

Silt and Sedimentation Impact Assessment and Mitigation Strategy

Proposed Development at

Knowle Hill, Allbrook

On behalf of

Bargate Homes Limited

October 2024

Document History and Status

Project Number 23823

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1 Non Technical Summary

- 1.1 This Silt and Sedimentation Impact Assessment and Mitigation Strategy has been undertaken on behalf of Bargate Homes Limited in support of a Reserved Matters Planning Application for the construction of 49 residential dwellings with associated access roads, car parking and landscaping on land west of Allbrook Way, Knowle Hill, Eastleigh
- 1.2 Natural England raised concerns at Outline Planning Stage regarding the potential risk of silt from the development site entering the River Itchen.
- 1.3 Bargate Homes are committed to preventing any impact on the River Itchen Special Area of Conservation (SAC) and have commissioned The Civil Engineering Practice to design a robust surface water drainage system that will capture any silt or pollutants and prevent them leaving the site.
- 1.4 Species Ecology Consultancy produced the Potential Impacts upon the River Itchen SAC from the Release of Fine Sediments Revised Mitigation Strategy dated February 2022 and Cole Easdon Consultants produced a Sediment Impact Assessment dated July 2022 both of which were submitted with the Outline Planning Application.
- 1.5 The proposed surface water drainage scheme has been designed with a SuDS wetland and a further wetland to the south of the SuDS wetland in accordance with the Cole Easdon Report submitted for Outline Planning Permission to provide a suitable water quality improvement and to capture silts and sediment and prevent them leaving the site.
- 1.6 The system as a whole is intended to digest nutrients and pollutants contained within fine sediment.
- 1.7 This assessment assesses the volume of sediment to be produced by the proposed development together with the proposed mitigation and monitoring strategy.

2 Definition of Terms

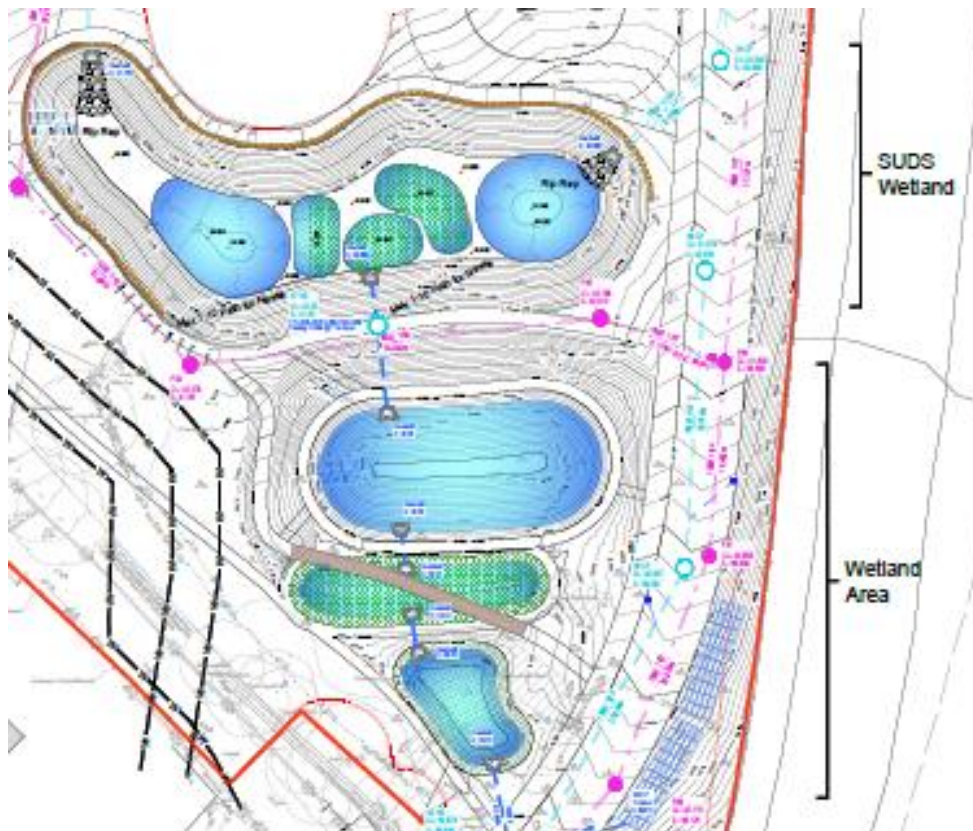
Within this report the following terms are used:

- SuDS Wetland

This refers to the first three stage wetland and includes two deep pools, two 500mm deep pools and one 400mm deep pool and includes storage for the surface water system above the standing water level.

- Wetland

This refers to the wetland area downstream of the SuDS wetland and is comprised of three separate pools of 1.5m, 500mm and 400mm in depth and provides water quality improvement and silt capture only.



3 Requirements of Outline Planning Approval

3.1 Permission Planning Condition 34

a) *The first reserved matters application shall be accompanied by a final detailed Sediment Impact Assessment based on the principles set out in the 'Potential Impacts Upon the River Itchen SAC from the Release of Fine Sediments' Revised Mitigation Strategy (Species Ecological Consultancy, February 2022) and the 'Sediment Impact Assessment' Technical Note (Cole Easdon ref. 6557/01, July 2022). The final Assessment shall detail the measures to be introduced during the construction and operation phases of development to prevent impacts on the River Itchen Special Area of Conservation (SAC) from sediment load discharge, in accordance with the points raised in Natural England's response letter dated 26 April 2022. This shall include:*

- *An assessment of the volume of sediment likely to enter the wetland;*
- *A requirement for the wetlands and infiltration basins to be constructed and fully functional prior to commencement of any other construction works at the site;*
- *A planting plan for the wetlands;*
- *A long-term funded maintenance and monitoring plan for the drainage features including the wetlands;*
- *A procedure for the event that monitoring showed measurable levels of pollutants entering the River Itchen.*

b) *No development shall commence until the final Sediment Impact Assessment has been approved in writing by the Local Planning Authority, and the development shall thereafter be implemented in accordance with the approved details.*

Reason: To ensure that the development would not impact on the integrity of the River Itchen Special Area of Conservation through the release of sediments.

4 Assessment of Sediment and Fine Sediment Generation

4.1 Sedimentation Guidance

- 4.1.1 The Design Manual for Roads and Bridges, CD 523 *Determination of pipe roughness and assessment of sediment deposition to aid pipeline design* uses a study commissioned by Atkins to determine sediment loads within highway drainage networks.
- 4.1.2 CD 523 notes '*Urban roads, which have been found to create more sediment than rural roads, generate maximum values in the order of 200 g/m² per annum, about 90 g/m² per annum of which is retained in gully pots*'. Atkins Ltd. *Sediment Loads, Monitoring of Sediment Loads from High Speed Roads*.
- 4.1.3 As a national standard document and with little other guidance on generation of sediment it is proposed to apply the maximum value of 200g/m² per annum noted for urban roads to all positively drained areas, roads, footways, roofs etc.
- 4.1.4 This will provide a highly robust estimate of the maximum likely sediment generation on site.

4.2 Sedimentation Estimate

- 4.2.1 The positively drained areas on site are as follows:

• Access Road	3,428m ²
• Shared drives	1,788m ²
• Footways	1,284m ²
• Houses	2,930m ²
• 10% Urban Creep	293m ²
• Garages	503m ²
• Private driveways	1,948m ²
Total	12,174m²

- 4.2.2 Applying the maximum value of 200g/m² per annum to the total positively drained area indicates 2,434,800g (2,434.8kg) of silt per annum.
- 4.2.3 With a typical mass of 1,169 kg/m³ the site could potentially generate 2.1m³ of silt per annum.

5 Surface Water System and Silt Capture

5.1 Proposed Permanent Surface Water System

- 5.1.1 The SuDS surface water drainage system will incorporate areas of permeable paving to private drives and shared access areas, trapped gullies to the main access road, together with catchpits (silt chambers) a SuDS wetland, which replaces the infiltration basins in the outline planning scheme, to provide suitable water quality treatment.
- 5.1.2 Once surface water has been discharged from the main SuDS wetland surface water will pass through a further three stage wetland. This wetland will provide further silt capture before discharging to the Southern Water surface water sewer and ultimately to the River Itchen approximately 200m southeast of the site via the public sewer network.
- 5.1.3 The small southern section of the access road, which is located at a level too low to be drained to the wetland area, will have its own separate attenuation and storage and will be drained using trapped gullies, catchpits (silt chambers) and a vortex plus downstream defender to provide suitable water quality mitigation.
- 5.1.4 The vortex plus downstream defender is a more appropriate form of water quality mitigation than the petrol interceptor noted in the Outline Planning Application by Cole Eastman and it follows that this element is in accordance with the options noted in the Outline Planning Application.

5.2 Wetland Design and Function

- 5.2.1 Wetlands experience a range of natural processes including sedimentation and uptake of nutrients by plants all of which can be mimicked in a constructed wetland.
- 5.2.2 The proposed SuDS wetland and the subsequent wetland will be lined with site won puddle clay under a suitable planting medium.
- 5.2.3 The wetlands will incorporate deep pools for sediment settlement and capture at approximately 1.5m in depth where water first enters each wetland, followed by two further shallower areas 0.5m deep and 0.4m deep which will be planted with reeds and suitable wetland vegetation.
- 5.2.4 The planting will aid the capture of fine sediments and assist in the breakdown of nutrients and pollutants.

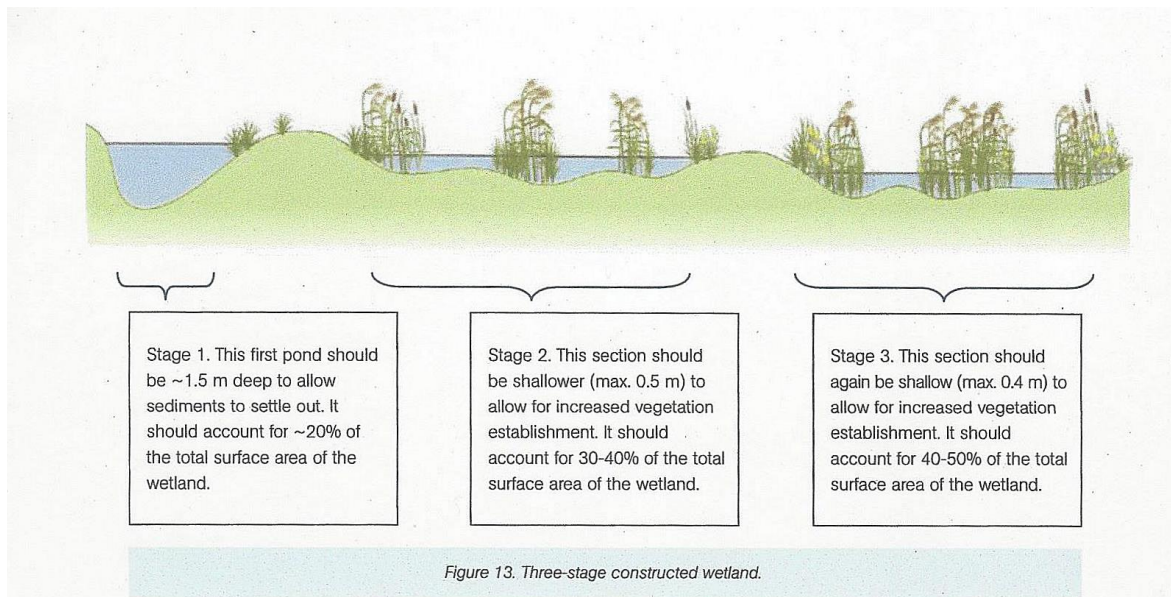


Image 1: Typical Three Stage Constructed Wetland (Mackenzie & McIlwraith, 2015)

- 5.2.5 The proposed SuDS wetland will incorporate earth berms to separate the various depths of water. The subsequent wetland area will receive water from the SuDS wetland at a controlled rate and be created as three separate pools separated by headwalls and pipework.
- 5.2.6 The proposed wetland will capture fine sediment and break down any nutrients and pollutants that escape the SuDS wetland.
- 5.2.7 The wetlands will be permanently wet and will also provide additional habitat for wildlife at the site and provide an aesthetically pleasing landscape feature at the site entrance.
- 5.2.8 Maintenance will be required in the form of clearing out excess sediment from the deep pool areas, managing vegetation and a programme of cut and thinning reed growth to maintain a healthy wetland system.
- 5.2.9 A copy of the Drainage Strategy Drawing and Wetlands drawings are located in Appendix 1 at the rear of this report.
- 5.3 Silt Capture
- 5.3.1 The permanent scheme will be as noted above generate and capture the estimated 2.1m³ of silt per annum.
- 5.3.2 The two areas at approximately 1.5m depth within the SuDS wetland will incorporate sumps covering a total area of 18.5m² to allow silt capture and ease of emptying.
- 5.3.3 The estimated 2.1m³ of silt per annum would amount to a depth of 113mm per year within these two sump areas.

5.4 Water Quality and Silt Mitigation

- 5.4.1 Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types. Those of relevance to the development proposals are as follows:

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car park, low-traffic roads	Low	0.5	0.4	0.4

Table 1: Pollution Hazard Indices

- 5.4.2 Where multiple drainage components are used in series the individual mitigation index of secondary and tertiary components is lowered by 50% due to reduced performance associated with primary treatment. In this case each of the individual systems meet the required level of treatment to mitigate the site risk.
- 5.4.3 The total treatment minimum level of treatment from each system is as follows:

Main Site Area (Parking and Driveways)	Total suspended solids (TSS)	Metals	Hydrocarbons
Permeable pavement	0.7	0.6	0.7
SuDS Wetland (at 50%)	0.4	0.4	0.4
Wetland (at 50%)	0.4	0.4	0.4
Total Treatment Provision	1.5	1.6	1.5

Main Site Area (Access and Footways)	Total suspended solids (TSS)	Metals	Hydrocarbons
SuDS Wetland	0.8	0.8	0.8
Wetland (at 50%)	0.4	0.4	0.4
Total Treatment Provision	1.2	1.2	1.2

Section of Highway Access below Wetland Level	Total suspended solids (TSS)	Metals	Hydrocarbons
Propriety Treatment Systems Vortex Plus Downstream Defender	0.5	0.4	0.5
Total Treatment	0.5	0.4	0.5

Table 2: Pollution Mitigation Provision

5.4.4 The proposed drainage design provides suitable mitigation to meet the target treatment level required for runoff with a very low to low risk of pollution.

5.5 Management and Maintenance of Drainage System

5.5.1 A Drainage Management and Maintenance Schedule has been developed for the site surface water drainage system. A copy is attached in Appendix 2 at the rear of this report.

6 Surface Water and Silt Capture During Construction

6.1 Proposed Surface Water System

- 6.1.1 It is proposed to construct the SuDS wetland and subsequent wetland as the first construction operation and provide temporary measures to assist in silt capture and water quality improvement during the construction works.
- 6.1.2 All surface water from the construction site will receive initial temporary treatment prior to discharging to the SuDS wetland area as detailed below.
- 6.1.3 Surface water runoff from the construction area will initially be contained using shallow areas lined with hay / straw bales wrapped in a permeable membrane to provide a further filtration medium to capture silt prior to directing surface water to the SuDS wetland for further treatment.
- 6.1.4 The SuDS wetland will be temporarily enhanced during the construction period by placing hay / straw bales wrapped in a permeable membrane on the earth berms to provide a medium to capture silt in the deep pool area and provide a further level of filtration.
- 6.1.5 As construction develops the site will contain working areas with permeable membrane and hay / straw bales but will also direct surface water to the surface water network.
- 6.1.6 At this stage the surface water network will be protected and enhanced during using double hessian bags to trapped gullies / catchpits which will be checked twice weekly and change as required to prevent silt and debris entering the system.
- 6.1.7 Enhanced maintenance of the surface water system will also be undertaken during construction with the SuDS wetland inspected daily and any build-up of silt removed to maintain the available SuDS wetland storage volume.

6.2 Water Quality and Silt Mitigation

- 6.2.1 Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types. Those of relevance to the construction phase area as follows:

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Sites with heavy pollution, e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates.	High	0.8	0.8	0.9

Table 3: Pollution Hazard Indices (Construction)

- 6.2.2 Where multiple drainage components are used in series the individual mitigation index of secondary and tertiary components is lowered by 50% due to reduced performance associated with primary treatment. We have not measured the mitigation from the temporary measures proposed however the wetland systems provide suitable treatment to mitigate the risk of pollutants from the site.

- 6.2.3 The total treatment minimum level of treatment from the system is as follows:

Main Site Area (Parking and Driveways)	Total suspended solids (TSS)	Metals	Hydrocarbons
SuDS Wetland	0.8	0.8	0.8
Wetland (at 50%)	0.4	0.4	0.4
Total Treatment Provision	1.2	1.2	1.2

Table 4: Pollution Mitigation Provision (Construction)

7 Silt Monitoring Proposals

7.1 Informative

- 7.1.1 Natural England raised concerns at Outline Planning Stage regarding the potential risk of silt entering the River Itchen from the development site.
- 7.1.2 The site surface water drainage system is proposed to discharge to the existing Southern Water Surface water system that ultimately discharges to the River Itchen Navigation to the southeast of the Allbrook Evangelical Free Church at approximate Postcode SO50 4LZ.

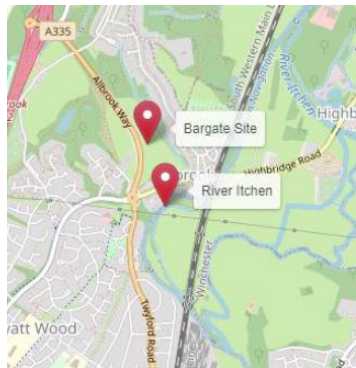


Image 2: Site Location and Southern Water Outfall Location

7.2 Pre Construction Baseline Monitoring

- 7.2.1 Monitoring will be undertaken within the River Itchen Navigation at the existing Southern Water Outfall.
- 7.2.2 This monitoring will be undertaken to confirm total suspended solids and turbidity using telemetered continuous in-flow monitoring of fine sediment / suspended solids.
- 7.2.3 It is proposed that monitoring be undertaken using a water quality sonde connected to a Flexi-Logger 105 with telemetry to provide continuous monitoring for a 12-month period.
- 7.2.4 The equipment will be subject to monthly maintenance visits to the water quality sonde and logger to assess the performance of the equipment and also complete any sonde calibration.
- 7.2.5 This monitoring will provide baseline data for the River Itchen Navigation during times of rainfall and during dry periods.

7.3 Construction and Post Construction Monitoring

7.3.1 Once the wetlands have been constructed and the site is connected to the public sewer monitoring is proposed as follows:

7.3.1.1 Monitoring within the River Itchen Navigation at the existing Southern Water Outfall, comprising a continuation of the baseline monitoring in the River Itchen Navigation telemetered in-flow monitoring of fine sediment / suspended solids.

7.3.1.2 Monitoring of surface water leaving the site at the onsite outflow chamber prior to surface water communicating with the Public Sewer comprising telemetered continuous in-flow monitoring of fine sediment / suspended solids.

7.3.1.3 Both monitoring locations will be subject to monthly maintenance visits to each water quality sonde and logger to assess the performance of the equipment and also complete any sonde calibration.

7.4 Assessing Monitoring Data

7.4.1 All data sets will be monitored and reviewed during construction and post construction until two years after the occupation of the 45th dwelling.

7.4.2 The site outfall data will be periodically reviewed to ensure no discharge of sediment from the site is occurring.

7.4.3 The River Itchen Navigation data sets will be reviewed periodically to assess if there are any results that fall outside the pre-construction baseline data.

7.5 Procedure if Measurable Increase in Pollutants Entering River Itchen Identified

7.5.1 If the data at the River Itchen Navigation Outfall indicates silt or turbidity outside the pre-construction baseline data the following action will take place.

- Compare the River Itchen Navigation data with the site monitoring data for the corresponding time period.
- If no corresponding spike in silt or turbidity is recorded from the site inform the Natural England, the Environment Agency and Southern Water that the increase in silt or turbidity is not related to site activity.

7.5.2 If there is a corresponding increase of silt or turbidity at the site outfall take the following action:

- Temporarily bung the SuDS Wetland outfall and wetland outfalls to hold surface water on site and notify Natural England, the Environment Agency and Southern Water of the incident.
- Arrange tanker to attend site and clear any silt debris from the wetlands and surface water catchpits and gullies.
- Test / check water quality in the wetland outfall to ensure it is back to the normal range of results.
- Remove the temporary bungs for the site surface water systems.
- Compare outfall data and River Itchen Navigation Data over the next three days to ensure silt or sediment remains within the baseline data range.

7.6 Monitoring period

- 7.6.1 Continuous monitoring is proposed to be maintained throughout the construction phase and then for a period of two years post the occupation of the 45th dwelling on site.
- 7.6.2 Bargate Homes will fund the monitoring and data analysis required to maintain and monitor the proposal together with any mitigation actions that may be required.

8 Conclusions

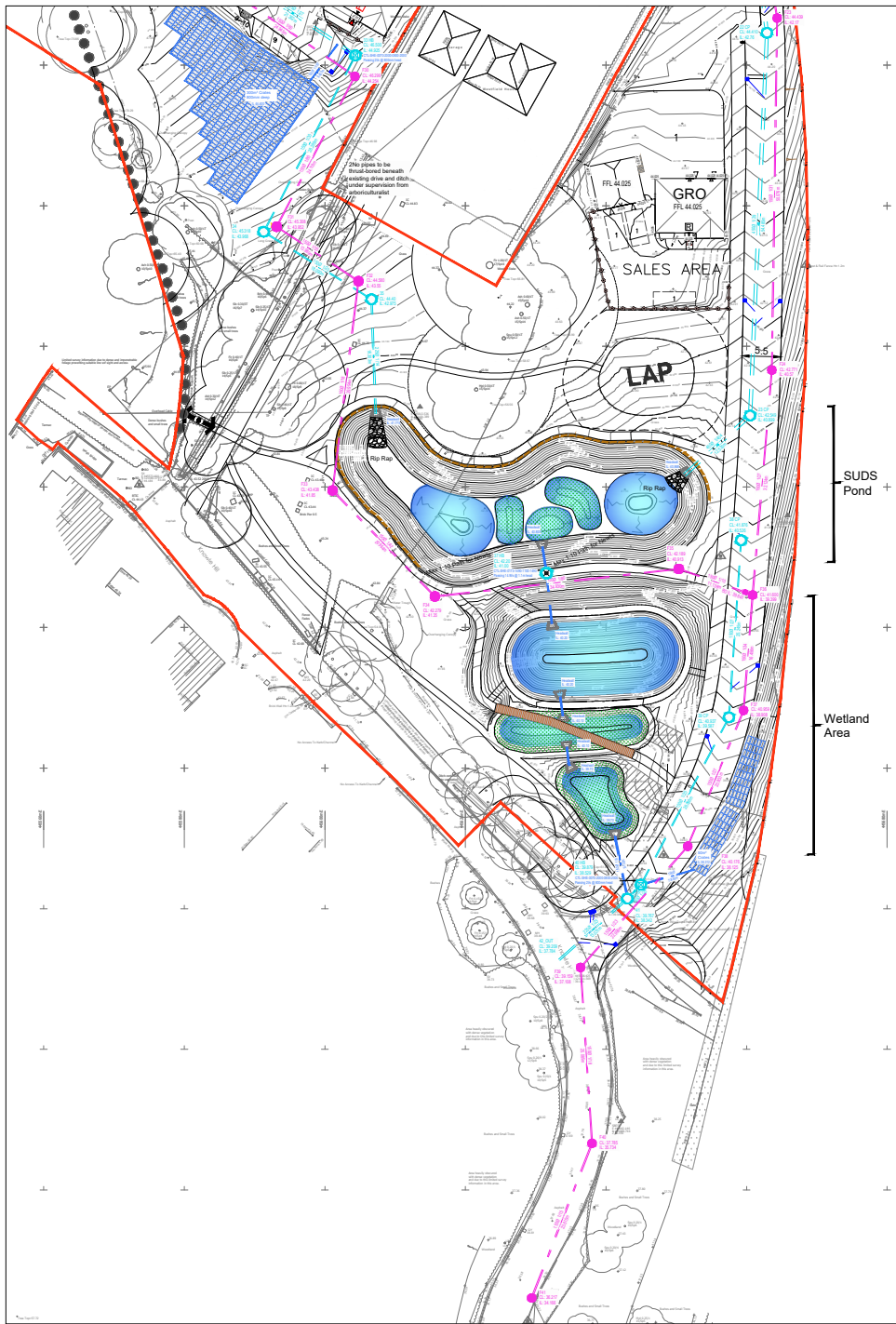
- 8.1 The site will generate a maximum of 2.1m³ of silt per annum.
- 8.2 A drainage system with wetland treatment capable of capturing, storing and removing the silt and fine sediment together with pollutants, associated with the level of risk for a housing site and during construction is proposed.
- 8.3 The two wetlands will be constructed as the first construction operation on site to ensure no silt, sediment or pollution reached the River Itchen SAC from the site.
- 8.4 A baseline data set of water monitoring for fine sediment and turbidity is proposed at the existing Southern Water outfall to the River Itchen Navigation to provide baseline data against which any impact from the site can be monitored.
- 8.5 Water quality monitoring is proposed at the existing Southern Water outfall to the River Itchen Navigation and the surface water outfall from the site throughout the construction phase and for a period of two years post occupation of the 45 dwelling.
- 8.6 Procedures in the event of an increase in siltation or turbidity in the River Itchen Navigation outside of the baseline range have been proposed.
- 8.7 Bargate Homes will fund the monitoring and data analysis required to maintain and monitor the proposal together with any mitigation actions that may be required.
- 8.8 The proposed monitoring provides a means of ensuring the drainage system performs as designed and procedures have been proposed in the unlikely event of an incident requiring action to safeguard the River Itchen SAC.

9 List of Appendices, Images and Tables

Appendix 1	Drainage Strategy and Wetland Drawings
Appendix 2	Drainage Management and Maintenance Schedule
Image 1	Three Stage Constructed Wetland (Mackenzie & McIlwraith, 2015)
Image 2	Site Location and Southern Water Outfall Location
Table 1	Pollution Hazard Indices
Table 2	Pollution Mitigation Provision
Table 3	Pollution Hazard Indices (Construction)
Table 4	Pollution Mitigation Provision (Construction)

Appendix 1

Drainage Strategy and Wetland Drawings



MH No.	MANHOLE DIAMETER (mm)	MANHOLE TYPE	COVER LEVEL (mm)	INVERT LEVEL (m)	DEPTH TO SOFFIT (m)	EASTING (m)	NORTHING (m)
1	1350	Type C	55.291	53.941	1.200	445535.996	121488.460
2	1200	Type B	55.979	53.688	2.086	445518.018	121479.959
3	1200	Type B	56.436	53.600	2.611	445514.319	121469.100
4	1350	Type C	54.930	52.890	1.800	445560.787	121464.955
5	1200	Type B	55.820	52.708	2.812	445521.226	121444.375
6	1350	Type C	54.936	52.441	2.120	445531.673	121399.054
7	1350	Type C	55.782	52.207	1.737	445540.057	121392.054
8	1350	Type C	53.782	52.207	1.200	445567.655	121402.956
9	1350	Type C	53.306	51.731	1.200	445580.056	121409.935
10	1350	Type C	52.722	51.147	1.200	445593.292	121407.435
11	1350	Type C	51.321	49.746	1.200	445610.230	121381.912
12	1350	Type C	54.746	53.321	1.200	445536.341	121383.250
13	1350	Type C	53.809	52.384	1.200	445539.655	121375.837
14	1350	Type C	53.086	51.661	1.200	445543.119	121347.584
15	1350	Type C	52.497	51.072	1.200	445566.653	121351.175
16	1350	Type C	50.658	49.158	1.200	445602.587	121359.123
17	1350	Type C	50.171	48.570	1.200	445614.850	121349.640
18	1350	Type C	49.424	47.774	1.200	445624.386	121348.834
19	1350	Type C	47.717	46.067	1.200	445639.355	121311.048
20	1350	Type C	46.031	44.381	1.200	445653.073	121284.758
21	1350	Type C	45.083	43.433	1.200	445660.421	121264.639
22	1350	Type C	44.410	42.760	1.200	445662.902	121244.598
23	1350	Type C	42.549	40.899	1.200	445660.506	121190.166
24	1350	Type C	40.937	48.502	1.200	445595.387	121236.234
25	1200	Type B	50.727	48.193	2.244	445557.756	121323.324
26	1350	Type B	49.375	47.793	1.200	445593.580	121291.937
27	1350	Type C	47.603	46.103	1.200	445561.276	121291.359
28	1200	Type B	48.228	46.012	1.916	445594.265	121288.792
30	1350	Type B	48.588	45.825	2.388	445568.369	121277.700
31	1350	Type B	48.170	45.798	1.997	445572.649	121269.750
32	1350	Type B	47.713	45.731	1.627	445586.643	121253.339
33	HB	Type C	46.500	44.495	1.405	445604.352	121241.393
34	1350	Type C	44.418	43.968	1.200	445591.306	121216.292
35	1350	Type C	45.500	42.975	1.200	445606.643	121206.699
37	HB	Type C	42.200	41.000	0.975	445631.355	121167.741
38	1350	Type C	41.876	40.588	1.200	445659.228	121141.408
39	1350	Type C	40.937	39.597	1.200	445657.499	121147.222
40	HB	Type C	39.879	38.529	1.200	445644.971	121123.420
41	1350	Type C	39.767	38.342	1.200	445643.056	121121.435

MH No.	MANHOLE DIAMETER (mm)	MANHOLE TYPE	COVER LEVEL (m)	INVERT LEVEL (m)	DEPTH TO SOFFIT (m)	EASTING (m)	NORTHING (m)
F1	1200	Type B	55.409	53.609	1.650	445532.984	121484.399
F2	1200	Type B	56.057	53.420	2.487	445519.245	124718.122
F3	1200	Type B	56.466	53.318	2.998	445516.550	124704.433
F4	1200	Type B	54.528	52.728	1.650	445552.064	124547.962
F5	1200	Type A	54.711	53.238	3.233	445534.125	124581.641
F6	1200	Type A	54.919	51.699	2.061	445533.077	124511.400
F7	1200	Type B	54.510	51.497	2.863	445549.252	124501.860
F8	1200	Type B	53.756	51.371	2.235	445567.537	124105.824
F9	1200	Type B	53.239	50.960	2.129	445579.149	124121.605
F10	1200	Type B	52.659	50.900	2.019	445594.793	124109.765
F11	1200	Type B	51.289	49.400	2.099	445612.523	123182.825
F13	1350	Type C	53.998	52.648	1.200	445552.458	123102.803
F14	1200	Type B	51.512	49.260	2.250	445581.079	123146.641
F15	1200	Type B	50.512	48.712	1.650	445605.402	123157.317
F16	1200	Type B	50.177	48.177	1.850	445618.081	123181.933
F17	1200	Type B	49.461	47.210	2.101	445626.526	123151.119
F18	1200	Type B	48.250	45.827	2.473	445595.689	123292.991
F19	1200	Type B	47.711	45.328	2.233	445610.332	123103.289
F20	1200	Type B	47.816	44.925	2.741	445640.434	123134.929
F21	1200	Type B	45.887	43.640	2.097	445655.717	112833.777
F22	1200	Type B	45.111	42.900	2.211	445658.284	112833.777
F23	1200	Type B	44.439	42.170	1.119	445684.349	112824.702
F24	1200	Type B	42.771	40.570	2.051	445683.597	112196.632
F25	1200	Type B	50.083	48.293	1.650	445582.657	123237.508
F26	1200	Type A	50.937	47.520	3.267	445555.072	123135.294
F27	1200	Type B	49.172	46.850	2.172	445562.487	12286.792
F28	1200	Type B	48.192	45.170	2.872	445570.144	11269.245
F29	1200	Type B	47.690	44.260	2.870	445583.719	11269.245
F30	1350	Type C	46.289	44.254	2.045	445604.279	112328.420
F31	1350	Type C	45.308	43.952	1.206	445593.139	112712.029
F32	1350	Type C	44.580	43.500	0.880	445604.782	112209.274
F33	1350	Type C	43.438	41.850	1.438	445601.101	112179.507
F34	1350	Type C	42.279	41.350	0.779	445516.652	112164.416
F35	1350	Type C	42.189	40.913	1.126	445630.361	112168.336
F36	1200	Type B	41.600	39.399	2.051	445680.863	112164.625
F37	1200	Type B	41.069	38.909	1.901	445659.576	112164.625
F38	1200	Type B	40.176	38.125	1.901	445651.654	112128.883
F39	1200	Type B	39.159	37.108	1.901	445636.396	112111.656
F40	1200	Type B	37.785	35.764	1.901	445638.016	112086.623
F41	1200	Type B	36.217	34.166	1.901	445629.431	112064.623

GENERAL NOTES:

1. All dimensions to be checked on site. All details and dimensions relating to sub-Contractors work must be checked and agreed between the sub-Contractor or supplier and the general Contractor.
2. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and specification.
3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority. No liability is accepted by the Consultant and the main Contractor is responsible for obtaining and checking all information and taking due care and attention whilst undertaking the works.

B	18.10.24	MJP	Minor updates to levels layout	SRM
A	17.10.24	MJP	Minor updates to drainage layout	SRM
REV	DATE	INT	DESCRIPTION	CHK

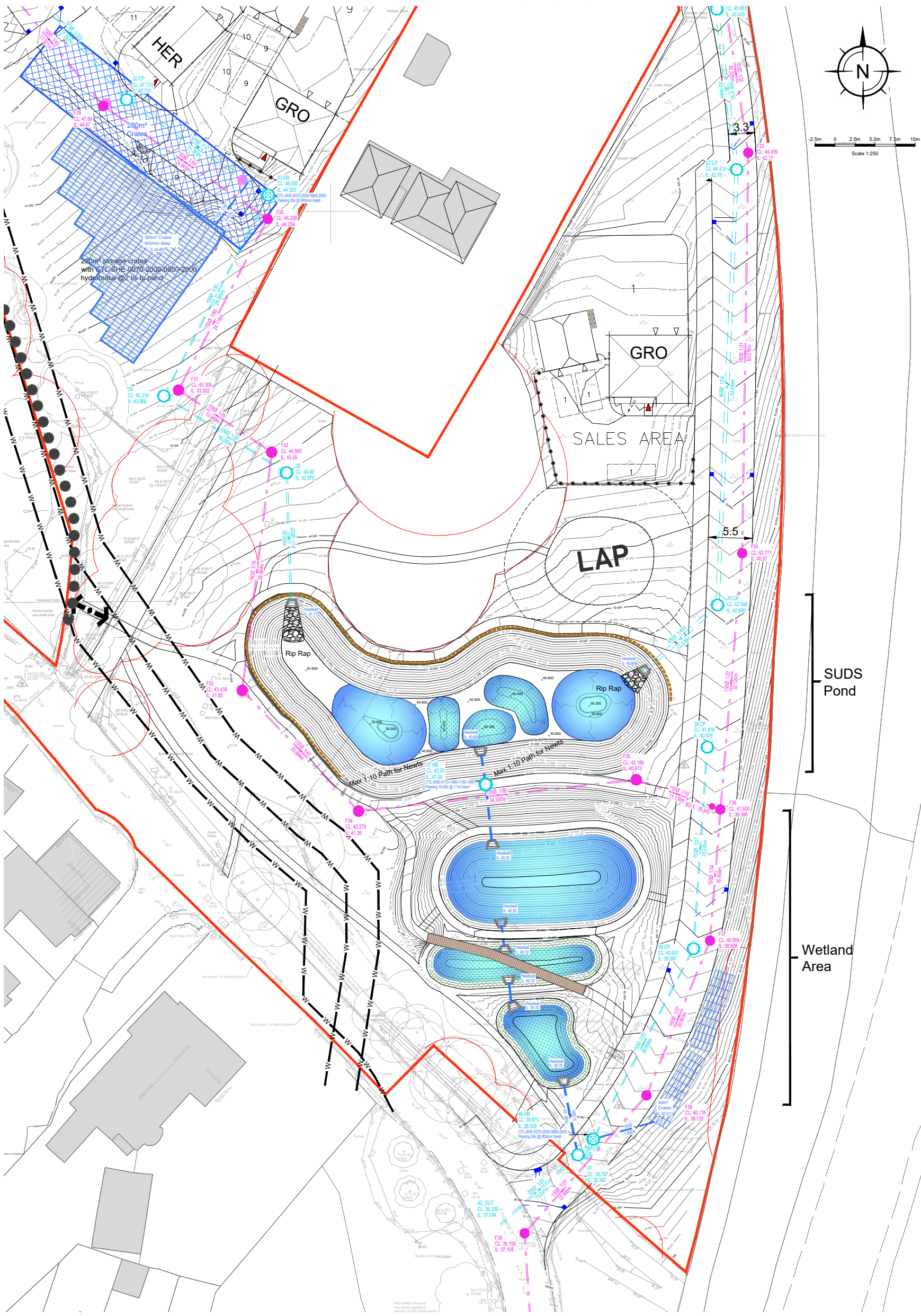
Issue Status	FOR APPROVAL
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CLIENT	Bargate Home
PROJECT	Knowel Hill Albrook Eastleigh
TITLE	Proposed Drainage Layout Plan Whole Site

DRAWING		DATE		PROJECT NO.	
M Pacifico		Oct 2024		23823	
ENGINEER		CHECKED		ORG. No.	
S Magowan				REV.	
SCALE				200 B	
1:500 @ A1					



- GENERAL NOTES:
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 2. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and specification.
 3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
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E	18.10.24	[MJP] Updated to site revised site plan & tree protection	[SRM]
D	24.07.24	[MJP] Key updated to suit revised plan	[SRM]
C	16.07.24	[MJP] Drainage model and ponds updated	[SRM]
B	-	[MJP] Tree added to protection area	[SRM]
Pond resized to suit			
A	13.02.24	[MJP] Contours updated. Typos corrected	[SRM]
Section added			

Issue Status

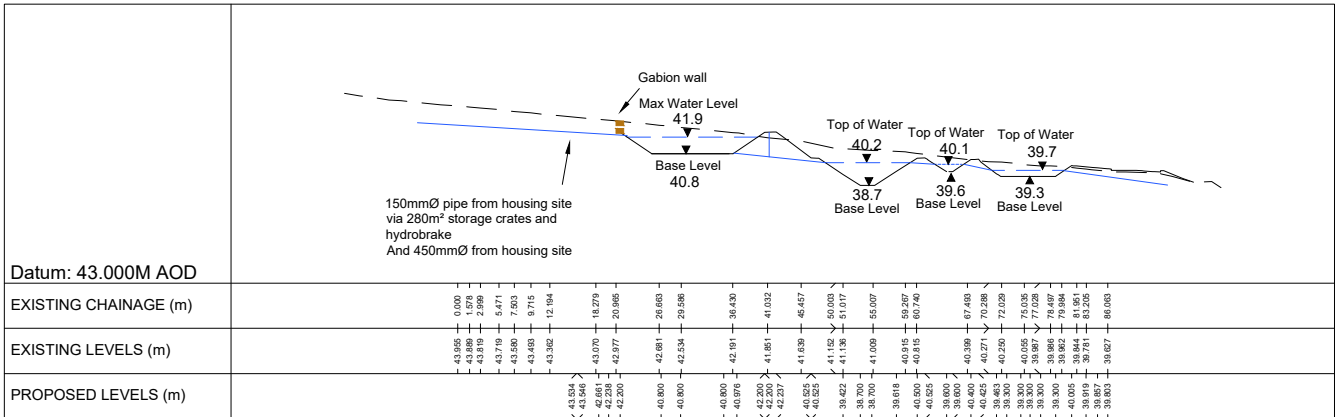
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CLIENT
Bargate Homes

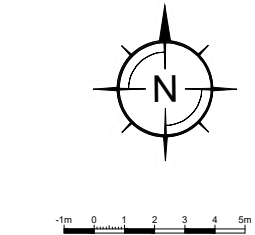
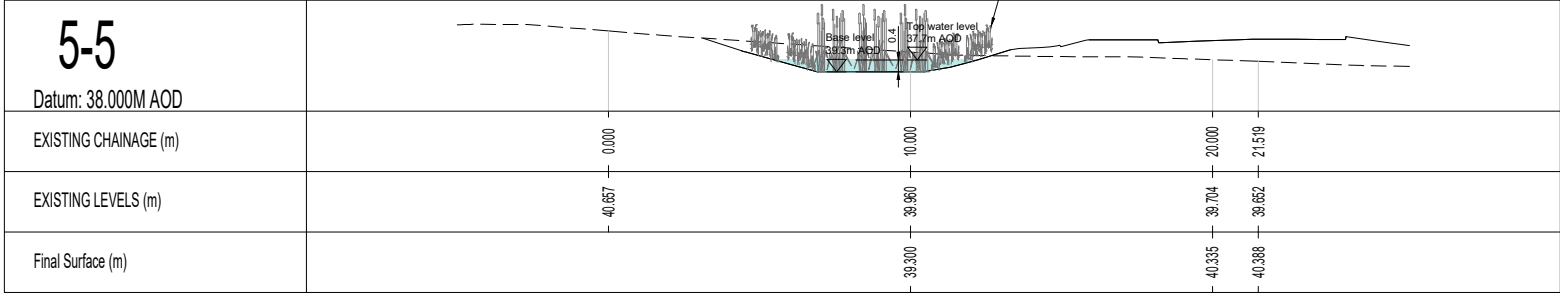
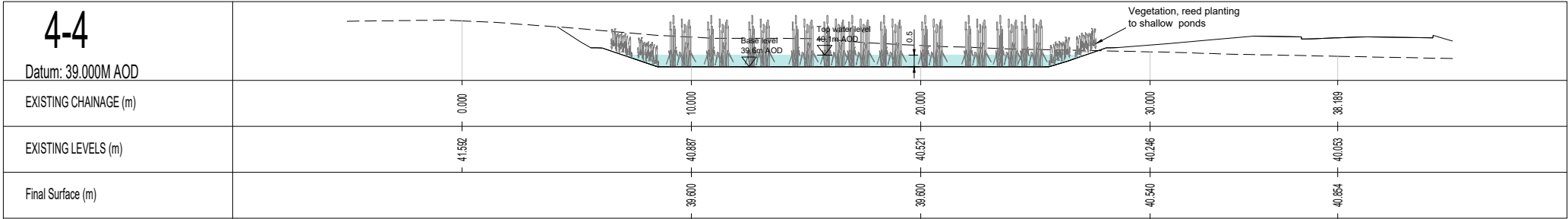
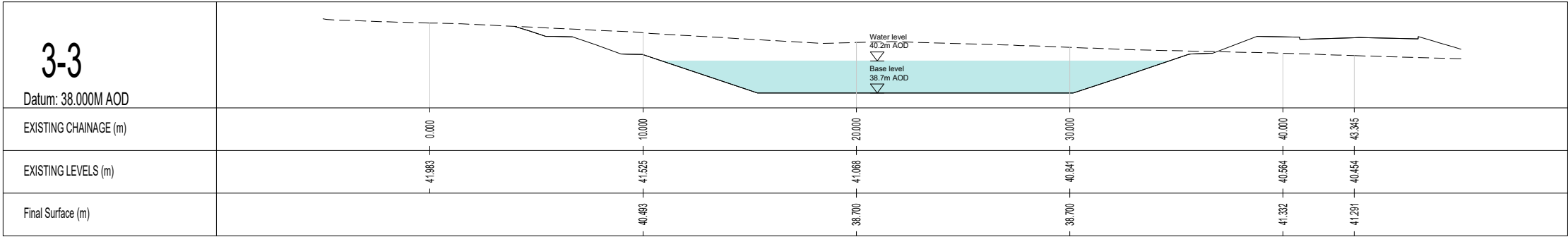
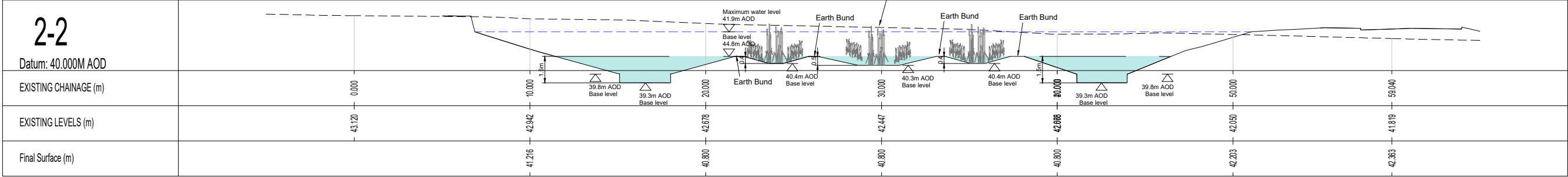
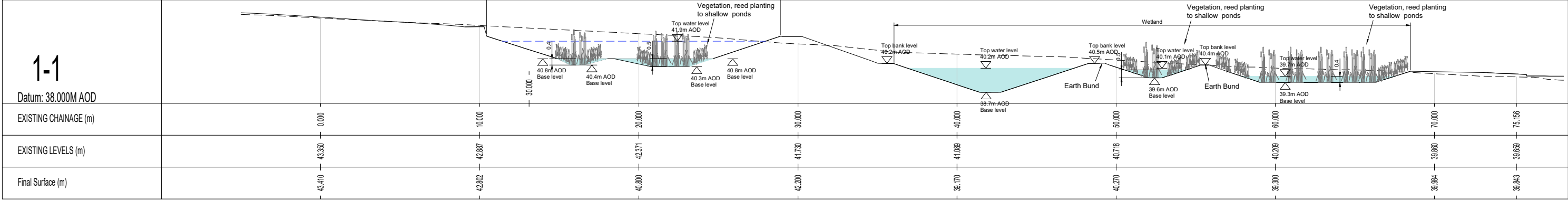
PROJECT
Knowle Hill
Albrook
Eastleigh

TITLE
SUDS and Proposed Wetland

DRAWN M Pacifico	DATE Jan 2024	PROJECT NO. 23823
ENGINEER S Magowan	CHECKED SRM	REV. 35 E
SCALE 1:250 @ A1		



Section A-A Through Basins (2x vertical exaggeration)



- GENERAL NOTES:
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A | 17.10.24 | [MJP] Sections and plan updated to suit updated layout | SRM

REV	DATE	BY	DESCRIPTION	CHK
Issue Status				
PRELIMINARY				

c

e

p

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CLIENT

Bargate Homes

PROJECT

Knowle Hill

Albrook

Eastleigh

TITLE

SUDS and Proposed Wetland Sections

DESIGN

A Davies

DATE

Mar 2024

PROJECT NO.

23823

ENGINEER

S Magowan

CHECKED

SRM

SCALE

1:125 @ A1

42

A

Appendix 2

Drainage Management and Maintenance Schedule

Drainage Management and Maintenance Schedule



Project	Land West of Allbrook Way, Knowle Hill, Eastleigh
Project Number	23823

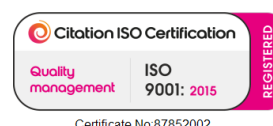
By Stuart Magowan

Date 17 October 2024

1 Schedule of Maintenance

- 1.1 Once appointed the Contractor will prepare a site specific method statement for the control of silt and other pollutants during construction. CIRIA Report C532, Control of water pollution from construction sites, provides further guidance on this.
- 1.2 The Contractor will maintain the proposed drainage system during construction and until the handing over of the site.
- 1.3 Upon completion the Principal Contractor will collate the data sheets, operation and maintenance details of all materials used in the construction of the site drainage system.
- 1.4 These details will issued to the Management Company for their records.
- 1.5 Upon completion management of shared drainage facilities (where not adopted by a Statutory Undertaker) will be passed on to a Management Company appointed by the Developer on behalf of the Residents.
- 1.6 In the event that the Management Company becomes unable to discharge its duties within two years of first appointment the Developer will endeavour to appoint an alternative on behalf of the Residents.
- 1.7 Maintenance of individual property drainage connections is the responsibility of the individual property owners.
- 1.8 The following maintenance schedule details the typical tasks to be undertaken at different intervals.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Manage vegetation and remove nuisance plants – aesthetics	As required
	Litter and debris removal – catchpits, headwalls and wetland areas	Monthly or as required



Maintenance Schedule	Required Action	Frequency
	Mow all margins to the wetland flow channels with vegetation height to be maintained at between 100mm and 150mm	Monthly or as required
	Cleaning of gutters and any filters on downpipes	3 Monthly
	Remove sediment and debris from trapped gullies, silt trap chambers, channel drains and inlet chambers	6 monthly
	Inspection of wetlands	6 monthly
	Inspection and removal of silt and hydrocarbons from Downstream Defender	6 monthly
	Removal of silt from wetland ponds	Annually
	Visual inspection of permeable paving for defects and settlement	Annually
	Cutting / removal of reeds to maintain healthy growth within the wetlands. Once established 1/3 of reeds to be removed annually.	Annually
	Sweeping / brushing of permeable paving	Every 2 years
	Surface and foul water pipework – jetting / rodding	Every 2 years or as required
Corrective Maintenance	Remove debris / blockages to trapped gullies, silt traps, channel drains and headwalls	As required
	Repairs to access chambers / manhole covers	As required
	Replace any broken permeable blocks / surface, remedial works to any depressions or rutting	As required
	Inspect inlet, outlet from downpipes, channel drains, gullies and headwalls for blockages, standing water and clear	As required
	Reconstruct storage structures if performance deteriorates or failure occurs	As required
	Where there is a build-up of silt in wetland or at inlets to the wetland areas of 50mm or more above the design level remove silt and spread on site. Undertake when ground is damp in autumn or early spring and transplant turf / overseed to original design levels	As required
Monitoring	Inspect silt traps and note the rate sediment has accumulated	Monthly in the first year and then annually
	Water quality to be monitored remotely at the outlet manhole from the site.	For first 5 years after completion
	Inspect storage structures to ensure they are fully emptying	Annually

Indicative Schedule of Maintenance for the Proposed Drainage System

Component	Inspection Frequency					
	1 Month	3 Months	6 Months	1 Year	After leaf fall in Autumn	2 Years
Headwalls, Gullies, Channels and Gutters		✓			✓	
Catchpits	✓				✓	
Surface and Foul Water Pipework						✓
Permeable Paving				✓		
Wetlands			✓			
Flow Controls			✓			
Storage Facilities				✓		
Downstream Defender			✓			
Outfall Manhole	✓					

Inspection Frequency Summary

2 Regular Maintenance Procedures

2.1 It is recommended the Management Company employ a suitably qualified company to undertake the maintenance works on site for all shared drainage. The following procedures provide a guide to the two most common maintenance items, jetting and silt removal, to be undertaken on site.

2.2 Jetting

2.2.1 Equipment Required:

- High-pressure water jetting equipment
- Personal protective equipment (PPE) for operators

2.2.2 Typical Procedure:

- Perform a pre-jetting inspection to assess the level of sedimentation
- Insert the jetting hose into the pipe, starting from the upstream end
- Gradually move the jetting hose downstream, ensuring the entire pipe length is cleaned
- Monitor the process to avoid any damage to the pipe structure.
- Collect dislodged silt and debris at the downstream end using a vacuum or manual removal

2.3 Silt Removal and Disposal

2.3.1 Equipment Required:

- Vacuum truck or manual removal tools

- Containers for temporary storage of silt and debris

2.3.2 Typical Procedure:

From Gullies, catchpits, pipework headwalls

- Collect the dislodged silt and debris from gullies, catchpits, downstream end of the surface water pipe or headwalls.
- Transfer the collected material to the containers
- Dispose of the collected silt and debris following local regulations and environmental guidelines

From Wetland ponds

- Consult Ecologist to ensure works undertaken at appropriate times to minimise any disruption to wildlife
- Remove silt and debris from base of ponds and spread material on the adjacent bank of the wetland area and leave in place for 24-48 hours .
- Transfer material to containers
- Dispose of the collected silt and debris following local regulations and environmental guidelines

3 Design Life

- 3.1 The design life of the development is likely to exceed the design life of the components within the SuDS network. During the routine drainage inspections it may be determined that some components have reached the end of their functional life cycle.
- 3.2 Where possible repairs should be the first option considered however if repairs are unviable it will be necessary for the property owner / Management Company to replace the faulty component.

4 Emergency Plan

4.1 Potential flood and maintenance indicators:

- Manholes or inspections chambers overflowing
- Gullies overflowing or ponding
- Channel drains overflowing or ponding
- Other visual indicators of the drainage system not performing as it should

4.2 Should any of the items above occur then immediate action as outlined below should be undertaken:

- Inspect for blockages in the problem area

- Should the problem not be identified via an initial inspection:
 - For unadopted onsite drainage the Management Company should appoint a suitable drainage engineer to inspect and survey the system and jet any blockages
 - For adopted onsite drainage the relevant statutory undertaker should be alerted
 - Where it is suspected that there is a problem with the downstream drainage network the Owner or relevant statutory undertaker of that system should be alerted