coopers

chartered consulting engineers

Our ref: 7843SMP

SuDS Management Plan

for

Residential Development at

Edgehill Park, Phase 4,

Whitehaven, Cumbria

For : Story Homes Ltd
Story House
Lords Way
Kingmoor Business Park
Carlisle
CA6 4SL

1st November 2023

Park House, Sandpiper Court,
Chester Business Park,
Chester, CH4 9QU

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SuDS Management Plan for Residential Development at
Edgehill Park, Phase 4, Whitehaven, Cumbria

Document Verification

Project Title	Residential development at Edgehill Park, Phase 4 Whitehaven, Cumbria
Project Number	7843
Document Title	SuDS Management Plan
Document Number	7843 SMP
This document is not to be used for contractual or engineering purposes unless the document verification sheet is signed where indicated by the approver of the document.	

Prepared by

A Jones

Senior Infrastructure Engineer

Document Revision

Report Reference	Date	Description	Prepared	Checked and Approved
7843 SMP	01/11/2023	SuDS Management Plan	A Jones	A Jones

This report has been prepared for and on behalf of our client, in accordance with the terms and conditions of the appointment agreement with Coopers. Other than where specifically allowed for in the said appointment agreement, any other party using this report for any purpose whatsoever does so at their own risk and any duty of care to that party is specifically excluded.

SuDS Management Plan for Residential Development at
Edgehill Park, Phase 4, Whitehaven, Cumbria

Contents

Section **Page No.**

-

1.0 Introduction

Coopers (Chester) Ltd, (Coopers) have been appointed by Story Homes Ltd to prepare a SuDS Management Plan for the proposed residential development at Edgehill Park, Phase 4.

The surface water drainage system provides storage for up to a 100-year storm event (with allowance for climate change and urban creep) within a network of pipes and manholes with flows discharging to a dry SUDS basin via a cascading swale. This entire network will be adopted by United Utilities via a S104 Agreement. Story Homes will be responsible for all components during construction and the S104 maintenance period. This report sets out the inspection and maintenance requirements until the components become public assets and maintained thereafter by United Utilities.

2.0 Operation and Maintenance

As with any drainage system, SuDS require regular inspection and maintenance to ensure that they continue to operate as designed and are fully functional at all times. The Edgehill Phase 4 SuDS components will consist of a network of pipes and manholes, a cascading swale, a dry SuDS basin with incoming and outgoing headwalls, and a flow control device.

The SUDS manual, CIRIA report C753, states that there are three types of maintenance activities associated with SUDS.

1. Regular Maintenance – 'basic tasks undertaken on a frequent and predictable schedule' including vegetation management, litter and debris removal, and inspections.'
2. Occasional Maintenance – 'tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).
3. Remedial Maintenance – 'intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.

Maintenance for the SuDS components includes:

- Inspection, cleaning and removal of sediments and obstructions etc. to restore hydraulic capacity and to prevent blockages; Jetting/vacuum of sewers to be undertaken as often as necessary to remove silts and/or ordinary debris.
- Local repair or replacement of damaged pipes in order to maintain the function of the onsite system and to prevent blockages.
- In the event that any extraordinary issues are encountered during an inspection, further information may be required such as a CCTV survey report to locate the exact cause of the issue.
- Maintenance to be undertaken on an annual schedule.

Pipe sizes and gradients have been designed to be self-cleansing albeit regular maintenance and inspections will be required to ensure the long-term efficiency of the systems.

The SuDS components require regular inspection/clearing to prevent blockages due to accumulation of silt and debris. In general, it is recommended that they are initially inspected and cleared by a suitably trained person every 6 month for at least the first 2 years of operation and then establish a long-term regular inspection/clearing regime appropriate for the site.

Any debris obstructing or in danger of obstructing any part of the surface water flow should be removed immediately.

Paved surfaces around any SUDS component should be inspected at the same time to ensure they continue to provide the required structural support.

Adopted drainage outside the Phase 4 site boundary is maintained by United Utilities (Drainage Authority) and is therefore not intended to form part of this SuDS Maintenance Plan and hence excluded. Any issues with the performance or operation of the adopted drainage systems should be reported as soon as possible to United Utilities as it could impact on the performance of the Phase 4 components.

It is the responsibility of the appointed Contractor to submit a method statement of how they intend to drain the site during construction.

The landscaping plans will provide additional information on maintenance of any soft landscaping / planting requirements within the SUDS components. The swales and SuDS basin should be landscaped as soon as possible to prevent erosion and siltation being passed downstream.

Maintenance requirements tables presented in CIRIA C753 The SuDS Manual provides a more detailed maintenance schedule. See Section 3 of this report for more information. Inspection/clearing should also be carried out after every major storm event and to the manufacturer's recommendations.

This maintenance plan is to be incorporated within the Health and Safety file, which, in addition to the details mentioned here, should include all the installed manufacturer's details and maintenance recommendations. In addition, it should hold the records of any inspections, together with any remedial measures undertaken. The drainage maintenance plan should be made available for inspection by the council if requested.

3.0 Maintenance schedule

TABLE 14.2 An example of operation and maintenance requirements for a proprietary treatment system

Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

TABLE 17.1 Operation and maintenance requirements for swales

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

TABLE 22.1 Operation and maintenance requirements for detention basins

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

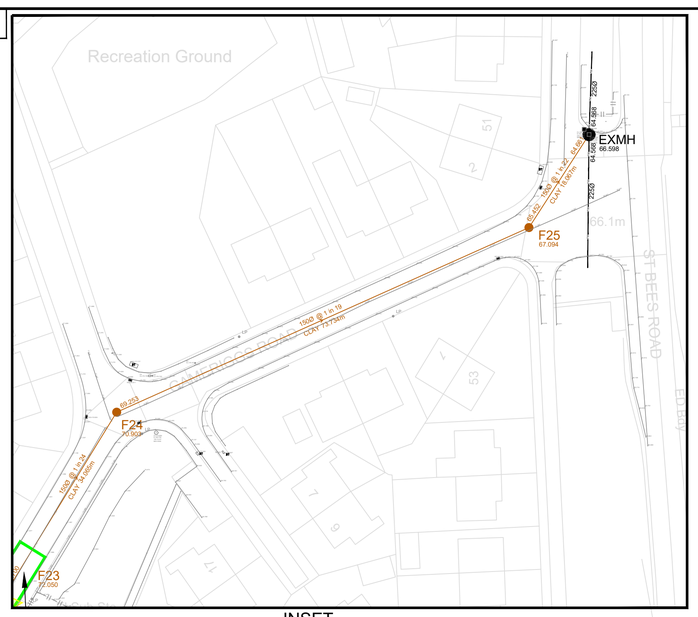
Extracts from CIRIA C753 'The SuDS Manual'

4.0 Reference Drawings

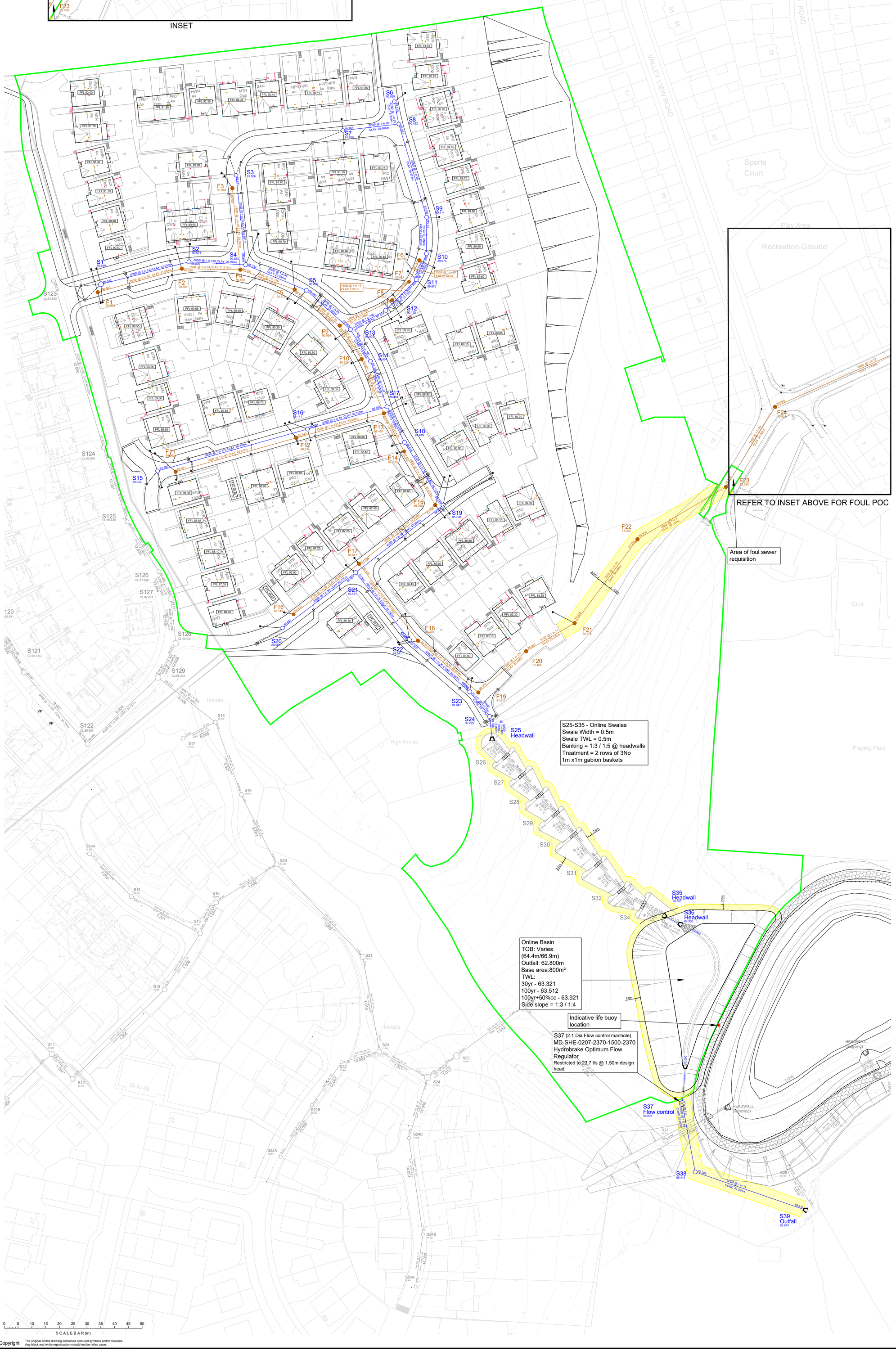
Drawing No.	Revision	Drawing Title
7843 / 01	C	Proposed Drainage layout
7843 / 15	B	Surface Water Attenuation and Outfall Details

DO NOT SCALE

NORTH



INSET



REFER TO INSET ABOVE FOR FOUL POC

KEY PLAN

Notes

1. Setting out shall be undertaken using only the information given. Distances should not be scaled from this drawing.
2. All sewers shall be constructed in accordance with Design and Construction Guidance (DCG) Standards and United Utilities Details & Guidelines.
3. The minimum gravity pipe diameter under adoptable highways shall be 150mm
4. It is the responsibility of the Contractor to verify all information given with regards to existing services and drainage connections etc. prior to commencing the works. The rates shall include for hand dig around services where necessary. The Contractor shall adhere to the CDM Regulations at all times
5. The outsides of all sewers shall be a minimum of 1.0m from kerb lines and the outside of manholes shall be a minimum of 0.5m from kerb lines
6. Existing flows in watercourses, sewers and land drains shall be maintained at all times
7. Only trained personnel shall be permitted to enter confined spaces
8. All materials to bear the relevant B.S. Kitemark and comply fully with the specifications. All concrete & concrete products must use Sulphate resistant cement to withstand Class 3 condition (unless the site investigation report proves that sulphate attack from soils and groundwater will not occur).
9. All opening notices etc. as required under Highways Acts etc. are to be obtained prior to commencement of works. All works are to be inspected by L.A., NHBC or the Network Operator as applicable.
10. Where "Structured Wall" UPVC pipes (or similar approved) are used in adoptable drainage they shall be handled and laid in accordance with the manufacturers instructions and will be subject to post installation deformation testing prior to adoption.
    A Class S Bed and Surround must be used for "Structured Wall" pipes
11. Trench backfill in highways to within 1m of highway shall, as directed by the Highway Authority be a suitable granular material all in accordance with Design and Construction Guidance (DCG) Standards.
12. Slab levels shall not be varied without reference to the Engineer for guidance.
13. Pipes have not been designed to accommodate construction traffic loading. The contractor is responsible for providing adequate protection to the pipes during construction.

Legend

- Site Boundary

Existing

- Existing Foul Drain
- Existing Highway Drain

Proposed

- Adoptable Surface Water Sewer
- Adoptable Foul Sewer
- Flow Control Manhole
- Highway Gully
- FFL xx.xx — Plot Slab Level
- Sewer Easement

Design based on Layout:
Edgehill Park Phase 4, Block Plan, Dwg No. 66D-STO-005
Rev: N
Grid/Level datum based on Topo:
Edgehill Park, Whitehaven. Topographical Survey. Dwg No. 230720-EHP-SH-TOPO-001
Rev: -

Coopers Drawing List:

7843 / 01	Proposed Drainage Layout
7843 / 02	Proposed Highway Setting Out
7843 / 03	Proposed Highway Layout
7843 / 04	Proposed Highway and Drainage Longsections
7843 / 05	Highway Construction Details
7843 / 06	S38 Agreement Plan
7843 / 07	External Works Layout
7843 / 08	Private Drainage Layout
7843 / 09	Drainage Construction Details.
7843 / 10	Manhole Schedules
7843 / 11	Surface Water Manhole Details
7843 / 12	Foul Manhole Details
7843 / 13	Flow Control Manhole Details
7843 / 14	Surface Water Catchment Areas
7843 / 15	Surface Water Attenuation Pond Details
7843 / 16	Proposed Cut and Fill Earthworks
7843 / 17	Proposed Surface Finishes
7843 / 18	S104 Sewer Easement Plan

APPROVAL

Rev.	Date	Revision	By	Appd.
C	11.08.23	Updated for approval	PW	AJ
B	26.07.23	Land drains added, life buoy location added	PW	AJ
A	19.06.23	Foul route on slope revised	JAR	AJ

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Client: Story HOMES

Project: EDGEHILL PARK, CUMBRIA, PHASE 4.

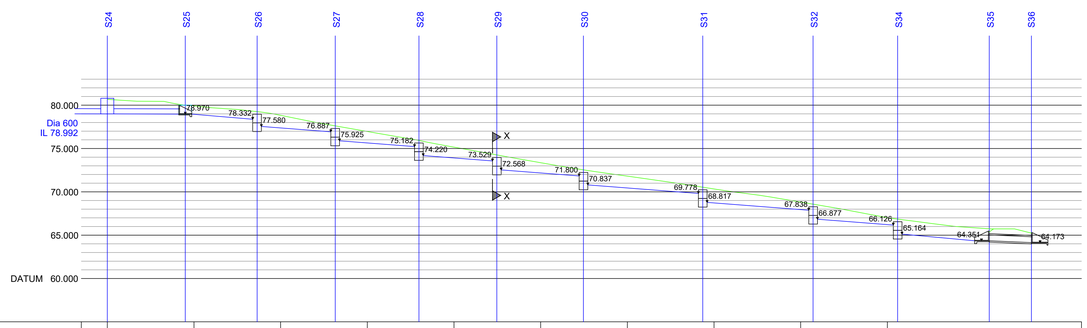
Title: Proposed Drainage Layout

DRAWING NUMBER: 7843 / 01

SCALE at A0	1:500	
DATE	11.05.23	REVISION
DRAWN	JAR	C
CHECKED	AJ	

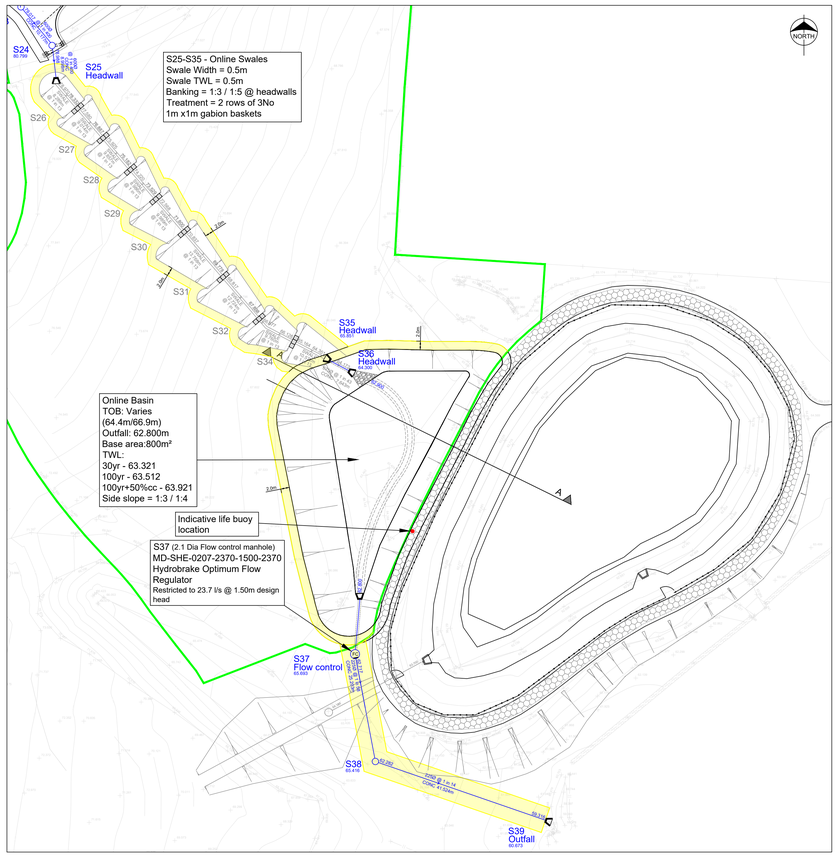
0 5 10 15 20 25 30 35 40 45 50
SCALEBAR (m)

DO NOT SCALE

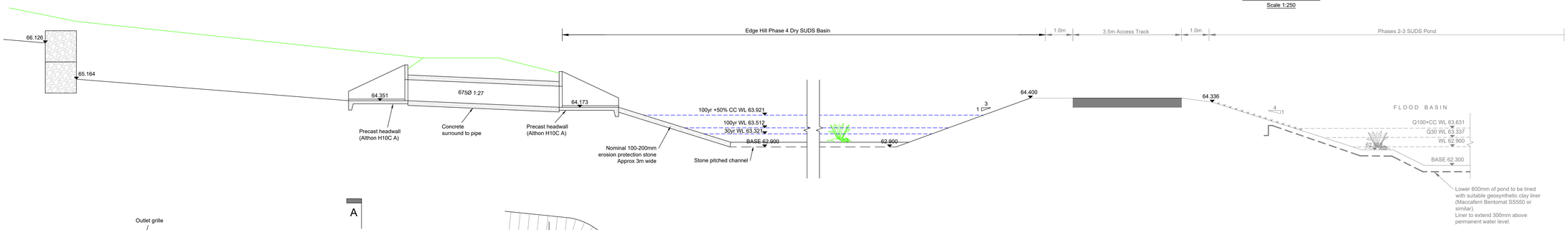


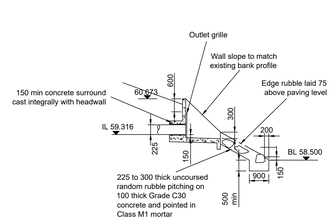
GROUND LEVEL	80.680	79.930	78.831	76.964	75.156	73.359	71.811	70.333	68.818	67.015			
STORMWATER COVER LEVEL	80.793	80.000	79.255	77.613	75.933	74.260	72.537	70.536	68.577	66.854	65.851	64.300	
STORMWATER INVERT	78.992	78.970 78.970	78.332 77.580	76.887 75.925	75.182 74.220	73.529 72.568	71.800 70.837	69.778 68.817	67.838 66.877	66.126 65.164	64.351	64.173	
STORMWATER DETAILS		Pipe 1.012 Dia 600 Circular CONC 1 in 400	Pipe 1.013 Dia 600 Circular CONC 1 in 13	Pipe 1.014 Dim(s) 500x500 Swale 1:3 1 in 13	Pipe 1.015 Dim(s) 500x500 Swale 1:3 1 in 13	Pipe 1.016 Dim(s) 500x500 Swale 1:3 1 in 13	Pipe 1.017 Dim(s) 500x500 Swale 1:3 1 in 13	Pipe 1.018 Dim(s) 500x500 Swale 1:3 1 in 13	Pipe 1.019 Dim(s) 500x500 Swale 1:3 1 in 13	Pipe 1.021 Dim(s) 500x500 Swale 1:3 1 in 13	Pipe 1.022 Dim(s) 500x500 Swale 1:3 1 in 13		Pipe 1.023 Dia 675 Circular CONC 1 in 27
STORMWATER LENGTHS		8.998	8.289	9.014	9.657	8.986	9.989	13.768	12.724	9.760	10.572	4.862	

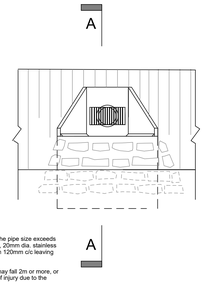
Swale Longsection
Scale 1:250



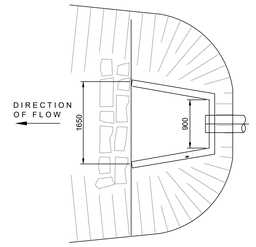
SUDS Basin Location Plan
Scale 1:250







Elevation

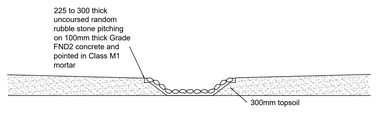


Plan

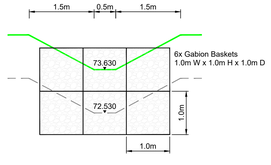
Notes

1. All dimension in millimeters.
2. Generally the angle between the direction of flow of the receiving watercourse and the outfall pipe should be 90°.
3. All reinforced concrete edges to be finished with a 25mm x 25mm fillet.
4. Minimum cover to reinforcement in the top face of the base slab to be 40mm.
5. The bed and opposite bank of the watercourse may in certain circumstances need to be protected by 225mm to 300mm thick uncoursed rubble pitching laid on a 100mm thick bed of FND2 concrete (Note 8)and pointed in
6. Class M1 mortar. The stone for pitching shall consist of large smooth faced stones roughly dressed square and shall be of hard durable and inert material. Burnter sandstone, Keuper waterstones and Carboniferous shalesand mudstones are not to be used.
7. An outlet grille must be provided on all outfalls where the pipe size exceeds 450mm. Where pipe diameters are 375mm to 450mm, 20mm dia. stainless steel bars are to be provided across outlet at maximum 120mm c/c leaving 100mm max. clear opening.
8. Secure handrailing shall be supplied where a person may fall 2m or more, or where a fall of less than 2m carries an increased risk of injury due to the landing surface.
9. FND2 to be used for soil conditions Sulphate Class 1 only. Designated mix references FND3, FND4A and FND4B to be used in soil conditions with Sulphate Classes 3, 4A, and 4B respectively (refer to specification Clause 4.3.1.)

Outfall Details

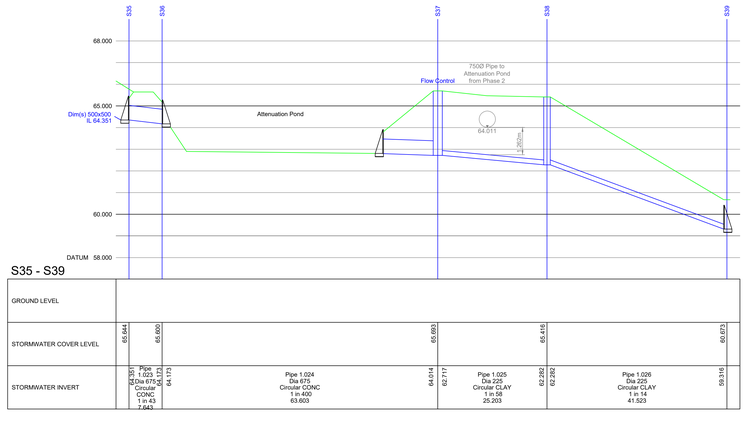


Stone Pitch Channel Detail



Section X-X
Swale / Gabion Weir Wall Detail

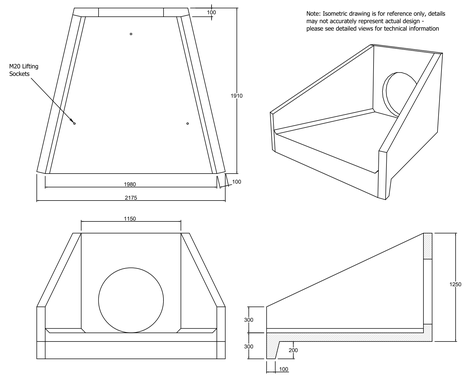
Section A-A - Section Though Phase 2/3 SUDS Pond & Phase 4 SUDS Basin
Scale 1:50



S35 - S39

GROUND LEVEL						
STORMWATER COVER LEVEL	65.644	65.600	65.683	66.416	60.673	
STORMWATER INVERT	64.351 64.173	Pipe 1.023 Dia 675 Circular CONC 1 in 43 1.043 64.173	Pipe 1.024 Dia 675 Circular CONC 1 in 400 63.603	64.614 62.717	Pipe 1.025 Dia 225 Circular CLAY 1 in 58 25.203	62.282 62.282	Pipe 1.026 Dia 225 Circular CLAY 1 in 14 41.523	59.316

Longsetion S35 to S39 showing 750Ø SW pipe cross over
Scales 1:500 H, 1:100 V



H10C A Headwall Details
Scale 1:25

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10. Where "Ultra Rib" UPVC pipes (or similar approved) are used in adoptable drainage they shall be handled and laid in accordance with the manufacturers instructions and will be subject to post installation deformation testing prior to adoption.
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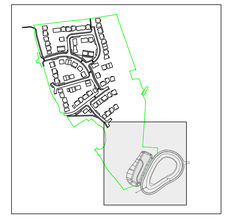

KEY PLAN

Design based on Layout:
Edgehill Park Phase 4, Block Plan,
Dwg No. 66D-STO-005
Rev: N
Grid/Level datum based on Topo:
Edgehill Park, Whitehaven.
Topographical Survey. Dwg No.
230720-EHP-SH-TOPO-001
Rev: -

Coopers Drawing List:

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7843 / 18	S104 Sewer Easement Plan

APPROVAL

Rev.	Date	Revision	By	Appd.
B	11.08.23	Updated for approval	PW	AJ
A	26.07.23	Top and bottom of batter levels shown	PW	AJ

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Web: http://coopers.co.uk

Client: Story Homes

Project: EDGEHILL PARK, CUMBRIA PHASE 4

Title: Surface Water Attenuation and Outfall Details

DRAWING NUMBER	SCALE at A0	1:250	
7843 / 15	DATE	26.04.23	REVISION
	DRAWN	PJN	B
	CHECKED	AJ	