

Table 3-3: Filter Drain Maintenance Requirements

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Remove litter and surface debris and weeds	Monthly or as required
	Grass cutting (to maintain grass height within landscape architect's specified design range)	To be confirmed by Landscape Architect [Monthly (during growing season) or as required]
	Manage other vegetation and remove nuisance plants/dead growth.	Monthly (at start, then as required).
	Remove sediment from main channel.	Annually (or as required after heavy rainfall events)
Occasional maintenance	Re-seed areas of poor vegetation growth (seed mix to landscape architect's specification).	Annually, or as required. As per landscape architect's specification
Monitoring	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly
Remedial Actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years
	Repair of erosion or other damage by re-seeding or re-turfing. Soil reinforcement such as coir matting should be used and staked in accordance with manufacturer's instructions.	As required.
	Realignment of flow channel surface.	As required.
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required.
	Re-level uneven surfaces and reinstate design levels. This may be required as part of sediment removal.	As required.
	Replace geotextiles and clean and replace filter media, if clogging occurs. Terram 1000 typical design life is 25 years.	As required.

3.7 Permeable Pavements

3.7.1 Operation

The permeable pavements are intended to be water quality and attenuation storage features and to be dry, except during rainfall events.

Where applicable the surface has been designed to be permeable/contain gaps where rain can flow through the upper construction layers into the voids between interlocking stones which make up the subbase.

The surfacing and drainage around the new buildings has generally been designed to facilitate access for maintenance vehicles.

3.7.2 Inspection and Maintenance Regime

Regular inspection and maintenance is important for the effective operation of the permeable pavement.

A recommended schedule is detailed in

Table 3-4 overleaf.

Table 3-4: Permeable Pavements Maintenance Requirements

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Initial inspection.	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	Annually.
	Monitor inspection chambers.	Annually.
Regular maintenance\inspection	Brushing and vacuuming.	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required and as per landscape architect's specification.
	Removal of weed.	As required.
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure. This could include replacement of the jointing and bedding material. The upper geotextiles layer may also need replacing if clogged and Terram 1000 has a life span of 25 years.	As required (if infiltration performance is reduced as a result of significant clogging).

3.8 Attenuation Storage Tanks

3.8.1 Operation

Attenuation storage tanks are intended to be surface water attenuation storage features to accommodate the balance of surface water runoff due to restricted discharge rates. These features are intended to be dry except during and following rainfall events.

Surface water will fill the attenuation storage tanks as the water level rises within the drainage system due to the flow control devices. Following rainfall events, water will drain down through the piped drainage system and the water level will slowly fall.

Access for maintenance has been provided through inspection chambers.

3.8.2 Inspection and Maintenance Regime

Regular inspection and maintenance is important for the effective operation of the features. A recommended schedule is detailed in Table 3-5 below.

Sediment\material removal should be undertaken in consultation with the guidance provided by environmental regulator.

Table 3-5: Attenuation Storage Tanks Maintenance Requirements

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Monthly, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, overflows and vents to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

3.9 Flow Control Chambers

Flow control chambers are proprietary products and the manufacturer's recommendations should be followed.

3.9.1 Operation

Flow control chambers are intended to restrict the surface water runoff discharge rate from the site to a designed rate utilising techniques such as an orifice plate, vortex separator or mechanical float control.

3.9.2 Inspection and Maintenance Regime

Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be drain efficiently, thus exposing the development to a greater level of flood risk.

A recommended schedule is detailed in Table 3-6 below.

Table 3-6: Flow Control Maintenance Requirements

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Initial inspection should be provided using a post construction CCTV survey.	N/A
	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	3-monthly, 48 hours after large storms.
Occasional maintenance	Check and remove large vegetation growth near pipe runs.	6 monthly
Remedial actions	Open penstock where poor performance is identified. Inspect and rectify any issues found.	As required.
	If continued poor performance, jet and CCTV survey.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.

3.10 Pipes & Manholes

3.10.1 Operation

Pipes are the main conveyance for surface water across the development. They are to be dry except during rainfall events. All pipes have been designed to be self-cleansing as a result of the gradients proposed.

Access for maintenance is provided through access chambers, manholes and rodding eyes.

3.10.2 Inspection and Maintenance Regime

Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be drained efficiently; thus, exposing the development to a greater flood risk level.

Sediment\material removal should be undertaken with reference to relevant guidance from the environmental regulator, especially where run-off is taken from potentially contaminated areas such as vehicular access points/parking.

A recommended schedule is detailed in Table 3-7 below.

Table 3-7: Pipes & Manholes Maintenance Requirements

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Initial inspection should be provided in the form of a post construction CCTV survey.	N/A
	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	Every 3 months, 48 hours after large storms.
Occasional maintenance	Check and remove large vegetation growth near pipe runs.	Every 6 months
Remedial actions	Rod through poorly performing runs as initial remediation.	As required.
	If poor performance persists, jet and CCTV survey poorly performing runs.	As required.
	Seek advice for the remediation techniques suitable for the type of issue and its location.	As required If above does not improve performance.

4.0 Appendices

Appendix A – Topographic Survey

Appendix B – Development Proposals

Appendix C – Buried Services Survey

Appendix D – CCTV Drainage Survey

Appendix E – Thames Water Sewer Records and PPSE Response

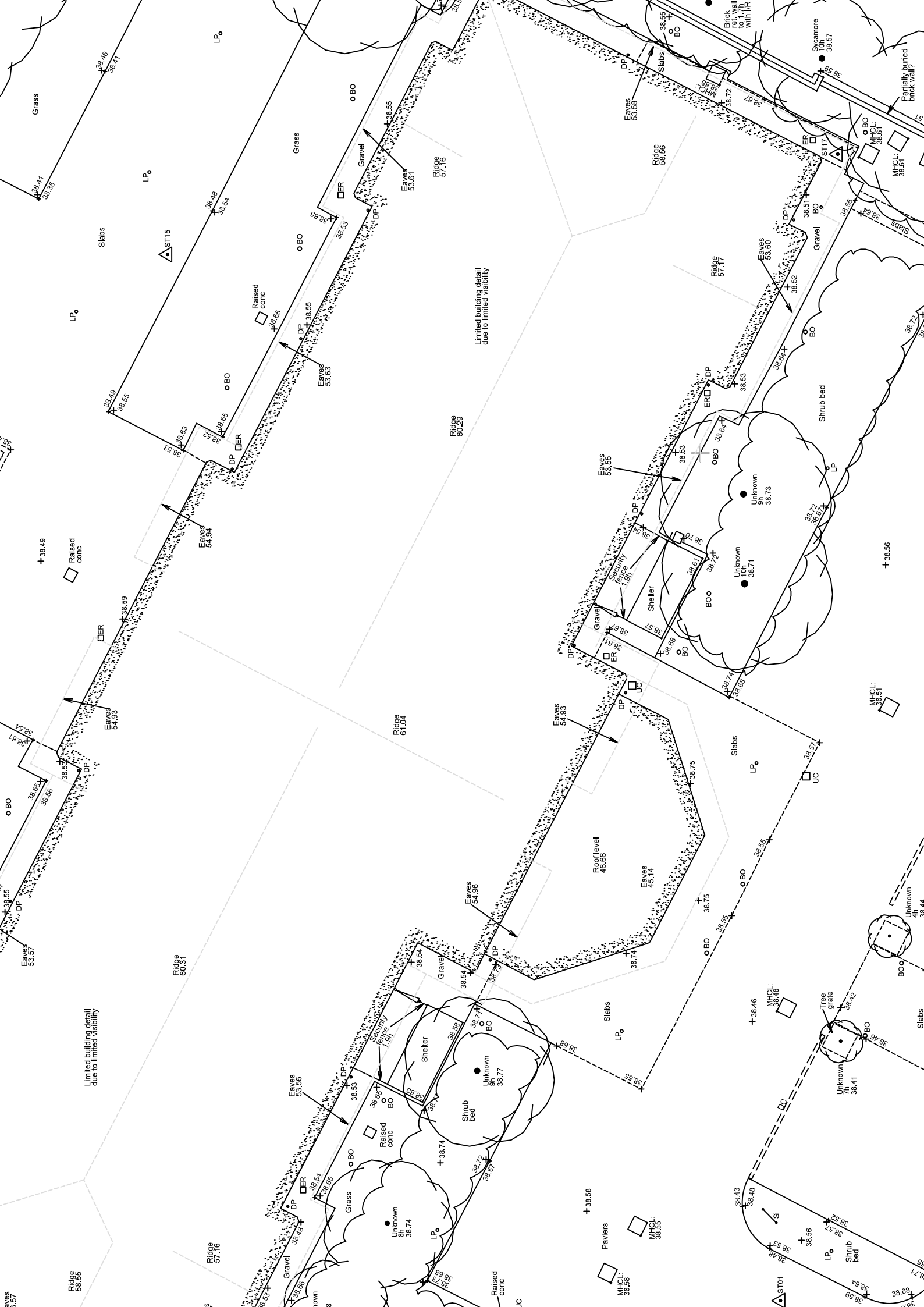
Appendix F – Reading Borough Council Correspondence

Appendix G – Culverted Watercourse Survey

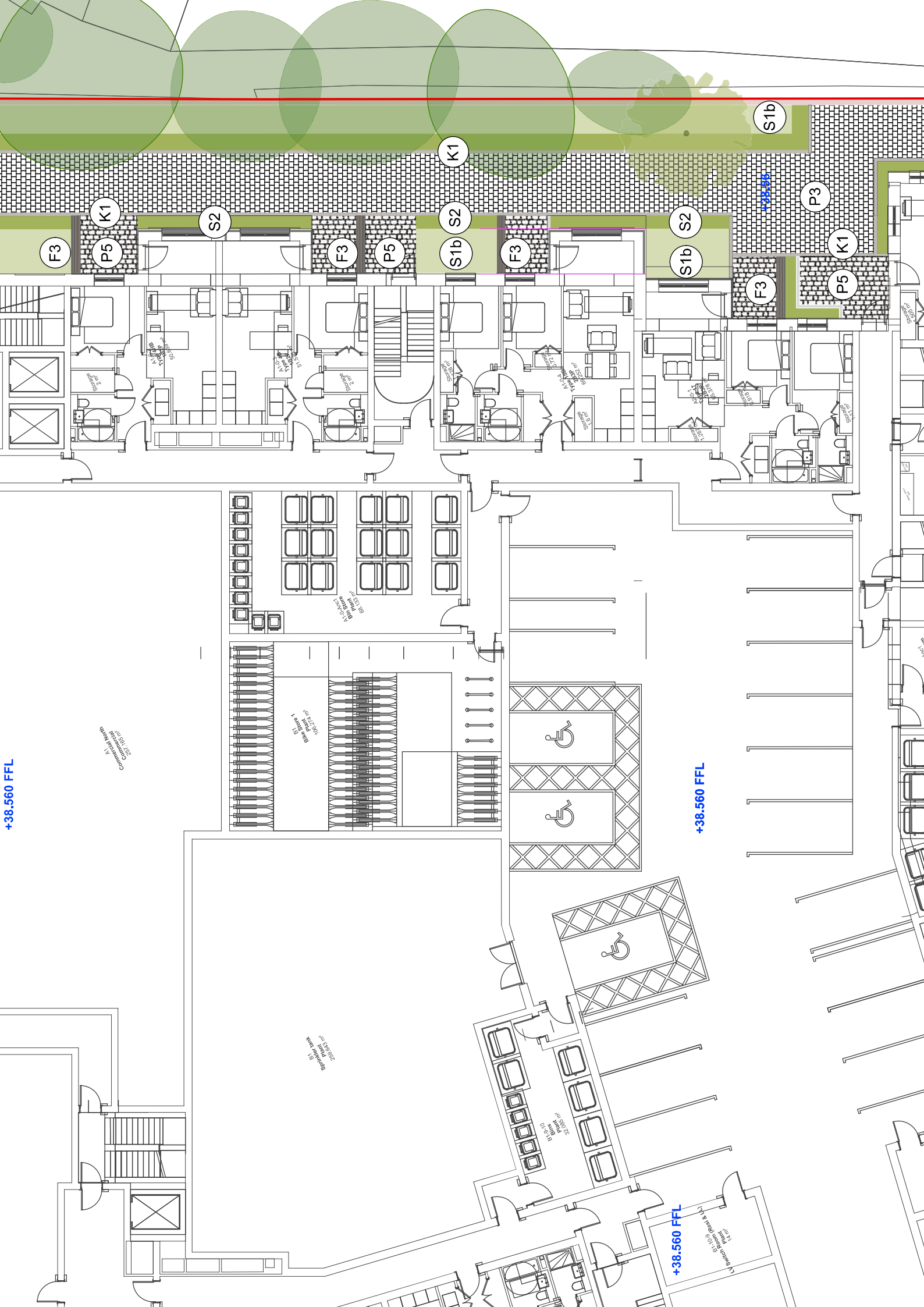
Appendix H – Drainage Drawings

Appendix I – Hydraulic Calculations

Appendix A – Topographic Survey



Appendix B – Development Proposals



+38.560 FFL

General Notes
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

+38.560 FFL

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

+38.560 FFL

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

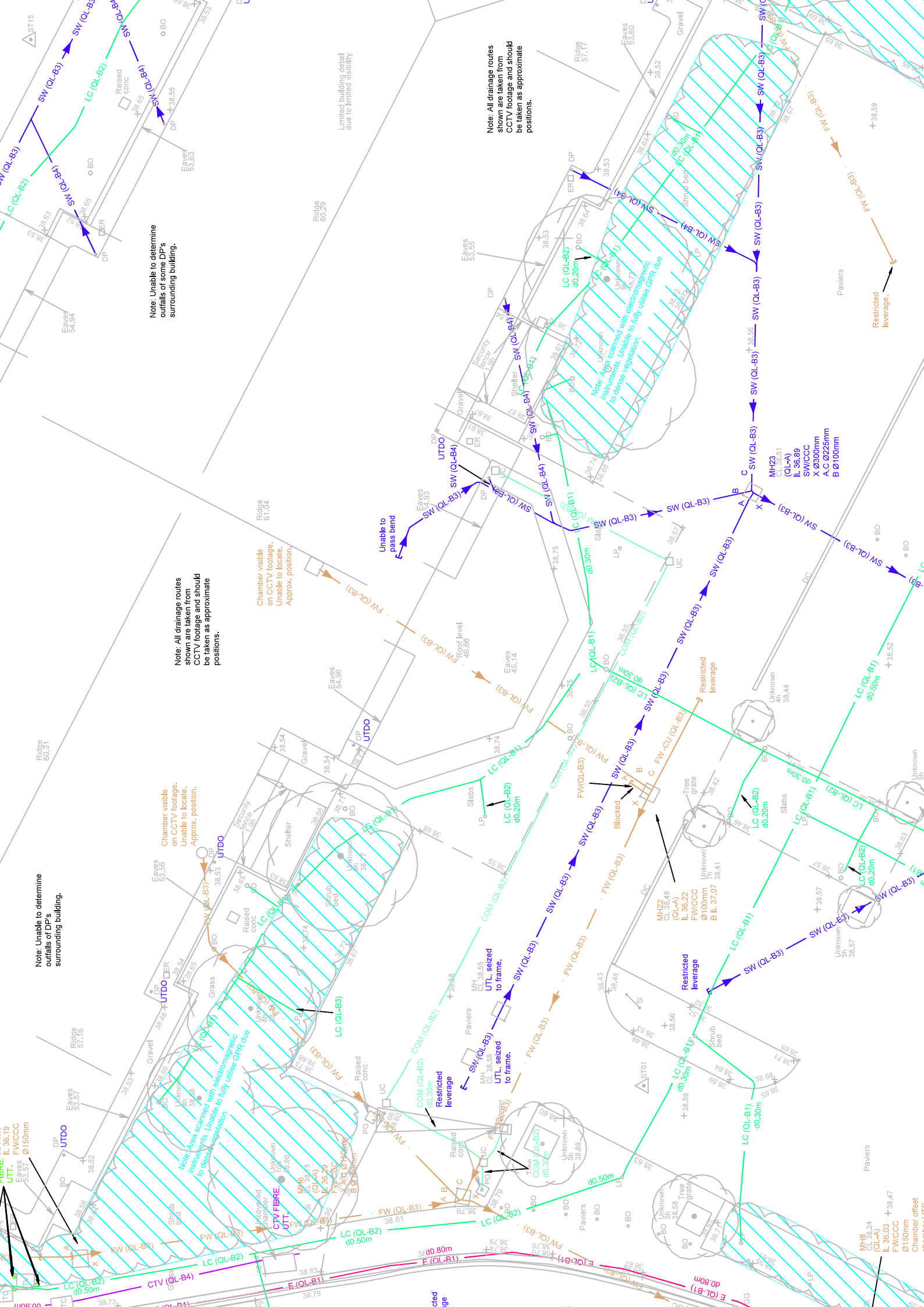
Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Staircase
201/10/19

Appendix C – Buried Services Survey



Appendix D – CCTV Drainage Survey

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING



IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH
 NOTTINGHAM YEOVIL

CCTV Report



Project

2 NORMAN PLACE,
READING, RG1 8DA.

Survey Date

04/09/2023

Client

HEXA CONSULTING LTD

Surveyor

SWA

Job Number

60390CCTV-01

Issue Date

19/09/2022

Checked by

AJM

Revision



High Pressure Jetting & Resurvey

Maintenance Visits

Following the initial investigations completed on site we would recommend a quarterly re-survey of the drainage network in order to monitor the ongoing pipework condition.

System Maintenance Survey:

Quarterly Assessment of Existing Defects Due – 04/03/2024

Annual Full System Re-survey Due – 04/09/2024

High Pressure Jetting Required:

(5% - 30%) – MH2 X, MH2 B, MH3 X, MH3 A, MH3 B, MH3 D, MH5 A, MH6 X, MH6 A, MH6 C, MH7 X, MH11 C, MH13 B, MH15 X, MH15 A, MH17 B, MH17 C, MH22 X, MH22 A, MH22 C, MH23 A, MH24 B, MH25 B

(35 % - 60%) – MH22 B

(65% - 95%) – MH7 C, MH24 B

Project-information

 Project name:
Norman place

 Contract number:
60390

 Contact:
James Chapman

 Date:
06/09/2023

Client **Hexa Consulting LTD**
 Contact: **James Chapman**
 Position: **N/a**
 Road **4 St Marys Place**
 Town **Nottingham**
 County **Nottinghamshire**
 Telephone: **011564 85252**
 Fax:
 Mobile:
 E-Mail: **james.chapman@hexaconsulting.co.uk**

Site **2 Norman Place**
 Contact: **James Chapman**
 Position: **N/A**
 Road **Norman Place**
 Town **Reading**
 County **Berkshire**
 Telephone: **011564 85252**
 Fax:
 Mobile:
 E-Mail: **james.chapman@hexaconsulting.co.uk**

Contractor **Survey Solutions**
 Contact: **Sam Ayriess**
 Position: **Surveyour**
 Road **Paper mill lane**
 Town **Irisweg 12**
 County **Ipswich**
 Telephone: **01473 240410**
 Fax: **N/A**
 Mobile: **N/A**
 E-Mail: **greg.baird@survey-solutions.co.uk**

Defect Grade Description

 Project name:
Norman place

 Contract number:
60390

 Contact:
James Chapman

 Date:
06/09/2023
1:
 Brick: No Structural Defects
Pipe: No Structural Defects

Acceptable Structural Condition

2:
 Brick: Minor cracking, Surface mortar loss, Spalling slight, wear slight
Pipe: Circumfrential crack, Moderate joint defects, Spalling slight, Wear slight

Minor collapse risk in short term but potential for further deterioration

3:
 Brick: Total mortarloss without other defects, single brick displaced, Deformation up to 5%, Spalling medium, Wear medium
Pipe: Fractures with deformation up tp 5%, Longitudinal cracking or mulitlpe cracking, Minor loss of level, More severe joint defects, Spalling medium, Wear medium

! Collapse unlikely in near future but future deterioration likely !

4:
 Brick: Total mortarloss with deformation greater than 10%, Deformation up to 10% and fractured, Displaced/hanging brickwork, Small number of missing bricks
Pipe: Broken, Deformation up to 10% and broken,, Fractured with deformation 5 - 10%, Multiple fractures, Serious loss of level, spalling large, wear large

!! Collapse likely in foreseeable future !!

5:
 Brick: Already Collapsed, Missing invert, Deformation over 10% and fractured, Displaced/hanging brickwork and deformation over 10%, Extensive missing bricks
Pipe: Already collapsed, Deformation over 10% and broken, Extensive areas of fabric missing, Fractured with deformation over 10%

!!! Collapsed or collapse imminent !!!



Inspection report

Date: 06/09/2023	Job N°: 60390	Weather: Dry	Operator: SWA	section number: 1	PLR: MH2 X X
Present:	Vehicle:	Camera: Solo pro Camera	Preset:	Cleaned: No	Grade:

Road: 2 Norman Place	Division:	start MH: MH2 X
Place: Reading	District:	end MH: SA
Location:	Tape No.:	Total length: 32.1 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Vitrified clay Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:250	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH2 X	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 50 % height/diameter	00:00:00		(Serv) 0
	0.73	JN	Junction at 10 o'clock, dia 100 mm	00:00:00	1_4a	(Constr) 0
	0.89	DE	Debris, 20 % cross-sectional area loss	00:00:00	1_5a	(Serv) 1
	1.31	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	1.31	S1	DES Debris silt, 5 % cross-sectional area loss, Start	00:00:00		(Serv) 1
	2.70	WL	Water level, 5 % height/diameter	00:00:00		(Serv) 0
	5.18	F1	DES Debris silt, 5 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	5.35	MH	Manhole Remark: MH	00:00:00	1_10a	(Constr) 0
	5.40	LL	Line of Sewer deviates left	00:00:00		(Serv) 0
	7.70	S2	DES Debris silt, 5 % cross-sectional area loss, Start	00:00:00		(Serv) 1
	10.80	WL	Water level, 5 % height/diameter	00:00:00		(Serv) 0
	12.60	JN	Junction at 10 o'clock, dia 100 mm	00:00:00	17_14a, b	(Constr) 0
	15.60	F2	DES Debris silt, 5 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	20.10	DES	Debris silt, 5 % cross-sectional area loss	00:00:00		(Serv) 1
	23.50	S3	DES Debris silt, 10 % cross-sectional area loss, Start	00:00:00		(Serv) 1
	23.90	C3	DES Debris silt, 5 % cross-sectional area loss, Changed	00:00:00		(Serv) 1
	27.60	F3	DES Debris silt, 5 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	28.90	WL	Water level, 5 % height/diameter	00:00:00		(Serv) 0
	30.00	JN	Junction at 10 o'clock, dia 100 mm	00:00:00		(Constr) 0
	32.10	SA	Survey abandoned, Remark: Restricted Leverage	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

 Place:
Reading

 Road:
2 Norman Place

 Date:
06/09/2023

 section number:
1

 PLR:
MH2 X X


Photo: 1_4a, 00:00:00
0.73m, Junction at 10 o'clock, dia 100 mm



Photo: 1_5a, 00:00:00
0.89m, Debris, 20 % cross-sectional area loss



Photo: 1_10a, 00:00:00
5.35m, Manhole Remark: MH



Photo: 17_14a, 00:00:00
12.6m, Junction at 10 o'clock, dia 100 mm

Inspection photosPlace:
ReadingRoad:
2 Norman PlaceDate:
06/09/2023section number:
1PLR:
MH2 X X

Photo: 17_14b, 00:00:00
12.6m, Junction at 10 o'clock, dia 100 mm



Inspection report

Date: 06/09/2023	Job N°: 60390	Weather: Dry	Operator: SWA	section number: 2	PLR: SA X
Present:	Vehicle:	Camera: Solo pro Camera	Preset:	Cleaned: No	Grade:

Road: 2 Norman Place	Division:	start MH: MH2 A
Place: Reading	District:	end MH: SA
Location:	Tape No.:	Total length: 18.9 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Vitrified clay Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:150	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH2 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.26	WL	Water level, 20 % height/diameter	00:00:00		(Serv) 0
	3.40	WL	Water level, 80 % height/diameter	00:00:00		(Serv) 0
	5.60	DC	Dimension of sewer changes, new dimension dia 100 mm	00:00:00	32_5a	(Misc) 0
	7.00	JDM	Joint displaced. Medium	00:00:00	33_6a	(Struct) 1
	8.40	WL	Water level, 95 % height/diameter	00:00:00		(Serv) 0
	10.00	JN	Junction at 10 o'clock, dia 100 mm	00:00:00		(Constr) 0
	13.70	MH	Manhole Remark: Chamber visible	00:00:00	36_9a	(Constr) 0
	14.20	LL	Line of Sewer deviates left	00:00:00		(Serv) 0
	18.50	LR	Line of Sewer deviates right	00:00:00		(Serv) 0
	18.90	SA	Survey abandoned, Remark: Unable to pass bend	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

 Place:
Reading

 Road:
2 Norman Place

 Date:
06/09/2023

 section number:
2

 PLR:
SA X


Photo: 32_5a, 00:00:00
 5.6m, Dimension of sewer changes, new dimension dia 100 mm



Photo: 33_6a, 00:00:00
 7m, Joint displaced. Medium



Photo: 36_9a, 00:00:00
 13.7m, Manhole Remark: Chamber visible



Inspection report

Date: 06/09/2023	Job N°: 60390	Weather: Dry	Operator: SWA	section number: 3	PLR: SA X
Present:	Vehicle:	Camera: Solo pro Camera	Preset:	Cleaned: No	Grade:

Road: 2 Norman Place	Division:	start MH: MH2 B
Place: Reading	District:	end MH: SA
Location:	Tape No.:	Total length: 23.5 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Vitrified clay Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:175	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH2 B	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	1.10	LR	Line of Sewer deviates right	00:00:00		(Serv) 0
	1.50	JN	Junction at 11 o'clock, dia 80 mm	00:00:00	3_4a	(Constr) 0
	5.38	GP	General Condition photograph	00:00:00	3_5a	(Misc) 0
	17.80	JN	Junction at 12 o'clock, dia 80 mm	00:00:00	3_6a	(Constr) 0
	18.20	WL	Water level, (%) height/diameter	00:00:00		(Serv) 0
	18.70	S1 DES	Debris silt, 5 % cross-sectional area loss, Start	00:00:00		(Serv) 1
	21.80	F1 DES	Debris silt, 5 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	22.10	MH	Manhole	00:00:00		(Constr) 0
	22.80	JN	Junction at 03 o'clock, dia 150 mm	00:00:00	52_11a	(Constr) 0
	23.50	SA	Survey abandoned, Remark: Unable to pass bend	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features