

NI2.MH

Mansion house • row 1

Surface water drainage verification statement

Contents

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01 Introduction

The purpose of this document is to verify that the surface water drainage network has been implemented in accordance with the previously approved details.

Planning permission for the development (application number 111587/FO/2016/N1) was approved on 18 November 2016.

Condition 7 of the approval relates to the surface water drainage design for the scheme and states:

a) Prior to the commencement of the development, a scheme for the drainage of surface water from the new development shall be submitted for approval in writing by the City Council as the Local Planning Authority. The development shall then be constructed in accordance with the approved details, within a previously agreed timescale.

b) Prior to the first occupation of the development a verification report shall be submitted, including relevant photographic evidence, that the scheme has been implemented in accordance with the previously approved details.

Part A of the condition was formally discharged on 13 January 2020 under application number CDN/19/0499. The following documents were submitted to discharge condition 7a:

- NI2.MH (90) 015 'Overland flow route – flood water'
- Joule Drainage statement Rev B

This document is to be submitted to the City Council, as Local Planning Authority, to discharge condition 7b.

Please note that the design submitted in Joule Drainage Statement Rev B showed the proposed surface water drainage network connecting into a combined sewer (ref: MH C01 on drawing 284-04 25 rev B) approximately 60m away from the site adjacent to Lockyard Lane heading towards Coppersmith Road.

Subsequently to the approval of condition 7a, permission was obtained from Ian Slater of MCC's Growth & Development Directorate to connect the surface water drainage into a much closer existing surface water manhole (ref: SW-34 on drawing 284-04 26 F). The flow from this manhole discharges into the Primary Arc sewer before discharging into the Shooters Brook combined sewer as per the approved design.

This variation to the drainage connection into the existing system was carried out to avoid significant disruption to the existing residents of Lockyard Lane whilst the final drainage run was connected. The volume of surface water attenuation is also increased by approximately 1.5m³ in the as-built design. A copy of the permission to connect into manhole SW-34 is appended to this statement.

02 Approved surface water drainage design

The following Joule drawings 284-04 25 B and 284-04 26 B show the surface water drainage design approved under application CSN/19/0499.

- Key:
- Phase 2 Site Boundary.
 - Phase 3 Site Boundary.
 - Phase 3 Building Outline.

Drainage gradients noted are minimum gradients between access points. Refer to invert levels at each end of drainage runs.

INFORMATION

[illegible]

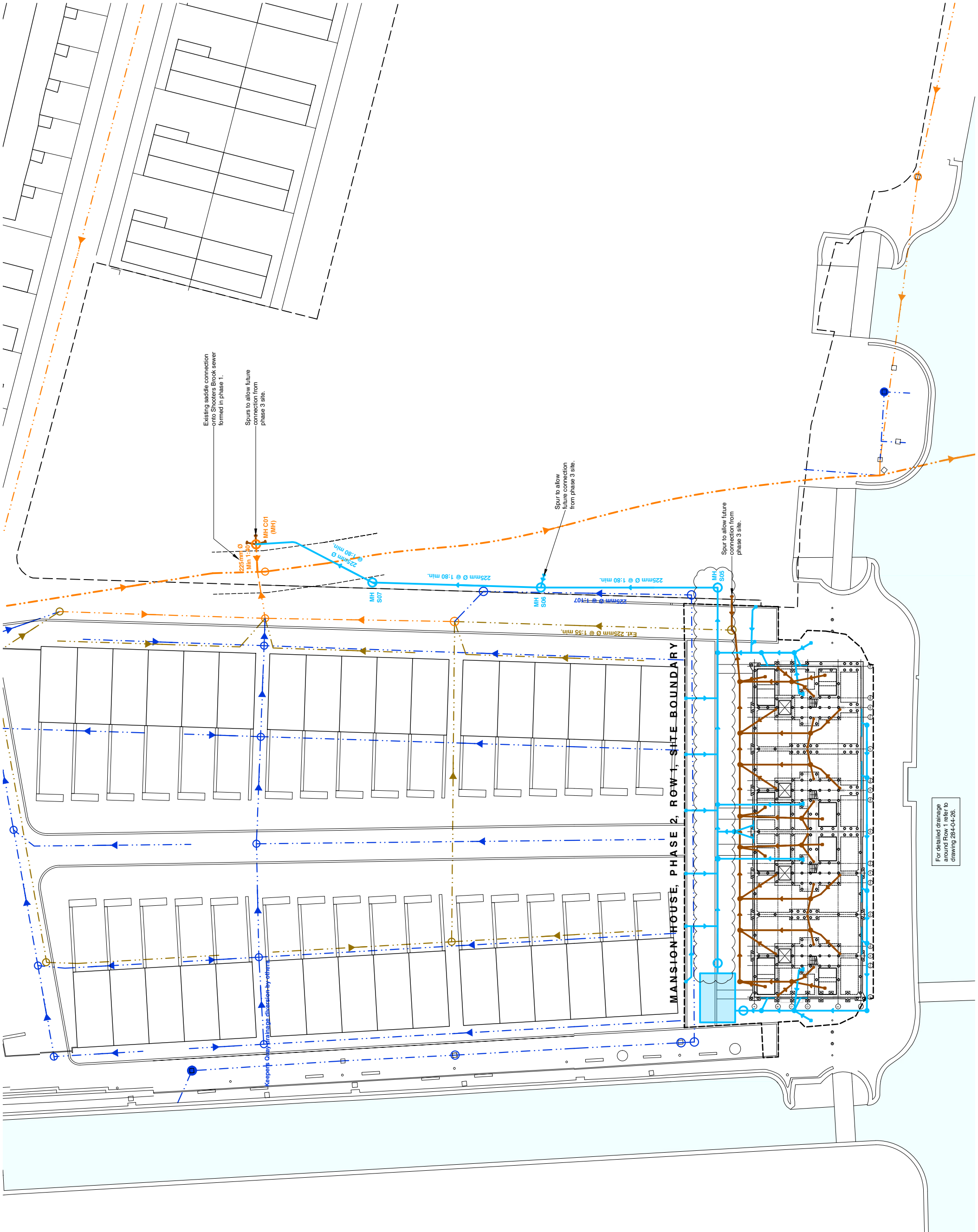
joule

Joule Consulting Engineers Ltd
T 0161 832 3487
F 0161 832 3793
W www.jouleconsultingengineers.co.uk
E mail@jouleconsultingengineers.co.uk

**New Islington,
Mansion House.**

Title:	Proposed, Drainage, Overall Site.
1. Proposed, Drainage, Overall Site.	

Job No:	284-04	Orig No:	25	Rev:	B
Scale:	250@A1 500@A3	Date:	09.18	Drawn:	TP



2. For general notes refer to drawing No. 284-04-N01 & N02.

— — — — — Phase 2 Site Boundary.

— Phase 3 Site Boundary.

Existing Drainage,

600 Journal of Management Inquiry

1. **Introduction**

0.44

Training (Contact Hours):

(surface water).

(combined hot & storm water):

/// (see typical detail).

**All foul drainage
100 Ø UPVC @ 1:80 min.
unless noted otherwise.**

All vent pipes and rainwater pipes are to be roddable above ground. Refer to Architects

Drainage gradients noted are minimum gradients between

invert levels at each end of drainage runs.

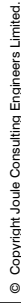
	B	TP	SW
Issued for Tender; surface water updated; phase3 layout and drainage diversion updated in line with MOC proposals.	A	TP	SW
Issued for Tender; drainage layout updated; air boundary spotted	-	TP Revised	N/A
Issued for information.	-	-	Signed
			27-Oct-18

Julie Consulting Engineers Ltd
T 0161 832 3487
F 0161 832 3793
W www.juleconsultingengineers.co.uk
E mail@juleconsultingengineers.co.uk

Project: **New Islington,
Mansion House.**

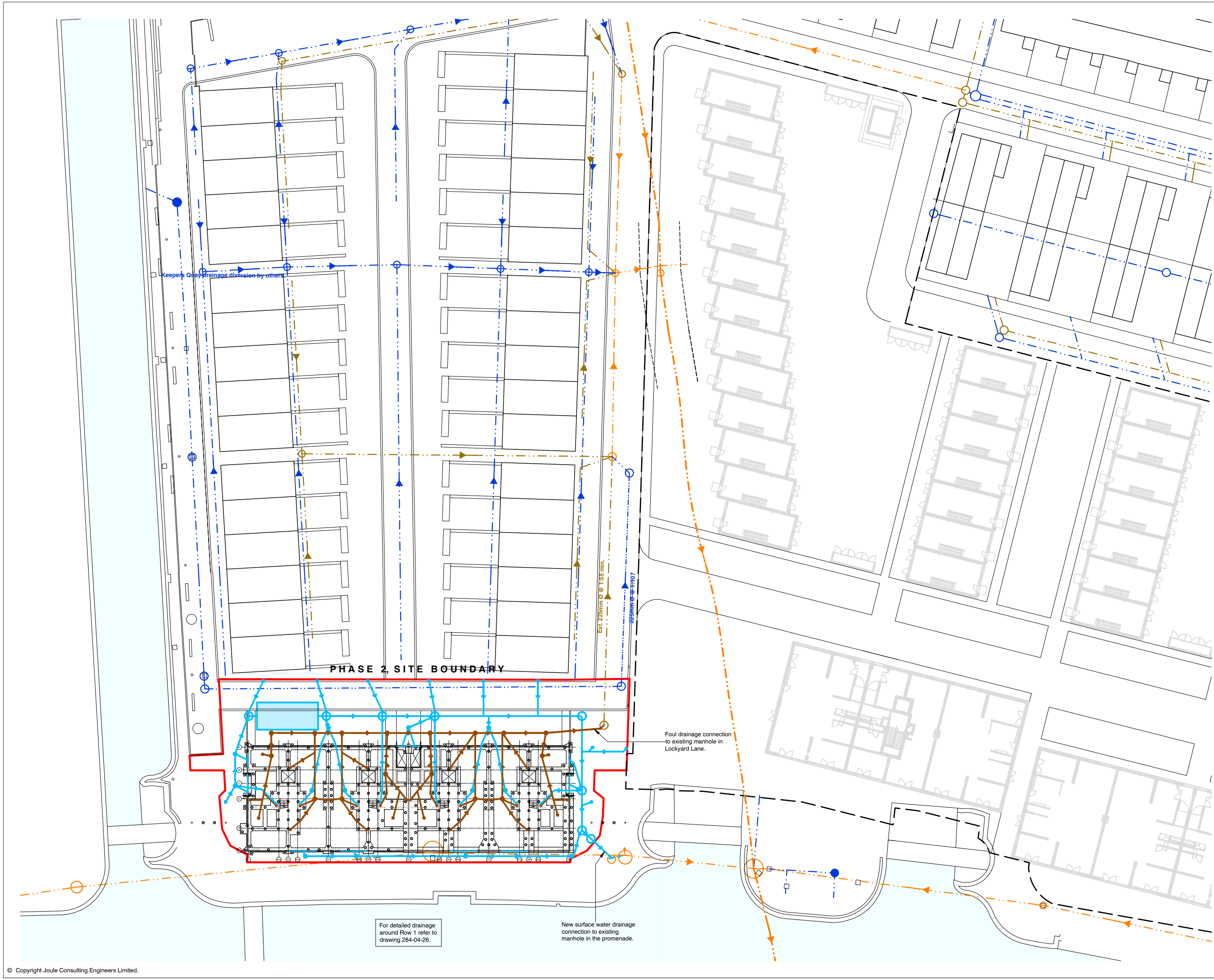
Proposed, Drainage, Row 1.	Totals
1	1
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5	5
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10	10
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98	98
99	99
100	100

Job No: 284-04	Dwg No: 26	Rev: B
Scale: 100@A1 200@A3	Date: 09.18	Drawn: TP



03 As built surface water drainage design

The following Joule drawings 284-04 25 F and 284-04 26 F show the construction status surface water drainage layouts.



Notes:

1. This drawing is to be read in conjunction with the site survey and all relevant Architects and Engineers drawings and the specification.
2. For general notes refer to drawing No. 284-04-N01 & N02.

Key:

- Phase 2 Site Boundary.
- Phase 3 Site Boundary.
- Phase 3 Building Outline.

Drainage Key:

- Existing Drainage, (Surface Water).
- Existing Drainage, (Foul).
- Existing Drainage, (Combined).
- Proposed Drainage, (Surface Water).
- Proposed Drainage Attenuation Tank, (Surface Water).
- Proposed ACO Drainage, (Surface Water).
- Proposed Drainage, (Foul).
- Proposed Drainage, (Combined).

Drainage gradients noted are minimum gradients between access points. Refer to invert levels at each end of drainage runs.

CONSTRUCTION

20.09.19	Issued for Construction, MH S12 omitted, it's a gradient updated, connection to Primary Arc updated, attenuation tank size and position updated, in line with Contractors proposals.	F	TP	SW
05.09.19	Issued for Construction, drop positions updated, inspection chambers S19 to S24 added, pile and ground beams updated.	E	TP	SW
21.08.19	Issued for Construction.	D	TP	SW
09.08.19	Issued for Information, surface water connection to Shooter Brook relief sewer omitted, connection to Primary Arc back drop added.	C	TP	SW
14.06.19	Issued for Information, surface water updated, phase 3 layout and connection updated, Keepsers Quay drainage diversion updated in line with MCC proposals.	B	TP	SW
14.09.18	Issued for Tender, drainage layout updated, site boundary updated.	A	TP	SW
27.03.18	Issued for Information.	-	TP	SW

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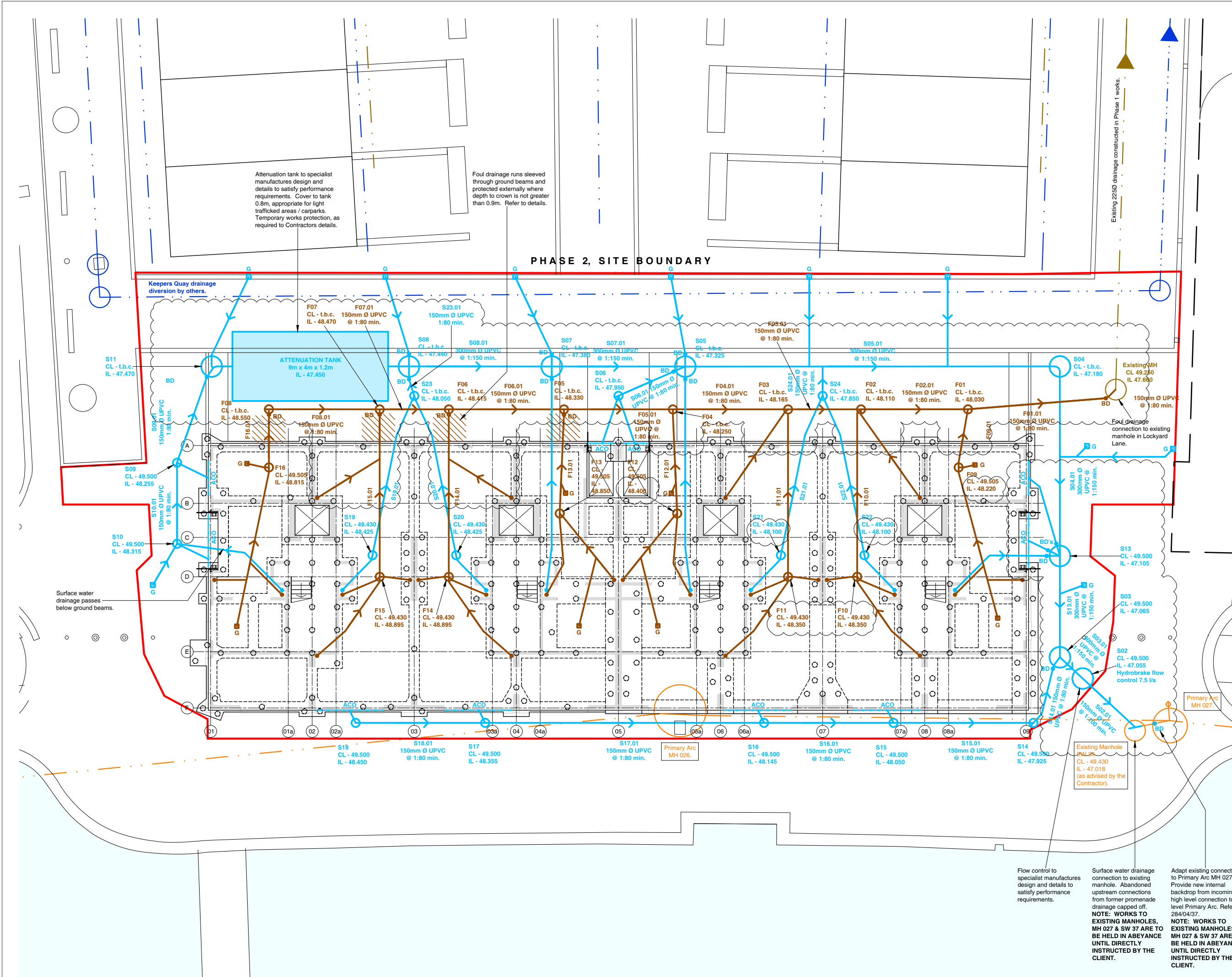
Joule Consulting Engineers Ltd
T 0161 832 3487
F 0161 832 3793
W www.jouleconsultingengineers.co.uk
E mail@jouleconsultingengineers.co.uk

Timber Wharf
40 Worsley Street
Castlefield
Manchester
M15 4LD

Project:
New Islington,
Mansion House.

Title:
Proposed,
Drainage,
Overall Site.

Job No: 284-04	Orig No: 25	Rev: F
Scale: 1:500 @ A3	Date: 09.18	Drawn: TP



Notes:

- This drawing is to be read in conjunction with the site survey and all relevant Architects and Engineers drawings and the specification.
- For general notes refer to drawing No. 284-04-N01 & N02.

Key:

Phase 2 Site Boundary.

Phase 3 Site Boundary.

Drainage Key:

- Existing Drainage, (Surface Water).
- Existing Drainage, (combined foul & storm water).
- Proposed Drainage, (Surface Water).
- Proposed Drainage Attenuation Tank, (Surface Water).
- Proposed ACO Drainage, (Surface Water).
- Proposed Drainage, (combined foul & storm water).
- Foul drains to be protected (see typical detail).
- Back Drop.

All surface water drainage
100 Ø UPVC @ 1:80 min.
unless noted otherwise.

All foul drainage
100 Ø UPVC @ 1:80 min.
unless noted otherwise.

All vent pipes and rainwater
pipes are to be roddable above
ground. Refer to Architects
details.

Drainage gradients noted are
minimum gradients between
access points. Refer to
invert levels at each end of
drainage runs.

For manhole, gully and
SVP/RWP popup setting out
refer to Architects details.

CONSTRUCTION

Date	Issue	Rev	TP	SW
20.09.19	Issued for Construction, MH S12 omitted, IL's & gradient updated, connection to Primary Arc updated, attenuation tank size and position updated, in line with Contractors proposals.	F	TP	SW
05.09.19	Issued for Construction, drop positions updated, inspection chambers S19 to S24 added, pile and ground beams updated.	E	TP	SW
21.08.19	Issued for Construction.	D	TP	SW
09.08.19	Issued for Information, surface water connection to Shooter Brook relief sewer omitted, connection to Primary Arc back drop added.	C	TP	SW
14.06.19	Issued for Information, surface water connection updated, Keepers Quay drainage diversion updated in line with MCC proposals.	B	TP	SW
14.06.18	Issued for Tender, drainage layout updated, site boundary updated.	A	TP	SW
27.03.18	Issued for Information.	-	TP	SW

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40 Worsley Street
Castlefield
Manchester
M15 4LD

Project:
New Islington,
Mansion House.

Title:
Proposed,
Drainage,
Row 1.

Job No:
284-04

Orig No:
26

Rev:
F

Scale:
1:200 @ A3

Date:
09.18

Drawn:
TP

04 Photographic verification of the as-built design

The following photos were taken during the construction of the surface water drainage system and show the implementation of the approved design.



Figure 1 shows the installation of the surface water drainage cellular attenuation tank in the car park area in front of Mansion House.



Figure 2 shows the membrane lining of the cellular attenuation tank prior to backfilling.



Figure 3 shows the Aco Q-Brake Vortex hydrobrake flow controller on site prior to fitting in SW MH S02.



Figure 4 shows the construction of surface water manhole S13.

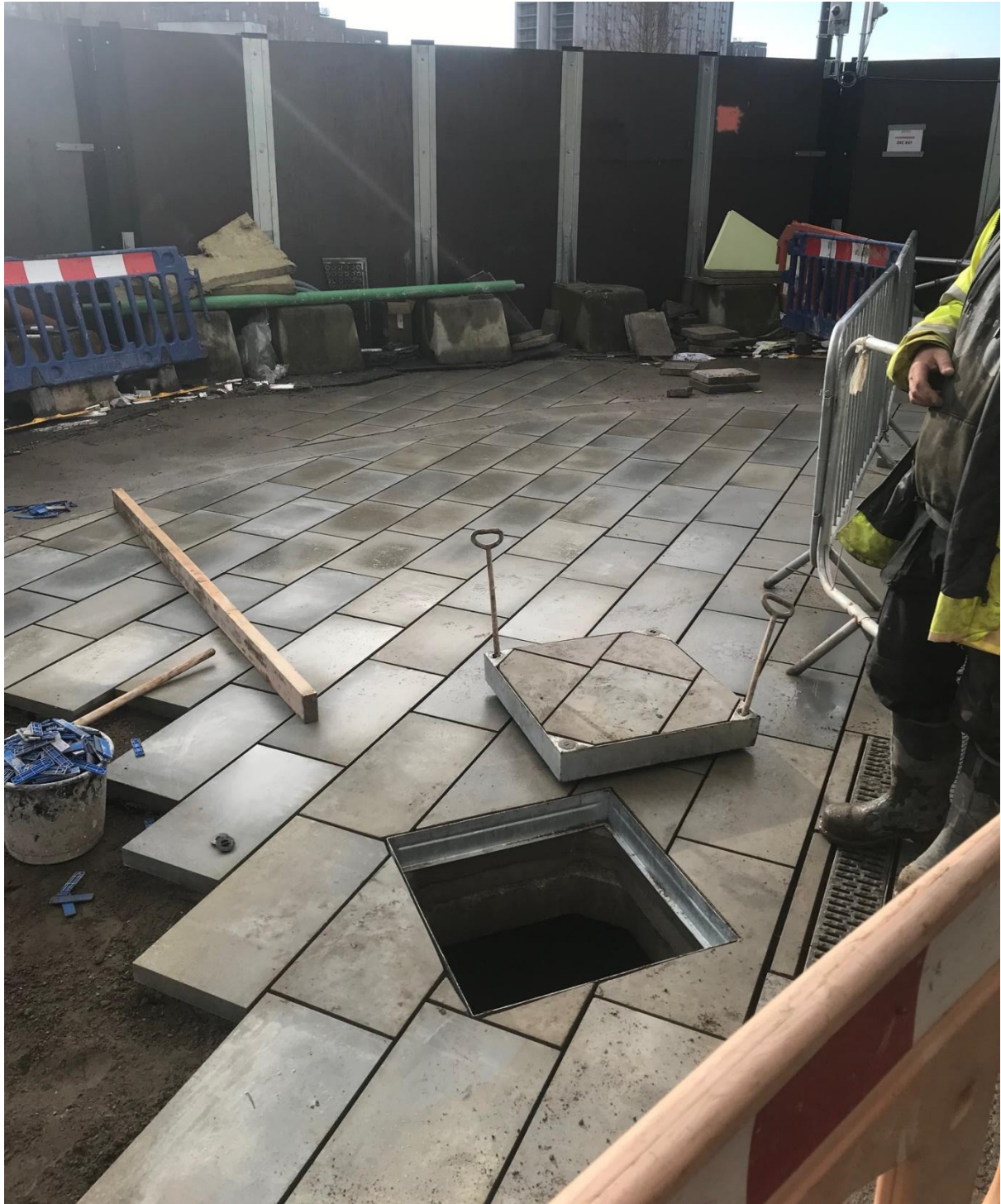


Figure 5 shows surface water manhole S03, heading towards the existing manhole SW 34 in the Marina



Figure 6 shows the hydrobrake flow controller fitted in the manhole

05 Appendix 1 – Joule Drainage Statement

Rev B

NEW ISLINGTON PHASE 2 – MANSION HOUSE ROW 1

DRAINAGE STATEMENT – Revision B

1.0 INTRODUCTION

- 1.1 The existing site is to be developed to provide residential development, comprising low rise houses arranged in a series of terraces alongside apartments and ground floor commercial spaces in an arrangement of taller Mansion House blocks.

The development includes a pattern of new roads and private gardens.

Delivery of the site is to be phased with Mansion House Row 1 constructed initially.

A post development site layout for Mansion House Row 1 is included in Appendix A.

2.0 DRAINAGE PROPOSALS

- 2.1 It is proposed to drain the site by utilising new separate foul and surface water drainage systems.

The existing and proposed drainage layouts are included in Appendix B.

2.2 FOUL WATER

- 2.2.1 As shown on the proposed drainage layout, and subject to agreement with United Utilities, foul water will drain under gravity within the site before discharging at an unrestricted rate to the existing combined sewer. Connection is to be made via direct connections installed in Phase 1.

2.3 FOUL WATER DESIGN

- 2.3.1 The design of the foul water drainage system has been carried out in accordance with the Building Regulations.

Outline calculations for Mansion House Row 1 are included in Appendix C.

2.4 SURFACE WATER

- 2.4.1 In developing the design for the surface water disposal from the site, based on sustainable drainage principles, various options were considered as summarised below.

Assessment is based on the generally accepted hierarchy for surface water disposal in accordance with the NPPF 2018 and National Standards for Sustainable Drainage Systems.

2.4.3 INFILTRATION TO THE GROUND

A Phase II Geo-environmental site investigation has been carried out at the site.

Ground conditions were shown to comprise a significant depth of made ground (up to 6m deep) over natural clay deposits of low permeability.

The report concluded that the drainage of surface water through soakaway infiltration was not recommended due to the substantial thickness of made ground encountered.

2.4.4 SWALES / DITCHES / BASINS

Due to the city centre locations of the proposed development, there is insufficient space available for the inclusion of swales, ditches or basins and therefore these methods have been discounted as not being practical.

2.4.5 PERMEABLE PAVING

Due to the issues associated with potentially contaminated made ground over clays of low permeability as noted above, it is not considered viable to utilise permeable paving for the disposal of surface water.

2.4.6 DISCHARGE TO A WATERCOURSE

No watercourses are present in the vicinity of the site with the exception of the recently completed canal basin to the South.

The relative level of any outfall and the canal water level, present particular difficulties in the draining of the site to the canal without the use of a pumping station. This option is therefore discounted at this stage as impractical with the exception of drainage of the hard surfacing between the buildings and the canal which are currently being reprofiled by Manchester City Council to allow direct runoff where this is possible.

2.4.7 CONNECTION TO AN EXISTING PUBLIC SURFACE WATER NETWORK

There is no existing public surface water network in the vicinity of the site.

2.4.8 CONNECTION TO AN EXISTING PUBLIC COMBINED SEWER

There is an existing public combined sewer (Shooters Brook relief sewer) crossing the site which is retained. This sewer previously carried surface water drainage from the site via connections from the historic road network and combined flows from the low rise housing development.

It is proposed that the new surface water network will be connected to the existing combined sewer via a new manhole connecting to an existing saddle connection fitted during the installation of the earlier drainage work on the site.

Whilst the proposed site layout and the proportion of impermeable surfacing contributing to surface water runoff is no more onerous than the historic arrangement, the requirements of the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA will still be recognised in the design.

In accordance with this document the development will aim for a minimum reduction of surface water runoff of 50%. This will be achieved through attenuation of surface water flows including on site storage and discharge at controlled rates to the network.

2.5 SURFACE WATER DESIGN

2.5.1 The proposed surface water drainage system will be designed in accordance with current industry standards and the Building Regulations.

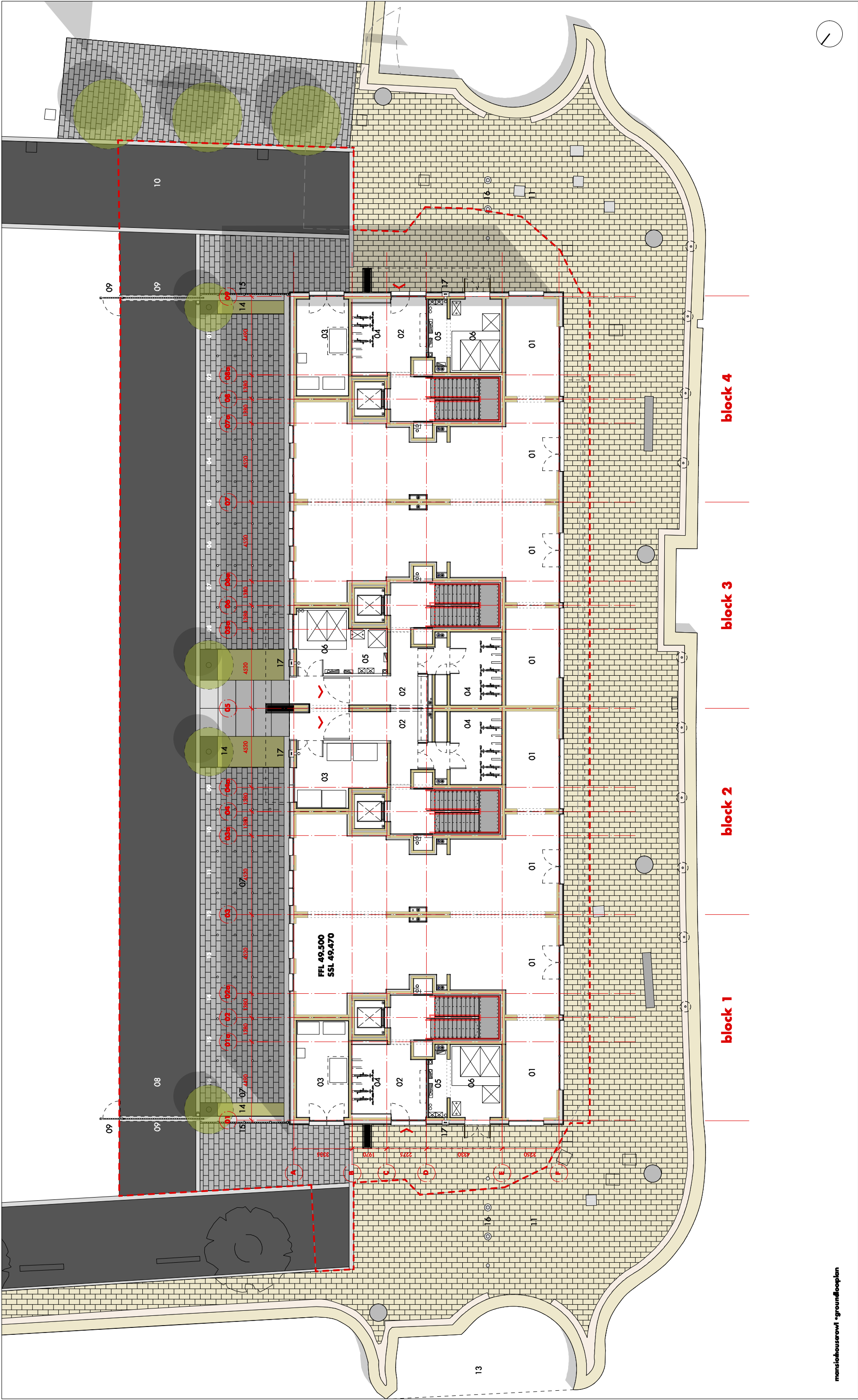
Outline calculations are included in Appendix C, considering allowable runoff for the overall site initially and then the attenuation requirements for the Mansion House Row 1 site specifically. Separate attenuation storage will be required for the later

development, which includes construction of the Mansion House Rows 2 & 3 and the terraced housing.

- 2.5.3 Car parking adjacent to the Mansion House Row 1 is limited and consequently the likelihood and risk of small spillages is considered to be low.

Pollution protection will be provided in the conventional manner by a pattern of trapped road gullies at regular positions along road gutters.

APPENDIX A - POST DEVELOPMENT SITE LAYOUT



mansiehouse row 1 • ground floor plan

- 01 commercial unit(s)

02 entrance lobby

03 bin store

04 bicycle store

05 incoming services

06 plant room

07 secure residents parking

08 secure access road

09 secure access gate

10 access road

11 secure access road for service vehicles only
- 12 canal

13 pedestrian link bridge

14 planter + trees + tree pit

15 metal railing fence

16 access control bollards

17 dry riser inlet

- RWP
- SYP

notes
- plant room layouts indicative for final setting
out refer to specialist M+E consultants drawings
and specification

d entrance canopy, plant doors, rear and front fenestration revised	01.06.18 *sp, *cf
c kitchen, pantries, plant rooms, cycle stores, external revised	24.03.18 *cf *cf
b access revised	14.03.18 *cf *cf
a *rft height reduced + access revised	04.03.18 *cf *cf
- *rft issue	23.03.18 *sp *cf
new *description	19.02.18 *cf *cf
issued	*drawn checked

shed km	+44 (0)151 709 821 1 +44 (0)207 253 881
project	new islington 2 • mansion house
client	urban splash
drawing number	NI2.MH-[00] 100 d
scale	1:200 @ c3
status	Information
row 1 • ground floor plan	
do not scale from this drawing - all dimensions are to be set out and checked on site prior to setting out. any discrepancies between the drawing and the site must be reported to the architect immediately or recorded on site and brought to the attention of the project architect immediately	

APPENDIX B - EXISTING AND PROPOSED SITE DRAINAGE

1.

This drawing is to be read in conjunction with the site survey and all relevant Architects and Engineers drawings and the specification.
2.

The statutory services information summarised on this drawing has been derived from information provided by the statutory undertakers. The services are summarised so that Joule can comment to the Client on any effect that these may have on the structural works. Contractors are to liaise directly with all statutory undertakers well in advance of commencing the works to confirm the locations of all existing services.
3.

For general notes refer to drawing no. 284-02-...

Key:

—

Site Boundary.

—

Proposed Building Outline.

Stats Key:

—

Existing Drainage (combined foul & storm water)

—

Existing Drainage (storm water)

Reference	Cover Level	Invert Level
XX01	-	-
2404	-	37.700
3600	-	-
3601	-	42.870
3602	-	43.750
3603	-	39.860
3604	-	40.140
3608	-	43.180
3610	-	44.360
3611	-	40.280

INFORMATION

01/02/17	Issued as a part of Drainage Statement.	A	TP	SW
02/03/16	Issued for Information.	-	TP	SW
Rev:	Rev:	Rev:	Rev:	Rev:

joule

Joule Consulting Engineers Ltd
T 0161 882 3487
W www.jouleconsultingengineers.co.uk
E info@jouleconsultingengineers.co.uk

Trinity Way Ltd
40 Worley Street
Castlefield
Manchester
M15 4LD

Project

New Islington,
Mansion House.

Type:

Existing,
Site Plan,
Statutory Services,
Drainage.

Job No:

284-04

Day No:

SI 11

Rev:

A

Scale:

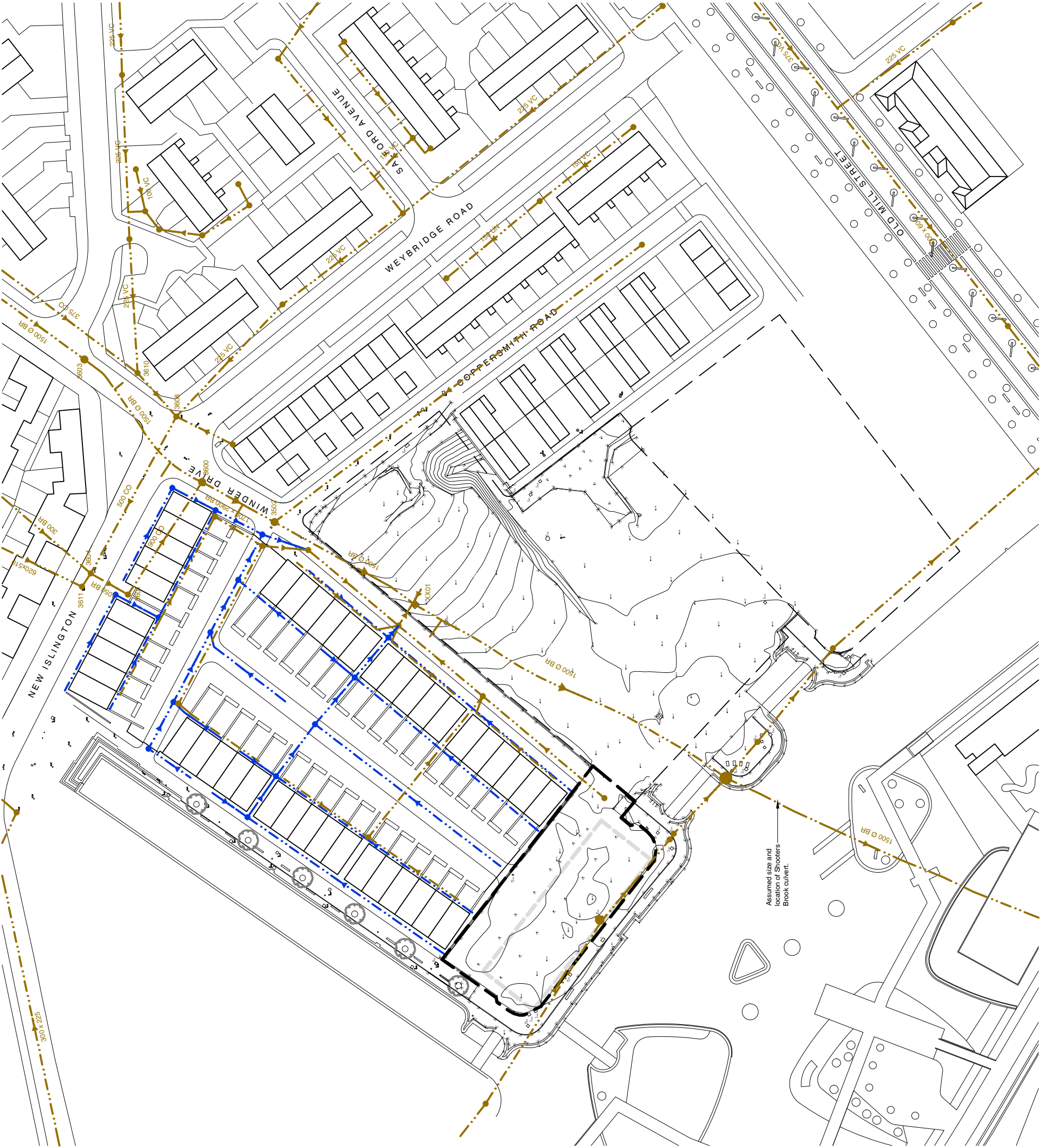
500@A1
1000@A3

Date:

08.16

Drawn:

TP



----- Phase 2 Site Boundary.

— — — — — Phase 3 Site Boundary.

Phase 3 Building Outline

Existing Drainage, —

(Surface Water).

Existing Drainage, (Foil)

Existing Drainage

Excluding Drainage; (Combined).

Proposed Drainage

_____ (Surface Water).

Proposed Drainage

Blank, (Surface Water)

Proposed ACU Dredge (Surface Water).

Proposed Drainage

(Foul).

Proposed Drainage

Drainage gradients noted are minimum gradients between access points. Refer to invert levels at each end of drainage runs.

INFORMATION

[illegible]

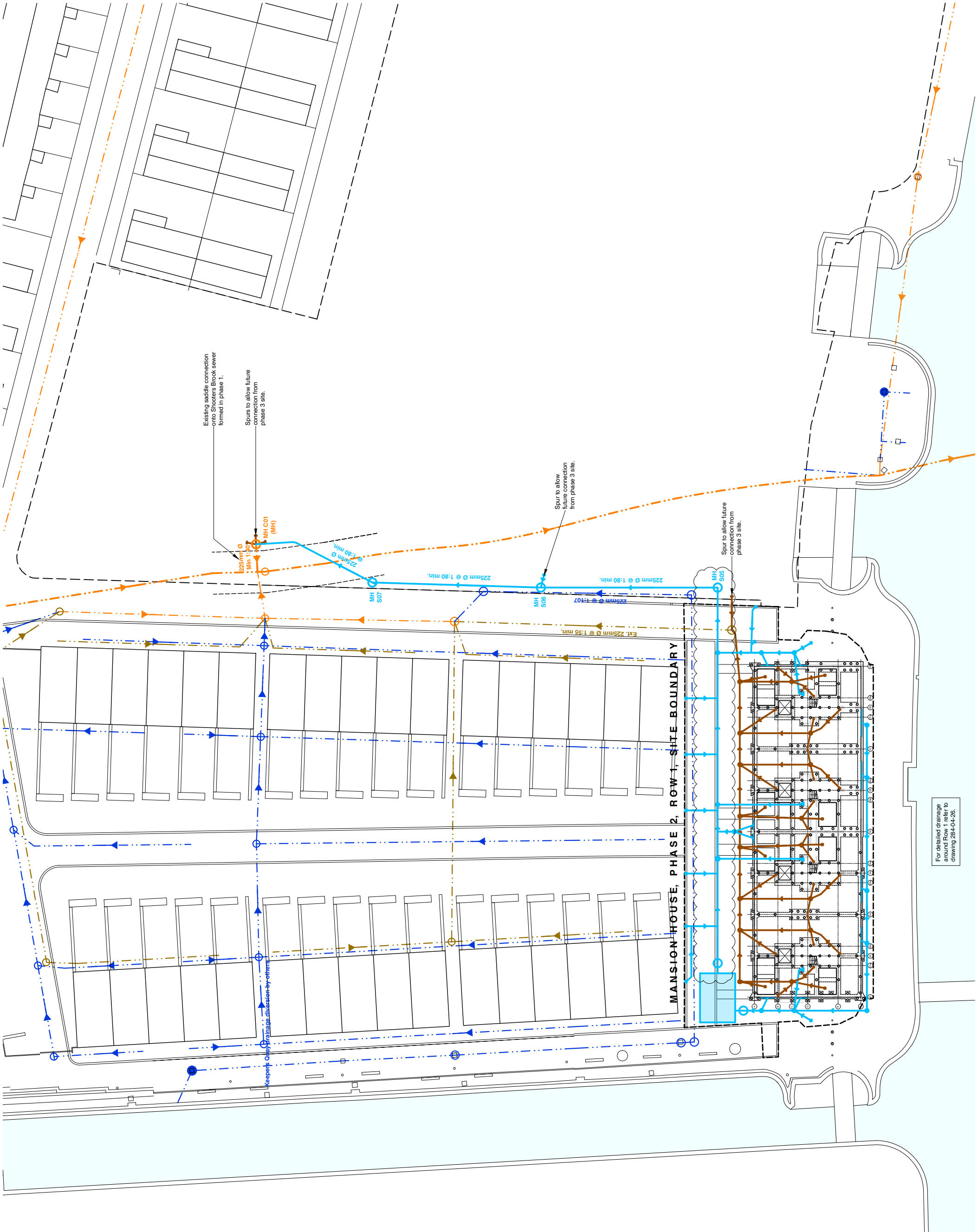
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F 0161 832 3793
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New Islington,
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Title:	Proposed, Drainage, Overall Site.

Job No:	284-04	Orig No:	25	Rev:	B
Scale:	250@A1 500@A3	Date:	09.18	Drawn:	TP



2. For general notes refer to drawing No. 284-04-N01 & N02.

— — — — — Phase 2 Site Boundary.

———— Phase 3 Site Boundary.

Existing Drainage,

600 Journal of Management Inquiry

1. **Introduction**

0.44

Training (Contact Hours):

(surface water).

(combined hot & storm water):

/// (see typical detail).

**All foul drainage
100 Ø UPVC @ 1:80 min.
unless noted otherwise.**

All vent pipes and rainwater pipes are to be roddable above ground. Refer to Architects

Drainage gradients noted are minimum gradients between access points. Refer to invert levels at each end of drainage runs.

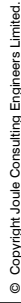
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Project: **New Islington,
Mansion House.**

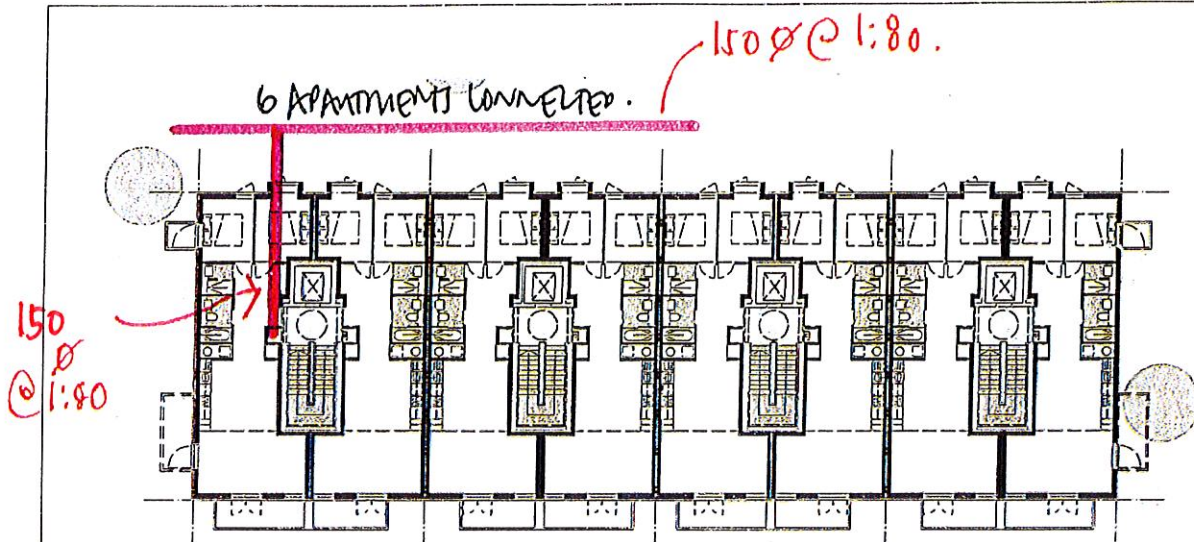
Proposed, Drainage, Row 1.	
Totals:	

Job No: 284-04	Dwg No: 26	Rev: B
Scale: 100@A1 200@A3	Date: 09.18	Drawn: TP



APPENDIX C - FOUL AND SURFACE WATER DRAINAGE CALCULATIONS

Job No 284/12	Sheet No FOUL 01	
Project NEW ULLINGTON MH.	Engineer jw	Date 12/16
Element FOUL DRAINAGE.	Checked by	Date



EACH MANSION HOUSE BLOCK INCORPORATES 8 DWELLINGS/
APARTMENT PER FLOOR.

∴ TOTAL NUMBER OF APARTMENTS PER RIVEN = 6

TOTAL NUMBER OF APARTMENT = $6 \times 8 = 48$.

ADOPTING THE RECOMMENDATIONS OF BUILDING REGULATIONS
PART H IN DETERMINING THE FOUL FLOW IN THE SEWER.

FOR A TYPICAL RUN FROM THE SERVICE RIVEN.

— 6 DWELLINGS CONNECTED. FLOW = 3.6 L/s (TABLES. BUILDING
REG PART H).

BY INSPECTION ADOPT. 150MM Ø AT MIN 1:80
ALLOWABLE FLOW = 20 L/s. ∴ OK.

TOTAL FLOW = 48 APARTMENT. SAT $2 \times 5.4 = 10.8$ L/s
(allowance).

ADOPT 150MM Ø @ 1:80. ALLOWABLE
FLOW = 20 L/s ∴ OK. (allows
25 UNITS. (allows
SOME FLEXIBILITY FOR
COMM USER) —

Job No 284/02

Sheet No SURFACE 01

Project NEW ISLINGTON MH.

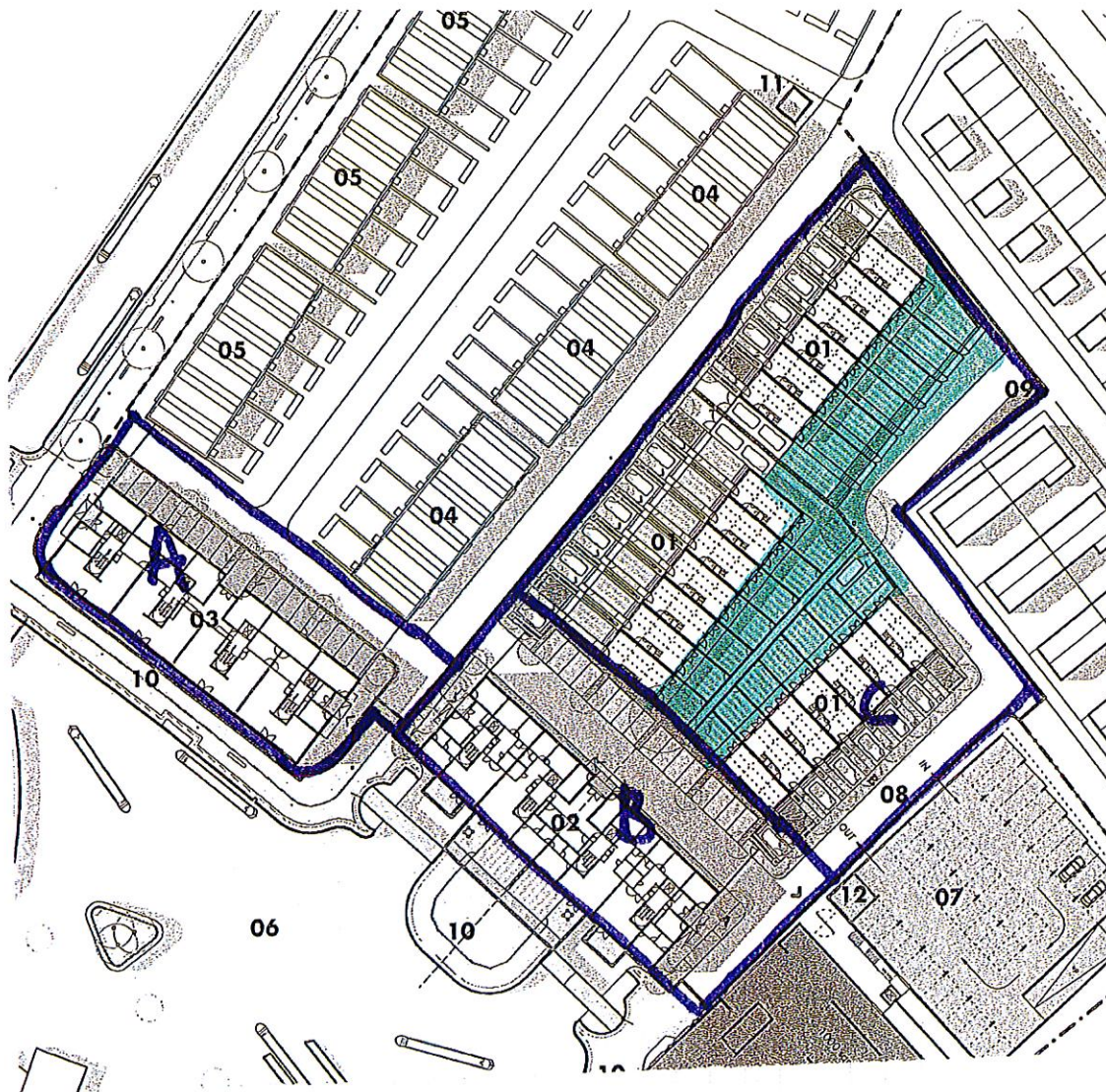
Engineer J.W

Date 12/16

Element SURFACE WATER DRAINAGE

Checked by

Date



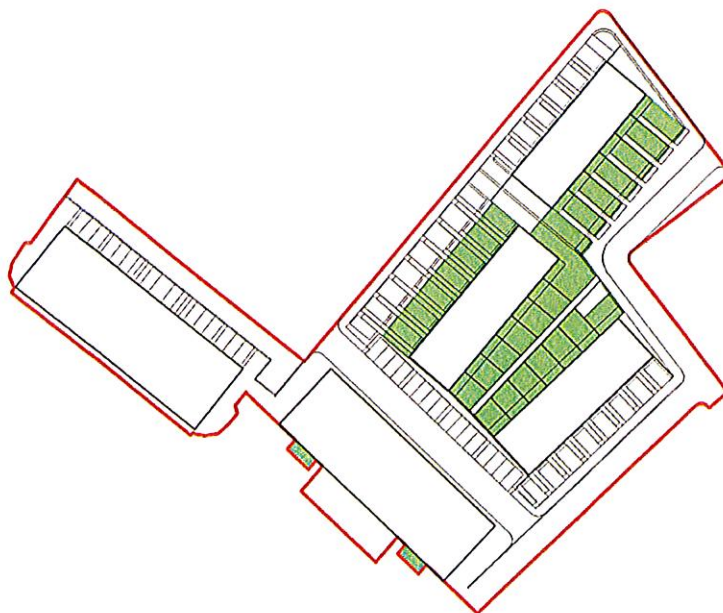
REF.	AREA	PIMP	
A	1375m ²	100%	
B	1560m ²	100%	
C	3450m ²	67%	1120 garden.
	<u>6385m²</u>	<u>82%</u>	

Job No 184/02	Sheet No SURFACE 02	
Project NEW BUNTING MH	Engineer S/W	Date 01/17
Element SURFACE WATER DRAINAGE.	Checked by	Date

CARLSDOM ESTATE:



PROPOSED SITE:



BY INSPECTION THE PROPOSED SITE INCLUDES A SIMILAR PROPORTION OF GREEN SPACE TO THE FORMER SITE.

Job No	284/04	Sheet No	SURFACE	03
Project	NEW ISLINGTON - MM	Engineer	NR	Date 20/02/19
Element	SURFACE WATER DRAINAGE	Checked by		Date

PROPOSALS

WITHIN THE PROPOSED SITE, OPTIONS FOR REDUCING OVERALL FLOW TO THE SEWER ARE LIMITED DUE TO THE NATURE OF MADE GROUND OVERLAYING IMPERMEABLE NATURAL CLAYS AND A LACK OF SURFACE WATER NETWORK.

SURFACE WATER DISPOSAL IS THEREFORE PROPOSED TO CONNECT TO THE EXISTING COMBINED PUBLIC SEWER (SHOOTERS BROOK).

IN ACCORDANCE WITH THE REQUIREMENTS OF THE MANCHESTER CITY, SALFORD + TRAFFORD COUNCIL LEVEL 2 STRATEGIC FRA (MGT FRA), A MINIMUM REDUCTION OF SURFACE WATER RUNOFF IS TARGETED AT 50%

* CONSIDER ROW 1 - DETERMINE SPECIFICATION OF MEASURES TO MEET TARGET RUNOFF.

* SITES B + C WILL BE BOUGHT IN DUE COURSE, WITH PROPOSALS CONFIRMED AT THAT TIME.

Job No	284/04	Sheet No	SURFACE 04		
Project	NEW ISLINGTON - MH		Engineer	NR	Date 20/02/19
Element	SURFACE WATER DRAINAGE		Checked by		Date

ROW 1 SURFACE WATER DRAINAGE

ALLOWABLE RUNOFF

FORMER SITE AND PROPOSED SITE HAVE SIMILAR PIMP AREA.

CALCULATE FORMER SITE PEAK SURFACE WATER FLOWS USING WALLINGFORD PROCEEDURE.

ROW 1 SITE PEAK FLOWS - SEE TEDDS CALCS ;

$$M1 - 5 ; Q_{max} = 15.0 \text{ L/s}$$

$$M2 - 5 ; Q_{max} = 19.2 \text{ L/s}$$

$$M5 - 5 ; Q_{max} = 24.9 \text{ L/s}$$

$$M30 - 5 ; Q_{max} = 35.2 \text{ L/s}$$

$$M100 - 5 ; Q_{max} = 44.5 \text{ L/s}$$

FOR A 50% REDUCTION , MAX ALLOWABLE DISCHARGE IN PROPOSED CONDITION ;

$$Q_{allow} = 0.50 \times 15 = 7.5 \text{ L/s}$$

$$\text{PROPOSED SITE AREA} = 1375 \text{ m}^2 \text{ (0.138 Ha)}$$

$$\text{PIMP} = 100\%$$

$$\text{CONTRIBUTING SITE AREA} = 1375 \text{ m}^2 \text{ (0.138 Ha)}$$

 Joule Consulting Engineers Timber Wharf, 40 Worsley Street Manchester M15 4LD	Project				Job no.	
	New Islington Phase 2				284/04	
	Calcs for				Start page no./Revision	
	Existing M1-5 Row 1				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	SW	07/03/2018				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Manchester
Storm duration	D = 5 min
Return period	Period = 1 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.360
5-year return period rainfall of 60 minutes duration	M5_60min = 18.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.36
Rainfall for 5min storm with 5 year return period	M5_5min _i = Z1 × M5_60min = 6.5 mm
Factor Z2 (Wallingford procedure)	Z2 = 0.62
Rainfall for 5min storm with 1 year return period	M1_5min = Z2 × M5_5min _i = 4.0 mm
Design rainfall intensity	I _{max} = M1_5min / D = 48.0 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 1375 m ²
Percentage of area that is impermeable	p = 82 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 15.0 l/s

 Joule Consulting Engineers Timber Wharf, 40 Worsley Street Manchester M15 4LD	Project				Job no.	
	New Islington Phase 2				284/04	
	Calcs for				Start page no./Revision	
	Existing M2-5 Row 1				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	SW	07/03/2018				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Manchester
Storm duration	D = 5 min
Return period	Period = 2 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.360
5-year return period rainfall of 60 minutes duration	M5_60min = 18.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.36
Rainfall for 5min storm with 5 year return period	M5_5min _i = Z1 × M5_60min = 6.5 mm
Factor Z2 (Wallingford procedure)	Z2 = 0.79
Rainfall for 5min storm with 2 year return period	M2_5min = Z2 × M5_5min _i = 5.1 mm
Design rainfall intensity	I _{max} = M2_5min / D = 61.4 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 1375 m ²
Percentage of area that is impermeable	p = 82 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 19.2 l/s

 Joule Consulting Engineers Timber Wharf, 40 Worsley Street Manchester M15 4LD	Project				Job no.	
	New Islington Phase 2				284/04	
	Calcs for				Start page no./Revision	
	Existing M5-5 Row 1				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	SW	07/03/2018				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Manchester
Storm duration	D = 5 min
Return period	Period = 5 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.360
5-year return period rainfall of 60 minutes duration	M5_60min = 18.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.36
Rainfall for 5min storm with 5 year return period	M5_5min _i = Z1 × M5_60min = 6.5 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.02
Rainfall for 5min storm with 5 year return period	M5_5min = Z2 × M5_5min _i = 6.6 mm
Design rainfall intensity	I _{max} = M5_5min / D = 79.5 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 1375 m ²
Percentage of area that is impermeable	p = 82 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 24.9 l/s

 Joule Consulting Engineers Timber Wharf, 40 Worsley Street Manchester M15 4LD	Project				Job no.	
	New Islington Phase 2				284/04	
	Calcs for				Start page no./Revision	
	Existing M30-5 Row 1				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	SW	07/03/2018				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Manchester
Storm duration	D = 5 min
Return period	Period = 30 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.360
5-year return period rainfall of 60 minutes duration	M5_60min = 18.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.36
Rainfall for 5min storm with 5 year return period	M5_5min _i = Z1 × M5_60min = 6.5 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.45
Rainfall for 5min storm with 30 year return period	M30_5min = Z2 × M5_5min _i = 9.4 mm
Design rainfall intensity	I _{max} = M30_5min / D = 112.4 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 1375 m ²
Percentage of area that is impermeable	p = 82 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 35.2 l/s

 Joule Consulting Engineers Timber Wharf, 40 Worsley Street Manchester M15 4LD	Project				Job no.	
	New Islington Phase 2				284/04	
	Calcs for				Start page no./Revision	
	Existing M100-5 Row 1				1	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
	SW	07/03/2018				

DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Manchester
Storm duration	D = 5 min
Return period	Period = 100 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.360
5-year return period rainfall of 60 minutes duration	M5_60min = 18.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.36
Rainfall for 5min storm with 5 year return period	M5_5min _i = Z1 × M5_60min = 6.5 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.83
Rainfall for 5min storm with 100 year return period	M100_5min = Z2 × M5_5min _i = 11.8 mm
Design rainfall intensity	I _{max} = M100_5min / D = 142.0 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 1375 m ²
Percentage of area that is impermeable	p = 82 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 44.5 l/s

Job No	284/04	Sheet No	SURFACE 05
Project	NEW ISLINGTON - MH	Engineer	NR
Element	SURFACE WATER DRAINAGE	Date	20/02/19
		Checked by	Date

PROPOSED ATTENUATION

REFER TO ATTACHED MICRO-DRAINAGE CALCS.

MAX OUTFALL FLOW FROM HYDROBRAKE = 7.5 l/s

THE REQUIRED ATTENUATION VOLUME IS PROVIDED BY A STORAGE TANK + CONTRIBUTING PIPEWORK;

$$\begin{aligned}
 \text{TANK} &\Rightarrow 0.95 \times \underset{(L)}{7.0} \times \underset{(W)}{5.0} \times \underset{(d)}{1.2} = 39.9 \text{ m}^3 \quad [7 \times 5 \times 1.2 \text{m CHAMBER, 95\% VOIDS}] \\
 \text{PIPE} &\Rightarrow 50\text{m} \times \pi \times \frac{0.3^2}{4} = 3.5 \text{ m}^3 \quad [50\text{m LONG 300mm } \phi \text{ PIPE}] \\
 \text{CHAMBER} &\Rightarrow \underset{(h)}{1.5\text{m}} \times \pi \times \frac{1.2^2}{4} = 1.7 \text{ m}^3 \quad [1.2\text{m } \phi \text{ CHAMBER}]
 \end{aligned}$$

$$\Sigma V = 45.1 \text{ m}^3$$

$$\begin{aligned}
 \text{MAX VOLUME USED IN MICRO DRAINAGE CALC} &= 41.468 + 1.112 \\
 &= 42.58 \text{ m}^3 \leq 45.1 \text{ m}^3 \\
 &\therefore \text{OK.}
 \end{aligned}$$

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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 385263 398526	
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
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

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.107	4-8	0.031

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 4.241

Network Design Table for Storm

^ - Indicates Time of Concentration is too low and the pipe is not sized using the rainfall

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	50.000	0.222	225.0	0.138	4.00	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)
S1.000	0.00	4.80^	48.000	0.138	0.0	0.0	0.0	1.04	73.8	0.0

AEA - Ambiantal		Page 2
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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
S1.001	10.000	0.125	80.0	0.000	0.00	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)
S1.001	0.00	4.89^	47.778	0.138	0.0	0.0	0.0	1.76	124.4	0.0

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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	0.138	0.138	0.138
1.001	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.138	0.138	0.138

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Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	S1	300	0.950	1.172	Unclassified	1200	0	0.950	Unclassified
S1.001	S2	300	1.172	1.297	Unclassified	1200	0	1.172	Unclassified

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)
S1.001	S	49.250	47.653	0.000	0	0

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

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location GB 385263 398526		Cv (Winter)	0.840
Data Type	Point Storm Duration (mins)		30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S2, DS/PN: S1.001, Volume (m³): 5.1

Unit Reference	MD-SHE-0122-7500-1375-7500
Design Head (m)	1.375
Design Flow (l/s)	7.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	122
Invert Level (m)	47.778
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.375	7.5
Flush-Flo™	0.404	7.5
Kick-Flo®	0.853	6.0
Mean Flow over Head Range	-	6.5

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.3	1.200	7.0	3.000	10.8	7.000	16.2
0.200	6.9	1.400	7.6	3.500	11.6	7.500	16.8
0.300	7.4	1.600	8.0	4.000	12.4	8.000	17.3
0.400	7.5	1.800	8.5	4.500	13.1	8.500	17.8
0.500	7.4	2.000	8.9	5.000	13.8	9.000	18.3
0.600	7.3	2.200	9.3	5.500	14.4	9.500	18.8
0.800	6.5	2.400	9.7	6.000	15.1		
1.000	6.5	2.600	10.1	6.500	15.6		

AEA - Ambiantal		Page 6																		
Science Park Square Brighton East Sussex	Row 1 New Islington Manchester 7.5l/s attenuation +30% cc																			
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XP Solutions	Network 2018.1																			
Storage Structures for Storm Cellular Storage Manhole: S2, DS/PN: S1.001 Invert Level (m) 47.875 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>35.0</td><td>35.0</td><td>1.201</td><td>0.0</td><td>63.8</td></tr><tr><td>1.200</td><td>35.0</td><td>63.8</td><td></td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	35.0	35.0	1.201	0.0	63.8	1.200	35.0	63.8			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)															
0.000	35.0	35.0	1.201	0.0	63.8															
1.200	35.0	63.8																		
©1982-2018 Innovyze																				

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2 year Return Period 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 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 0.750
 Site Location GB 385263 398526 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 30, 30, 30

		Water Surcharged					
PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Level (m)	Depth (m)	Flow / Cap.
S1.000	S1	15 minute 2 year Winter I+30%	15	49.250	48.135	-0.165	0.40
S1.001	S2	30 minute 2 year Winter I+30%	30	49.250	48.043	-0.035	0.08

		Pipe			
PN	US/MH Name	Infil. Flow (l/s)	Maximum Vol (m ³)	Flow (l/s)	Status
S1.000	S1		0.148	27.9	OK
S1.001	S2	0.0	7.612	7.3	OK

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Science Park Square Brighton East Sussex	Row 1 New Islington Manchester 7.5l/s attenuation +30% cc	
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XP Solutions	Network 2018.1	

30 year Return Period 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 Coeffiecient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 0.750
 Site Location GB 385263 398526 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 30, 30, 30

			Water Surcharged				
PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Level (m)	Depth (m)	Flow / Cap.
S1.000	S1	60 minute 30 year Winter I+30%	60	49.250	48.524	0.224	0.45
S1.001	S2	60 minute 30 year Winter I+30%	60	49.250	48.514	0.436	0.08

		Pipe			
PN	US/MH Name	Infil. Flow (l/s)	Maximum Vol (m ³)	Flow (l/s)	Status
S1.000	S1	0.587	31.0	SURCHARGED	
S1.001	S2	0.0	25.512	7.5	SURCHARGED

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Science Park Square Brighton East Sussex	Row 1 New Islington Manchester 7.5l/s attenuation +30% cc	
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100 year Return Period 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 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 0.750
 Site Location GB 385263 398526 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 30, 30, 30

			Water Surcharged				
PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Level (m)	Depth (m)	Flow / Cap.
S1.000	S1	60 minute 100 year Winter I+30%	60	49.250	48.989	0.689	0.61
S1.001	S2	60 minute 100 year Winter I+30%	60	49.250	48.978	0.900	0.08

			Pipe		
PN	US/MH Name	Infil. Flow (l/s)	Maximum Vol (m ³)	Flow (l/s)	Status
S1.000	S1		1.112	42.3	FLOOD RISK
S1.001	S2	0.0	41.468	7.5	FLOOD RISK

**06 Appendix 2 – Email ref: “Fwd: Mansion
House Ph1 – Connection to MCC
drainage” dated 10/02/2020 18:25**

Jack Needham

From: Simon Humphreys <SimonHumphreys@urbansplash.co.uk>
Sent: 10 February 2020 18:25
To: Jack Needham; Hunter Lyden; Andrew Machin
Subject: Fwd: Mansion House Ph1 - Connection to MCC drainage

See below.

MCC not needing any any agreement to connect to their drain.

Cheers

Simon

Sent from my iPhone

Simon Humphreys

Director of Development - Urban Splash

Trustee - Merseyside Building Preservation Trust, The Florence Institute Trust

0151 708 9449

Established Innovators 1993-2018 - 25 years of Urban Splash | www.urbansplash.co.uk/25-years

"Consistently exemplary," Construction News

"it has revolutionised inner city areas" The Independent

"...this is the way forward" Esther McVey, Housing Minister on our modular Homes

Unit 204 Vanilla Factory, 39 Fleet Street, Liverpool L1 4AR | www.urbansplash.co.uk

Subscribe to the Urban Splash Newsletter | www.urbansplash.co.uk/newsplash

Begin forwarded message:

From: Ian Slater <i.slater@manchester.gov.uk>
Date: 10 February 2020 at 10:45:42 GMT
To: Simon Humphreys <SimonHumphreys@urbansplash.co.uk>
Cc: Louise Mcmanus <l.mcmanus@manchester.gov.uk>, Rory Gaffney <r.gaffney@manchester.gov.uk>
Subject: Mansion House Ph1 - Connection to MCC drainage

Simon,

We discussed this at the SRG last week and whether we needed a S106 style agreement. Ken has discussed this with Legal who have commented as below.

The following right was granted within the Lease to US:-

"to connect into (but no so as to overload the capacity) and use all Conduits from time to time within or forming part of the Retained Land subject to the

Tenant paying a fair proportion of the cost of maintaining such Conduits in good repair"

"Conduits" is defined as tanks pipes sewers drains meters ducts trunking sewers gutters and associated apparatus and other media for the passage or transmission of soil water gas electricity smoke light information or other matters including where relevant ancillary equipment and structures excluding those belonging to the relevant supply authorities"

On this basis they don't think that anything else is required.

Are you content with this?

Regards,

Ian Slater
Head of Residential Growth
Growth & Development Directorate
Manchester City Council
Town Hall
Albert Square
Manchester
M60 2LA

email: i.slater@manchester.gov.uk
tel: 0161 234 4582
internal: 801 34582
fax: 0161 274 7003
website: <http://www.manchester.gov.uk>

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