



Proposed Garden Centre Development
Perrywood Garden Centre, Newton Road, Sudbury, Suffolk

DRAINAGE STRATEGY

GHB Reference:

011/2023/DS

Created:

December 2023

Revision:

02

Status:

DRAFT

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Revision History				
Revision History & Issue Record (For Completion by Originating Company)				
Rev:	Date:	Reason status / Details of Changes:	Prepared by:	Reviewed by:
01	13/12/2023	Initial Issue	ER	JAH
02	18/12/2023	Adjustments to Attached Drawings	ER	JAH

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1. PROJECT DETAILS

1.1. Table 1 Project Details

Report Title:	Proposed Garden Centre Development Perrywood Garden Centre, Newton Road, Sudbury - Drainage Strategy
Date:	18 December 2023
Document Reference and Revision:	011/2023/DS 02
Prepared by:	GH Bullard & Associates LLP
On behalf of Client:	Perrywood Garden Centre

1.2. Table 2 Authorisation Sheet

Project:	Proposed Garden Centre Development
Report Title:	Proposed Garden Centre Development Perrywood Garden Centre, Newton Road, Sudbury - Drainage Strategy
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Date:	18 December 2023



2. INTRODUCTION

- 2.1. This drainage strategy report is being submitted as part of a planning submission package to discharge Planning Condition 10 of Planning Application Ref: DC/20/03810 for the erection of a new garden centre building and associated extension and alteration works, car parking provision and landscaping, at Perrywood Garden Centre, Sudbury, Suffolk. A site location plan is attached in **Appendix A**.
- 2.2. This drainage strategy has been prepared in accordance with the parameters outlined within the FRA and Drainage Strategy Report Ref: IG21/269 DS, dated 21 February 2022 prepared by JPC Environmental Services submitted and approved as part of Planning Ref: DC/22/01350 Application under Section 73 of The Town and Country Planning Act for DC/20/03810 for the variation of condition 10 (Disposal of surface water).
- 2.3. The information provided within this report is based on the best available data currently recorded or provided by a third party. The accuracy of this report is therefore not guaranteed and does not obviate the need to make additional appropriate searches, inspections and enquiries.

3. POLICY CONTEXT

- 3.1. Suffolk Flood Risk Management Partnership document, Suffolk Local Flood Risk Management Strategy (February 2023) advises how local flood risk will be managed in Suffolk.
- 3.2. Suffolk Flood Risk Management Partnership document, Suffolk Flood Risk Management Strategy Appendix A Sustainable Drainage Systems (SuDS): A Local design Guide (2023)SF3967 advises on the standards to be used at a local level.
- 3.3. The SuDS Manual (C753) – Ciria Industry Best Practice Guidance.



4. EXISTING SITE INFORMATION

- 4.1. The site is located to the east of Sudbury and is accessed off the A134. It is bound by agricultural land to the north, south and east and Valley Road to the east. Refer to the site location plan in **Appendix A**
- 4.2. The site is brownfield and comprises an existing garden centre including single storey buildings, sheds, raised planter areas, materials storage areas, glasshouses, polytunnels, car parking areas, vehicle access routes and landscaping. The proposed development area utilises an area previously used for plant growing and was previously developed with access tracks and polytunnels. This area is now disused, and all previous structures removed. Refer to the existing site layout in **Appendix B**.
- 4.3. The site can be located from the following information:
 - i.* Postcode: CO10 0PZ
 - ii.* NG Reference: TL903416
 - iii.* The site levels range from 63.5m AOD to 55.85m AOD. The site slopes from 63.5m AOD at the north-east corner to 55.85m AOD towards the centre of the site and from 58.4m AOD at the west and 62.3m AOD at the south boundary towards the site centre. The existing developed site area is at a level of approximately 57.3-57.5m AOD in the location of the main building. Refer to **Appendix B** for the topographical levels.
- 4.4. The BGS records describe the geology as:
 - i.* Superficial: Lowestoft Formation – Sand and Gravel
 - ii.* Bedrock: Crag Group – Sand
- 4.5. There are two mapped ponds located within the site area; the topographical survey has not identified any inlets or outlets within the ponds however it is accepted that this drains areas of the access road, existing car parking areas and runoff from a section of the A134 where no highway gullies suitably serve the carriageway .
- 4.6. There are three watercourses identified by the topographical survey located within the east of the site; the topographical survey has not identified any inlets/outlets within the first watercourse to the east of the ponds. The second watercourse to the east is assumed to have a connection at the south to the watercourse flowing towards Valley Road, which in turn flows to the watercourse flowing south alongside Valley Road. Refer to **Appendix B** for the location of the watercourses.
- 4.7. It is understood that the developed areas to the west and north of the site currently drain via a series of soakaways, with some of the runoff draining to the two ponds within the site as identified on the drawing in **Appendix B**. Outfalls from the ponds have not been identified and so it is assumed that when the ponds reach capacity, the runoff flows overland to the east towards the existing watercourse network as indicated by the flow paths shown on the drawing in **Appendix B**. The undeveloped area of the site at the east currently drains via the watercourses as indicated in **Appendix B**.
- 4.8. Infiltration testing was undertaken by RSA Geotechnics Ltd during October 2020 across the site area which showed minimum infiltration rates of 1.0×10^{-6} to 2.2×10^{-6} m/s in the locations where infiltration testing was possible to complete (three failed test locations out of six test locations).



5. PROPOSED DEVELOPMENT

- 5.1. The proposed development comprises the construction of a new Garden Centre Building with associated canopy covered areas, glasshouse, outdoor plant storage and sales area, car park, access road and soft landscaping. The proposed layout drawing is attached in **Appendix C**.
- 5.2. Further development of a car parking area may be undertaken as a future phase of works included as part of the original planning application.
- 5.3. The total proposed impermeable development area within this strategy is 3.0ha. Refer to GHB Drawing Ref 011/2023/114 within **Appendix D** for a summary of the impermeable areas associated with the development.

Surface Water Disposal

- 5.4. In accordance with Government and Local Plan Policies and the requirements of the Building Regulations, surface water runoff from the development will be drained at source in a sustainable way by making full use of Sustainable Drainage Systems (SuDS) where possible.
- 5.5. The SuDS hierarchy dictates that infiltration at source is considered first. After infiltrating at source has been considered, the next stage is to deal with runoff in individual catchments, followed finally by site wide drainage solutions. Runoff from the development should not adversely impact upon drainage systems outside of the site boundary.
- 5.6. Detailed surface water drainage design should take into account all three key SuDS principles in equal measure:
 - i.* Reducing peak quantity;
 - ii.* Improving quality; and
 - iii.* Providing amenity and biodiversity value.
- 5.7. The FRA and Drainage Strategy report prepared by JPC Environmental Services, previously submitted and approved as part of Planning Ref: DC/22/01350 for DC/20/03810 for the variation of condition 10 (Disposal of surface water) concluded that based on site investigation work, the geology is not suitable for discharging runoff via infiltration techniques. The JPC Environmental Services approved strategy design was based on a previously accepted restricted discharge rate of 13.1l/s to the watercourse located at the east of the site. This drainage strategy has been developed based on the parameters detailed within the JPC Environment Services report unless otherwise noted.
- 5.8. The drainage strategy has been designed using a restricted discharge rate of **13.1l/s** to the watercourse at the east site boundary, with runoff attenuated on site within swales and an attenuation basin. The proposed drainage strategy drawings are attached in **Appendix D**.
- 5.9. The swales and attenuation basin will not be lined to allow infiltration to occur at the base where ground conditions permit low level infiltration to occur. Infiltration testing in the location of the proposed basin indicated a rate of 2.2×10^{-6} m/s at 2m bgl, therefore this has been included for within the calculations, allowing partial infiltration within the basin. On-site testing will need to be undertaken to confirm this rate is achievable at the designed basin base, else an infiltration trench will be incorporated to achieve infiltration at the already tested depth of 2m bgl. Refer to the drainage strategy drawings in **Appendix D** for the basin detail.



- 5.10. The existing runoff discharging to the ponds at the site, which will be removed as part of the development, will continue to be incorporated into the proposed network and be passed on to the watercourse at the south-east boundary, maintaining the existing drainage regime. The flow control chamber incorporates a weir wall overflow to accommodate overtopping due to runoff from this upper catchment, albeit in lower storm events, the basin capacity will act to attenuate flows from the existing site.
- 5.11. There will be some interception of rainwater provided in the external plant storage and sales area to the east of the canopy, where the stored plants will intercept the rainfall. Rainwater harvesting is to be provided but does not form part of the drainage calculations as yields are not confirmed. The basin invert level will be set lower than the outfall pipe to allow for interception. This interception has not been included for in the design calculations.
- 5.12. Table 5.1 summarises how the use of SuDS components has been considered and utilised in this drainage strategy.

SUDS Type	Component Type	Suitable	Explanation/Comments
Source Control	Rainwater Harvesting systems	No	Not proposed as part of the development.
	Green Roofs	No	Not proposed as part of the development.
	Rain gardens	No	Not proposed as part of the development.
	Permeable Paving	No	Not proposed as part of the development. Cleansing is provided by other features.
Infiltration	Soakaway	No	Insufficient infiltration potential
	Filter Drain/Strips	No	Insufficient infiltration potential
	Infiltration Basin	Yes	Infiltration to be utilised in the base of the basin where testing has indicated low level infiltration rates, in conjunction with a positive outfall.
	Swale	Yes	Infiltration to be utilised in the base of the swales where testing has indicated low level infiltration rates, in conjunction with a positive outfall.
	Tree Pits	No	Not proposed as part of the development layout.
Conveyance	Swale	Yes	Swales to be used to convey runoff from the roof and parking areas.
	Filter Drain	No	Not proposed as part of the development.
Detention	Sub-surface Storage	No	Not required.
	Detention Basin	Yes	Basin proposed at the east of the site to provide attenuation storage.
	Pond	No	Not proposed as part of the development.
	Wetland	No	No scope to provide this within the site layout.

Table 5.1: Table summarising the use of SuDS components.



Quantity

- 5.13. Micro-Drainage has been used to design the attenuation storage associated with up to the 1% AEP event plus an allowance for 40% climate change (JPC parameters) using FEH data and a controlled discharge rate of 13.1l/s using a Hydro-Brake flow control device. An allowance for urban creep has not been included for due to the site use.
- 5.14. The design calculations and drainage strategy layout have included for the potential further development of the area to the west of the currently proposed car park, included for within the Planning Application boundary. This development would be part of a future phase of works and is allowed for in the form of a restricted flow rate (2No. at 3 l/s).
- 5.15. The calculations for the 50% AEP, 3.33% AEP and 1% AEP + climate change rainfall events are attached in **Appendix E**, with the drainage layout attached in **Appendix D**. The calculations show that there is no flooding on or off-site during rainfall events up to the 1% AEP plus climate change scenario.
- 5.16. A half drain time less than 24 hours is achieved in the 50% AEP and 3.33% AEP events.

Quality

- 5.17. The water discharging to the watercourse must be cleansed and therefore treatment processes are introduced through the drainage network. These should be in accordance with Chapter 26 of the Ciria SuDS Manual C753, where the hazard of low to medium is mitigated with the various SuDS components to equal or exceed the hazard indices. Refer to the following Tables 26.2 and 26.3 which show the hazard and mitigation indices associated with the proposed drainage scheme.
- 5.18. It is proposed that the development catchments will discharge as follows:
- roof areas (Low pollution hazard level) - via rainwater downpipes to swales (prior to the attenuation basin)
 - car park and impermeable yard areas (Medium pollution hazard level) - via gullies or channel drains and piped networks to swales (prior to the attenuation basin)
 - access roads (Medium pollution hazard level) - via gullies and piped networks to swales (prior to the attenuation basin)
 - external paved area accommodating the outdoor plant storage and sales (Low pollution hazard level) – via channel drains to swales (prior to the attenuation basin)
- 5.19. The tables show that the combined mitigation indices associated with the swales and detention basin treatment train exceed the hazard indices associated with the above catchments (TSS = $0.5+0.5/2 = 0.75$, Metals = $0.6+0.5/2 = 0.85$, Hydrocarbons = $0.6+0.6/2 = 0.9$).



TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

Type of SuDS component	Mitigation indices ¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		



Exceedance

- 5.20. In an exceedance event in which rainfall surpasses the design capacity, there should be no vulnerable buildings or infrastructure at risk of flooding.
- 5.21. Site ground levels will be locally contoured to deflect water away from the buildings. The exceedance flow path will be directed away from the building thresholds and to the east and south-east boundary, replicating the current flow path.
- 5.22. The exceedance paths have been shown on GHB Drawing 011/2023/014 in **Appendix D**.

6. MAINTENANCE

- 6.1. The site drainage network will be maintained by the site owner, Perrywood Garden Centre.
- 6.2. Maintenance of the system will include for frequent inspections of the piped network, channel drains and gullies, watercourses, swales, attenuation basin and flow control device with debris removal to ensure designed levels of performance are achieved. Refer to the Maintenance Plan attached in **Appendix F**.

7. SUMMARY

- 7.1. Surface Water runoff from the development will discharge to the existing watercourse at the south-east boundary at a controlled rate of 13.1l/s, with on-site attenuation provided in the form of swales and an attenuation basin. The swales and basin will not be lined to allow low level infiltration to occur where ground conditions permit.
- 7.2. The drainage strategy is designed to store and discharge the runoff associated with up to the 1% AEP rainfall event plus an allowance of 40% climate change, without flooding within the site.
- 7.3. The runoff from the roof areas, external parking and access areas will discharge via conveyance swales and an attenuation basin, which sufficiently cleanse the runoff prior to discharge to the watercourse at the south-east boundary.
- 7.4. Exceedance flow will be directed away from vulnerable buildings and infrastructure and outflow along its original path to the east towards the existing watercourses as currently occurs.
- 7.5. In accordance with government policy, SuDS will be used on site where possible, and surface water drainage of the site will be carried out in a sustainable way.
- 7.6. As long as maintenance of the new drainage systems is correctly carried out, the risk of flooding and the subsequent risks from infrastructure failure, is very Low.



APPENDICES



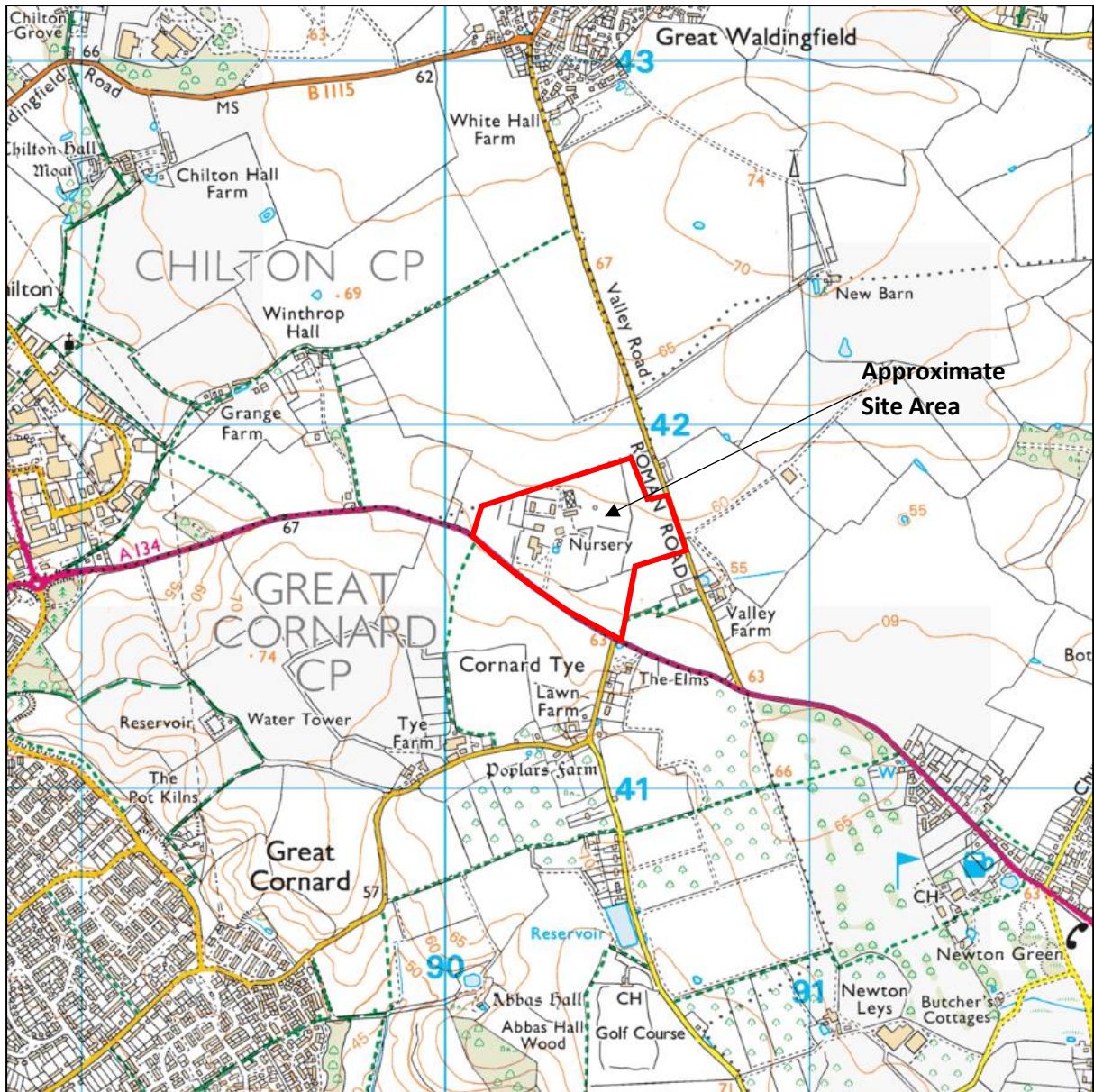
Appendix A

Site Location Plan



011/2023: Perrywood Garden centre, Sudbury, Suffolk, CO10 0PZ

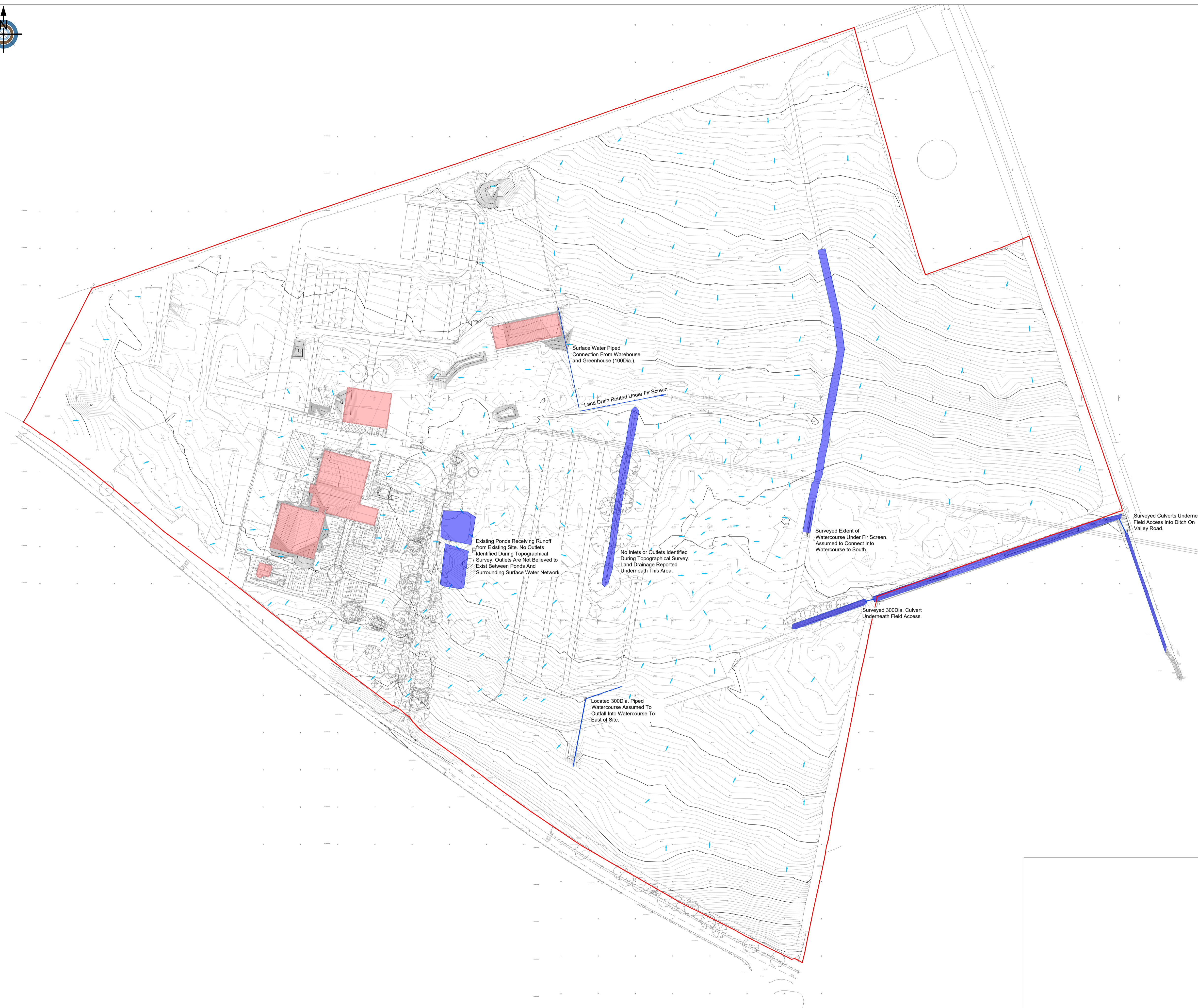
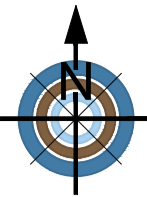
Site Location Plan



Appendix B

Existing Site Layout





- NOTES:**
1. This drawing is to be read in conjunction with GHB series 011/2023 drawings and documents and any other relevant project team documents.
 2. Preliminary Issue - This drawing is not to be used for construction or detailed pricing purposes. Any work undertaken before approvals are received (in writing) are at risk of abortive works.
 3. This drawing has been produced based upon the following information:
Topographical Survey by Survey Solutions (Ref. 364311PLS-03_09E dated 14/04/2022) To OS Grid and Datum.
Drone Topographical Survey of Cleared site and aggregate heaps by Ashwell Construction Ltd (Ref. N/A dated 19/08/2022) To OS Grid and Datum.
Architectural Layout by Pleydell Smithyman (Ref. site plan base (bind) dated 27/06/23).
 4. This drawing has been prepared solely for the purpose of obtaining a Planning Consent based on information available and planning requirements at the date of issue only.

Rev	Rev Date	Description	Drawn	Chk'd
P3	18/12/23	Revised to Include Additional Existing Features, As Per Client Advice	BAF	DJB
P2	13/12/23	Revised for Inclusion In Drainage Strategy for Planning	BAF	DJB
P1	27/02/23	Initial Issue	BAF	JAH

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Client: **PERRYWOOD GARDEN CENTRE**

Project: **PERRYWOOD GARDEN CENTRE,
SUDBURY**

Drawing Title: **EXISTING SITE DRAINAGE STRATEGY**

Status: **FOR INFORMATION**

Scale: **1:1000 @ A1**

Created: **FEB 2023** Drawn: **BAF**

DWG Reference: **011-2023.DWG** Checked: **JAH**

Drawing Number: **011/2023/010** Revision: **P3**

P# = Preliminary, C# = Construction, AB# = As Built

Appendix C

Proposed Layout Drawing





- NOTES:**
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 2. Preliminary Issue - This drawing is not to be used for construction or detailed pricing purposes. Any work undertaken before approvals are received (in writing) are at risk of abortive works.
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Architectural Layout by Pleydell Smithyman (Ref. site plan base (bind) dated 27/06/23).
 4. This drawing has been prepared solely for the purpose of obtaining a Planning Consent based on information available and planning requirements at the date of issue only.

P4	13/12/23	Revised to Accommodate Drainage and Layout Adjustments	BAF	DJB
P3	21/11/23	Revised to Accommodate Drainage Design Adjustments	BAF	DJB
P2	07/11/23	Revised to Accommodate Project Team Comments on Layout	BAF	DJB
P1	31/07/23	Initial Issue	BAF	DJB
Rev	Rev Date	Description	Drawn	Check'd

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HARDSTANDING LEGEND:

- ACCESS ROAD
Standard Stone Mastic Asphalt (SMA)
- CAR PARKING
Standard Stone Mastic Asphalt (SMA)
- FOOTWAY
Standard Asphalt Concrete (AC)
- RAISED TABLE
Granite Setts Ramp/ Block Paved Table
- SERVICE YARD
Reinforced Concrete Slab
- PLANT SALES AREA
Impermeable Block Paving (Colour: TBC)
- SOFT LANDSCAPING
Grass Seeding/ Planting (As Per Landscape Details)

Scale Bar:
0 5 10 20 50

Client: **PERRYWOOD GARDEN CENTRE**

Project: **PERRYWOOD GARDEN CENTRE SUDBURY**

Drawing Title: **HARDSTANDING AND LEVELS OVERALL SITE PLAN LAYOUT**

Status: **FOR INFORMATION**

Scale: **1:500 @ A1**

Created: **JUL 2023** Drawn: **BAF**

DWG Reference: **011-2023.DWG** Checked: **DJB**

Drawing Number: **011/2023/101** Revision: **P4**

PH = Preliminary, CF = Construction, AB# = As Built