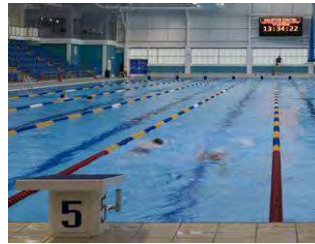


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architecture : engineering : building consultancy



PROPOSED RESIDENTIAL DEVELOPMENT

LAND OFF COB GATE, WHAPLODE

DRAINAGE STATEMENT

11748-WMS-ZZ-XX-RP-C-39201-S2-P1-DRAINAGE_STATEMENT

June 2018

Contract: Proposed Residential Development, Land off Cob Gate, Whaplode**Document Title:** Drainage Statement**Our Ref:** 11748-WMS-ZZ-XX-RP-C-39201-S2-P1-Drainage_Statement**Prepared by:** P.A. Eagles BEng MCIHT **Date:** June 2018**RECORD OF AMENDMENTS TO DOCUMENT**

Ref	Description	Date
P1	Initial issue for Planning Submission	29/06/2018

Verified by: A.C. Gibson BEng CEng MICE MCIHT **Date:** June 2018

C O N T E N T S

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- 3.0 DRAINAGE STRATEGY**
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1.0 INTRODUCTION

William Saunders have been commissioned by Firdene Homes Limited to prepare a Drainage Statement for a proposed residential development off Cob Gate, Whaplode, Lincolnshire. The document is to be submitted as evidence to support a planning application for a residential development.

The southern part of the site has outstanding planning permission for the development of 5 no. dwellings under approval H23-0018-17.

2.0 PROPOSED DEVELOPMENT

2.1 SITE LOCATION AND DESCRIPTION

The site is located in the south-west of Whaplode near Spalding and lies to the north of Cob Gate with the entrance approximately 400m west of the junction with Mill Gate and Church Gate. The National Grid Reference for the site is 531946E, 323932N.

Access to the site is gained off Cob Gate to the south of the site, through a narrow strip of land. A location plan is given in Appendix A.

The site is bound by arable farmland in all directions apart from the south and south-east where the land use is residential. There are watercourses along the northern, western and eastern boundaries with those to the north and west being controlled by South Holland Internal Drainage Board.

The site area is approximately 2.35 ha. The topography of the site is generally flat. A topographical survey is given in Appendix B.

The Environment Agency (EA) flood risk map for planning (GOV.UK) indicates that the majority of the proposed development site is located within EA flood zone 3 (annual probability of fluvial flooding of greater than 1 in 100 or coastal flooding of greater than 1 in 200) with smaller areas within EA flood zone 2 (annual probability of fluvial flooding of between 1 in 100 and 1 in 1000 or coastal flooding of between 1 in 200 and 1 in 1000) and EA flood zone 1 (annual probability of fluvial or coastal flooding of less than 1 in 1000). As such a Flood Risk Assessment is required to be undertaken and submitted to the Local Planning Authority as part of a planning submission for the development of the site. This is to be prepared by others and will not form part of this report, however a copy of the flood risk map is included within Appendix C.

South Holland IDB have confirmed that the water levels in the adjacent watercourses are 1.830m AOD and 2.130m AOD respectively for the 30 year and 100 year plus climate change events.

2.2 DEVELOPMENT PROPOSALS

The proposals are for a residential development consisting of 30 no. 2 and 3 bed dwellings. The proposed site layout is shown at Appendix D.

3.0 DRAINAGE STRATEGY

3.1 FOUL DRAINAGE

An existing Anglian Water foul sewer is located along the south-eastern boundary crossing the proposed site entrance, which serves the existing dwellings to the south. This connects to an existing foul pumping station to the south east of the site. An existing 100mm diameter rising main is located along the eastern boundary and connects to the pumping station. South of the site is a 180mm rising main which crosses the proposed site entrance. A copy of the Anglian Water sewer record is included within Appendix E.

It is proposed to provide a gravity private foul drainage network and an adoptable gravity foul sewer which will discharge to the existing Anglian Water foul sewer.

The foul water connection from the development to the public sewer is to be approved by Anglian Water under a Section 106 agreement and the proposed foul sewer approved and adopted under a Section 104 Agreement with Anglian Water.

The proposed site layout also requires the existing rising main along the eastern boundary to be diverted into the site along the proposed highway alignment. This will be subject to approval under a Section 185 Agreement with Anglian Water.

3.2 SURFACE WATER DRAINAGE

There is a South Holland IDB watercourse running along the western and northern site boundaries (DRN 197P4503) which is designated as a high priority watercourse. South Holland IDB have confirmed that surface water can discharge to the watercourse at a restricted rate of 1.4 l/s per hectare. Increased discharge rates will be permitted subject to the payment of a Surface Water Development Contribution Rate. There is a non-IDB drain running along the eastern boundary. It is understood that there are no existing below ground surface water drainage systems within or adjacent to the site. A copy of the South Holland IDB correspondence is included within Appendix F.

In accordance with requirement H3 of the Building Regulations 2000 all possible options for disposal of surface water have been considered using the preferred hierarchy i.e.

- Soakaways
- Infiltration

- Watercourse
- Sewer

Site Investigations have determined that ground conditions are suitable for soakaways/infiltration techniques for disposal of surface water. Percolation tests undertaken on site have found a worst case infiltration rate of 2.23E-06 m/s and ground water seepages at 1.7m below ground level. A copy of the site investigation report is included within Appendix G.

It is proposed to utilise soakaways for roof drainage and permeable block paving infiltrating into the ground for individual private drives and private roads. Initial sizes of soakaways have been calculated using the BRESOAK Software.

The proposed adoptable highway is to utilise swales where possible and a traditional below ground gravity drainage system discharging to the adjacent IDB watercourse along the western boundary. Due to the relatively flat topography of the site, the requirement for a restricted discharge rate, attenuation volumes within swales and maximum depth requirements for the swales, the proposed highway drainage system is provided with two outfalls to the watercourse to minimise the length of upstream drain runs and hence satisfy the preceding requirements and reduce the need for lifting proposed road levels significantly above existing ground levels.

Lincolnshire County Council's adoptable drainage standards require a minimum restricted discharge rate of 4.0 l/s and a minimum diameter of 75mm for any restriction device. As such this will result in restricted discharge rates greater than the IDB's preferred 1.4 l/s per hectare rate. It is proposed to provide two restricted discharges of 4.0 l/s requiring payment of Surface Water Development Contribution Rates for both to the IDB.

3.3 EXISTING AND PROPOSED RUNOFF

The site is currently undeveloped and as such is treated as a greenfield site. The greenfield runoff of the site has been calculated at 3.29l/s using South Holland Internal Drainage Board's allowable discharge rate of 1.4l/s per hectare. However, two separate discharge points to South Holland's watercourse are proposed with discharges restricted to 4.0l/s based on the minimum discharge rate permitted by Lincolnshire County Council Highways in their role as Lead Local Flood Authority.

3.4 ATTENUATION VOLUMES

Adopting 4.0l/s for preliminary sizing and using MicroDrainage Quick Storage Estimate with 0.0634 ha (north of site) and 0.1456 ha (south of site) of impermeable surfacing on the site and making

allowance for climate change over the life of the development, on site attenuation requirements are as follows: -

Storm Return Period	30	100 (+40%CC)
North Attenuation Storage Required (m ³)	8 - 14	23 - 35
South Attenuation Storage Required (m ³)	26 - 43	66 - 102

Table 1 – Attenuation Storage

A copy of the proposed drainage layout drawing is included at Appendix H with drainage calculations at Appendix I. The attenuation volume required will be dependent upon the specific requirements of the hydraulic model for final design of the highway drainage system. This will be designed to ensure that it has sufficient capacity to cope with the peak 1 in 100-year storm (+40% climate change) with no or minimal flooding at the surface to ensure that no buildings within the site or property downstream of the site are at risk of flooding as a direct result of the proposed development.

3.5 DRAINAGE STRATEGY

In order to manage the run off from the developed site, and accommodate future climate change, the detailed design of the surface water drainage system will need to include the following: -

- Attenuation within swales will be necessary to reduce run off rates to meet allowable discharge conditions.
- Flood Flow Routes
To address the residual risks of surface water flows and potential infrastructure failure, flow routes for such waters have been analysed and demonstrated to not present a hazard to the development or adjacent properties.
- Plot Level
Adjacent to flood flow routes and areas at risk from surface water flooding, floor levels set above flood level to minimise the flood risk.
- Design/Construction Standard
All on-site foul and surface water drainage will be designed and constructed in accordance with current Building Regulation Standards, Anglian Water adoptable standards and Lincolnshire County Council Highway Drainage Standards.

4.0 CONCLUSIONS

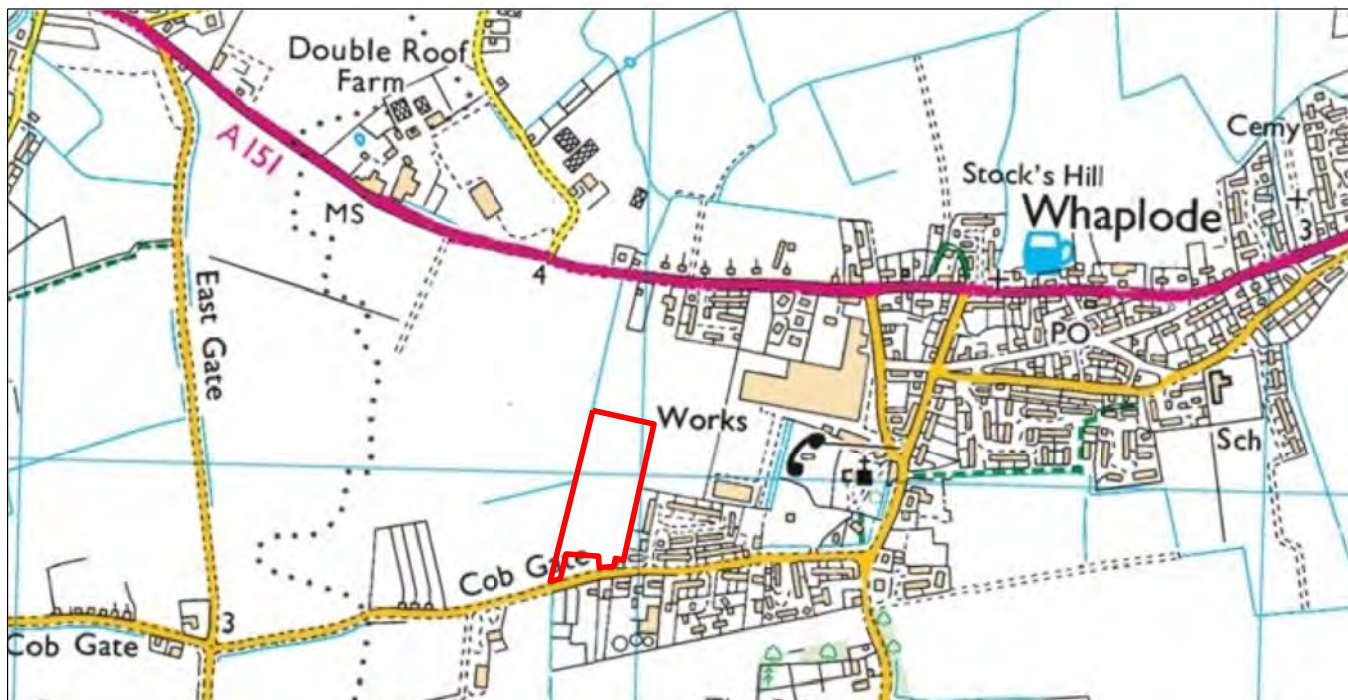
- The proposed development is at risk of flooding from fluvial/tidal water (refer to separate Flood Risk Assessment).
- The development will generate quantities of surface water runoff which could pose flood risk to the development itself or to its neighbours unless appropriate design and management measures are taken.
- The surface water runoff generated by the proposed development will be managed in a manner which will ensure no risk of flooding or increased risk to surrounding properties, at present and taking into account allowances for future climate change.
- On site testing has indicated ground conditions are suitable for disposal of surface water using soakaways/infiltration techniques.
- Soakaways/infiltration techniques are to be utilised for roof drainage, individual private drives and private roads.
- Swales and a traditional below ground gravity drainage system are to be utilised for the proposed adoptable highway discharging to the adjacent IDB watercourse along the western boundary.
- The residual risks from surface water and infrastructure failure have addressed by consideration of flood flow routes through the development.
- Floor levels are to be set to minimise the flood risk from adjacent areas at risk from flood flow routes.
- Attenuation of the surface water will be required on site (provided by the swales).
- Foul water is proposed to be discharged to the Anglian Water foul sewer in the entrance to the site off Cob Gate.

COB GATE, WHAPLODE

DRAINAGE STATEMENT

APPENDIX A

Location Plan



SCALE 1:25,000



SCALE 1:50,000

NGR: 531939, 323951

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In accordance with CDM Regulations 7, 11 and 18, any significant risks (as defined in the Approved Code of Practice paragraph 133) relating to the design features shown on this drawing have been identified and are annotated thus: 

☒ No significant risks have been identified.

☐ Significant risks have been identified - refer to notes on drawing for information on residual risks and any control measures to be employed.

Refer to the current Designer's Risk Assessment sheets for further details.

Designer's Signature		Date	
Rev.	Description	Vfd	Date
P1	Initial Issue	PAE	Apr18

Project					
Cob Gate, Whaplode					
Client					
Firdene Homes Limited					
Title					
Site Location					
Drawing Status					
Information					
Project Ref.	Drawn	Date	Scale		
11748	WD	Apr 18	As shown		@A4
Drawing/Document Reference					
Project	Originator	Zone	Level	Type	Role Number Status Rev.
11748	WMS	ZZ	XX	DR	C - 30001 - S2 - P1

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architecture: engineering: building consultancy

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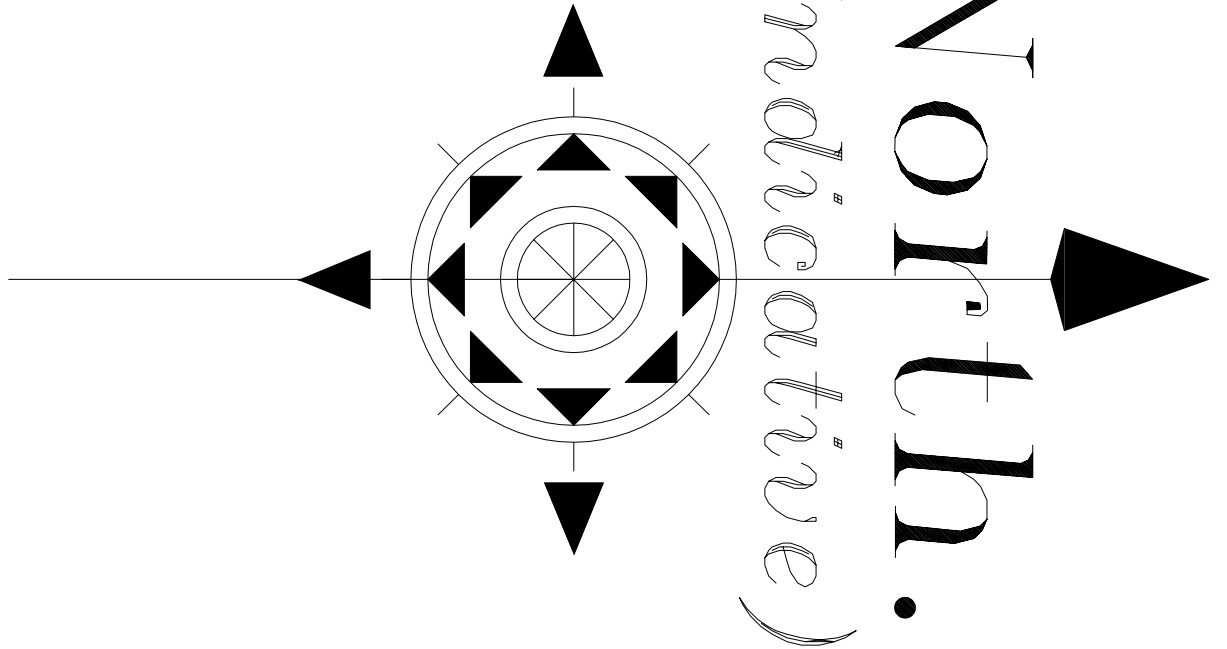
This drawing & any design thereon is the copyright of Wm Saunders Partnership LLP and must not be reproduced without their written consent. Contractors must verify all dimensions, levels & co-ordinates at the site before commencing any work or making any shop drawings: no dimensions to be taken from drawing.

COB GATE, WHAPLODE

DRAINAGE STATEMENT

APPENDIX B

Topographical Survey



The diagram illustrates the components of a business plan, categorized into three main sections:

- STANDARD DOCUMENTS:** This section lists the core documents typically included in a business plan, such as the Executive Summary, Business Plan, Financial Plan, Marketing Plan, Operations Plan, Human Resources Plan, Legal Plan, Risk Management Plan, Environmental Impact Statement, Social Responsibility Report, and Appendix.
- DRAWING KEY:** This section provides a visual guide to the symbols and icons used throughout the plan, including the Cover Page, Table of Contents, List of Figures, List of Tables, List of Abbreviations, List of Acronyms, List of Symbols, List of Units, List of References, List of Sources, List of Contributors, List of Reviewers, List of Advisors, List of Consultants, List of Suppliers, List of Customers, List of Partners, List of Competitors, List of Stakeholders, List of Interested Parties, List of Affected Parties, List of Beneficiaries, List of Victims, List of Perpetrators, List of Witnesses, List of Victims, List of Perpetrators, List of Witnesses, List of Victims, List of Perpetrators, List of Witnesses.
- SPECIAL SERVICES:** This section details additional services and resources that may be required for the business plan, including Business Plan, Financial Plan, Marketing Plan, Operations Plan, Human Resources Plan, Legal Plan, Risk Management Plan, Environmental Impact Statement, Social Responsibility Report, Appendix, Cover Page, Table of Contents, List of Figures, List of Tables, List of Abbreviations, List of Acronyms, List of Symbols, List of Units, List of References, List of Sources, List of Contributors, List of Reviewers, List of Advisors, List of Consultants, List of Suppliers, List of Customers, List of Partners, List of Competitors, List of Stakeholders, List of Interested Parties, List of Affected Parties, List of Beneficiaries, List of Victims, List of Perpetrators, List of Witnesses, List of Victims, List of Perpetrators, List of Witnesses, List of Victims, List of Perpetrators, List of Witnesses.

The depiction of a wall, fence or hedge does not necessarily represent a legal boundary. It is the clients responsibility to confirm legal boundaries with the vendor.

Unless previously agreed, all services existing on site have been surveyed apart from where access is restricted by vehicles or other significant obstructions.

If applicable, manhole covers will be lifted unless this significantly obstructs the flow of traffic or vehicular access. Manhole will not be lifted if this were to present any health &

Safety risk to staff or the public. Irreplaceable or cracked covers will not be lifted.

For safety reasons, pipe sizes and directions are estimated from above ground and are therefore approximate values.

The data used for the computation of the horizontal and vertical

control to this survey was recorded using our survey grade GNSS receivers. This data was provided by Leica Geosystems Smartnet RTK correction service.

A scale factor of 1 has been applied to this survey which has been based on station 1 and referenced to station 2.

Plotting on paper may lead to a variety of scaling risks/errors due to paper stretching or inaccurate plotter settings etc. Therefore any dimensions scaled from a camera reproduction of

This survey should be treated with caution. This drawing must be used in conjunction with all other relevant documentation.

PLEASE NOTE: THIS DRAWING IS AN AMALGAMATION

OF TWO SURVEYS DATING BACK TO DEC 2016.

REVISIONS/UPDATES & ASSOCIATED DETAILS

Uwg No	Details	By	Date
5985-2	Extra survey detail added.	CS	20/04

SHEET SCHEDULE

SHEET 1 SHEET 2

Category	Percentage
Category 1	10%
Category 2	20%
Category 3	30%
Category 4	40%
Category 5	50%
Category 6	60%
Category 7	70%
Category 8	80%
Category 9	90%
Category 10	100%

 **Ratcliff**
Land & Engineering Surveys Ltd

www.jatcliftandsurveys.co.uk — info@jtsurveys.co.uk — Tel: 01733 27085

TOPOGRAPHICAL SURVEY OF
LAND AT COB GATE, WHAPLODE.

SHEET SIZE & SCALE	DATE SURVEYED
--------------------	---------------

A0@ 1:250	APRIL 2017
DRAWING NUMBER	DRAWN BY
FIGURE	ADIC

5985-Z	AR/CS
CLIENT COOPER ARCHITECTURAL	

DESIGN LTD.

APPENDIX C

EA Flood Risk Map

Flood map for planning

Your reference
11748

Location (easting/northing)
531945/323967

Created
3 Apr 2018 11:51

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Flood map for planning

Your reference
11748

Location (easting/northing)
531945/323967

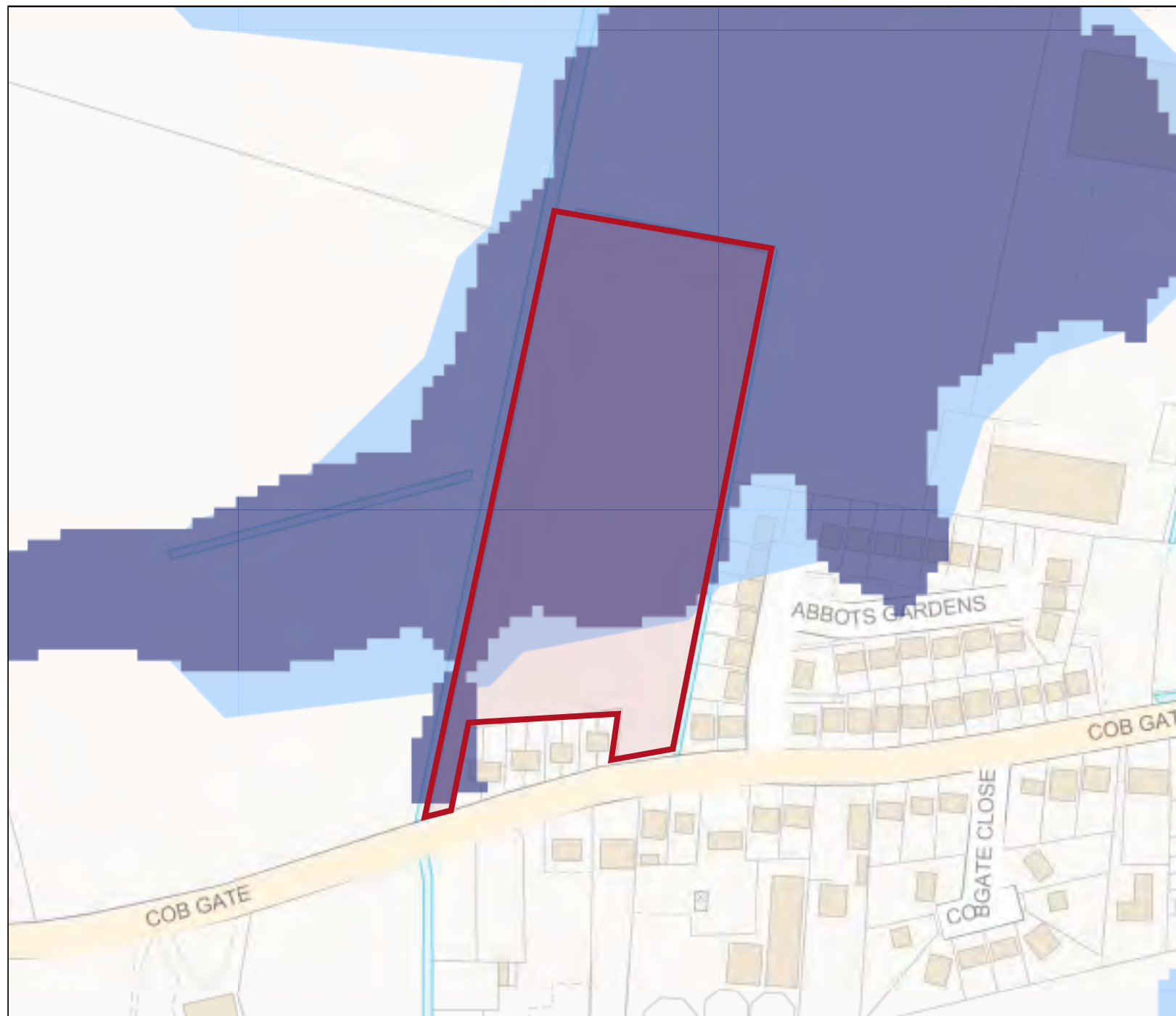
Scale
1:2500

Created
3 Apr 2018 11:51

-  Selected area
-  Flood zone 3
-  Flood zone 3: areas benefiting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area

0 20 40 60m

Page 2 of 2



APPENDIX D

Proposed Site Layout

PRELIMINARY SITE LAYOUT as at 06/06/18

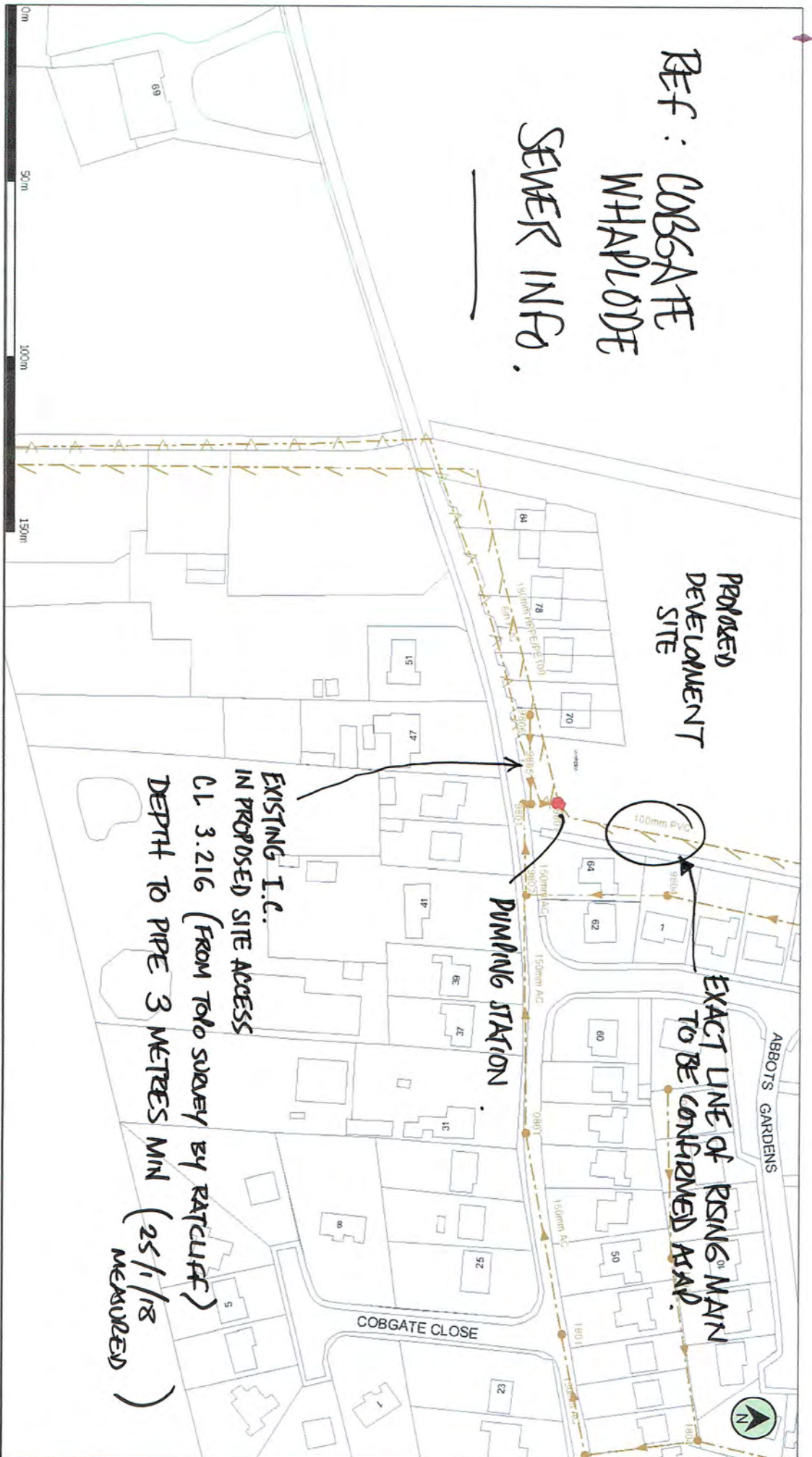


- plot schedule
total 28 plots
- Affordable Units**
2 bed affordable bungalow – Plots 1 –7 inclusive
- Market Units**
2 bed detached bungalows
‘Surtlee’ design – plots 9, 15, 22
- 3 bed detached bungalows**
‘Moulton’ design – plots 8, 11, 25
‘Dorington’ design – plots 10, 17
‘Weston’ design – plots 12, 14, 16, 18, 23, 26, 27
‘Suterton’ design – plots 13,19,24
‘Hargate’ design – plots 20, 21, 28

APPENDIX E

Anglian Water Sewer Records

Ref: COBGATE
WHAPLODE
SEWER INFO.



(c) Crown copyright and database rights 2016 Ordnance Survey 100022432 Date: 02/06/16 Scale: 1:1515 Map Centre: 531953,323813 Data updated: 04/12/15 Wastewater Plan A4

This plan is provided by Anglian Water pursuant to 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 recording of record at all, the location of any water main, discharge pipe, sewer or drain, manhole, rising main, private sewer, decommissioned sewer, or any other apparatus shown on this map. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2016 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 | Outfall |
| Surface Sewer | (Colour denotes effluent type) |
| Combined Sewer | Inlet |
| Final Effluent | (Colour denotes effluent type) |
| Rising Main | Manhole |
| (Colour denotes effluent type) | (Colour denotes effluent type) |
| Private Sewer | Sewage Treatment Works |
| (Colour denotes effluent type) | |
| Decommissioned Sewer | Pumping Station |
| (Colour denotes effluent type) | |

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B23-0541-16

