	8.000	37.2
0.400	15.0	1.800	18.2	4.500	28.2	8.500	38.3
0.500	14.8	2.000	19.1	5.000	29.7	9.000	39.4
0.600	14.4	2.200	20.0	5.500	31.1	9.500	40.4
0.800	12.5	2.400	20.9	6.000	32.4		
1.000	13.8	2.600	21.7	6.500	33.7		

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Storage Structures for Storm

Tank or Pond Manhole: S8, DS/PN: S1.007

Invert Level (m) 45.506

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	83.0	1.200	83.0	1.201	0.0

Tank or Pond Manhole: S18, DS/PN: S2.004

Invert Level (m) 45.376

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	125.0	0.800	125.0	0.801	0.0

Tank or Pond Manhole: S27, DS/PN: S5.004

Invert Level (m) 41.570

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	159.0	1.200	159.0	1.201	0.0

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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 Offline Controls 0 Number of Time/Area Diagrams 1
Number of Online Controls 3 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 506182 183886 TQ 06182 83886
Data Type Point
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, 2160, 2880, 4320, 5760, 7200, 8640,
10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+40%	100/15 Summer				46.933
S1.001	S2	15 Winter	100	+40%	100/15 Summer				46.896
S1.002	S3	15 Winter	100	+40%	100/15 Summer				46.858
S1.003	S4	15 Winter	100	+40%	30/15 Summer				46.765
S1.004	S5	15 Winter	100	+40%	30/15 Summer				46.697
S1.005	S6	15 Winter	100	+40%	100/15 Summer				46.536
S1.006	S7	60 Winter	100	+40%	30/60 Winter				46.509
S1.007	S8	120 Winter	100	+40%	30/15 Winter				46.507
S1.008	S9	120 Winter	100	+40%	30/15 Summer				47.102
S1.009	S10	120 Winter	100	+40%	30/15 Summer				47.803
S2.000	S11	180 Winter	100	+40%	100/60 Winter				46.150
S2.001	S12	180 Winter	100	+40%	100/15 Summer				46.149
S2.002	S13	180 Winter	100	+40%	100/30 Summer				46.147

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

PN	US/MH Name	Surcharged Flooded			Half Drain Pipe		Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
S1.000	S1	0.358	0.000	0.75		29.4	FLOOD RISK	
S1.001	S2	0.398	0.000	0.67		29.1	FLOOD RISK	
S1.002	S3	0.455	0.000	0.82		38.6	FLOOD RISK	
S1.003	S4	0.501	0.000	1.28		38.4	FLOOD RISK	
S1.004	S5	0.472	0.000	1.97		59.0	SURCHARGED	
S1.005	S6	0.346	0.000	1.31		66.6	SURCHARGED	
S1.006	S7	0.609	0.000	0.66		38.7	SURCHARGED	
S1.007	S8	0.701	0.000	0.71		42.4	SURCHARGED	
S1.008	S9	1.357	0.000	0.42		30.3	SURCHARGED	
S1.009	S10	2.316	0.000	0.27		13.4	SURCHARGED	
S2.000	S11	0.126	0.000	0.12		4.5	SURCHARGED	
S2.001	S12	0.219	0.000	0.29		9.1	SURCHARGED	
S2.002	S13	0.280	0.000	0.20		14.1	SURCHARGED	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S2.003	S14	180 Winter	100	+40%	100/15 Summer				46.144
S3.000	S15	180 Winter	100	+40%					46.145
S3.001	S16	180 Winter	100	+40%	100/120 Winter				46.143
S4.000	S17	180 Winter	100	+40%	100/30 Summer				46.143
S2.004	S18	180 Winter	100	+40%	30/60 Winter				46.141
S2.005	S19	480 Summer	100	+40%					45.391
S5.000	S20	15 Winter	100	+40%	100/15 Summer				46.353
S5.001	S21	15 Winter	100	+40%					45.449
S6.000	S22	15 Winter	100	+40%					44.562
S5.002	S23	180 Winter	100	+40%	100/15 Summer				43.418
S7.000	S24	15 Winter	100	+40%					44.229
S5.003	S25	180 Winter	100	+40%	100/15 Summer				43.417
S8.000	S26	180 Winter	100	+40%	100/30 Summer				43.427
S5.004	S27	180 Winter	100	+40%	30/15 Summer				43.412
S5.005	S28	180 Winter	100	+40%					41.426

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S2.003	S14	0.415	0.000	0.30		13.1	SURCHARGED	
S3.000	S15	-0.080	0.000	0.14		5.5	OK	
S3.001	S16	0.068	0.000	0.12		10.3	SURCHARGED	
S4.000	S17	0.297	0.000	0.14		7.9	SURCHARGED	
S2.004	S18	0.465	0.000	0.09		5.0	SURCHARGED	
S2.005	S19	-0.262	0.000	0.04		5.0	OK	
S5.000	S20	0.428	0.000	1.60		61.3	SURCHARGED	
S5.001	S21	-0.206	0.000	0.21		72.5	OK	
S6.000	S22	-0.038	0.000	0.69		21.4	OK	
S5.002	S23	1.136	0.000	0.14		23.9	SURCHARGED	
S7.000	S24	-0.165	0.000	0.41		101.1	OK	
S5.003	S25	1.215	0.000	0.44		55.6	SURCHARGED	
S8.000	S26	1.166	0.000	0.39		17.7	SURCHARGED	
S5.004	S27	1.617	0.000	0.37		18.4	SURCHARGED	
S5.005	S28	-0.169	0.000	0.14		18.4	OK	