

Prepared on behalf of

1215 Heritage Homes Ltd

FLOOD RISK ASSESSMENT

**Proposed Residential Development
Southampton Road, Alderbury**

Flood Risk Assessment

Acknowledgements:

Disclaimer

The methodology adopted and the sources of information used by Sanderson Associates (Consulting Engineers) Ltd in providing its services are outlined within this Report.

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This report was checked and approved on the 14 November 2019 and the Report is therefore valid on this date, circumstances, regulations and professional standards do change which could subsequently affect the validity of this Report.

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Site Location Plan: 10631/001

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1 Introduction

- 1.1 Sanderson Associates (Consulting Engineers) Ltd have been appointed to undertake a Flood Risk Assessment for a proposed residential development on land off Southampton Road, Alderbury, Wiltshire.
- 1.2 The assessment discusses the present and future flood risk to the site, using a risk based approach and reference to the Sequential and Exception Test where appropriate.
- 1.3 This assessment of flood risk has been undertaken taking into account the National Planning Policy Framework, March 2012 (NPPF) and associated Planning Practice Guidance, 2014 (PPG).
- 1.4 The report also looks at the existing and proposed surface water drainage mechanism and considers drainage requirements to ensure a suitable and acceptable strategy for surface water discharge is pursued.
- 1.5 A formal consultation with the Environment Agency has not taken place as their generalised mapping data shows the site is located within Flood Zone 1. Environment Agency and local water authority mapping data has been reviewed and referred to during the production of this report.

2 Existing Situation

2.1 Existing Site Description

- 2.1.1 The site is located within the village and Civil Parish of Alderbury, Wiltshire which is situated 5 km southeast of Salisbury. An O.S. Reference for the site is: 419078, 127045. A location plan, referenced 10631-001 included in Appendix A shows the sites location and surroundings.
- 2.1.2 The development is currently undeveloped land located to the north and to the rear of properties that front onto Southampton Road. A review of historical imagery does not suggest that the site has been previously developed. Therefore for the purposes of this assessment the development site is deemed to be Greenfield.
- 2.1.3 The site is bound to the north by sports pitches/recreational facilities. To the east, south and west by residential properties. Southampton Road is also located to the south of the development site.
- 2.1.4 There is currently no vehicular access to the site. Aerial imagery shows a number of footpaths crossing the site, but O.S. mapping does not record these as being formalised.
- 2.1.5 The closest watercourse to the site is an unnamed channel which is located approximately 250m to the northwest at its closest point and generally flows from southwest to northeast in the vicinity of the site. The watercourse appears to be a minor agricultural drain located at the perimeter of agricultural land.
- 2.1.6 The development site generally grades from southwest to northeast with levels ranging from approximately 77m AOD at its boundary with properties that front onto Southampton Road to 73m AOD at the northern boundary with the adjacent recreational facilities.

- 2.1.7 The site area is 12,521m² (1.252Ha) and as above is undeveloped greenfield land. WinDES Source Control software has been used to calculate the existing Qbar surface water run off rate. The IH124 method has been used, which requires calculations to be carried out for an area of 50Ha and proportioned down to the site area. The Greenfield Run Off rate has been calculated at 0.616l/s. WinDES calculations are contained in Appendix C of this report.

3 Proposed Development

3.1 Site Proposals

- 3.1.1 It is proposed that the site is re-developed for residential use with the construction of 32 detached and semi-detached residential dwellings. The development will also have associated access, hardstanding/parking facilities and open green/garden areas.
- 3.1.2 It is proposed that access/egress will be taken from the south via a formal access off Southampton Road that will be constructed as part of the development.
- 3.1.3 On assessing the proposed site layout, the overall site area remains at 12,521m² (1.252Ha). Drawing 10631-002B, contained in Appendix A, shows a take-off of potential drained/undrained surface to enable an initial assessment of the proposed surface water runoff rate. The areas equate to 2,305m² of buildings/positively drained areas, 3,404m² of permeable surfaced areas and 6,810m² of open green/undrained areas.
- 3.1.4 WinDES system 1 software has been used to calculate a proposed unrestricted 1 in 1 year surface water run-off rate, based on the take-off of areas. The unrestricted 1 in 1 year surface water run-off rate has been calculated at 26.3l/s (WinDES calculation contained in Appendix C).
- 3.1.5 As the above run off rate is unrestricted, it would be unacceptable to discharge surface water at this level without introducing measures to restrict and control. Section 8 of this report will look at potential surface water management solutions at this location, in line with Part H3 of the Building Regulation, 2010.
- 3.1.6 The developments drainage should be designed and implemented in line with current guidance, advice and the requirements of the local authority and local water authority to ensure suitable measures are introduced to restrict and manage surface water discharge.

4 Consultations

- 4.1 Environment Agency flood mapping confirms that the sites demise is located wholly within fluvial Flood Zone 1. Flood Zone 1 is land that has been assessed as having a less than 1 in 1000 (0.1%) annual probability of flooding from a fluvial source in any given year and is the lowest risk flood zone in line with National Planning Policy Framework delineation.
- 4.2 DEFRA groundwater mapping confirms the site is not located a receptor sensitive Groundwater Source Protection Zone. These are areas around a point of abstraction or an aquifer that is sensitive to the potential risk of leeching pollutants. The closest designated areas are located approximately 3.0km to the north in the vicinity of Laverstock and 2.0km to the southeast in the vicinity of Pepperbox Hill.
- 4.3 DEFRA geological mapping shows the sites underlying strata consists of an undesignated/unproductive superficial (drift) and a Secondary A bedrock aquifer. Undesignated/unproductive aquifer are layers that generally have a very low water bearing capacity/void ratio. Secondary A aquifers are described as strata that have a level of water storage/void capacity and may support base river flow on a local rather than strategic scale. Secondary A aquifers were previously designated as minor aquifers.
- 4.4 Wessex Water have provided apparatus plans for the area of the site, these are contained in Appendix B of this report.
- 4.5 Further mapping data has been reviewed and will be referred to in Section 5 of this report.

5 Assessment of Flood Risk

5.1 Surface Water

- 5.1.1 The main risk of flooding from overland flow comes from water channelled in the local highway network, impermeable areas within the vicinity of the site and land at a higher elevation.
- 5.1.2 Environment Agency surface water mapping has been reviewed which shows areas at an elevated risk of surface water flooding for different storm return periods.
- 5.1.3 The EA online surface water mapping shows that the area of the site, in general, is modelled to have a 'Very Low' risk of surface water flooding. A very low risk is land that has a less than 1 in 1000 annual probability of surface water flooding. A 'Very Low' risk area is the lowest risk classifications in line with surface water flood zone delineation.
- 5.1.4 A minor area, at an isolated location on the eastern boundary is shown to be at a 'Low Risk' (between a 1 in 100 and 1 in 1000 annual probability, 2nd lowest risk classification). This area appears to be a minor accumulation likely associated with a relative low point in the sites topography and does not form part of or contribute to extensive overland flow networks.
- 5.1.5 An area within proximity to the site is shown to be at a high risk of surface water flooding/accumulation. The area is located approximately 400m to the northeast in the vicinity of Alderbury and West Grimstead Primary School. A number of flow paths in the Alderbury area contribute to this at risk location. It should be noted that these do not emanate or pass through the development site, which is located at a higher elevation.
- 5.1.6 The mitigation measures recommended in Section 7 should be implemented to ensure surface water localised to, and conveyed within the site would not affect developed property.

5.2 Fluvial/River

5.2.1 The closest watercourse to the site is an unnamed watercourse which is located approximately 250m to northwest at its closest point.

5.2.2 Environment Agency flood mapping confirms that the sites demise is located wholly within fluvial Flood Zone 1. Flood Zone 1 is land that has been assessed as having a less than 1 in 1000 (0.1%) annual probability of flooding from a fluvial source in any given year. Flood Zone 1 is the lowest risk classification of flood zone in line with planning policy delineation. No areas of higher probability flood zones (Flood Zone 2 & 3) are located within proximity to the development site.

5.2.3 Due to the scale of the development and the distribution of flood zones in the area. The development will not increase the flood risk to developed properties or the surrounding area.

5.3 Sewers

5.3.1 If any of the sewers/drainage apparatus adjacent to the site were to surcharge and flood, it is likely that any floodwaters would be shallow, relatively slow moving and constrained within the limits of the carriageway.

5.3.2 At the time of writing the report there was no evidence available to suggest the site has been directly affected from flooding from overloaded sewers/drainage apparatus in the past; therefore the risk of flooding from sewers would be considered low.

5.3.3 The mitigation measures proposed for the development as discussed in section 7 will also protect against any flooding from this source should the risk increase over the lifetime of the development.

5.4 *Groundwater*

- 5.4.1 The potential for groundwater flooding has been assessed with the aid of groundwater mapping from the Environment Agency, British Geological Survey records.
- 5.4.2 DEFRA (The Department for Environment, Food and Rural Affairs) groundwater mapping confirms that the site overlays a Secondary A bedrock aquifer, these are described as strata that have a level of intergranular and/or fracture permeability and usually provide a level of water storage. They may support water supply and/or river base flow on a local rather than strategic scale. In most cases, secondary aquifers are strata that were previously designated as minor aquifers.
- 5.4.3 The superficial/drift strata is classed as an unproductive aquifer. These are described as strata that have a predominantly low permeability/void ratio.
- 5.4.4 The British Geological Survey geological map of the UK has been reviewed and confirms an unrecorded superficial strata (suggesting limited deposits/shallow rockhead) and bedrock strata of the Wittering Formation consisting of sand, silt and clay.
- 5.4.5 The British Geological Survey hold a borehole record that was excavated 350m to the north of the site, as part of highway works associated with the A36 and is located in same geological region. The reviewed borehole records available show a superficial strata of loose sandy silt to a depth of 1.98m below ground level (bgl) underlain by firm to stiff silty, sandy clay. Groundwater was encountered during the excavation at a depth of 1.22m bgl, no reference is made to whether this was in the form of seepage or standing water. The British Geological Survey Groundwater Timeline confirms that at the time of excavation (July 1970) groundwater levels were in there normal range. (It should be noted that the borehole is remote from the site and can only give any idea of conditions within the vicinity of the site.)

5.4.6 From reviewed evidence it is unlikely that groundwater would be an issue at this location. It should also be noted that no subsurface structures are proposed as part of the development outside of drainage and foundation works.

5.4.7 The mitigation measures proposed for the development as discussed in section 7 will also protect against any flooding from this source should the risk increase over the lifetime of the development.

5.5 *Flooding from Reservoir Failure*

5.5.1 The site is shown on EA mapping to be outside and not within proximity to areas at risk of reservoir flooding. The maintenance, monitoring and safety of the reservoir is bound by the Reservoir Safety Act 1975 which sets out the safety regulations and legal responsibilities for this structure.

5.6 *Climate Change*

5.6.1 It is generally considered that the intensity of rainfall will increase by up to 40% by the year 2085 and that winter months will become proportionately wetter.

5.6.2 These factors have been considered in the assessment of flood risk from all sources including watercourses and within drainage calculations allowance for climate change/uncertainty.

6 Sequential and Exception Test

6.1 Sequential Approach

- 6.1.1 The site is considered to lie within Flood Zone 1 as confirmed by the Environment Agency mapping data.
- 6.1.2 The site is currently open green land, in accordance with Table 2 of (PPG 2014, Planning Practice Guidance 2014) its current/last use is classed as being 'water compatible' in terms of flood risk vulnerability.
- 6.1.3 The proposed residential use of the site, in accordance with Table 2 (PPG 2014, Planning Practice Guidance 2014) is classed as being 'More Vulnerable' in terms of flood risk vulnerability.
- 6.1.4 In accordance with Table 3 (PPG 2014, Planning Practice Guidance 2014) a 'More Vulnerable' development located in Flood Zone 1 is an appropriate development in terms of flood risk, therefore the Exception Test would not be required as part of a planning application for this development.
- 6.1.5 As the site is located in Flood Zone 1 there can be no other sites in the area with a lower risk from fluvial flooding, based upon the Flood Zone classification outlined in Table 1 of the Planning Practise Guidance, 2014.

7 Mitigation Measures

- 7.1 It is important that any proposed development that has the potential to change the flood mechanisms on a site is designed such that there is no increased flood risk to the site itself, or sites in the vicinity. Mitigation Measures should be introduced into the development to ensure that the potential for flooding of property and the safety of the end user is reduced, the below section will propose a number of measures in response to the report risk:
- 7.2 A suitable drainage strategy should be implemented for the development that meets the requirement of local/national planning policy and meets with the requirements of all relevant stakeholders.
- 7.3 Any hard standing areas to the immediate outside of the buildings should fall away from entrance points to the building, wherever possible, with a minimum gradient of 1 in 100. If this is not possible then the introduction of linear drainage at the entrance points to the building will provide extra protection to the building in times of extreme rainfall events.
- 7.4 Where possible non-trafficked hardstanding and footway areas should be constructed to naturally fall into adjacent garden/green areas.
- 7.5 Properties should have a finished floor level higher than immediate development external areas to prevent potential surface water flooding of the dwellings, from localised surface water accumulations at the properties external interface.
- 7.6 Drains associated with the development should be cleared annually to ensure the risk of blockages is reduced.

8 Drainage Design Considerations

8.1 Foul Drainage

- 8.1.1 The sites foul system should be constructed in line with 'Sewers for adoption - a design and construction guide for developers' 6th edition. (Potentially superseded by 7th edition by the adopting authority).
- 8.1.2 Foul water from the site should connect into the local public sewer network based on an application to Wessex Water. An assessment should also be carried out to ascertain if the site can drain foul water by gravity or whether an element of pumping would be required in order to facilitate a direct connection.
- 8.1.3 The Wessex Water apparatus plans contained in Appendix B shows a combined sewer located to the south of the site in Southampton Road. A foul and combined sewer to the west of the site in Junction Road and a combined/foul sewer located to the east in Firs Road. Site levels suggests that a direct connection into Southampton Road would require foul pumping. A connection into Junction or Firs Road would potentially be feasible but would require easements and the crossing of third party land.

8.2 Methods of Surface Water Treatment

- 8.2.1 The current Building Regulations, Part H3, detail the favoured hierarchy of surface water disposal being in order of the following preference: to ground by infiltration, to watercourse and then to sewer. Local water authorities generally do not accept discharge into the public sewer prior to an investigation into alternative discharge locations such as infiltration or watercourse.
- 8.2.2 A surface water discharge to watercourse or sewer would also require attenuating the proposed discharge rate down to a minimum level acceptable to the local water authority, this can be a 40% reduction over the existing rate for brownfield locations with a proven existing connection. As the Southampton Road development is greenfield surface water discharge rates would be required to be limited to 5l/s for

up to a 1 in 100 year storm event + a 40% allowance for climate change/uncertainty. This growth is applied to reflect the mean increase in rainfall intensity for low probability storm events as projected by annual rainfall data. In the first instance Infiltration methods of drainage should be investigated prior to alternative discharge locations being considered.

8.3 *Infiltration Drainage*

- 8.3.1 Infiltration methods of drainage such as soakaways and filter drains percolate surface water runoff allowing it to permeate into the subsoil at its natural rate, mimicking the natural process of drainage and as such are subject to the local ground conditions.
- 8.3.2 DEFRA (The Department for Environment, Food and Rural Affairs) groundwater mapping confirms that the site overlays a Secondary A bedrock aquifer, these are described as strata that have a level of intergranular and/or fracture permeability and usually provide a level of water storage. They may support water supply and/or river base flow on a local rather than strategic scale. In most cases, secondary aquifers are strata that were previously designated as minor aquifers.
- 8.3.3 The superficial/drift strata is classed as an unproductive aquifer. These are described as strata that have a predominantly low permeability/void ratio.
- 8.3.4 The British Geological Survey geological map of the UK has been reviewed and confirms an unrecorded superficial strata (suggesting limited deposits/shallow rockhead) and bedrock strata of the Wittering Formation consisting of sand, silt and clay.
- 8.3.5 The British Geological Survey hold a borehole record that was excavated 350m to the north as part of highway works associated with the A36 and is located in same geological region. The reviewed borehole records available show a superficial strata of loose sandy silt to a depth of 1.98m below ground level (bgl) underlain by firm to stiff silty, sandy clay. Groundwater was encountered during the excavation

at a depth of 1.22m bgl, no reference is made to whether this was in the form of seepage or standing water. (it should be noted that the BGS borehole record is remote for the site and can only provide an idea of subsurface conditions in the sites general vicinity.) The photos below show the excavations carried out during infiltration testing, The tests pits show that excavations remained stable with no evidence of groundwater exposure or seepage at depth.









- 8.3.6 As geological records suggest that infiltration would potentially be feasible at this location, site specific infiltration testing to BRE 365 has been carried out, the results were provided by 1215 Heritage Homes are contained in Appendix C. Testing was carried out at three locations on the site with three tests being carried out at each location over consecutive days in line with BRE 365. (results contained in Appendix C).
- 8.3.7 It should be noted that the siting of any potential soakaway must be a minimum of 6.0m distance away from developed properties and a minimum of 3.0m away from the site boundary. In the current arrangement a mixture of shared and individual property soakaways would be required to accommodate this method of drainage on the site as well as the utilisation of permeable paving for roads and hardstanding areas. A permeable paving and subbase storage/infiltration system could also be oversized to accommodate roof and driveway areas.
- 8.3.8 For the purpose of the initial soakaway feasibility the worst case soakaway test result will be used to ensure a robust assessment. On the associated test results this is labelled Test Pit 1, which returned an infiltration coefficient of 0.05920m/hr.
- 8.3.9 WinDES calculations have been carried out based on the overall drained area of the site of 0.571Ha, this includes building roof areas and external areas denoted as permeable surfaces on the proposed drained area plan. The calculations show the total footprint area of permeable surfaces required for variable depths of subbase to provide the necessary storage requirements. From plan 10631-002B it can be seen that there is a potential maximum area of permeable surfaces of 3,406m², infiltration and storage calculations show that a subbase depth of between 0.2m and 0.3m would be required to provide the necessary storage volume to accommodate the 1 in 100 year + 40% storm event based on the infiltration characteristics of the site. This type of system would be required to be installed to British Standard 7533. (WinDES calculations contained in Appendix C).

- 8.3.10 From the above it can be seen that the site would be suitable for soakaway apparatus.

8.4 *Discharge to Watercourse*

- 8.4.1 The closest watercourse to the site is an unnamed channel which is located approximately 250m to the northwest at its closest point and appears to be a minor agricultural drain located at the perimeter of agricultural land.

- 8.4.2 Due to the remote nature of the closest watercourse and the prevalence of third party land between the site and the watercourse, it is unlikely that connection directly to watercourse would be viable at this location.

8.5 *Discharge to Sewer*

- 8.5.1 Wessex Water require investigation into alternative methods of surface water disposal such as infiltration techniques or a discharge to a watercourse, in accordance with the surface water management hierarchy as outlined in Building Regulations Part H, prior to accepting a positive discharge to public sewer.
- 8.5.2 Based on the above evidence infiltration is a viable option at this location in terms of substrata permeability, therefore at this stage a surface water connection to public sewer would not be pursued. It is also understood that the site is remote from the public system.

9 Surface Water Drainage Strategy

- 9.1 The purpose of the Surface Water Drainage Strategy is to detail the principle of a drainage strategy. The final details should be designed and confirmed at the detailed design stage and following consultations with the Local Planning, Highway and Drainage Authority.
- 9.2 It is clear that there is an opportunity to provide a level of SuDs techniques appropriate for the new site which will contribute to a sustainable development and improve urban design, by balancing the different issues that influence the development.
- 9.3 In regards to proposed surface water discharge the below with outline the findings of this study:
- 9.4 The closest watercourse to the site is an unnamed channel which is located approximately 250m to the northwest at its closest point and appears to be a minor agricultural drain located at the perimeter of agricultural land. Due to its remote nature it is unlikely to be suitable for a surface water connections.
- 9.5 Evidence and onsite testing show that that infiltration drainage techniques would be viable at this location, due to the nature of the underlying strata. As discussed previously there are a number of constraints on the site in terms of the required offsets for locating individual soakaways. Permeable surfaces for roadways and hardstanding should be introduce with subbase storage and infiltration as it removes maintenance issues associated with a high number of individual property soakaways.

10 Conclusion

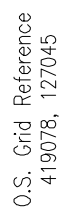
- 10.1 This report serves to review and assess the sources of potential flooding to the site, the impact of the proposed development on the flood mechanisms of the site and the impact on the surrounding area in accordance with NPPF.
- 10.2 Sequential and Exception Tests have been assessed in accordance with NPPF and it is concluded that the development is suitable for this location.
- 10.3 The flood risk to the site from a number of sources of flooding are not considered significant, suitable mitigation measures have been recommended in response to the assessed risk.
- 10.4 This report concludes that the site can be developed without increasing flood risk to the site itself and other sites in the vicinity with the implementation of suitable mitigation measures.

APPENDIX A

Site Location Plan: 10631/001

Proposed Drained Areas: 10631/002B

Received Layout Plan



O.S. Grid Reference
419078, 127045

Rev	Amendment	Drawn	Date	Checked
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(consulting engineers) ltd
Highways | Traffic | Transportation | Water

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Project Name

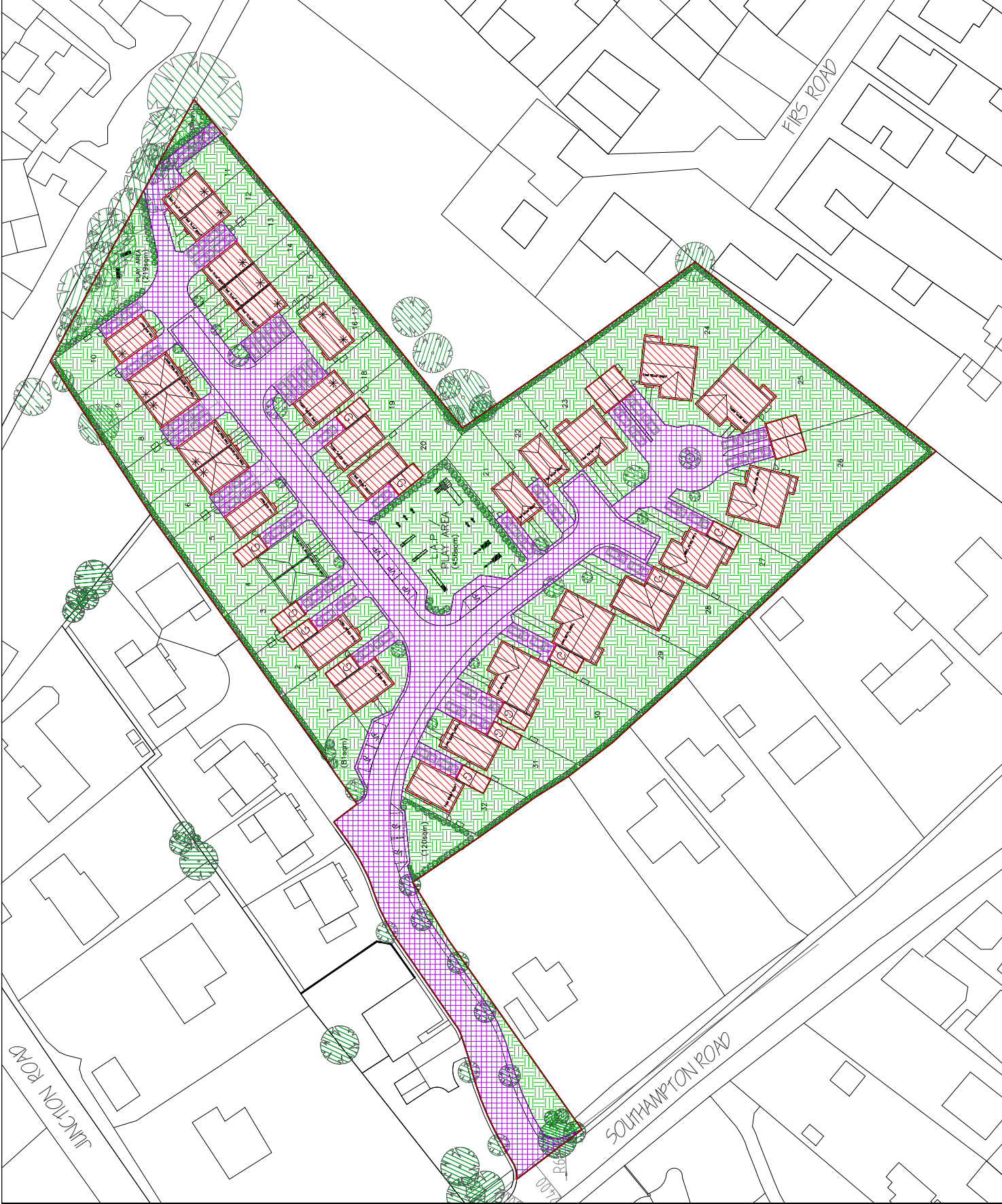
Proposed Residential Development
Land off Southampton Road
Alderbury, Wiltshire

Drawing Title

Site Location Plan

Scale	N.T.S	Drawn By	TW
Drawing Size	A3	Checked By	DH
Date	08/18	Approved By	DH
Drawing Number		Rev	
10631-001			



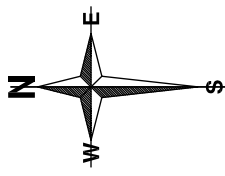


Design Risk Assessment are carried out through the design stage of the project, in accordance with the company procedures in the Health and Safety manual and the Acop Managing Health and Safety in Construction. Where reasonably possible, all areas applicable to the design have been identified and noted for action on Risk Assessment Sheets specific to this project. The drawing should be used in conjunction with the Risk Assessment. This information is to be provided to the Principal Designer to be included in the Health and Safety Plan.

GENERAL NOTES:

- GENERAL NOTES:
1. No drawings to be sold from this drawing.
2. All measures to be checked on site.
3. The contractor must verify all figured dimensions on the below concerning any work or making any shop drawings.
4. The drawings is the sole property of DTM Heritage Homes Limited and no part may be reproduced without written consent.

NOTES:



REVISION

000

CLIENT: 1215HERTIAGEHOMES

PROJECT: MAINLAND DEVELOPMENT

DRAWING TITLE:
SITE_LAYOUT



PRIVATE

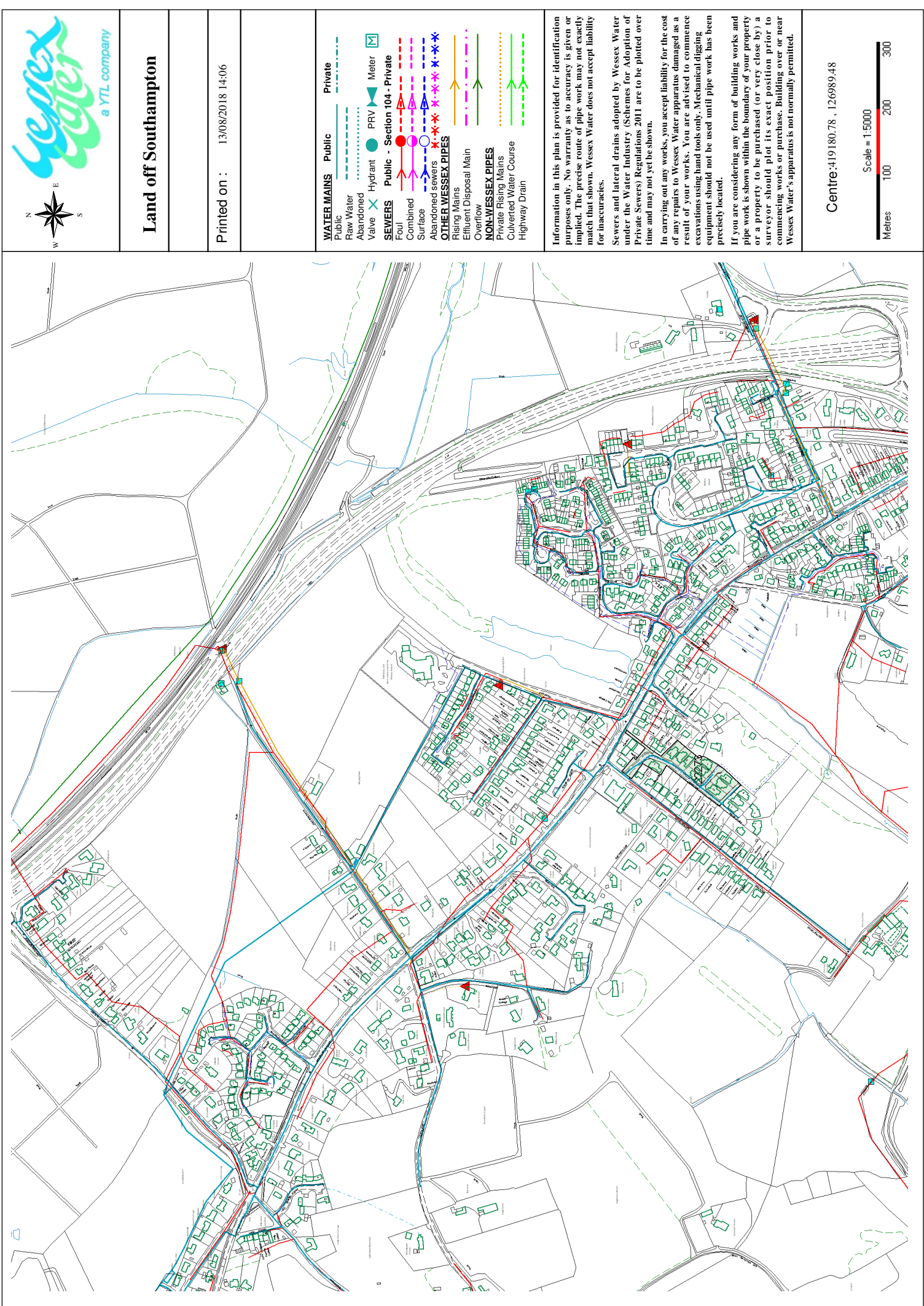
2 BED - 884SQFT / 906SQFT
3 BED - 1016SQFT / 1162SQFT
4 BED - 657SQFT / 1708SQFT
5 BED - 1995SQFT
TOTAL = 19 DWELLINGS

AFFORDABLE / SHARED

1 BED - 470SQFT / 545SQFT - 2 DWELLINGS
2 BED - 801SQFT / 884SQFT - 6 DWELLINGS
3 BED - 1007SQFT / 1182SQFT - 5 DWELLINGS
TOTAL = 13 DWELLINGS

APPENDIX B

Consultation



WATER MAINS	Public	Private
Raw Water	—	—
Abandoned	---	---
Valve	⊗	⊗
PRV	●	●
Meter	⊞	⊞
SEWERS	Public - Section 104 - Private	
Foul	—	---
Combined	—	---
Surface	—	---
Abandoned sewers	---	---
OTHER WESSEX PIPES		
Rising Mains	—	---
Effluent Disposal Main	—	---
Overflow	—	---
NON-WESSEX PIPES		
Private Rising Mains	—	---
Culverted Water Course	—	---
Highway Drain	—	---

Information in this plan is provided for identification purposes only. No warranty as to accuracy is given or implied. The precise route of pipe work may not exactly match that shown. Wessex Water does not accept liability for inaccuracies.

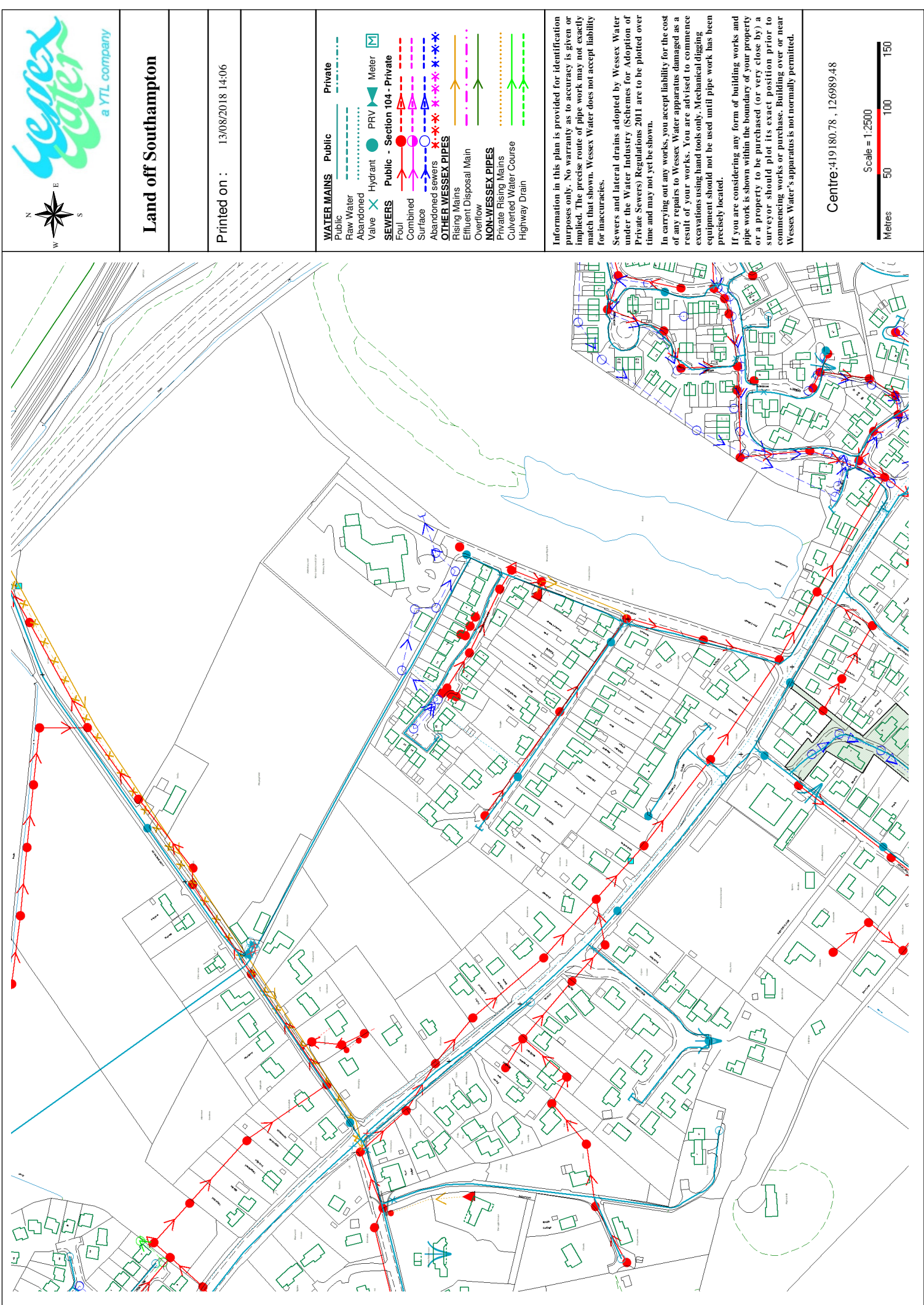
Sewers and lateral drains adopted by Wessex Water under the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011 are to be plotted over time and may not yet be shown.

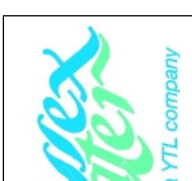
In carrying out any works, you accept liability for the cost of any repairs to Wessex Water apparatus damaged as a result of your works. You are advised to commence excavations using hand tools only. Mechanical digging equipment should not be used until pipe work has been precisely located.

If you are considering any form of building works and pipe work is shown within the boundary of your property or a property to be purchased (or very close by) a surveyor should plot its exact position prior to commencing works or purchase. Building over or near Wessex Water's apparatus is not normally permitted.

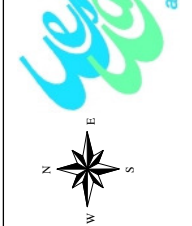
Centre: 419180.78 , 126989.48







Wessex Water
a YTL company



N
W E S

Land off Southampton

Printed on : 13/08/2018 14:06

- | WATER MAINS | |
|-------------|---------|
| Public | Private |
| Raw Water | |
| Abandoned | |
| Valve | PRV |
| Hydrant | Meter |
- | SEWERS | |
|--------------------------------|--|
| Public - Section 104 - Private | |
| Foul | |
| Combined | |
| Surface | |
| Abandoned sewers | |
- | OTHER WESSEX PIPES | |
|------------------------|--|
| Rising Mains | |
| Effluent Disposal Main | |
| Overflow | |
- | NON-WESSEX PIPES | |
|------------------------|--|
| Private Rising Mains | |
| Culverted Water Course | |
| Highway Drain | |

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Centre: 419180.78 , 126989.48

Scale = 1:2500

Metres 50 100 150

APPENDIX C

Drainage Information and WinDES Calculations

Sanderson Associates		Page 1
Sanderson House Jubilee Way Huddersfield, WF4 4TD		
Existing Greenfield SW run off rate	Designed by thomas.walker Checked by	
Micro Drainage	Source Control 2018.1	

IH 124 Mean Annual Flood

Input

Return Period (years)	1	Soil	0.150
Area (ha)	50.000	Urban	0.000
SAAR (mm)	828	Region Number	Region 7

Results l/s

QBAR Rural	24.6
QBAR Urban	24.6
Q1 year	20.9
Q1 year	20.9
Q2 years	21.7
Q5 years	31.5
Q10 years	39.9
Q20 years	49.4
Q25 years	52.9
Q30 years	55.9
Q50 years	64.6
Q100 years	78.6
Q200 years	92.4
Q250 years	96.9
Q1000 years	127.2

$$\frac{24.6}{50} \times 1.252 = 0.616\text{l/s}$$

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Sanderson Associates		Page 1
Sanderson House Jubilee Way Huddersfield, WF4 4TD		
Proposed 1 in 1 year SW run off rate pre treatment	Designed by thomas.walker Checked by	
Micro Drainage	Network 2019.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	18.700	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	10.000	0.200	50.0	0.204	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	47.55	5.09	0.000	0.204	0.0	0.0	0.0	1.85	73.7	26.3

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PERCOLATION TEST RESULTS SHEET JUNE 2018

SITE NAME: LAND AT WAGTAILS

LOCATION: SOUTHAMPTON ROAD, ALDERBURY, SP5 3AF

(Once development has been completed) Roof area.....m2 Hard Standing.....m2

Test Pit 1 (nearest site hut)	LAT 51.04267	LONG 1.73001
Width/m 0.3	Length/m 1.6	Depth/m 1.62
Percolation Test (Date/Start Time)		Time taken to drain from 75%-25%
1. 21/06/2018 14:10hrs		2hrs 20 min
2. 22/06/2018 09:35hrs		3hrs 50 min
3. 23/06/2018 12:02 hrs		4hrs 10 min

Test Pit 2 (Far corner of site near footpath)	LAT 51.04275	LONG 1.72841
Width/m 0.3	Length/m 1.3	Depth/m 1.470
Percolation Test (Date/Start Time)		Time taken to drain from 75%-25%
1. 25/06/2018 09:15hrs		1hr 15 min
2. 26/06/2018 14:15hrs		1hr
3. 27/06/2018 11:47hrs		1hr 53 min

Test Pit 3 (In between above)	LAT 51.04256	LONG 1.72876
Width/m 0.3	Length/m 1.6	Depth/m 1.3
Percolation Test (Date/Start Time)		Time taken to drain from 75%-25%
1. 28/06/2018 12:10hrs		3hrs 20 min
2. 29/06/2018 11:50hrs		3hrs 30 min
3. 30/06/2018 10:30hrs		3hrs 45 min

L O N D O N . W I N D S O R . S A L I S B U R Y

Quick Design : Infiltration Systems

Variables

Rainfall and Runoff

FSR Rainfall

Return Period (years)

Region

Map

M5-60 (mm)

Ratio R

100

England and Wales

18.700

0.350

Cv (Summer)

Cv (Winter)

Impemeable Area (ha)

Climate Change (%)

0.750

0.840

0.571

40

Infiltration Structure

Porous Car Park

Infiltration Coefficient Base (m/hr)

Safety Factor

Porosity

0.05920

2.0

0.30

☐ With Outflow

Maximum Discharge (l/s)

0.0

Variables

Results

2D Graphs

3D Graphs

Structures

Pollution

Analyse

OK

Cancel

Help

Enter Area between 0.000 and 999.999

Quick Design : Infiltration Systems

Results

Results are presented in paired rows. These represent maximum and minimum storage requirements for each size of structure.

Depth (m)	Net Vol (m³)	Surface Area (m²)	Capacity Ratio	Ex/Fill Vol (m³)	Half Drain (mins)
0.2	215.6	3593.1	1.6	718.6	81
	187.2	3119.4	1.8	623.9	81
0.3	222.5	2472.0	2.3	741.6	109
	209.4	2326.5	2.5	698.0	109
0.4	233.1	1942.8	2.9	777.1	139
	223.4	1861.5	3.1	744.6	139
0.6	252.6	1403.6	4.1	842.2	199
	245.9	1366.2	4.2	819.7	199
1.0	283.1	943.5	6.1	943.5	320
	279.1	930.5	6.1	930.5	320
1.5	309.9	688.7	8.3	1033.1	472
	307.6	683.6	8.4	1025.3	472
2.0	332.3	553.8	10.3	1107.6	624
	330.3	550.6	10.4	1101.1	624

Variables

Results

2D Graphs

3D Graphs

Structures

Pollution

Analyse

OK

Cancel

Help

Enter Area between 0.000 and 999.999