

Our Ref: BEK/23021/230411/JPD-RevA

11 July 2023

Joda Property Developments
Great Clough Farm
Great Clough
Loveclough
BB4 8UQ

Proposed Detailed Drainage Strategy – Southern Court, Burnley

BEK Enviro (BEK) has been instructed by Joda Property Developments Ltd to provide a Detailed Drainage Strategy for the proposed development of 5No residential properties located on land at Southern Court in Burnley, Lancashire.

Existing Site

At present the application site comprises of an undeveloped plot of land to the north west of Southern Court.

For purposes of this assessment, it is considered to have the same drainage characteristics as a greenfield site.

- Total Red Line Boundary = 0.186Ha

Existing Sewers

United Utilities sewer records identify that there are no public surface water sewers located within the vicinity of the site. The only public sewer is a 225mm diameter combined sewer located south west of the site within Southern Court.

Development Proposals

Development proposals include the erection of 5No detached properties with off street parking and access road direct from Southern Court.

Hierarchy of Surface Water Disposal

In accordance with the NPPF and the Non-Statutory Technical Standards for SUDS: Practice Guidance the discharge of surface water shall comply with the drainage hierarchy detailed within the National Planning Policy Framework, Planning Practice Guidance and within Building Regulations Part H and specifies the following methods in order of preference:

- Infiltration via soakaway or other suitable infiltration device
- Discharge to watercourse

- Discharge to public sewer

Infiltration

The Site Investigation and Ground Assessment Report undertaken by BEK Ref BEK-23021-2, April 2023 identifies that the ground comprises of clay and shallow bedrock which are not suitable for infiltration methods, an extract is provided below:

‘Firm to stiff Orange/brown/grey clays’ were encountered within each trial pit. ‘firm gravelly sandy clay with occasional clayey sand pockets and occasional cobbles’ were encountered within all of the trial holes.

‘The bedrock was encountered within Trial Pit 1 (1.1 m), Trial Pit 2 (1 m), Trial Pit 3 (1.25 m), and Trial Pit 4 (1.8 m) during the site investigation.’

Furthermore, soilscape maps identify the site to be located on ground considered to be *‘Slowly permeable seasonally wet acid loamy and clayey soils.*

Taking the above into consideration the use of infiltration methods are not considered to be appropriate.

Watercourse

There are no watercourses within the local vicinity of the site in which a surface water connection could be made.

Sewer

Due to the unsuitability of soakaways and the lack of watercourses within the immediate area, surface water flows from the site have been connected into the public combined sewer located within Southern Court.

Greenfield Runoff Rates

Greenfield runoff rates have been calculated based on the total redline boundary of 0.186Ha, which resulted in QBar of 1.59l/s.

Proposed Discharge Rates

United Utilities have requested that surface water flows are restricted to no more than 2l/s for all return periods

Proposed Drainage Strategy

Within the proposed drainage strategy flows from the development are collected via a network of rainwater down pipes and gullies, before being connected into the 225mm public combined sewer within Southern Court.

Flows have been restricted to no more than 2.0l/s by means of an orifice flow control chamber, for all events up to and including the 100 year + 50% climate change event.

Flows in excess of this will be attenuated within 1200mm large diameter pipes located within the access road.

- Proposed Impermeable Area = 0.133Ha

Proposed Discharge Rates

Return Period	Discharge Rate (l/s)
1 Year	1.3
30 Year	1.3
100 Year + 50% Climate Change	2.0

Flow Control

- Hydrobrake or similar
- Chamber 2100mm diameter
- Design depth = 2.000m
- Design flow = 2.0l/s
- Aperture = 0.057m

Exceedance Routes (Normal Conditions)

The proposed surface water drainage network has sufficient capacity to retain flows below ground level during all return periods up to the 1 in 100 year + 50% climate change event with no surface flooding.

Exceedance Routes (Total System Failure)

In the unlikely event of total system failure, surface water flows from the site are anticipated to follow topography ultimately out of the access road then north down Southern Court, where they are likely to be intercepted via highway drainage serving Ightnhill Road. As such the risk associated with flooding to the proposed development and surrounding buildings is considered to be low.

Foul Flows

Foul flows from the proposed development will be connected into the public 225mm combined sewer located within Southern Court via a single combined connection.

Maintenance and Management

Following development, the drainage network serving the site will remain private, upon request from the LPA the developer is to provide evidence of the funding mechanism for the management and maintenance of the drainage system.



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

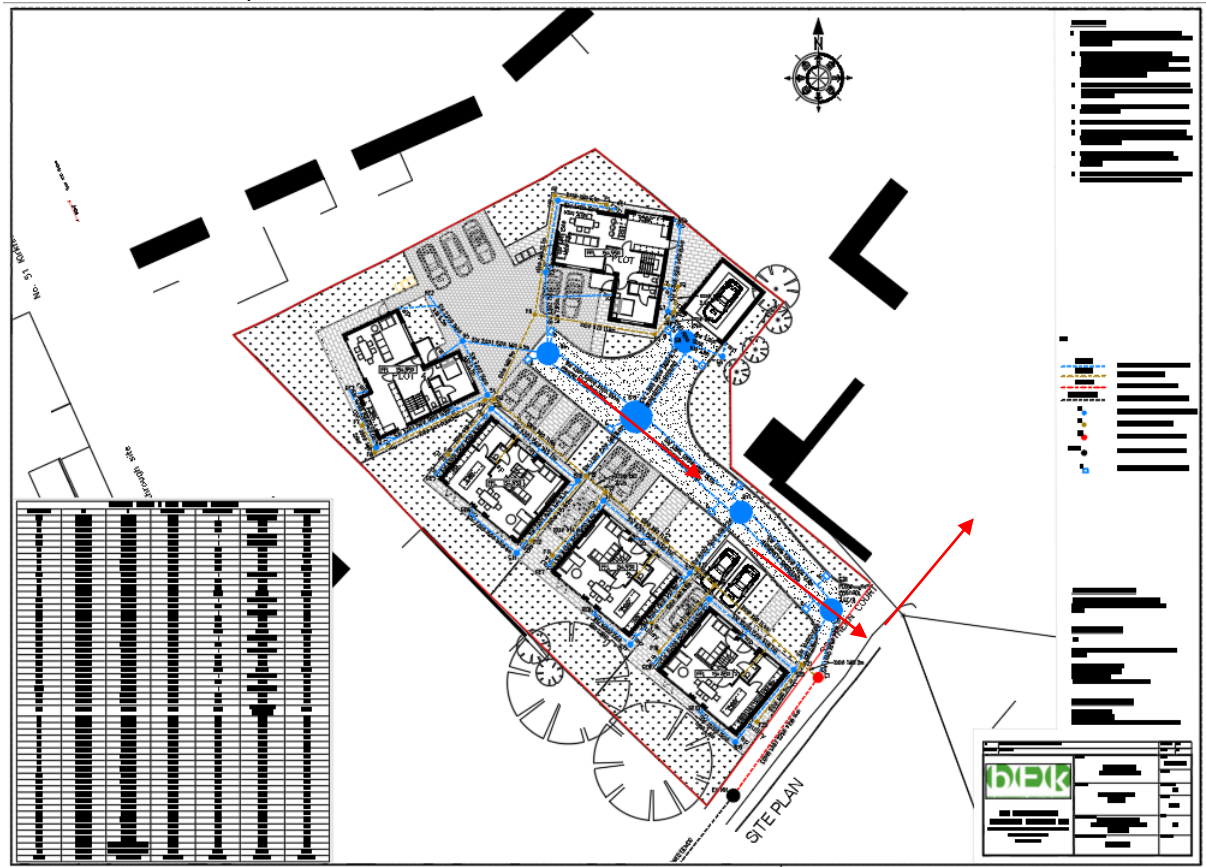
bEk Enviro Ltd

Suite One | No 3 Mitton Road Business Park
Mitton Road | Whalley | Lancashire | BB7 9YE

01254 377622

mbuckley@bekenenviro.co.uk | bekenenviro.co.uk

Exceedance Route Total System Failure



I trust the above is satisfactory. Should you require anything further please do not hesitate to contact the undersigned.

Yours sincerely

DAVID EMMOTT

BSc (Hons) MSc MEnvSc CEnv

Annex A – Sewer Records

Annex B – Greenfield Runoff Rates

Annex C – Site Investigation and Ground Assessment Report

Annex D – Proposed Surface Water Drainage Layout with Manhole Schedule

Annex E – Typical Drainage Details

Annex F – Proposed SW Modelled Calculation Report

Annex G – Drainage Management and Maintenance Plan

ANNEX A

Sewer Records

Christian vose

144
New Lane,
ACCRINGTON,
BB5 3QW

FAO:

How to contact us:

**United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP**

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

**Your Ref: Southern Court
Our Ref: UUPS-ORD-470467
Date: 08/03/2023**

Dear Sirs

Location: 14 KIRKFELL DRIVE, BURNLEY, BB12 8AZ

I acknowledge with thanks your request dated 08/03/2023 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

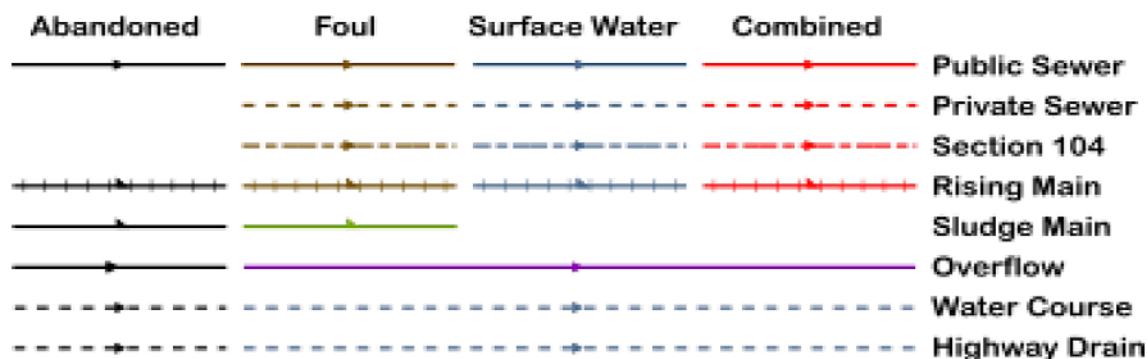
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

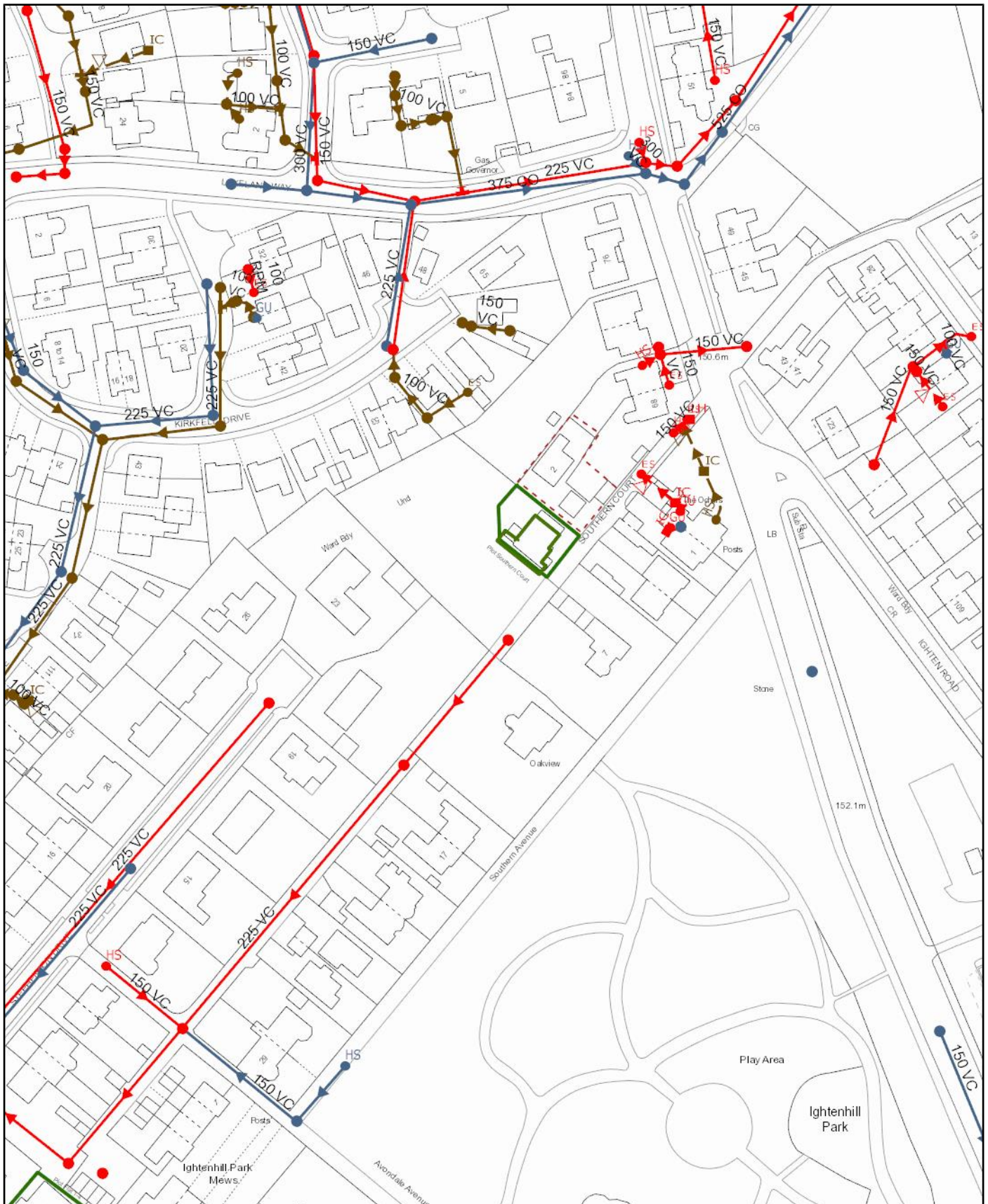
- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

Manhole	Side Entry Manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	
Drop Shaft	Change of Characteristic
Orifice Plate	



Scale: 1:1535
Date: 08/03/2023

SEWER RECORDS



Water for the North West

Address or Site Reference: 14 KIRKFELL DRIVE, BURNLEY, BB12 8AZ

Printed by: Property Searches

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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ANNEX B Greenfield Runoff Rates

Pr t n



ff e

ma s

Calculated by: Ch v e

Site name: SOUTENOUT

Site location: BUNLEY

Thghbt
c c c w i h E v m e A g c y g c " f f
m a g m e v m e " , S 0 3 0 2 1 9 (2 0 1 3) , h S D S M a 7 5 3 (, 2 0 1 5)
h - y S D S (D , 2 0 1 5)
a y b h b g c h g c w a r
f f m .

Site Details

Latitude: 5379816° N

Longitude: 2 2 7 2 3 2 ° W

Reference: 2234466194

Date:) T h m A 0 a 4 g 2 0 d 2 3 1

Runoff estimation approach 1 1 2 4

Site characteristics

Total site area (ha): 0 1 8 6

Methodology

Q_{BAR} estimation method: Calc r m S A A R

SPR estimation method: c m

Soil characteristics D t E d

SOIL type: 4 4

HOST class: N/A N/A

SPR/SPRHOST: 0 4 7 0 4 7

Hydrological characteristics D t E d

SAAR (mm): 1140 1140

Hydrological region: 10 10

Growth curve factor 1 year: 0 8 7 0 8 7

Growth curve factor 30 years: 1 7 1 7

Growth curve factor 100 years: 2 0 8 2 0 8

Growth curve factor 200 years: 2 3 7 2 3 7

Notes

(1) Is Q_{BAR} > 20 l/s/ha?

Wh Q 20 / / h h m i g c h g s
S O 20 / / h . L y e

(2) Are brates < 5.0 l/s?

Wh flw h 5 0 / c r
chgy 50 / b c g m
v g h m a L w e r
c fl w m a y
bygge
me .

(3) Is SPR/SPRHOST < 0.3?

Wh g w a v w g h h f
way v c h g f f s w o m a y
b c

Greenfield runoff rates D t E d

Q_{BAR} (l/s): 1 5 9 1 5 9

1 in 1 year (l/s): 1 3 8 1 3 8

1 in 30 years (l/s): 2 7 2 7

1 in 100 year (l/s): 3 3 3 3

1 in 200 years (l/s): 3 7 7 3 7 7

This report was prepared for the
www.kmfj.usdms.me, which
can both be used as a
greenfield or as a
accepted. The A, CE, ffs

ANNEX C

Extract of BEK Site Investigation and Ground Assessment

- 3.3.3 The samples were delivered to the UKAS laboratory of Envirolab for the following selected analysis:

Arsenic (Total), Cadmium (Total), Copper (Total), Lead (Total), Nickel (Total), Zinc (Total), Chromium (Total), Selenium (Total), Mercury (Total), Boron (Soluble), Hexavalent Chromium, Cyanide (Total), pH, 16 EPA Poly-Aromatic Hydrocarbons (PAH), Total Phenols, Total Sulphate, Sulphate 2:1 extract, Soil Organic Matter and Asbestos Screen.

Five samples were tested for speciated Total Petroleum Hydrocarbon Compounds (TPH-CWG).

- 3.3.4 Copies of the chemical test results are presented in Appendix B.

Geotechnical Testing

- 3.3.5 Following a review of ground conditions, 3 natural clay bulk samples were submitted to the UKAS accredited laboratory of Murray Rix and were tested for Plasticity Index and Moisture Content.

- 3.3.6 Copies of the geotechnical test results are presented in Appendix C.

3.4 Ground Conditions

Made Ground

- 3.4.1 The site investigation encountered made ground at two locations. A 'Black slightly Clayey very gravelly sand with frequent broken brick, occasional coal fragments occasional cobbles and frequent ash and clinker' was encountered to a depth of 0.6 m within Trial Pit No 4. 'Black sandy sub-angular fine to course slightly ashy gravel with occasional broken brick, cobbles and rare broken glass' was encountered within Trial Pit No 6 to a depth of 0.3 m in the area of the access track that runs along the southern site boundary.

Topsoil/Relic Topsoil

- 3.4.2 'Soft brown / black organic sandy clay with frequent rootlets, fine to course gravels, occasional cobbles and rare pottery' was encountered at the surface of Trial Pit 1, Trial Pit 2, Trial Pit 7 to depths varying from 0.26 m to 0.3 m. The remaining exploratory locations Trial pit 3 and Trial Pit 5 encountered 'soft brown /black organic slightly sandy clay with frequent rootlets, occasional broken brick and rare plastic' to depths of 0.3 m to 0.4 m. A layer of 'Soft brown very sandy slightly silty clay with fine to course gravels, rare rootlets and rare wood' (relic topsoil) was encountered within Trial Pit No 6 between 0.3 m and 0.6 m.

Superficial Deposits

- 3.4.3 'Firm to stiff Orange/brown/grey clays' were encountered within each trial pit. 'firm gravelly sandy clay with occasional clayey sand pockets and occasional cobbles' were encountered within all of the trial holes.
- 3.4.4 There was no visual/olfactory evidence of contamination during the site investigation.
- 3.4.5 The bedrock was encountered within Trial Pit 1 (1.1 m), Trial Pit 2 (1 m), Trial Pit 3 (1.25 m), and Trial Pit 4 (1.8 m) during the site investigation.
- 3.4.6 Groundwater was encountered no encountered within any of the exploratory locations during the site investigation. A land drain was encountered in Trial Pit 5 at a depth of 0.8 m.



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PROJECT NUMBER 23021

PROJ. NAME Southern Court, Burnley

CLIENT Joda Property Developments

DATE 28th February 2023

EXCAVATION METHOD Trial Pit

TRIAL PIT NO TP1

SHEET 1/7

COMPLETION

COMMENTS Shear Vane at 0.4 m 78 KPa . Trial Pit Dry.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Elevation (m)
0.1						Soft brown / black organic sandy clay with frequent rootlets, fine to coarse gravels and occasional cobbles	0.1
0.2	0.2	D=0.20 m					0.2
0.3						Stiff brown slightly sandy clay with fine to coarse gravels and occasional cobbles	0.3
0.4							0.4
0.5							0.5
0.6						Very stiff slightly clayey sandy fine to coarse gravels of sandstone and frequent cobbles of sandstone.	0.6
0.7							0.7
0.8							0.8
0.9							0.9
1							1
1.1						Weathered sandstone (Bedrock)	1.1
1.2						Termination Depth at: 1.2 m	1.2
1.3							1.3
1.4							1.4



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PROJECT NUMBER 23021

PROJ. NAME Southern Court, Burnley

CLIENT Joda Property Developments

DATE 28th February 2023

EXCAVATION METHOD Trial Pit

TRIAL PIT NO TP2

SHEET 2/7

COMPLETION

COMMENTS Shear Vane at 0.4 m 117 KPa . Trial Pit Dry.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Elevation (m)
0.1	0.15	D=0.15 m				Soft brown / black organic sandy clay with frequent rootlets, fine to course gravels , rare small cobbles and rare pottery	0.1
0.2							0.2
0.3						Stiff orange very silty slightly sandy clay with occasional small cobbles	0.3
0.4							0.4
0.5							0.5
0.6						Stiff orange very silty sandy clay with occasional small cobbles and fine gravels with frequent sand pockets	0.6
0.7						Stiff grey silty clay with frequent fine to course gravels	0.7
0.8							0.8
0.9							0.9
1						Weathered sandstone (Bedrock)	1
1.1						Termination Depth at: 1.1 m	1.1
1.2							1.2
1.3							1.3
1.4							1.4



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PROJECT NUMBER 23021 PROJ. NAME Southern Court, Burnley CLIENT Joda Property Developments	DATE 28th February 2023 EXCAVATION METHOD Trial Pit TRIAL PIT NO TP3 SHEET 3/7
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COMPLETION
COMMENTS Shear Vane at 0.5 m 63 KPa . Trial Pit Dry.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Elevation (m)
0.1						Soft brown / black organic slightly sandy clay with frequent rootlets, occasional broken brick and are plastic	0.1
0.2	0.2	D=0.2 m					0.2
0.3							0.3
0.4							0.4
0.5						Firm golden / brown slightly clayey sand with fine to coarse gravels and cobbles	0.5
0.6							0.6
0.7							0.7
0.8						Firm very sandy clay with frequent fine to coarse gravels and cobbles and occasional coal fragments	0.8
0.9							0.9
1							1
1.1						Firm very gravelly clay with frequent cobbles	1.1
1.2							1.2
1.3						Weathered sandstone (Bedrock)	1.3
1.4						Termination Depth at: 1.3 m	1.4



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PROJECT NUMBER 23021

PROJ. NAME Southern Court, Burnley

CLIENT Joda Property Developments

DATE 28th February 2023

EXCAVATION METHOD Trial Pit

TRIAL PIT NO TP4

SHEET 4/7

COMPLETION

COMMENTS Shear Vane at 0.7 m 96 KPa & 1.1 m 82 KPa. Trial Pit Dry.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Elevation (m)
0.1						Black slightly clayey very gravelly sand with frequent broken brick, occasional coal fragments, occasional cobbles and frequent ash & clinker (Made Ground)	0.1
0.2							0.2
0.3	0.3	D=0.3 m					0.3
0.4							0.4
0.5							0.5
0.6						Stiff very silty slightly sandy clay with fine gravels	0.6
0.7							0.7
0.8							0.8
0.9						Stiff orange / brown very sandy slightly silty clay with fine to coarse gravels, occasional cobbles and frequent sand pockets	0.9
1							1
1.1						Stiff orange / grey mottled very silty clay with occasional large gravels and rare cobbles	1.1
1.2							1.2
1.3							1.3
1.4	1.4	B=1.4 m				Stiff orange / brown sandy clay with fine to coarse gravel, occasional cobbles and coal fragments	1.4
1.5						Very stiff orange / brown slightly clayey gravel of sand stone.	1.5
1.6							1.6
1.7							1.7
1.8						Weathered sandstone (Bedrock)	1.8
1.9						Termination Depth at: 1.86 m	1.9



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PROJECT NUMBER 23021

PROJ. NAME Southern Court, Burnley

CLIENT Joda Property Developments

DATE 28th February 2023

EXCAVATION METHOD Trial Pit

TRIAL PIT NO TP5

SHEET 5/7

COMPLETION

COMMENTS Shear Vane at 0.6 m 60 KPa & 1.4 m 112 KPa. Trial Pit Dry. Land drain at 0.8 m.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Elevation (m)
0.1						Soft brown / black organic sandy silty clay with frequent rootlets, occasional pottery, rare plastic, rare broken brick and occasional coarse slate	0.1
0.2	0.2	D=0.2 m					0.2
0.3						Soft brown / black sandy fine to coarse gravel with rare wooden log and rare coal fragments	0.3
0.4						Firm orange / light brown silty sandy clay with fine to coarse gravels and small cobbles	0.4
0.5							0.5
0.6						Firm orange / grey mottled very sandy clay with occasional sand pockets	0.6
0.7							0.7
0.8							0.8
0.9							0.9
1						Firm orange / grey mottled fine to coarse gravelly very sandy clay with occasional sand pockets and occasional cobbles	1
1.1							1.1
1.2							1.2
1.3						Stiff slightly friable clay with occasional sand pockets.	1.3
1.4						Stiff friable fine to coarse gravelly sandy clay with occasional cobbles and rare coal fragments.	1.4
1.5	1.5	B=1.5 m					1.5
1.6						Termination Depth at: 1.6 m	1.6
1.7							1.7



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PROJECT NUMBER 23021 PROJ. NAME Southern Court, Burnley CLIENT Joda Property Developments	DATE 28th February 2023 EXCAVATION METHOD Trial Pit TRIAL PIT NO TP6 SHEET 6/7
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COMPLETION

COMMENTS Shear Vane at 0.6 84 KPa & 0.9 m 61 KPa. Trial Pit Dry.

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Elevation (m)
0.1	0.15	D=0.15 m				Black sandy sub-angular fine to coarse slightly ashy gravel with occasional broken brick, cobbles and rare broken glass (Made Ground)	0.1
0.2							0.2
0.3						Soft brown / black organic very sandy slightly silty clay with fine to coarse gravel, rare rootlets and rare wood.	0.3
0.4							0.4
0.5							0.5
0.6						Stiff grey / golden mottled firm very silty clay with fine rounded gravel	0.6
0.7							0.7
0.8							0.8
0.9						Firm grey / orange very silty sandy clay with fine to coarse gravels and occasional sand pockets	0.9
1							1
1.1	1.1	B=1.1 m				Firm grey / orange mottled very silty sandy clay with fine to coarse gravels and rare cobbles.	1.1
1.2							1.2
1.3							1.3
1.4							1.4
1.5						Stiff brown / grey very sandy gravelly friable clay with occasional cobbles and rare coal fragments	1.5
1.6							1.6
1.7							1.7
1.8						Termination Depth at: 1.8 m	1.8
1.9							1.9



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PROJECT NUMBER 23021

PROJ. NAME Southern Court, Burnley

CLIENT Joda Property Developments

DATE 28th February 2023

EXCAVATION METHOD Trial Pit

TRIAL PIT NO TP7

SHEET 7/7

COMPLETION

COMMENTS Shear Vane at 0.6 m 62 KPa & 1.3 m 109 KPa. Trial Pit Dry.

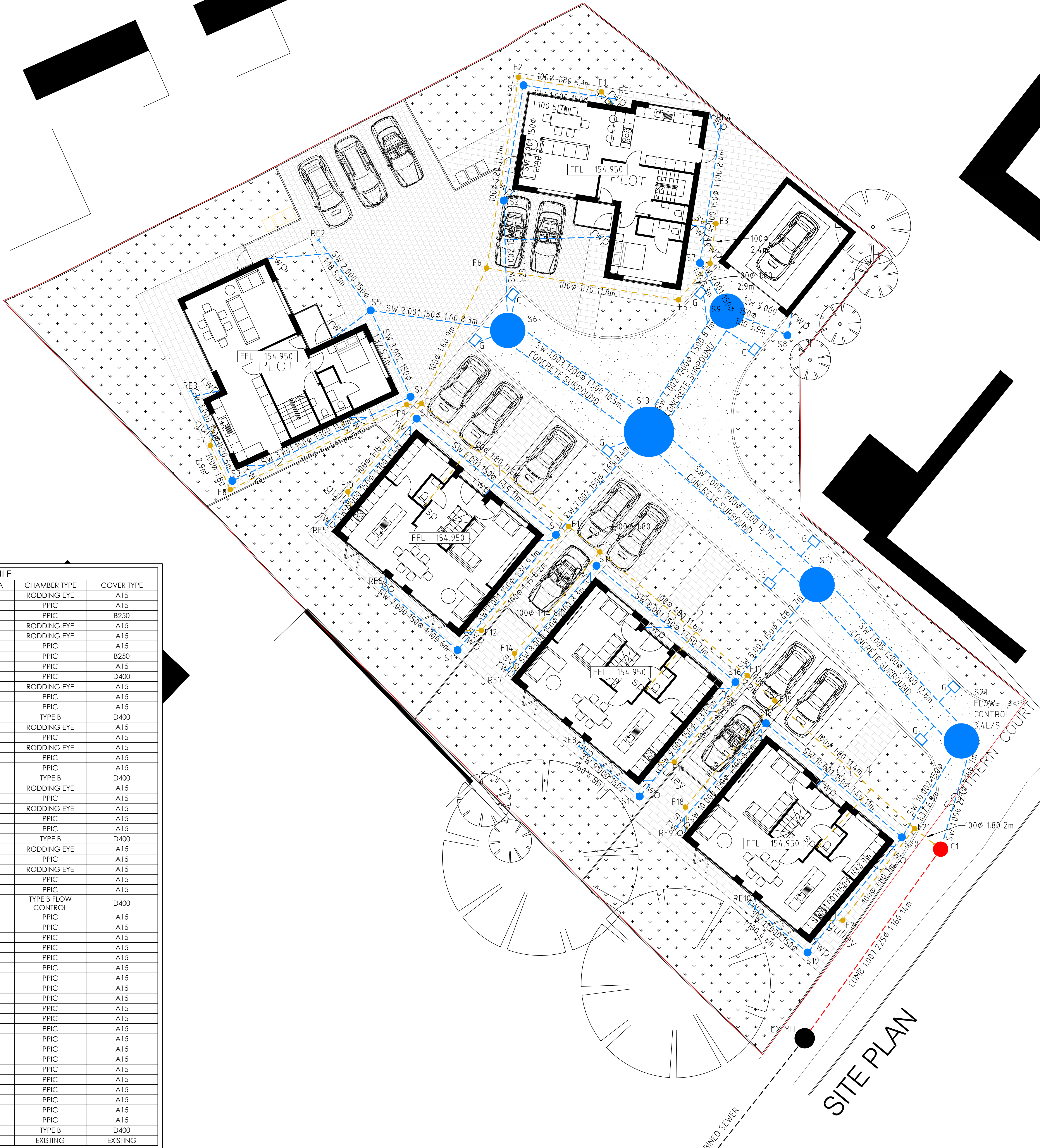
Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Elevation (m)
0.1						Soft brown / black organic sandy clay with frequent rootlets and occasional fine to coarse gravels and rare glass.	0.1
0.2	0.2	D=0.2 m					0.2
0.3						Black slightly silty clayey sand with fine to coarse gravels and cobbles	0.3
0.4							0.4
0.5							0.5
0.6						Firm grey / light brown very clayey sand with frequent clay pockets.	0.6
0.7							0.7
0.8							0.8
0.9						Firm orange very sandy silty clay with fine to coarse gravels and cobbles	0.9
1							1
1.1							1.1
1.2							1.2
1.3						Stiff to stiff orange / brown slightly sandy very silty clay with fine to coarse gravels and large cobbles	1.3
1.4							1.4
1.5						Stiff orange / brown slightly silty sandy clay with fine to coarse gravels and coal fragments	1.5
1.6						Very stiff slightly silty friable clay with occasional fine to coarse gravels and rare coal fragments	1.6
1.7							1.7
1.8						Termination Depth at: 1.75 m	1.8
1.9							1.9

ANNEX D

Proposed Drainage Layout & MH Schedule

2020
No. 51 Kitchen
through site

SURFACE WATER & FOUL MANHOLE SCHEDULE						
REFERENCE	CL	IL	DEPTH TO IL	MANHOLE DIA	CHAMBER TYPE	COVER TYPE
RE1	154.800	154.150	0.650	-	RODDING EYE	A15
S1	154.800	154.093	0.707	450	PPIC	A15
S2	154.800	154.020	0.780	450	PPIC	B250
RE2	154.800	154.150	0.650	-	RODDING EYE	A15
RE3	154.800	154.150	0.650	-	RODDING EYE	A15
S3	154.800	154.150	0.650	450	PPIC	A15
S4	154.800	154.031	0.769	450	PPIC	B250
S5	154.800	153.854	0.946	450	PPIC	A15
S6	154.650	152.664	1.986	450	PPIC	D400
RE4	154.800	154.150	0.650	-	RODDING EYE	A15
S7	154.800	154.066	0.734	450	PPIC	A15
S8	154.800	154.150	0.650	450	PPIC	A15
S9	154.650	152.660	1.990	2100	TYPE B	D400
RE5	154.800	154.150	0.650	-	RODDING EYE	A15
S10	154.800	154.066	0.734	450	PPIC	A15
RE6	154.800	154.150	0.650	-	RODDING EYE	A15
S11	154.800	154.090	0.710	450	PPIC	A15
S12	154.800	153.823	0.977	450	PPIC	A15
S13	154.650	152.643	2.007	3000	TYPE B	D400
RE7	154.800	154.150	0.650	-	RODDING EYE	A15
S14	154.800	154.067	0.733	450	PPIC	A15
RE8	154.800	154.150	0.650	-	RODDING EYE	A15
S15	154.800	154.069	0.731	450	PPIC	A15
S16	154.800	153.825	0.975	450	PPIC	A15
S17	154.650	152.616	2.034	2100	TYPE B	D400
RE9	154.800	154.150	0.650	-	RODDING EYE	A15
S18	154.800	154.068	0.732	450	PPIC	A15
RE10	154.800	154.150	0.650	-	RODDING EYE	A15
S19	154.800	154.104	0.696	450	PPIC	A15
S20	154.800	153.827	0.973	450	PPIC	A15
S21	154.650	152.590	2.060	2100	TYPE B FLOW CONTROL	D400
F1	154.800	154.000	0.800	300	PPIC	A15
F2	154.800	153.936	0.864	300	PPIC	A15
F3	154.800	154.000	0.800	300	PPIC	A15
F4	154.800	153.970	0.830	300	PPIC	A15
F5	154.800	153.945	0.855	300	PPIC	A15
F6	154.700	153.789	0.911	300	PPIC	A15
F7	154.800	153.677	1.123	300	PPIC	A15
F8	154.800	154.000	0.800	300	PPIC	A15
F9	154.800	153.717	1.083	300	PPIC	A15
F10	154.800	154.000	0.800	300	PPIC	A15
F11	154.700	153.617	1.083	300	PPIC	A15
F12	154.800	154.000	0.800	300	PPIC	A15
F13	154.700	153.472	1.228	300	PPIC	A15
F14	154.800	154.000	0.800	300	PPIC	A15
F15	154.700	153.442	1.258	300	PPIC	A15
F16	154.800	154.000	0.800	300	PPIC	A15
F17	154.700	153.297	1.403	300	PPIC	A15
F18	154.800	154.000	0.800	300	PPIC	A15
F19	154.700	153.269	1.431	300	PPIC	A15
F20	154.800	154.000	0.800	300	PPIC	A15
F21	154.700	BD 153.912, 153.127	1.573	300	PPIC	A15
C1	154.650	BD 153.102, 152.548	2.102	1200	TYPE B	D400
EXMH	154.000	152.464 TBC	1.536 TBC	EXISTING	EXISTING	EXISTING



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- FINAL POSITION OF RAINWATER DOWN PIPES AND SOIL VENT PIPES TO BE CONFIRMED BY THE ARCHITECT.

KEY

- SW 1.000 PROPOSED SURFACE WATER DRAIN
- FW 1.000 PROPOSED FOUL DRAIN
- CO 1.000 PROPOSED COMBINED DRAIN
- EX COMBINED EXISTING PUBLIC COMBINED SEWER
- S1 PROPOSED SURFACE WATER MANHOLE
- F1 PROPOSED FOUL MANHOLE
- C1 PROPOSED COMBINED MANHOLE
- EX MH EXISTING PUBLIC SEWER MANHOLE
- G PROPOSED SURFACE WATER GULLY

SURFACE WATER ATTENUATION

STORAGE PROVIDED WITHIN 1200Ø LARGE DIAMETER PIPES LOCATED WITHIN THE ACCESS ROAD

FLOW CONTROL DETAILS

S21
HYDROBRAKE OR SIMILAR VORTEX FLOW CONTROL DEVICE

DISCHARGE RATE = 2.0L/S
DESIGN DEPTH = 2.000m
CHAMBER = 2100m
SHE REF: CTL-SHE-0057-2000-2000-2000

PROPOSED DISCHARGE RATES

1 IN 1 YEAR = 1.3L/S
1 IN 30 YEAR = 1.3L/S
1 IN 100 YEAR + 50% CC + 10% URBAN CREEP = 2.0L/S

A AMENDED FOLLOWING COMMENTS FROM UII		11/07/23	CV
REVISION	COMMENT	DATE	BY
CLIENT: JODA PROPERTY DEVELOPMENTS LTD		11/03/2023	STATUS:
PROJECT: SOUTHERN COURT BURNLEY		DRAWN BY: CV	SCALE: 1:100
DRAWING TITLE: PROPOSED SURFACE WATER/FOUL LAYOUT & MH SCHEDULE		SIZE: A0	REVISION:
DRAWING REFERENCE: 2023-019-01			



BEK ENVIRONMENTAL CONSULTING ENGINEERS LTD
Suite 1, No 3 Milton Road Business Park, Milton Road, Whalley, Clitheroe BB7 9EX
TEL: 01254 377622

ANNEX E

Typical Drainage Details

ANNEX F

Modelled Surface Water Calculation Report

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	150.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	Preferred Cover Depth (m)	0.500
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

	Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Depth (m)	Notes
✓	RE1	0.003	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	S1	0.000		154.800	Manhole	Adoptable	450	0.707	
✓	S2	0.010	4.00	154.800	Manhole	Adoptable	450	0.780	
✓	RE2	0.004	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	RE3	0.003	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	S3	0.003	4.00	154.800	Manhole	Adoptable	450	0.650	
✓	S4	0.000		154.800	Manhole	Adoptable	450	0.769	
✓	S5	0.013	4.00	154.800	Manhole	Adoptable	450	0.946	
✓	S6	0.011	4.00	154.650	Manhole	Adoptable	2100	1.986	
✓	RE4	0.006	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	S7	0.000		154.800	Manhole	Adoptable	450	0.734	
✓	S8	0.004	4.00	154.800	Manhole	Adoptable	450	0.650	
✓	S9	0.005	4.00	154.650	Manhole	Adoptable	2100	1.990	
✓	RE5	0.020	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	S10	0.003	4.00	154.800	Manhole	Adoptable	450	0.734	
✓	RE6	0.003	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	S11	0.000		154.800	Manhole	Adoptable	450	0.710	
✓	S12	0.000		154.800	Manhole	Adoptable	450	0.977	
✓	S13	0.012	4.00	154.650	Manhole	Adoptable	3000	2.007	
✓	RE7	0.005	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	S14	0.003	4.00	154.800	Manhole	Adoptable	450	0.733	
✓	RE8	0.003	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	S15	0.000		154.800	Manhole	Adoptable	450	0.731	
✓	S16	0.000		154.800	Manhole	Adoptable	450	0.975	
✓	S17	0.011	4.00	154.650	Manhole	Adoptable	2100	2.034	
✓	RE9	0.005	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	S18	0.003	4.00	154.800	Manhole	Adoptable	450	0.732	
✓	RE10	0.003	4.00	154.800	Manhole	Adoptable	150	0.650	
✓	S19	0.000		154.800	Manhole	Adoptable	450	0.696	
✓	S20	0.000		154.800	Manhole	Adoptable	450	0.973	
✓	S21	0.000		154.650	Manhole	Adoptable	2100	2.060	Auto-design is off
✓	C1	0.000		154.650	Manhole	Adoptable	1200	2.102	Auto-design is off
✓	EXMH	0.000		154.000	Manhole	Adoptable	1200	1.536	

Links (Input)

Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.000	RE1	S1	5.700	0.600	Colebrook-White	154.150	154.093	0.057	100.0	150	Circular	4.09	51.0
1.001	S1	S2	7.300	0.600	Colebrook-White	154.093	154.020	0.073	100.0	150	Circular	4.22	50.5
1.002	S2	S6	8.500	0.600	Colebrook-White	154.020	153.715	0.305	27.9	150	Circular	4.29	50.2
2.000	RE2	S5	5.300	0.600	Colebrook-White	154.150	153.854	0.296	17.9	150	Circular	4.04	51.3
3.000	RE3	S5	6.000	0.600	Colebrook-White	154.150	153.854	0.296	20.3	150	Circular	4.04	51.2
3.001	S3	S4	11.900	0.600	Colebrook-White	154.150	154.031	0.119	100.0	150	Circular	4.20	50.6
3.002	S4	S5	5.700	0.600	Colebrook-White	154.031	153.854	0.177	32.2	150	Circular	4.25	50.3
2.001	S5	S6	8.300	0.600	Colebrook-White	153.854	153.714	0.140	59.3	150	Circular	4.36	49.9
1.003	S6	S13	10.500	0.600	Colebrook-White	152.664	152.643	0.021	500.0	1200	Circular	4.46	49.4
4.000	RE4	S7	8.400	0.600	Colebrook-White	154.150	154.066	0.084	100.0	150	Circular	4.14	50.8
4.001	S7	S9	3.300	0.600	Colebrook-White	154.066	153.736	0.330	10.0	150	Circular	4.16	50.7
5.000	S8	S9	3.900	0.600	Colebrook-White	154.150	153.760	0.390	10.0	150	Circular	4.02	51.4
4.002	S9	S13	8.700	0.600	Colebrook-White	152.660	152.643	0.017	500.0	1200	Circular	4.24	50.4
6.000	RE5	S10	8.400	0.600	Colebrook-White	154.150	154.066	0.084	100.0	150	Circular	4.14	50.8
6.001	S10	S12	11.000	0.600	Colebrook-White	154.066	153.823	0.243	45.3	150	Circular	4.26	50.3
7.000	RE6	S11	6.000	0.600	Colebrook-White	154.150	154.090	0.060	100.0	150	Circular	4.10	51.0
7.001	S11	S12	9.100	0.600	Colebrook-White	154.090	153.823	0.267	34.1	150	Circular	4.19	50.6
7.002	S12	S13	8.400	0.600	Colebrook-White	153.823	153.693	0.130	64.6	150	Circular	4.37	49.8
1.004	S13	S17	13.700	0.600	Colebrook-White	152.643	152.616	0.027	500.0	1200	Circular	4.60	48.9
8.000	RE7	S14	8.300	0.600	Colebrook-White	154.150	154.067	0.083	100.0	150	Circular	4.14	50.8
8.001	S14	S16	11.000	0.600	Colebrook-White	154.067	153.825	0.242	45.5	150	Circular	4.26	50.3
9.000	RE8	S15	4.800	0.600	Colebrook-White	154.150	154.069	0.081	59.3	150	Circular	4.06	51.2
9.001	S15	S16	9.000	0.600	Colebrook-White	154.069	153.825	0.244	36.9	150	Circular	4.15	50.8
8.002	S16	S17	7.700	0.600	Colebrook-White	153.825	153.666	0.159	48.4	150	Circular	4.35	49.9
1.005	S17	S21	12.800	0.600	Colebrook-White	152.616	152.590	0.026	500.0	1200	Circular	4.73	48.4
10.000	RE9	S18	8.200	0.600	Colebrook-White	154.150	154.068	0.082	100.0	150	Circular	4.14	50.8
10.001	S18	S20	11.000	0.600	Colebrook-White	154.068	153.827	0.241	45.6	150	Circular	4.26	50.3
11.000	RE10	S19	4.600	0.600	Colebrook-White	154.150	154.104	0.046	100.0	150	Circular	4.08	51.1
11.001	S19	S20	9.000	0.600	Colebrook-White	154.104	153.827	0.277	32.5	150	Circular	4.16	50.7
10.002	S20	S21	6.900	0.600	Colebrook-White	153.827	153.640	0.187	36.9	150	Circular	4.33	50.0
1.006	S21	C1	7.000	0.600	Colebrook-White	152.590	152.548	0.042	166.7	225	Circular	4.86	47.8
1.007	C1	EXMH	14.000	0.600	Colebrook-White	152.548	152.464	0.084	166.7	225	Circular	4.95	47.5

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	5.700	100.0	150	Circular	154.800	154.150	0.500	154.800	154.093	0.557
1.001	7.300	100.0	150	Circular	154.800	154.093	0.557	154.800	154.020	0.630
1.002	8.500	27.9	150	Circular	154.800	154.020	0.630	154.650	153.715	0.785
2.000	5.300	17.9	150	Circular	154.800	154.150	0.500	154.800	153.854	0.796
3.000	6.000	20.3	150	Circular	154.800	154.150	0.500	154.800	153.854	0.796
3.001	11.900	100.0	150	Circular	154.800	154.150	0.500	154.800	154.031	0.619

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	RE1	150	Manhole	Adoptable	S1	450	Manhole	Adoptable
1.001	S1	450	Manhole	Adoptable	S2	450	Manhole	Adoptable
1.002	S2	450	Manhole	Adoptable	S6	2100	Manhole	Adoptable
2.000	RE2	150	Manhole	Adoptable	S5	450	Manhole	Adoptable
3.000	RE3	150	Manhole	Adoptable	S5	450	Manhole	Adoptable
3.001	S3	450	Manhole	Adoptable	S4	450	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.002	5.700	32.2	150	Circular	154.800	154.031	0.619	154.800	153.854	0.796
2.001	8.300	59.3	150	Circular	154.800	153.854	0.796	154.650	153.714	0.786
1.003	10.500	500.0	1200	Circular	154.650	152.664	0.786	154.650	152.643	0.807
4.000	8.400	100.0	150	Circular	154.800	154.150	0.500	154.800	154.066	0.584
4.001	3.300	10.0	150	Circular	154.800	154.066	0.584	154.650	153.736	0.764
5.000	3.900	10.0	150	Circular	154.800	154.150	0.500	154.650	153.760	0.740
4.002	8.700	500.0	1200	Circular	154.650	152.660	0.790	154.650	152.643	0.807
6.000	8.400	100.0	150	Circular	154.800	154.150	0.500	154.800	154.066	0.584
6.001	11.000	45.3	150	Circular	154.800	154.066	0.584	154.800	153.823	0.827
7.000	6.000	100.0	150	Circular	154.800	154.150	0.500	154.800	154.090	0.560
7.001	9.100	34.1	150	Circular	154.800	154.090	0.560	154.800	153.823	0.827
7.002	8.400	64.6	150	Circular	154.800	153.823	0.827	154.650	153.693	0.807
1.004	13.700	500.0	1200	Circular	154.650	152.643	0.807	154.650	152.616	0.834
8.000	8.300	100.0	150	Circular	154.800	154.150	0.500	154.800	154.067	0.583
8.001	11.000	45.5	150	Circular	154.800	154.067	0.583	154.800	153.825	0.825
9.000	4.800	59.3	150	Circular	154.800	154.150	0.500	154.800	154.069	0.581
9.001	9.000	36.9	150	Circular	154.800	154.069	0.581	154.800	153.825	0.825
8.002	7.700	48.4	150	Circular	154.800	153.825	0.825	154.650	153.666	0.834
1.005	12.800	500.0	1200	Circular	154.650	152.616	0.834	154.650	152.590	0.860
10.000	8.200	100.0	150	Circular	154.800	154.150	0.500	154.800	154.068	0.582
10.001	11.000	45.6	150	Circular	154.800	154.068	0.582	154.800	153.827	0.823
11.000	4.600	100.0	150	Circular	154.800	154.150	0.500	154.800	154.104	0.546
11.001	9.000	32.5	150	Circular	154.800	154.104	0.546	154.800	153.827	0.823
10.002	6.900	36.9	150	Circular	154.800	153.827	0.823	154.650	153.640	0.860
1.006	7.000	166.7	225	Circular	154.650	152.590	1.835	154.650	152.548	1.877

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.002	S4	450	Manhole	Adoptable	S5	450	Manhole	Adoptable
2.001	S5	450	Manhole	Adoptable	S6	2100	Manhole	Adoptable
1.003	S6	2100	Manhole	Adoptable	S13	3000	Manhole	Adoptable
4.000	RE4	150	Manhole	Adoptable	S7	450	Manhole	Adoptable
4.001	S7	450	Manhole	Adoptable	S9	2100	Manhole	Adoptable
5.000	S8	450	Manhole	Adoptable	S9	2100	Manhole	Adoptable
4.002	S9	2100	Manhole	Adoptable	S13	3000	Manhole	Adoptable
6.000	RE5	150	Manhole	Adoptable	S10	450	Manhole	Adoptable
6.001	S10	450	Manhole	Adoptable	S12	450	Manhole	Adoptable
7.000	RE6	150	Manhole	Adoptable	S11	450	Manhole	Adoptable
7.001	S11	450	Manhole	Adoptable	S12	450	Manhole	Adoptable
7.002	S12	450	Manhole	Adoptable	S13	3000	Manhole	Adoptable
1.004	S13	3000	Manhole	Adoptable	S17	2100	Manhole	Adoptable
8.000	RE7	150	Manhole	Adoptable	S14	450	Manhole	Adoptable
8.001	S14	450	Manhole	Adoptable	S16	450	Manhole	Adoptable
9.000	RE8	150	Manhole	Adoptable	S15	450	Manhole	Adoptable
9.001	S15	450	Manhole	Adoptable	S16	450	Manhole	Adoptable
8.002	S16	450	Manhole	Adoptable	S17	2100	Manhole	Adoptable
1.005	S17	2100	Manhole	Adoptable	S21	2100	Manhole	Adoptable
10.000	RE9	150	Manhole	Adoptable	S18	450	Manhole	Adoptable
10.001	S18	450	Manhole	Adoptable	S20	450	Manhole	Adoptable
11.000	RE10	150	Manhole	Adoptable	S19	450	Manhole	Adoptable
11.001	S19	450	Manhole	Adoptable	S20	450	Manhole	Adoptable
10.002	S20	450	Manhole	Adoptable	S21	2100	Manhole	Adoptable
1.006	S21	2100	Manhole	Adoptable	C1	1200	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.007	14.000	166.7	225	Circular	154.650	152.548	1.877	154.000	152.464	1.311

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.007	C1	1200	Manhole	Adoptable	EXMH	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.300	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	50	0	0

Node S21 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	152.590	Product Number	CTL-SHE-0057-2000-2000-2000
Design Depth (m)	2.000	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	154.168	0.018	0.5	0.0020	0.0000	OK
15 minute winter	S1	10	154.110	0.017	0.5	0.0027	0.0000	OK
15 minute winter	S2	10	154.046	0.026	2.1	0.0108	0.0000	OK
15 minute winter	RE2	10	154.163	0.013	0.6	0.0018	0.0000	OK
15 minute winter	RE3	10	154.162	0.012	0.5	0.0013	0.0000	OK
15 minute winter	S3	10	154.168	0.018	0.5	0.0046	0.0000	OK
15 minute winter	S4	10	154.044	0.013	0.5	0.0021	0.0000	OK
15 minute winter	S5	10	153.896	0.042	3.7	0.0183	0.0000	OK
360 minute winter	S6	256	152.914	0.250	1.4	0.8936	0.0000	OK
15 minute winter	RE4	10	154.176	0.026	1.0	0.0053	0.0000	OK
15 minute winter	S7	10	154.080	0.014	1.0	0.0023	0.0000	OK
15 minute winter	S8	10	154.161	0.011	0.6	0.0032	0.0000	OK
360 minute winter	S9	256	152.914	0.254	0.4	0.8927	0.0000	OK
15 minute winter	RE5	10	154.195	0.045	3.2	0.0288	0.0000	OK
15 minute winter	S10	10	154.104	0.038	3.7	0.0091	0.0000	OK
15 minute winter	RE6	10	154.168	0.018	0.5	0.0020	0.0000	OK
15 minute winter	S11	10	154.103	0.013	0.5	0.0021	0.0000	OK
15 minute winter	S12	10	153.869	0.046	4.2	0.0074	0.0000	OK
360 minute winter	S13	256	152.914	0.271	2.4	1.9481	0.0000	OK
15 minute winter	RE7	10	154.172	0.022	0.8	0.0038	0.0000	OK
15 minute winter	S14	10	154.090	0.023	1.3	0.0055	0.0000	OK
15 minute winter	RE8	10	154.166	0.016	0.5	0.0018	0.0000	OK
15 minute winter	S15	10	154.083	0.014	0.5	0.0022	0.0000	OK
15 minute winter	S16	10	153.852	0.027	1.8	0.0044	0.0000	OK
360 minute winter	S17	256	152.914	0.298	2.1	1.0646	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE1	1.000	S1	0.5	0.442	0.028	0.0065	
15 minute winter	S1	1.001	S2	0.5	0.315	0.027	0.0114	
15 minute winter	S2	1.002	S6	2.1	1.042	0.061	0.0169	
15 minute winter	RE2	2.000	S5	0.6	0.304	0.014	0.0126	
15 minute winter	RE3	3.000	S5	0.5	0.232	0.013	0.0141	
15 minute winter	S3	3.001	S4	0.5	0.512	0.028	0.0117	
15 minute winter	S4	3.002	S5	0.5	0.221	0.015	0.0137	
15 minute winter	S5	2.001	S6	3.7	0.930	0.158	0.0327	
360 minute winter	S6	1.003	S13	1.1	0.145	0.001	1.8908	
15 minute winter	RE4	4.000	S7	1.0	0.701	0.056	0.0123	
15 minute winter	S7	4.001	S9	1.0	1.192	0.018	0.0028	
15 minute winter	S8	5.000	S9	0.6	1.028	0.011	0.0023	
360 minute winter	S9	4.002	S13	0.3	0.089	0.000	1.5836	
15 minute winter	RE5	6.000	S10	3.2	0.802	0.180	0.0336	
15 minute winter	S10	6.001	S12	3.7	0.922	0.140	0.0446	
15 minute winter	RE6	7.000	S11	0.5	0.508	0.028	0.0059	
15 minute winter	S11	7.001	S12	0.5	0.198	0.016	0.0245	
15 minute winter	S12	7.002	S13	4.2	0.932	0.188	0.0374	
360 minute winter	S13	1.004	S17	1.5	0.173	0.001	2.7966	
15 minute winter	RE7	8.000	S14	0.8	0.490	0.045	0.0135	
15 minute winter	S14	8.001	S16	1.3	0.683	0.049	0.0212	
15 minute winter	RE8	9.000	S15	0.5	0.560	0.022	0.0043	
15 minute winter	S15	9.001	S16	0.5	0.342	0.017	0.0134	
15 minute winter	S16	8.002	S17	1.7	0.811	0.068	0.0165	
360 minute winter	S17	1.005	S21	1.4	0.173	0.001	2.9633	

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE9	10	154.172	0.022	0.8	0.0038	0.0000	OK
15 minute winter	S18	10	154.091	0.023	1.3	0.0055	0.0000	OK
15 minute winter	RE10	10	154.168	0.018	0.5	0.0020	0.0000	OK
15 minute winter	S19	10	154.117	0.013	0.5	0.0021	0.0000	OK
15 minute winter	S20	10	153.853	0.026	1.8	0.0041	0.0000	OK
360 minute winter	S21	256	152.914	0.324	1.7	1.1224	0.0000	SURCHARGED
30 minute winter	C1	26	152.576	0.028	1.3	0.0321	0.0000	OK
30 minute winter	EXMH	27	152.492	0.028	1.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE9	10.000	S18	0.8	0.490	0.045	0.0134	
15 minute winter	S18	10.001	S20	1.3	0.714	0.049	0.0202	
15 minute winter	RE10	11.000	S19	0.5	0.510	0.028	0.0045	
15 minute winter	S19	11.001	S20	0.5	0.368	0.016	0.0124	
15 minute winter	S20	10.002	S21	1.7	0.894	0.060	0.0135	
360 minute winter	S21	Hydro-Brake®	C1	1.3				
30 minute winter	C1	1.007	EXMH	1.3	0.465	0.033	0.0399	12.8

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	154.177	0.027	1.2	0.0030	0.0000	OK
15 minute winter	S1	10	154.119	0.026	1.2	0.0042	0.0000	OK
15 minute winter	S2	10	154.062	0.042	5.2	0.0173	0.0000	OK
15 minute winter	RE2	10	154.170	0.020	1.6	0.0028	0.0000	OK
15 minute winter	RE3	10	154.168	0.018	1.2	0.0020	0.0000	OK
15 minute winter	S3	10	154.178	0.028	1.2	0.0070	0.0000	OK
15 minute winter	S4	10	154.051	0.020	1.2	0.0032	0.0000	OK
15 minute winter	S5	10	153.925	0.070	9.1	0.0306	0.0000	OK
180 minute winter	S6	176	153.359	0.695	4.7	2.4842	0.0000	OK
15 minute winter	RE4	10	154.191	0.041	2.4	0.0082	0.0000	OK
15 minute winter	S7	10	154.088	0.022	2.4	0.0036	0.0000	OK
15 minute winter	S8	10	154.168	0.018	1.6	0.0051	0.0000	OK
180 minute winter	S9	176	153.359	0.699	1.5	2.4566	0.0000	OK
15 minute winter	RE5	10	154.225	0.075	7.9	0.0475	0.0000	OK
15 minute winter	S10	10	154.128	0.062	9.1	0.0150	0.0000	OK
15 minute winter	RE6	10	154.178	0.028	1.2	0.0031	0.0000	OK
15 minute winter	S11	10	154.110	0.020	1.2	0.0032	0.0000	OK
15 minute winter	S12	10	153.901	0.078	10.3	0.0124	0.0000	OK
180 minute winter	S13	176	153.359	0.716	7.1	5.1473	0.0000	OK
15 minute winter	RE7	10	154.185	0.035	2.0	0.0060	0.0000	OK
15 minute winter	S14	10	154.102	0.035	3.2	0.0085	0.0000	OK
15 minute winter	RE8	10	154.175	0.025	1.2	0.0027	0.0000	OK
15 minute winter	S15	10	154.090	0.021	1.2	0.0033	0.0000	OK
15 minute winter	S16	10	153.869	0.044	4.4	0.0070	0.0000	OK
180 minute winter	S17	176	153.359	0.743	5.0	2.6544	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE1	1.000	S1	1.2	0.564	0.068	0.0122	
15 minute winter	S1	1.001	S2	1.2	0.399	0.067	0.0221	
15 minute winter	S2	1.002	S6	5.2	1.345	0.153	0.0328	
15 minute winter	RE2	2.000	S5	1.6	0.363	0.038	0.0252	
15 minute winter	RE3	3.000	S5	1.2	0.281	0.030	0.0280	
15 minute winter	S3	3.001	S4	1.2	0.663	0.068	0.0217	
15 minute winter	S4	3.002	S5	1.2	0.269	0.038	0.0271	
15 minute winter	S5	2.001	S6	9.1	1.174	0.392	0.0642	
180 minute winter	S6	1.003	S13	3.2	0.181	0.002	7.2355	
15 minute winter	RE4	4.000	S7	2.4	0.897	0.135	0.0230	
15 minute winter	S7	4.001	S9	2.4	1.530	0.042	0.0052	
15 minute winter	S8	5.000	S9	1.6	1.371	0.028	0.0046	
180 minute winter	S9	4.002	S13	0.3	0.103	0.000	6.0157	
15 minute winter	RE5	6.000	S10	7.9	1.006	0.445	0.0660	
15 minute winter	S10	6.001	S12	9.1	1.133	0.344	0.0889	
15 minute winter	RE6	7.000	S11	1.2	0.656	0.068	0.0111	
15 minute winter	S11	7.001	S12	1.2	0.239	0.039	0.0486	
15 minute winter	S12	7.002	S13	10.3	1.171	0.464	0.0737	
180 minute winter	S13	1.004	S17	2.8	0.238	0.001	9.8266	
15 minute winter	RE7	8.000	S14	2.0	0.637	0.113	0.0260	
15 minute winter	S14	8.001	S16	3.2	0.865	0.121	0.0411	
15 minute winter	RE8	9.000	S15	1.2	0.721	0.052	0.0080	
15 minute winter	S15	9.001	S16	1.2	0.428	0.041	0.0261	
15 minute winter	S16	8.002	S17	4.4	1.046	0.170	0.0321	
180 minute winter	S17	1.005	S21	2.0	0.170	0.001	9.5752	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE9	10	154.185	0.035	2.0	0.0060	0.0000	OK
15 minute winter	S18	10	154.104	0.035	3.2	0.0085	0.0000	OK
15 minute winter	RE10	10	154.178	0.028	1.2	0.0031	0.0000	OK
15 minute winter	S19	10	154.124	0.020	1.2	0.0032	0.0000	OK
15 minute winter	S20	10	153.868	0.041	4.4	0.0066	0.0000	OK
180 minute winter	S21	176	153.359	0.769	3.1	2.6642	0.0000	SURCHARGED
15 minute summer	C1	89	152.576	0.028	1.3	0.0321	0.0000	OK
15 minute summer	EXMH	89	152.492	0.028	1.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	RE9	10.000	S18	2.0	0.635	0.113	0.0258	
15 minute winter	S18	10.001	S20	3.2	0.901	0.121	0.0392	
15 minute winter	RE10	11.000	S19	1.2	0.659	0.068	0.0085	
15 minute winter	S19	11.001	S20	1.2	0.462	0.038	0.0241	
15 minute winter	S20	10.002	S21	4.4	1.152	0.149	0.0262	
180 minute winter	S21	Hydro-Brake®	C1	1.3				
15 minute summer	C1	1.007	EXMH	1.3	0.465	0.033	0.0399	17.1

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	RE1	448	154.611	0.460	0.3	0.0507	0.0000	FLOOD RISK
480 minute winter	S1	448	154.611	0.517	0.4	0.0823	0.0000	FLOOD RISK
480 minute winter	S2	448	154.611	0.590	1.3	0.2451	0.0000	FLOOD RISK
480 minute winter	RE2	448	154.611	0.461	0.4	0.0649	0.0000	FLOOD RISK
480 minute winter	RE3	448	154.611	0.461	0.3	0.0507	0.0000	FLOOD RISK
480 minute winter	S3	448	154.611	0.460	0.3	0.1156	0.0000	FLOOD RISK
480 minute winter	S4	448	154.611	0.580	0.3	0.0921	0.0000	FLOOD RISK
480 minute winter	S5	448	154.611	0.757	2.3	0.3283	0.0000	FLOOD RISK
480 minute winter	S6	448	154.611	1.946	4.7	6.9567	0.0000	FLOOD RISK
480 minute winter	RE4	448	154.611	0.460	0.6	0.0930	0.0000	FLOOD RISK
480 minute winter	S7	448	154.611	0.544	0.6	0.0866	0.0000	FLOOD RISK
480 minute winter	S8	448	154.611	0.460	0.4	0.1299	0.0000	FLOOD RISK
480 minute winter	S9	448	154.611	1.950	1.5	6.8540	0.0000	FLOOD RISK
480 minute winter	RE5	448	154.611	0.461	2.0	0.2916	0.0000	FLOOD RISK
480 minute winter	S10	448	154.611	0.545	2.3	0.1312	0.0000	FLOOD RISK
480 minute winter	RE6	448	154.611	0.460	0.3	0.0507	0.0000	FLOOD RISK
480 minute winter	S11	448	154.611	0.521	0.3	0.0828	0.0000	FLOOD RISK
480 minute winter	S12	448	154.611	0.788	2.6	0.1252	0.0000	FLOOD RISK
480 minute winter	S13	448	154.611	1.967	7.0	14.1423	0.0000	FLOOD RISK
480 minute winter	RE7	448	154.611	0.460	0.5	0.0792	0.0000	FLOOD RISK
480 minute winter	S14	448	154.611	0.543	0.8	0.1310	0.0000	FLOOD RISK
480 minute winter	RE8	448	154.611	0.460	0.3	0.0507	0.0000	FLOOD RISK
480 minute winter	S15	448	154.611	0.541	0.4	0.0861	0.0000	FLOOD RISK
480 minute winter	S16	448	154.611	0.785	1.6	0.1249	0.0000	FLOOD RISK
480 minute winter	S17	448	154.611	1.994	5.0	7.1243	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute winter	RE1	1.000	S1	0.3	0.376	0.017	0.1003	
480 minute winter	S1	1.001	S2	0.3	0.287	0.017	0.1285	
480 minute winter	S2	1.002	S6	1.3	0.912	0.038	0.1496	
480 minute winter	RE2	2.000	S5	0.4	0.262	0.009	0.0933	
480 minute winter	RE3	3.000	S5	0.3	0.221	0.008	0.1056	
480 minute winter	S3	3.001	S4	0.3	0.437	0.017	0.2095	
480 minute winter	S4	3.002	S5	0.3	0.213	0.010	0.1003	
480 minute winter	S5	2.001	S6	2.3	0.819	0.099	0.1461	
480 minute winter	S6	1.003	S13	3.1	0.145	0.002	11.8304	
480 minute winter	RE4	4.000	S7	0.6	0.606	0.034	0.1479	
480 minute winter	S7	4.001	S9	0.6	1.025	0.011	0.0581	
480 minute winter	S8	5.000	S9	0.4	0.910	0.007	0.0687	
480 minute winter	S9	4.002	S13	0.5	0.085	0.000	9.8024	
480 minute winter	RE5	6.000	S10	2.0	0.706	0.113	0.1479	
480 minute winter	S10	6.001	S12	2.3	0.804	0.087	0.1937	
480 minute winter	RE6	7.000	S11	0.3	0.434	0.017	0.1056	
480 minute winter	S11	7.001	S12	0.3	0.187	0.010	0.1602	
480 minute winter	S12	7.002	S13	2.6	0.822	0.117	0.1479	
480 minute winter	S13	1.004	S17	3.7	0.194	0.002	15.4359	
480 minute winter	RE7	8.000	S14	0.5	0.428	0.028	0.1461	
480 minute winter	S14	8.001	S16	0.8	0.593	0.030	0.1937	
480 minute winter	RE8	9.000	S15	0.3	0.479	0.013	0.0845	
480 minute winter	S15	9.001	S16	0.3	0.301	0.010	0.1584	
480 minute winter	S16	8.002	S17	1.1	0.713	0.043	0.1356	
480 minute winter	S17	1.005	S21	3.1	0.144	0.002	14.4219	

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.43%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	RE9	448	154.611	0.460	0.5	0.0792	0.0000	FLOOD RISK
480 minute winter	S18	448	154.611	0.542	0.8	0.1307	0.0000	FLOOD RISK
480 minute winter	RE10	448	154.611	0.460	0.3	0.0507	0.0000	FLOOD RISK
480 minute winter	S19	448	154.611	0.506	0.4	0.0805	0.0000	FLOOD RISK
480 minute winter	S20	448	154.611	0.783	1.5	0.1246	0.0000	FLOOD RISK
480 minute winter	S21	448	154.611	2.020	3.1	6.9990	0.0000	FLOOD RISK
480 minute winter	C1	448	152.583	0.035	2.0	0.0394	0.0000	OK
480 minute winter	EXMH	448	152.498	0.034	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute winter	RE9	10.000	S18	0.5	0.428	0.028	0.1444	
480 minute winter	S18	10.001	S20	0.8	0.623	0.030	0.1937	
480 minute winter	RE10	11.000	S19	0.3	0.436	0.017	0.0810	
480 minute winter	S19	11.001	S20	0.3	0.324	0.010	0.1584	
480 minute winter	S20	10.002	S21	1.1	0.784	0.037	0.1215	
480 minute winter	S21	Hydro-Brake®	C1	2.0				
480 minute winter	C1	1.007	EXMH	2.0	0.526	0.050	0.0536	69.7

ANNEX G

Drainage Management and Maintenance Plan



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Southern Court Burnley

Drainage Maintenance Strategy

April 2023

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1.0 Maintenance

- 1.1.1 A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.
- 1.1.2 It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event. Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.
- 1.1.3 A management company may be required for maintenance of attenuation facilities.
- 1.1.4 This section is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details. Where proprietary products are specified, the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.
- 1.1.5 The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.
- 1.1.6 The surface water network has been designed to accommodate the 1 in 100-year storm rainfall event plus an allowance for climate change particular to the requirements of the site. It may be that the exceedance flows above the 1 in 30-year storm rainfall event are stored within the site partially above ground, on non-habitable external landscaping, parking or other space. As the flows are generally being attenuated on site and within SuDS features there will be a period after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs appropriate action should be taken as noted in this section.

1.2 Components

- 1.2.1 The following components have been included within the drainage design for the proposed development:
 - Inspection, Manhole and Catchpit Chambers
 - Pipes
 - Drainage Channels and Gullies
 - Flow Control Unit
- 1.2.2 A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.
- 1.2.3 It is assumed that the maintenance of the drainage network will be the responsibility of an on-site facilities management team.
- 1.2.4 A copy of the final construction drainage layout along with supplier information should be provided in the final Operations and Maintenance Manual.

- 1.2.5 It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event.
- 1.2.6 Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.
- 1.2.7 Long-term management practices include monthly sweeping of external paved areas. The sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilised during storm events and transported to the drainage system.
- 1.2.8 During the winter months, drainage features such as gullies and channels should be cleared of ice, snow, debris or litter
- 1.2.9 Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the filter drains and the upstream/downstream chambers.

1.3 Inspection, Manhole and Catchpit Chambers

- 1.3.1 Access points have been located at the head of each run, at a change in direction and at a change of pipe size in accordance with Building Regulations Part H.
- 1.3.2 The appropriate health and safety equipment must be used when accessing manholes. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the Maintenance Manager prior to any access.

1.4 Pipes

- 1.4.1 Pipes are proprietary products and the materials can vary across the site and as such where used the manufacture's recommendations should be followed. Regardless of the product used the pipes will be fully compliant with the BEK drainage specification.
- 1.4.2 Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleaning where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.
- 1.4.3 Access for maintenance is provided through access chambers and manholes.
- 1.4.4 Regular inspection and maintenance is important to identify areas which may have been obstructed/clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk.

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 as post construction CCTV survey.	N/A
Regular maintenance\ inspection	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Check and remove large vegetation growth near pipe runs.	Monthly or as required
Remedial Action	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	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.

1.5 Drainage Channels and Gullies

- 1.5.1 Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned through the use of a high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.
- 1.5.2 Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers are allowed to move within their frame, this may cause damage to the frame or seating.
- 1.5.3 Sediment\material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the car park channels.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection including channel outlet boxes.	Half yearly and after large storms.
Regular maintenance\ inspection	Litter and debris removal	Monthly or as required.
	Check and remove large vegetation growth near channel runs.	Monthly or as required
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action. 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.	3-monthly, 48 hours after large storms.
Remedial Action	Inspect access/outlet boxes and rod through poorly performing channels and outlets as initial remediation.	As required.

1.6 Flow Control Unit

- 1.6.1 The flow control units are intended for flood control and flow restriction. The flow control specification is subject to detailed design. The manufacturer's recommendations should also be taken in to consideration.
- 1.6.2 Access for maintenance has been provided by locating within manhole chambers.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures and flow control chambers.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets.	As required.

2.0 Typical Inspection Regime Summary

Activity	Indicative frequency	Typical tasks
Routine/regular maintenance	Monthly (for normal care of SuDS)	litter picking grass cutting inspection of inlets, outlets and control structures.
Occasional maintenance	Annually	silt control around components vegetation management around components suction sweeping of permeable paving silt removal from catchpits, soakways and cellular storage
Remedial maintenance	As required (tasks to repair problems due to damage or vandalism)	inlet/outlet repair erosion repairs reinstatement of edgings reinstatement following pollution removal of silt build up

Inspections

As part of the on-going management of most SuDS components there is a need for regular inspections to ensure that blockages, silt and excess litter are not adversely affecting the component or scheme.

Routine inspection

Routine inspections should be carried out once a month for most components, although some, such as infiltration devices, require less frequent visits. Site managers and/or landscape contractors should be used to inspect the SuDS.

Recurring attendance ensures monitoring of the drainage system, a rapid response to problems and “ownership” of the SuDS components. The inspections should be recorded on a maintenance record.

Waste management

SuDS generate waste - they are designed to intercept silt and allow the natural breakdown of organic pollutants. Regular maintenance of SuDS, including occasional removal of silt and vegetation that gathers in SuDS, is required to ensure long term performance.

Removal of silt from surface water runoff is important because a large proportion of pollutants are attached to silt particles. If the silt is removed, then most of the pollution will be dealt with.

Organic waste should be used around the SuDS components or schemes to form wildlife piles. If this is not practical it should be composted or, as a last resort, removed to a licensed landfill site.

