Appendix A – Topographic Survey

Legend

Symbol	Description	Symbol	Description
	Building	123.45	Spot height in metres
	Barrier	PB	Post Box
	Bottom of Bank	BH	Borehole
BT	British Telecom	BS	Bus Stop
	Concrete	CTV	Cable TV
	Canopy	EP	Electricity Pole
	Drop Kerb	ER	Earth Rod
	Drain	FH	Fire Hydrant
	Fence	FL	Floor Level
	Flower Bed	FP	Flag Pole
	Fence - Birdsmouth	Gas	Gas Valve
	Foliage	GM	Gas Marker
	Footpath	GP	Gate Post
	Fence - Security	GY	Gully
	Fence - Wire	IC	Inspection Chamber
	Grass	IL	Invert Level
	Gate	LP	Lamp Post
	Hedge	MH	Manhole
	Kerb	MK	Marker
	Kerb Top	RE	Rodding Eye
	Lake / Pond	RS	Road Sign
	Marsh	SC	Stop Cock
E	Overhead Electricity Line	ST	Septic Tank
T	Overhead Telephone Line		Survey Station
	Ramp	SP	Sign Post
	Sign Post	SV	Stop Valve
	Tarmac	TL	Traffic Light
	Top of Bank	TP	Telegraph Pole
	Track	WM	Water Meter
	Verge		Tree (deciduous)
	Road Markings		Tree (coniferous)
	Wall		Tree (unsurveyed)
100.0	Contours		Shrub
	Steep Slope		

amr geomatics

SURVEY STATIONS MARKED WITH ROAD NAILS AND PEGS WITH COORDINATES RELATING TO OSGB36 NATIONAL GRID

SITE LEVELS MARKED AT STATIONS RELATE TO ORDNANCE DATUM OSGM15, VIA DIFFERENTIAL GPS.

USE ONLY FOR THE PURPOSE INDICATED BELOW

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DRAWING REVISION RECORD

No.	Detail	DWG No.	Date	Intl.
1				
2				
3				
4				

amrGeomatics
Chartered Land Surveyors
www.amrGeomatics.co.uk

Site: "CLEATOR MOOR"
CUMBRIA

Drawing

TOPOGRAPHICAL SURVEY

Date	30 AUG 2023	Drawing No.	**P11140/amr/1** Subm. 01
Scale	1: 500 @ A1		
Drawn By	LR	Checked By	MH

RICS
Chartered Land Surveyors
mail@amrGeomatics.co.uk

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Hexham
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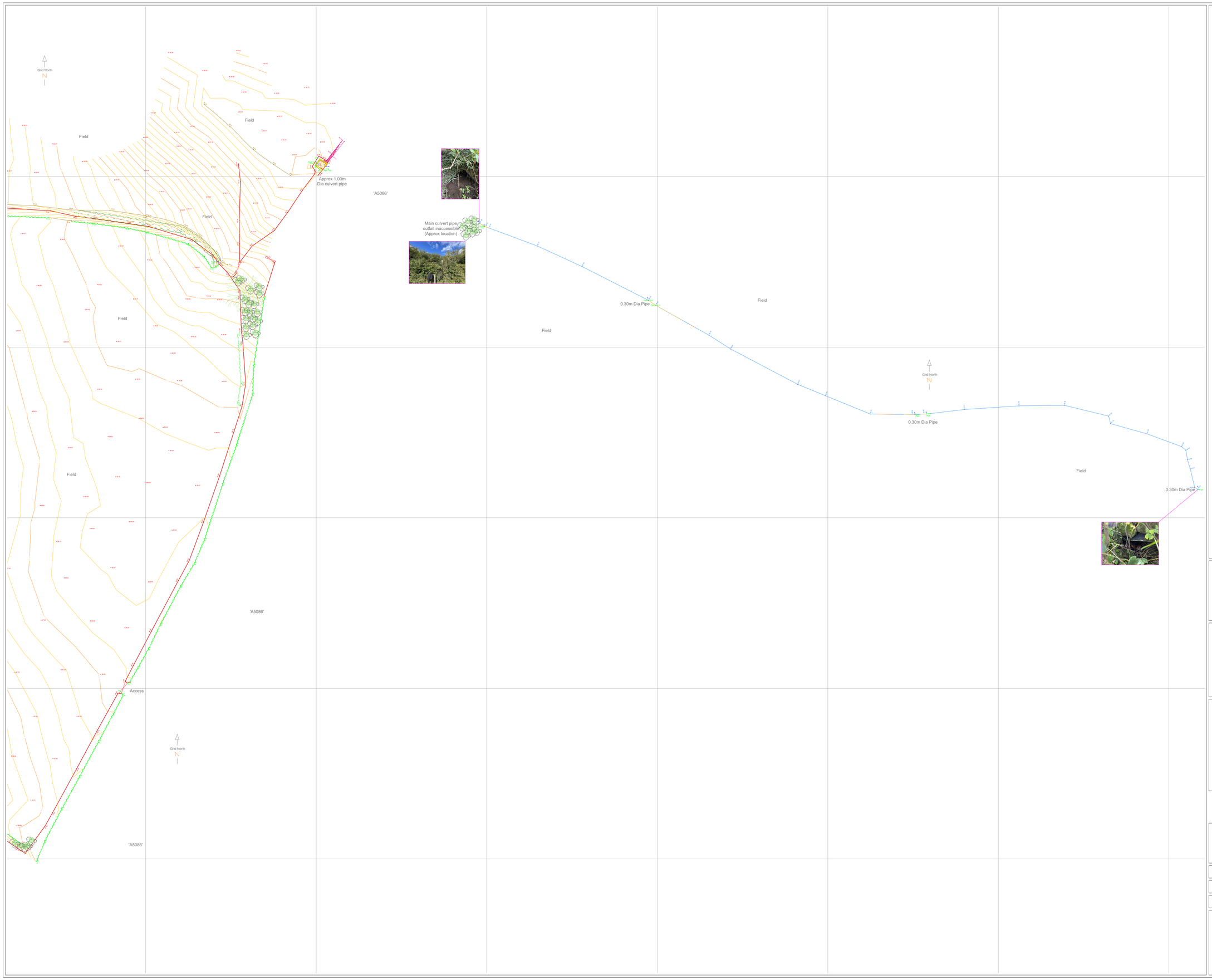

Legend

- Building
- Barrier
- Bottom of Bank
- British Telecom
- Concrete
- Canopy
- Drop Kerb
- Drain
- Fence
- Flower Bed
- Fence - Birdsmouth
- Foliage
- Footpath
- Fence - Security
- Fence - Wire
- Grass
- Gate
- Hedge
- Kerb
- Kerb Top
- Lake / Pond
- Marsh
- Overhead Electricity Line
- Overhead Telephone Line
- Ramp
- Sign Post
- Tarmac
- Top of Bank
- Track
- Verge
- Road Markings
- Wall
- Contours
- Steep Slope
- Spot height in metres
- Post Box
- Borehole
- Bus Stop
- Cable TV
- Electricity Pole
- Earth Rod
- Fire Hydrant
- Floor Level
- Flag Pole
- Gas Valve
- Gas Marker
- Gate Post
- Gully
- Inspection Chamber
- Invert Level
- Lamp Post
- Manhole
- Marker
- Rodding Eye
- Road Sign
- Stop Cock
- Septic Tank
- Survey Station
- Sign Post
- Stop Valve
- Traffic Light
- Telegraph Pole
- Water Meter
- Tree (deciduous)
- Tree (coniferous)
- Tree (unsurveyed)
- Shrub

SURVEY STATIONS MARKED WITH ROAD NAILS AND PEGS WITH COORDINATES RELATING TO OSGB36 NATIONAL GRID

SITE LEVELS MARKED AT STATIONS RELATE TO ORDNANCE DATUM OSGM15, VIA DIFFERENTIAL GPS.

USE ONLY FOR THE PURPOSE INDICATED BELOW

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DRAWING REVISION RECORD

No.	Detail	DWG No.	Date	Intl.
1				
2				
3				
4				

amrGeomatics
Chartered Land Surveyors

www.amrGeomatics.co.uk

Site: "CLEATOR MOOR"
CUMBRIA

Drawing
TOPOGRAPHICAL SURVEY

Date	30 AUG 2023	Drawing No.	**P11140/amr/2** Subm. 01
Scale	1: 500 @ A1		
Drawn By	LR	Checked By	MH

Chartered Land Surveyors
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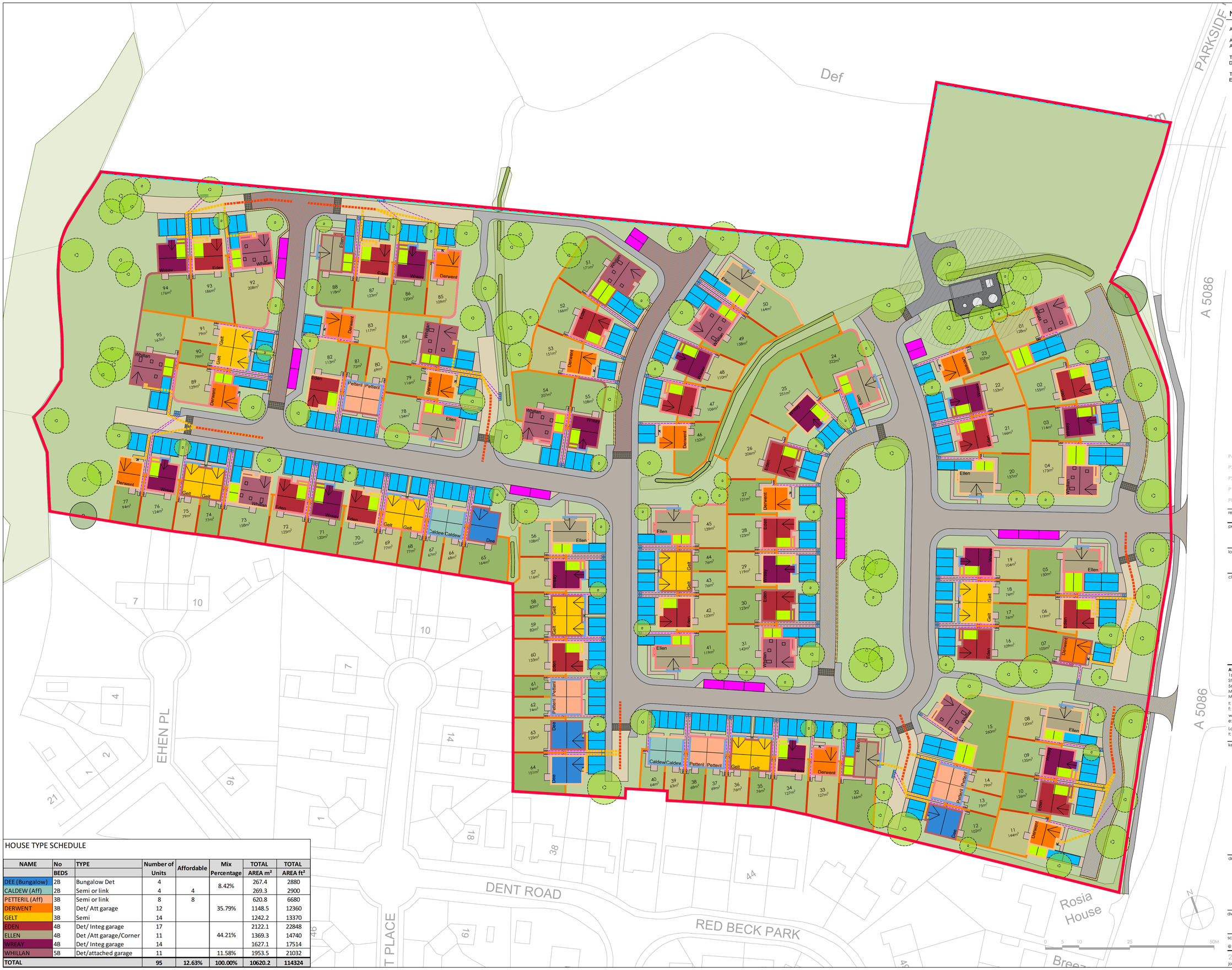
Appendix B – Proposed Layout



HOUSE TYPE SCHEDULE

NAME	No BEDS	TYPE	Number of Units	Affordable	Mix Percentage	TOTAL AREA m²	TOTAL AREA ft²
DEE (Bungalow)	2B	Bungalow Det	4		8.42%	267.4	2880
CALDEW (Aff)	2B	Semi or link	4	4		269.3	2900
PETTERIL (Aff)	3B	Semi or link	8	8		620.8	6680
DERWENT	3B	Det/ Att garage	12		35.79%	1148.5	12360
GELT	3B	Semi	14			1242.2	13370
EDEN	4B	Det/ Integ garage	17		44.21%	2122.1	22848
ELLEN	4B	Det /Att garage/Corner	11			1369.3	14740
WREAY	4B	Det/ Integ garage	14			1627.1	17514
WHILLAN	5B	Det/attached garage	11		11.58%	1953.5	21032
TOTAL			**95**	**12.63%**	**100.00%**	**10620.2**	**114324**

NOTES

ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE

ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT BEFORE ANY WORK COMMENCES

THIS DRAWING SHALL NOT BE SCALED TO ASCERTAIN ANY DIMENSIONS WORK TO FIGURED DIMS ONLY

THIS DRAWING SHALL NOT BE REPRODUCED WITHOUT EXPRESS WRITTEN PERMISSION FROM AFL LTD.

Key

Site Boundary Redline

rev	date/ints	description
P4	14-11-24 DC	Plan updated following feedback from client. Further consultant commentary required.
P3	25-09-24 GB	Update following comments from Genesis
P2	19-09-24 GB	Update following comments from Genesis
P1	17-09-24 GB	Revised layout
P0	05-03-24 DC	First Issue

project
PARKSIDE ROAD

location
PARKSIDE ROAD, CLEATOR MOOR

client
GENESIS HOMES

AFL Architects
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e: mail@afl-uk.com

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AFL architects

key plan

drawing title
PARKSIDE ROAD, CLEATOR MOOR
SITE FRAMEWORK PLAN
(WORK IN PROGRESS)

dwg purpose
CONCEPT

scale 1:500 | drawn DC | checked DC
@ sheet size A1 | rev date 14-11-2024

244102 job number | AFL-ZZ-XX-DR-A-20112 drawing number | P4 revision

Appendix C – Flood Risk Map

Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**302884/514999**	**12 Dec 2024 13:19**

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger that 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

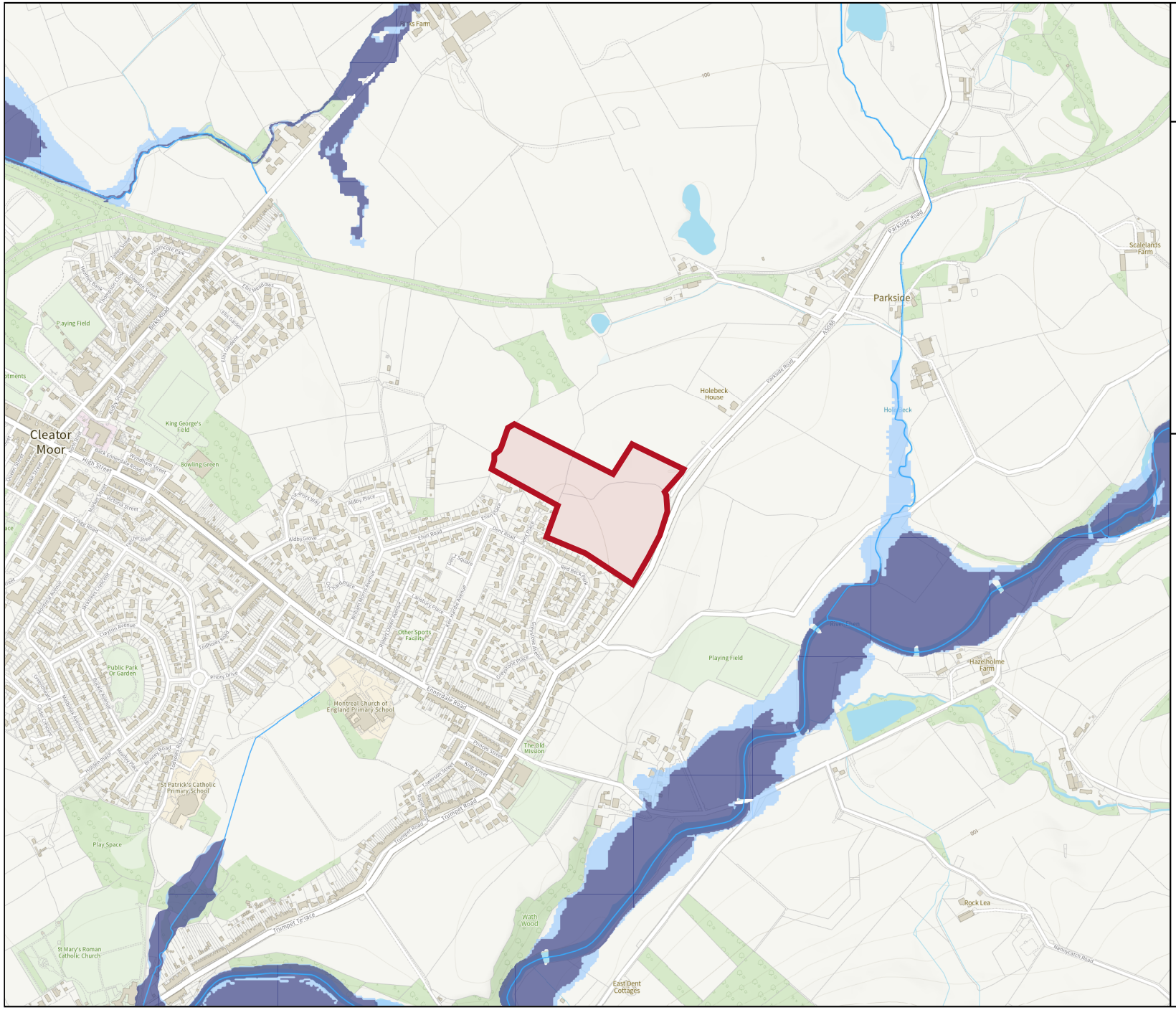
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2024 OS AC0000807064. https://flood-map-for-planning.service.gov.uk/os-terms



Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
302884/514999

Scale
1:10000

Created
12 Dec 2024 13:19

- Selected area
- Flood zone 3
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 100 200 300m

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Appendix C –
Greenfield Run Off Estimation

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Jason McNeil
Site name:	Cleator
Site location:	Cleator

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	54.52076° N
Longitude:	3.50104° W
Reference:	2079146768
Date:	Oct 03 2024 11:06

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 4.107

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	1337	1337
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	42.28	42.28
1 in 1 year (l/s):	36.78	36.78
1 in 30 years (l/s):	71.87	71.87
1 in 100 year (l/s):	87.93	87.93
1 in 200 years (l/s):	100.19	100.19

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix D –
Proposed Drainage Strategy Layout

A0

ADDITIONAL SURVEY INFO REQUIRED TO DETERMINE FULL EXTENT OF BATTERS

VOL = 1997m3
SIDE SLOPES 1:3
TOP = 93.450m
BASE = 92.150m

SLOS MAINTENANCE TRACK

S28 Hydrobeake
CL93.45
IL92.150
ORIFICE 264mm
DESIGN FLOW
42l/s
DESIGN HEAD
1.7m

Approx 1.00m Dia culvert pipe

90.6m

A 5086

'A5086'

Rosia House

ALL DRIVEWAYS TO BE CONSTRUCTED WITH A FILTER DRAIN

KEY PLAN

Highways
1. All excavations below adopted highways to be backfilled with Type 1 and compacted in layers not exceeding 150mm.
2. Highway Authority to be contacted as soon as Contractor is on site to enable early discussions with the Clerk of Works.

General Drainage
3. Manhole/inspespectionchamber covers in trafficked areas to be loading type D400 and B125 in non-trafficked areas.
4. All gullies to be trapped as shown on the details drawings.

Adopted Drainage
5. Position and levels of existing manholes and sewers are to be checked on site as soon as possible and preferably before site activities commence.
6. The sewer connection is to be carried out by an NWL Approved Contractor.
7. This drawing is to be read in conjunction with the drainage details drawings.
8. For proposed adopted drainage pipes with less than 900mm cover in areas not subjected to vehicular loading and less than 1200mm in vehicular loading areas to be concrete protected.
9. Adopted drainage is to comply with 'Sewers for Adoption 6th Edition'.
10. Pipe surround to be granular type 's' unless noted otherwise.

Private Drainage
11. Private drainage is to comply with all statutory requirements and accord with BS EN 752 and Building Regulations Approved Document H.
12. Pipe bedding should granular unless noted otherwise and the granular material to be to BS882 Pt 2 and to Building Regulations Part H.
13. Pipe sizes to be 100mm u.n.o..
14. For drainage pipes to be cast in concrete to have rocker pipes either side of concrete.

Layout Key
- Highway gully and 150mmØ lead (connection of lead to carrier pipe to be at 45° in the direction of surface water flow, where possible).

Surface Water Drainage
- Adopted manhole - Concrete Ring (see manhole schedule for further detail).
- Adopted surface water sewer.

Foul Drainage
- Adopted Manhole - Concrete Ring .
- Adopted foul water sewer .

Existing Drainage
- Existing Manhole .
- Existing sewer .

External Works Notes
× 9.000 - Proposed external level.
×EX9.000m - Existing level.
13.60 - Proposed finished floor level.
RET 600 - Proposed retaining wall with retained height.
- Exposed brickwork.
- Tanking/Double DPC
- Flag on edge up to 450mm high.
H - Proposed steps
- Proposed batter

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Issue	Date	Description	By	Chkd	Appd
P3	13.12.24	Planning issue	JM	KR	RH
P2	15.08.24	Updated to suit latest layout	JM	RH	RH
P1	07.12.23	Preliminary Issue	JM	RH	PL

COAST CONSULTING ENGINEERS
7 Silverton Court, Northumberland Business Park, NE23 7RY
0191 5977879

Client: GENESIS HOMES

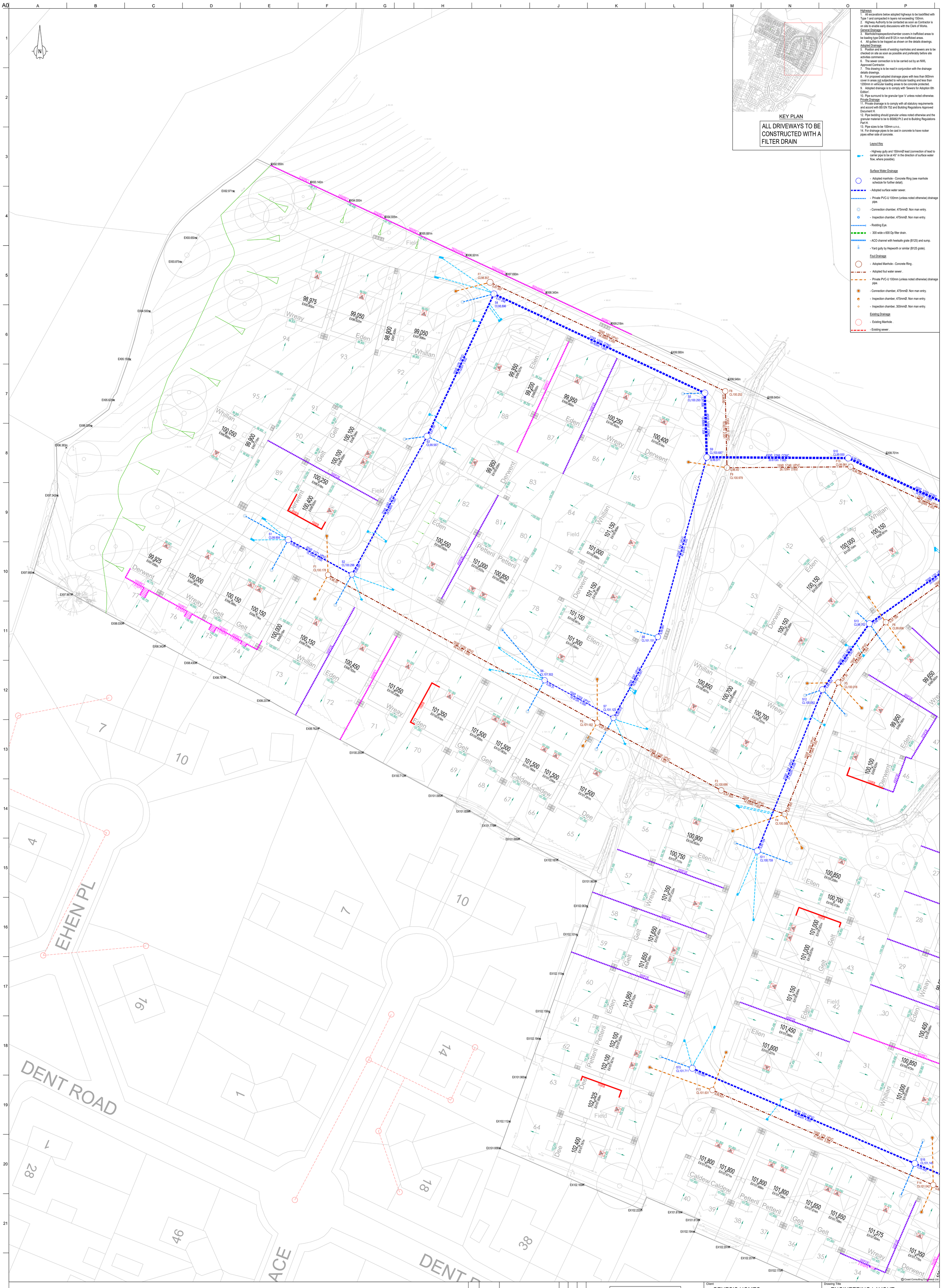
Job Title: PARKSIDE ROAD CLEATOR MOOR

Drawing Title: ENGINEERING LAYOUT SHEET 1

Scale at A0: 1:250

Drawing Status: PRELIMINARY

Job No: 23098 | Drawing No: 01 | Issue: P3



Highways
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Adopted Drainage
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6. The sewer connection is to be carried out by an NWL Approved Contractor.
7. This drawing is to be read in conjunction with the drainage details drawings.
8. For proposed adopted drainage pipes with less than 900mm cover in areas not subjected to vehicular loading and less than 1200mm in vehicular loading areas to be concrete protected.
9. Adopted drainage is to comply with 'Sewers for Adoption 6th Edition'.
10. Pipe surround to be granular type 's' unless noted otherwise.

Private Drainage
11. Private drainage is to comply with all statutory requirements and accord with BS EN 752 and Building Regulations Approved Document H.
12. Pipe bedding should granular unless noted otherwise and the granular material to be to BS882:Pt 2 and to Building Regulations Part H.
13. Pipe sizes to be 100mm u.n.o..
14. For drainage pipes to be cast in concrete to have rocker pipes either side of concrete.

Layout Key

- Highway gully and 150mmØ lead (connection of lead to carrier pipe to be at 45° in the direction of surface water flow, where possible).

Surface Water Drainage

- Adopted manhole - Concrete Ring (see manhole schedule for further detail).
- Adopted surface water sewer.
- Private PVC-U 100mm (unless noted otherwise) drainage pipe.
- Connection chamber, 475mmØ. Non man entry.
- Inspection chamber, 475mmØ. Non man entry.
- Rodding Eye.
- 300 wide x 600 Dp filter drain.
- ACO channel with heelsafe grate (B125) and sump.
- Yard gully by Hepworth or similar (B125 grate).

Foul Drainage

- Adopted Manhole - Concrete Ring .
- Adopted foul water sewer .
- Private PVC-U 100mm (unless noted otherwise) drainage pipe.
- Connection chamber, 475mmØ. Non man entry.
- Inspection chamber, 475mmØ. Non man entry.
- Inspection chamber, 300mmØ. Non man entry.

Existing Drainage

- Existing Manhole .
- Existing sewer .

Issue	Date	Description	By	Chkd	Appd
P3	13.12.24	Planning issue	JM	KR	RH
P2	15.08.24	Updated to suit latest layout	JM	RH	RH
P1	07.12.23	Preliminary Issue	JM	RH	PL

COAST CONSULTING ENGINEERS
7 Silverton Court, Northumberland Business Park, NE23 7RY
0191 5977879

Client: GENESIS HOMES

Job Title: PARKSIDE ROAD CLEATOR MOOR

Drawing Title: ENGINEERING LAYOUT SHEET 2

Scale at A0: 1:250

Drawing Status: PRELIMINARY

Job No: 23098 | Drawing No: 02 | Issue: P3

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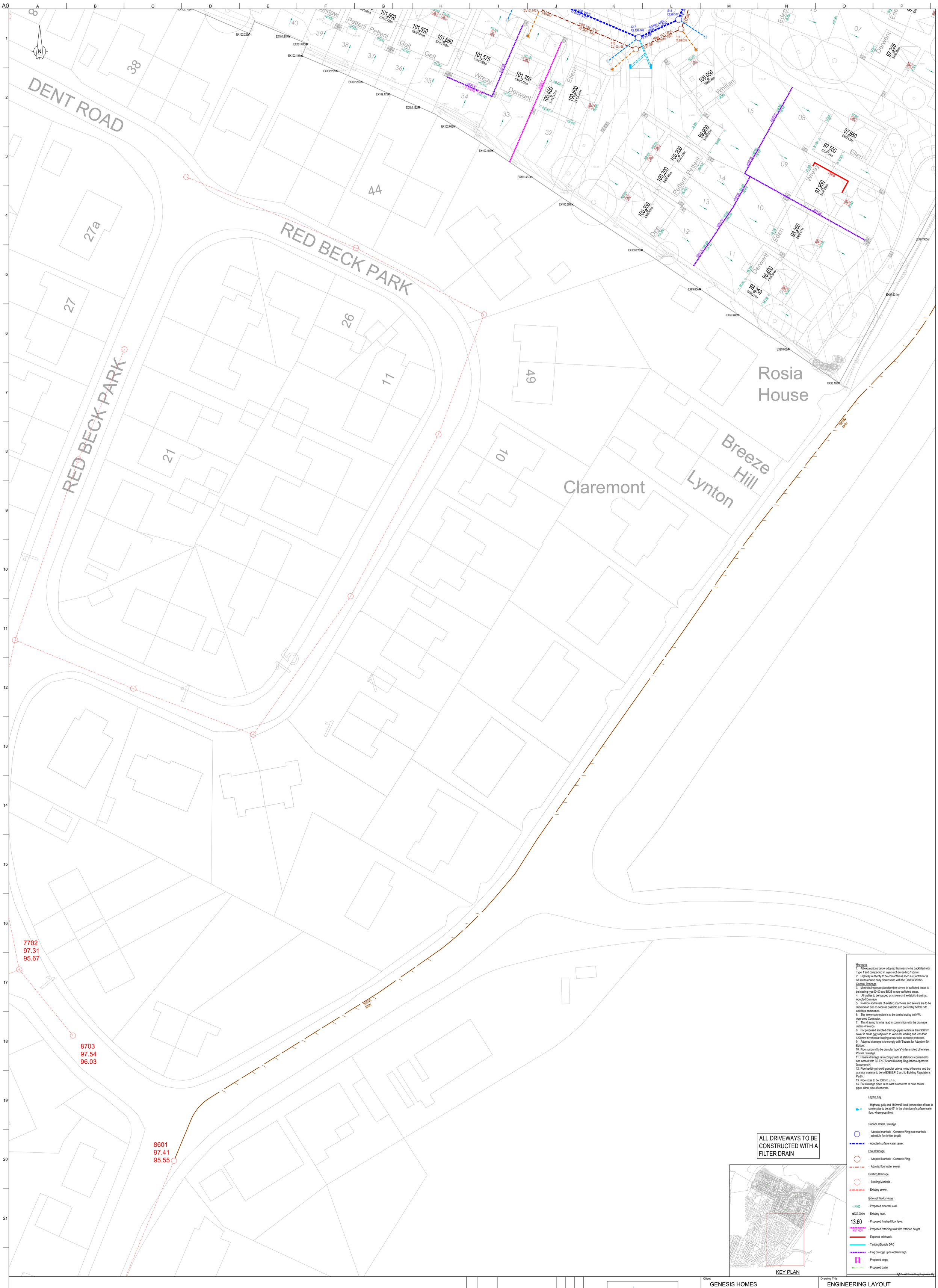

ALL DRIVEWAYS TO BE CONSTRUCTED WITH A FILTER DRAIN

KEY PLAN

Highways
1. All excavations below adopted highways to be backfilled with Type 1 and compacted in layers not exceeding 150mm.
2. Highway Authority to be contacted as soon as Contractor is on site to enable early discussions with the Clerk of Works.

General Drainage
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4. All gullies to be trapped as shown on the details drawings.

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9. Adopted drainage is to comply with 'Sewers for Adoption 6th Edition'.
10. Pipe surround to be granular type 's' unless noted otherwise.

Private Drainage
11. Private drainage is to comply with all statutory requirements and accord with BS EN 752 and Building Regulations Approved Document H.
12. Pipe bedding should granular unless noted otherwise and the granular material to be to BS882:Pt 2 and to Building Regulations Part H.
13. Pipe sizes to be 100mm u.n.o..
14. For drainage pipes to be cast in concrete to have rocker pipes either side of concrete.

Layout Key
- Highway gully and 150mmØ lead (connection of lead to carrier pipe to be at 45° in the direction of surface water flow, where possible).

Surface Water Drainage
- Adopted manhole - Concrete Ring (see manhole schedule for further detail).
- Adopted surface water sewer.

Foul Drainage
- Adopted Manhole - Concrete Ring .
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- Existing sewer .

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× 9.000 - Proposed external level.
×EX9.000m - Existing level.
13.60 - Proposed finished floor level.
RET 600 - Proposed retaining wall with retained height.
- Exposed brickwork.
- Tanking/Double DPC
- Flag on edge up to 450mm high.
H - Proposed steps
- Proposed batter

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Issue	Date	Description	By	Chkd	Appd
P1	13.12.24	Planning issue	JM	KR	RH

COAST CONSULTING ENGINEERS
7 Silverton Court, Northumberland Business Park, NE23 7RY
0191 5977879

Client: GENESIS HOMES

Job Title: PARKSIDE ROAD CLEATOR MOOR

Drawing Title: ENGINEERING LAYOUT SHEET 3

Scale at A0: 1:250

Drawing Status: **PRELIMINARY**

Job No: 23098 | Drawing No: 03 | Issue: P1

Appendix E –
Surface Water Drainage Calculations

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 241206 Cleator SW.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	15.704	0.092	170.7	0.095	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	34.036	0.545	62.5	0.066	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	34.026	0.446	76.3	0.098	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	50.405	0.165	305.5	0.073	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.004	13.900	0.035	397.1	0.076	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.000	16.972	0.163	104.1	0.097	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	19.974	0.205	97.4	0.063	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	40.283	1.671	24.1	0.058	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	30.613	0.077	397.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	36.677	0.094	390.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	37.623	0.677	55.6	0.172	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	17.522	0.330	53.1	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.002	35.083	1.152	30.5	0.136	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	36.013	2.220	16.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	52.332	0.566	92.5	0.141	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	27.631	0.997	27.7	0.161	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)
1.000	48.71	5.26	98.479	0.095	0.0	0.0	0.0	1.00	39.7	12.5
1.001	47.60	5.60	98.387	0.161	0.0	0.0	0.0	1.66	65.9	20.8
1.002	46.64	5.92	97.767	0.259	0.0	0.0	0.0	1.80	127.4	32.7
1.003	44.36	6.73	97.246	0.332	0.0	0.0	0.0	1.03	113.9	39.9
1.004	43.77	6.96	97.006	0.408	0.0	0.0	0.0	1.01	161.3	48.4
2.000	48.62	5.29	99.310	0.097	0.0	0.0	0.0	0.98	17.4	12.8
2.001	47.81	5.54	99.072	0.160	0.0	0.0	0.0	1.32	52.7	20.7
2.002	47.03	5.79	98.867	0.218	0.0	0.0	0.0	2.68	106.4	27.8
1.005	42.54	7.47	96.971	0.626	0.0	0.0	0.0	1.01	161.2	72.1
1.006	41.19	8.06	96.894	0.626	0.0	0.0	0.0	1.02	162.7	72.1
3.000	48.39	5.36	99.184	0.172	0.0	0.0	0.0	1.76	69.9	22.5
3.001	47.96	5.49	98.432	0.255	0.0	0.0	0.0	2.16	152.9	33.1
3.002	47.31	5.70	98.102	0.391	0.0	0.0	0.0	2.86	202.1	50.1
1.007	40.94	8.18	96.800	1.017	0.0	0.0	0.0	5.07	805.9	112.8
4.000	47.82	5.53	100.061	0.141	0.0	0.0	0.0	1.64	115.6	18.3
4.001	47.34	5.69	99.495	0.302	0.0	0.0	0.0	3.00	211.9	38.7

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 241206 Cleator SW.SWS

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
4.002	9.549	0.571	16.7	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.003	40.733	1.396	29.2	0.093	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.004	25.539	0.847	30.2	0.076	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.005	20.304	0.555	36.6	0.056	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.006	22.309	0.314	71.0	0.137	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.007	24.386	0.085	286.9	0.047	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.008	87.651	2.280	38.4	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	19.961	0.516	38.7	0.049	5.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	25.226	0.320	78.8	0.196	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.002	40.802	1.012	40.3	0.055	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.003	39.707	1.037	38.3	0.061	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	15.175	3.150	4.8	0.000	0.00	0.0	0.600	o	600	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)
4.002	47.21	5.73	98.498	0.351	0.0	0.0	0.0	3.86	273.1	44.9
4.003	46.51	5.96	97.927	0.444	0.0	0.0	0.0	2.92	206.5	55.9
4.004	46.14	6.09	96.456	0.520	0.0	0.0	0.0	3.31	365.6	65.0
4.005	45.81	6.20	95.609	0.576	0.0	0.0	0.0	3.00	331.8	71.5
4.006	45.33	6.37	95.054	0.713	0.0	0.0	0.0	2.15	237.7	87.5
4.007	44.30	6.76	94.740	0.760	0.0	0.0	0.0	1.06	117.6	91.2
1.008	40.17	8.55	94.430	1.777	0.0	0.0	0.0	3.94	1112.8	193.3
5.000	49.06	5.16	95.410	0.049	0.0	0.0	0.0	2.11	83.9	6.5
5.001	48.27	5.39	94.819	0.245	0.0	0.0	0.0	1.77	125.3	32.0
5.002	47.40	5.67	94.499	0.300	0.0	0.0	0.0	2.48	175.5	38.5
5.003	46.61	5.93	93.487	0.361	0.0	0.0	0.0	2.55	180.2	45.6
1.009	40.12	8.58	92.150	2.138	0.0	0.0	0.0	11.14	3150.4	232.3

Free Flowing Outfall Details for 241206 Cleator SW.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	CULVERT	90.024	89.000	0.000	0	0

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Simulation Criteria for 241206 Cleator SW.SWS

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 Coeffiecient	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	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.100	Storm Duration (mins)	30
Ratio R	0.247		

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Online Controls for 241206 Cleator SW.SWS

Hydro-Brake® Optimum Manhole: S28HB, DS/PN: 1.009, Volume (m³): 29.4

Unit Reference	MD-SHE-0264-4200-1700-4200
Design Head (m)	1.700
Design Flow (l/s)	42.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	264
Invert Level (m)	92.150
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.700	42.0
Flush-Flo™	0.526	42.0
Kick-Flo®	1.154	34.9
Mean Flow over Head Range	-	35.9

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	8.4	1.200	35.5	3.000	55.2	7.000	83.3
0.200	27.2	1.400	38.2	3.500	59.5	7.500	86.1
0.300	39.8	1.600	40.8	4.000	63.5	8.000	88.9
0.400	41.4	1.800	43.2	4.500	67.2	8.500	91.6
0.500	41.9	2.000	45.4	5.000	70.7	9.000	94.2
0.600	41.8	2.200	47.5	5.500	74.1	9.500	96.7
0.800	40.9	2.400	49.6	6.000	77.3		
1.000	38.8	2.600	51.5	6.500	80.3		

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Storage Structures for 241206 Cleator SW.SWS

Tank or Pond Manhole: S28HB, DS/PN: 1.009

Invert Level (m) 92.150

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1244.0	1.300	1848.0

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Summary of Critical Results by Maximum Level (Rank 1) for 241206 Cleator SW.SWS

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 FSR Ratio R 0.256
Region England and Wales Cv (Summer) 1.000
M5-60 (mm) 17.600 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 100
Climate Change (%) 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S1	30 Summer	100	+45%	100/15 Summer			
1.001	S2	30 Summer	100	+45%	100/15 Summer			
1.002	S3	15 Summer	100	+45%	100/15 Summer			
1.003	S4	30 Summer	100	+45%	100/15 Summer			
1.004	S5	30 Summer	100	+45%	100/15 Summer			
2.000	S6	30 Summer	100	+45%	100/15 Summer	100/15 Summer		
2.001	S7	15 Summer	100	+45%	100/15 Summer			
2.002	S8	15 Summer	100	+45%	100/15 Summer			
1.005	S9	30 Summer	100	+45%	100/15 Summer			
1.006	S10	30 Summer	100	+45%	100/15 Summer			
3.000	S11	15 Summer	100	+45%	100/15 Summer			
3.001	S12	15 Summer	100	+45%	100/15 Summer			
3.002	S13	15 Summer	100	+45%	100/15 Summer			
1.007	S14	30 Summer	100	+45%				
4.000	S15	15 Summer	100	+45%	100/15 Summer			
4.001	S16	15 Summer	100	+45%	100/15 Summer			
4.002	S17	15 Summer	100	+45%	100/15 Summer			
4.003	S18	15 Summer	100	+45%	100/15 Summer			

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Summary of Critical Results by Maximum Level (Rank 1) for 241206 Cleator SW.SWS

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	S1	99.858	1.154	0.000	1.36			47.7	FLOOD RISK
1.001	S2	99.694	1.082	0.000	1.23			76.0	SURCHARGED
1.002	S3	98.882	0.815	0.000	1.03			120.6	SURCHARGED
1.003	S4	98.396	0.775	0.000	1.44			152.0	SURCHARGED
1.004	S5	98.039	0.583	0.000	1.77			186.7	SURCHARGED
2.000	S6	101.303	1.843	0.209	2.88			46.7	FLOOD
2.001	S7	100.087	0.790	0.000	1.54			73.3	SURCHARGED
2.002	S8	99.599	0.507	0.000	1.00			100.9	SURCHARGED
1.005	S9	97.926	0.505	0.000	2.05			284.7	SURCHARGED
1.006	S10	97.595	0.251	0.000	1.96			281.2	SURCHARGED
3.000	S11	100.369	0.960	0.000	1.40			92.4	SURCHARGED
3.001	S12	99.054	0.322	0.000	1.05			137.6	SURCHARGED
3.002	S13	98.716	0.314	0.000	1.13			209.3	SURCHARGED
1.007	S14	97.071	-0.179	0.000	0.68			478.0	OK
4.000	S15	100.608	0.247	0.000	0.74			80.7	SURCHARGED
4.001	S16	100.401	0.606	0.000	0.84			160.4	SURCHARGED
4.002	S17	99.844	1.046	0.000	0.90			170.0	SURCHARGED
4.003	S18	99.436	1.209	0.000	1.05			201.7	FLOOD RISK

PN	US/MH Name	Level Exceeded
1.000	S1	
1.001	S2	
1.002	S3	
1.003	S4	
1.004	S5	
2.000	S6	2
2.001	S7	
2.002	S8	
1.005	S9	
1.006	S10	
3.000	S11	
3.001	S12	
3.002	S13	
1.007	S14	
4.000	S15	
4.001	S16	
4.002	S17	
4.003	S18	

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Summary of Critical Results by Maximum Level (Rank 1) for 241206 Cleator SW.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
4.004	S19	15 Summer	100	+45%	100/15 Summer				97.884
4.005	S20	15 Summer	100	+45%	100/15 Summer				97.417
4.006	S21	15 Summer	100	+45%	100/15 Summer				96.924
4.007	S22	15 Summer	100	+45%	100/15 Summer				96.066
1.008	S23	30 Summer	100	+45%					94.839
5.000	S24	15 Summer	100	+45%	100/15 Summer				95.769
5.001	S25	15 Summer	100	+45%	100/15 Summer				95.702
5.002	S26	15 Summer	100	+45%	100/15 Summer				95.231
5.003	S27	15 Summer	100	+45%	100/15 Summer				94.189
1.009	S28HB	600 Summer	100	+45%	100/60 Summer				93.148

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
4.004	S19	1.053	0.000	0.76			240.3	FLOOD RISK	
4.005	S20	1.433	0.000	0.95			265.9	FLOOD RISK	
4.006	S21	1.495	0.000	1.62			328.5	FLOOD RISK	
4.007	S22	0.951	0.000	3.46			350.4	FLOOD RISK	
1.008	S23	-0.191	0.000	0.80			824.1	OK	
5.000	S24	0.134	0.000	0.44			33.1	SURCHARGED	
5.001	S25	0.583	0.000	1.26			140.6	SURCHARGED	
5.002	S26	0.432	0.000	1.02			166.1	SURCHARGED	
5.003	S27	0.402	0.000	1.17			195.6	SURCHARGED	
1.009	S28HB	0.398	0.000	0.02			42.0	SURCHARGED	

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 241206 Cleator SW.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	15.704	0.092	170.7	0.095	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	34.036	0.545	62.5	0.066	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	34.026	0.446	76.3	0.098	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	50.405	0.165	305.5	0.073	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.004	13.900	0.035	397.1	0.076	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.000	16.972	0.163	104.1	0.097	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	19.974	0.205	97.4	0.063	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	40.283	1.671	24.1	0.058	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	30.613	0.077	397.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	36.677	0.094	390.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	37.623	0.677	55.6	0.172	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	17.522	0.330	53.1	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.002	35.083	1.152	30.5	0.136	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	36.013	2.220	16.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	52.332	0.566	92.5	0.141	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	27.631	0.997	27.7	0.161	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)
1.000	48.71	5.26	98.479	0.095	0.0	0.0	0.0	1.00	39.7	12.5
1.001	47.60	5.60	98.387	0.161	0.0	0.0	0.0	1.66	65.9	20.8
1.002	46.64	5.92	97.767	0.259	0.0	0.0	0.0	1.80	127.4	32.7
1.003	44.36	6.73	97.246	0.332	0.0	0.0	0.0	1.03	113.9	39.9
1.004	43.77	6.96	97.006	0.408	0.0	0.0	0.0	1.01	161.3	48.4
2.000	48.62	5.29	99.310	0.097	0.0	0.0	0.0	0.98	17.4	12.8
2.001	47.81	5.54	99.072	0.160	0.0	0.0	0.0	1.32	52.7	20.7
2.002	47.03	5.79	98.867	0.218	0.0	0.0	0.0	2.68	106.4	27.8
1.005	42.54	7.47	96.971	0.626	0.0	0.0	0.0	1.01	161.2	72.1
1.006	41.19	8.06	96.894	0.626	0.0	0.0	0.0	1.02	162.7	72.1
3.000	48.39	5.36	99.184	0.172	0.0	0.0	0.0	1.76	69.9	22.5
3.001	47.96	5.49	98.432	0.255	0.0	0.0	0.0	2.16	152.9	33.1
3.002	47.31	5.70	98.102	0.391	0.0	0.0	0.0	2.86	202.1	50.1
1.007	40.94	8.18	96.800	1.017	0.0	0.0	0.0	5.07	805.9	112.8
4.000	47.82	5.53	100.061	0.141	0.0	0.0	0.0	1.64	115.6	18.3
4.001	47.34	5.69	99.495	0.302	0.0	0.0	0.0	3.00	211.9	38.7

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 241206 Cleator SW.SWS

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
4.002	9.549	0.571	16.7	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.003	40.733	1.396	29.2	0.093	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.004	25.539	0.847	30.2	0.076	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.005	20.304	0.555	36.6	0.056	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.006	22.309	0.314	71.0	0.137	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.007	24.386	0.085	286.9	0.047	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.008	87.651	2.280	38.4	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	19.961	0.516	38.7	0.049	5.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	25.226	0.320	78.8	0.196	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.002	40.802	1.012	40.3	0.055	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.003	39.707	1.037	38.3	0.061	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	15.175	3.150	4.8	0.000	0.00	0.0	0.600	o	600	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)
4.002	47.21	5.73	98.498	0.351	0.0	0.0	0.0	3.86	273.1	44.9
4.003	46.51	5.96	97.927	0.444	0.0	0.0	0.0	2.92	206.5	55.9
4.004	46.14	6.09	96.456	0.520	0.0	0.0	0.0	3.31	365.6	65.0
4.005	45.81	6.20	95.609	0.576	0.0	0.0	0.0	3.00	331.8	71.5
4.006	45.33	6.37	95.054	0.713	0.0	0.0	0.0	2.15	237.7	87.5
4.007	44.30	6.76	94.740	0.760	0.0	0.0	0.0	1.06	117.6	91.2
1.008	40.17	8.55	94.430	1.777	0.0	0.0	0.0	3.94	1112.8	193.3
5.000	49.06	5.16	95.410	0.049	0.0	0.0	0.0	2.11	83.9	6.5
5.001	48.27	5.39	94.819	0.245	0.0	0.0	0.0	1.77	125.3	32.0
5.002	47.40	5.67	94.499	0.300	0.0	0.0	0.0	2.48	175.5	38.5
5.003	46.61	5.93	93.487	0.361	0.0	0.0	0.0	2.55	180.2	45.6
1.009	40.12	8.58	92.150	2.138	0.0	0.0	0.0	11.14	3150.4	232.3

Free Flowing Outfall Details for 241206 Cleator SW.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	CULVERT	90.024	89.000	0.000	0	0

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Simulation Criteria for 241206 Cleator SW.SWS

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 Coeffiecient	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	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.100	Storm Duration (mins)	30
Ratio R	0.247		

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Online Controls for 241206 Cleator SW.SWS

Hydro-Brake® Optimum Manhole: S28HB, DS/PN: 1.009, Volume (m³): 29.4

Unit Reference	MD-SHE-0264-4200-1700-4200
Design Head (m)	1.700
Design Flow (l/s)	42.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	264
Invert Level (m)	92.150
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.700	42.0
Flush-Flo™	0.526	42.0
Kick-Flo®	1.154	34.9
Mean Flow over Head Range	-	35.9

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	8.4	1.200	35.5	3.000	55.2	7.000	83.3
0.200	27.2	1.400	38.2	3.500	59.5	7.500	86.1
0.300	39.8	1.600	40.8	4.000	63.5	8.000	88.9
0.400	41.4	1.800	43.2	4.500	67.2	8.500	91.6
0.500	41.9	2.000	45.4	5.000	70.7	9.000	94.2
0.600	41.8	2.200	47.5	5.500	74.1	9.500	96.7
0.800	40.9	2.400	49.6	6.000	77.3		
1.000	38.8	2.600	51.5	6.500	80.3		

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Storage Structures for 241206 Cleator SW.SWS

Tank or Pond Manhole: S28HB, DS/PN: 1.009

Invert Level (m) 92.150

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1244.0	1.300	1848.0

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Summary of Critical Results by Maximum Level (Rank 1) for 241206 Cleator SW.SWS

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 FSR Ratio R 0.256
Region England and Wales Cv (Summer) 1.000
M5-60 (mm) 17.600 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 30
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1	15 Summer	30	+0%					98.644
1.001	S2	15 Summer	30	+0%					98.552
1.002	S3	15 Summer	30	+0%					97.966
1.003	S4	15 Summer	30	+0%	30/15 Summer				97.654
1.004	S5	30 Summer	30	+0%	30/15 Summer				97.516
2.000	S6	15 Summer	30	+0%	30/15 Summer				99.839
2.001	S7	15 Summer	30	+0%					99.297
2.002	S8	15 Summer	30	+0%					99.004
1.005	S9	30 Summer	30	+0%	30/15 Summer				97.478
1.006	S10	15 Summer	30	+0%	30/15 Summer				97.362
3.000	S11	15 Summer	30	+0%					99.344
3.001	S12	15 Summer	30	+0%					98.611
3.002	S13	15 Summer	30	+0%					98.294
1.007	S14	30 Summer	30	+0%					96.989
4.000	S15	15 Summer	30	+0%					100.197
4.001	S16	15 Summer	30	+0%					99.653
4.002	S17	15 Summer	30	+0%					98.674
4.003	S18	15 Summer	30	+0%					98.133

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Summary of Critical Results by Maximum Level (Rank 1) for 241206 Cleator SW.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.060	0.000	0.87			30.6	OK	
1.001	S2	-0.060	0.000	0.86			53.1	OK	
1.002	S3	-0.101	0.000	0.74			86.6	OK	
1.003	S4	0.033	0.000	0.96			100.9	SURCHARGED	
1.004	S5	0.060	0.000	1.06			111.8	SURCHARGED	
2.000	S6	0.379	0.000	1.79			28.9	SURCHARGED	
2.001	S7	0.000	0.000	1.00			47.8	OK	
2.002	S8	-0.088	0.000	0.67			68.0	OK	
1.005	S9	0.057	0.000	1.22			170.1	SURCHARGED	
1.006	S10	0.018	0.000	1.16			166.3	SURCHARGED	
3.000	S11	-0.065	0.000	0.83			55.2	OK	
3.001	S12	-0.121	0.000	0.65			84.8	OK	
3.002	S13	-0.108	0.000	0.72			133.6	OK	
1.007	S14	-0.261	0.000	0.37			259.2	OK	
4.000	S15	-0.164	0.000	0.41			45.2	OK	
4.001	S16	-0.142	0.000	0.54			102.3	OK	
4.002	S17	-0.124	0.000	0.63			119.4	OK	
4.003	S18	-0.094	0.000	0.79			152.4	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for 241206 Cleator SW.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
4.004	S19	15 Summer	30	+0%					96.660
4.005	S20	15 Summer	30	+0%	30/15 Summer				96.134
4.006	S21	15 Summer	30	+0%	30/15 Summer				95.896
4.007	S22	15 Summer	30	+0%	30/15 Summer				95.498
1.008	S23	15 Summer	30	+0%					94.723
5.000	S24	15 Summer	30	+0%					95.480
5.001	S25	15 Summer	30	+0%					95.020
5.002	S26	15 Summer	30	+0%					94.677
5.003	S27	15 Summer	30	+0%					93.687
1.009	S28HB	480 Summer	30	+0%					92.644

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
4.004	S19	-0.171	0.000	0.56			178.7	OK	
4.005	S20	0.150	0.000	0.68			188.2	SURCHARGED	
4.006	S21	0.467	0.000	1.12			226.4	SURCHARGED	
4.007	S22	0.383	0.000	2.33			236.5	SURCHARGED	
1.008	S23	-0.307	0.000	0.48			490.9	OK	
5.000	S24	-0.155	0.000	0.21			16.0	OK	
5.001	S25	-0.099	0.000	0.78			87.6	OK	
5.002	S26	-0.122	0.000	0.66			107.1	OK	
5.003	S27	-0.100	0.000	0.76			127.9	OK	
1.009	S28HB	-0.106	0.000	0.02			41.9	OK	

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 241206 Cleator SW.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	15.704	0.092	170.7	0.095	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	34.036	0.545	62.5	0.066	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	34.026	0.446	76.3	0.098	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	50.405	0.165	305.5	0.073	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.004	13.900	0.035	397.1	0.076	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.000	16.972	0.163	104.1	0.097	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	19.974	0.205	97.4	0.063	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	40.283	1.671	24.1	0.058	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	30.613	0.077	397.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	36.677	0.094	390.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.000	37.623	0.677	55.6	0.172	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.001	17.522	0.330	53.1	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.002	35.083	1.152	30.5	0.136	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	36.013	2.220	16.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.000	52.332	0.566	92.5	0.141	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	27.631	0.997	27.7	0.161	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)
1.000	48.71	5.26	98.479	0.095	0.0	0.0	0.0	1.00	39.7	12.5
1.001	47.60	5.60	98.387	0.161	0.0	0.0	0.0	1.66	65.9	20.8
1.002	46.64	5.92	97.767	0.259	0.0	0.0	0.0	1.80	127.4	32.7
1.003	44.36	6.73	97.246	0.332	0.0	0.0	0.0	1.03	113.9	39.9
1.004	43.77	6.96	97.006	0.408	0.0	0.0	0.0	1.01	161.3	48.4
2.000	48.62	5.29	99.310	0.097	0.0	0.0	0.0	0.98	17.4	12.8
2.001	47.81	5.54	99.072	0.160	0.0	0.0	0.0	1.32	52.7	20.7
2.002	47.03	5.79	98.867	0.218	0.0	0.0	0.0	2.68	106.4	27.8
1.005	42.54	7.47	96.971	0.626	0.0	0.0	0.0	1.01	161.2	72.1
1.006	41.19	8.06	96.894	0.626	0.0	0.0	0.0	1.02	162.7	72.1
3.000	48.39	5.36	99.184	0.172	0.0	0.0	0.0	1.76	69.9	22.5
3.001	47.96	5.49	98.432	0.255	0.0	0.0	0.0	2.16	152.9	33.1
3.002	47.31	5.70	98.102	0.391	0.0	0.0	0.0	2.86	202.1	50.1
1.007	40.94	8.18	96.800	1.017	0.0	0.0	0.0	5.07	805.9	112.8
4.000	47.82	5.53	100.061	0.141	0.0	0.0	0.0	1.64	115.6	18.3
4.001	47.34	5.69	99.495	0.302	0.0	0.0	0.0	3.00	211.9	38.7

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 241206 Cleator SW.SWS

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
4.002	9.549	0.571	16.7	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.003	40.733	1.396	29.2	0.093	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.004	25.539	0.847	30.2	0.076	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.005	20.304	0.555	36.6	0.056	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.006	22.309	0.314	71.0	0.137	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.007	24.386	0.085	286.9	0.047	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.008	87.651	2.280	38.4	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	19.961	0.516	38.7	0.049	5.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	25.226	0.320	78.8	0.196	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.002	40.802	1.012	40.3	0.055	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.003	39.707	1.037	38.3	0.061	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	15.175	3.150	4.8	0.000	0.00	0.0	0.600	o	600	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)
4.002	47.21	5.73	98.498	0.351	0.0	0.0	0.0	3.86	273.1	44.9
4.003	46.51	5.96	97.927	0.444	0.0	0.0	0.0	2.92	206.5	55.9
4.004	46.14	6.09	96.456	0.520	0.0	0.0	0.0	3.31	365.6	65.0
4.005	45.81	6.20	95.609	0.576	0.0	0.0	0.0	3.00	331.8	71.5
4.006	45.33	6.37	95.054	0.713	0.0	0.0	0.0	2.15	237.7	87.5
4.007	44.30	6.76	94.740	0.760	0.0	0.0	0.0	1.06	117.6	91.2
1.008	40.17	8.55	94.430	1.777	0.0	0.0	0.0	3.94	1112.8	193.3
5.000	49.06	5.16	95.410	0.049	0.0	0.0	0.0	2.11	83.9	6.5
5.001	48.27	5.39	94.819	0.245	0.0	0.0	0.0	1.77	125.3	32.0
5.002	47.40	5.67	94.499	0.300	0.0	0.0	0.0	2.48	175.5	38.5
5.003	46.61	5.93	93.487	0.361	0.0	0.0	0.0	2.55	180.2	45.6
1.009	40.12	8.58	92.150	2.138	0.0	0.0	0.0	11.14	3150.4	232.3

Free Flowing Outfall Details for 241206 Cleator SW.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.009	CULVERT	90.024	89.000	0.000	0	0

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Simulation Criteria for 241206 Cleator SW.SWS

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 Coeffiecient	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	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.100	Storm Duration (mins)	30
Ratio R	0.247		

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Online Controls for 241206 Cleator SW.SWS

Hydro-Brake® Optimum Manhole: S28HB, DS/PN: 1.009, Volume (m³): 29.4

Unit Reference	MD-SHE-0264-4200-1700-4200
Design Head (m)	1.700
Design Flow (l/s)	42.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	264
Invert Level (m)	92.150
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.700	42.0
Flush-Flo™	0.526	42.0
Kick-Flo®	1.154	34.9
Mean Flow over Head Range	-	35.9

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	8.4	1.200	35.5	3.000	55.2	7.000	83.3
0.200	27.2	1.400	38.2	3.500	59.5	7.500	86.1
0.300	39.8	1.600	40.8	4.000	63.5	8.000	88.9
0.400	41.4	1.800	43.2	4.500	67.2	8.500	91.6
0.500	41.9	2.000	45.4	5.000	70.7	9.000	94.2
0.600	41.8	2.200	47.5	5.500	74.1	9.500	96.7
0.800	40.9	2.400	49.6	6.000	77.3		
1.000	38.8	2.600	51.5	6.500	80.3		

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Storage Structures for 241206 Cleator SW.SWS

Tank or Pond Manhole: S28HB, DS/PN: 1.009

Invert Level (m) 92.150

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1244.0	1.300	1848.0

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Summary of Critical Results by Maximum Level (Rank 1) for 241206 Cleator SW.SWS

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 FSR Ratio R 0.256
Region England and Wales Cv (Summer) 1.000
M5-60 (mm) 17.600 Cv (Winter) 1.000

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 2
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1	15 Summer	2	+0%					98.588
1.001	S2	15 Summer	2	+0%					98.489
1.002	S3	15 Summer	2	+0%					97.889
1.003	S4	15 Summer	2	+0%					97.428
1.004	S5	30 Summer	2	+0%					97.268
2.000	S6	15 Summer	2	+0%					99.449
2.001	S7	15 Summer	2	+0%					99.189
2.002	S8	15 Summer	2	+0%					98.957
1.005	S9	30 Summer	2	+0%					97.235
1.006	S10	30 Summer	2	+0%					97.147
3.000	S11	15 Summer	2	+0%					99.290
3.001	S12	15 Summer	2	+0%					98.549
3.002	S13	15 Summer	2	+0%					98.222
1.007	S14	30 Summer	2	+0%					96.932
4.000	S15	15 Summer	2	+0%					100.157
4.001	S16	15 Summer	2	+0%					99.597
4.002	S17	15 Summer	2	+0%					98.608
4.003	S18	15 Summer	2	+0%					98.051

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Summary of Critical Results by Maximum Level (Rank 1) for 241206 Cleator SW.SWS

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.116	0.000	0.46			16.3	OK	
1.001	S2	-0.123	0.000	0.42			25.8	OK	
1.002	S3	-0.178	0.000	0.34			39.8	OK	
1.003	S4	-0.193	0.000	0.46			48.2	OK	
1.004	S5	-0.188	0.000	0.54			57.3	OK	
2.000	S6	-0.011	0.000	1.00			16.2	OK	
2.001	S7	-0.108	0.000	0.53			25.2	OK	
2.002	S8	-0.135	0.000	0.33			33.5	OK	
1.005	S9	-0.186	0.000	0.63			87.2	OK	
1.006	S10	-0.197	0.000	0.60			85.6	OK	
3.000	S11	-0.119	0.000	0.44			29.4	OK	
3.001	S12	-0.183	0.000	0.32			41.4	OK	
3.002	S13	-0.180	0.000	0.33			60.9	OK	
1.007	S14	-0.318	0.000	0.19			134.9	OK	
4.000	S15	-0.204	0.000	0.22			24.1	OK	
4.001	S16	-0.198	0.000	0.25			47.0	OK	
4.002	S17	-0.190	0.000	0.29			54.2	OK	
4.003	S18	-0.176	0.000	0.35			67.6	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for 241206 Cleator SW.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
4.004	S19	15 Summer	2	+0%					96.583
4.005	S20	15 Summer	2	+0%					95.753
4.006	S21	15 Summer	2	+0%					95.248
4.007	S22	15 Summer	2	+0%	2/15 Summer				95.116
1.008	S23	30 Summer	2	+0%					94.628
5.000	S24	15 Summer	2	+0%					95.460
5.001	S25	15 Summer	2	+0%					94.939
5.002	S26	15 Summer	2	+0%					94.607
5.003	S27	15 Summer	2	+0%					93.605
1.009	S28HB	480 Summer	2	+0%					92.418

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
4.004	S19	-0.248	0.000	0.25			78.6	OK	
4.005	S20	-0.231	0.000	0.31			86.6	OK	
4.006	S21	-0.181	0.000	0.52			106.0	OK	
4.007	S22	0.001	0.000	1.09			110.1	SURCHARGED	
1.008	S23	-0.402	0.000	0.24			243.1	OK	
5.000	S24	-0.175	0.000	0.11			8.5	OK	
5.001	S25	-0.180	0.000	0.33			37.2	OK	
5.002	S26	-0.192	0.000	0.27			44.7	OK	
5.003	S27	-0.182	0.000	0.32			53.9	OK	
1.009	S28HB	-0.332	0.000	0.02			38.6	OK	

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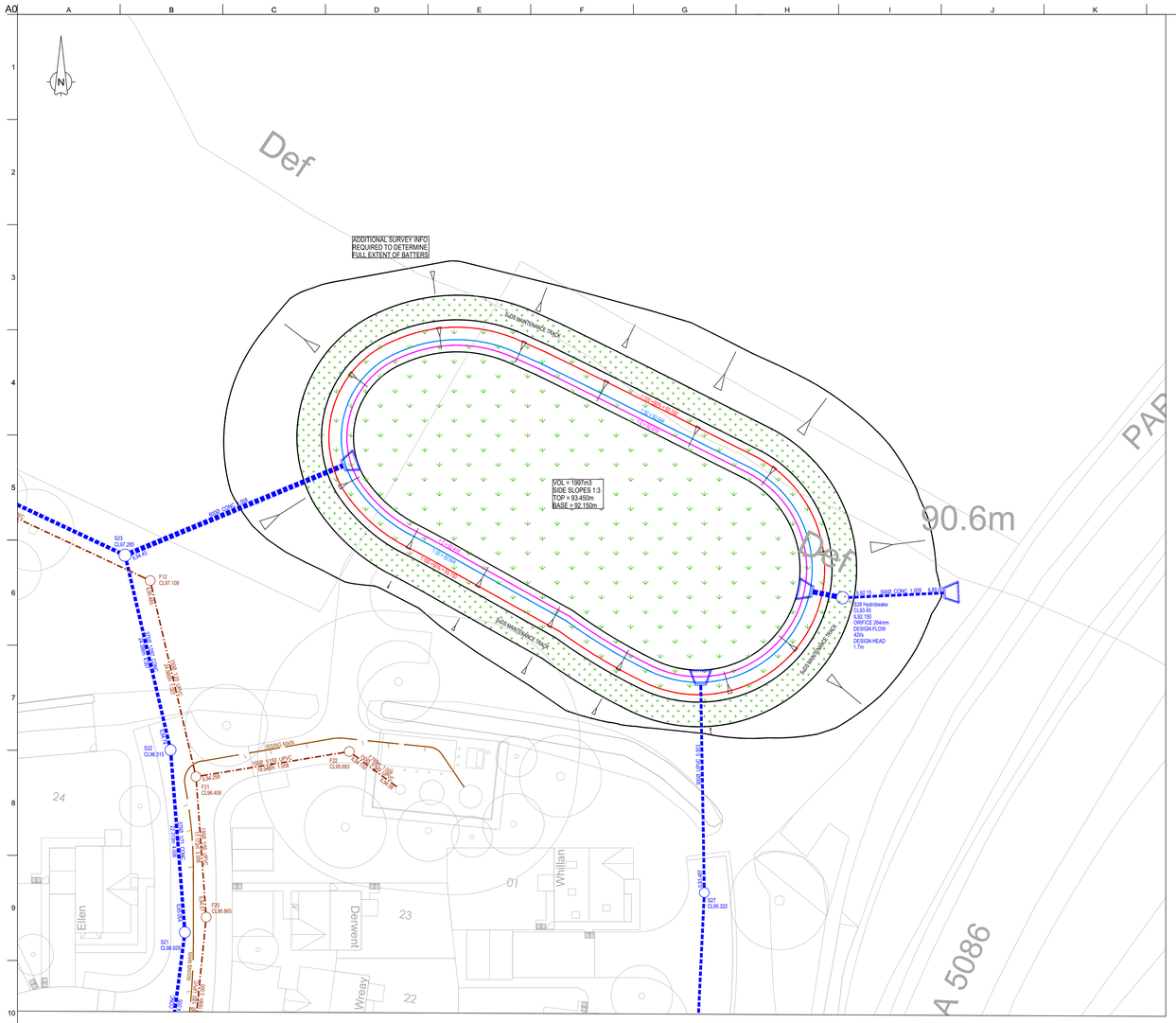
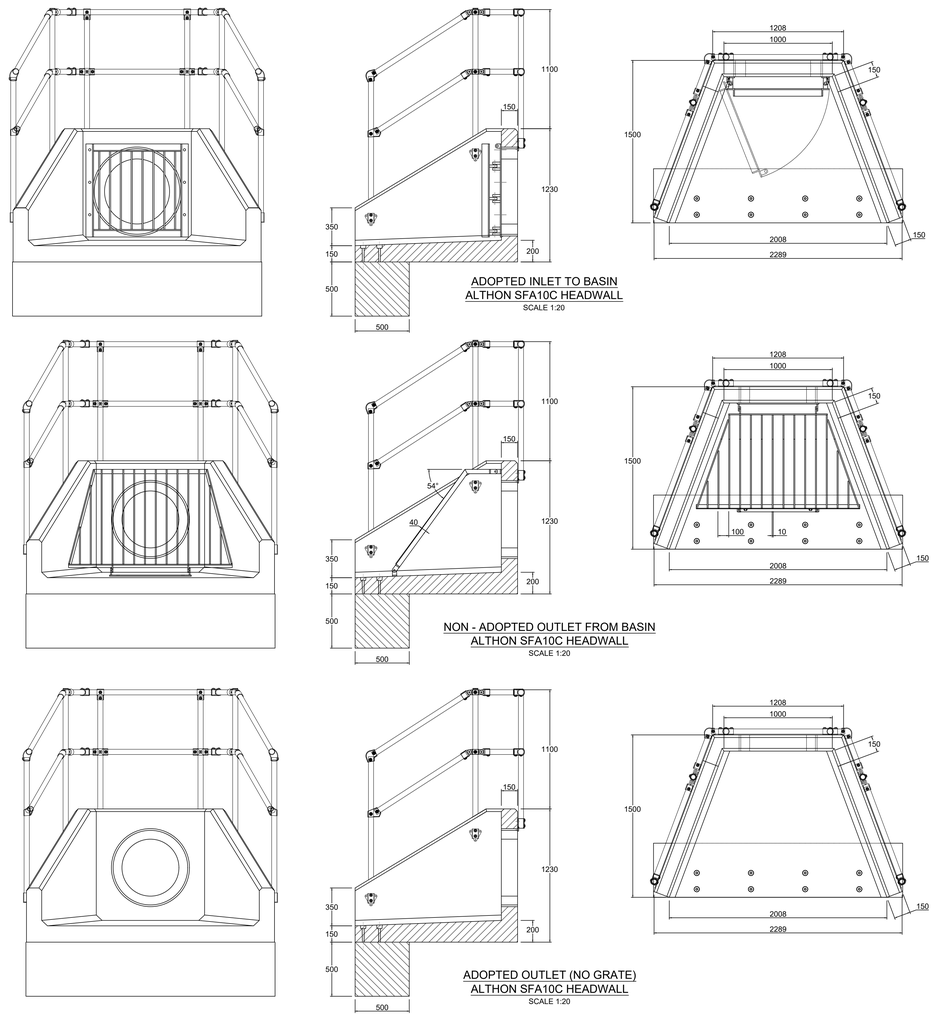
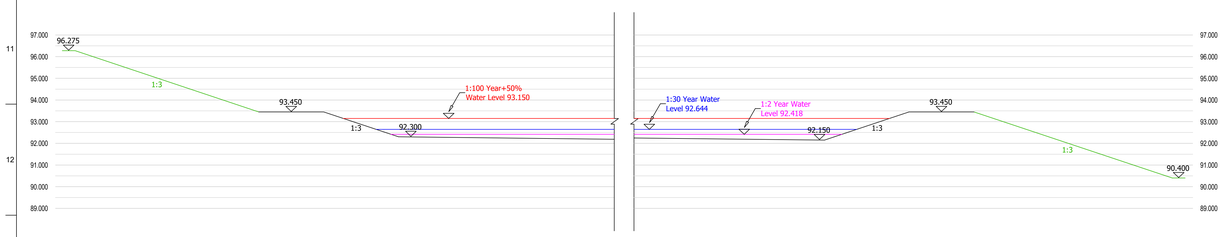
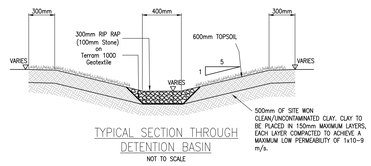
Appendix F –
Detention Basin Details







Detention Basin - Typical Cross Section
Scale 1:100



TYPICAL SECTION THROUGH DETENTION BASIN
NOT TO SCALE

Issue	Date	Description	By	Chkd	Appd
P1	13.12.24	Preliminary Issue	JM	KR	RH

COAST CONSULTING ENGINEERS
7 Silverton Court, Northumberland Business Park, NE23 7RY
0191 5977879

Client
GENESIS HOMES

Job Title
PARKSIDE ROAD
CLEATOR MOOR

Drawing Title
DETENTION BASIN DETAILS

Scale at A0
1:250

Drawing Status
PRELIMINARY

Job No	Drawing No	Issue
23098	121	P1

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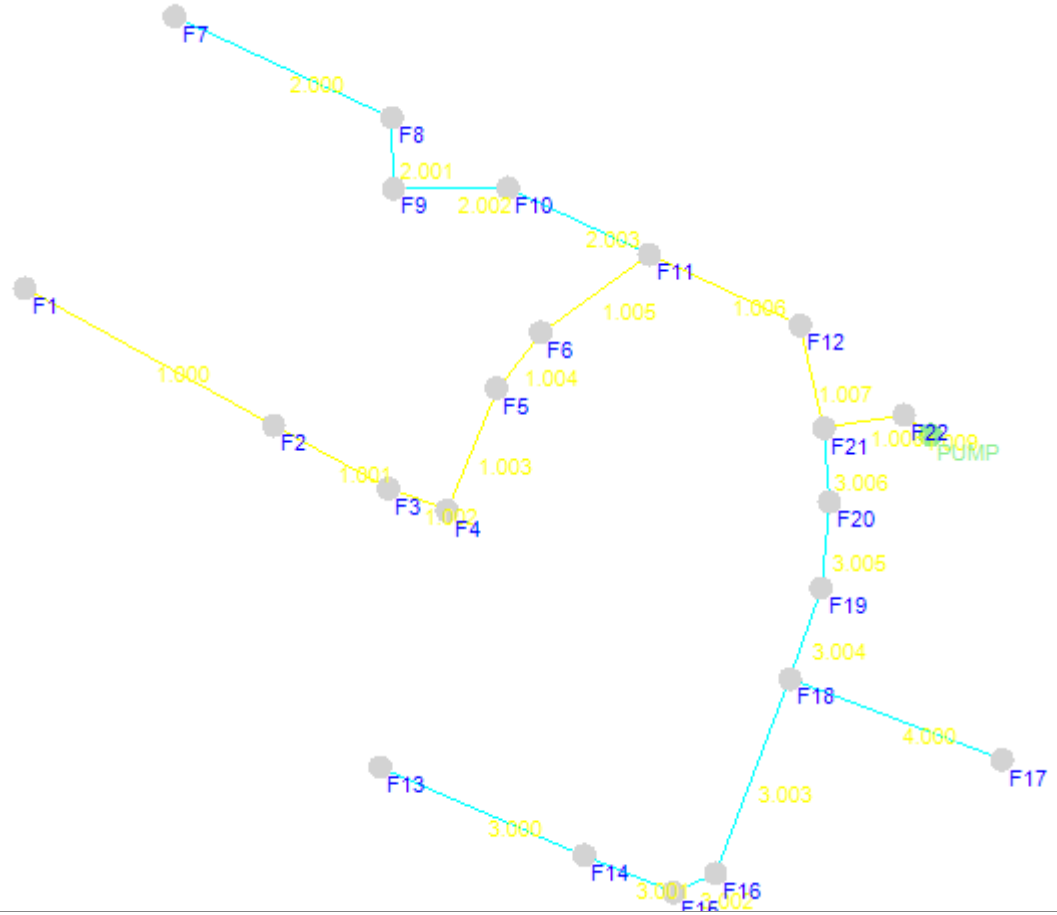
Do not scale

Appendix G –
Foul Drainage Layout

Coast Consulting Engineers Ltd		Page 1
Suite 6, Vita House Fish Quay North Shields, NE30 1JA	Parkside Road Cleator Moor Foul Water Network	
Date 13/12/2024 File	Designed by JM Checked by KR	
Innovyze	Network 2020.1.3	



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