Little Waltham

Opus

Flood Risk Assessment

30th October 2023

CSP
CONSULTING CIVIL & STRUCTURAL ENGINEERING PROFESSIONALS

FLOOD RISK ASSESSMENT

INTEGRATED RETIREMENT COMMUNITY

ON

LAND WEST OF BLASFORD HILL (B1008)
LITTLE WALTHAM
CHELMSFORD
CM3 3PA

Project No: SRL004

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SRL004

RECORD SCHEDULE

Revision	Date	By	Summary of Changes
1	14/09/2023	CMP	FIRST ISSUE
2	29/09/2023	CMP	SECOND ISSUE
3	30/10/2023	CMP	UPDATED TO SUIT DESIGN TEAM & CLIENT COMMENTS

LIST OF CONTENTS

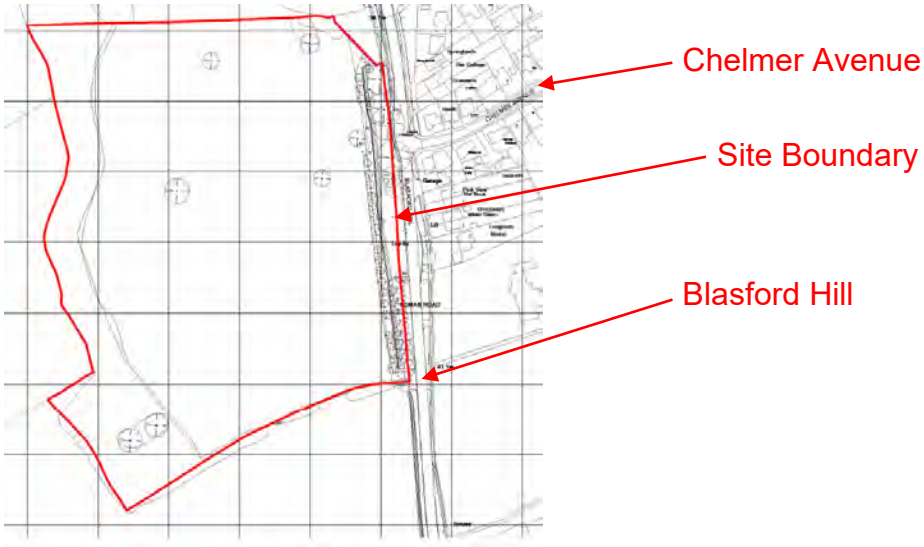
1.0 INTRODUCTION

1.1 Site Location

The site is located on greenfield land west of Blasford Hill (B1008), Little Waltham, Chelmsford, CM3 3PA (nearby postcode).

A woodland is present within the west of the site and a linear ditch is noted on the topographical survey running parallel to the eastern site boundary (south to north).

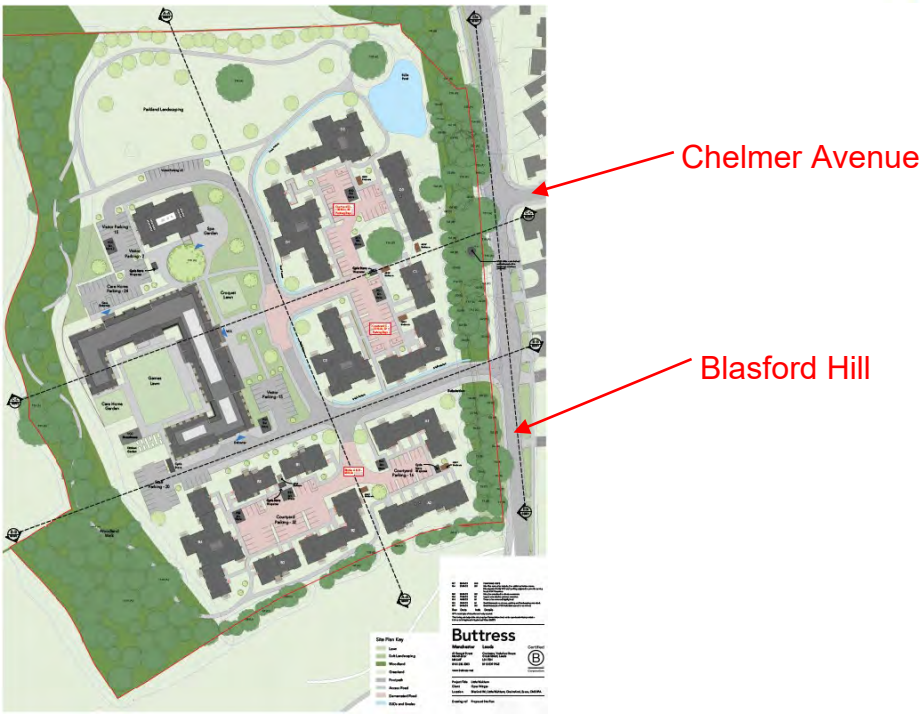
The site is approximately 6.9 hectares and the location with an approximate red line boundary is shown below. See Appendix A for the topographical survey.



1.2 Development Proposals

The development proposals are for the erection of an Integrated Retirement Community (Use Class C2) comprising; a Village Care Centre, care home, one and two bedroom care suites, and one and two bedroom care apartments, wellness spa, open space and associated works including car parking, access, hard and soft landscaping and associated engineering works.

An extract of the development proposal is included below and the full plan is included in Appendix B.



1.3 Geology

The site is partly underlain by Glaciofluvial Deposits comprising sand and gravel and partly underlain by Head deposits of clay, silt, sand and gravel. The bedrock geology is made up of the London Clay Formation, the depth of which is to be confirmed by on-site testing and is not expected to affect the drainage strategy.

NSRI Soilscapes define the ground conditions as “Neutral and acid pastures and deciduous woodlands; acid communities such as bracken and gorse in the uplands”. Drainage is characterised as “freely draining”.

Based on the geology, infiltration is likely to be a viable outfall solution only in the Glaciofluvial Deposits at the top of the site. The Head Deposits, due to the clay and silt content are unlikely to provide a sufficiently high infiltration rate to accommodate soakaways. However, on-site tests will be carried out to determine the actual infiltration rates prior to detailed design.

1.4 Existing Drainage Infrastructure

The existing site is greenfield, with linear woodlands along the west, south and east and a few trees dotted across the site. The wider topography falls from west to east and so the woodland on the west of the site intercepts overland runoff from the adjacent upstream agricultural land.

Surface water mapping shows the site is predominantly at Very Low risk of flooding, which adds to the likelihood of infiltration being a viable outfall solution. There is an area of Low risk in the northwest corner of the site, where a possible channel has formed through the woodland within a contour valley.

There is no record of existing on-site drainage infrastructure (such as pipes etc) shown on the services survey (see Appendix A) however a ditch is present running south to north along the eastern site boundary. No outfall is shown from this ditch so it is assumed that overland flows (that do not drain immediately to ground) flow in an easterly direction before collecting within the ditch and infiltrating to ground, this is defined in the geo-environmental report carried out by Applied Geology as being 0.5m wide by 0.8m deep and it is noted that at the time of inspection there was no water present.

2.0 Flood Risk

2.1 Flood Risk Aims

The key aims of this flood risk assessment are to:

- Assess the flood risk to the development and to demonstrate the feasibility of designing the development so that the risk of flooding is acceptable.
- Assess the potential impact of the development on flood risk elsewhere and demonstrate that this can be mitigated by using sustainable drainage systems to drain the site.
- Satisfy the requirements of the National Planning Policy Framework.

This assessment has been carried out in accordance with the National Planning Policy Framework (NPPF). The aim of the NPPF is to ensure that flood risk is considered at all stages in the planning process and to direct development run-off away from the areas at highest risk. Where new development is necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible to reduce flood risk overall.

The NPPF require that all sources of flooding are considered including: flood risk from rivers (fluvial), flood risk from the sea or tidally influenced rivers, surface water flood risk (pluvial), groundwater flood risk and flood risk from sewers, drains or artificial sources. Each source will be assessed in turn.

Further regional and local planning policies which apply to this area include:

- Chelmsford Level 1 and Level 2 Strategy Flood Risk Assessment (SFRA), October 2017
- Essex SuDS Design Guide, 2020
- Chelmsford Surface Water Management Plan (SWMP), March 2014

These documents have been referred to and their guidance incorporated into the development proposals where appropriate.

The site is within Flood Zone 1 however, this FRA is required because the site is greater than 1 hectare.

2.2 Flood Risk from Rivers (Fluvial)

Watercourses flood when the amount of water in them exceeds the flow capacity of the river channel. Flooding can either develop gradually or rapidly, depending on the characteristics of the catchment.

Land use, topography and the development can have a strong influence on flooding from rivers. The site is located within Flood Zone 1 which is defined as land that has less than 1 in 1000 (<0.1%) annual probability of fluvial flooding and is categorised as ‘low risk’.

As a residential development, the development type is classed as “more vulnerable”, and in accordance with the NPPF, this is appropriate for Flood Zone 1. The sequential test is passed, and the exception test is not required.

Overall, Flood Risk from Fluvial Sources is **low** and **acceptable**.

2.3 Flood Risk from the Sea (Tidal)

Flooding to low-lying land from the sea and tidal estuaries is caused by storm surges and high tides. Where tidal defences exist, they can be overtopped or breached during a severe storm, which may be more likely with climate change.

The site is not near the sea or a tidally influenced river therefore Flood Risk from Tidal sources is considered to be **low** and **acceptable**.

2.4 Surface Water Flood Risk (Pluvial)

Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding. In developed areas, this flood water can be polluted with domestic sewage where foul sewers surcharge and overflow. Local topography and built form can have a strong influence on the direction and depth of flow. The design of a development down to a micro-level can influence or exacerbate this.

Overland flow paths should be taken into account in spatial planning for urban developments. Flooding can be exacerbated if development increases the percentage of impervious area.

The site has been planned taking account of exceedance flow routes and detailed design of the drainage facilities. Consequently the flood risk from surface water is considered to be **low** and **acceptable**.

2.5 Groundwater Flood Risk

The site is comprised of superficial deposits characterized as “freely draining” with the underlying formation (The London Clay Formation) classified as an unproductive aquifer. A review of the Site Investigation (Applied Geology) indicates that the risk from groundwater flooding is noted to be” low or moderate”.

Groundwater flood risk would likely be due to perched groundwater infiltrating from surface layers and percolating at a slower rate into the underlying clay. As there is minimal upstream catchment (upstream flow is impeded/diverted by the woodland present on the western site boundary), so long as infiltration features are designed to be shallow and exceedance flow routes are available, flood risk from groundwater sources is considered to be **low** and **acceptable**.

2.6 Flood Risk from Sewers

In urban areas, rainwater is frequently drained into sewers. Flooding can occur when sewers are overwhelmed by heavy rainfall or become blocked. Sewer flooding continues until the water drains away.

Sewer records have been requested and received. A copy is included in Appendix C. There is no public storm sewer in Blasford Hill, Little Waltham. A public foul sewer exists in the gardens behind the houses on the east side of Blasford Hill and manhole 6402 exists close to the north east corner of the site.

New proposed drainage infrastructure will be built in accordance with Building Regulations and will be maintained by a site wide maintenance contractor. The benefit of sustainable drainage systems (over traditional piped networks) is that features are typically shallow, easier to maintain and the need for maintenance is easier to identify (i.e., litter on a permeable pavement can be swept up and removed, however, litter in a gully tends to accumulate until a drainage failure occurs and a specialist contractor is required to fix the issue).

The site manager is encouraged to start and support a resident’s association (such as a “friends of” group, FoG) so that maintenance is continued in perpetuity for the appropriate sustainable drainage (and wider landscaping) features. As the drainage system is proposed to outfall via infiltration, it is important to make all site users aware of this so that accidental pollution incidents are avoided (for example to deter paint or chemical disposal into drainage infrastructure).

An outline maintenance guide is included in Appendix F it is recommended that more user-friendly guides are created following construction which can be circulated to both residents and maintenance contractors. There are no public (or private) sewers noted on the existing greenfield site, therefore flood risk from sewers is considered to be **low** and **acceptable**.

2.7 Flood Risk from Artificial Sources

Non-natural or artificial sources of flooding can include reservoirs, canals, and lakes. Reservoir or canal flooding may occur as a result of the facility being overwhelmed and/or as a result of dam or bank failure.

The site is not within a reservoir flood zone, therefore Flood Risk from Artificial Sources is considered to be **low** and **acceptable**.

2.8 Climate Change

The NPPF makes it a planning requirement to account for climate change in the proposed design. Current climate change maps indicate that the site lies within the 'Combined Essex Management Catchment' and so peak rainfall allowances for climate change are as follows: for a development with a "more vulnerable" classification and predicted lifetime of 100 years, the upper end allowance and 2070s Epoch is used.

For the 3.3% Annual Exceedance Risk (AER) event (1 in 30-year event) an allowance of 35% will be used when calculating storage volumes. For the 1% AER event (1 in 100-year event) an allowance of 40% climate change will be used.

2.9 Residual Risk & Exceedance

Flood Risk can be mitigated but never removed entirely. There will always be residual risk, e.g., from storm events that cannot be practicably accounted for, that far exceed the design event.

Exceedance flows will outfall east as per the existing scenario in line with the topography of the area. The destination of exceedance volumes (the highway) is classed as low risk. Exceedance Flow Paths should not be impeded by the development proposals. The plan in Appendix D shows the anticipated exceedance flow paths. External levels are recommended to be minimum 150mm below Finished Floor Levels (FFLs) in accordance with Building Regulations Part M. The Architect's plan, in Appendix D, shows the proposed site levels.

2.10 Access & Egress

The site is within Flood Zone 1 and therefore safe access and egress is provided via the main access route from Blasford Hill (B1008) which forms the eastern site boundary.

2.11 Loss of Floodplain Storage

The site is within Flood Zone 1 and therefore at low risk of both fluvial and pluvial flooding. A review of floodplain storage is not appropriate.

2.12 Flood Risk Mitigation Measures

The increase of impermeable area as a result of development will increase runoff rates and volumes unless appropriately mitigated. The recommended mitigation measures outlined as follows will reduce the impact of flood risk to the proposed development and downstream catchment:

- Wherever possible, permeable surfaces are to be chosen over impermeable surfaces. Examples include permeable paving, geogrids (filled with gravel or preferably low lying meadow species such as clover/vetch for a low maintenance temporary parking solution). The source control, interception and subbase attenuation benefits will improve drainage and reduce surface water flood risk.

- Implementation of a sustainable drainage design (covered in a separate report) will ensure that runoff rates are not increased, and where possible (i.e., where infiltration is viable) runoff volumes are not increased. This will be achieved using a variety of SuDS features such as

rainwater harvesting, permeable paving, swales and infiltration/detention basins. Attenuation will be provided on-site for all storm events up to and including the extreme 1 in 100 year event plus a 40% allowance for climate change.

APPENDIX A

TOPOGRPAHICAL SURVEY

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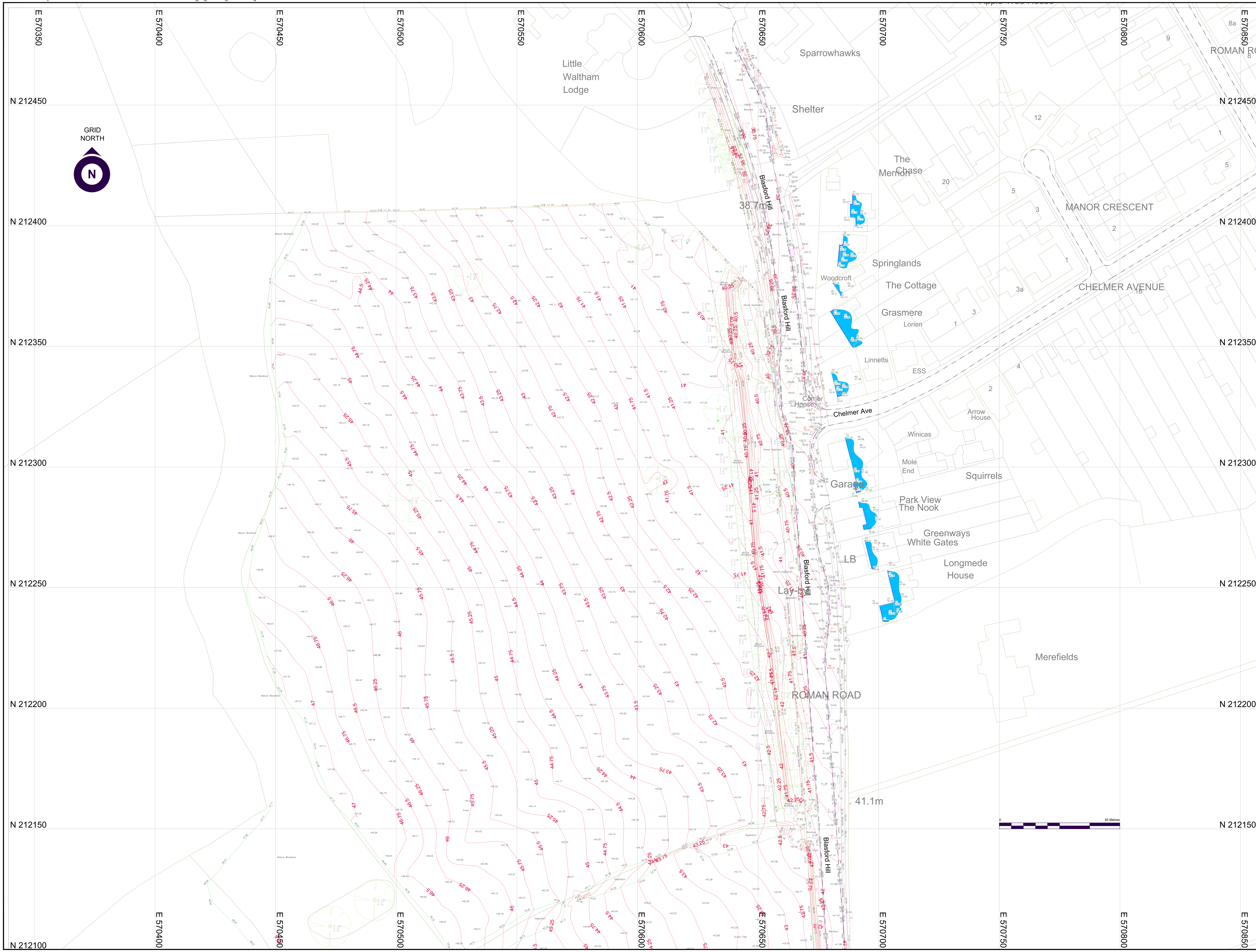


SURVEY DRAWING NOTES

A0

SURVEY CONTROL DETAILS

1. HORIZONTAL GRID

The survey is orientated to Ordnance Survey Grid North and is surveyed to a plane grid. All horizontal measurements and dimensions taken from this survey will be GROUND distance.

This is derived using Trimble Business Center software Local Site Settings calculations
The control has been established by tying into the active Ordnance Survey control network as follows :
The co-ordinate system used for the primary control is OSGB36; this has been calculated from ETRS89 using the OSTN015 transformation parameters.

For this particular project, the TRIMBLE VRS NOW network has been used with observations taken on the following date. 07/02/2023

Manufacturers quoted accuracy is typically RMS 10 – 20 mm in plan and 20 – 30 mm in height. These values can however fluctuate depending upon time of day, satellite geometry and other conditions that could cause degradation to the final solutions. for salient control and wherever possible and practical, Carter Jonas have used an open sky with good satellite geometry so as to maintain the highest accuracy possible. Accuracy reports can be supplied of final observations accuracies if required.

Mean sea level corrections (MSL) are deemed to be insignificant and have therefore not been applied due to the low level of this site

2. VERTICAL DATUM:

Altitudes for the control have been calculated from GPS derived heights and converted to Orthometric heights (Ordnance Datum Newlyn - ODN) using OSGM15 transformation parameters.

3. This drawing is to be read in conjunction with all other relevant drawings.
4. Check scale bar and grid before taking non-figured dimensions from this drawing.
5. If there is any doubt please the Contact Carter Jonas measured surveys team.
6. Ordnance Survey data where used is reproduced from the Ordnance Survey Map with permission of the Controller of Her Majesty's Stationery Office. © Crown Copyright and database rights 2020 OS 100004458

LEGEND

	BUILDING		GATE
			HEDGE/ VEGETATION /TREE CANOPY
99.90	CONTOUR	+30.29	SPOT LEVEL
	BANKING	STN/102 100.000	SURVEY STATION WITH LEVEL
			SAPLING
	FENCE & DESCRIPTION		TREE (INDICATIVE ONLY)

FENCE TYPE ABBREVIATIONS

B/W	Barbed wire	He	Heras
C/P	Chestnut Paling	I/R	Iron Railing
C/B	Close Boarded	P/W	Post and Wire
C/I	Corrugated Iron	P/R	Post and rail
C/L	Chain Link	P/C	POST AND CHAIN
C/Ba	Crash Barrier	P/Bw	POST AND BARBED WIRE
C/Pa	Concrete Panel	S/S	STEEL SECURITY
E/L	Electric	W/M	WIRE MESH
H/D	Hoarding		

SURVEY PLAN ABBREVIATIONS

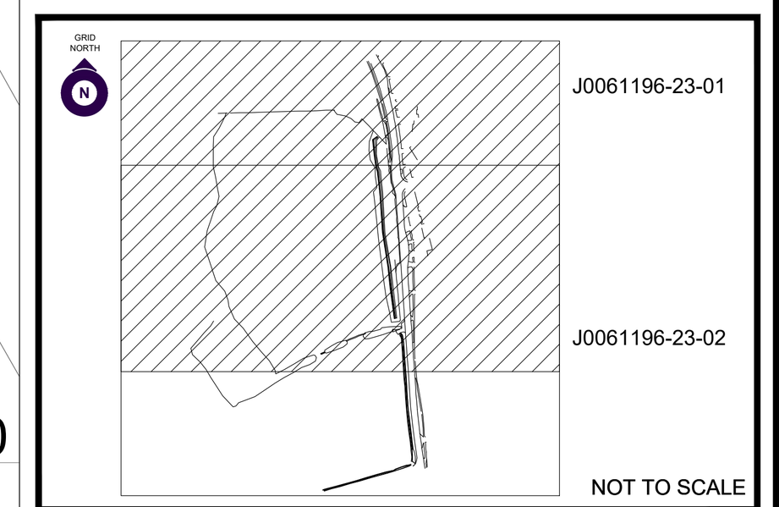
BOL	BOLLARD	LP	LAMP POST
BBE	BELISHA BEACON	MKR	MARKER POST
BH	BOREHOLE	MH	MANHOLE
BP	BOUNDARY POST	MP	MILE POST
BS	BUS STOP	OHC	OVERHEAD CABLES
BT	BRITISH TELECOM IC	PI	PIPE
CATV	CABLE TELEVISION IC	PM	PARKING METER
CCTV	CLOSE CIRCUIT TV	PO	POST
CBX	CONTROL CABINET	PYL	ELECTRIC PYLON
CL	COVER LEVEL	RE	RODDING EYE
COL	COLUMN	RF/RG	ROOF/RIDGE LEVEL
CP	CATCH PIT	NP	NAME PLATE
CTV	CABLE TELEVISION POINT	RS	ROAD SIGN
DK	DROP KERB	RWP	RAINWATER PIPE
DRN	DRAIN	SC	STOP COCK
DWP	DOWN WATER PIPE	SFL	SOFFIT LEVEL
DP	DOWN PIPE	Slev	SILL LEVEL
EC	ELECTRICITY CONTROL BOX	SPO	SIGN POST/BOARD
ECB	ELECTRICITY CABLE	ST	STOP TAP
EV	EAVES LEVEL	STP	STUMP
EP	ELECTRICITY POLE	SV	STOP VALVE
ER	EARTH ROD	SW	STORM WATER
FFL	FINISHED FLOOR LEVEL	TAP	WATER TAP
FH	FIRE HYDRANT	TBX	TELEPHONE CALL BOX
FL	FLOOD LIGHT	THL	THRESHOLD LEVEL
G	GULLY	TL	TRAFFIC LIGHT
GV	GAS VALVE	TP	TELEPHONE POLE
GP	GATE POST	TRAIL PIT	TPIT
HLev	HEAD LEVEL	TW	TOP OF WALL
IC	INSPECTION COVER	SVP	SOIL & VENT PIPE
IL	INVERT LEVEL	WL	WATER LEVEL
KB	KERB	WM	WATER METER
KO	KERB OUTLET GULLY	WV	WATER VALVE
LB	LITTER BIN	WO	WASH OUT

CONTROL STATION CO-ORDINATES

STATION	EASTING	NORTHING	LEVEL	DESCRIPTION
Stn1	570669.35	212365.72	39.38	Survey Nail
Stn2	570673.92	212299.87	39.84	Survey Nail
Stn3	570672.89	212158.28	41.69	Survey Nail
Stn4	570697.82	212005.86	42.04	Survey Nail

UNLESS OTHERWISE STATED THE SURVEY STATIONS LISTED ABOVE ARE ONLY INTENDED TO BE USED FOR TOPOGRAPHICAL SURVEYS AT THE STATED SCALE. THE LONG-TERM STABILITY OF SURVEY CONTROL MARKERS CANNOT BE GUARANTEED

SHEET LAYOUT



GENERAL

A. NO ALLOWANCE HAS BEEN MADE FOR SUB SURFACE ENTRY INTO MANHOLES OR OTHER CHAMBERS OR VOIDS BELOW GROUND LEVEL. THEREFORE ANY DETAILS RELATING TO DEPTHS, SIZES ETC. ARE TAKEN FROM ABOVE GROUND AND AS SUCH WILL BE APPROXIMATE ONLY.
B. THE CONTRACTOR IS TO CHECK AND VERIFY ALL CRITICAL DIMENSIONS AND LEVELS BEFORE WORK STARTS.
C. BURIED SERVICES SHOWN ON THIS DRAWING MAY BE ASSUMED ROUTES AND WILL NORMALLY BE OF UNKNOWN CONDITION, CONTRACTORS SHOULD UNDERTAKE SUITABLE VALIDATION WORK AND TAKE PARTICULAR CARE DURING EXCAVATION WORK; SAFE DIGGING PRACTICES SHOULD BE FOLLOWED.
D. SHOULD THERE BE ANY CONFLICT BETWEEN THE DETAILS INDICATED ON THIS DRAWING AND THOSE INDICATED ON OTHER DRAWINGS, THEN CARTER JONAS SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE.
E. IT IS IMPORTANT TO NOTE THAT THE SAME ACCURACIES IMPLIED BY THE PLOTTING SCALE ARE EQUALLY APPLICABLE TO DIGITAL DATA SUPPLIED FOR CAD.
F. EVERY EFFORT IS MADE TO IDENTIFY ALL VISIBLE ABOVE GROUND FEATURES. HOWEVER, IT SHOULD BE BORNE IN MIND THAT THERE MAY BE ITEMS OBSCURED AT THE TIME OF SURVEY.
G. VISIBLE FEATURES IN THE VICINITY OF THE BOUNDARIES, AS SHOWN ON THIS SURVEY, MAY NOT REPRESENT THE EXTENT OF LEGALLY CONVEYED OWNERSHIP.
H. UNLESS OTHERWISE SPECIFIED FEATURES SHOWN USING LINE STYLES OR HATCHING ARE INDICATIVE ONLY, SUCH AS; ROAD MARKINGS, HEDGE CENTRELINES, BRICK HATCHING AND GLAZING DETAIL.

Issue	DATE	DESCRIPTION	DRAWN	CHKD

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Client : OPUS VILLAGES MANAGEMENT LTD
Project : LAND AT LITTLE WALTHAM
Title : TOPOGRAPHICAL SURVEY (Sheet 1 of 2)
Scale: 1:500@A0 Date: 07/02/2023
Drawn by: KJD Surveyed by :KJD
Checked by: MJ Dwg no:J0061196-23-01_Issue01

APPENDIX B

ARCHITECT'S PLANS

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.

Site Plan Key

- Lawn
- Soft Landscaping
- Woodland
- Grassland
- Footpath
- Access Road
- Demarcated Road
- SUDs and Swales

Proposed Masterplan

1 : 500

N

5 0 5 10 15 20 25 m

SCALE 1:500

Rev	Date	Intls	Details
P07	20/10/23	SSU	PLANNING ISSUE
P06	27/09/23	DC	Site Plan revised to include; 2no additional refuse stores (Courtyards B & D); VCC staff parking adjusted to provide turning head; ASHP locations
P05	20/09/23	DC	Site plan amedned to clients comments
P04	17/08/23	LB	Layout amended to suit tree retention.
P03	10/08/23	LB	Trees to be removed highlighted.
P02	31/07/23	LB	Draft Masterplan entrance, parking and landscaping amended.
P01	29/06/23	DC	Draft Masterplan VCC Schedule Issued for comment

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Project Title	Little Waltham
Client	Opus Villages
Location	Blasford Hill, Little Waltham, Chelmsford, Essex, CM3 3PA
Drawing ref	Proposed Site Plan
Date	20/10/2023 14:47:53
Scale	As indicated
Checker	DC
Size	A0
Job No:	**9510**
Status	**S0** Initial Status

Project Origin Volume Level Type Role Number Rev

LWALT-BUT-MS-ZZ-DR-A-04001-P07

APPENDIX C

ANGLIA WATER ASSETS

(c) Crown copyright and database rights 2023 Ordnance Survey 100022432 | Date: 29/08/23 | Scale: 1:1250 | Map Centre: 570692,212307 | Data updated: 31/07/23 | Our Ref: 1260016 - 1 | Wastewater Plan A3

This plan is provided by Anglian Water pursuant its obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy or omission, including the failure to accurately record, or record at all, the location of any water main, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2023 Ordnance Survey 100022432.This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

- Foul Sewer
- Surface Sewer
- Combined Sewer
- Final Effluent
- Rising Main*
- Private Sewer*
- Decommissioned Sewer*
- Outfall*
- Inlet*
- Manhole*
- Sewage Treatment Works
- Public Pumping Station
- Decommissioned Pumping Station

*(Colour denotes effluent type)

mikebull@csplondon.com
Little Watham

love every drop anglianwater

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
6402	F	-	-	2.64
6403	F	-	-	1.75
7201	F	-	-	1.52
7301	F	-	-	1.52
7302	F	-	-	1.68
7401	F	-	-	2.03
8301	F	-	-	1.52
8401	F	-	-	2.9

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

APPENDIX D

DRAINAGE STRATEGY

PROPOSED DETENTION BASIN TO ACT AS FEED FOR PUMP STATION AND ALSO SOAKAWAY. BASIN WILL NORMALLY HAVE A MINIMAL WATER DEPTH EXCEPT DURING STORMS.

Exg FWMH
AW Ref 6402
CL 38.77
I. 36.13

Exg 150ø FOUL DRAIN

INDICATES APPROXIMATE LAYOUT OF EXISTING FOUL DRAINAGE WITHIN HOUSING ESTATE, TAKEN FROM ANGLIAN WATER ASSET SEARCH MAPS.

Exg FWMH
AW Ref 7401

Exg 150ø FOUL DRAIN

Exg FWMH
AW Ref 8201

Exg 150ø FOUL DRAIN

Exg 150ø FOUL DRAIN

Exg FWMH
AW Ref 7302

Exg FOUL DRAIN

Exg FWMH
AW Ref 7301

Exg FOUL DRAIN

Exg FWMH
AW Ref 7201

NEW FOUL DRAINAGE TO CONNECT INTO EXISTING MANHOLE WITHIN CHELMER AVENUE, SUBJECT TO ANGLIAN WATER APPROVAL. ANTICIPATED FOUL SEWAGE DISCHARGE RATE = 20l/s.

PUMP STATION
DUTY, STANDBY & ASSIST

RISING MAIN TO HIGH LEVEL SOAKAWAY

BASIN SIZE & LOCATION SUBJECT TO FURTHER GEOTECHNICAL SITE INVESTIGATION

EXISTING DITCH TO BE CONNECTED TO NEW POND

PROPOSED DETENTION BASIN
SURFACE AREA = 700m²
TOP WATER LEVEL = 40.250

SOAKAWAY SIZE & LOCATION SUBJECT TO FURTHER GEOTECHNICAL SITE INVESTIGATION
ALLOW FOR 180 METRES OF 1.0x2.0m DEEP TRENCHES FILLED WITH SDS GEOLIGHT STORMWATER STORAGE CRATES.
(DEPTH NOTED IS BELOW INLET PIPE INVERT)

SOAKAWAY SIZE & LOCATION SUBJECT TO FURTHER GEOTECHNICAL SITE INVESTIGATION
ALLOW FOR 160 METRES OF 1.0x2.0m DEEP TRENCHES FILLED WITH SDS GEOLIGHT STORMWATER STORAGE CRATES.
(DEPTH NOTED IS BELOW INLET PIPE INVERT)

ACCESS ROAD DRAINAGE TO CONNECT TO SWALES

RAINWATER HARVESTING FOR IRRIGATION, WITH OVERFLOW TO DRAINAGE NETWORK

RAINWATER HARVESTING FOR IRRIGATION, WITH OVERFLOW TO DRAINAGE NETWORK

ACCESS ROAD DRAINAGE TO CONNECT TO SWALES

EXISTING DITCH PIPED BELOW NEW ACCESS ROAD

EXISTING DITCH TO BE CLEANED OUT, WIDENED AND DEEPENED.

SOAKAWAY SIZE & LOCATION SUBJECT TO FURTHER GEOTECHNICAL SITE INVESTIGATION
ALLOW FOR 100 METRES OF 1.0x2.0m DEEP TRENCHES FILLED WITH SDS GEOLIGHT STORMWATER STORAGE CRATES.
(DEPTH NOTED IS BELOW INLET PIPE INVERT)

HEAD OF FOUL DRAINAGE RUN TO OUTFALL MANHOLE APPROXIMATELY 400m. FALL AVAILABLE APPROX 1:40

TP01 TP02 TP03 TP04 TP05 TP06 TP07 TP08

SPA
FFL 45.000

D1
FFL 43.000

D2
FFL 42.000

D3
FFL 41.500

C1
FFL 42.000

C2
FFL 42.800

C3
FFL 43.800

VCC
FFL 45.500

VCC
FFL 45.500

VCC
FFL 45.500

A1
FFL 43.200

A2
FFL 44.000

B1
FFL 45.000

B2
FFL 45.000

B3
FFL 45.500

B4
FFL 46.200

B5
FFL 45.200

WORKS TO ENHANCE THE EXISTING DITCH ARE TO BE CARRIED OUT WITH THE FULL APPROVAL OF THE ARBORICULTURIST

NEW DRAINAGE ROUTES ARE TO BE CO-ORDINATED TO AVOID ROOT PROTECTION AREAS. (RPA's)

MAIN FOUL OUTFALL AND SURFACE CONNECTIONS TO THE DITCH ARE TO BE HAND DUG THROUGH ANY RPAs IN ACCORDANCE WITH THE ARBORICULTURIST REQUIREMENTS.

TP01 — INDICATES LOCATION AND REFERENCE OF TRIAL PIT CARRIED OUT ON SITE BY APPLIED GEOLOGY IN SEPTEMBER 2023

INDICATES EXTENT OF PROPOSED PERMEABLE PAVING, INFILTRATES TO GROUND BELOW.

INDICATES ALIGNMENT OF PROPOSED SWALE FOR ROAD DRAINAGE

INDICATES DRAINAGE EXCEEDANCE FLOW ROUTE

SURFACE WATER MANHOLE

FOUL WATER MANHOLE

(Pk 1.001) — 'Pk' REF'S THE MICRODRAINAGE DESIGN PIPE NUMBER, REFER TO CALCS.

ATTENUATION TANK / SOAKAWAY SIZE NOTED ON PLAN

COVERS & FRAMES TO MANHOLES AND INSPECTION CHAMBERS ARE TO BE SELECTED TO SUIT ARCHITECTURAL FINISH REQUIREMENTS WITHIN THE EXTERNAL AREAS. LOADING GRADE DETAILS ARE GIVEN ON THE CONSTRUCTION DETAIL DRAWINGS.

DRAINAGE LEGEND

REFER TO DRAINAGE CONSTRUCTION DETAILS DRAWING

Rev	Description	Date	By	Chk'd
P2	FOR PLANNING	26.10.23	MC	CP
P1	PRELIMINARY ISSUE	13.10.23	MC	CP

Status
FOR PLANNING

Client
OPUS VILLAGES

Project
BLASFORD HILL
LITTLE WALTHAM

Title
STORM & FOUL DRAINAGE CONCEPT

CSP
CONSULTING ENGINEERING **CIVIL & STRUCTURAL PROFESSIONALS**
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Scale @ A0	Drawn	Date	Checked
1:500	MC	OCT 23	CP

Job Number	Drg Number	Revision
SRL004	LWALT-CSP-SE-XX-DR-D-0001	P2

Note:
Do Not Scale from this drawing.
Dimensions are to be checked on site.
If in doubt please ask.

Site Plan Key

- Lawn
- Soft Landscaping
- Woodland
- Grassland
- Footpath
- Access Road
- Demarcated Road
- SUDs and Swales

Proposed Levels

1 : 500

N

5 0 5 10 15 20 25 m
SCALE 1:500

Rev	Date	Intls	Details
P05	20/10/23	SSU	PLANNING ISSUE
P04	16/10/23	SSU	Retaining Walls highlighted and levels adjusted to Civils comments. SUDs & key plan added to suit Landscape princples. Access road to Courtyard D amended for updated refuse swept path analysis.
P03	09/10/23	SSU	Site levels revised. Footpaths to ILUs adjusted where required to allow for step-free access
P02	17/08/23	LB	Layout amended to suit tree retention.
P01	04/08/23	LB	Draft proposed levels for comment.

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Certified B Corporation

Project Title Little Waltham
Client Opus Villages
Location Blasford Hill, Little Waltham, Chelmsford, Essex, CM3 3PA

Drawing ref Proposed Levels

Date 20/10/2023 14:52:25 **Scale** As indicated
Checker DC **Size** A0
Job No: 9510 **Status** S0 Initial Status

Project Origin Volume Level Type Role Number Rev
LWALT-BUT-MS-ZZ-DR-A-04002-P05

APPENDIX E

NOT USED

APPENDIX F

MAINTENANCE SCHEDULE

GENERAL REQUIREMENTS	
Generally	**Frequency**
Litter: collect all litter or other debris and remove from site at each visit.	Monthly
INLETS, OUTLETS, CONTROLS, GULLIES, CHANNEL DRAINS, ATTENUATION TANKS AND INSPECTION CHAMBERS	
Regular Maintenance	**Frequency**
Inspect surface structures removing obstructions, sediment, oil/grease and floating debris and silt as necessary. Check there is no physical damage. Strim vegetation 1m min. surround to structures and keep hard aprons free from silt and debris.	Monthly Monthly
Flow Control Devices (Hydrobrake): Inspect and remove blockages, hose down as required, check flow.	Six-monthly
Inspection chambers and below ground control chambers: Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn and major storm events.	Annually
Occasional Maintenance	
Cleaning of the system if necessary. They should be designed out of the system where possible.	As necessary
Remedial Work	
Inspect and remove baskets or similar silt-traps clean and replace. Repair physical damage if necessary.	As necessary
PERMEABLE AND POROUS SURFACES	
Regular Maintenance	
Cleaning Brush regularly and remove sweepings from all hard surfaces.	Monthly
Occasional Maintenance	
Permeable Pavements. Brush and vacuum surface once a year to prevent silt blockage and enhance design life.	Annually
Remedial work	
Monitor effectiveness of permeable pavement and when water does not infiltrate immediately advise Client of possible need for reinstatement of top layers or specialist cleaning. Recent experience suggests jet washing and suction cleaning will substantially reinstate pavement to 90% efficiency.	As required
OVERLAND FLOW AND DESIGNED FLOODABLE AREAS	
Regular Maintenance	
Ensure flood flow routes or areas that are design to temporarily store flood water are not obstructed. Remove obstructions from site.	Monthly