

Surface Water Drainage Design Note

Proposed Commercial Development at

**Chalcroft Nursery, Chalcroft Lane
Bersted, West Sussex**

On behalf of

Chalcroft Associates LLP

September 2026

Document History and Status

Project Number 24123

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1 Non Technical Summary

- 1.1 This Surface Water Drainage Design Note has been undertaken on behalf of Chalcroft Associates LLP to discharge planning conditions 22 and 23 of Planning Permission BE/13/24/S73 (as amended by BE/77/25/NMA) for the construction of 3 commercial buildings with associated access roads, car parking, loading bays, storage areas and landscaping at Chalcroft Nursery, Chalcroft Lane, Bersted, West Sussex.
- 1.2 The proposed development will incorporate a sustainable drainage system that will discharge surface water by gravity at a suitably restricted rate to the watercourse adjacent to the northern site boundary and provide storage for all storm return periods up to and including the 1:100 year rainfall event with an allowance for climate change.
- 1.3 This report concludes that a suitable surface water drainage system has been designed to accommodate the anticipated flows from the proposed development together with meeting water quality, amenity and biodiversity requirements.

2 Planning Policy Context

2.1 Planning Permission BE/81/20/OUT

2.1.1 Planning Permission BE/81/20/OUT for the development proposals was granted by Arun District Council on 23 March 2021

2.1.2 Two planning conditions were applied with regard to drainage.

2.1.3 **Planning Condition 22** states: *'Development shall not commence, other than works of site survey and investigation, until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, and the recommendations of the SuDS Manual produced by CIRIA.*

Winter groundwater monitoring to establish highest annual ground water levels and winter Percolation testing to BRE 365, or similar approved, will be required to support the design of any Infiltration drainage. No part of the development hereby approved shall be occupied until the complete surface water drainage system serving the property has been implemented in accordance with the agreed details and the details so agreed shall be maintained in good working order in perpetuity.

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies W SP1, W DM1, W DM2 and W DM3 of the Arun Local Plan. This is required to be a pre-commencement condition because it is necessary to implement the surface water drainage system prior to commencing any building works.'

2.1.4 **Planning Condition 22** states: *'Development shall not commence until full details of the maintenance and management of the surface water drainage system is set out in a site-specific maintenance manual and submitted to, and approved in writing, by the Local Planning Authority. The manual is to include details of financial management and arrangements for the replacement of major components at the end of the manufacturer's recommended design life. Upon completed construction of the surface water drainage system, the owner or management company shall strictly adhere to and implement the recommendations contained within the manual*

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies W DM1, W DM2 and W DM3 of the Arun Local Plan. It is

considered necessary for this to be a pre-commencement condition to ensure that the future maintenance and funding arrangements for the surface water disposal scheme are agreed before construction commences.'

2.2 Subsequent Minor Material Amendment (BE/13/24/S73) with wording amended by BE/77/25/NMA

2.2.1 Planning Condition 22 of BE/13/24/S73 (as amended) states '*Development of each phase shall not commence, other than works of site survey and investigation, until full details of the proposed surface water drainage scheme for that phase have been submitted to and approved in writing by the Local Planning Authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, and the recommendations of the SuDS Manual produced by CIRIA. Winter groundwater monitoring to establish highest annual ground water levels and winter Percolation testing to BRE 365, or similar approved, will be required to support the design of any Infiltration drainage. No part of the development hereby approved shall be occupied until the complete surface water drainage system serving the property has been implemented in accordance with the agreed details and the details so agreed shall be maintained in good working order in perpetuity.'*

2.2.2 Condition 23 of the BE/13/24/S73 as amended states '*Development of each phase shall not commence until full details of the maintenance and management of the surface water drainage system for that phase is set out in a site-specific maintenance manual and submitted to, and approved in writing, by the Local Planning Authority. The manual is to include details of financial management and arrangements for the replacement of major components at the end of the manufacturer's recommended design life. Upon completed construction of the surface water drainage system, the owner or management company shall strictly adhere to and implement the recommendations contained within the manual.'*

2.3 National Standards for Sustainable Drainage Systems (SuDS)

2.3.1 The National Standards for Sustainable Drainage Systems were published on 19 June 2025 and updated on 30 July 2025.

2.3.2 The standards are intended to be used in conjunction with the National Planning Policy Framework.

2.3.3 Standard 1: runoff destinations states:

'1.1 a 'SuDS approach' shall be adopted to address the management of surface water by the development and where it should be discharged. Runoff shall be treated as a resource and managed in a way that avoids negative impacts of the development on flood risk, the morphology and water quality of receiving waters and the associated ecology.'

1.2 Runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below hierarchy:

priority 1: collected for non-potable use

priority 2: infiltrated to ground

priority 3: discharged to an above ground surface water body

priority 4: discharged to a surface water sewer, or another piped surface water drainage system

priority 5: discharged to a combined sewer

Note 1: priority 1 is the highest priority and priority 5 is the lowest.

Note 2: for the purposes of this standard, a combined sewer is a sewer intended to receive both foul sewage and surface runoff and does not include a sewer intended to receive only foul sewage, even if it has the capacity to accommodate additional flows or has an element of surface water in it already.

1.3 To utilise a lesser priority final destination, appropriate evidence shall be provided that demonstrates all higher priority final destinations have been utilised to the maximum extent practicable. Higher cost alone shall not be a reason to utilise lower priority final destinations.

1.4 Where more than one final destination is utilised, each final destination's ability to accept runoff shall be maximised in order of priority.'

2.3.4 Standard 2: management of everyday rainfall (interception) states:

'2.1 Apply a 'SuDS approach' so that at least the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface waters or piped drainage systems.'

2.2 Evidence shall be provided that the approach to managing runoff from 'everyday' rainfall has been developed alongside and in support of the

management of runoff quality (standard 4) and the delivery of amenity and biodiversity benefits (standards 5 and 6).'

2.3.5 Standard 3: management of extreme rainfall and flooding states:

'3.1 A 'SuDS approach' shall be adopted to address the management of development runoff during extreme rainfall, including allowances for climate change and urban creep to:

- protect people and property on the development from flooding of the surface water drainage system
- mitigate any increased flood risk to people and property adjacent to or downstream of the development
- protect the receiving water body from morphological damage or minimise the impact on sewer capacity

3.2 When discharging to an infiltration feature, the system shall be appropriately sized to accommodate the design event based on ground conditions and contributing areas.

3.3 When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff (rate and volume) for the 1% annual exceedance probability (AEP) event shall be controlled to ensure the runoff from the development does not increase flood risk elsewhere.

3.4 When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff rate for the 50% AEP event shall be controlled to ensure development runoff from an event of this magnitude has no negative impact.

3.5 Any flooding from the surface water drainage system for events up to the 1% AEP event shall be managed within the development.

3.6 Any flooding from off-site sources for the 1% AEP event should be managed on site or safely routed through the site, ensuring any downstream risks are not increased compared to the pre-development scenario.

3.7 The risks (both on and off the development) associated with flooding from the surface water drainage system for exceedance events greater than the 1% AEP event shall be appropriately managed.'

2.3.6 Standard 4: water quality states:

'4.1 Apply a 'SuDS approach' that protects surface waters, groundwater and coastal waters by managing the quality of the surface water runoff to adequately address water quality risks from the development.

4.2 The proposed SuDS management train(s) shall be based on a robust water quality risk assessment, appropriate to the pollution hazard and sensitivity of receiving waters, reflecting industry recognised guidance or other quantitative assessment as agreed with the approving body and permitting requirements.'

2.3.7 Standard 5: amenity states:

'5.1 A 'SuDS approach' shall be adopted that maximises benefits for amenity through the creation of multi-functional places and landscapes.'

2.3.8 Standard 6: biodiversity states:

'6.1 A 'SuDS approach' shall be adopted to ensure the surface water drainage system maximises biodiversity benefits throughout the development lifecycle.

6.2 The surface water drainage system shall add biodiversity value by:

- creating diverse, self-sustaining, resilient local ecosystems which contribute to net gains in biodiversity*
- supporting and promoting natural local habitat and species, for example, through local nature recovery strategies (LNRS)*
- contributing to the delivery of local biodiversity strategies*
- contributing to habitat connectivity'*

2.3.9 Standard 7: design of drainage for construction, operation, maintenance, decommissioning and structural integrity states:

'7.1 A 'SuDS approach' shall be adopted to ensure that surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.

7.2 The designer shall provide a management and maintenance plan [that supports the design objectives detailed in standards 1 to 6 and ensures the performance of the surface water drainage system with regards to runoff destinations, everyday and extreme rainfall, water quality, amenity and biodiversity is maintained throughout the lifetime of the development.

7.3 Surface water drainage design shall examine for the likelihood and consequences of potential failure scenarios that may occur during the operation phase and safely manage the associated risks.

7.4 The surface water drainage system shall be designed to ensure structural integrity of all components under anticipated loading conditions for the design life of the development so that it does not affect the structural integrity of any existing or proposed components within, or adjacent to, the development.'

3 Existing Site

3.1 Site Location

- 3.1.1 The development site is located on land at Chalcroft Nursery, Chalcroft Lane Bersted, West Sussex, PO21 5TS and centred on Ordnance Survey reference SU 917 005.



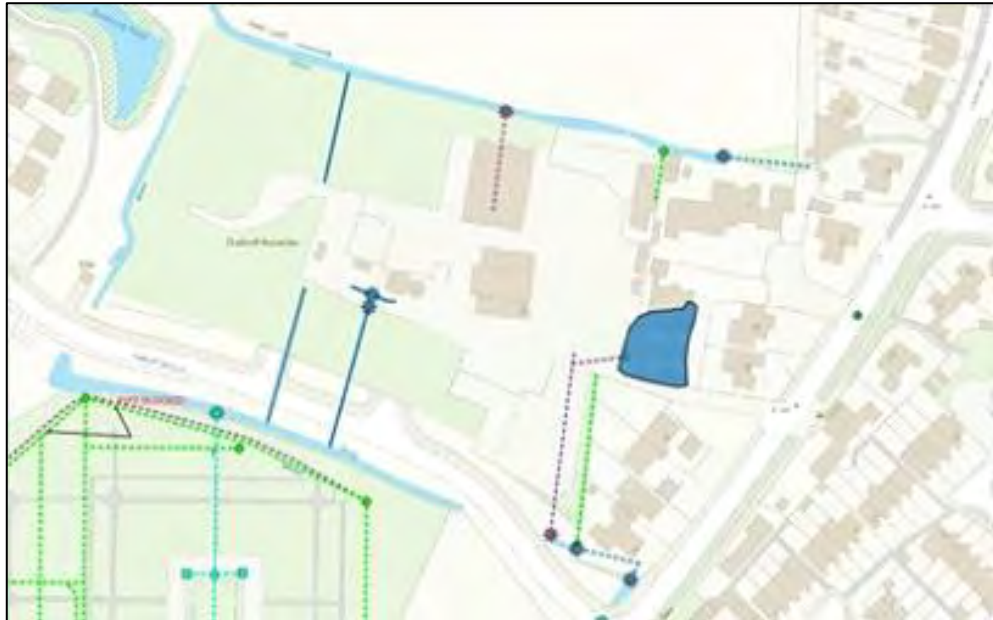
Image 1: Site Location

- 3.1.2 The site is bounded to the north by an ordinary watercourse, the south by Chalcroft Lane, the east by commercial development and the west by a potential residential development site.
- 3.1.3 A copy of the site location plan is located in Appendix 1 at the rear of this report.
- #### 3.2 Site Description
- 3.2.1 The site is approximately 4,597m² in area and forms a part of the wider Chalcroft Nursery site.
- 3.2.2 Existing ground levels are highest at the northeast corner of the site at approximately 7m AOD. The site falls towards its southern boundary to a level of approximately 6.7m AOD.
- 3.2.3 A copy of the existing site layout plan is located in Appendix 2 at the rear of this report.

3.3 Existing Surface Water Drainage

3.3.1 Surface water is currently collected and discharged to the watercourse at the southern site boundary.

3.3.2 Arun Drainage Team provided the following plan indicating potential on site drainage in green and purple dashed lines to be investigated.



3.3.3 Chalcroft Associates investigated the routes on 29 April 2026 and confirmed the following:

- Purple dashed line to north of the site:
No outflow to ditch evident, building has been constructed over the line noted, no evidence of this route on site.
- Green dashed line to north of the site:
No outflow to ditch evident, no evidence of this route on site.
- Purple dashed line to south of site:
There is a 100mm diameter pipe, the pond indicated has been removed and there is no evidence of connection to the north, 100mm connection to the southern ditch. Never observed any discharge from the ditch outfall.
- Green dashed line to the south of the site:
No evidence of a connection to the ditch. Pipe is indicated in an area of inaccessible land between property boundaries and access was not available to the area.

3.3.4 None of the routes present a reasonable prospect of providing a surface water connection.

3.4 Geology and Groundwater

3.4.1 Infiltration testing was undertaken in November 2025 with four tests being attempted. Tests were ultimately abandoned after 25 hours with only a 28% drop in water levels across that period.

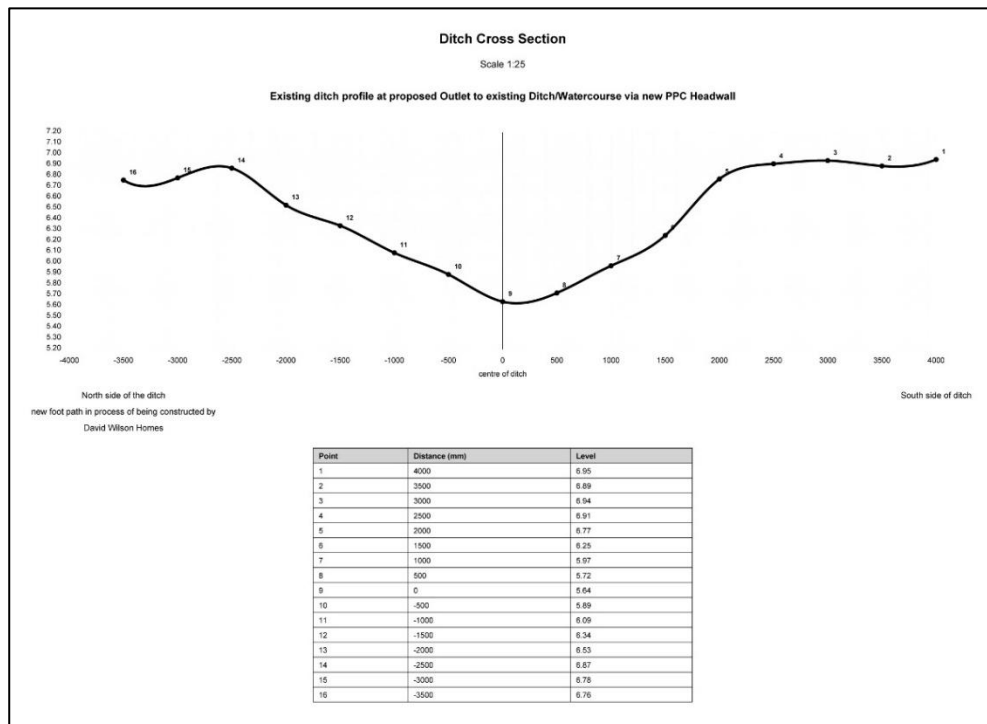
3.4.2 Winter groundwater monitoring has confirmed groundwater rising to a peak of 6.298m AOD, approximately 700mm below ground level.

3.4.3 Extracts from the groundwater monitoring and infiltration testing reports are located in Appendix 3 at the rear of this report.

3.5 Existing Watercourse

3.5.1 The ditch at the proposed outfall location has a bed level of 5.64m. Top of bank is at 6.87m AOD.

3.5.2 A profile of the ditch has been provided at the location of the proposed surface water outfall.



3.5.3 Water level monitoring observations on site have confirmed a typical water depth of 170mm during rainfall events in late February and early March 2026, equating to a top water level of 5.81m AOD.

- 3.5.4 This top water level followed an exceptionally wet winter period with 170% of long-term average rainfall for February noted by the Environment Agency. The water level observation confirm the 170mm depth was the deepest recorded over the winter period and has been taken as representative of the 1:1 year storm level.
- 3.5.5 Based on the observed water levels a model of the existing watercourse has been created in Causeway Flow software that includes the section of watercourse from the site boundary and a section of the downstream 750mm diameter pipe.
- 3.5.6 Sufficient drainage area has been added to this model to recreate the observed 170mm depth of flow on a 1:1 year rainfall event.
- 3.5.7 Simulation has been undertaken for the 1:100 year plus 45% climate change event to predict the corresponding peak water level during that rainfall event.
- 3.5.8 The depth of water calculated for the 1:100 year +45% climate change event is 336mm, a top water level of 5.986m AOD.
- 3.5.9 The water level monitoring details and calculations are located in Appendix 4 at the rear of this report.

4 Development Proposals

4.1 Description

4.1.1 The development proposals are for the construction of 3 commercial buildings with associated access roads, car parking, loading bays, storage areas and landscaping.

4.1.2 The areas of the various positively drained elements of the development are summarised as follows:

- Roof Areas 516m²
- Access Road, Parking Areas and Loading Bays 1,727m²
- Storage Areas 197m²
- Footpaths 629m²

4.1.3 A copy of the proposed site layout plan showing the positively drained areas is located in Appendix 5 at the rear of this report.

4.2 Surface Water Drainage

4.2.1 CIRIA report C753 The SuDS Manual-v6 provides guidance on surface water drainage. The aim for surface water runoff is to match greenfield runoff rates and volumes where reasonably achievable.

4.2.2 The National Standards for Sustainable Drainage Systems set out the drainage hierarchy for surface water drainage and notes the following list of drainage options in order of preference:

- Priority 1: collected for non-potable use
- Priority 2: infiltrated to ground
- Priority 3: discharged to an above ground surface water body
- Priority 4: discharged to a surface water sewer, or another piped surface water drainage system
- Priority 5: discharged to a combined sewer

4.2.3 Non-Potable Use

4.2.3.1 The commercial units on site have almost zero non-potable water demand that could provide a use for recycled rainwater.

4.2.3.2 It is proposed to incorporate SuDS Planters with appropriate, pollinator-friendly planting to rainwater downpipes on the commercial buildings to capture rainwater and supply water to irrigate each planter.

4.2.3.3 No reduction in volume or runoff rate has been made in the surface water calculations, this allows for the SuDS Planters to be at capacity during a design storm event and ensures a robust assessment of the surface water system.

4.2.4 Surface Water Discharge Location and Consents

4.2.4.1 The preferred surface water drainage strategy should where possible be based on infiltration to ground, however infiltration has been proven to be unviable and groundwater has been recorded approximately 700mm below ground level on site.

4.2.4.2 The proposed surface water drainage strategy has been based on a restricted discharge to the watercourse at the northern site boundary. The site owner is one of the riparian owners of this ditch and may therefore make a suitable discharge to this watercourse.

4.2.4.3 The proposed outfall headwall and pipework may require Arun Bylaw Consent which has been applied for under reference 893-241-109.

4.2.4.4 The previous scheme was granted Ordinary Watercourse Consent (OWC), reference LDC-2025-043 on 11 August 2025 for a similar outfall headwall in the same location.

4.2.4.5 Given how similar the works are it is not anticipated that Bylaw Consent will be withheld.

4.2.4.6 A copy of the existing OWC together with the confirmation of the Bylaw Consent application for the site is attached in Appendix 6 at the rear of this report.

4.2.5 Proposed Surface Water Runoff and Restrictions

4.2.5.1 Pre-developed greenfield runoff rates have been established using the HR Wallingford tool for Greenfield Runoff Estimation based on the FEH Statistical Method for rainfall estimation.



Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (<https://www.uksuds.com/>)

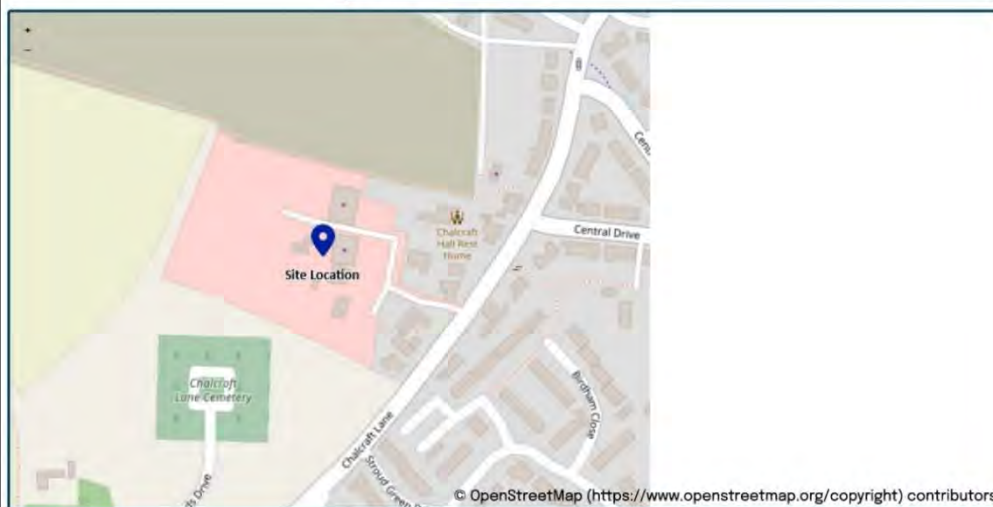
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	10/02/2026
Calculated by	Steve Doughty
Reference	24123
Model version	2.2.2

Location

Site name	Charlcroft Nursery
Site location	Bersted



Site easting (British National Grid)	491784
Site northing (British National Grid)	100513

Site details

Total site area (ha)	1 ha
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Greenfield runoff

Method

Method

FEH statistical (2025)

FEH statistical (2025)

	My value	Map value
SAAR9120 (mm)	768	mm
BFIHOST19scaled	0.668	
QMed-QBar conversion	1.136	☐ 1.136
QMed (l/s)	1.7	l/s
QBar (FEH statistical 2025) (l/s)	2	l/s

Growth curve factors

	My value	Map value
Hydrological region	7	☐ 7
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

	Method
Flow rate 1 year (l/s)	FEH statistical (2025) 1.7 l/s
Flow rate 2 year (l/s)	1.7 l/s
Flow rate 10 years (l/s)	3.2 l/s
Flow rate 30 years (l/s)	4.5 l/s
Flow rate 100 years (l/s)	6.3 l/s
Flow rate 200 years (l/s)	7.3 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com/) (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Image 2: Greenfield Runoff Calculation

4.2.5.2 The total positively drained area of the site will be approximately 3,070m² and the equivalent greenfield runoffs are as follows:

- Q_{bar} (approximate 1:2 year) at 1.7 l/s/ha 0.5 l/s
- 1:30 year at 4.5 l/s/ha 1.4 l/s
- 1:100 year at 6.3 l/s/ha 1.9 l/s

4.2.6 Discharge Volume and Restricted Discharge Rate

EQ. 24.10 Estimating the extra runoff volume from a development site compared to the greenfield equivalent

$$Vol_{xs} = RD \times A \times 10 \left[\frac{PIMP}{100} (\alpha 0.8) + \left(1 - \frac{PIMP}{100} \right) (\beta SPR) - SPR \right]$$

where:

- Vol_{xs} = extra runoff volume of development runoff over greenfield runoff (m³)
- RD = rainfall depth for the 1:100 year, 6 hour event (mm)
- $PIMP$ = impermeable area as a percentage of the total area
- A = area of the site, in hectares (ha)
- SPR = SPR index for the SOIL or HOST class (specified as a decimal proportion; this specifies the proportion of runoff from pervious surfaces (if SPRHOST values are used, then the minimum value should be set to 0.1)
- α = proportion of paved area draining to the network (values 0–1) with 80% assumed runoff
- β = proportion of the pervious area draining to the network or directly to the river (values from 0 to 1)

If the paved area is assumed to drain to the network, and all the permeable areas are landscaped so that they do not enter the drainage system or river, Equation 1 simplifies to:

$$Vol_{xs} = RD \times A \times 10 \left(0.8 \frac{PIMP}{100} - SPR \right)$$

However, where all the permeable areas are assumed to continue to drain to the river or network as well as all paved areas, Equation 2 becomes:

$$Vol_{xs} = RD \times A \times 10 (0.8 - SPR) \frac{PIMP}{100}$$

4.2.6.1 The above calculation can be used to estimate if there is an additional volume of runoff likely to be discharged from the site post development.

4.2.6.2 The permeable and landscaped areas will continue to drain to the watercourse or network and therefore the final version of Equation 2 is:

$$Vol_{xs} = RD \times A \times 10 (0.8 - SPR) PIMP/100$$

4.2.6.3 For the site $Vol_{xs} = 66.1 \times 0.4597 \times 10 (0.8 - 0.668) 67/100 = 26.9\text{m}^3$ of additional runoff from the site post development from the 1:100 year 6 hour rainfall event.

4.2.6.4 The National Standards for Sustainable Drainage Systems notes that 'the peak allowable discharge rate from the development to surface waters or sewers for the 50% AEP event shall be limited to the equivalent 50% AEP greenfield runoff rate, or 3 l/s/ha, whichever is the greater.

*Where the **volume of runoff** discharged from the development to surface waters or sewers for the 1% AEP, 6-hour rainfall event is greater than the volume of greenfield runoff for the same rainfall event, the peak allowable discharge rate from the development for the 1% AEP event shall be limited to the 50% AEP greenfield runoff rate or 3l/s/ha, whichever is the greater.'*

- 4.2.6.5 As the volume of runoff from the 1:100 year 6 hour rainfall event will be greater from the developed site when compared to the greenfield equivalent for the same event the peak discharge from the site will be restricted to the 50% AEP greenfield runoff rate or 3l/s/ha whichever is greater.
- 4.2.6.6 For this site 3l/s/ha is the greater figure requiring a restriction to a maximum of 0.9l/s, for the 0.307ha of positively drained area, for all rainfall events up to and including the 1:100 year +45% climate change event.
- 4.2.6.7 Calculations with suitable restriction have been prepared in order to demonstrate that surface water drainage can be adequately accommodated within the site without increasing flood risk elsewhere.
- 4.2.6.8 The proposed development is comprised almost exclusively of areas where surface water will be collected and as such no additional area has been included within the calculations to account for potential future urban creep as there is no realistic possibility of increasing the positively drained areas beyond the current proposals.

4.2.7 Proposed Surface Water Drainage System

- 4.2.7.1 To maximise the amenity and biodiversity benefit to the site SuDS planters will be provided to at least half of the rainwater downpipes together with multifunctional parking and access areas which comprise surface water collection, storage and water quality treatment has been developed.
- 4.2.7.2 The main surface water system has been designed to incorporate a permeable paving system which will accept surface water from all positively drained areas on site. The permeable paving will utilise a 30% voided subbase sized with sufficient storage to accommodate a 1:100 year storm event including an additional 45% to account for the predicted effects of future climate change from the whole site is proposed.
- 4.2.7.3 The calculations detail a permeable stone to extend beneath the roads, parking bays and loading bays to be laid with a level base and outfall level at 6.20m AOD, (620mm deep beneath the main carriage way and increasing beneath the parking bays and loading areas as proposed levels dictate).
- 4.2.7.4 The system will be lined in order to avoid groundwater ingress.

4.2.8 Interception drainage

- 4.2.8.1 The site investigation has proved it is unviable to infiltrate to ground and winter groundwater levels have been recorded at shallow depth requiring any proposed storage to be lined to prevent groundwater ingress.
- 4.2.8.2 To ensure at least the first 5mm of rainfall for the majority of rainfall events do not result in runoff from the site to the receiving watercourse the following is proposed.
- 4.2.8.3 Permeable paving to the multifunctional access and parking areas is proposed. CIRIA 753 The SuDS Manual notes at Table 24.6 '*All permeable pavements, whether lined or not, can be deemed to comply, provided there is no extra area drained to the permeable pavement*'.
- 4.2.8.4 For the proposed scheme the permeable pavement also accepts additional surface water from the roofs and footpath areas, an additional area of 1,145m².
- 4.2.8.5 For Interception drainage we confirm the permeable paving area draining its own area of 1,727m² can be deemed to comply.
- 4.2.8.6 The additional roof and foot path areas will generate 5.725m³ of water from 5mm of rainfall over their combined area of 1,145m².
- 4.2.8.7 It is proposed to provide storage for the additional surface water runoff generated by the first 5m of rainfall from the roofs and footpath areas below the outfall level within the permeable paving area and allow that volume to evaporate between rainfall events.
- 4.2.8.8 5.725m³ of additional surface water volume equates to 11mm of water depth within 30% voided stone across the area of the permeable pavement.
- 4.2.8.9 The voided stone will therefore be laid with a minimum 631mm depth of 30% voided stone and with a level base at 6.189m AOD. The outfall from the voided stone will remain at 6.20m AOD.
- 4.2.8.10 This will allow the first 5mm of rainfall to be retained and evaporated from the site for the majority of everyday rainfall events whilst retaining capacity to accept the 1:100 year plus climate change event.

4.2.9 Surcharged Outfall

- 4.2.9.1 As previously noted the depth of water calculated for the 1:100 year +45% climate change event within the existing ditch at the proposed outfall location is 336mm, a top water level of 5.986m AOD.

4.2.9.2 The system has been modelled with a surcharged outfall to the existing drainage ditch.

4.2.9.3 The surcharge applied to the outfall pipe in the modelling (invert level 5.75m AOD) is 236mm equating to the top water level of 5.986m AOD.

4.2.10 A copy of the drainage strategy plan together with the calculations is located in Appendix 7 at the rear of this report.

4.3 Water Quality

4.3.1 The proposed development is for commercial use. In accordance with CIRIA SuDS Manual 2015 (Report C753), the pollution hazard level for this type of development is classified as between low and medium depending on depending on the various elements of the site.

4.3.2 The surface water drainage scheme will include mitigation to ensure that surface water is suitably treated and any pollution risk adequately managed prior to discharge.

4.3.3 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
Commercial / Industrial roofs	Low	0.3	0.2	0.05
Commercial yards and delivery areas	Medium	0.7	0.6	0.7

Table 1: Pollution Hazard Indices

4.3.4 The surface water drainage design will incorporate the use of permeable paving and filtration through the voided stone below the permeable paving which is sufficient to meet the required treatment level.

SuDS Type	Total suspended solids (TSS)	Metals	Hydrocarbons
Permeable pavement	0.7	0.6	0.7
Voided stone as filter drain	0.4	0.4	0.4

Table 2: Pollution Mitigation Indices

4.3.5 The proposed infrastructure will meet the target treatment level required as follows:

Roofs	Total suspended solids (TSS)	Metals	Hydrocarbons
Voided stone as filter drain	0.4	0.4	0.4
Total Treatment Provision	0.4	0.4	0.4

Main Access and Parking	Total suspended solids (TSS)	Metals	Hydrocarbons
Permeable pavement	0.7	0.6	0.7
Total Treatment Provision	0.7	0.6	0.7

Table 3: Pollution Mitigation Provision

4.3.6 An interim drainage management and maintenance plan is located in Appendix 8 at the rear of this report.

4.4 Risk to Others

4.4.1 The proposed surface water drainage system has been designed to current National SuDS standards and incorporate attenuation and storage which will minimise runoff leaving the site during times of heavy rainfall.

4.4.2 Allowance has been made for a 45% increase in rainfall intensity which accords with the latest figures published by the Environment Agency and with the requirements under the National Planning Policy Framework.

4.4.3 The surface water drainage design will ensure that runoff from the proposed development does not exceed the relevant 3l/s/ha runoff rates and the resultant risk is negligible.

4.4.4 The proposed drainage system will incorporate sufficient treatment prior to final discharge thus mitigating the risk of pollution from the site.

4.4.5 Sewerage undertakers have an obligation to upgrade the existing networks if a connection to an equivalent or larger sized public sewer is technically achievable.

4.4.6 The residual risk of sewer flooding from this development for the foreseeable future is therefore negligible.

4.5 Surface Water Exceedance

- 4.5.1 In the event that part of the onsite surface water drainage network was to become blocked, suffer a failure due to lack of maintenance or be inundated with a storm beyond the 1:100 year +45% design storm surface water would pond on the site and ultimately overtop the onsite storage and flow into the watercourses at the north and south of the site.
- 4.5.2 A surface water exceedance route plan is located in Appendix 9 at the rear of this report.

5 Amenity Assessment

5.1 Generally

5.1.1 National Standard 5 requires a SuDS approach that maximises amenity benefits through multifunctional places and landscapes.

5.1.2 The proposed SuDS planters make part of the drainage system visible and integrate rainfall management with planting around the commercial buildings. Together with the permeable parking and access areas, the drainage infrastructure performs multiple functions: runoff collection, attenuation, water-quality treatment, rainwater reuse and landscape enhancement.

5.1.3 The planters will soften hard-edged building and circulation areas, provide seasonal visual interest and demonstrate the beneficial use of roof runoff. The planters have been positioned so that access, visibility and maintenance operations remain unobstructed.

Standard 5 criterion	Scheme Response	Assessment
Multifunctional places and landscapes	SuDS planters combine roof-water collection, irrigation and planting. Permeable paving combines access, parking, attenuation and treatment.	Compliant
Visual and landscape contribution	Distributed planting introduces visible green infrastructure and softens hardstanding and building frontages.	Compliant
Resource efficiency	Roof runoff is retained within planters and reused for irrigation. Hydraulic design does not depend on this storage.	Compliant
Safety and nuisance	No permanent open-water feature is proposed. Planters are shallow,	Compliant

Standard 5 criterion	Scheme Response	Assessment
	contained features, subject to safe siting and routine upkeep.	
Long-term amenity performance	Benefits depend on inspection, vegetation management, removal of litter and sediment, and replacement of failed planting.	Compliant

5.2 Standard 5 Conclusion

5.2.1 The drainage scheme satisfies Standard 5 by integrating visible, vegetated and resource-efficient SuDS features within multifunctional access, parking and building-edge spaces.

6 Biodiversity Assessment

6.1 Generally

6.1.1 National Standard 6 requires the drainage system to maximise biodiversity benefits throughout its lifecycle and add value through resilient habitat, support for local species and improved habitat connectivity. The primary biodiversity contribution is provided by the distributed SuDS planters. These create additional vegetated habitat within the developed site and can provide forage and shelter for invertebrates when planted with suitable species.

6.1.2 The planters are modest in scale and suitable and proportionate to the scale of the commercial development. Their value is increased by distribution across the site, connection with the wider landscape scheme and use of varied, locally appropriate, non-invasive and pollinator-friendly planting. Permeable paving and filtration through the voided stone also protect the receiving environment by providing runoff treatment before discharge.

Standard 6 criterion	Scheme Response	Assessment
Biodiversity value	Vegetated SuDS planters add planted habitat to areas that would otherwise comprise buildings or hardstanding.	Compliant
Diverse and resilient planting	Planters will be planted with a varied planting mix to maximise habitat and environment for native species.	Compliant
Support for local habitat and species	Locally appropriate, pollinator-friendly planting will provide forage and shelter for invertebrates and contribute to site greening.	Compliant
Habitat connectivity	The planters distributed across the site will act as	Compliant

Standard 6 criterion	Scheme Response	Assessment
	small ecological stepping stones when linked with the wider landscape scheme.	
Lifecycle performance	The benefit requires establishment watering, seasonal management, replacement of failures and control of invasive species.	Compliant

6.2 Standard 6 Conclusion

6.2.1 The scheme satisfies Standard 6 by providing SuDS Planters which add vegetated habitat with locally appropriate, pollinator-friendly planting to provide forage and shelter for a range of species. The distribution of the planters also supports ecological connectivity across the site.

7 Compliance with National Standards for SuDS

7.1 Standard 1 - Runoff Destinations

- 7.1.1 SuDS Planters will provide rainwater harvesting to maintain irrigation within the planters. The commercial units have almost zero demand for non-potable use.
- 7.1.2 Infiltration to ground was ruled out as a suitable runoff destination through site testing which proved infiltration was unviable. Winter groundwater monitoring also proved high groundwater levels across the site.
- 7.1.3 Discharge of surface water in excess of that collected for non-potable use will be to the watercourse at the northern boundary of the site for which the owner of the site is a riparian owner.
- 7.1.4 The drainage scheme follows the drainage hierarchy, non-potable reuse for the SuDS Planters is included in the proposals, infiltration is ruled out on evidence and the residual discharge to a watercourse utilises the highest priority runoff destination for the site.
- 7.1.5 The proposed drainage scheme satisfies Standard 1 (Runoff Destinations) of the National Standards for Sustainable Drainage Systems

7.2 Standard 2 - Management of Everyday Rainfall (Interception)

- 7.2.1 The retention of the first 5mm of rainfall for 'every day' rainfall is deemed to be met for the permeable pavement areas.
- 7.2.2 To meet the requirement for the additional areas draining to the permeable pavement an additional storage volume of 5.75m³ below the outfall level of the permeable paving is proposed.
- 7.2.3 The additional 11mm depth will allow for 5mm of rainfall from the additionally contributing areas (roofs and footpaths) to be held on site to evaporate from the system for everyday rainfall events.
- 7.2.4 The proposed drainage scheme satisfies Standard 2 (Management of Everyday Rainfall (Interception)) of the National Standards for Sustainable Drainage Systems.

7.3 Standard 3 - Management of Extreme Rainfall and Flooding

- 7.3.1 The proposed surface water drainage system has been designed to current National SuDS standards and incorporates attenuation and storage which will minimise runoff leaving the site during times of heavy rainfall.
- 7.3.2 Allowance has been made for a 1:100 year event including a 45% increase in rainfall intensity which accords with the latest figures published by the Environment Agency.
- 7.3.3 All storage will be provided below ground up to and including the 1:100 year plus climate change event ensuring there is no flooding on site up to and including the 1:100 year plus climate change event.
- 7.3.4 The volume of discharge from the 1:100 year 6 hour rainfall event is greater than the equivalent 1:100 year greenfield event and therefore the proposed surface water discharge rate has been restricted to a maximum of 3ls/ha (0.9l/s for the drained area) for all events up to and including the 1:100 year plus climate change event to ensure flood risk for the development is not increased
- 7.3.5 No reduction in volume or runoff rate has been made in the surface water calculations for any available capacity in the SuDS Planters or the 5mm rainfall volume stored below the outfall level. This ensures if these systems are full / at capacity during a design storm event the required storage volume remains available within the proposed surface water system.
- 7.3.6 The outfall has been modelled with a surcharged outfall. The level of surcharge is based on site observations of the watercourse water levels and a model of the watercourse to establish the 1:100 year flow level.
- 7.3.7 The proposed drainage scheme satisfies Standard 3 (Management of Extreme Rainfall and Flooding) of the National Standards for Sustainable Drainage Systems.

7.4 Standard 4 - Water Quality

- 7.4.1 The proposed use of a permeable pavement for the majority of the site together with filtration through the permeable stone for the roof areas meets the simple index approach to provide the target treatment level required for the type of development proposed.
- 7.4.2 The proposed drainage scheme satisfies Standard 4 (Water Quality) of the National Standards for Sustainable Drainage Systems.

7.5 Standard 5 – Amenity Assessment Against CIRIA C753 Amenity Criteria

7.5.1 The drainage scheme integrates visible, vegetated and resource-efficient SuDS features together with a permeable paving system which provides multifunctional access, parking and building-edge spaces across the site.

7.5.2 The proposed drainage scheme satisfies Standard 5 (Amenity) of the National Standards for Sustainable Drainage Systems.

7.6 Standard 6 – Biodiversity

7.6.1 The scheme provides SuDS Planters which add vegetated habitat with locally appropriate, pollinator-friendly planting to provide forage and shelter for a range of species. The distribution of the planters also supports ecological connectivity across the site.

7.7 Standard 7 - Design of Drainage for Construction, Operation, Maintenance, Decommissioning and Structural Integrity

7.7.1 An interim drainage management and maintenance plan has been produced a copy of which is included at the rear of this report.

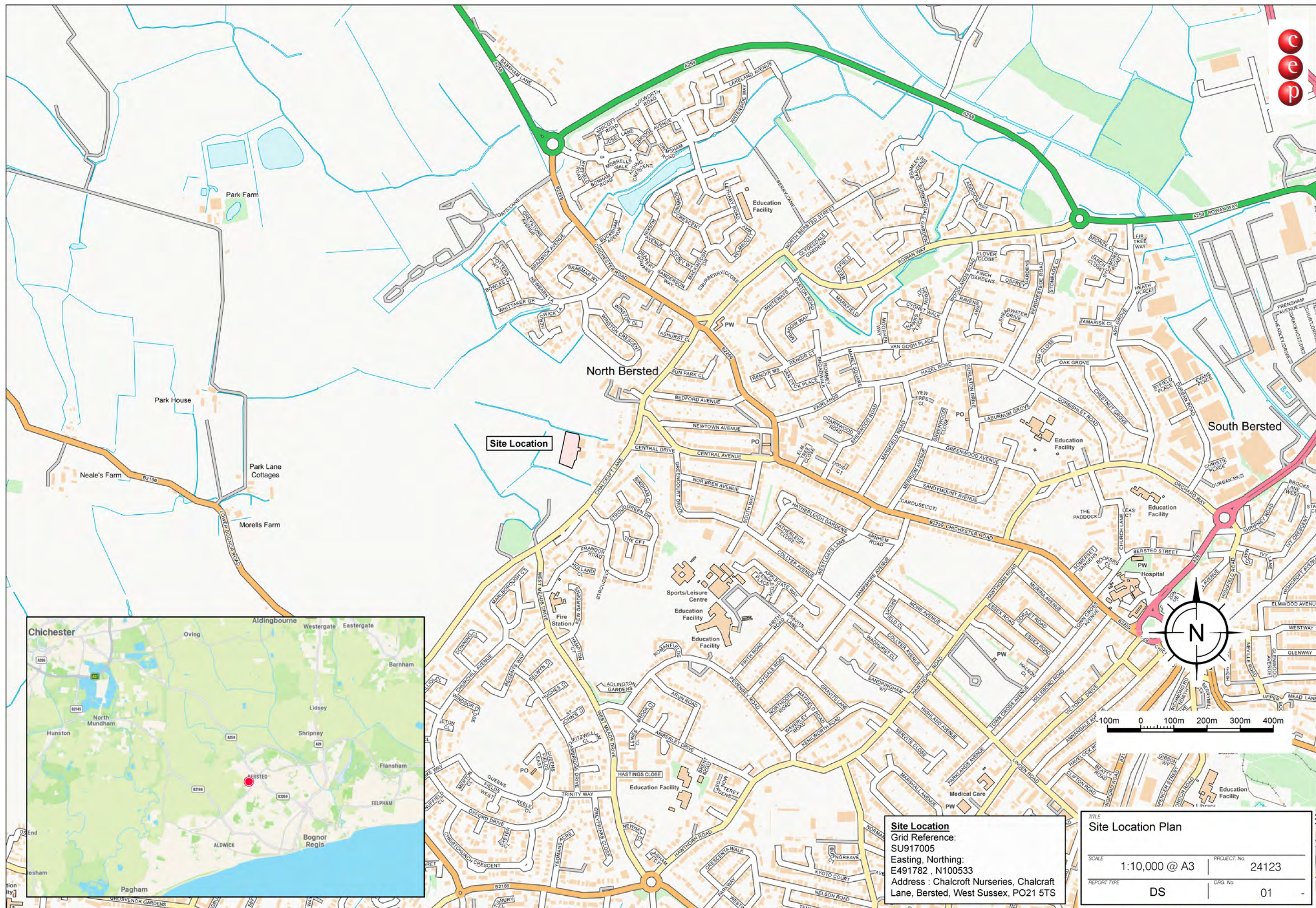
8 Conclusions

- 8.1 Winter groundwater monitoring has been undertaken to establish highest annual ground water levels and winter percolation testing has been undertaken in accordance with BRE 365.
- 8.2 Infiltration has been proven to be unviable and groundwater has been recorded approximately 700mm below ground level and an infiltration drainage system is not viable.
- 8.3 A suitable SuDS drainage system is proposed which accords with the requirements of national and local policy.
- 8.4 Surface water will be discharged at a restricted rate to the existing watercourse to the north of the site.
- 8.5 Calculations confirm that surface water runoff generated by the proposed development can be attenuated on site for all rainfall events up to the 1:100 year event including an allowance for climate change.
- 8.6 Water quality improvement will be provided to mitigate against any risk to any receiving waterbody.
- 8.7 A site-specific maintenance manual has been prepared which includes details of financial management and arrangements for the replacement of major components at the end of the manufacturer's recommended design life.
- 8.8 A suitable surface water drainage system has been designed to accommodate the anticipated flows from the proposed development.

9 List of Appendices, Images and Tables

Appendix 1	Site Location Plan
Appendix 2	Existing Site Layout Plan
Appendix 3	Extracts from Ground Water Monitoring and Infiltration Testing Reports
Appendix 4	Water Level Monitoring and Watercourse Calculations
Appendix 5	Proposed Site Layout and Positively Drained Areas Plan
Appendix 6	Existing OWC Consent and Confirmation of Bylaw Consent Application
Appendix 7	Drainage Strategy Plan and Calculations
Appendix 8	Interim Drainage Management and Maintenance Plan
Appendix 9	Surface Water Exceedance Route Plan
Image 1	Site Location
Image 2	Greenfield Runoff Calculation
Table 1	Pollution Hazard Indices
Table 2	Pollution Mitigation Indices
Table 3	Pollution Mitigation Provision

Appendix 1
Site Location Plan



Site Location

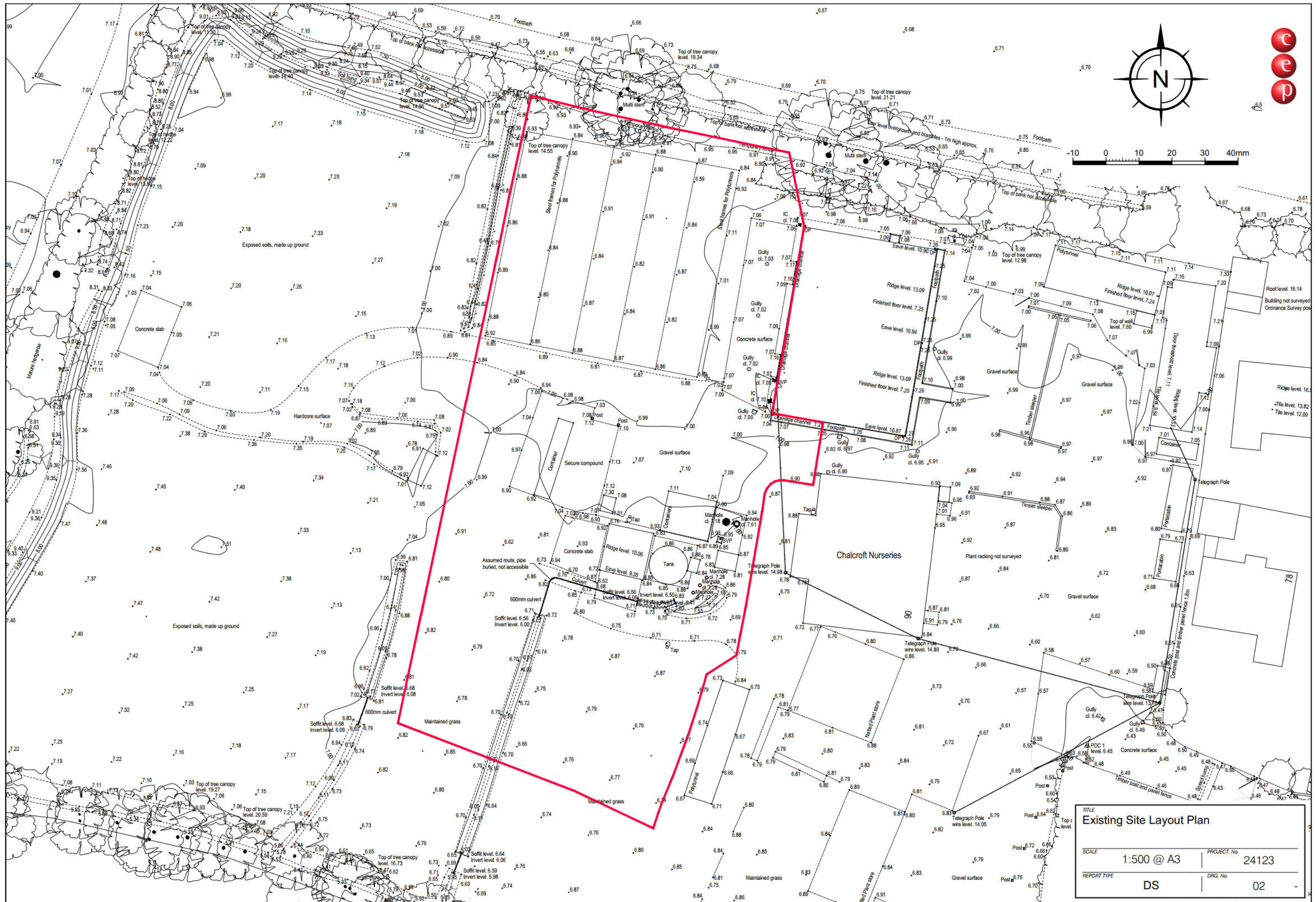


100m 0 100m 200m 300m 400m

Site Location
Grid Reference:
SU917005
Easting, Northing:
E491782, N100533
Address : Chalcroft Nurseries, Chalcroft
Lane, Bersted, West Sussex, PO21 5TS

Site Location Plan			
SCALE		PROJECT No.	
1:10,000 @ A3		24123	
REPORT TYPE		DRG. No.	
DS		01	

Appendix 2
Existing Site Layout Plan



-10 0 10 20 30 40mm



TITLE Existing Site Layout Plan	
SCALE 1:500 @ A3	PROJECT No 24123
REPORT TYPE DS	DRG. No 02

Appendix 3

Extracts from Ground Water Monitoring and Infiltration Testing Reports

NOTES

1. This drawing is to be read in conjunction with drawings FC2921/01-25.

2m deep Ground Water Monitoring Borehole location

Chalcroft Nursery Ground Water Monitoring Winter 2024-2025

GW Hole No	1	2	3	4	5	6
Ground Level	7.00	7.10	6.80	7.42	7.20	7.15
Date	Water Level	Water Level	Water Level	Water Level	Water Level	Water Level
	Depth to (mm)	mAOD Depth to (mm)	mAOD Depth to (mm)	mAOD Depth to (mm)	mAOD Depth to (mm)	mAOD Depth to (mm)
04/12/2024	1150	5.85	1650	5.45	800	6
11/12/2024	910	6.09	1274	5.826	810	5.99
18/12/2024	982	6.018	1252	5.848	809	5.991
27/12/2024	965	6.035	1173	5.927	803	5.997
09/01/2025	780	6.22	1109	5.991	820	5.98
09/01/2025	730	6.27	1093	6.007	798	6.002
15/01/2025	702	6.298	1062	6.038	809	5.991
22/01/2025	791	6.209	1081	6.039	815	5.985
29/01/2025	719	6.281	1027	6.073	796	6.004
09/02/2025	720	6.28	1008	6.094	794	6.008
12/02/2025	826	6.174	1008	6.092	797	6.003
19/02/2025	741	6.259	997	6.103	788	6.012
26/02/2025	729	6.271	992	6.108	789	6.011
14/03/2025	796	6.204	981	6.119	787	6.013
20/03/2025	766	6.234	964	6.106	792	6.008
02/04/2025	818	6.182	1007	6.093	820	5.98
09/04/2025	854	6.146	1022	6.078	844	5.956
16/04/2025	865	6.135	1029	6.071	847	5.953
23/04/2025	884	6.116	1033	6.057	859	5.941
30/04/2025	968	6.032	1058	6.042	872	5.928
07/05/2025	936	6.064	1055	6.045	884	5.916
21/05/2025	996	6.004	1096	6.004	925	5.875
					1421	5.999
					891	6.309
					1946	5.204

Note:
GW Monitoring Boreholes installed and monitored by Client
For location of GW Borehole locations refer to ABMH Cdwg FC2921/20

Scale in Meters (1:500)

REV	DESCRIPTION	DATE
B	Results Table added	25/06/25
A	Issued For BUDGET/APPROVAL ONLY	24/11/24
-	Issued For BUDGET/APPROVAL ONLY	11/11/24

abmh
ABMH Civils Ltd
1 The Grove, Felpham, Bognor Regis, West Sussex PO22 7EY
Mark Mob: 07761 950060
Email: mark@abmh.co.uk / Web: www.abmh.co.uk

PROJECT	CHALCROFT NURSERY CHALCROFT LANE, BERSTED WEST SUSSEX PO21 5TS
DRAWING	SITE OVERVIEW WINTER GROUND WATER MONITORING LOCATIONS
SCALE	1:500
DATE	NOV 24
INITIAL	MH
CHKD	
REV	B

Winter Infiltration Testing

Site;	Chalcroft Nurseries, Chalcroft Lane, Bersted. PO21 5TS
Planning Authority;	Arun District Council
Planning Application Reference;	BE/89/25/DOC Conditions 22 and 23
Date of Test;	6 th November 2025
Location of Trial Pit;	491769.497E 100577.996N
Trial Pit Size;	330mm Wide x 2000mm Length x 1500mm deep (hit water table)
Topo Ground Level	6.87
Topo Designed Invert Level	6.13
25% Target	5.94
75% Target	5.56
100% Target	5.37
Commencement	12.15pm filled with 501.6litre to 6.13 invert level
1 st check 5 th November 2025	2.33pm reading 6.03 = 10.659% drop in 2 hours 18 mins
2 nd check 5 th November 2025	5.06pm reading 5.98 = 15.504% drop in 4 hours 51 mins
3 rd check 6 th November 2025	8.34am reading 5.88 = 25.194% drop in 20 hours 19 mins
4 th check 6 th November 2025	1.27pm reading 5.85 = 28.101% drop in 25 hours 17 mins
Test Finished as non-compliant result.	



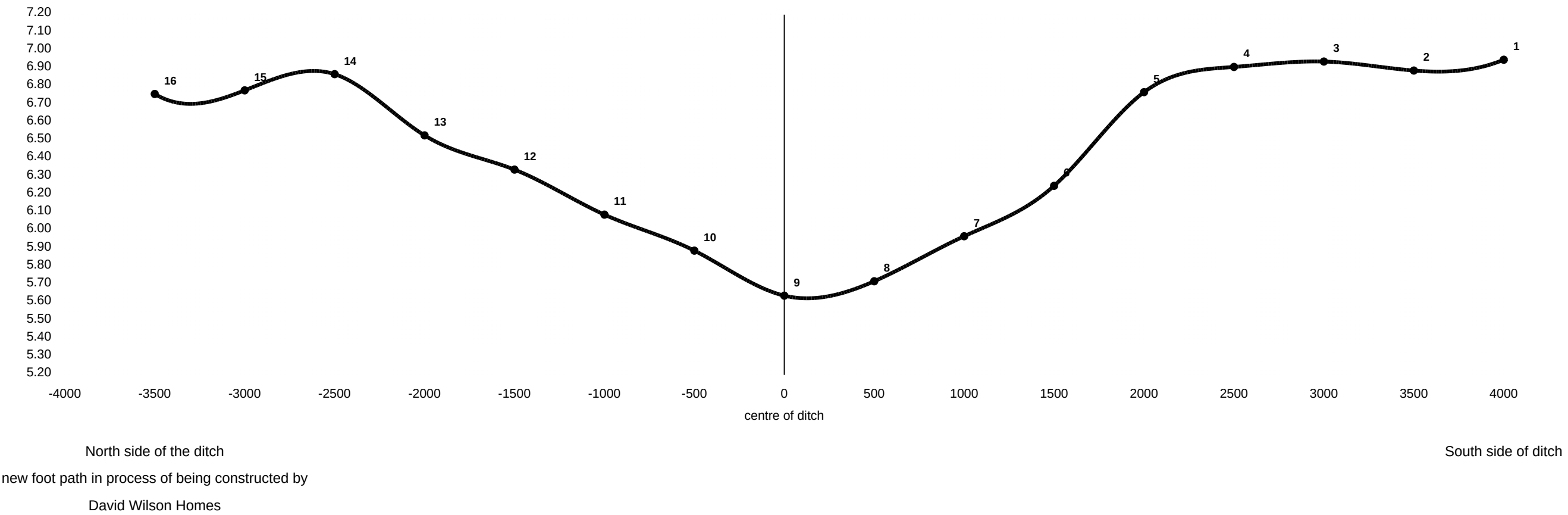
Appendix 4

Water Level Monitoring and Watercourse Calculations

Ditch Cross Section

Scale 1:25

Existing ditch profile at proposed Outlet to existing Ditch/Watercourse via new PPC Headwall



Point	Distance (mm)	Level
1	4000	6.95
2	3500	6.89
3	3000	6.94
4	2500	6.91
5	2000	6.77
6	1500	6.25
7	1000	5.97
8	500	5.72
9	0	5.64
10	-500	5.89
11	-1000	6.09
12	-1500	6.34
13	-2000	6.53
14	-2500	6.87
15	-3000	6.78
16	-3500	6.76

Chalcroft Nursery water level monitoring from last winter for the ditch to the north of the site.

From patrick cullen <patrickcullen@live.co.uk>

Date Wed 23/09/2026 16:10

To Stuart Magowan <stuart@civil.co.uk>

Hello Stuart,

Please find attached the information for the winter testing. We only started taking photos of the measurements once we instructed your company.

Attached are the photos of our day book with the recorded results. We have photos of the ditch to confirm the measurements which I will send over on a separate email.

The bottom of the ditch is at 5.64 above AOD and the highest level recorded on 19th February at 5.81 above AOD.

10 November 2025 - 90mm water level, 1260 mm below our datum measurement taken by staff
24 November 2025 - 90mm water level, 1260 mm below our datum measurement taken by staff
1 December 2025 - 95mm water level, 1255 mm below our datum measurement taken by staff
15 December 2025 - 110mm water level, 1240 mm below our datum measurement taken by staff
5 January 2026 - 100mm water level, 1250 mm below our datum measurement taken by staff
19 January 2026 - 115mm water level, 1235 mm below our datum measurement taken by staff
3 February 2026 - 150mm water level, 1200 mm below our datum measurement taken by staff
10 February 2026 - 150 mm water level, 1200 mm below our datum measurement taken by staff
19 February 2026 - 170mm, 20th Feb 2026 water level 1180mm below our fixed datum
2 March 2026 - 110mm water level, 1240 mm below our fixed datum
9 March 2026 - 90mm water level, 1260 mm below our fixed datum
16 March 2026 - 60mm water level, 1290 mm below our fixed datum
23 March 2026 - 0 mm photo ditch empty, 1350 mm below our fixed datum
2 April 2026 - 0 mm photo ditch empty, 1350 mm below our fixed datum
7 April 2026 - 0 mm photo ditch empty, 1350 mm below our fixed datum
13 April 2026 - 0 mm photo ditch empty, 1350 mm below our fixed datum
20 April 2026 - 0 mm photo ditch empty, 1350 mm below our fixed datum
27 April 2026 - 0 mm photo ditch empty, 1350 mm below our fixed datum

CHAPPEL HART 3/2/2021

Hole	1	2	3	4	5	6
	1300	1110	1000	1370	935	1155

16/3/2022

1290 under 7.05 at man
pitch

Hole	1	2	3	4	5	6
	1320	1180	820	1370	1065	1300

1885 Hole 1
1790 Hole 2
875 Hole 3
1380 Hole 4
1230 Hole 5
1410 Hole 6

21/4/21 1350 under 7.05 under

Hole	1	2	3	4	5	6
	1470	1420	910	1410	1440	1655

21/5/21 1515 Hole 1 1350 under 7.05 under
1465 Hole 2
895 Hole 3
1425 Hole 4
1355 Hole 5
1765 Hole 6

20/6/2021 1350 under 7.05

Hole	1	2	3	4	5	6
	1390	1280	1340	1490	1520	2040

21/6/2021 1350 under 7.05

Hole	1	2	3	4	5	6
	1680	1720	1510	1580	1610	2070

21/6/2021 1350 under 7.05

Hole	1	2	3	4	5	6
	1750	1750	1155	1510	1630	2070

11/5/2021 1350 under 7.05

Hole	1	2	3	4	5	6
	1705	1755	1175	1598	1630	2070

2/5/2021 1350 under 7.05

Hole	1	2	3	4	5	6
	1710	1720	1215	1620	1130	2050

Should you require any further information please give me a call.

Kind regards

Pat Cullen



Chalcroft Northern Ditch

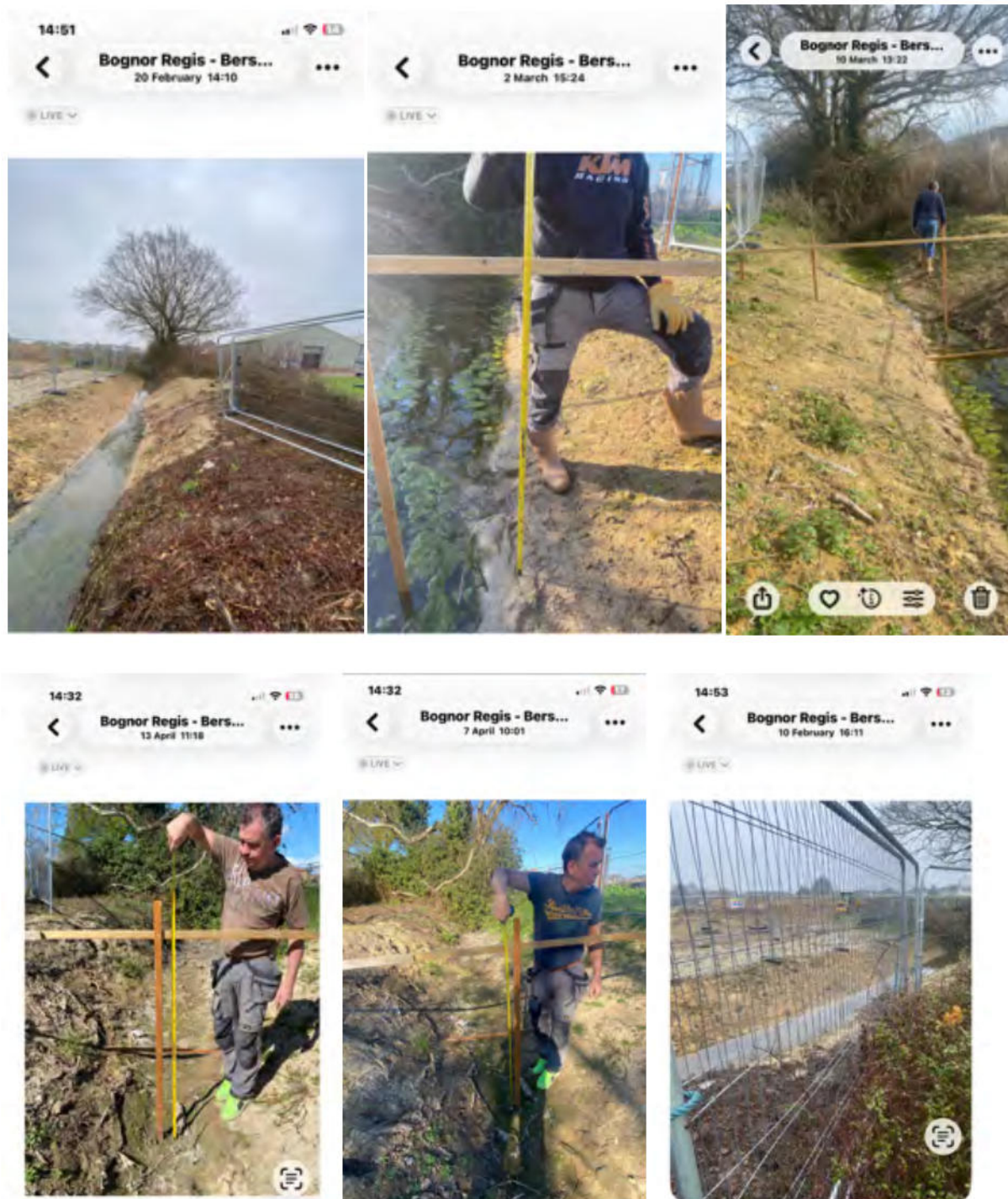
From patrick cullen [REDACTED]

Date Wed 23/09/2026 16:50

To Stuart Magowan [REDACTED] >

Hello Stuart,

Please find attached photos of the drainage ditch measuring.





Kind regards

Pat Cullen



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.000
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	150.0		

Watercourse Link Type

Template	Freeform Carrier	Preferred Cover (m)	0.001
Shape	Open User Defined	Follow Ground	✓
Barrels	1	Velocity	Manning
Auto Increment (mm)	1	ks (mm) / n	0.035

Available Diameters (mm)

1230

Width / Total	Depth / Total	Width / Total	Depth / Total	Width / Total	Depth / Total
0.000	1.000	2.000	0.203	4.000	0.496
0.500	0.724	2.500	0.000	4.500	0.919
1.000	0.569	3.000	0.065	5.000	1.000
1.500	0.366	3.500	0.268		

Surface Link Type

Template	Freeform Carrier	Auto Increment (mm)	75
Shape	Circular	Follow Ground	x
Barrels	1		

Available Diameters (mm)

150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.147	5.00	6.870	491777.403	100597.620	1.220	5.650
2			6.660	491840.074	100583.750	1.070	5.590
3			6.800	491896.234	100572.073	1.292	5.508

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
Watercourse	1	2	64.187	0.035	5.650	5.590	0.060	1069.8	1230	6.71	51.2
1.000	2	3	57.361	0.600	5.590	5.508	0.082	699.5	700	7.66	48.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
Watercourse	0.627	2555.4	27.2	-0.010	-0.160	0.147	0.0	183	0.192
1.000	1.006	387.1	25.5	0.370	0.592	0.147	0.0	120	0.579

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s) x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume x
Winter CV	1.000	Additional Storage (m³/ha)	0.0	

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
10	0	0	0
20	0	0	0
30	0	0	0
50	0	0	0
100	45	0	0

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	12	5.820	0.170	18.4	0.0000	0.0000	OK
30 minute summer	2	22	5.679	0.089	15.0	0.0000	0.0000	OK
30 minute summer	3	22	5.576	0.068	13.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	Watercourse	15.9	
30 minute summer	2	1.000	13.0	10.4

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.97%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	5.899	0.249	53.0	0.0000	0.0000	OK
15 minute summer	2	13	5.748	0.158	51.1	0.0000	0.0000	OK
15 minute summer	3	13	5.637	0.129	45.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	Watercourse	51.1	
15 minute summer	2	1.000	45.7	23.0

Results for 20 year Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	5.914	0.264	62.9	0.0000	0.0000	OK
15 minute summer	2	13	5.763	0.173	60.9	0.0000	0.0000	OK
15 minute summer	3	13	5.650	0.142	55.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	Watercourse	60.9	
15 minute summer	2	1.000	55.6	27.3

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	5.922	0.272	68.5	0.0000	0.0000	OK
15 minute summer	2	13	5.770	0.180	66.7	0.0000	0.0000	OK
15 minute summer	3	13	5.658	0.150	61.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	Watercourse	66.7	
15 minute summer	2	1.000	61.0	29.8

Results for 50 year Critical Storm Duration. Lowest mass balance: 99.96%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	5.932	0.282	75.8	0.0000	0.0000	OK
15 minute summer	2	13	5.779	0.189	74.1	0.0000	0.0000	OK
15 minute summer	3	13	5.666	0.158	68.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	Watercourse	74.1	
15 minute summer	2	1.000	68.1	32.9

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	5.986	0.336	124.7	0.0000	0.0000	OK
15 minute summer	2	12	5.835	0.245	122.5	0.0000	0.0000	OK
15 minute summer	3	13	5.714	0.206	113.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
15 minute summer	1	Watercourse	122.5	
15 minute summer	2	1.000	113.5	54.2

Appendix 5

**Proposed Site Layout
and Positively Drained Areas Plan**

PROPOSED AREAS KEY		
	Site boundary	4,597m sq
	Roofs	516m sq
	Access Road	1,083m sq
	Parking Bays	477m sq
	Loading Bays	167m sq
	Storage Areas	197m sq
	Footpaths	629m sq
TOTAL		3,069m sq



-2.5m 0 2.5m 5.0m 7.5m 10m



TITLE Proposed Site Layout And Positively Drained Areas Plan			
SCALE	NTS	PROJECT No.	24123
REPORT TYPE	DS	DRG. No.	03 A

Appendix 6
Existing OWC Consent
and
Confirmation of Bylaw Consent Application

Ground Floor
Northleigh
County Hall
Chichester
West Sussex
PO19 1RH



Lead Local Flood Authority

Date: 11th August 2025

Pat Cullen c/o Mark Hobbs
ABMH Civils Ltd
1 The Grove
Felpham
PO22 7EY BY EMAIL

Dear Mr Cullen,

RE: Land Drainage Works at Chalcroft Nurseries, Chalcraft Lane, Bersted

Thank you for your recent application for Ordinary Watercourse Land Drainage Consent.

I confirm that your proposals for the permanent works under Application reference WSCC- 724209324 is approved by West Sussex County Council. I enclose consent number LDC-2025-043 issued under Section 23 of the Land Drainage Act 1991.

Please notify this authority no less than seven days before commencement and upon completion of the works, quoting the above consent number for reference. Please note that inspections will be carried out as deemed necessary.

The applicant must provide photographs of the works during construction and on completion, and forward digital copies to this office. Please note the 'Conditions' attached to this approval.

Yours sincerely,



Dominic Henly
Flood Risk Management Team Manager | Planning Services
West Sussex County Council



West Sussex County Council

Ordinary Watercourse Land Drainage Consent

Land Drainage Act 1991

Name

Pat Cullen – Orchard Enterprises (Southern) Limited

Consent applying to

Land At Chalcroft Nurseries, Chalcraft Lane, Bersted PO21 5TS

Consent Number: LDC-2025-043

Effective from: 11 August 2025

This note does not form part of the Certificate of Authorisation.

Legislation

Land Drainage Consents are required by virtue of the Land Drainage Act 1991. The following activities on an Ordinary (non-main) Watercourse require Local Authority Consent:

under Section 23 of the Land Drainage Act 1991;

- the erection or alteration of any mill dam, weir or other like obstruction to the flow of any watercourse
- the erection of a culvert in an ordinary watercourse
- alteration of a culvert in a manner that would be likely to affect the flow of an ordinary watercourse

under Sections 17 and 20(2) of the Land Drainage Act 1991

- any drainage works carried out by a local authority against flooding in connection with any watercourse

under Section 61F Land Drainage Act 1991 (Inserted by Schedule 22 Environment Act 1995)

- the operation of any drainage works, under the control of any Internal Drainage Board or local authority, so as to manage the level of water in a watercourse for the purposes of facilitating spray irrigation.

Note: Consent under the above legislation is required irrespective of whether the works are permanent or temporary.

Contraventions

In relation to Ordinary Watercourses, West Sussex Drainage Partnership can under Section 24 of the Land Drainage Act 1991 serve a legal notice requiring the person to abate the nuisance within a specified time. Failure to abide by such a notice can result in the West Sussex Drainage Partnership carrying out the necessary remedial work and seeking to recover costs.

Land Drainage Act 1991

Land Drainage Consent

Control of works affecting watercourses and/or flood defences

Consent number LDC-2025-043

To: Pat Cullen – Orchard Enterprises (Southern) Limited

West Sussex County Council, as Lead Local Flood Authority exercise of its powers under Section 23 of the Land Drainage Act 1991 and subject to the conditions attached, hereby grants its consent in relation to the works or operations described in this Consent.

Watercourse: Not Named

Location: Land At Chalcroft Nurseries, Chalcroft Lane, Bersted PO21 5TS

Map Reference: SU 91750 00520

Description of Works:

The existing land drainage ditches that flow to the south within the light industrial site development will be made redundant and need to be abandoned (as shown on drawing FC2921.26D). These works take into account recent changes to these ditches, and their connection to the ditch/watercourse to the south undertaken by Barretts as part of a larger residential scheme and access road.

As detailed on plans and sections

FC2921.25 - Ex Drainage Layout

FC2921.26D - Enabling Works - Altered Ex SW Drainage Layout

A437-S38-04J - Engineering and Drainage Layout - Barretts Site (altered land drainage from this site due to new road works)

FC2921/25 A Existing SW and FW site arrangements

In supporting documentation

West Sussex County Council does not accept any responsibility for the design and construction of the works referred hereto and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.

This Consent shall come into effect on:

Date 11 August 2025


Dominic Henly

Flood Risk Management Team Manager | Planning Services
West Sussex County Council

Date of signing: **11 August 2025**

Conditions

This consent is granted with the following conditions:

General

Photographs to be supplied of before, during and after construction.

Site Specific

- N/A

Other Information

This Consent does not remove from the applicant the necessity to obtain other licences, consents, approvals or permissions (including planning permission) which may be required in law or in order to comply with any duties or responsibilities for conservation or protection of the environment.

It is the applicants responsibility to ensure that he obtains the consent / permission of any owners and occupiers affected by the works.

This Consent does not confer any rights of entry or rights over property.

Works should be arranged to ensure there is no increase in flood risk to third parties.

That the LLFA does not accept any responsibility for the design and construction of the works that are the subject of this Consent and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.

The works must be undertaken in accordance with the approved plans, drawings, calculations, specifications and other relevant documents.

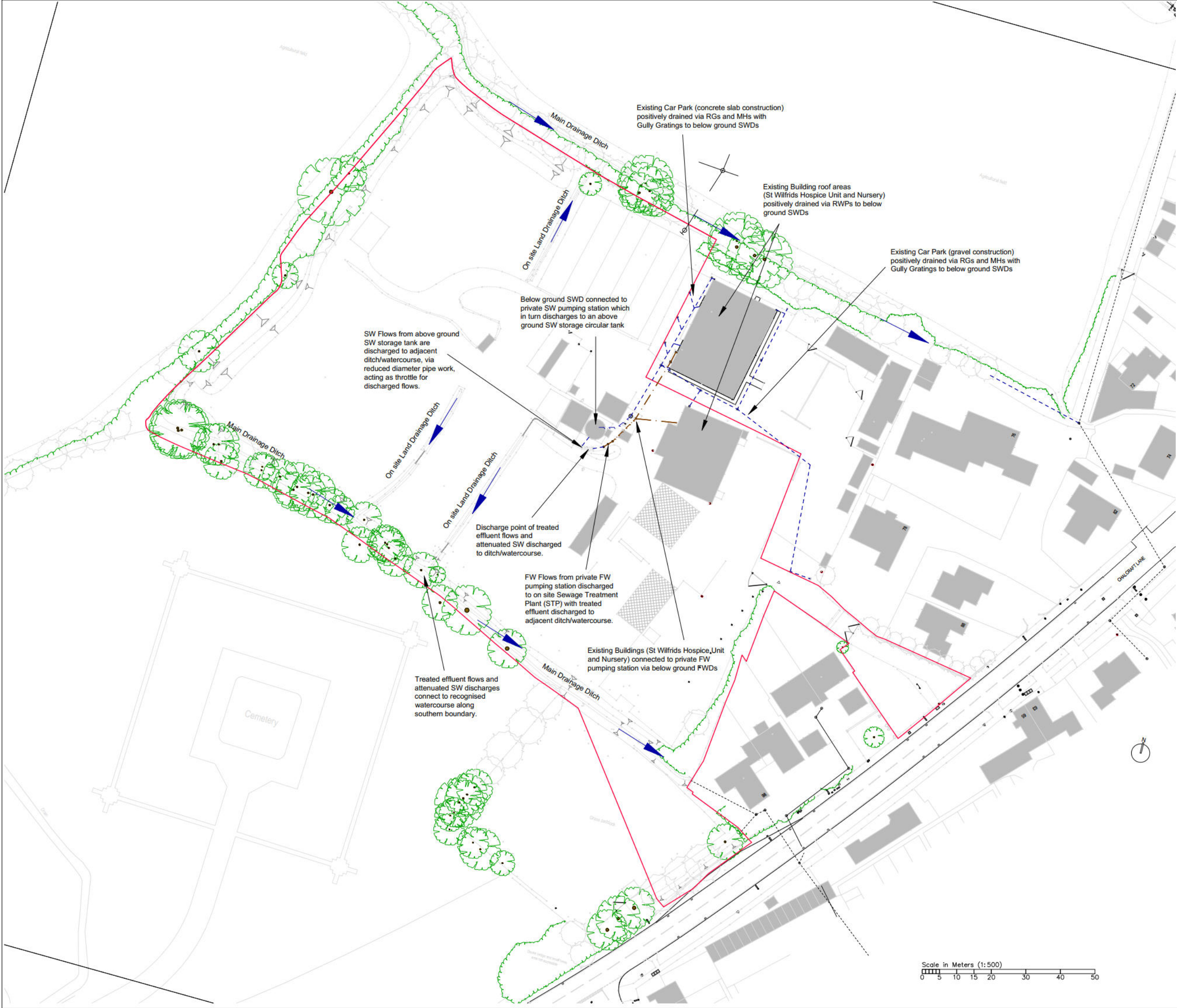
All reasonable precautions must be taken during the undertaking of the works so as not to obstruct, impede or interfere with the flow of water in, into or out of the watercourse and not to damage the banks or bed or any drainage works without the approval of the Lead Local Flood Authority.

Timescales

Works to be completed within three years of the date of this consent or else the consent will be deemed to have expired. This period can be extended upon written agreement.

Upon completion of works please send notification within 28 days to the issuing authority or to [REDACTED]

- NOTES**
1. This drawing is to be read in conjunction with drawings FC2921/01-30.
 2. Drainage information based on Client Records. All Existing drainage to be verified through additional investigations, including on site CCTV surveys, prior to detailed design and construction on site.



-	Issued For BUDGET/APPROVAL ONLY	12/02/25
REV	DESCRIPTION	DATE

abmh
ABMH Civils Ltd
1 The Grove, Felpham, Bognor Regis, West Sussex PO22 7EY
Mark Mob: 07761 950000
Email: mark@abmh.co.uk / Web: www.abmh.co.uk

PROJECT	CHALCROFT NURSERY CHALCROFT LANE, BERSTED WEST SUSSEX PO21 5TS		
DRAWING	SITE OVERVIEW INDUSTRIAL ESTATE EXISTING FW & SW SITE ARRANGEMENTS		
DRAWING NO.	FC2921/25	REV	-
SCALE	1:500	DATE	FEB 25
INITIAL	MH	CHKD	

This drawing is prepared using AutoCAD. Only written dimensions are to be respected.
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Removal of this block also removes all warranties and infringes copyright.

NOTES

- This drawing is to be read in conjunction with drawings FC2921/01-30.
- Refer to drawing FC2921/27A for Details
- Existing Surface Water
 - Existing SW arrangement was implemented to cater for works approved by Planning Permission BE/168/12 and planning Condition No 3. Planning Condition No 3 was discharged on 02/06/15 by ADC, Ref BE/23/15/00C.
 - OWC approval for discharge of SW flows to adjacent ditch/watercourse is believed to have been obtained from ADC by the client shortly after Planning Condition No 3 discharged, though OWC approval number unknown.
- Proposed Surface Water
 - Existing SW arrangement is to be relocated to the north of the site to enable the existing development to operate as existing, prior to the implementation of Planning Permission BE/25/24/RES. These proposed works are regarded merely as enabling works to allow the light industrial estate works to commence without unduly affecting the existing operations on site.
 - Land Drainage Bylaw formally approved by ADC via email dated 16/04/25 for connection to ex watercourse with restricted SW discharge.
 - Reference: LDB/ARUN/2025/001
- Existing Foul Drainage
 - Existing FW arrangement was implemented to cater for works approved by Planning Permission BE/168/12.
 - STP treated effluent discharge to a ditch was approved by EA, EA Ref NPSWQD006114
 - OWC approval for discharge of treated effluent flows to adjacent ditch/watercourse is believed to have been obtained from ADC by the client shortly after Planning Condition No 3 discharged, though OWC approval number unknown.
- Proposed Foul Drainage
 - Existing STP is to be made redundant through the proposed connection of the existing FWD system to the adopted sewer network at the site's northern boundary. Flows and connection point have been agreed in principal with Southern Water by the adjacent housing developer, but are subject to a formal S106 sewer connection application once the adjacent site's adopted sewers have been constructed.
- Construction Notes
 - No part of the Headwall structure is to protrude/encroach into the profile of the ditch/watercourse.
 - Contractor to follow the drawings exactly and to provide ABMH Civils with photos of the completed works to enable these to be forwarded to ADC for verification that the works have been undertaken in accordance with approved designs.
 - Existing drainage retained to be surveyed and pipe diameters/material and invert levels to be provided to engineer prior to construction.



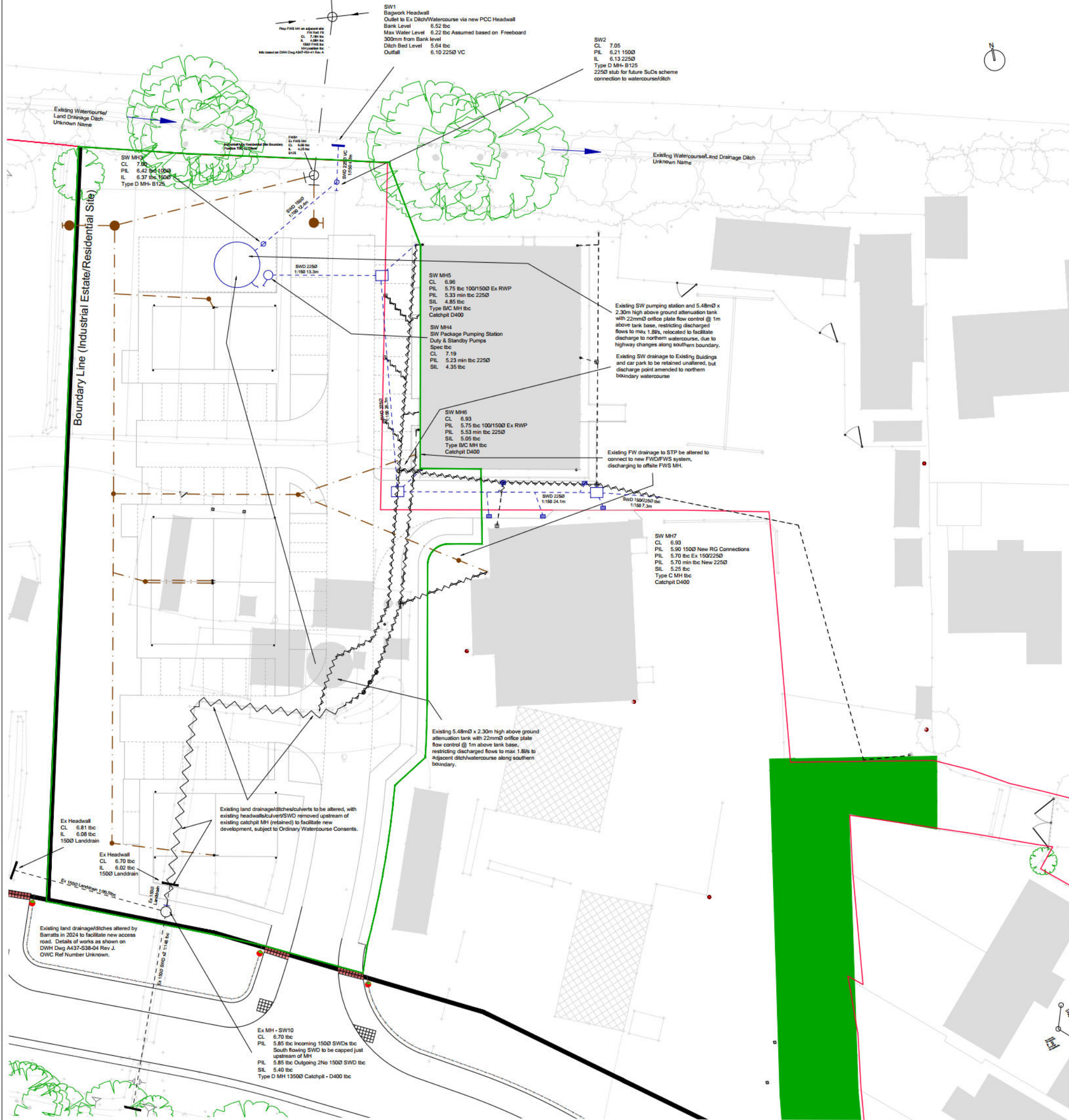
Site Location Plan 1:2500

REV	DESCRIPTION	DATE
D	Outfall PIL amended/South Ditches added	12/06/25
C	ADC LDB Approval noted on drawing	24/04/25
B	Issued For BUDGET/APPROVAL ONLY	09/04/25
A	Issued For BUDGET/APPROVAL ONLY	02/04/25
-	Issued For BUDGET/APPROVAL ONLY	14/03/25

abmh
ABMH Civils Ltd
1 The Grove, Felpham, Bognor Regis, West Sussex PO22 7EY
Mark Mob: 07751 950000
Email: mark@abmh.co.uk / Web: www.abmh.co.uk

PROJECT	CHALCROFT NURSERY CHALCROFT LANE, BERSTED WEST SUSSEX PO21 5TS
DRAWING	INDUSTRIAL ESTATE ENABLING WORKS EXISTING ALTERED SW DRAINAGE LAYOUT
REV	FC2921/26
DATE	FEB 25
INTL	MH
CHKD	

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Removal of this title block also removes all warranties and infringes copyright.



- GENERAL NOTES:
1. Do not scale.
 2. Refer to all other Project Drawings and supporting notes.
 3. The Contractor is to check and verify all buildings and site dimensions and levels, including sewer invert levels, before works start on site. The contractor is to comply in all aspects with the current building legislation, British Standards, building regulations etc.
 4. Positions of existing services/statutory undertakers apparatus adjacent to or crossing proposed excavations are to be checked by the contractor prior to starting work.
 5. This drawing is to be read in conjunction with and checked against all other drawings, Engineering details, Specification and any structural, Geotechnical or other specialist document provided.
 6. Any anomaly or contradiction between any of the above is to be reported to the Engineer.
 7. This drawing is schematic for clarity only, positions of pipe runs and manholes may vary on site due to site conditions.
 8. Traffic management and safety measures shall comply in all respects to Chapter 8 of the Traffic Signs Manual published by HMSO. The Contractor shall submit his proposals for the approval of the Engineer and Local Highway Authority prior to commencing any work.
 9. The Contractor shall contact all utilities companies prior to commencing and excavation. It is the Contractor's responsibility to locate the exact position of all underground and overhead services, cables, pipes etc prior to the excavations and to take all necessary protective measures.
 10. The Contractor shall make good any damage caused to walls, fences, kerbs, surfacing, road signs etc at his own expense as instructed by the Highway Authority.
 11. The Contractor shall indemnify the Client, Engineer and Local Authority against damage to any highway authority property, statutory undertakers plant and any costs associated with the disruption of services and the repair/replacement of the damaged plant. No work on site shall commence until written evidence of the above indemnity has been submitted to and accepted by the Engineer.
 12. Highway Inspector to be present during inspections/CBR testing.
 13. The Contractor shall maintain access to all properties affected by the works.
 14. Any new cover gratings shall be hinged, to minimise the likelihood of theft.

ENGINEERING &
DRAINAGE LAYOUT
SCALE 1:250

Node ID	Easting (m)	Northing (m)	CL (m)	Depth to Invert (m)	Dia (mm)	Node Type	Manhole Type	Connections	Link ID	IL (m)	Dia (mm)
1E1	491666.270	100139.303	7.483	1.073	1500	Manhole	Catchpit	0	1.000	6.412	225
1E2	491712.114	100106.286	7.533	1.346	1500	Manhole	Catchpit	1	1.003	6.287	225
1E3	491725.854	100002.170	7.297	1.096	1500	Manhole	Catchpit	1	1.003	6.205	225
1E4	491748.149	100005.058	7.290	1.075	1500	Manhole	Catchpit	0	1.003	6.125	225
1E5	491789.371	100403.034	6.845	0.859	1500	Manhole	Catchpit	1	1.003	5.986	225
1E6	491814.864	100447.829	6.900	1.008	1500	Manhole	Control	0	1.008	5.988	225
OUTFALL 1	491818.473	100442.372	6.900	1.300		Junction	Headwall	1	1.013	5.800	225
OUTFALL 2	491835.947	100422.253	7.000	1.099		Junction	Headwall	1	6.003	5.901	150
1E7	491835.255	100425.052	6.900	0.894	1500	Manhole	Control	1	6.000	5.994	150
1E1	491723.404	100133.230	6.933	0.700		Junction	Headwall	0	5.000	5.000	150
C105	491742.483	100101.891	6.700	0.810	1500	Manhole	Catchpit	1	5.000	5.650	150
1E2	491734.320	100476.429	6.610	0.970		Junction	Headwall	1	5.001	5.680	2 x 150

West Sussex County Council Notes

- No works shall commence within the existing public highway until the Agreement is signed.
- Any soft spots within the proposed highway shall be dug out and the void backfilled in layers up to formation level with selected granular material as directed and to the satisfaction of the Highways Inspector.
- All fill material up to foundation level of the proposed highway to be approved and compacted in layers as directed and to the satisfaction of the Highways Inspector.
- Any damage caused to the existing highway during the course of the works to be repaired as directed and to the satisfaction of the Highways Inspector and/or Area Engineer.
- Continuity of access to occupied areas to be maintained to satisfaction of Highways Inspector, Area Office Engineer and/or Local Authority.
- Any abandoned/redundant pipes and chambers that fall within the proposed highway shall be grubbed up and the void backfilled in layers up to formation level of the carriageway with selected granular material or permanently filled with concrete (or similar filler).
- All redundant connections in existing manholes/chambers that are affected by the works shall be sealed and the benching made good as directed and to the satisfaction of the Highways Inspector and/or utility company involved.
- Any existing live drains, sewers, ducts, cables, etc. that will pass under the proposed highway shall be surveyed, probed, traced, matted, jettied, etc. to ascertain their structural condition and suitability to fall within the new highway. If deemed necessary, special protection and/or replacement may be required as directed and to the satisfaction of the Highways Inspector, Area Engineer and/or Utility Company involved.
- Any existing live manholes, chambers, boxes, etc. that will be located within the proposed highway shall be surveyed to ascertain their structural condition and suitability to fall within the new highway. If deemed necessary, special protection and/or replacement may be required as directed and to the satisfaction of the Highways Inspector, Area Engineer and/or Utility Company involved.
- Developer/Contractor to provide suitable and effective wheel washing facilities to prevent mud from being conveyed onto the public highway and to provide the means to clean the highway to the satisfaction of the Highways Inspector, Area Engineer and/or Local Authority.
- No concrete to be poured or laid in temperatures below 2deg C on a falling max/min thermometer or before the temperature reaches 2deg C on a rising max/min thermometer (to be provided by the Contractor and displayed in a position agreed by the Highways Inspector).
- All road signs and markings to comply with the Traffic Signs Manual.
- All road markings to be thermoplastic.
- Contractor to comply with Chapter 8 of the Traffic Signs Manual 2009.
- Refer to WSCC 276/38 Highway Agreement Standard Details drawings 01-36 and revision thereof.
- Highway Inspector to approve all kerb and/or edging line and level on site with the main contractor prior to installation. The Highway Inspector will direct the contractor accordingly to achieve a satisfactory finish which may deviate from the technically approved detailed drawings. The contractor will record all variances for the 'as-built' drawings issue.
- All adoptable highway works to be carried out in accordance with the DfT Specification of Highway Works or as amended by the West Sussex County Council Standard Details - both available on the internet.

LOCATION PLAN
SCALE 1:1000

- KEY
- Back of footway / channel level
 - Proposed road contours (major at 100mm intervals, minor at 25mm intervals)
- DRAINAGE KEY
- Proposed Highway Drain & MH connection
 - Highway gully and 150mmØ connection
 - Catchpit manhole
 - Control manhole
 - Headwall
 - Enhanced Swale
- STORM

FOR CONSTRUCTION
THIS DRAWING IS NOT TECHNICALLY APPROVED
ISSUED FOR CONSTRUCTION AT RISK
AS PER CLIENT INSTRUCTIONS

PROPOSED CONTROL MANHOLE TO RESTRICT FLOWS FROM 0.031m OF HANDSTANDING TO A MAXIMUM 2.3 m FOR ALL STORMS UP TO AND INCLUDING THE 1 IN 100 YEAR EVENT WITH A 4% ALLOWANCE FOR CLIMATE CHANGE. MINIMUM ORIFICE DIAMETER OF 0.075m ENFORCED TO PREVENT BLOCKAGE.
HYDROBRAKE PRODUCT NUMBER: CTL-SHE-0075-2000-0000-2000
DESIGN HEAD: 0.500m
DESIGN FLOW: 2.0 l/s

Rev	Date	By	Comments
1	12/24	CB	Old road design removed
2	11/24	CB	Fencing added to layout
3	07/24	WM	Design updated to suit OWC comments.
4	05/24	JS	Updated following ADC & adjacent site comments. MH schedules added.
5	03/24	JS	Updated following client request.
6	02/24	CB	Issued For Construction

DAVID WILSON HOMES
WHERE QUALITY LIVES

Site:	Nursery Fields, Berstead
Title:	Engineering & Drainage Layout
Dwg No:	A437-S38-04
Revision:	3
Drawn by:	DS
Date:	JUL 2023
Sheet Size:	A1
Scale:	1:250



Outlook

Copy of request for works regulated by land drainage byelaws

From esupport@arun.gov.uk <[REDACTED]>

Date Thu 24/09/2026 09:52

To Stuart Magowan <[REDACTED]>



Arun District Council

Application to undertake works regulated by land drainage byelaws 2004

Date submitted - 24 September 2026 at 09:51

Form reference - 893-241-109

Applicant details

Basis	The application is being made as a company
-------	--

Company name	Chalcroft Associates LLP
Registration number	OC337417
Phone number	
Email address	
Registered address	5 Culver Road Felpham Bognor Regis West Sussex PO22 7EF
Contact person	
Name	Stuart Magowan
Position	Managing Director
Phone number	
Email address	
Works details	
Location	Watercourse to the northern boundary of Chalcroft Nursery Site, approximately 140m west of Tara Perry Close, Bognor Regis
National grid reference	491769 , 100601
Name of river or watercourse	Nothing entered
Interest in the land	Land owner

Description and purpose of the proposed works	Headwall and pipework to allow the discharge of surface water to the watercourse to facilitate the adjacent commercial development site.
---	--

Number of structures	1
----------------------	---

Responsible party during the construction	Principal Contractor tbc
---	--------------------------

Responsible party upon completion	Chalcroft Associates LLP Management Company
-----------------------------------	---

Construction details	
-----------------------------	--

Works temporary or permanent	Permanent
------------------------------	-----------

Construction start date	1/12/2026
-------------------------	-----------

Planning permission	
----------------------------	--

Planning authority	Arun District Council
--------------------	-----------------------

Reference	BE/13/24/S73
-----------	--------------

Date permission granted	6/12/2024
-------------------------	-----------

Environmental impact	
-----------------------------	--

Environment Agency interests	None identified
Affect on the environment and mitigation	There will be a short term temporary effect on the immediate area of the works during clearance and the construction works, these will be undertaken under Ecological supervision to minimise any disruption. Long term the works will have no effect on the environment the banks will be seeded as part of the landscaping scheme for the site and the long term management will have a positive effect on the watercourse.

Documents checklist

Name of document	Reference	Description
Site Location Plan	01	Site location
Site Layout Drainage and Levels	101C	Site Drainage and Levels
Construction Detials - Drainage	502 A	Construction Details including headwall details
Watercourse Headwall Method Statement	24123 v1.0	Method Statement for headwall works

<https://www.arun.gov.uk>

DX 57406 Littlehampton

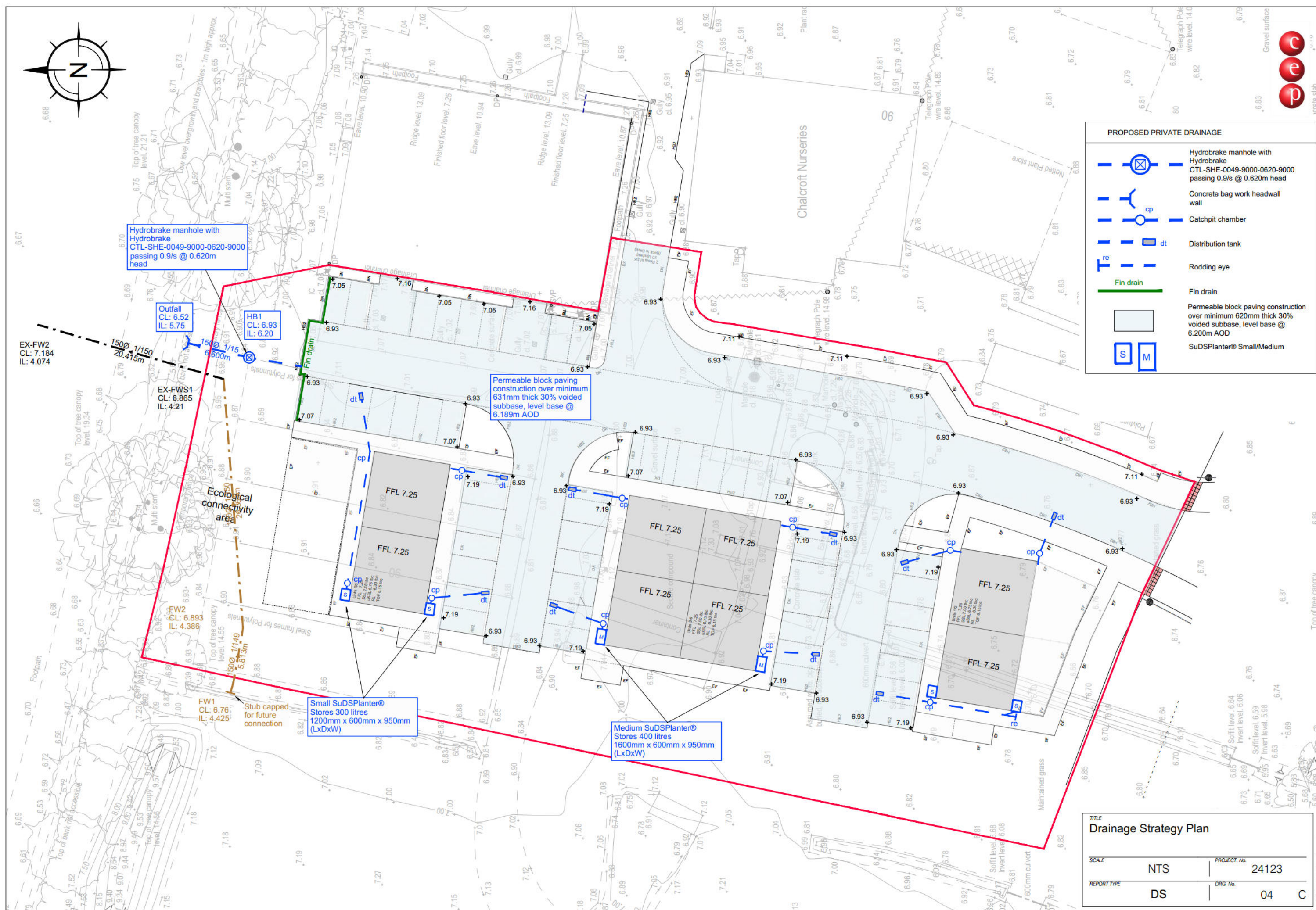
You can view Arun District Council's Privacy Policy from <https://www.arun.gov.uk/privacy-policy>

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Appendix 7

Drainage Strategy Plan and Calculations



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	150.0		

Surface Link Type

Template	Freeform Carrier	Auto Increment (mm)	75
Shape	Circular	Follow Ground	x
Barrels	1		

Available Diameters (mm)

150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
HB1	0.307	5.00	6.930	1200	491779.193	100589.349	0.730	6.200
Outfall	0.000		6.520		491780.693	100595.776	0.770	5.750

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	HB1	Outfall	6.600	0.600	6.200	5.750	0.450	14.7	150	5.04	58.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	2.644	46.7	64.4	0.580	0.620	0.307	0.0	150	2.693

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
10	0	0	0
30	0	0	0
30	45	0	0
100	0	0	0

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node Outfall Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m ²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		
Applies to All storms					

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.236	440	0.236	880	0.236	1320	0.236	1760	0.236	2200	0.236
10	0.236	450	0.236	890	0.236	1330	0.236	1770	0.236	2210	0.236
20	0.236	460	0.236	900	0.236	1340	0.236	1780	0.236	2220	0.236
30	0.236	470	0.236	910	0.236	1350	0.236	1790	0.236	2230	0.236
40	0.236	480	0.236	920	0.236	1360	0.236	1800	0.236	2240	0.236
50	0.236	490	0.236	930	0.236	1370	0.236	1810	0.236	2250	0.236
60	0.236	500	0.236	940	0.236	1380	0.236	1820	0.236	2260	0.236
70	0.236	510	0.236	950	0.236	1390	0.236	1830	0.236	2270	0.236
80	0.236	520	0.236	960	0.236	1400	0.236	1840	0.236	2280	0.236
90	0.236	530	0.236	970	0.236	1410	0.236	1850	0.236	2290	0.236
100	0.236	540	0.236	980	0.236	1420	0.236	1860	0.236	2300	0.236
110	0.236	550	0.236	990	0.236	1430	0.236	1870	0.236	2310	0.236
120	0.236	560	0.236	1000	0.236	1440	0.236	1880	0.236	2320	0.236
130	0.236	570	0.236	1010	0.236	1450	0.236	1890	0.236	2330	0.236
140	0.236	580	0.236	1020	0.236	1460	0.236	1900	0.236	2340	0.236
150	0.236	590	0.236	1030	0.236	1470	0.236	1910	0.236	2350	0.236
160	0.236	600	0.236	1040	0.236	1480	0.236	1920	0.236	2360	0.236
170	0.236	610	0.236	1050	0.236	1490	0.236	1930	0.236	2370	0.236
180	0.236	620	0.236	1060	0.236	1500	0.236	1940	0.236	2380	0.236
190	0.236	630	0.236	1070	0.236	1510	0.236	1950	0.236	2390	0.236
200	0.236	640	0.236	1080	0.236	1520	0.236	1960	0.236	2400	0.236
210	0.236	650	0.236	1090	0.236	1530	0.236	1970	0.236	2410	0.236
220	0.236	660	0.236	1100	0.236	1540	0.236	1980	0.236	2420	0.236
230	0.236	670	0.236	1110	0.236	1550	0.236	1990	0.236	2430	0.236
240	0.236	680	0.236	1120	0.236	1560	0.236	2000	0.236	2440	0.236
250	0.236	690	0.236	1130	0.236	1570	0.236	2010	0.236	2450	0.236
260	0.236	700	0.236	1140	0.236	1580	0.236	2020	0.236	2460	0.236
270	0.236	710	0.236	1150	0.236	1590	0.236	2030	0.236	2470	0.236
280	0.236	720	0.236	1160	0.236	1600	0.236	2040	0.236	2480	0.236
290	0.236	730	0.236	1170	0.236	1610	0.236	2050	0.236	2490	0.236
300	0.236	740	0.236	1180	0.236	1620	0.236	2060	0.236	2500	0.236
310	0.236	750	0.236	1190	0.236	1630	0.236	2070	0.236	2510	0.236
320	0.236	760	0.236	1200	0.236	1640	0.236	2080	0.236	2520	0.236
330	0.236	770	0.236	1210	0.236	1650	0.236	2090	0.236	2530	0.236
340	0.236	780	0.236	1220	0.236	1660	0.236	2100	0.236	2540	0.236
350	0.236	790	0.236	1230	0.236	1670	0.236	2110	0.236	2550	0.236
360	0.236	800	0.236	1240	0.236	1680	0.236	2120	0.236	2560	0.236
370	0.236	810	0.236	1250	0.236	1690	0.236	2130	0.236	2570	0.236
380	0.236	820	0.236	1260	0.236	1700	0.236	2140	0.236	2580	0.236
390	0.236	830	0.236	1270	0.236	1710	0.236	2150	0.236	2590	0.236
400	0.236	840	0.236	1280	0.236	1720	0.236	2160	0.236	2600	0.236
410	0.236	850	0.236	1290	0.236	1730	0.236	2170	0.236	2610	0.236
420	0.236	860	0.236	1300	0.236	1740	0.236	2180	0.236	2620	0.236
430	0.236	870	0.236	1310	0.236	1750	0.236	2190	0.236	2630	0.236



Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2640	0.236	3180	0.236	3720	0.236	4260	0.236	4800	0.236	5340	0.236
2650	0.236	3190	0.236	3730	0.236	4270	0.236	4810	0.236	5350	0.236
2660	0.236	3200	0.236	3740	0.236	4280	0.236	4820	0.236	5360	0.236
2670	0.236	3210	0.236	3750	0.236	4290	0.236	4830	0.236	5370	0.236
2680	0.236	3220	0.236	3760	0.236	4300	0.236	4840	0.236	5380	0.236
2690	0.236	3230	0.236	3770	0.236	4310	0.236	4850	0.236	5390	0.236
2700	0.236	3240	0.236	3780	0.236	4320	0.236	4860	0.236	5400	0.236
2710	0.236	3250	0.236	3790	0.236	4330	0.236	4870	0.236	5410	0.236
2720	0.236	3260	0.236	3800	0.236	4340	0.236	4880	0.236	5420	0.236
2730	0.236	3270	0.236	3810	0.236	4350	0.236	4890	0.236	5430	0.236
2740	0.236	3280	0.236	3820	0.236	4360	0.236	4900	0.236	5440	0.236
2750	0.236	3290	0.236	3830	0.236	4370	0.236	4910	0.236	5450	0.236
2760	0.236	3300	0.236	3840	0.236	4380	0.236	4920	0.236	5460	0.236
2770	0.236	3310	0.236	3850	0.236	4390	0.236	4930	0.236	5470	0.236
2780	0.236	3320	0.236	3860	0.236	4400	0.236	4940	0.236	5480	0.236
2790	0.236	3330	0.236	3870	0.236	4410	0.236	4950	0.236	5490	0.236
2800	0.236	3340	0.236	3880	0.236	4420	0.236	4960	0.236	5500	0.236
2810	0.236	3350	0.236	3890	0.236	4430	0.236	4970	0.236	5510	0.236
2820	0.236	3360	0.236	3900	0.236	4440	0.236	4980	0.236	5520	0.236
2830	0.236	3370	0.236	3910	0.236	4450	0.236	4990	0.236	5530	0.236
2840	0.236	3380	0.236	3920	0.236	4460	0.236	5000	0.236	5540	0.236
2850	0.236	3390	0.236	3930	0.236	4470	0.236	5010	0.236	5550	0.236
2860	0.236	3400	0.236	3940	0.236	4480	0.236	5020	0.236	5560	0.236
2870	0.236	3410	0.236	3950	0.236	4490	0.236	5030	0.236	5570	0.236
2880	0.236	3420	0.236	3960	0.236	4500	0.236	5040	0.236	5580	0.236
2890	0.236	3430	0.236	3970	0.236	4510	0.236	5050	0.236	5590	0.236
2900	0.236	3440	0.236	3980	0.236	4520	0.236	5060	0.236	5600	0.236
2910	0.236	3450	0.236	3990	0.236	4530	0.236	5070	0.236	5610	0.236
2920	0.236	3460	0.236	4000	0.236	4540	0.236	5080	0.236	5620	0.236
2930	0.236	3470	0.236	4010	0.236	4550	0.236	5090	0.236	5630	0.236
2940	0.236	3480	0.236	4020	0.236	4560	0.236	5100	0.236	5640	0.236
2950	0.236	3490	0.236	4030	0.236	4570	0.236	5110	0.236	5650	0.236
2960	0.236	3500	0.236	4040	0.236	4580	0.236	5120	0.236	5660	0.236
2970	0.236	3510	0.236	4050	0.236	4590	0.236	5130	0.236	5670	0.236
2980	0.236	3520	0.236	4060	0.236	4600	0.236	5140	0.236	5680	0.236
2990	0.236	3530	0.236	4070	0.236	4610	0.236	5150	0.236	5690	0.236
3000	0.236	3540	0.236	4080	0.236	4620	0.236	5160	0.236	5700	0.236
3010	0.236	3550	0.236	4090	0.236	4630	0.236	5170	0.236	5710	0.236
3020	0.236	3560	0.236	4100	0.236	4640	0.236	5180	0.236	5720	0.236
3030	0.236	3570	0.236	4110	0.236	4650	0.236	5190	0.236	5730	0.236
3040	0.236	3580	0.236	4120	0.236	4660	0.236	5200	0.236	5740	0.236
3050	0.236	3590	0.236	4130	0.236	4670	0.236	5210	0.236	5750	0.236
3060	0.236	3600	0.236	4140	0.236	4680	0.236	5220	0.236	5760	0.236
3070	0.236	3610	0.236	4150	0.236	4690	0.236	5230	0.236	5770	0.236
3080	0.236	3620	0.236	4160	0.236	4700	0.236	5240	0.236	5780	0.236
3090	0.236	3630	0.236	4170	0.236	4710	0.236	5250	0.236	5790	0.236
3100	0.236	3640	0.236	4180	0.236	4720	0.236	5260	0.236	5800	0.236
3110	0.236	3650	0.236	4190	0.236	4730	0.236	5270	0.236	5810	0.236
3120	0.236	3660	0.236	4200	0.236	4740	0.236	5280	0.236	5820	0.236
3130	0.236	3670	0.236	4210	0.236	4750	0.236	5290	0.236	5830	0.236
3140	0.236	3680	0.236	4220	0.236	4760	0.236	5300	0.236	5840	0.236
3150	0.236	3690	0.236	4230	0.236	4770	0.236	5310	0.236	5850	0.236
3160	0.236	3700	0.236	4240	0.236	4780	0.236	5320	0.236	5860	0.236
3170	0.236	3710	0.236	4250	0.236	4790	0.236	5330	0.236	5870	0.236

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
5880	0.236	6420	0.236	6960	0.236	7500	0.236	8040	0.236	8580	0.236
5890	0.236	6430	0.236	6970	0.236	7510	0.236	8050	0.236	8590	0.236
5900	0.236	6440	0.236	6980	0.236	7520	0.236	8060	0.236	8600	0.236
5910	0.236	6450	0.236	6990	0.236	7530	0.236	8070	0.236	8610	0.236
5920	0.236	6460	0.236	7000	0.236	7540	0.236	8080	0.236	8620	0.236
5930	0.236	6470	0.236	7010	0.236	7550	0.236	8090	0.236	8630	0.236
5940	0.236	6480	0.236	7020	0.236	7560	0.236	8100	0.236	8640	0.236
5950	0.236	6490	0.236	7030	0.236	7570	0.236	8110	0.236	8650	0.236
5960	0.236	6500	0.236	7040	0.236	7580	0.236	8120	0.236	8660	0.236
5970	0.236	6510	0.236	7050	0.236	7590	0.236	8130	0.236	8670	0.236
5980	0.236	6520	0.236	7060	0.236	7600	0.236	8140	0.236	8680	0.236
5990	0.236	6530	0.236	7070	0.236	7610	0.236	8150	0.236	8690	0.236
6000	0.236	6540	0.236	7080	0.236	7620	0.236	8160	0.236	8700	0.236
6010	0.236	6550	0.236	7090	0.236	7630	0.236	8170	0.236	8710	0.236
6020	0.236	6560	0.236	7100	0.236	7640	0.236	8180	0.236	8720	0.236
6030	0.236	6570	0.236	7110	0.236	7650	0.236	8190	0.236	8730	0.236
6040	0.236	6580	0.236	7120	0.236	7660	0.236	8200	0.236	8740	0.236
6050	0.236	6590	0.236	7130	0.236	7670	0.236	8210	0.236	8750	0.236
6060	0.236	6600	0.236	7140	0.236	7680	0.236	8220	0.236	8760	0.236
6070	0.236	6610	0.236	7150	0.236	7690	0.236	8230	0.236	8770	0.236
6080	0.236	6620	0.236	7160	0.236	7700	0.236	8240	0.236	8780	0.236
6090	0.236	6630	0.236	7170	0.236	7710	0.236	8250	0.236	8790	0.236
6100	0.236	6640	0.236	7180	0.236	7720	0.236	8260	0.236	8800	0.236
6110	0.236	6650	0.236	7190	0.236	7730	0.236	8270	0.236	8810	0.236
6120	0.236	6660	0.236	7200	0.236	7740	0.236	8280	0.236	8820	0.236
6130	0.236	6670	0.236	7210	0.236	7750	0.236	8290	0.236	8830	0.236
6140	0.236	6680	0.236	7220	0.236	7760	0.236	8300	0.236	8840	0.236
6150	0.236	6690	0.236	7230	0.236	7770	0.236	8310	0.236	8850	0.236
6160	0.236	6700	0.236	7240	0.236	7780	0.236	8320	0.236	8860	0.236
6170	0.236	6710	0.236	7250	0.236	7790	0.236	8330	0.236	8870	0.236
6180	0.236	6720	0.236	7260	0.236	7800	0.236	8340	0.236	8880	0.236
6190	0.236	6730	0.236	7270	0.236	7810	0.236	8350	0.236	8890	0.236
6200	0.236	6740	0.236	7280	0.236	7820	0.236	8360	0.236	8900	0.236
6210	0.236	6750	0.236	7290	0.236	7830	0.236	8370	0.236	8910	0.236
6220	0.236	6760	0.236	7300	0.236	7840	0.236	8380	0.236	8920	0.236
6230	0.236	6770	0.236	7310	0.236	7850	0.236	8390	0.236	8930	0.236
6240	0.236	6780	0.236	7320	0.236	7860	0.236	8400	0.236	8940	0.236
6250	0.236	6790	0.236	7330	0.236	7870	0.236	8410	0.236	8950	0.236
6260	0.236	6800	0.236	7340	0.236	7880	0.236	8420	0.236	8960	0.236
6270	0.236	6810	0.236	7350	0.236	7890	0.236	8430	0.236	8970	0.236
6280	0.236	6820	0.236	7360	0.236	7900	0.236	8440	0.236	8980	0.236
6290	0.236	6830	0.236	7370	0.236	7910	0.236	8450	0.236	8990	0.236
6300	0.236	6840	0.236	7380	0.236	7920	0.236	8460	0.236	9000	0.236
6310	0.236	6850	0.236	7390	0.236	7930	0.236	8470	0.236	9010	0.236
6320	0.236	6860	0.236	7400	0.236	7940	0.236	8480	0.236	9020	0.236
6330	0.236	6870	0.236	7410	0.236	7950	0.236	8490	0.236	9030	0.236
6340	0.236	6880	0.236	7420	0.236	7960	0.236	8500	0.236	9040	0.236
6350	0.236	6890	0.236	7430	0.236	7970	0.236	8510	0.236	9050	0.236
6360	0.236	6900	0.236	7440	0.236	7980	0.236	8520	0.236	9060	0.236
6370	0.236	6910	0.236	7450	0.236	7990	0.236	8530	0.236	9070	0.236
6380	0.236	6920	0.236	7460	0.236	8000	0.236	8540	0.236	9080	0.236
6390	0.236	6930	0.236	7470	0.236	8010	0.236	8550	0.236	9090	0.236
6400	0.236	6940	0.236	7480	0.236	8020	0.236	8560	0.236	9100	0.236
6410	0.236	6950	0.236	7490	0.236	8030	0.236	8570	0.236	9110	0.236

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
9120	0.236	9410	0.236	9700	0.236	9990	0.236	10280	0.236	10570	0.236
9130	0.236	9420	0.236	9710	0.236	10000	0.236	10290	0.236	10580	0.236
9140	0.236	9430	0.236	9720	0.236	10010	0.236	10300	0.236	10590	0.236
9150	0.236	9440	0.236	9730	0.236	10020	0.236	10310	0.236	10600	0.236
9160	0.236	9450	0.236	9740	0.236	10030	0.236	10320	0.236	10610	0.236
9170	0.236	9460	0.236	9750	0.236	10040	0.236	10330	0.236	10620	0.236
9180	0.236	9470	0.236	9760	0.236	10050	0.236	10340	0.236	10630	0.236
9190	0.236	9480	0.236	9770	0.236	10060	0.236	10350	0.236	10640	0.236
9200	0.236	9490	0.236	9780	0.236	10070	0.236	10360	0.236	10650	0.236
9210	0.236	9500	0.236	9790	0.236	10080	0.236	10370	0.236	10660	0.236
9220	0.236	9510	0.236	9800	0.236	10090	0.236	10380	0.236	10670	0.236
9230	0.236	9520	0.236	9810	0.236	10100	0.236	10390	0.236	10680	0.236
9240	0.236	9530	0.236	9820	0.236	10110	0.236	10400	0.236	10690	0.236
9250	0.236	9540	0.236	9830	0.236	10120	0.236	10410	0.236	10700	0.236
9260	0.236	9550	0.236	9840	0.236	10130	0.236	10420	0.236	10710	0.236
9270	0.236	9560	0.236	9850	0.236	10140	0.236	10430	0.236	10720	0.236
9280	0.236	9570	0.236	9860	0.236	10150	0.236	10440	0.236	10730	0.236
9290	0.236	9580	0.236	9870	0.236	10160	0.236	10450	0.236	10740	0.236
9300	0.236	9590	0.236	9880	0.236	10170	0.236	10460	0.236	10750	0.236
9310	0.236	9600	0.236	9890	0.236	10180	0.236	10470	0.236	10760	0.236
9320	0.236	9610	0.236	9900	0.236	10190	0.236	10480	0.236	10770	0.236
9330	0.236	9620	0.236	9910	0.236	10200	0.236	10490	0.236	10780	0.236
9340	0.236	9630	0.236	9920	0.236	10210	0.236	10500	0.236	10790	0.236
9350	0.236	9640	0.236	9930	0.236	10220	0.236	10510	0.236	10800	0.236
9360	0.236	9650	0.236	9940	0.236	10230	0.236	10520	0.236		
9370	0.236	9660	0.236	9950	0.236	10240	0.236	10530	0.236		
9380	0.236	9670	0.236	9960	0.236	10250	0.236	10540	0.236		
9390	0.236	9680	0.236	9970	0.236	10260	0.236	10550	0.236		
9400	0.236	9690	0.236	9980	0.236	10270	0.236	10560	0.236		

Node HB1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	6.200	Product Number	CTL-SHE-0049-9000-0620-9000
Design Depth (m)	0.620	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	0.9	Min Node Diameter (mm)	1200

Node HB1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	6.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1727.0	1727.0	0.620	1727.0	1818.3	0.621	0.0	1818.3

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
2160 minute summer	HB1	1440	6.312	0.112	2.8	58.0144	0.0000	OK
15 minute summer	Outfall	1	5.986	0.236	0.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
2160 minute summer	HB1	1.000	0.8	88.9

Results for 10 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
720 minute summer	HB1	720	6.437	0.237	12.9	123.2903	0.0000	SURCHARGED
15 minute summer	Outfall	1	5.986	0.236	0.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
720 minute summer	HB1	1.000	0.9	100.5

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	HB1	720	6.505	0.305	16.0	158.3481	0.0000	SURCHARGED
15 minute summer	Outfall	1	5.986	0.236	0.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
720 minute summer	HB1	1.000	0.9	103.1

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	HB1	1410	6.676	0.476	8.7	247.1409	0.0000	FLOOD RISK
15 minute summer	Outfall	1	5.986	0.236	0.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	HB1	1.000	0.9	122.3

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	HB1	945	6.599	0.399	10.6	207.3201	0.0000	SURCHARGED
15 minute summer	Outfall	1	5.986	0.236	0.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
960 minute winter	HB1	1.000	0.9	109.8

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	HB1	1410	6.811	0.611	10.9	317.2932	0.0000	FLOOD RISK
15 minute summer	Outfall	1	5.986	0.236	0.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	HB1	1.000	0.9	131.0

Appendix 8

Interim Drainage Management and Maintenance Plan

Interim Drainage Management and Maintenance Plan



Project	Chalcroft Nursery, Bersted, West Sussex
Project Number	24123
By	Stuart Magowan
Date	24 September 2026

1 Introduction

- 1.1 This Interim Drainage Management and Maintenance Plan has been prepared as the initial draft of the document that will become the Drainage Maintenance and Management Manual.
- 1.2 The Drainage Management and Maintenance Manual will be completed as part of the Operation and Maintenance Manual to be provided by the Principal Contractor on completion of construction.
- 1.3 The Drainage Management and Maintenance Manual will be handed over to a Management Company appointed by the Developer on behalf of the Site Operators on project completion.
- 1.4 The Drainage Management and Maintenance Manual will remain a live document and will be used to guide and record the management and maintenance of the surface water and foul drainage systems.
- 1.5 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 Site Operators.

2 During Construction

- 2.1 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.
- 2.2 The Contractor will maintain the proposed drainage system during construction and until the handing over of the site.
- 2.3 Prior to handover a pre-handover inspection will be undertaken by the Contractor and the Management Company.



3 Surface Water Drainage System

- 3.1 The surface water drainage system has been designed as a Sustainable Urban Drainage System (SuDS).
- 3.2 The system has been designed to collect surface water from the roofs and discharge it at a restricted rate to the watercourse at the north of the site.
- 3.3 Onsite highways and parking areas have been designed as permeable pavement which will also discharge surface water at a restricted rate to the watercourse at the north of the site and will provide storage for high intensity rainfall events within a voided subbase.
- 3.4 The system incorporates SuDS planters across the site which collect and reuse rainwater to irrigate the planters.
- 3.5 The system will provide water quality improvement to ensure that at the point of discharge the surface water has received suitable pollution mitigation.

4 Schedule of Maintenance

- 4.1 Management of shared drainage facilities will be passed on to a Management Company.
- 4.2 Maintenance of individual building drainage connections, gutters and downpipes, are the responsibility of the individual building owners (the Site Operators).
- 4.3 There are three categories of maintenance activities:

- **Regular maintenance**

Basic tasks undertaken on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.

- **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).

- **Remedial maintenance**

Intermittent tasks that may be required to rectify faults associated with the system. 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.

- 4.4 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 – SuDS planters, catchpits, headwalls and manholes	Monthly or as required
	Cleaning of gutters and any filters on downpipes and SuDS Planters	3 Monthly
	Maintain SuDS planting and ensure vegetation is thriving.	3 Monthly or as required
Occasional Maintenance	Remove sediment and debris from silt trap chambers, channel drains, inlet chambers and SuDS Planters	6 monthly
	Visual inspection of permeable paving for defects and settlement	Annually
	Sweeping / brushing of permeable paving	Every 2 years
	Surface and foul water pipework - jetting / rodding	Every 2 years or as required
Remedial Maintenance	Remove debris / blockages to silt traps / channel drains / 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, headwalls and gullies for blockages, standing water and clear	As required
	Reconstruct storage structures if performance deteriorates or failure occurs	As required
Monitoring	Inspect silt traps and note the rate sediment has accumulated	Monthly in the first year and then annually
	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
Gullies, Channel Drains and Gutters		✓	✓		✓	
Catchpits	✓				✓	
Surface and Foul Water Pipework						✓
Permeable Paving				✓		
SuDS Planter		✓	✓		✓	
Flow Controls			✓			
Storage Facilities				✓		
Existing Watercourse	✓					

Inspection Frequency Summary

5 Maintenance Procedures

5.1 It is recommended that the Management Company employ a suitably qualified company to undertake the maintenance works for all shared drainage.

5.2 The following procedures provide a guide to the two most common maintenance items, jetting and silt removal, to be undertaken on site:

5.3 Jetting

5.3.1 Equipment Required:

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

5.3.2 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 or structure length is cleaned.
- Monitor the process to avoid any damage to the drainage infrastructure.
- Collect dislodged silt and debris at the downstream end using a vacuum or manual removal.

5.4 Silt Removal and Disposal

5.4.1 Equipment Required:

- Vacuum truck or manual removal tools.
- Containers for temporary storage of silt and debris.

5.4.2 Typical Procedure:

- Collect the dislodged silt and debris from the downstream end of pipe or structure.
- Transfer the collected material to the containers.
- Dispose of the collected silt and debris following local regulations and environmental guidelines.

5.5 Planter and Ecology Maintenance and Procedures

5.5.1 It is recommended that the Management Company employ a suitably qualified company to undertake the maintenance works for the planters.

5.6 Establishment Criteria

5.6.1 A defined establishment (defect-rectification) period of five growing seasons shall apply, with the following performance criteria monitored annually against a baseline recorded at practical completion:

Criterion	Target
Marginal / emergent cover	At least 80% vegetative cover of the planted area by the end of Year 2, with no single species exceeding ~30% (to maintain diversity).
Species establishment	At least 75% of the specified species present and viable at the end of Year 3.
Invasive / undesirable species	Zero Schedule 9 INNS; injurious weeds (e.g. creeping thistle, ragwort, docks) controlled to less than 5% cover.

5.7 Replacement Requirements

- Any plants that fail, die or are lost to more than the thresholds above shall be replaced like-for-like (same native species and provenance) in the next appropriate planting season; seeding spring or early autumn).
- Replacement planting shall itself be covered by the remaining establishment period, or a minimum of one further growing season, whichever is greater.
- If a species repeatedly fails, the ecologist may substitute an ecologically equivalent native species suited to the observed conditions, recorded as a change to the planting schedule.
- At the end of the establishment period a handover survey shall confirm the criteria are met; outstanding replacement or remedial works shall be completed before the maintenance responsibility passes fully to the Management Company.

5.7.1 Preventing invasive-species transfer

- Apply Check, Clean, Dry to all maintenance activity moving between the planters and the northern watercourse, and never move water, sediment or vegetation from the watercourse into planters (or vice versa).
- Maintain the planters and monitor for early signs of INNS, treating any incursion promptly to prevent downstream spread.

5.8 Monitoring and Maintenance Integration

5.8.1 Key provisions include:

- Ecological inspection at each maintenance visit, with works timed sensitively (e.g. avoiding the March–August bird-nesting and amphibian-breeding season for cutting/clearance where practicable).

- Annual establishment monitoring for five years, with replacement planting as required and reporting to the Management Company.

6 Financing

- 6.1 The regular and corrective maintenance of all shared elements of the drainage system will be managed and funded through the Management Company on behalf of the Site Operators.
- 6.2 Maintenance of individual building drainage infrastructure , gutters and downpipes, will be funded by the individual building owners (the Site Operators).

7 Health and Safety

7.1 Designers Residual Risks

- 7.1.1 There are no significant residual risks associated with the construction of the proposed surface or foul water drainage network or permeable paving system beyond common site risks that would reasonably be anticipated by a competent Civil Engineering Contractor.

7.2 Construction Phase

- 7.2.1 The Principal Contractor will undertake a construction phase Health and Safety Plan for the site.
- 7.2.2 Prior to handover the Principal Contractor will undertake a review of maintenance activities required and prepare suitable Health and Safety documentation as part of the site hand over documents.

8 Design Life

- 8.1 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.
- 8.2 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 arrange for the replacement of the faulty component.

9 Emergency Plan

9.1 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

9.2 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
 - 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

9.3 Spillages

9.3.1 If a serious spillage in volume or toxicity occurs on site then the spillage should be isolated with soil, turf or specialist fabric and all downstream outlets should be bunged / blocked.

9.3.2 Once the spillage is contained the Environment Agency should be contacted immediately on 0370 850 6506.

9.4 Emergency Contact Details

Management Company TBC

Drainage Inspection Checklist



The Civil Engineering Practice
11 Tungsten Building
George Street
Fishersgate
Sussex
BN41 1RA

Project	Chalcroft Nursery
Project Number	24123

Inspection date		Inspector / company	
Weather		Previous rainfall	
Inspection type	☐ Monthly ☐ 3-monthly ☐ 6-monthly ☐ Annual ☐ Autumn ☐ 2-year ☐ Reactive	Drawing / area reference	

Complete the applicable rows for the current inspection frequency. Mark N/A where an item is not due. Record defects and transfer required works to the separate Maintenance Proforma.

Frequency	Component	Inspection / action	Result	Defect reference
Monthly / first year	Catchpits and silt traps	Inspect for litter, debris, blockage and sediment accumulation. Record sediment depth or rate of accumulation.	☐ Satisfactory ☐ Defect ☐ N/A	
Monthly / as required	SuDS planters, catchpits, headwalls and manholes	Remove or schedule removal of litter and debris.	☐ Satisfactory ☐ Defect ☐ N/A	
Monthly	Existing watercourse	Inspect condition, free flow and visible obstruction at or near the site discharge.	☐ Satisfactory ☐ Defect ☐ N/A	
3-monthly	Gullies, channel drains and gutters	Inspect and clean gutters and filters on downpipes; check gullies and channel	☐ Satisfactory ☐ Defect	



Frequency	Component	Inspection / action	Result	Defect reference
		drains for blockage or standing water.	☐ N/A	
3-monthly / as required	SuDS planters	Check planting condition and confirm vegetation is thriving; identify failed plants, nuisance plants, injurious weeds or INNS.	☐ Satisfactory ☐ Defect ☐ N/A	
6-monthly	Silt traps, channel drains, inlet chambers and SuDS planters	Inspect sediment and debris levels; confirm removal is required or completed.	☐ Satisfactory ☐ Defect ☐ N/A	
6-monthly	Flow controls	Inspect for obstruction, damage and evidence of impaired operation.	☐ Satisfactory ☐ Defect ☐ N/A	
After autumn leaf fall	Gullies, channel drains and gutters	Inspect and clear leaf litter, debris and filters.	☐ Satisfactory ☐ Defect ☐ N/A	
After autumn leaf fall	Catchpits	Inspect and clear leaf litter and accumulated debris.	☐ Satisfactory ☐ Defect ☐ N/A	
After autumn leaf fall	SuDS planters	Remove leaf litter where it obstructs inlets/outlets; retain appropriate organic matter where compatible with planting.	☐ Satisfactory ☐ Defect ☐ N/A	
Annual	Permeable paving	Visual inspection for defects, settlement, broken blocks, depressions and rutting.	☐ Satisfactory ☐ Defect ☐ N/A	

Frequency	Component	Inspection / action	Result	Defect reference
Annual	Storage facilities	Confirm structures are fully emptying and show no evidence of deterioration or failure.	☐ Satisfactory ☐ Defect ☐ N/A	
Annual for 5 years	SuDS planting establishment	Record vegetative cover, species establishment, invasive/undesirable species and replacement planting needs against the plan criteria.	☐ Satisfactory ☐ Defect ☐ N/A	
2-yearly / as required	Surface and foul water pipework	Inspect maintenance records and undertake or schedule jetting / rodding where due or necessary.	☐ Satisfactory ☐ Defect ☐ N/A	
2-yearly	Permeable paving	Undertake or schedule sweeping / brushing.	☐ Completed ☐ Required ☐ N/A	
Reactive	All inlets, outlets, downpipes, channel drains, headwalls and gullies	Check blockages, standing water, overflow or ponding; clear where safe and appropriate.	☐ Satisfactory ☐ Defect ☐ N/A	
Reactive	Access chambers and manhole covers	Check damage, instability and safe access.	☐ Satisfactory ☐ Defect ☐ N/A	

Inspection Summary and Sign-off

Overall condition	☐ Satisfactory	Emergency action needed	☐ No ☐ Yes
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	☐ Satisfactory with minor works ☐ Unsatisfactory		
Maintenance proforma raised	☐ No ☐ Yes, Ref:	Follow-up inspection due	
Inspector signature		Date	

Emergency indicators include overflowing manholes or inspection chambers, overflowing or ponding gullies/channel drains, or other evidence that the drainage system is not performing as intended. Escalate immediately in accordance with the plan.

Drainage Maintenance Proforma



The Civil Engineering Practice
11 Tungsten Building
George Street
Fishersgate
Sussex
BN41 1RA

Project	Chalcroft Nursery
Project Number	24123

Proforma reference		Date raised	
Raised by		Related inspection date / ref	
Priority	☐ Routine ☐ Urgent ☐ Emergency	Target completion date	
Contractor / operative		Work area / asset ID	

1 Defect or Maintenance Requirement

Component / location

Observed condition / defect

Likely cause, if known



Photograph / drawing references

2 Required Maintenance

☐ Vegetation management / nuisance plant removal	☐ Litter and debris removal
☐ Clean gutters / downpipe filters	☐ Maintain or replace SuDS planting
☐ Sediment removal	☐ Clear blockage
☐ Jet / rod pipework	☐ Sweep / brush permeable paving
☐ Repair chamber / cover	☐ Replace permeable blocks / repair settlement or rutting
☐ Repair / reconstruct storage structure	☐ Other: _____

3 Risk, Environmental and Access Controls

☐ Site-specific RAMS reviewed	☐ Appropriate PPE confirmed
☐ Chamber / confined-space risks assessed	☐ Traffic / pedestrian controls provided
☐ Pollution and spill controls available	☐ Downstream outlet protection considered

☐ Check, Clean, Dry applied where moving between planters and watercourse	☐ Ecological timing / nesting and amphibian constraints considered
☐ Waste / silt containment and disposal route confirmed	☐ Permit / access approval obtained where required

4 Work Completion Record

Date attended		Completion status	☐ Complete ☐ Part complete ☐ Further works required
Operatives		Waste transfer / disposal ref	
Plant / equipment used		Photos after completion	

Work undertaken

Materials / replacement planting used

Residual defect or further action required

5 Verification and Close-out

System operating satisfactorily	☐ Yes ☐ No ☐ Not verified	Follow-up inspection required	☐ No ☐ Yes, date:
Record updated in maintenance log	☐ Yes ☐ No	Escalated to Management Company	☐ No ☐ Yes
Completed by / signature		Date	
Verified by / signature		Date	

If flooding, overflow, persistent ponding, a serious blockage, structural failure or a serious spillage is identified, apply the emergency arrangements in the Drainage Management and Maintenance Plan and notify the responsible party without delay.

Appendix 9

Surface Water Exceedance Route Plan

