



RIDGE

**GREEN INFRASTRUCTURE
SUDS STRATEGY**

ONE HORTON HEATH

EASTLEIGH BOROUGH COUNCIL

February 2024



GREEN INFRASTRUCTURE SUDS STRATEGY ONE HORTON HEATH

Prepared for

Eastleigh Borough Council
Eastleigh House,
Upper Market Street,
Eastleigh,
SO50 9YN

Prepared by

Ridge and Partners LLP
1 Royal Court
Kings Worthy
Winchester
Hampshire
SO23 7TW

Tel: 01962 834400

Contact

Tom Clark
Senior Civil Engineer



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Appendices:

Appendix A- Overall Green Infrastructure Plan

Appendix B- Catchment Plan

Appendix C- SuDS feature cross-section drawings

SECTION 1

INTRODUCTION

1. PROJECT BACKGROUND

1.1. Overview

Ridge & Partners prepared this SuDS Strategy on behalf of Eastleigh Borough Council. The proposed development has been designed in full accordance with the Development Plan and Outline Planning Application (OPA) O/20/89498, which has a resolution to grant consent subject to S106 negotiations relating to education. The application is for full planning consent due to the time for these negotiations to complete. Submitting details of the Green Infrastructure Landscaping (GI) as a full planning application will deliver the GI in accordance with, and as part of the OPA, but enable commencement more quickly than waiting for the resolution of the OPA S106 and the determination of an application for reserved Matters Approval of details of the GI (hereby referred to as the 'Application Site- reserved matters planning application').

1.2. Site Location

The site is currently in agricultural use, mainly arable with some grassland. The area for green infrastructure site is shown below:



Figure 1 Green Infrastructure Site Area

The site is located within the central two-thirds of One Horton Heath, Grid Reference SU 48931 17787, X (Easting) 448855 and Y (Northing) 117787. Latitude and Longitude (decimal), 50.949902, -1.3059010, Latitude and Longitude (degs, mins, secs), 50°57'00"N, 001°18'21"W.

1.3. Hydrological Settings

The nearest river is the River Itchen which is located 1.67km away from the proposed development. The tributary of Foxwood Stream runs between the solar farm and the Fir Tree Lane and north of the proposed one Horton heath Lower Acre site as shown in figure 3.

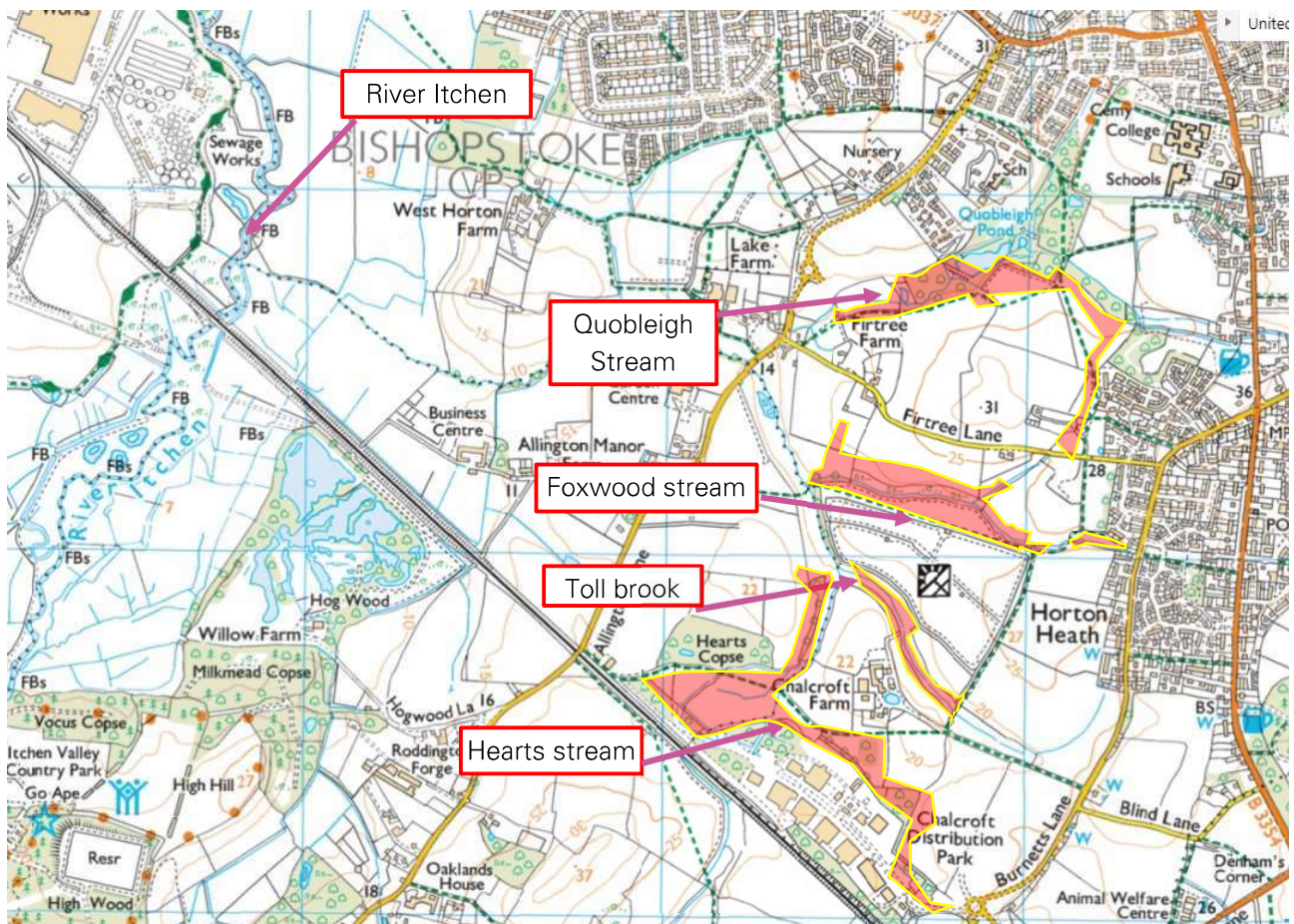


Figure 2: Location of River Itchen from the proposed site

1.4. Proposed Development

The proposed development has been designed in full accordance with the Development Plan and Outline Planning Application (OPA) O/20/89498, which has a resolution to grant consent subject to S106 negotiations relating to education. The application is for full planning consent due to the time for these negotiations to complete. Submitting details of the Green Infrastructure Landscaping (GI) as a full planning application will deliver the GI in accordance with, and as part of the OPA, but enable commencement more quickly than waiting for the resolution of the OPA S106 and the determination of an application for reserved Matters Approval of details of the GI.

This report primarily focuses on green infrastructure as shown below:

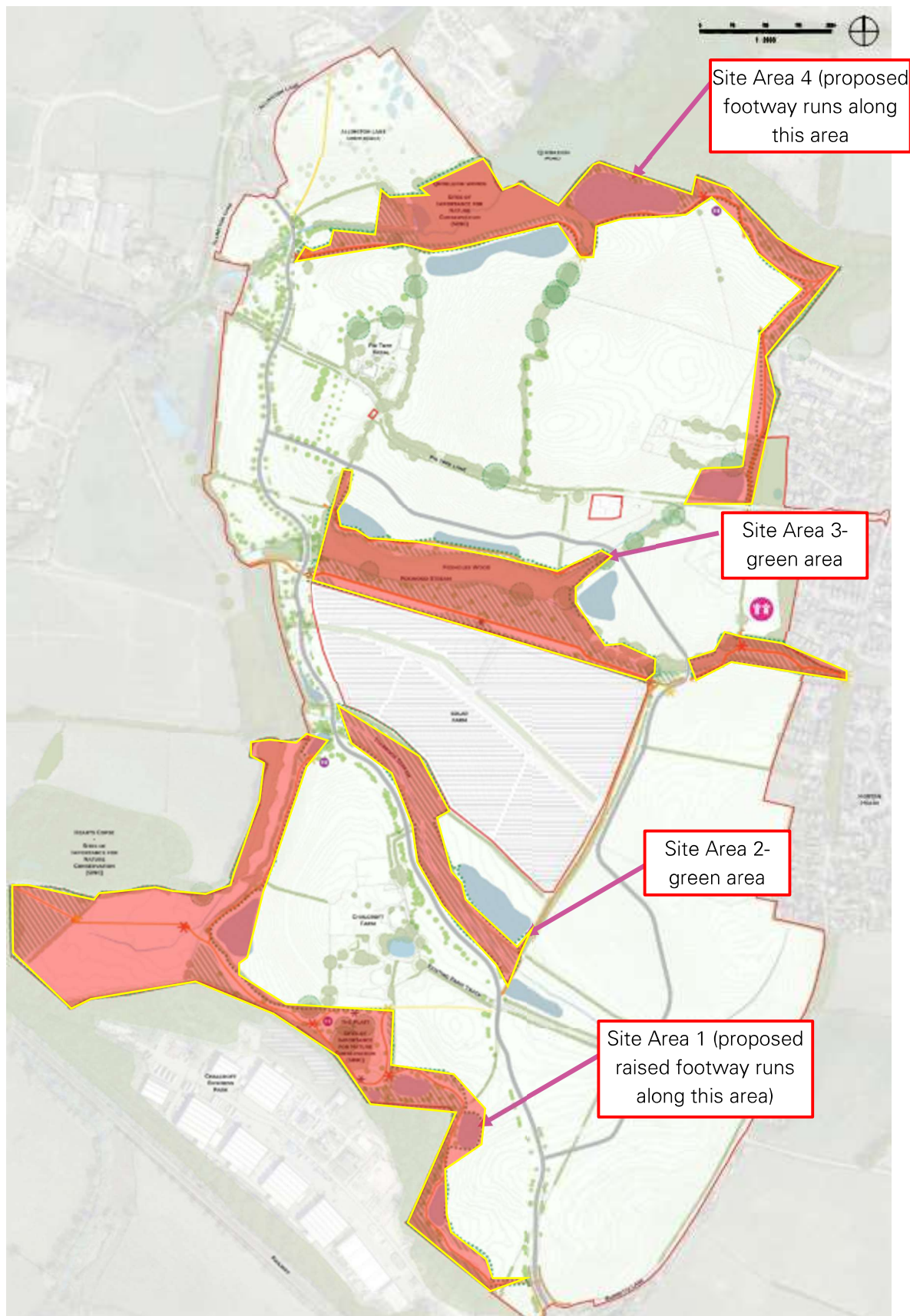


Figure 5: Green Infrastructure Areas

SECTION 2

WATER QUALITY

2. WATER QUALITY

2.1. Introduction

The proposed development utilises flow paths through ponds before reaching its final destination at the nearest stream.

2.2. Simple Index Tool

The Simple Index Approach has been utilised to assess the water quality management set out in the SuDS Manual, with appropriate cross referencing to the relevant 'Design Conditions'.

The results of these assessments are in the following tables for each catchment area are suitably designed to maintain water quality.

Refer to appendix B for catchment area plan and appendix C for SuDS feature cross- section (Pond B, C, D, M, N & EM).

Site Area 1

The surface water collected from the nearby catchments (Catchment M, N and EM) is discharged into the SuDS feature M, SuDS feature N and SuDS feature EM, located within the green infrastructure (Site Area 1). The proposed development of catchment M, N & EM will be carried out in a later stage. In the event where additional water quality measures are required, a separate detailed water quality assessment will be conducted. However, the water quality assessment for the road and residential roof is taken into consideration for this study. The surface water collected within SuDS feature M & N is discharged into Hearts Stream.

The water quality index table for site area 1 is as follows:

Low Traffic Road

SUMMARY TABLE	
Land Use Type	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)
Pollution Hazard Level	Low
Pollution Hazard Indices	
TSS	0.5
Metals	0.4
Hydrocarbons	0.4
SuDS components proposed	
Component 1	Pond
SuDS Pollution Mitigation Indices	

TSS	0.7
Metals	0.7
Hydrocarbons	0.5
Combined Pollution Mitigation Indices	
TSS	0.7
Metals	0.7
Hydrocarbons	0.5
Acceptability of Pollution Mitigation	
TSS	Sufficient
Metals	Sufficient
Hydrocarbons	Sufficient

Residential Roof

SUMMARY TABLE

Land Use Type	Residential Roof
Pollution Hazard Level	Very Low
Pollution Hazard Indices	
TSS	0.2
Metals	0.2
Hydrocarbons	0.05
SuDS components proposed	
Component 1	Pond
SuDS Pollution Mitigation Indices	
TSS	0.7
Metals	0.7

Hydrocarbons	0.5
Combined Pollution Mitigation Indices	
TSS	0.7
Metals	0.7
Hydrocarbons	0.5
Acceptability of Pollution Mitigation	
TSS	Sufficient
Metals	Sufficient
Hydrocarbons	Sufficient

Site Area 2 and 3

There is no proposed development within Site Area 2 and Area 3 of green infrastructure. The surface water collected within these areas infiltrates into the ground. Therefore, no water quality assessments are required.

Site Area 4

The surface water from the nearby catchments (Catchment C and D) is discharged into the SuDS features C and D located within the green infrastructure (Site Area 4). The proposed development for these catchments will be carried out at a later stage. The surface water from Catchment B will be discharged into SuDS feature B, and the collected surface water within SuDS feature B is then discharged into the Quobleigh stream located within green infrastructure Site Area 4. In the event where additional water quality measures are required, a separate detailed water quality assessment will be conducted. However, the water quality assessment for the road and residential roof is taken into consideration for this study. The water quality index table for Site 4 is as follows:

Low Traffic Road

SUMMARY TABLE	
Land Use Type	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)
Pollution Hazard Level	Low
Pollution Hazard Indices	
TSS	0.5
Metals	0.4

Hydrocarbons 0.4

SuDS components proposed

Component 1 Pond

SuDS Pollution Mitigation Indices

TSS 0.7

Metals 0.7

Hydrocarbons 0.5

Combined Pollution Mitigation Indices

TSS 0.7

Metals 0.7

Hydrocarbons 0.5

Acceptability of Pollution Mitigation

TSS Sufficient

Metals Sufficient

Hydrocarbons Sufficient

Residential Roof

SUMMARY TABLE

Land Use Type Residential Roof

Pollution Hazard Level Very Low

Pollution Hazard Indices

TSS 0.2

Metals 0.2

Hydrocarbons 0.05

SuDS components proposed

Component 1	Pond
-------------	------

SuDS Pollution Mitigation Indices	
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TSS	0.7
-----	-----

Metals	0.7
--------	-----

Hydrocarbons	0.5
--------------	-----

Combined Pollution Mitigation Indices	
---------------------------------------	--

TSS	0.7
-----	-----

Metals	0.7
--------	-----

Hydrocarbons	0.5
--------------	-----

Acceptability of Pollution Mitigation	
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TSS	Sufficient
-----	------------

Metals	Sufficient
--------	------------

Hydrocarbons	Sufficient
--------------	------------

2.3. Removal of Nutrient (Nitrates and Phosphorous)

Ponds

Retention ponds are structures that provide both retention and treatment of contaminated storm water runoff. Retention ponds include a permanent pool of water into which storm water runoff is directed and outflows are controlled to reduced flow rate. A well-designed pond provides a community asset and opportunities for new habitats. The pond's physical, biological and chemical processes work to remove storm water pollutants. Sedimentation processes remove particulates, organic matter, and metals, while dissolved metals and nutrients are removed through biological uptake. In general, a higher-level storm water quantity control can be achieved as well as providing amenity benefits.

Landscaped depressions containing permanent pools of water, retention ponds are similar in many respects to detention basins, in that they can collect and temporarily store / attenuate surface water runoff and release it more slowly to the discharge point. However, they can provide an enhanced level of water quality treatment and also provide biodiversity and amenity benefits by supporting emergent and submerged vegetation along the waterline and within shallow marshy areas. Retention ponds need to be designed with suitable upstream pre-treatment systems to prevent open water areas becoming blocked with silt, odorous due to pollution or stagnant.

The phosphorous within the pond will be alleviated using the following mechanism:

- Sediment removal device has been included upstream to prevent gross pollution and the volume of the pond being compromised by the build up of sediments.
- The pond has been designed so that the deposited fine sediment on the bottom is not washed out in high flows.
- Uptake by plants and aquatic flora to reduce the phosphorous within the pond.

The nitrate within the pond will be alleviated using the following mechanism:

- Removal of coarse sediments within the sediment forebay.
- The permanent pool of water provides further settlement of fine sediments and removal of nutrients
- Nitrogen reducing native marginal and aquatic species (including evergreen plants).
- The incorporation of distinct zones in the large basin providing the water quality and quantity volume storage in a number of independent cells. These features create increased attenuation, longer pollutant removal pathways (and therefore enhanced pollution removal) an easier maintenance regime and more varied ecology.
- Basin include a sediment forebay, permanent micro pools, attenuation storage volume above permanent pool water level and aquatic benches surrounding the permanent micro pools, which support wetland planting, acting as a biological filter and providing ecology amenity and safety benefits. Around the micro pools shallow wet/marshy grassland areas provide further filtration.

SECTION 03

SUDS MAINTENANCE PLAN

3. SUDS MAINTENANCE PLAN

3.1. Introduction

This section sets out the principles for the long-term management and maintenance of the proposed surface water Sustainable Drainage Systems (SuDS) to be constructed to discharge surface water discharged from nearby catchments. The purpose of this section is to set out the basis of the SuDS Maintenance Plan for the development and to ensure that the management company is entrusted with a robust inspection and maintenance programme. It ensures that the optimum operation of the drainage network is continually maintained for the lifetime of the development and to prevent the increased risk of flooding both on and off site in accordance with the National Planning Policy Framework (NPPF).

All those responsible for maintenance should follow relevant Health and Safety legislation (Health and Safety at Work Regulations, 1999) for all activities listed within this section including lone working, if relevant) and risk assessments should always be undertaken. Any contractor employed by the Site Operator/Management Company shall carry out periodic maintenance of all such SuDS in accordance with the schedules listed in this section. Inspection checks shall be carried out by a qualified and competent person, at the minimum intervals listed within the schedules and the appropriate work carried out.

3.2. SuDs Layout

The storm water drainage strategy for the proposed development is to utilise a range of SuDS features to discharge the surface water to the nearest water course,

The proposed storm water system contains the following SuDS Components:

- Ponds

There are three categories of maintenance activities referred to in this Section:

- Regular maintenance (including inspections and monitoring).

Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.

- Occasional maintenance

Comprises 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).

- Remedial maintenance

Comprises 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.

Ponds

The ponds present within the vicinity of the catchments which will be utilised to discharge the surface water from the nearby catchments.

To ensure that the people who are in the vicinity of the pond are aware of the potential danger and also to minimize the risk of drowning, a lifesaving ring should be provided within the area of the pond.

Ponds will require regular maintenance to ensure continuing operation to design performance standards, and all designers should provide detailed specifications and frequencies for the required maintenance activities, along with likely machinery requirements and typical annual costs- within the Maintenance Plan. The

treatment performance of ponds is dependent on maintenance, and robust management plans will be required to ensure maintenance is carried out in the long term. Different designs will have different operation and maintenance requirements, but this section gives some generic guidance.

Maintenance of ponds is relatively straightforward for landscape contractors, and typically there should only be a small amount of extra work required for a SuDS Pond is necessary for standard public open space.

Regular inspection and maintenance are important for the effective operation of ponds as designed. Maintenance responsibility for a pond and its surrounding area should always be placed with a responsible organisation. Litter and debris removal should be undertaken as part of general landscape maintenance for the site and before any other SuDS management task. All litter should be removed from site.

Any invasive maintenance work such as silt or vegetation removal is only required intermittently, but it should be planned to be sympathetic to the requirements of wildlife in a pond. Care should be taken to avoid disturbance to nesting birds during the breeding season and habitats of target species (e.g., great crested newt and water voles) at critical times. The window for carrying out maintenance to achieve this is usually towards the end of the growing season (typically September/October), although this will vary with species).

Invasive silt and vegetation removal should only be carried out to limited areas at any one time 25-30% of the pond area on one occasion each year to minimise the impact on biodiversity. Plant management, to achieve particular desired habitat effects, should be clearly specified in a maintenance schedule.

Site vegetation should be trimmed as necessary to keep the pond free of leaves and to maintain the aesthetic appearance of the site. Slope areas that have become bare should be re-vegetated and any eroded areas should be regraded before replanting.

Maintenance access (or "easement") should be provided to the pond from a public or private road. An assessment should be made at the planning stage regarding the maintenance and associated access requirements. Ideally, access should be at least 3.5 m wide, have a maximum cross fall of 1 in 7, and be sufficiently robust to withstand maintenance equipment and vehicles. However, temporary access routes for infrequent operations could be considered where permanent routes are not appropriate. The access should extend to any forebay, safety and aquatic benches, inlet and outlet infrastructure. Consideration should be given as to whether maintenance vehicles will need to turn around. Wherever possible.

SuDS ponds and wetlands should be designed so that special machinery is not required to undertake maintenance. The list of actions is not exhaustive, and some actions may not always be required. Consideration should be given to the need to control risks to biosecurity during maintenance operations.

Sediments excavated from ponds or forebays that receive runoff from residential or standard road and roof areas should be safely disposed of in accordance with current waste management legislation. However, consultation should take place with the environmental regulator to confirm appropriate protocols. Chemical testing of the sediment may be required, before sediment excavation, to determine its classification and appropriate disposal methods. For industrial site runoff, sediment testing will be essential. In the majority of cases on low-risk sites with source control and a Management Train, it will be acceptable to distribute the sediment on site, if there is an appropriate safe and acceptable location to do so. If ponds are to be drawn down, care should be taken to prevent downstream discharge of sediments and anoxic water. The environmental regulator should be notified before such activities.

New ponds may become rapidly dominated by invasive native plants, particularly common bulrush (*Typha latifolia*). As it is not desirable for all new ponds to be bulrush dominated, it should be ensured that in the first five years, while vegetation is establishing, certain plant growth is controlled. After this time, ponds can usually be allowed to develop naturally recognising that, unless the margins are occasionally managed, they are likely to become dominated by trees and shrubs.

Eutrophication of SuDS ponds can occur during the summer months. This is best alleviated by controlling the nutrient source or providing a continuous baseflow to the pond. Unless eutrophication is severe, aeration can be used as a stop-gap measure to save aquatic animal species and reduce risks to receiving waters. However, the addition of barley straw bales, dredging or rendering the nutrients inactive by chemical means can also be successful.

Maintenance Plans and schedules should be developed during the design phase. Specific maintenance needs of the pond should be monitored, and maintenance schedules adjusted to suit requirements.

CDM 2015 requires designers to ensure that all maintenance risks have been identified, eliminated, reduced and/or controlled where appropriate.

This information will be required as part of the health and safety file.

Regular Maintenance

Monthly

Remove any debris and litter. Cut grass and manage other vegetation, inspect outlet and inlet and for blockage.

Yearly

Hand cut submerged and emergent aquatic plants. Remove 25% of bank vegetation from water's edge to a minimum of 1m above water level. Tidy all dead growth before the start of growing season.

Occasional Maintenance

Remove sediment from the main body of big ponds when pool volume is reduced by 20%.

Remedial Actions

Repair erosion or other damages, replant, aerate pond when signs of eutrophication are detected, realign riprap or repair other damage, repair/rehabilitate inlets, outlets and overflows.

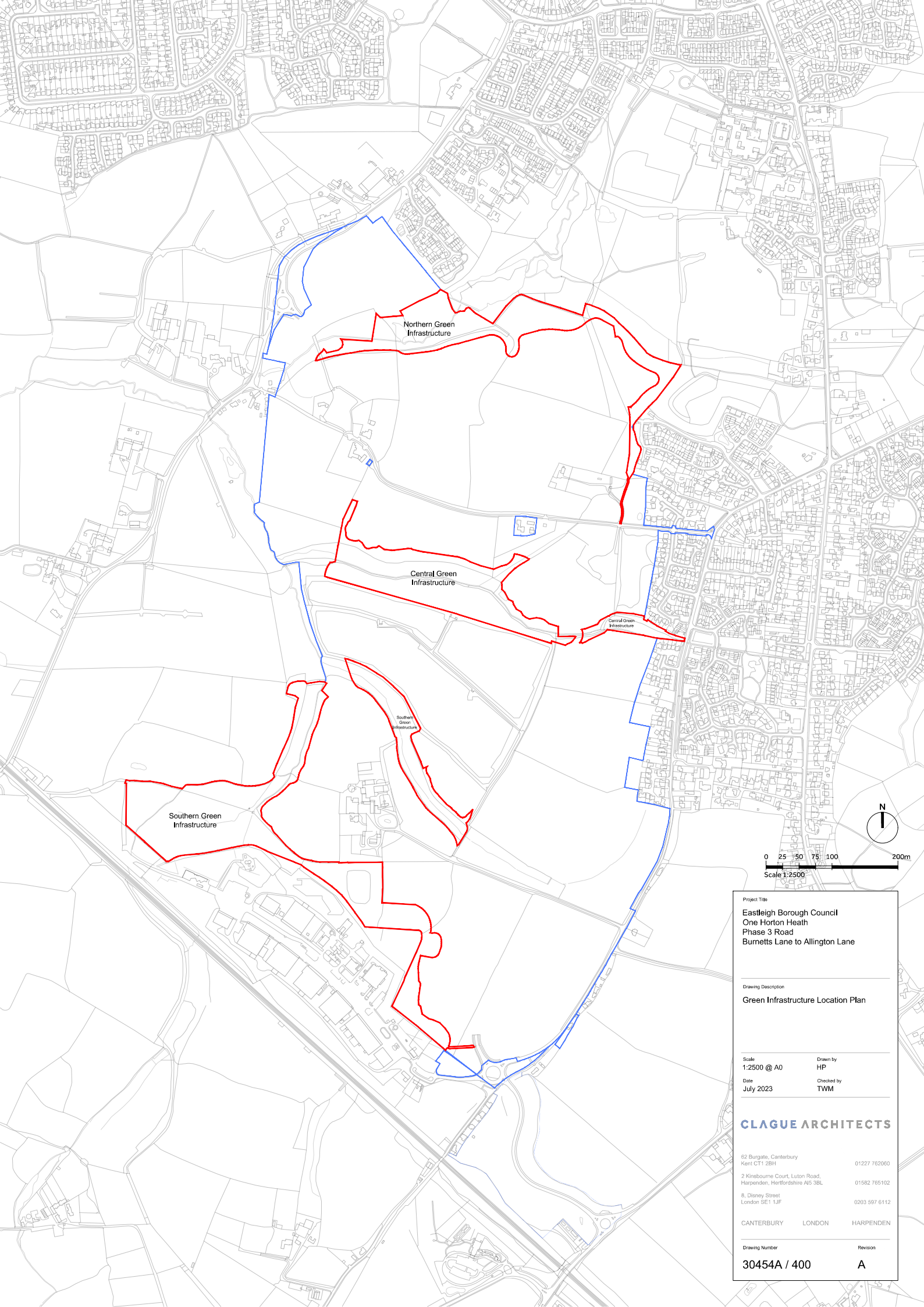
3.3. Required Maintenance Schedule

To ensure the long-term performance of the proposed DS, the onsite drainage system will be owned and maintained by the site operator or a maintenance company (MC) in accordance with the indicative schedule below, in the alternative the local authority may wish to adopt such features. However, at the detailed drainage design stage a full management and maintenance plan detailing best practice system maintenance regimes and proprietary manufacturer requirements and lifecycle management, in accordance with the CIRIA SuDS Manual will need to be produced. In the absence of local authority adoptions, maintenance of the overall drainage network will be the responsibility of an appointed management company.

ELEMENT / DRAINAGE COMPONENT	OWNERSHIP ADOPTION	/ MAINTENANCE REQUIREMENTS
Flow Restriction Device & Chamber	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods. Check function of flow restriction componentry to suit manufacturer's guidance. Inspection annually and before / after extreme storm events.
Catchpit Manholes	Site Operator / MC	To be monitored for silt build-up and cleaned as required using suction methods. Inspection annually and before / after extreme storm events.
Gullies (Internal & External)	Site Operator / MC	To be monitored for silt build-up and cleaned as required. Where provided, ensure air traps are primed and sealed to prevent smells. Inspection quarterly.
Ponds	Site Operator / MC	To be monitored for litter and debris. Careful strimming to remove overgrown vegetation twice yearly. Removal of self-seeded saplings to prevent new tree growth. Monitor for silt build up and remove and spread locally outside design profile as required. Inspection quarterly and before / after extreme storm events.
Petrol/Oil Inceptor	Site Operator / MC	To be monitored for silt build-up, remove grim, dirt, oil and clean as required. Check function of flow restriction componentry to suit manufacturer's guidance. Inspection quarterly and before / after extreme storm events

APPENDIX A

OVERALL GREEN INFRASTRUCTURE PLAN



Northern Green
Infrastructure

Central Green
Infrastructure

Central Green
Infrastructure

Southern
Green
Infrastructure

Southern Green
Infrastructure



0 25 50 75 100 200m
Scale 1:2500

Project Title
Eastleigh Borough Council
One Horton Heath
Phase 3 Road
Burnetts Lane to Allington Lane

Drawing Description
Green Infrastructure Location Plan

Scale
1:2500 @ A0
Date
July 2023

Drawn by
HP
Checked by
TWM

CLAGUE ARCHITECTS

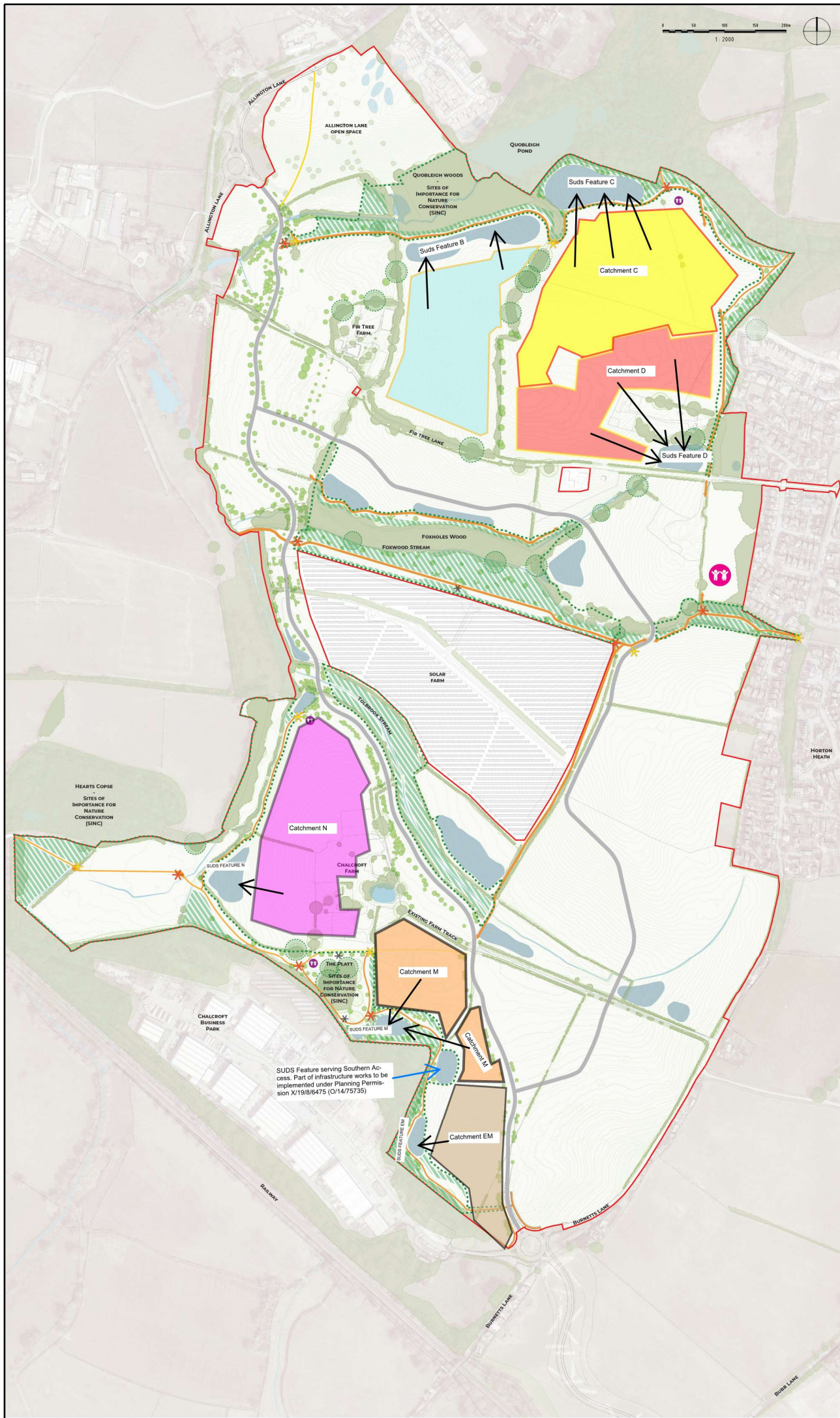
62 BURGATE, CANTERBURY Kent CT1 2BH	01227 762060
2 KINSBOURNE COURT, LUTON ROAD, HARPENDEN, HERTFORDSHIRE AL5 3BL	01582 765102
8, DISNEY STREET LONDON SE1 1JF	0203 597 6112

CANTERBURY	LONDON	HARPENDEN
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Drawing Number	Revision
30454A / 400	A

APPENDIX B

CATCHMENT SITE PLAN



- NOTES:
1. This drawing is to be read in conjunction with all relevant context drawings and specifications with any conflicting information to be brought to the attention of Deacon Design before works commence on site.
 2. Do not scale from this drawing, (except for planning application purposes only) always work to noted dimensions.
 3. All given dimensions in mm.
- KEY:
- Overall Site Redline Boundary
 - Green Infrastructure Boundary
 - Proposed Greenway
 - Proposed Footpath
 - Proposed Bridleway Paths
 - Proposed Link Roads
 - Existing Waterways
 - Proposed Sustainable drainage systems (SuDs)
 - Approximate Built Area
 - Boundary Enhancements
 - Existing Trees/Hedges
 - Root Protection Areas
 - Existing Veteran Tree
 - Proposed Tree Planting
 - Proposed recreation & play areas
 - Proposed Destination recreation & play (to be delivered via future phases)
 - Proposed Interpretation Signage Location
 - Proposed Wayfinding Signage Location
 - Proposed Gateway Signage Location

ONE HORTON HEATH

Eastleigh Borough Council

DEACON DESIGN
Landscape Architects | Masterplanning | Urban Design
One The Square, Wokingham, Hampshire RG40 3EQ
www.deacondesign.co.uk | info@deacondesign.co.uk
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One Horton Heath
Site Wide Infrastructure
PROJECT NO: DO278
DATE: 02.08.22
SCALE: 1:2000
SHEET NO: 001
TOTAL SHEETS: 001
Site Wide Green Infrastructure Proposals
DRAWN BY: DO278/01
CHECKED BY: D
DATE: 02.08.22

APPENDIX C

CROSS-SECTION OF SUDS FEATURES DRAWINGS