Appendix F

Proposed Development Layout Drawing

N

17.4m

Pond

Wellwick Farm Cottages

B 1027

COLCHESTER ROAD

Track

Pumping Station

Pit (disused)

Open Space

Open Space

Pond

Pond

Engine Pond

9246

Well

Drain

Pond

Pond

BM 17.55m

16.6m

BM 16.47m

Lamb Farm Cottages

Lamb Farm

Lamb

Revision	Date	Amendment	Initials
B	19.03.24	Amendments to extension area	SAH
A	24.10.23	Development extension area amended	SAH

Drawing Title	**Wellwick Indicative Site Plan**
Drawing Number	**CC009-PL-02-1**
Revision	**Rev A**
Scale @ A1	1:1000
Drawn By	SAH
Date Started	May 2023
Checked by	
Date	08.02.2024

Development

Wellwick

St.Osyth, Clacton, Essex

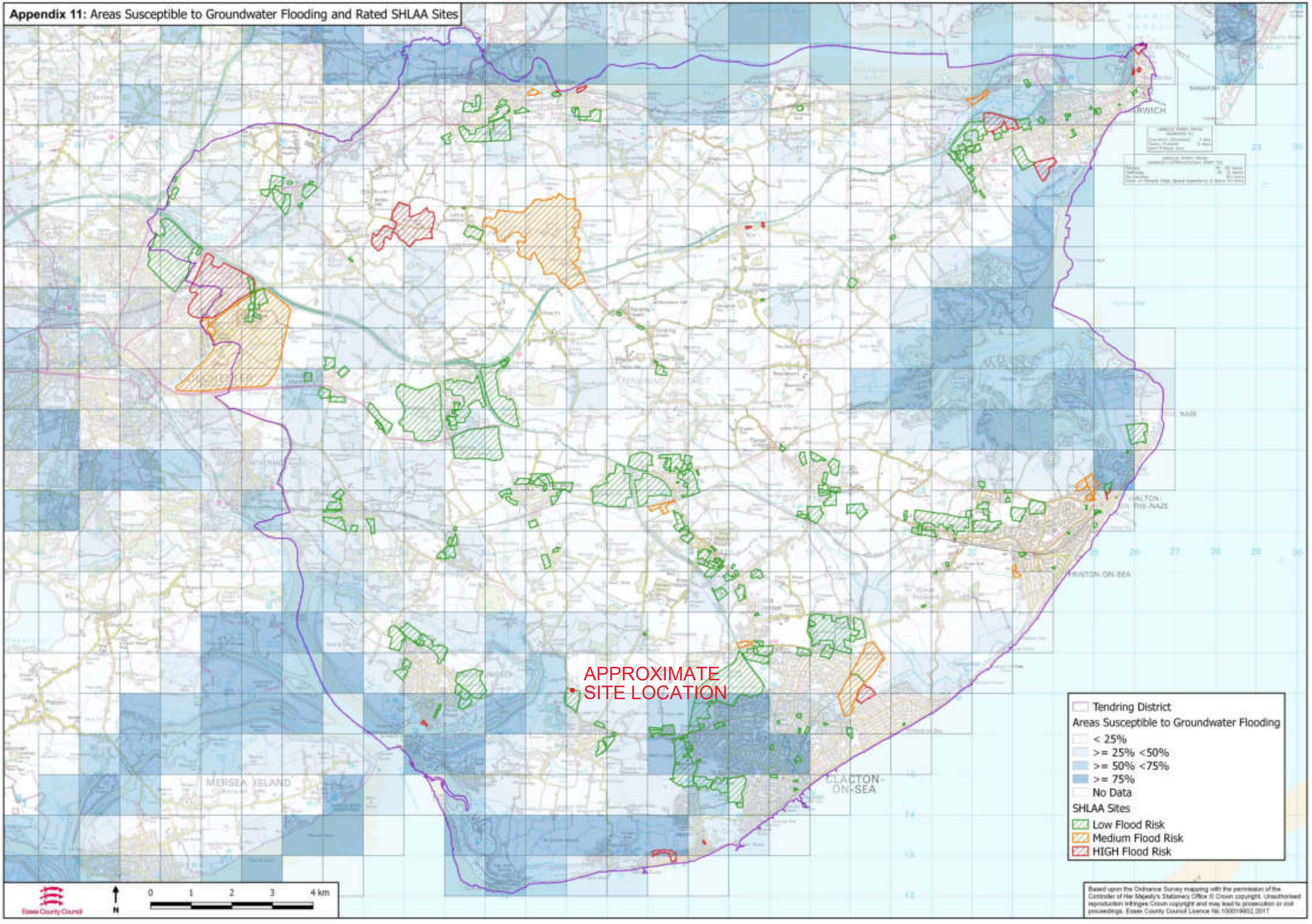
CITY & COUNTRY

BENTFIELD PLACE, BENTFIELD ROAD, STANSTED, ESSEX, CM24 8HL

[redacted]

Appendix G

Strategic Flood Risk Assessment - Areas Susceptible to Groundwater Flooding (AStGWF) mapping


Appendix 11: Areas Susceptible to Groundwater Flooding and Rated SHLAA Sites
APPROXIMATE SITE LOCATION
Tendring District
Areas Susceptible to Groundwater Flooding
< 25%
>= 25% <50%
>= 50% <75%
>= 75%
No Data
SHLAA Sites
Low Flood Risk
Medium Flood Risk
HIGH Flood Risk
0 1 2 3 4 km
N
Essex County Council
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Appendix H

Proposed Drainage Strategy Layout and Details Drawings

Legend-

- Site Boundary- Area: 4.67ha
- Proposed Exceedance Flowpath
- Indicative Surface Water Network
- Proposed Infiltration Swale
- Proposed Interception Drain
- Indicative Foul Water Network

Proposed Impermeable Area Table

Catchment	Measured Area (m^2)	10% Creep (m^2)	Total (m^2)
Plots	2720	272.0	2992.0
Garages	750.0	0	750.0
Drives	3122	0	3122.0
Footways	0	0	0.0
North Roads	2698.3	0	2698.3
Sub Total-	9290.3	272.0	9562.3

TYPICAL DRY SWALE CONSTRUCTION DETAIL (N.T.S)
(AS DESIGNED IN INFO DRAINAGE)

NOTES:

1. This drawing is to be read in conjunction with GHB series 217/2023 drawings and documents and any other relevant project team documents.
2. Preliminary Issue - This drawing is not to be used for construction or detailed pricing purposes. Any work undertaken before approvals are received (in writing) are at risk of abortive works.
3. This drawing has been produced based upon the following information:
   Topographical Survey by City & Country (Ref. N/A dated N/A) subject to transformation of :
   Scale N/A and translation (N/A, N/A, N/A) about point (N/A, N/A, N/A).
   Architectural Layout by City & Country (Ref. CC009-PL-02-1 (pdf) dated 24/05/2023) subject to transformation of :
   Scale 593.908 and translation (N/A, N/A, N/A) about point (N/A, N/A, N/A).
4. This drawing has been prepared solely for the purpose of obtaining a Planning Consent based on information available and planning requirements at the date of issue only.

Rev	Rev Date	Description	Drawn	Chck'd
P5	21/03/24	Updated layout added	JWT	JAH
P4	08/03/24	Drainage layout updated	JWT	JAH
P3	23/01/24	Drainage layout updated	ARC	JAH
P2	21/12/23	Layout and Site Boundary Alterations	ARC	JAH
P1	12/12/23	Initial Issue	ARC	JAH

GHBullard & Associates LLP
Civil and Traffic Engineering Consultants
[redacted]
27 Barton Road,
Thurston,
Suffolk,
IP31 3PA

Client: CITY & COUNTRY

Project: RESIDENTIAL DEVELOPMENT
WELLWICK SITE
ST OSYTH, ESSEX

Drawing Title: FLOOD RISK ASSESSMENT
AND DRAINAGE STRATEGY
PROPOSED SURFACE WATER
STRATEGY

Status: FOR PLANNING

Scale: 1:1000 @ A1

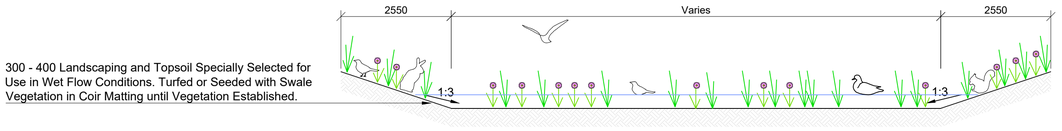
Created: DEC 2023 | Drawn: ARC

DWG Reference: 217-2023.DWG | Checked: JAH

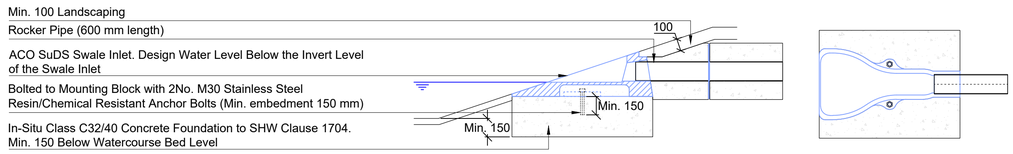
Drawing Number: 217/2023/012

Revision: P5

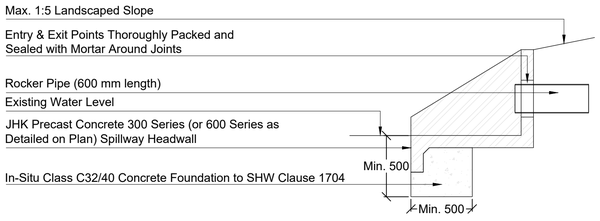
P# = Preliminary, C# = Construction, AB# = As Built



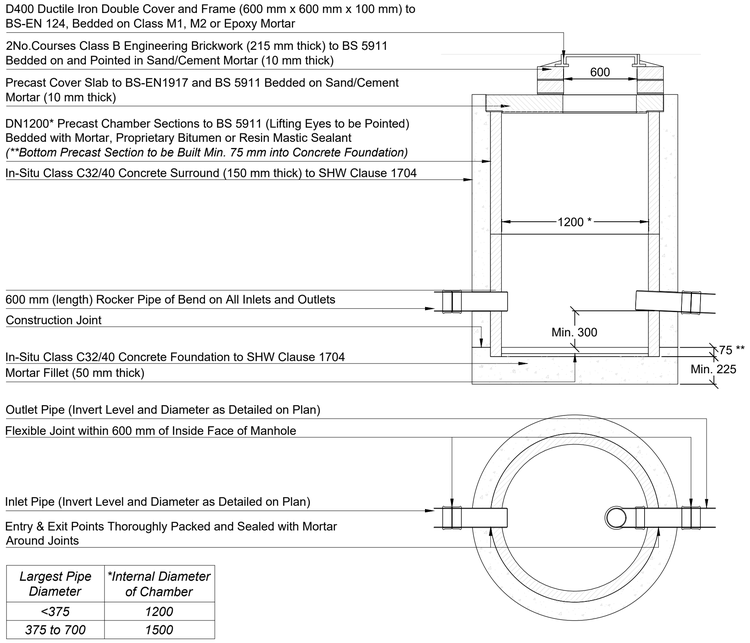
BIO-RETENTION BASIN PROFILE (NOT TO SCALE)



TYPICAL HEADWALL (ACO SuDS SWALE INLET) DETAIL

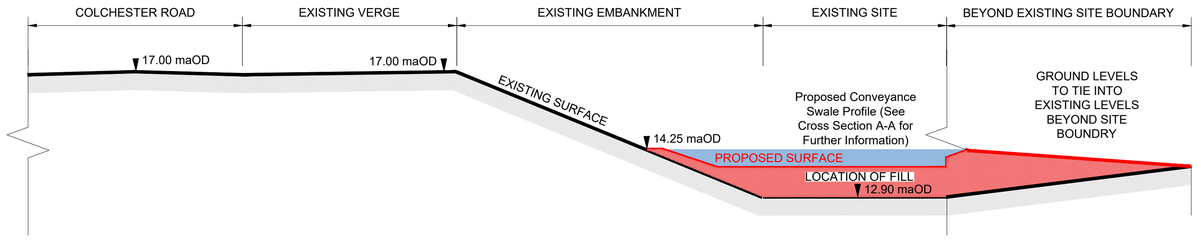


TYPICAL HEADWALL DETAIL

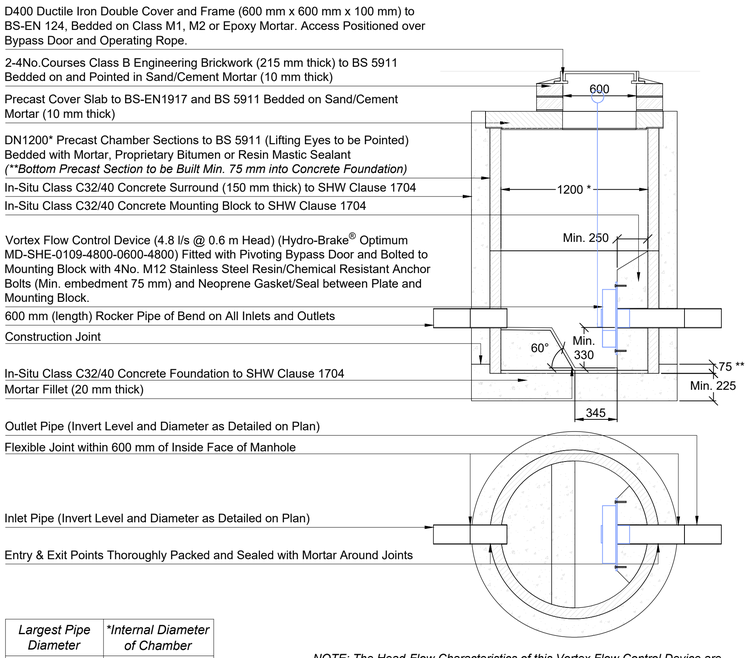


Largest Pipe Diameter	**Internal Diameter of Chamber*
<375	*1200*
375 to 700	*1500*

TYPICAL CATCHPIT DETAIL



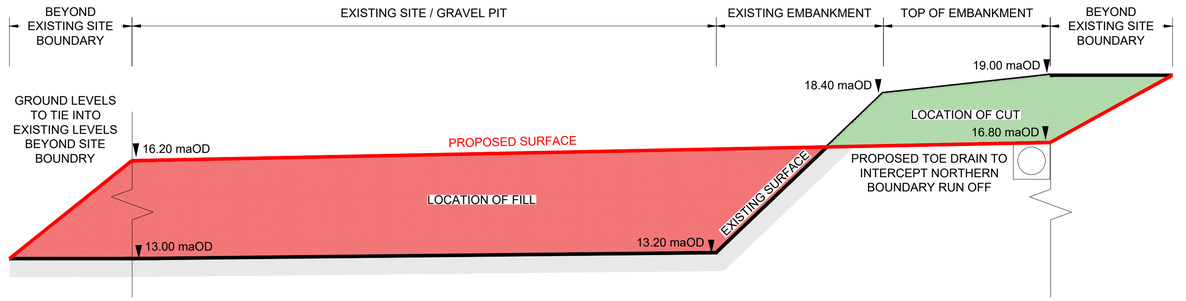
CROSS SECTION B-B: INDICATIVE PROPOSED AND EXISTING LEVELS (NOT TO SCALE)



Largest Pipe Diameter	**Internal Diameter of Chamber*
<375	*1200*
375 to 700	*1500*

NOTE: The Head-Flow Characteristics of this Vortex Flow Control Device are Unique. The use of any flow control device other to that specified above will invalidate the design and could cause non-compliance with the hydraulic model.

TYPICAL VORTEX FLOW CONTROL CATCHPIT DETAIL



CROSS SECTION C-C: INDICATIVE PROPOSED AND EXISTING LEVELS (NOT TO SCALE)

NOTES:

1. This drawing is to be read in conjunction with GHB series 217/2023 drawings and documents and any other relevant project team documents.
2. Preliminary Issue - This drawing is not to be used for construction or detailed pricing purposes. Any work undertaken before approvals are received (in writing) are at risk of abortive works.
3. This drawing has been produced based upon the following information:
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   Scale N/A and translation (N/A, N/A, N/A) about point (N/A, N/A, N/A).
   Architectural Layout by City & Country (Ref. CC009-PL-02-1 (pdf) dated 24/05/2023) subject to transformation of :
   Scale 593.908 and translation (N/A, N/A, N/A) about point (N/A, N/A, N/A).
4. This drawing has been prepared solely for the purpose of obtaining a Planning Consent based on information available and planning requirements at the date of issue only.
5. Refer to GHB Drawing No. 217/2023/012 for respective cross-section locations.

Rev	Rev Date	Description	Drawn	Chck'd
P4	08/03/24	Bio-retention basin detail added	ARC	JAH
P3	12/01/24	Swale Dimension Changes	ARC	JAH
P2	21/12/23	Swale Dimension Changes	ARC	JAH
P1	12/12/23	Initial Issue	ARC	JAH

GHBullard & Associates LLP
Civil and Traffic Engineering Consultants
[redacted]
27 Barton Road,
Thurston,
Suffolk,
IP31 3PA

Client: CITY & COUNTRY

Project: RESIDENTIAL DEVELOPMENT
WELLWICK SITE
ST OSYTH, ESSEX

Drawing Title: FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY
PROPOSED SURFACE WATER CONSTRUCTION DETAILS

Status:	FOR PLANNING
Scale:	NTS @ A1
Created:	DEC 2023
Drawn:	ARC
DWG Reference:	217-2023.DWG
Checked:	JAH
Drawing Number:	217/2023/013
Revision:	P4

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

Appendix I

InfoDrainage Calculations

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by:	Checked by:	Approved By:
	JWT	JAH	JAH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

Swale

Type : Swale

Swale

Exceedance Level (m)	15.300
Depth (m)	0.550
Base Level (m)	14.750
Top Width (m)	8.700
Side Slope (1:X)	3.00
Base Width (m)	5.400
Freeboard (mm)	300
Length (m)	405.000
Long. Slope (1:X)	10000.00
Filtration Rate (m/hr)	500.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	1541.228

Trench

Trench Depth (m)	1.400
Trench Porosity (%)	30

Advanced

Safety Factor	10.0

Swale

Side Infiltration Rate (m/hr)	0.036
Porosity (%)	100

Trench

Base Infiltration Rate (m/hr)	0.0194
Side Infiltration Rate (m/hr)	0.036
Trench Conductivity (m/hr)	500.0

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by:	Checked by:	Approved By:
	JWT	JAH	JAH
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

Swale LowInf

Type : Swale

Swale

Exceedance Level (m)	15.300
Depth (m)	0.550
Base Level (m)	14.750
Top Width (m)	8.700
Side Slope (1:X)	3.00
Base Width (m)	5.400
Freeboard (mm)	300
Length (m)	415.000
Long. Slope (1:X)	10000.00
Filtration Rate (m/hr)	500.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	1579.283

Trench

Trench Depth (m)	1.400
Trench Porosity (%)	30

Advanced

Safety Factor	10.0

Swale

Side Infiltration Rate (m/hr)	0.036
Porosity (%)	100

Trench

Side Infiltration Rate (m/hr)	0.036
Trench Conductivity (m/hr)	500.0

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by: JWT	Checked by: JAH	Approved By: JAH
Report Details: Type: Inflow Summary Storm Phase: Phase	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	Swale LowInf		Time of Concentration	2.412	100	0	100	2.412
Catchment Area (1)	Swale		Time of Concentration	0.738	100	0	100	0.738
Catchment Area (2)	Swale		Time of Concentration	0.218	100	0	100	0.218
TOTAL		**0.0**		**3.368**				**3.368**

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by: JWT	Checked by: JAH	Approved By: JAH
Report Details: Type: Outfall Details Storm Phase: Phase	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Swale	Free Discharge		
Swale LowInf	Free Discharge		

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by: JWT	Checked by: JAH	Approved By: JAH
Report Title: Rainfall Analysis Criteria	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by: JWT	Checked by: JAH	Approved By: JAH
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Status
Swale	FEH: 2 years: +0 %: 720 mins: Winter	13.749	13.711	0.358	0.361	17.1	235.869	0.000	118.526	0.0	0.000	1412	OK
Swale LowInf	FEH: 2 years: +0 %: 10080 mins: Summer	14.799	14.791	1.408	1.441	9.5	993.953	0.000	899.108	2.2	135.297	4074	OK

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by: JWT	Checked by: JAH	Approved By: JAH
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Status
Swale	FEH: 30 years: +0 %: 10080 mins: Summer	14.572	14.551	1.182	1.201	13.9	781.872	0.000	1379.087	0.0	0.000	3449	OK
Swale LowInf	FEH: 30 years: +0 %: 720 mins: Winter	14.840	14.833	1.449	1.483	77.5	1097.047	0.000	83.565	18.5	309.025	920	OK

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by: JWT	Checked by: JAH	Approved By: JAH
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Status
Swale	FEH: 30 years: +35 %: 960 mins: Winter	14.855	14.855	1.464	1.505	56.8	1113.295	0.000	238.501	4.9	153.979	2021	OK
Swale LowInf	FEH: 30 years: +35 %: 360 mins: Winter	14.912	14.907	1.520	1.557	187.3	1278.419	0.000	46.247	50.2	565.280	426	OK

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by: JWT	Checked by: JAH	Approved By: JAH
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Status
Swale	FEH: 100 years: +0 %: 1440 mins: Winter	14.822	14.822	1.431	1.472	38.6	1035.848	0.000	345.659	2.8	88.218	2469	OK
Swale LowInf	FEH: 100 years: +0 %: 480 mins: Winter	14.886	14.880	1.494	1.530	133.9	1211.262	0.000	59.096	38.0	506.319	520	OK

Project:	Date:		
Full Site- Swale Residential Development, Wellwick Site St. Osyth, Essex	05/03/2024		
	Designed by: JWT	Checked by: JAH	Approved By: JAH
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: G.H.Bullard & Associates 27 Barton Road, Thurston Suffolk		

FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Status
Swale	FEH: 100 years: +45 %: 720 mins: Winter	14.974	14.974	1.583	1.624	109.2	1415.995	0.000	197.759	8.7	391.000	1808	OK
Swale LowInf	FEH: 100 years: +45 %: 360 mins: Summer	14.999	14.996	1.608	1.646	373.7	1516.159	0.000	54.885	96.8	860.736	270	OK

Appendix J

Essex County Council Drainage Pro-Forma

Essex County Council

SuDS Water quantity and Quality – LLFA Technical Assessment Proforma

Introduction

This proforma identifies the information required by Essex LLFA to enable technical assessment the Designers approach to water quantity and water quality as part of SuDS design approach in compliance with Essex SuDS Design Guide.

Completion of the proforma will also allow for technical assessment against Non-statutory technical standards (NSTS) for Sustainable Drainage. The proforma will accompany the site specific Flood Risk Assessment and Drainage Strategy submitted as part of the planning application.

Please complete this form in full for full applications and the coloured sections for outline appllications. This will help us identify what information has been included and will assist with a smoother and quicker application.

Instructions for use

Use the units defined for input of figures

Numbers in brackets refer to accompanying notes.

Where ……m^3 .....m^3/m^2 *are noted – both values should be filled in.*

Site details

1.1	Planning application reference (if known)			
1.2	Site name	St Osyth Priory The Bury St Osyth, Essex CO16 8NZ		
1.3	Total application site area (1)	4.1	ha	
1.4	Predevelopment use (4)	Brownfield		
1.5	Post development use	Residential		
	If other, please sepcify	N/A		
1.6	Urban creep applicable	Yes	if yes, factor applied:	10%
1.7	Proposed design life / planning application life	100 years		
1.8	Method(s) of discharge: (5)			

☐ *Reuse* ☑ *Infiltration* ☐ *Hybrid* ☐ *Waterbody* ☐ *Storm sewer* ☐ *Combined sewer*

1.9	Is discharge direct to estuary / sea	No
1.10	Have agreements in principle (where applicable) for discharge been provided	Yes

Essex County Council

SuDS Water quantity and Quality – LLFA Technical Assessment

Calculation inputs

2.1	Area within site which is drained by SuDS (2)	9600	m^2
2.2	Impermeable area drained pre development (3)	0	m^2
2.3	Impermeable area drained post development (3)	9600	m^2
2.4	Additional impermeable area (2.3 minus 2.2)	9600	m^2
2.5	Method for assessing greenfield runoff rate	FEH	
2.6	Method for assessing brownfield runoff rate	N/A	
2.7	Coefficient of runoff (Cv) (6)	1.0	
2.8	Source of rainfall data (FEH Preferred)	FEH	
2.9	Climate change factor applied 45	%	

Attenuation (positive outlet)

2.10 Drainage outlet at risk of drowning (tidal locking, elevated water levels in watercourse/sewer)
Note: Vortex controls require conditions of free discharge to operate as per manufacturers specification.

2.11 Invert level at final outlet 12.80 mAOD

2.12 Design level used for surcharge water level at point of discharge (16) mAOD

Infiltration (Discharge to Ground)

2.13 Have infiltration tests been undertaken Yes

2.14 If yes, which method has been used BRE 365

2.15 Infiltration rate (where applicable) N/A m/s

2.16 Depth to highest known ground water table 0.6mbgl mAOD

2.17 If there are multiple infiltration features please specify where they can be found in the FRA

2.18 Depth of infiltration feature N/A mAOD

2.19 Factor of safety used for sizing infiltration storage N/A

Essex County Council

SuDS Water quantity and Quality – LLFA Technical Assessment Proforma

Calculation outputs

Sections 3 and 4 refer to site where storage is provided by full attenuation or partial infiltration. Where all flows are infiltrated to ground go straight to Section 6.

3.0 Greenfield runoff rates (incl. Urban Creep)

3.1	1 in 1 year rainfall	1.5	l/s/ha,	7.3	l/s for the site
3.2	1 in 30 year rainfall	4.3	l/s/ha,	20.9	l/s for the site
3.3	1 in 100 year rainfall + CCA	6.3 (no cca)	l/s/ha,	30.6(no cca)	l/s for the site

4.0 Brownfield runoff rates (incl. Urban Creep)

4.1	1 in 1 year rainfall	N/A	l/s/ha,	N/A	l/s for the site
4.2	1 in 30 year rainfall	N/A	l/s/ha,	N/A	l/s for the site
4.3	1 in 100 year rainfall + CCA	N/A	l/s/ha,	N/A	l/s for the site

5.0 Proposed maximum rate of runoff from site (incl. Urban Creep) (7)

5.1	1 in 1 year rainfall	4.87	l/s/ha,	4.87	l/s for the site
5.2	1 in 30 year rainfall	4.87	l/s/ha,	4.87	l/s for the site
5.3	1 in 100 year rainfall + CCA	4.87	l/s/ha,	4.87	l/s for the site

6.0 Attenuation storage to manage flow rates from site (incl. Climate Change Allowance (CCA) and Urban Creep)

6.1	Storage - 1 in 100 year + CCA (9)	2932	m^3	m^3/m^2
6.2	50% storage drain down time 1 in 30 years	8		hours

7.0 Controlling volume of runoff from the site(10)

7.1	Pre development runoff volume(12) (development area)	0	m^3 for the site
7.2	Post development runoff volume (unmitigated) (12)	0	m^3 for the site
7.3	Volume to be controlled (5.2 - 5.1)	0	m^3 for the site

Essex County Council

7.4	Volume control provided by:		
	- Interception losses[13]	N/A	m^3
	- Rain harvesting [14]	N/A	m^3
	- Infiltration	N/A	m^3
	- Attenuation	2050	m^3
	- Separate volume designated as long term storage[15]	N/A	m^3
7.5	Total volume control (sum of inputs for 5.4)	2050	m^3 [17]

8.0 Site storage volumes (full infiltration only)

8.1	Storage - 1in 30 year + CCA [8]	2400	m^3		m^3/m^2 (of developed impermeable area)
8.2	Storage - 1 in 100 year + CCA [11]	2932	m^3	2932	m^3/m^2

SuDS Water quantity and Quality – LLFA Technical Assessment Proforma

Design Inputs

Proposed site use: Residential Housing

Pollution hazard category (see C753 Table 26.2): Low/Very Low

High risk area defined as area storing fuels chemicals, refuelling area, washdown area, loading bay.

Design Outputs

List order of SuDS techniques proposed for treatment: Potential to use rain gardens and permeable paving prior to proposed Swales

Note that gully pots, pipes and tanks are not accepted by Essex LLFA as a form of treatment (for justification see C753 Section 4.1, Table 26.15 and Box B.2)

Are very high pollution risk areas drained separate from SuDS to foul system: Yes

Other

Please include any other information that is relevant to your application

Essex County Council

SuDS Water quantity and Quality – LLFA Technical Assessment Proforma

Notes

1. All area with the proposed application site boundary to be included.
2. The site area which is positively drained includes all green areas which drain to the SuDS system and area of surface SuDS features. It excludes large open green spaces which do not drain to the SuDS system.
3. Impermeable area should be measured pre and post development. Impermeable surfaces include, roofs, pavements, driveways and paths where runoff is conveyed to the drainage system.
4. Predevelopment use may impact on the allowable discharge rate. The LLFA will seek for reduction in flow rates to GF (Essex SuDS Design Guide).
5. Runoff may be discharge via one or more methods.
6. Sewers for Adoption 6th Edition recommends a Cv of 100% when designing drainage for impermeable area (assumes no loss of runoff from impermeable surfaces) and 0% for permeable areas. Where lower Cv's are used the applicant should justify the selection of Cv.
7. It is Essex County Council's preference that discharge rates for all events up to the 1 in 100 year event plus climate change are limited to the 1 in 1 greenfield rate. This is also considered to mitigate the increased runoff volumes that occur with the introduction of impermeable surfaces. If discharge rates are limited to a range of matched greenfield flows then it is necessary to provide additional mitigation of increased runoff volumes by the provision of Long-term Storage.
8. Storage for the 1 in 30 year must be fully contained within the SuDS components. Note that standing water within SuDS components such as ponds, basins and swales is not classified as flooding. Storage should be calculated for the critical duration rainfall event.
9. Runoff generated from rainfall events up to the 1 in 100 year will not be allowed to leave the site in an uncontrolled way. Temporary flooding of designated areas to shallow depths and velocities may be acceptable.
10. The following information should only be provided if increased runoff volumes are not mitigated by limiting all discharge rates back to the greenfield 1 in 1 year rate.
11. Climate change is specified as 40% increase to rainfall intensity, unless otherwise agreed with the LLFA / EA.
12. To be determined using the 100 year return period 6 hour duration winter rainfall event.
13. Where Source Control is provided Interception losses will occur. An allowance of 5mm rainfall depth can be subtracted from the net inflow to the storage calculation where interception losses are demonstrated. The Applicant should demonstrate use of subcatchments and source control techniques. Further information is available in the SuDS Design Guide.
14. Please refer to Rain harvesting BS for guidance on available storage.
15. Flows within long term storage areas should be infiltrated to the ground or discharged at low flow rate of maximum 2 l/s/ha.
16. Careful consideration should be used for calculations where flow control / storage is likely to be influenced by surcharged sewer or peak levels within a watercourse. Outlets can be tidally locked where discharge is direct to estuary or sea. Calculations should demonstrate that risk of downed outlet has been taken into consideration. Vortex controls require conditions of free discharge to operate as per specification.
17. In controlling the volume of runoff the total volume from mitigation measures should be greater than or equal to the additional volume generated.