

1215 Heritage Homes Ltd

Proposed Residential
Development
Southampton Road, Alderbury

Flood Risk Assessment



Control Sheet

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 Southampton Road, Alderbury
REPORT TITLE: Flood Risk Assessment
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1 Introduction

- 1.1 Sanderson Associates Consulting Engineers 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. A gradient of 1 in 43 from South West to North East is assumed for the purpose of the initial drainage assessment.

2.1.7 The site area is $12,521\text{m}^2$ (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 30 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 10631-002C, 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 2,211m² of buildings/positively drained areas, 3,252m² of permeable surfaced areas and 7,058 m² of open green/undrained areas.
- 3.1.4 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 in 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.

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 Design Construction Guidance and Wessex Water recommendations.
- 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 growing 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.

- 9 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.









- 9.1.1 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).
- 9.1.2 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, permeable paving is used for the road and driveways and has sufficient storage with a 300mm sub-base to discharge the roof areas from the properties.
- 9.1.3 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 or 1.64×10^{-5} m/s.
- 9.1.4 WinDES calculations have been carried out based on the overall drained area of the site of 0.546Ha, this includes building roof areas and external areas denoted as permeable surfaces on the proposed drained area plan. The calculations show the 0.3m of sub-base is required to provide the necessary storage requirements to accommodate the M100 + 40% storm event when laid at 1 in 43 gradient. From plan 10631-002C it can be seen that there is a potential maximum area of permeable surfaces of 3,252m². This type of system would be required to be installed to British Standard 7533-13. (WinDES calculations contained in Appendix C).
- 9.1.5 From the above it can be seen that the site would be suitable for soakaway apparatus.

9.2 Discharge to Watercourse

- 9.2.1 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.
- 9.2.2 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 and in relation to paragraph 9.1.5 above unnecessary.

9.3 *Discharge to Sewer*

9.3.1 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.

9.3.2 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 pursued. It is also understood that the site is remote from the public system.

10 Surface Water Drainage Strategy

- 10.1 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.
- 10.2 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.
- 10.3 In regards to proposed surface water discharge the below with outline the findings of this study:
- 10.4 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.
- 10.5 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.

11 Conclusion

- 11.1 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.
- 11.2 Sequential and Exception Tests have been assessed in accordance with NPPF and it is concluded that the development is suitable for this location.
- 11.3 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.
- 11.4 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

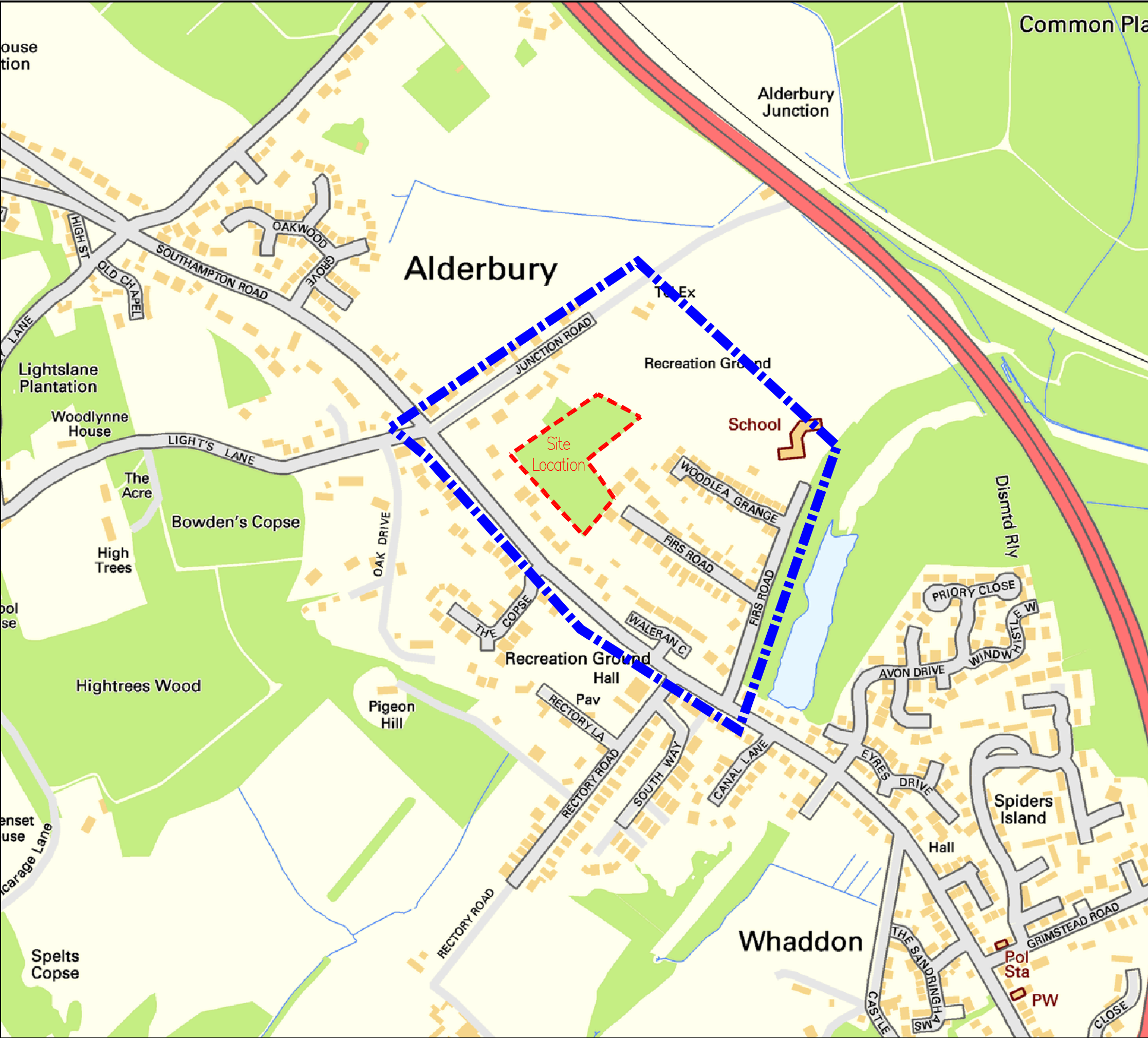
Proposed Drained Areas: 10631/002C

Drainage Layout: 10631/003A

Flood Routing Plan: 10631/004A

Drainage Details 10631/005

Received Layout Plan



O.S. Grid Reference
419078, 127045

Rev	Amendment	Drawn	Date	Checked



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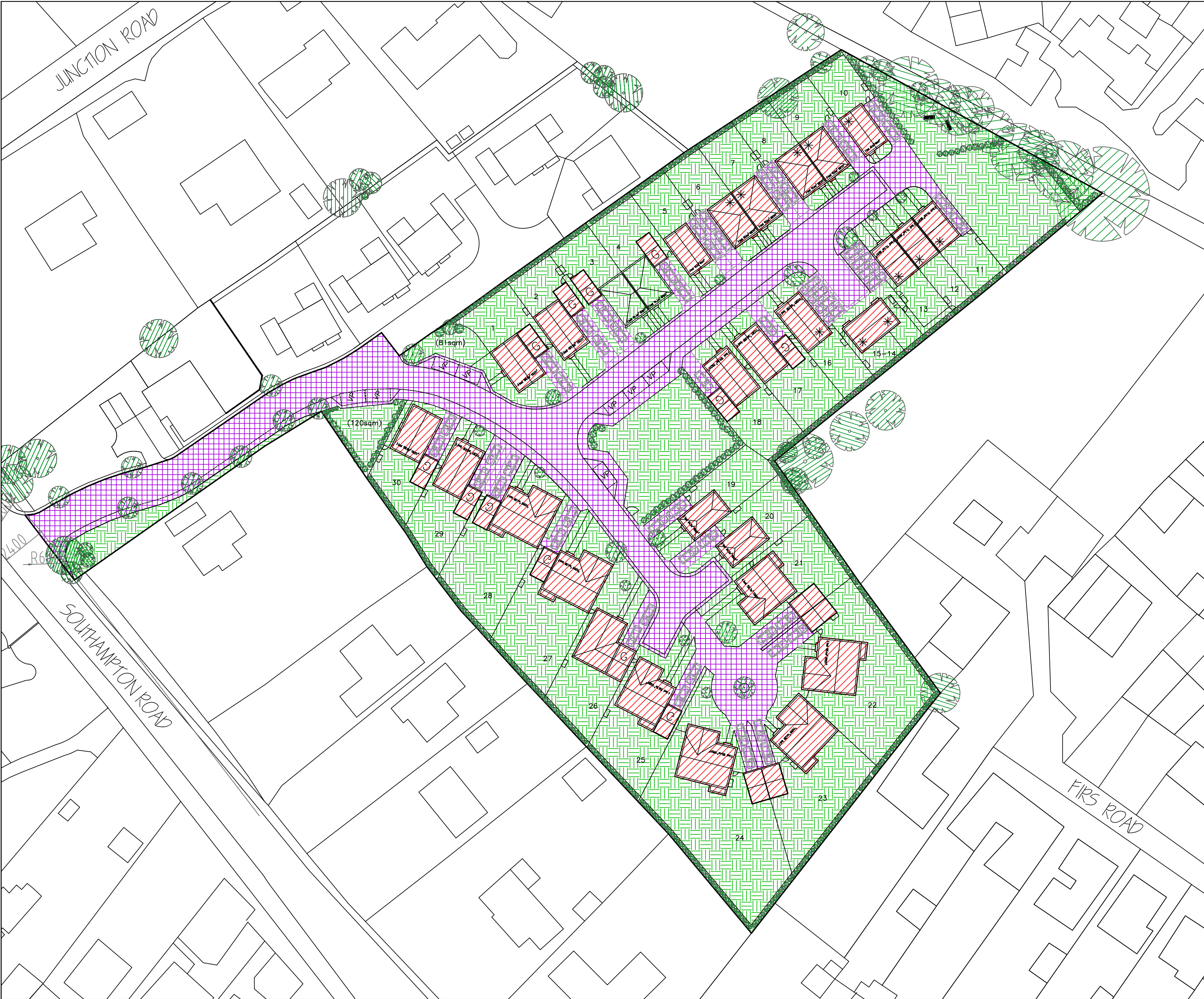
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Project Name
Proposed Residential Development
Land off Southampton Road
Alderbury, Wiltshire

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	



Key

Impermeable Areas

	Buildings	2,211m ²
	Total	2,211m ²

Green/Permeable Surfaced Areas

	Unmade/Green	7,058m ²
	Permeable Surfaces	3,252m ²
	Total Area	12,521m ²

Rev	Amendment	Drawn	Date	Checked
C	Site Layout amended	JKB	04/23	DAH
B	Area distribution amended	LOB	11/19	TW
A	Area distribution amended	TW	08/19	DH

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Client
1215 Heritage Homes Ltd

Project Title
Southampton Road
Alderbury, Wiltshire

Drawing Title
Proposed Drained Areas

Scale	1:500	Drawn By	TW
Drawing Size	A2	Checked By	DH
Date	08/18	Approved By	DH

Drawing Number	Rev
10631-002	C



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• Service connections are not shown but their presence should be anticipated.

• Reference to any third party equipment shown on this drawing was only relevant at the time the drawing was prepared.

• It is the client's responsibility to ensure that any equipment ordered meets the design.

Key

Permeable Paving - Shared Surface - Detail 1

Permeable Paving - Driveway - Detail 2

Baffle - Detail 3
10m spacing between each unit

For details, please refer to drawing ref: 10631-005

A	Site Layout amended	JKB	04/23	DAH
Rev	Amendment	Drawn	Date	Checked



Client

1215 Heritage Homes Ltd

Project Title

Southampton Road
Alderbury, Wiltshire

Drawing Title

Proposed Drainage Layout

Scale	1:500	Drawn By	TOD
Drawing Size	A2	Checked By	DAH
Date	24.04.23	Approved By	PJM
	Drawing Number		Rev
	10631-003		A



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- Service connections are not shown but their presence should be anticipated.
- Reference to any third party equipment shown on this drawing was only relevant at the time the drawing was prepared.
- It is the client's responsibility to ensure that any equipment ordered meets the design.

Key

— Flood Routing Direction

Notes

1. 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.
2. Where possible non-trafficked hardstanding and footway areas should be constructed to naturally fall into adjacent garden/green areas.
3. 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.

A	Site Layout amended	JKB	04/23	DAH
Rev	Amendment	Drawn	Date	Checked



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Client

1215 Heritage Homes Ltd

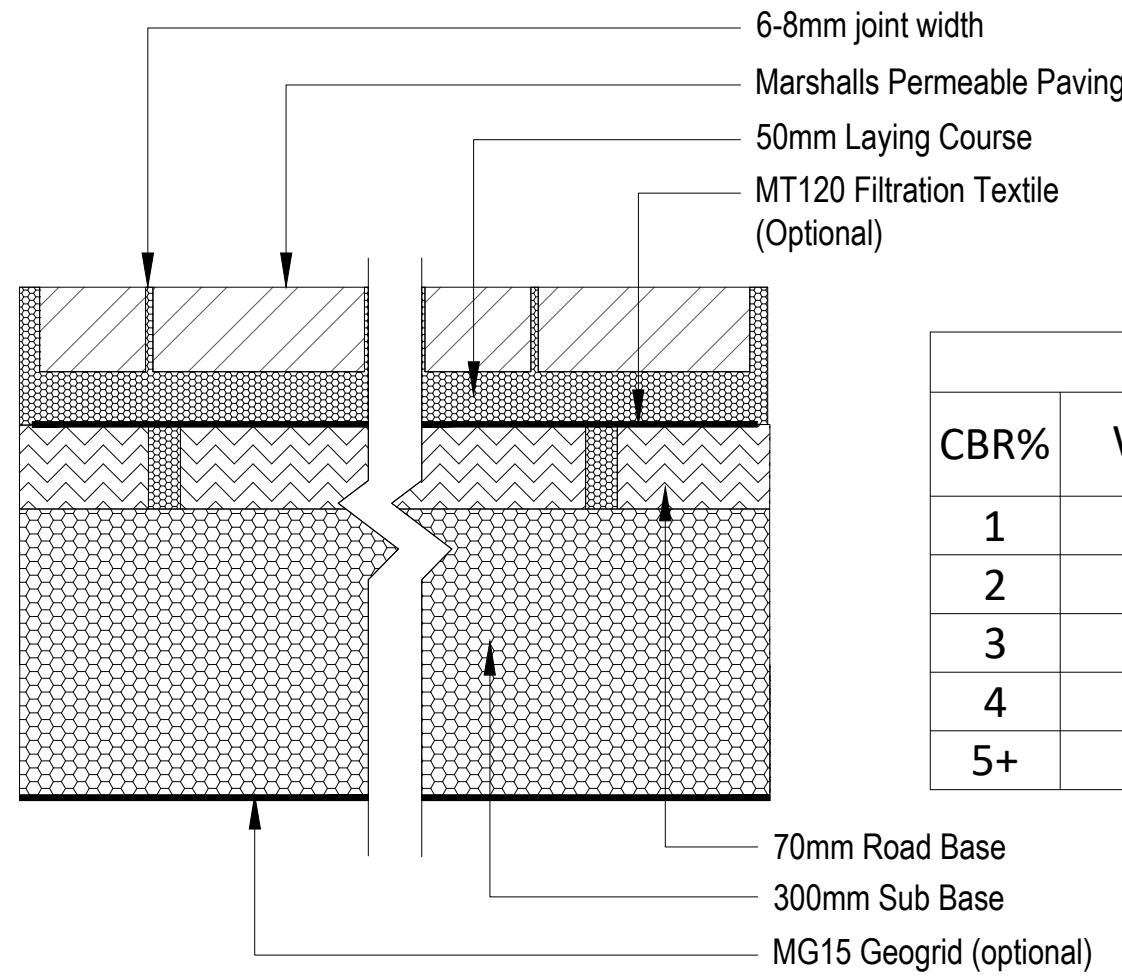
Project Title

Southampton Road
Alderbury, Wiltshire

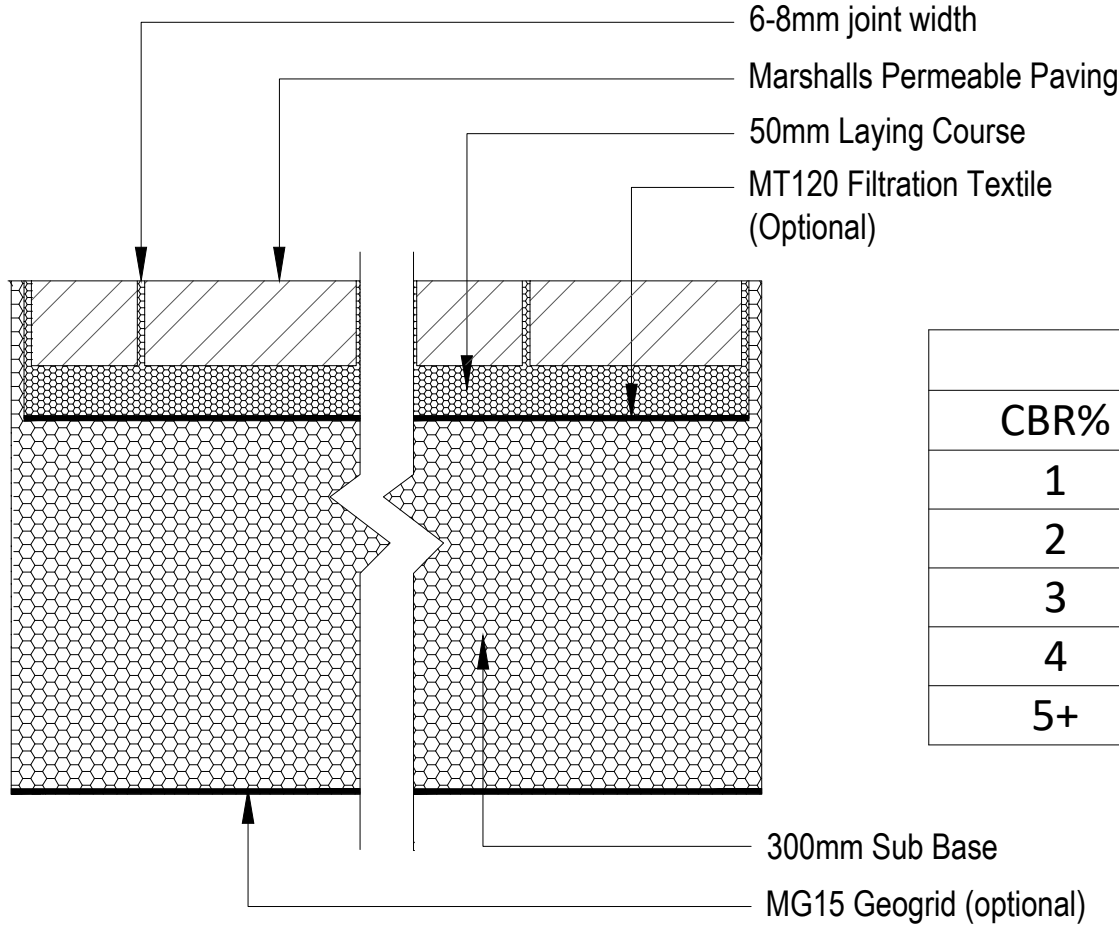
Drawing Title

Flood Routing Plan

Scale	1:500	Drawn By	TOD
Drawing Size	A2	Checked By	DAH
Date	24.04.23	Approved By	PJM
Drawing Number		Rev	
10631-004		A	



CBR%	Capping Depth (mm)	
	With Geogrid	Without Geogrid
1	350	600
2	225	350
3	150	225
4	-	150
5+	-	-



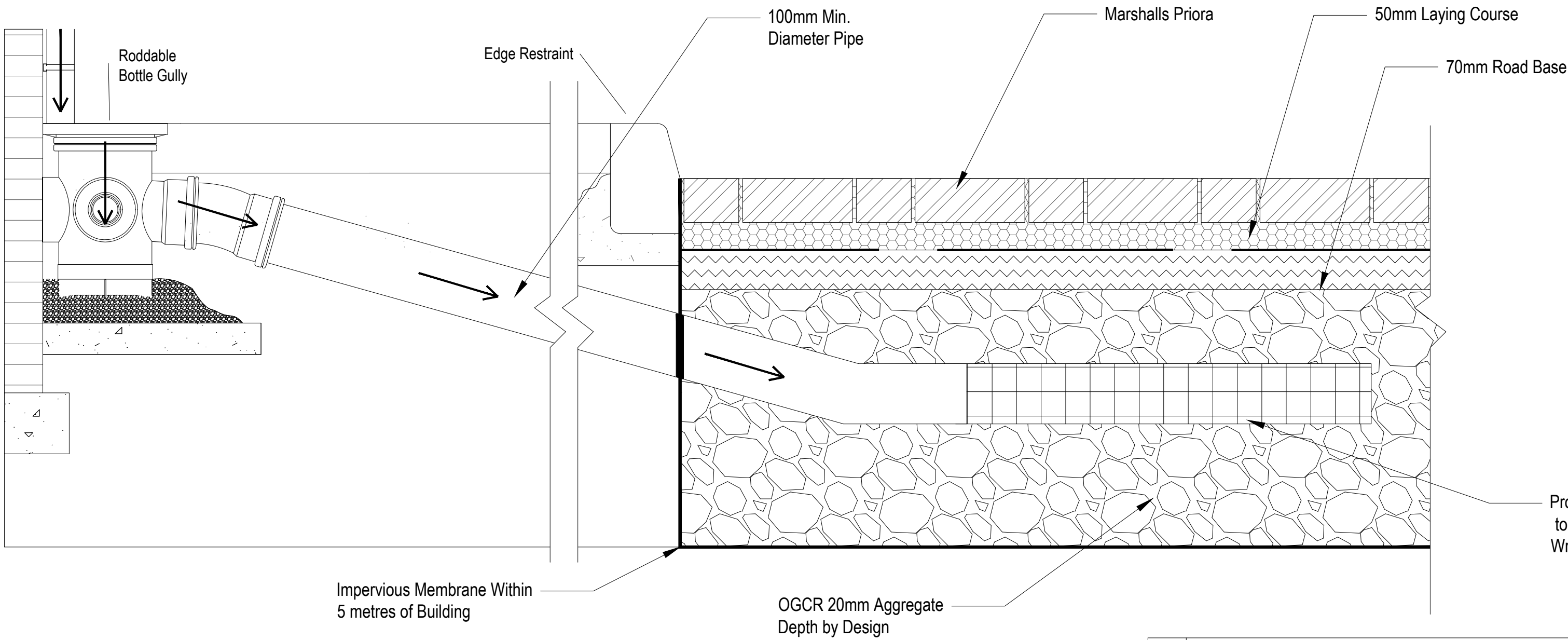
CBR%	Capping Depth (mm)	
	With Geogrid	Without Geogrid
1	350	600
2	225	350
3	150	225
4	-	150
5+	-	-

Detail 1
Priora Installation (Type C) - 1 HGV per week (0.015 msa)

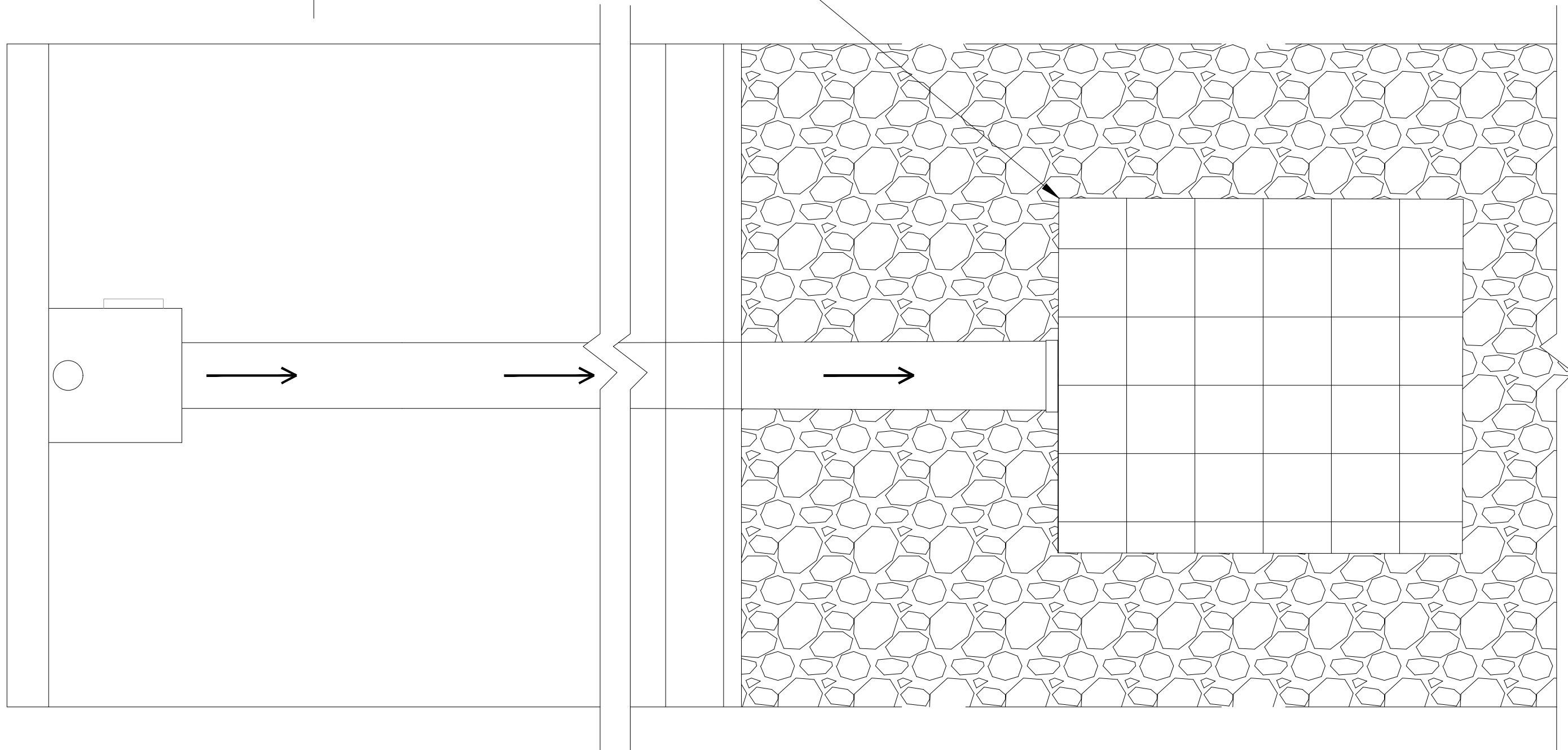
- Notes:
1. Jointing Material to be 2-6.3mm Graded OGCR in line with BS EN12620
 2. Laying Course to be 2-6.3mm Graded OGCR in line with BS EN12620
 3. Sub Base material to be 4-20mm Graded OGCR in line with BS EN12620
 4. Road Base material to be DBM 50 pen to SHW clause 929 laid to SHW clause 903 with 75mm diam. at 750mm centres filled with laying course material
 5. Capping Layer material to be 4-20mm Graded OGCR in line with BS EN12620
 6. Marshalls MG15 Geogrid laid in line with SHW Clause 609

Detail 2
Priora Installation (Type C) - Pedestrian & Domestic Driveways (2000kg GVW)

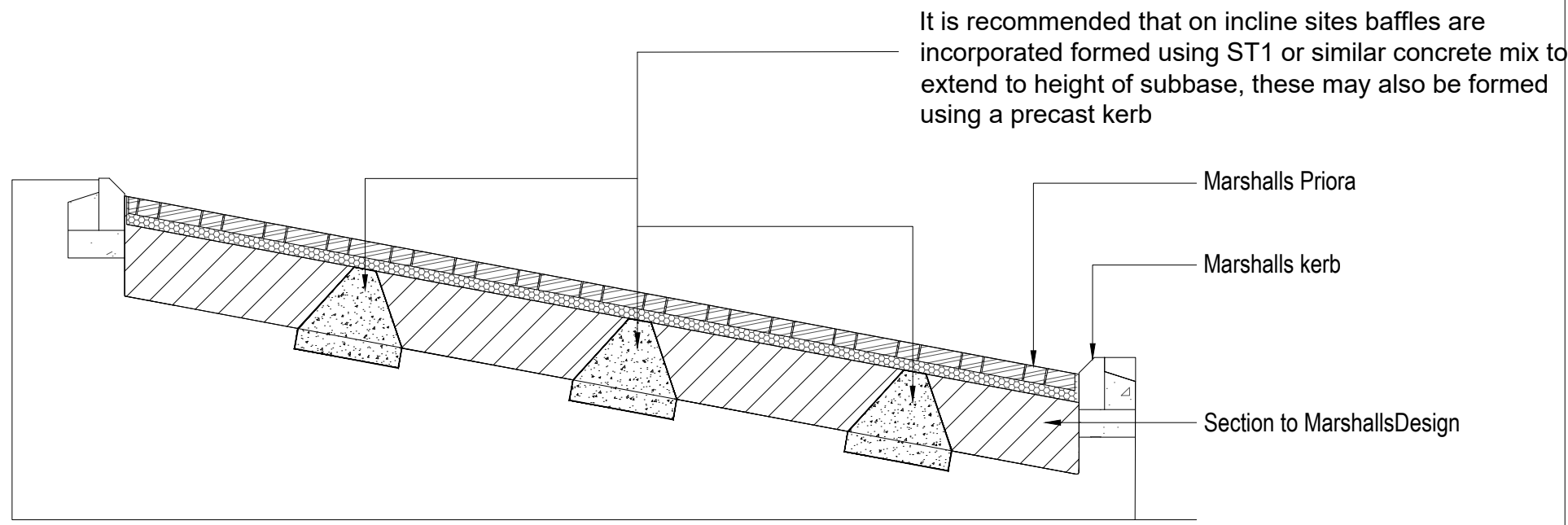
- Notes:
1. Jointing Material to be 2-6.3mm Graded OGCR in line with BS EN12620
 2. Laying Course to be 2-6.3mm Graded OGCR in line with BS EN12620
 3. Sub Base material to be 4-20mm Graded OGCR in line with BS EN12620
 4. Capping Layer material to be 4-20mm Graded OGCR in line with BS EN12620
 5. Marshalls MG15 Geogrid laid in line with SHW Clause 609



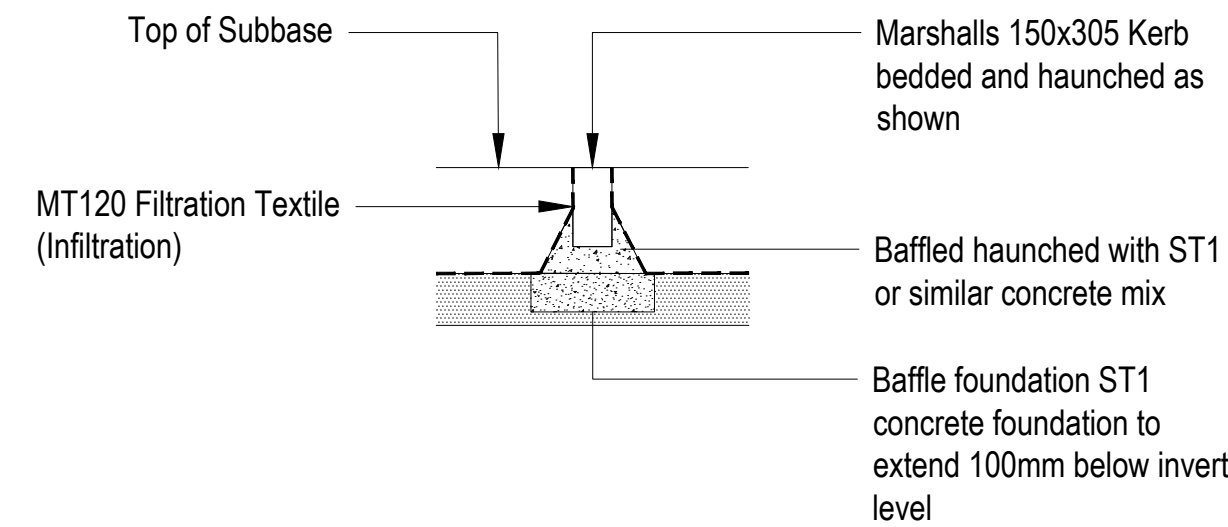
Typical section of RWP connection into Permeable Paving



Typical plan of RWP connection into Permeable Paving



Detail 3
Typical Sloped Site Detail



Detail 3
Typical Baffle Detail

- Sanderson Associates Consulting Engineers ("the consultant"), has not checked or verified, and shall have no liability whatsoever for any inaccuracies which may be attributable to any data, reports, base plan(s) and drawings provided by the client, or purchased by the consultant on the client's behalf, that may have been utilised within this drawing.
- The consultant shall not be liable for the use by any person of any document for any purpose other than that for which the same were provided by the consultant.
- No liability whatsoever is accepted by the consultant for any error or omissions.
- The consultant accepts no liability for any vehicle specification errors within the vehicle track software used and / or it's vehicle libraries.
- The locations of utilities apparatus, if shown, is reproduced from plans supplied to the consultant, although care has been taken when duplicating this information. These locations are approximate only and no guarantee can be given for their accuracy. It is the client's or it's appointed agent/contractors responsibility to verify the exact locations on site by hand dug trial holes or other appropriate means prior to mechanical excavation.
- Service connections are not shown but their presence should be anticipated.
- Reference to any third party equipment shown on this drawing was only relevant at the time the drawing was prepared.
- It is the client's responsibility to ensure that any equipment ordered meets the design.

Rev	Amendment	Drawn	Date	Checked



Client	1215 Heritage Homes LTD		
Project Title	Southampton Road Alderbury, Wiltshire		
Drawing Title	Drainage Details		
Scale	N.T.S	Drawn By	TOD
Drawing Size	A 1	Checked By	DAH
Date	24.04.23	Approved By	PJM
Drawing Number		Rev	
10631-005			

CONSTRUCTION DESIGN & MANAGEMENT REGULATIONS 2015

Design this document as a guide to the design of the project, in accordance with the company procedures in the field and the design of the project. The design of the project is the responsibility of the design team. The design team is responsible for the design of the project. The design team is responsible for the design of the project. The design team is responsible for the design of the project.

GENERAL NOTES

1. To be completed by the design team.
2. All dimensions to be checked on site.
3. The design team is responsible for the design of the project.
4. The design team is responsible for the design of the project.

NOTES



PRIVATE DWELLINGS

2 BED - X 2 DWELLINGS
3 BED - X 8 DWELLINGS
4 BED - X 3 DWELLINGS
5 BED - X 5 DWELLINGS
TOTAL = 18 DWELLINGS

AFFORDABLE/SHARED DWELLINGS *

1 BED - X 2 DWELLINGS
2 BED - X 6 DWELLINGS
3 BED - X 4 DWELLINGS
TOTAL = 12 DWELLINGS

PARKING SCHEDULE

1 Bed 1 Parking Space
2 Bed 2 parking Space
3 Bed 2 parking Space + Garage
4 Bed 2/3 parking Space + Garage
5 Bed 2/3 parking Space + Garage
8 No Visitor Spaces 0.27/Dwelling

Garages 6x3m internally

Landscaping
Biological Mitigation/ Natural Area 12.25sqm

B/S Bin/Cycle Store

Note: Plots 11 & 12 have been deleted from the site plan numbered 1215_01

HERITAGE HOMES

12 HERITAGE HOMES

MAINLAND DEVELOPMENT

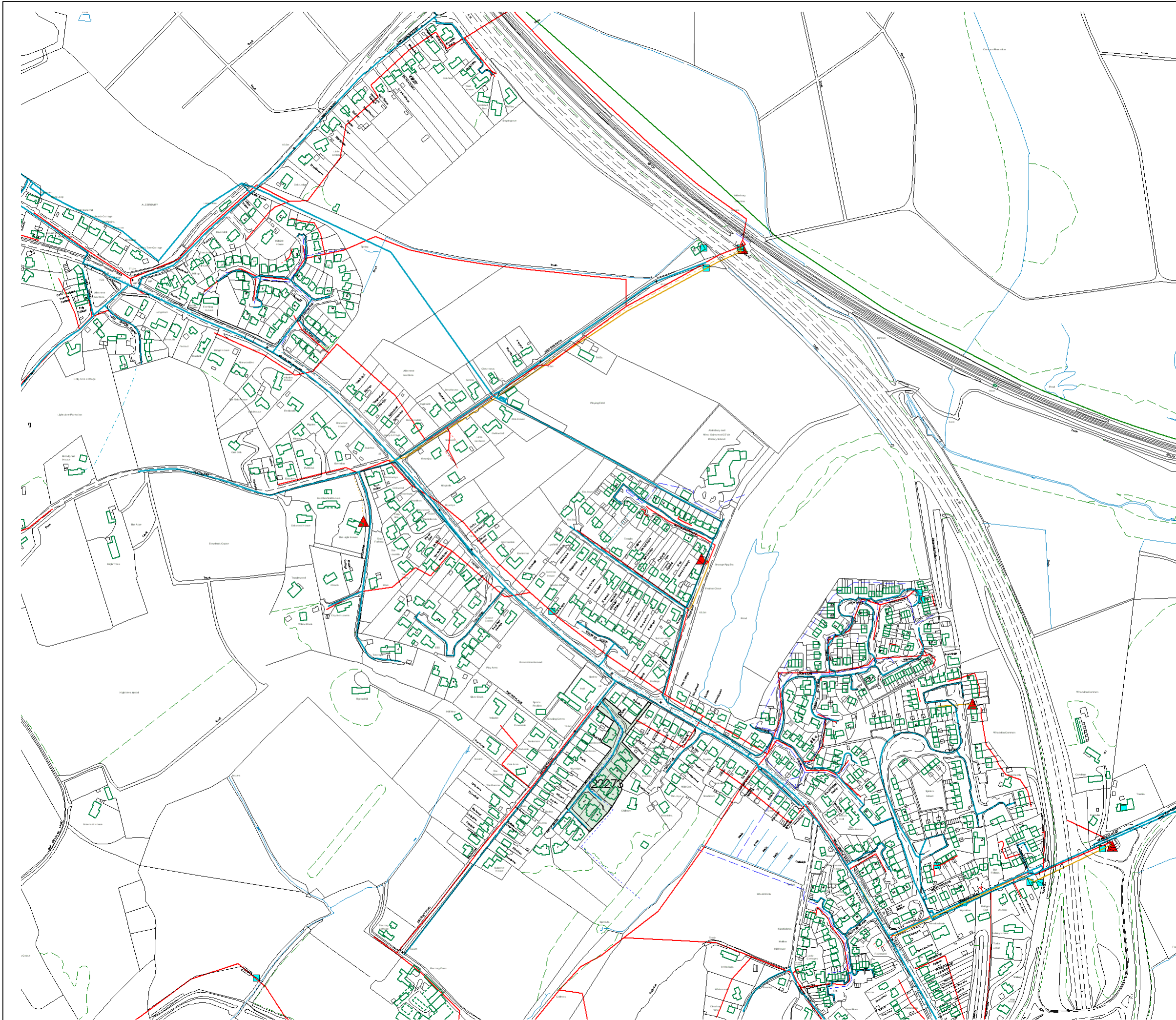
FINA

SITE LAYOUT





APPENDIX B
Consultation



Land off Southampton

Printed on : 13/08/2018 14:06

WATER MAINS

Public

Private

Public Raw Water

Abandoned

Valve

Hydrant

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.

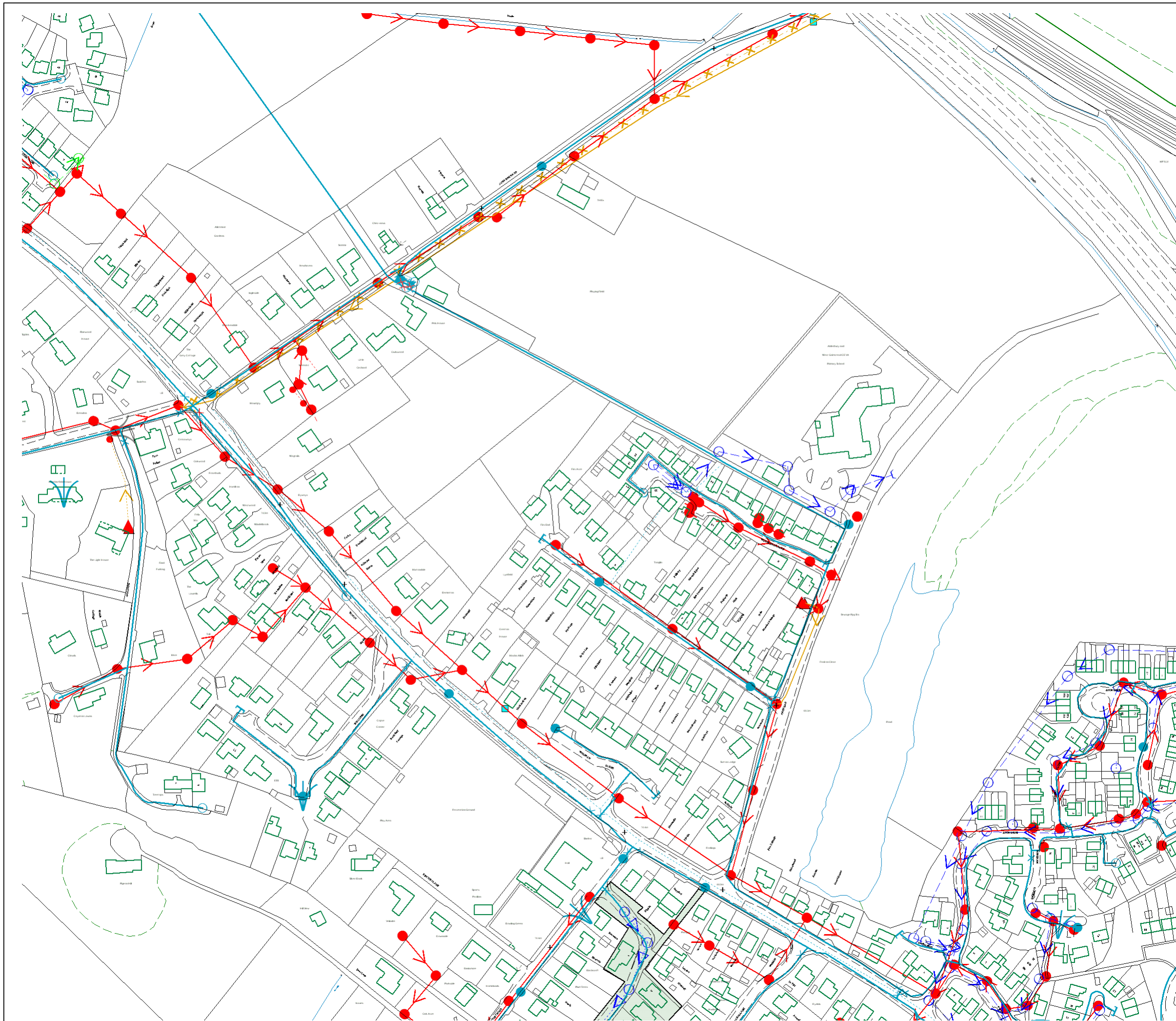
In carrying out any works, you accept liability for the cost of any repairs to Wessex Water apparatus damaged as a result of your works. You are advised to commence excavations using hand tools only. Mechanical digging equipment should not be used until pipe work has been precisely located.

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

Scale = 1:5000

Metres 100 200 300



Land off Southampton

Printed on : 13/08/2018 14:06

WATER MAINS		Public	Private
Public		—	- - -
Raw Water		- - -	- - -
Abandoned		...	...
Valve	X	Hydrant	●
		PRV	▲
		Meter	M

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

Scale = 1:2500

Metres 50 100 150

APPENDIX C

Greenfield Run Off Calculations

Permeable Paving – M30

Permeable Paving – M100

Permeable Paving – M100+CC

Soakaway Test Result

Sanderson Associates		Page 1
Sanderson House Jubilee Way Huddersfield, WF4 4TD		
Date 21/08/2018 13:40 File	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		PERMEABLE PAVING - M30 - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE			
Date 27/04/2023 File 10631A PERMEABLE PAVING...		Designed by DAH Checked by PJM			
Micro Drainage		Source Control 2019.1			
Summary of Results for 30 year Return Period					
Half Drain Time : 36 minutes.					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	72.641	0.141	16.2	44.7	O K
30 min Summer	72.661	0.161	18.5	58.1	O K
60 min Summer	72.673	0.173	19.9	67.2	O K
120 min Summer	72.678	0.178	20.4	70.7	O K
180 min Summer	72.674	0.174	20.0	68.0	O K
240 min Summer	72.669	0.169	19.4	63.8	O K
360 min Summer	72.657	0.157	18.0	55.0	O K
480 min Summer	72.646	0.146	16.8	47.6	O K
600 min Summer	72.636	0.136	15.7	41.5	O K
720 min Summer	72.628	0.128	14.7	36.5	O K
960 min Summer	72.614	0.114	13.1	29.0	O K
1440 min Summer	72.594	0.094	10.8	19.6	O K
2160 min Summer	72.574	0.074	8.5	12.3	O K
2880 min Summer	72.562	0.062	7.1	8.5	O K
4320 min Summer	72.548	0.048	5.4	5.2	O K
5760 min Summer	72.543	0.043	4.3	4.2	O K
7200 min Summer	72.540	0.040	3.6	3.5	O K
8640 min Summer	72.537	0.037	3.1	3.0	O K
10080 min Summer	72.535	0.035	2.8	2.7	O K
15 min Winter	72.653	0.153	17.6	52.2	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
15 min Summer	67.685	0.0	17		
30 min Summer	45.068	0.0	29		
60 min Summer	28.763	0.0	46		
120 min Summer	17.832	0.0	80		
180 min Summer	13.334	0.0	114		
240 min Summer	10.796	0.0	146		
360 min Summer	7.989	0.0	210		
480 min Summer	6.450	0.0	272		
600 min Summer	5.460	0.0	334		
720 min Summer	4.763	0.0	396		
960 min Summer	3.838	0.0	514		
1440 min Summer	2.826	0.0	752		
2160 min Summer	2.079	0.0	1108		
2880 min Summer	1.670	0.0	1468		
4320 min Summer	1.225	0.0	2176		
5760 min Summer	0.983	0.0	2936		
7200 min Summer	0.828	0.0	3608		
8640 min Summer	0.720	0.0	4336		
10080 min Summer	0.640	0.0	5072		
15 min Winter	67.685	0.0	17		
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Sanderson Associates				Page 2	
Sanderson House Jubilee Way Huddersfield, WF4 4TD		PERMEABLE PAVING - M30 - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE			
Date 27/04/2023 File 10631A PERMEABLE PAVING...		Designed by DAH Checked by PJM			
Micro Drainage		Source Control 2019.1			
Summary of Results for 30 year Return Period					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	72.674	0.174	20.0	67.7	O K
60 min Winter	72.685	0.185	21.3	76.8	O K
120 min Winter	72.686	0.186	21.4	77.7	O K
180 min Winter	72.679	0.179	20.6	72.1	O K
240 min Winter	72.671	0.171	19.6	65.2	O K
360 min Winter	72.653	0.153	17.6	52.6	O K
480 min Winter	72.638	0.138	15.9	42.8	O K
600 min Winter	72.626	0.126	14.5	35.3	O K
720 min Winter	72.615	0.115	13.2	29.5	O K
960 min Winter	72.598	0.098	11.2	21.4	O K
1440 min Winter	72.576	0.076	8.7	12.8	O K
2160 min Winter	72.557	0.057	6.5	7.2	O K
2880 min Winter	72.548	0.048	5.2	5.1	O K
4320 min Winter	72.541	0.041	3.8	3.8	O K
5760 min Winter	72.537	0.037	3.1	3.0	O K
7200 min Winter	72.534	0.034	2.6	2.5	O K
8640 min Winter	72.531	0.031	2.2	2.2	O K
10080 min Winter	72.529	0.029	2.0	1.9	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	45.068	0.0	30		
60 min Winter	28.763	0.0	48		
120 min Winter	17.832	0.0	86		
180 min Winter	13.334	0.0	122		
240 min Winter	10.796	0.0	156		
360 min Winter	7.989	0.0	222		
480 min Winter	6.450	0.0	284		
600 min Winter	5.460	0.0	344		
720 min Winter	4.763	0.0	406		
960 min Winter	3.838	0.0	524		
1440 min Winter	2.826	0.0	762		
2160 min Winter	2.079	0.0	1104		
2880 min Winter	1.670	0.0	1468		
4320 min Winter	1.225	0.0	2204		
5760 min Winter	0.983	0.0	2920		
7200 min Winter	0.828	0.0	3648		
8640 min Winter	0.720	0.0	4376		
10080 min Winter	0.640	0.0	5000		
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Sanderson Associates		Page 3
Sanderson House Jubilee Way Huddersfield, WF4 4TD	PERMEABLE PAVING - M30 - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE	
Date 27/04/2023 File 10631A PERMEABLE PAVING...	Designed by DAH Checked by PJM	
Micro Drainage Source Control 2019.1		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.700	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.546

Time (mins)		Area
From:	To:	(ha)
0	4	0.546

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Sanderson Associates		Page 4																								
Sanderson House Jubilee Way Huddersfield, WF4 4TD	PERMEABLE PAVING - M30 - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE																									
Date 27/04/2023 File 10631A PERMEABLE PAVING...	Designed by DAH Checked by PJM																									
Micro Drainage Source Control 2019.1																										
Model Details Storage is Online Cover Level (m) 73.000 Porous Car Park Structure <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.05920</td><td>Width (m)</td><td>325.2</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>10.0</td></tr><tr><td>Max Percolation (l/s)</td><td>903.3</td><td>Slope (1:X)</td><td>43.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.32</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>72.500</td><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.05920	Width (m)	325.2	Membrane Percolation (mm/hr)	1000	Length (m)	10.0	Max Percolation (l/s)	903.3	Slope (1:X)	43.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.32	Evaporation (mm/day)	3	Invert Level (m)	72.500	Cap Volume Depth (m)	0.300
Infiltration Coefficient Base (m/hr)	0.05920	Width (m)	325.2																							
Membrane Percolation (mm/hr)	1000	Length (m)	10.0																							
Max Percolation (l/s)	903.3	Slope (1:X)	43.0																							
Safety Factor	2.0	Depression Storage (mm)	5																							
Porosity	0.32	Evaporation (mm/day)	3																							
Invert Level (m)	72.500	Cap Volume Depth (m)	0.300																							
©1982-2019 Innovyze																										

Sanderson Associates					Page 1	
Sanderson House Jubilee Way Huddersfield, WF4 4TD			PERMEABLE PAVING - M100 - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE			
Date 27/04/2023 File 10631A PERMEABLE PAVING...			Designed by DAH Checked by PJM			
Micro Drainage			Source Control 2019.1			
Summary of Results for 100 year Return Period						
Half Drain Time : 43 minutes.						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
15 min Summer	72.668	0.168	19.3	63.0	O K	
30 min Summer	72.691	0.191	22.0	82.0	O K	
60 min Summer	72.706	0.206	23.7	94.8	O K	
120 min Summer	72.711	0.211	24.3	99.8	O K	
180 min Summer	72.708	0.208	23.9	96.5	O K	
240 min Summer	72.701	0.201	23.1	90.8	O K	
360 min Summer	72.688	0.188	21.6	78.9	O K	
480 min Summer	72.676	0.176	20.2	68.9	O K	
600 min Summer	72.665	0.165	18.9	60.6	O K	
720 min Summer	72.655	0.155	17.8	53.7	O K	
960 min Summer	72.639	0.139	16.0	43.0	O K	
1440 min Summer	72.615	0.115	13.2	29.4	O K	
2160 min Summer	72.591	0.091	10.5	18.5	O K	
2880 min Summer	72.576	0.076	8.7	12.9	O K	
4320 min Summer	72.557	0.057	6.6	7.3	O K	
5760 min Summer	72.548	0.048	5.2	5.1	O K	
7200 min Summer	72.544	0.044	4.4	4.3	O K	
8640 min Summer	72.541	0.041	3.8	3.7	O K	
10080 min Summer	72.538	0.038	3.4	3.2	O K	
15 min Winter	72.680	0.180	20.7	72.9	O K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
15 min Summer	87.481	0.0	17			
30 min Summer	58.825	0.0	30			
60 min Summer	37.780	0.0	46			
120 min Summer	23.448	0.0	80			
180 min Summer	17.485	0.0	114			
240 min Summer	14.101	0.0	148			
360 min Summer	10.362	0.0	214			
480 min Summer	8.328	0.0	276			
600 min Summer	7.024	0.0	338			
720 min Summer	6.108	0.0	398			
960 min Summer	4.895	0.0	520			
1440 min Summer	3.576	0.0	762			
2160 min Summer	2.607	0.0	1120			
2880 min Summer	2.081	0.0	1472			
4320 min Summer	1.511	0.0	2200			
5760 min Summer	1.203	0.0	2936			
7200 min Summer	1.007	0.0	3608			
8640 min Summer	0.872	0.0	4408			
10080 min Summer	0.772	0.0	5120			
15 min Winter	87.481	0.0	17			
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Sanderson Associates				Page 2	
Sanderson House Jubilee Way Huddersfield, WF4 4TD		PERMEABLE PAVING - M100 - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE			
Date 27/04/2023 File 10631A PERMEABLE PAVING...		Designed by DAH Checked by PJM			
Micro Drainage		Source Control 2019.1			
Summary of Results for 100 year Return Period					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	72.706	0.206	23.7	94.8	O K
60 min Winter	72.720	0.220	25.3	108.1	O K
120 min Winter	72.722	0.222	25.6	110.7	O K
180 min Winter	72.715	0.215	24.7	103.9	O K
240 min Winter	72.706	0.206	23.7	94.8	O K
360 min Winter	72.686	0.186	21.4	77.7	O K
480 min Winter	72.669	0.169	19.5	64.1	O K
600 min Winter	72.655	0.155	17.8	53.5	O K
720 min Winter	72.642	0.142	16.4	45.2	O K
960 min Winter	72.622	0.122	14.0	33.2	O K
1440 min Winter	72.595	0.095	10.9	20.0	O K
2160 min Winter	72.571	0.071	8.1	11.2	O K
2880 min Winter	72.557	0.057	6.5	7.3	O K
4320 min Winter	72.546	0.046	4.8	4.6	O K
5760 min Winter	72.541	0.041	3.8	3.7	O K
7200 min Winter	72.537	0.037	3.2	3.1	O K
8640 min Winter	72.534	0.034	2.7	2.6	O K
10080 min Winter	72.532	0.032	2.4	2.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	58.825	0.0	30		
60 min Winter	37.780	0.0	50		
120 min Winter	23.448	0.0	88		
180 min Winter	17.485	0.0	124		
240 min Winter	14.101	0.0	158		
360 min Winter	10.362	0.0	226		
480 min Winter	8.328	0.0	290		
600 min Winter	7.024	0.0	350		
720 min Winter	6.108	0.0	412		
960 min Winter	4.895	0.0	530		
1440 min Winter	3.576	0.0	766		
2160 min Winter	2.607	0.0	1124		
2880 min Winter	2.081	0.0	1472		
4320 min Winter	1.511	0.0	2156		
5760 min Winter	1.203	0.0	2944		
7200 min Winter	1.007	0.0	3640		
8640 min Winter	0.872	0.0	4256		
10080 min Winter	0.772	0.0	4960		
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Sanderson Associates		Page 3
Sanderson House Jubilee Way Huddersfield, WF4 4TD	PERMEABLE PAVING - M100 - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE	
Date 27/04/2023 File 10631A PERMEABLE PAVING...	Designed by DAH Checked by PJM	
Micro Drainage Source Control 2019.1		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.700	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.546

Time (mins)		Area
From:	To:	(ha)
0	4	0.546

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Sanderson Associates		Page 4																								
Sanderson House Jubilee Way Huddersfield, WF4 4TD	PERMEABLE PAVING - M100 - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE																									
Date 27/04/2023 File 10631A PERMEABLE PAVING...	Designed by DAH Checked by PJM																									
Micro Drainage Source Control 2019.1																										
Model Details Storage is Online Cover Level (m) 73.000 Porous Car Park Structure <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.05920</td><td>Width (m)</td><td>325.2</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Length (m)</td><td>10.0</td></tr><tr><td>Max Percolation (l/s)</td><td>903.3</td><td>Slope (1:X)</td><td>43.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Porosity</td><td>0.32</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Invert Level (m)</td><td>72.500</td><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.05920	Width (m)	325.2	Membrane Percolation (mm/hr)	1000	Length (m)	10.0	Max Percolation (l/s)	903.3	Slope (1:X)	43.0	Safety Factor	2.0	Depression Storage (mm)	5	Porosity	0.32	Evaporation (mm/day)	3	Invert Level (m)	72.500	Cap Volume Depth (m)	0.300
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Sanderson Associates				Page 1	
Sanderson House Jubilee Way Huddersfield, WF4 4TD		PERMEABLE PAVING - M100+CC - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE			
Date 27/04/2023 File 10631A PERMEABLE PAVING...		Designed by DAH Checked by PJM			
Micro Drainage		Source Control 2019.1			
Summary of Results for 100 year Return Period (+40%)					
Half Drain Time : 62 minutes.					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	72.707	0.207	23.8	95.8	O K
30 min Summer	72.735	0.235	26.7	123.9	O K
60 min Summer	72.754	0.254	26.7	143.8	O K
120 min Summer	72.763	0.263	26.7	153.0	O K
180 min Summer	72.760	0.260	26.7	149.6	O K
240 min Summer	72.753	0.253	26.7	142.0	O K
360 min Summer	72.736	0.236	26.7	125.0	O K
480 min Summer	72.723	0.223	25.6	111.0	O K
600 min Summer	72.711	0.211	24.2	99.3	O K
720 min Summer	72.700	0.200	23.0	89.2	O K
960 min Summer	72.681	0.181	20.8	73.3	O K
1440 min Summer	72.652	0.152	17.5	51.9	O K
2160 min Summer	72.623	0.123	14.2	34.0	O K
2880 min Summer	72.604	0.104	11.9	24.0	O K
4320 min Summer	72.579	0.079	9.1	14.0	O K
5760 min Summer	72.564	0.064	7.3	9.1	O K
7200 min Summer	72.554	0.054	6.2	6.4	O K
8640 min Summer	72.548	0.048	5.4	5.2	O K
10080 min Summer	72.545	0.045	4.7	4.6	O K
15 min Winter	72.722	0.222	25.5	109.8	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
15 min Summer	122.474	0.0	17		
30 min Summer	82.355	0.0	31		
60 min Summer	52.892	0.0	50		
120 min Summer	32.827	0.0	84		
180 min Summer	24.479	0.0	118		
240 min Summer	19.741	0.0	152		
360 min Summer	14.507	0.0	218		
480 min Summer	11.659	0.0	282		
600 min Summer	9.833	0.0	344		
720 min Summer	8.551	0.0	406		
960 min Summer	6.853	0.0	528		
1440 min Summer	5.007	0.0	766		
2160 min Summer	3.650	0.0	1124		
2880 min Summer	2.913	0.0	1472		
4320 min Summer	2.116	0.0	2204		
5760 min Summer	1.684	0.0	2936		
7200 min Summer	1.410	0.0	3672		
8640 min Summer	1.220	0.0	4296		
10080 min Summer	1.080	0.0	5008		
15 min Winter	122.474	0.0	17		
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Sanderson Associates				Page 2	
Sanderson House Jubilee Way Huddersfield, WF4 4TD		PERMEABLE PAVING - M100+CC - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE			
Date 27/04/2023 File 10631A PERMEABLE PAVING...		Designed by DAH Checked by PJM			
Micro Drainage		Source Control 2019.1			
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	72.754	0.254	26.7	143.1	O K
60 min Winter	72.776	0.276	26.7	166.5	O K
120 min Winter	72.783	0.283	26.7	173.9	O K
180 min Winter	72.776	0.276	26.7	166.4	O K
240 min Winter	72.764	0.264	26.7	153.7	O K
360 min Winter	72.738	0.238	26.7	127.1	O K
480 min Winter	72.719	0.219	25.2	107.4	O K
600 min Winter	72.703	0.203	23.3	91.8	O K
720 min Winter	72.688	0.188	21.6	79.0	O K
960 min Winter	72.664	0.164	18.8	59.9	O K
1440 min Winter	72.630	0.130	14.9	37.5	O K
2160 min Winter	72.598	0.098	11.3	21.7	O K
2880 min Winter	72.580	0.080	9.2	14.2	O K
4320 min Winter	72.558	0.058	6.7	7.5	O K
5760 min Winter	72.548	0.048	5.4	5.2	O K
7200 min Winter	72.544	0.044	4.5	4.3	O K
8640 min Winter	72.541	0.041	3.8	3.7	O K
10080 min Winter	72.538	0.038	3.4	3.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	82.355	0.0	31		
60 min Winter	52.892	0.0	58		
120 min Winter	32.827	0.0	92		
180 min Winter	24.479	0.0	130		
240 min Winter	19.741	0.0	166		
360 min Winter	14.507	0.0	232		
480 min Winter	11.659	0.0	296		
600 min Winter	9.833	0.0	360		
720 min Winter	8.551	0.0	422		
960 min Winter	6.853	0.0	542		
1440 min Winter	5.007	0.0	780		
2160 min Winter	3.650	0.0	1128		
2880 min Winter	2.913	0.0	1472		
4320 min Winter	2.116	0.0	2200		
5760 min Winter	1.684	0.0	2928		
7200 min Winter	1.410	0.0	3672		
8640 min Winter	1.220	0.0	4400		
10080 min Winter	1.080	0.0	5136		
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Sanderson Associates		Page 3
Sanderson House Jubilee Way Huddersfield, WF4 4TD	PERMEABLE PAVING - M100+CC - A SOUTHAMPTON ROAD ALDERBUURY, WILTSHIRE	
Date 27/04/2023 File 10631A PERMEABLE PAVING...	Designed by DAH Checked by PJM	
Micro Drainage Source Control 2019.1		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.700	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.546

Time (mins)		Area
From:	To:	(ha)
0	4	0.546

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Sanderson Associates		Page 4																								
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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

SC

File Edit View Analyse Cascade Window Help

Micro Drainage

Variables

Rainfall and Runoff

FSR Rainfall

Return Period (years) 100

Region England and Wales

Map M5-60 (mm) 18.800

Ratio R 0.350

Cv (Summer) 0.750

Cv (Winter) 0.840

Impermeable Area (ha) 0.567

Climate Change (%) 40

Infiltration Structure

Cellular Storage

Infiltration Coefficient Base (m/hr) 0.05920

Infiltration Coefficient Side (m/hr) 0.05920

Safety Factor 2.0

Porosity 0.95

☐ With Outflow

Maximum Discharge (l/s) 0.0

SC Source Control

File Edit View Analyse Cascade Window Help

Micro Drainage

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)	Ex/Fill Vol (m³)	Half Drain (mins)
0.2	290.8	1530.7	306.1	254
	261.3	1375.2	275.0	254
0.3	299.6	1051.1	315.3	342
	281.7	988.6	296.6	341
0.4	311.2	819.1	327.6	431
	298.3	785.0	314.0	431
0.6	334.1	586.2	351.7	608
	323.3	567.2	340.3	608
1.0	368.3	387.7	387.7	946
	359.8	378.8	378.8	946
1.5	397.4	278.9	418.3	1330
	389.1	273.1	409.6	1328
2.0	421.4	221.8	443.6	1669
	413.8	217.8	435.5	1667



FAIRHURST



Sanderson House, Jubilee Way, Grange Moor,
Huddersfield, WF4 4TD



01924 844080

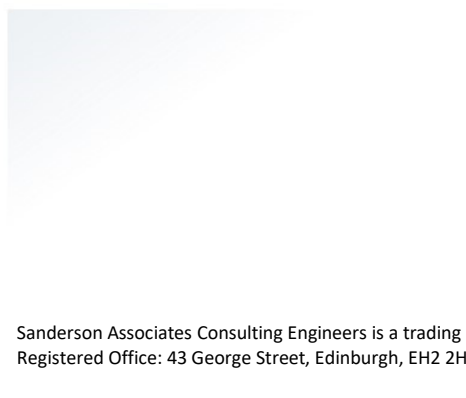


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