



Homes England

New Lane, Havant

Flood Risk Assessment and Drainage Strategy

August 2018

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creative minds safe hands



Document Control

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1.0 Introduction

1.1 Brief

- 1.1.1 WYG have been commissioned by Homes England to produce a Flood Risk Assessment (FRA) in support of the redevelopment of the Former Colt International site off New Lane, Havant.
- 1.1.2 This report has been produced to identify, and where appropriate recommend mitigation to, any flooding issues associated with the proposed development, following the requirements of the Environment Agency (EA), Hampshire County Council and Southern Water.
- 1.1.3 The purpose of this report is to demonstrate how the development complies with planning policy on flood risk – National Planning Policy Framework (NPPF) and supporting Planning Practice Guidance (PPG).

1.2 Report Structure

- 1.2.1 The structure of this report is summarised as follows:
 - Section 2: Describes existing conditions with respect to flooding and drainage; along with design proposals;
 - Section 3: Provides a commentary on how flood risk from a range of potential sources may or may not constrain development proposals;
 - Section 4: Describes how surface water from the development area can be drained in a sustainable manner, without increasing the risk of flooding elsewhere;
 - Section 5: Describes how foul drainage from the new development may be discharged;
 - Section 6: Presents a summary of the report and identifies the main conclusions that can be drawn.



2.0 Site Conditions and Planning Policy

2.1 Existing Conditions

- 2.1.1 The site is located to the north of Havant town centre, to the south of Bartons Road, to the west of New Lane and to the east of Martin Road and is surrounded to the north by residential development, to the west by St Alban's Church and to the east and south by industrial and commercial development. The nearest postcode is PO9 2LY. The site location, current site layout and proposed layout can be seen in Figures 1, 2 and 3 respectively.
- 2.1.2 The site is approximately 3.08 ha. The Former Colt International site is now being demolished.
- 2.1.3 The Greenfield run-off rate for the site has been calculated by taking into account three catchments of impermeable surfacing. The three impermeable areas found are 0.210ha, 0.552ha and 0.918ha. With the use of Micro Drainage software and the ICP SUDS method, QBAR rates of 0.7 l/s, 2.0 l/s and 3.3 l/s have been calculated, respectively. This equates to 6.0 l/s in total. All calculations can be seen in Appendix B.

2.2 Topography

- 2.2.1 The topographical survey of the site reveals that site falls from north west to the south east with levels varying between 28mAOD in the north west to 16mAOD in the south east.

2.3 Hydrology

- 2.3.1 There is a drainage ditch to the west of the existing building within the application site. There is also an existing watercourse adjacent to the south east of the application boundary. The drainage ditch in the application site leads to the existing watercourse in the east, through a culvert or similar, which runs along the southern boundary of the application site.

2.4 Hydrogeology

- 2.4.1 Geological mapping highlights that the site is underlain with London Clay Formation – Clay, Silt and Sand with superficial deposits of Head. This can be seen in Figure 7.



2.5 Groundwater

- 2.5.1 The site is located within groundwater source protection Zone 1C. The underlying bedrock is not designated as an aquifer.

2.6 Proposed Development

- 2.6.1 The applicant is proposing to condense the employment, whilst retaining 100 employees into one third of the application site with the remainder of the site to be used for residential development.
- 2.6.2 The proposed site plan can be seen in Figure 3.

2.7 Policy Context

- 2.7.1 The National Planning Policy Framework (NPPF) currently sets out the Government's planning policies for England.
- 2.7.2 The Planning Policy Guidance (supporting the NPPF) defines Flood Zone 1 in the table, shown below.

Table 1 – Table 3 from Planning Policy Guidance (Flood Risk and Coastal Change) 06 03 2014

Table 3: Flood risk vulnerability and flood zone ‘compatibility’

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓ Development is appropriate.
 × Development should not be permitted.

- 2.7.3 Under the NPPF, residential buildings are classified as “more vulnerable” and commercial developments as “less vulnerable. Predominantly, the site is in Flood Zone 1, however, there is a small area to the south east of the application site in Flood Zone 2.
- 2.7.4 All residential and commercial development should be kept out of the small area of Flood Zone 2 to the south east of the application site.



3.0 Flooding

3.1 Introduction

- 3.1.1 There are a wide range of potential mechanisms which can cause flooding. Each potential source of flooding is discussed individually below:

3.2 Tidal or Main River Flooding

- 3.2.1 The location of the site in relation to possible sources of flood risk is shown in Figure 4.
- 3.2.2 There is a main river, as defined by the Environment Agency adjacent to the eastern boundary of the application site.
- 3.2.3 There is a small flood risk from this main river in the Q1000 storm. Commercial and residential development will be kept out of this small area of Flood Zone 2.

3.3 Surface Water Flooding

- 3.3.1 Surface water flooding can occur during high intensity rainfall events as sheet run off from fields or hard paved areas. There are areas at high, medium and low risk of surface water flooding within the application site. These areas of surface water flood risk are associated with both the drainage channel located to the west of the works building and the main watercourse to the east of the application site.
- 3.3.2 The Government surface water flood risk map is shown in Figure 5.
- 3.3.3 Surface water flooding will continue to be managed going forward by the implementation of the Surface Water Drainage Strategy set out in Section 4.

3.4 Sewer Flooding

- 3.4.1 The Strategic Flood Risk Assessment for Havant as part of the Partnership for South Hampshire (PUSH) Strategic indicates that there is a history of sewer flooding in the area which Southern Water keep a record of.



- 3.4.2 Southern Water has been contacted in regards to the proposed development. Their response can be seen attached in Appendix C. One of the statements made is that an assessment is required to ascertain an appropriate point of connection to the foul and surface water sewerage network. This should be completed as soon as possible prior to detailed design. It was also stated that it will be important to utilise oil/petrol interceptors in general hardstanding areas.

3.5 Groundwater Flooding

- 3.5.1 The SFRA for Havant indicates that there is a risk of groundwater flooding in some areas to the north of the borough of Havant. For this reason, it is not recommended to use infiltration as a method of surface water disposal.
- 3.5.2 Groundwater monitoring should be carried out and if groundwater levels are found to be high in this area, additional land drainage features may need to be incorporated into the detailed design of the site.

3.6 Flood Risk from other sources

- 3.6.1 On rare occasions a development may be subject to flood risk from upstream features such as reservoirs, where there is a theoretical risk of failure. At this development it has been identified that there is no flood risk from other sources.

3.7 Exceedance Flows

- 3.7.1 Proposed levels of the site have not been provided at the time of writing, therefore a detailed exceedance flow review can not be produced. However, referring to existing levels the west and northern parts of the application site generally fall towards the existing watercourse in the west of the site. Eastern parts of the site are redirected by kerbs and landscaping to be collected into the existing drainage schematic.
- 3.7.2 Existing topography suggests that some of the overland flows may be redirected onto New Lane to the east of the site. The development at the application site should aim to reduce the overland flows exiting the site, as to improve potential sewer flooding as discussed previously.



- 3.7.3 The development should also look to retaining a similar general topography in the west and northern parts of the site, as to not increase the risk of flooding off-site, while improving the general topography or drainage catchment method in eastern parts of the site.
- 3.7.4 In the event of pipes being non-operational or storm events causing runoff in excess of the 1 in 100 year plus 40% for climate change storm event, the detailed design of the site should be shaped to direct exceedance flows to appropriate, localised ponding areas onsite.
- 3.7.5 Exceedance calculations and plans should be produced in the detailed design stage, prior to construction. If ponding areas are restricted to regions in the site which may bring a danger to residents and employees, it is recommended that an emergency evacuation plan is provided to ensure risk is mitigated in times of extreme weather events.



4.0 Surface Water Drainage Strategy

- 4.1.1 As well as to ensure that the users of the site are not at risk, another key objective is to ensure that the development does not increase the potential of flooding elsewhere, and if the opportunity arises, to reduce the potential for flooding off site. This objective can be achieved by designing a drainage strategy for the development which will set the strict framework to be followed during the detailed drainage design.
- 4.1.2 The surface water drainage strategy will be delivered in accordance with prevailing local and national planning policy. Currently, the most significant factors influencing the design of the drainage strategy are the Flood and Water Management Act 2010, Hampshire's Strategic Flood Risk Assessment, the National Planning Policy Framework (NPPF) and relevant chapters of the Planning Practice Guidance (PPG). This drainage strategy sets the guidelines for future detailed design, but more importantly, it demonstrates that a sustainable drainage solution is deliverable at this site, complying with all relevant planning and legislative criteria. The most important function of this drainage strategy is to demonstrate that the development will not increase flood risk elsewhere.
- 4.1.3 In addition to ensuring flood risk is not increased, mitigation to existing flooding will be considered where possible.
- 4.1.4 All calculations have been based on a range of rainfall return events up to and including the 1% AEP (1 in 100 year) event plus 40% climate change allowance.
- 4.1.5 The method of discharge of surface water is critical to ensuring that flood risk will not be increased elsewhere. Planning Practice Guidance and Building Regulations dictate the hierarchy for discharge options. In order of preference these are:
- To the ground (infiltration);
 - To a surface water body;
 - To a surface water sewer, highway drain or another drainage system;
 - To a combined sewer;
- 4.1.6 As there is a history of groundwater flooding within Havant and the site is within groundwater source protection zone 1c, infiltration is not a feasible option of surface water disposal for the site. Further to this, there is a watercourse adjacent to the application boundary which will prove a more viable option.

- 4.1.7 Also due to history of groundwater flooding within the vicinity of the application site, it is recommended that groundwater monitoring is carried out at the application site prior to the detailed design stage of this project. If required, additional land drainage measures may need to be designed at the detailed design stage.
- 4.1.8 The topographical survey of the site reveals that there is an existing surface water drainage ditch along the western edge of the existing building; it is assumed that this is culverted to the main river to the east of the application site. This can be confirmed via a CCTV survey.
- 4.1.9 Surface water from the site should discharge at a rate lower than existing to provide betterment on current conditions.
- 4.1.10 The existing impermeable areas for the site equate to approximately 2.35ha. It is assumed that as some of the site is to be converted to residential, that the impermeable areas will be reduced due to green spaces such as gardens. The proposed impermeable area is approximately 1.68 ha.

Table 2 – Post Development Areas and corresponding allowable discharge rates.

Location	Impermeable Area (Ha)	Impermeable Area +10% for Urban Creep	1 in 1 year	1 in 30 year	1 in 100 year	QBAR (l/s)
Area 1	0.210	0.231	1.0	2.7	3.8	1.2
Area 2	0.552	0.607	2.6	7.1	9.9	3.1
Area 3	0.918	1.010	4.4	11.8	16.5	5.2

- 4.1.11 It is proposed to limit runoff from the site to the existing QBAR for each impermeable area as specified using Micro Drainage's ICP SUDS method. Results of this are included in the Table 2 above and also shown in Appendix B.
- 4.1.12 The discharge rates have been calculated using the different areas that are drained to each attenuation feature. These can be seen in Appendix A, SK01 where different surface water networks join into a respective storage area.
- 4.1.13 In order to achieve this reduction in flow rates attenuation through a basin or crates can be used. The proposed development will be designed to ensure provision for the Q100 + CC (40%) climate change event.



- 4.1.14 The impermeable areas as mention in Table 2 have been used in a Quick Storage Estimate using Micro Drainage. These calculations give us the required storage for all events up to the Q100 + climate change (40%) to provide betterment on current conditions for each area of the site.
- 4.1.15 Three storage areas, as well as flow control devices are provided of sizes 293m³, 616m³, and 889m³. This is taken by using two thirds of the range given by the Quick Storage Estimates in Micro Drainage, seen in Appendix B. These storage areas are labelled as Storage 1, 2 and 3 respectively on SK01. The impermeable area of different regions of the site has been taken into storage areas, upstream of any connection to the watercourse to achieve the proposed flow rate.
- 4.1.16 Petrol Interceptors form an important feature of this site, which has been confirmed in the statement from Southern Water in Appendix C. Therefore, all impermeable areas of hardstanding car parking have, their surface water drainage taken through a petrol interceptor. Where possible drainage from areas not needing to pass through an interceptor have been drained without the use of an interceptor. Please refer to SK01 in Appendix A for further details.
- 4.1.17 The maintenance, management and responsibility of the drainage systems will lie with the site owner. An outline SuDS Maintenance Plan is contained within Appendix D.
- 4.1.18 The existing drainage ditch which travels through the site will be retained. It is proposed that it be left open with options to naturalise the ditch during the detailed design phase of this project. This would be achieved by removing some of the concrete that forms the existing channel. The channel then flows into a labelled culvert and is removed from site as can be seen in drawing SK01, contained in Appendix A.
- 4.1.19 There are currently a number of crossings of foul and surface water networks on the proposed drainage strategy. During the detailed design phase of this project these crossing will have to be designed to ensure there are no clashes of networks.
- 4.1.20 Responsibility for the maintenance of the new surface water drainage systems including the any attenuation features will initially be undertaken by the site developer and following adoption of the surface water drainage system will become the responsibility of Southern Water.



- 4.1.21 In the event that SUDS attenuation systems are incorporated into the final design then these may not be adopted by Southern Water and will be maintained by a separate private management company. The SUDS attenuation systems will be required to be inspected and maintained in accordance with an agreed schedule which may require approval from Hampshire County Council under a separate agreement.



5.0 Sustainable Drainage Systems (SuDS)

5.1 Introduction

- 5.1.1 In order to comply with the national guidelines and local policies set by the Hampshire County Council Flood Risk Department (which is a statutory consultee in relation to the flood risk and drainage issues) it is required to undertake an assessment of the possible use of Sustainable Urban Drainage Systems (SUDS) techniques within the proposed surface water drainage design.
- 5.1.2 It is important for developers to establish the soil conditions and hydrology of a site, considering appropriate SUDS techniques at an early stage of the design process. This will ensure the best drainage solution is found and included in the layout and associated costs.

5.2 SuDS Options

- 5.2.1 At the time of writing, there are no infiltration test results available for the application site. It is anticipated that the site will not infiltrate due to the likelihood of underlaying clay being present. This information has been taken from the information provided in Figure 7.
- 5.2.2 To ensure accurate infiltration data is produced, a site-specific survey should be completed to determine if infiltration is an option at this application site.
- 5.2.3 In the event that infiltration is viable then it is proposed to drain the storm water to features such as soakaways and filter strips. However, due to the site constraints, mainly limited space, this may not be viable.
- 5.2.4 Where viable, permeable paving could be considered for areas of parking which if not designed to infiltrate into the underlying ground could be utilised to extend the period of concentration for the surface water entering the main drainage system and also to provide an element of water treatment.
- 5.2.5 Infiltration systems such as soakaways are useful in remote locations away from public sewers, or if local public sewers have reached full capacity. They are used to dispose of storm water by allowing



water to permeate through the soakaway, consisting of an underground chamber lined with a porous membrane, and into the surrounding soil.

- 5.2.6 Infiltration trenches are stone filled reservoirs to which surface water is diverted and is gradually infiltrated into the ground. The life of the trench can be lengthened by incorporating filter strips or sump pits at inflow points to remove excess solids.
- 5.2.7 Filter drains are also stone filled trenches, however also include perforated pipes running through them. They allow storage, filtering and filtration of water before it is discharged to the receiving watercourse. Absorption, filtering and microbial decomposition in the surrounding soil removes pollutants from the system.

5.3 Review of SUDS Options

- 5.3.1 Where it is possible, it is proposed to incorporate a fully compliant SUDS strategy where economically viable and reasonable in relation to the discharge of surface water drainage from the proposed development.
- 5.3.2 This section will also seek to identify some of the SUDS systems and techniques which are to be considered and reviewed as part of the proposed detailed surface water drainage design and subsequent planning application for the development site.
- 5.3.3 The overarching principles of a SUDS system are to minimise the impacts arising from the development on the quantity and quality of the development surface water run-off, whilst at the same time replicating the natural drainage from the site before development.

SUDS key objectives are to minimise the impacts from the development on the quantity and quality of run-off and to maximise amenity and biodiversity opportunities.

The accepted SUDS management train consists of three elements:

Source Control

- Water butts, green roofs, filter drains, pervious surfaces, swales, rain water harvesting

Site Control

- Swales, ponds, wetlands, infiltration devices

Regional Control

- Basins, ponds and wetlands

- Reservoirs

Figure 1 below highlights these principles and how they may be applied to a development via a SuDS Management Train.

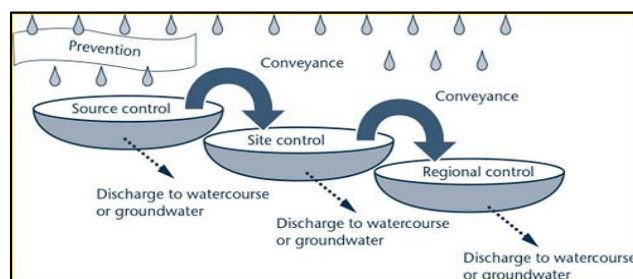


Figure 1 – SuDS Management Train Illustration

5.3.4 Various methods are currently available for source, site and regional control. A review has been undertaken of how best the various systems and sub techniques could be incorporated into the proposed surface water management design and these are set out below:

Table 3 - Source Control Methods

Type of SUDS	Description	Applicability to the Site
Water butts	Small storage tanks on each individual housing plot.	This application may be appropriate to the site.
Grey water recycling	Water collected from residential and commercial use and reused.	This application may be appropriate to the site.
Rain water harvesting	Recycling of water from roofs and impermeable areas.	This application may be appropriate to the site.
Green roofs	Vegetated roofs that reduce runoff and remove pollutants.	This is considered not to be appropriate for this type of development.
Filter drains	Linear drains or trenches filled with granular material that allow infiltration to the surrounding ground.	Subject to a more detailed assessment of the site permeability and possible contamination issues this may be appropriate for the site.
Pervious surfaces	Surfaces that allow surface water inflow into underlying surfaces.	Subject to a more detailed assessment of the site permeability and possible contamination issues this may be appropriate for the site. An option to permeate porous piping for water quality purposes may be an option.

Swales	Vegetated channels to convey store and treat runoff.	This application may be appropriate to the site. The existing channel at the site could be converted to a naturalised channel. Infiltration purposes to be determined.
Local Shallow basins/ponds	Shallow areas of open space that temporarily hold water and collect silt.	The site layout has minimal open spaces or landscaped zones for basins/ponds to be incorporated.

Table 4 - Site Control Methods

Type of SUDS	Description	Applicability to the Site
Swales	Vegetated channels to convey, store and treat runoff.	This application may be appropriate to the site. The existing channel at the site could be converted to a naturalised channel. Infiltration purposes to be determined.
Shallow basins/ponds/wetlands	Shallow areas of public open space that temporarily hold water and collect silt.	The site layout has minimal open spaces or landscaped zones for basins/ponds to be incorporated.
Infiltration devices	Generally granular trenches or soakaways that store water and allow infiltration to the surrounding ground.	Subject to a more detailed assessment of the site permeability and possible contamination issues this may be appropriate for the site.

- 5.3.5 As the proposed SUDS strategy will only be seeking to utilise source and site wide methods, regional methods have not been considered.
- 5.3.6 The SUDS design should seek to provide an appropriate management train of SUDS components to effectively mitigate the pollution risks associated with the different site users.
- 5.3.7 Within this development, there are three key drivers in respect of pollutant risks to the offsite watercourses, these being pollution from vehicle parking areas, pollution from highways and pollution from raw material spills.
- 5.3.8 It is recommended that the future detailed surface water drainage design for the development site should provide at least two levels of treatment in respect of water quality where possible. Although possible options have been stated above, alternative SUDS options may also be considered during the detailed design stage which achieves the same water quality objective.



6.0 Foul Drainage Strategy

6.1 Local Public Sewers

- 6.1.1 The topographical survey indicates that there are sewers within the application boundary. It is assumed that these sewers discharge into the public adopted network.
- 6.1.2 An existing sewer asset plan from Southern Water is contained in Appendix C.
- 6.1.3 There are currently approximately 100 members of staff employed at the site. Assuming an allowance for foul flows of 150 litres per person per day, with the design foul rate assumed at 6 times the domestic rate in accordance with BS 752-4:1997, the existing foul loading of 1.04l/s has been calculated.
- 6.1.4 In addition to this, approximately 100 dwellings will also be included. Based on British Flows and Loads 4, the standard residential dwelling should be taken as 150 litres or person per day. This will increase the foul loading by a further 1.04l/s, using a peak factor of 6.
- 6.1.5 The total foul loading from the application site, post-development, has been calculated to be 2.08l/s.
- 6.1.6 Capacity within the foul network will need to be checked with Southern Water following a fixed layout. Southern Water are required to accept flows through the Water Act 2010. If sufficient capacity does not exist, Southern Water may require developer contribution towards upgrading works to facilitate the development.
- 6.1.7 There are currently a number of crossings of foul and surface water networks on the proposed drainage strategy. During the detailed design phase of this project these crossing will have to be designed to ensure there are no clashes of networks.



7.0 Summary and Conclusion

7.1 Summary

- 7.1.1 WYG were commissioned by Homes England to produce a Flood Risk Assessment (FRA) and Drainage Strategy for a mixed commercial and residential scheme at the Colt International works on New Lane, Havant.

7.2 Conclusions

The conclusions of this Flood Risk Assessment (FRA) and Drainage Strategy are as follows:

- 1 WYG have been commissioned by Homes England to produce a Flood Risk Assessment (FRA) in support of the redevelopment of the Former Colt International site off New Lane, Havant.
- 2 The site is located to the north of Havant town centre, nearest postcode is PO9 2LY. The site is approximately 3.08 ha. The Former Colt International site is now being demolished.
- 3 The three impermeable areas found are 0.210ha, 0.552ha and 0.918ha. With the use of Micro Drainage software and the ICP SUDS method, QBAR rates of 0.7 l/s, 2.0 l/s and 3.3 l/s have been calculated, respectively.
- 4 The development will discharge at the existing QBAR rate for the Q100 + Climate Change (40%) storm to provide betterment on current conditions.
- 5 Surface water from the development should discharge at a controlled rate to the main river south east of the application site.
- 6 In order to attenuate the flows for the Q100 + climate change (40%) event, three separate storage areas will be required, as well as flow control devices.
- 7 Three storage areas, as well as flow control devices are provided of sizes 293m³, 616m³, and 889m³.
- 8 Petrol interceptors will be incorporated into the drainage design where appropriate.
- 9 Responsibility for the maintenance of the new surface water drainage systems including the any attenuation features will initially be undertaken by the site developer and following adoption of the surface water drainage system will become the responsibility of Southern Water.
- 10 In the event that SUDS attenuation systems are incorporated into the final design then these may not be adopted by Southern Water and will be maintained by a separate private management company. The SUDS attenuation systems will be required to be inspected and maintained in



accordance with an agreed schedule which may require approval from Hampshire County Council under a separate agreement.

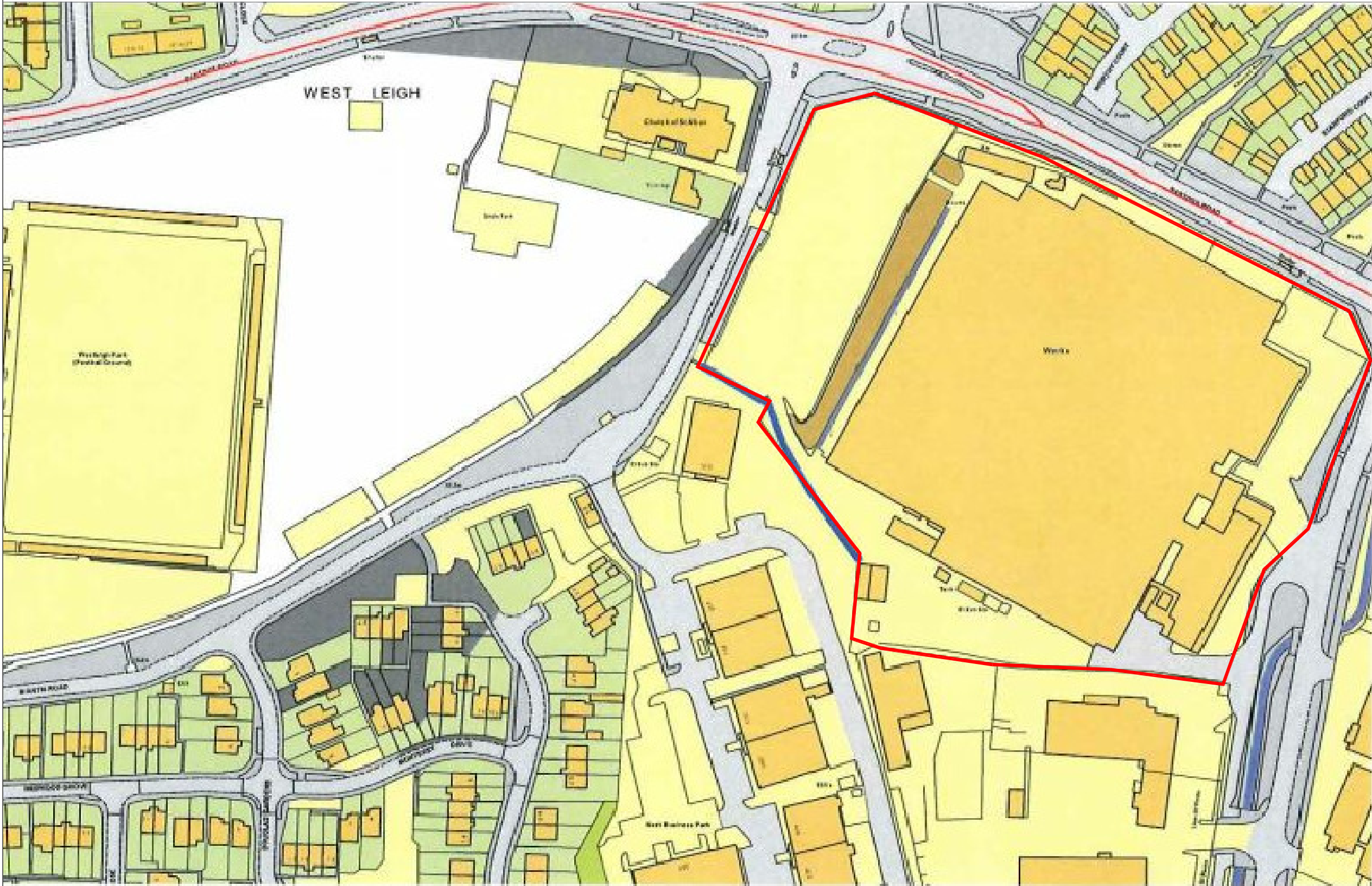
- 11 To ensure accurate infiltration data is produced, a site-specific survey should be completed to determine if infiltration is an option at this application site. In the event that infiltration is viable then it is proposed to drain the storm water to features such as soakaways and filter strips. However, due to the site constraints, mainly limited space, this may not be viable.
- 12 Where it is possible, it is proposed to incorporate a fully compliant SUDS strategy where economically viable and reasonable in relation to the discharge of surface water drainage from the proposed development.
- 13 It is recommended that the future detailed surface water drainage design for the development site should provide at least two levels of treatment in respect of water quality where possible. Although possible options have been stated above, alternative SUDS options may also be considered during the detailed design stage which achieves the same water quality objective.
- 14 In the event of pipes being non-operational or storm events causing runoff in excess of the 1 in 100 year plus 40% for climate change storm event, the detailed design of the site should be shaped to direct exceedance flows to appropriate, localised ponding areas onsite.
- 15 Exceedance calculations and plans should be produced in the detailed design stage, prior to construction. If ponding areas are restricted to regions in the site which may bring a danger to residents and employees, it is recommended that an emergency evacuation plan is provided to ensure risk is mitigated in times of extreme weather events.
- 16 The total foul loading from the application site, post-development, has been calculated to be 2.08l/s.
- 17 Capacity within the foul network will need to be checked with Southern Water following a fixed layout. Southern Water are required to accept flows through the Water Act 2010. If sufficient capacity does not exist, Southern Water may require developer contribution towards upgrading works to facilitate the development.
- 18 This FRA demonstrates that the site will not increase the risk of flooding elsewhere.

New Lane, Havent FRA



Figures

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Project:
NEW LANE, HAVANT

Drawing Title:
FIGURE 1
SITE LOCATION PLAN

Scale @	A3	Drawn	Date	Checked	Date	Approved	Date
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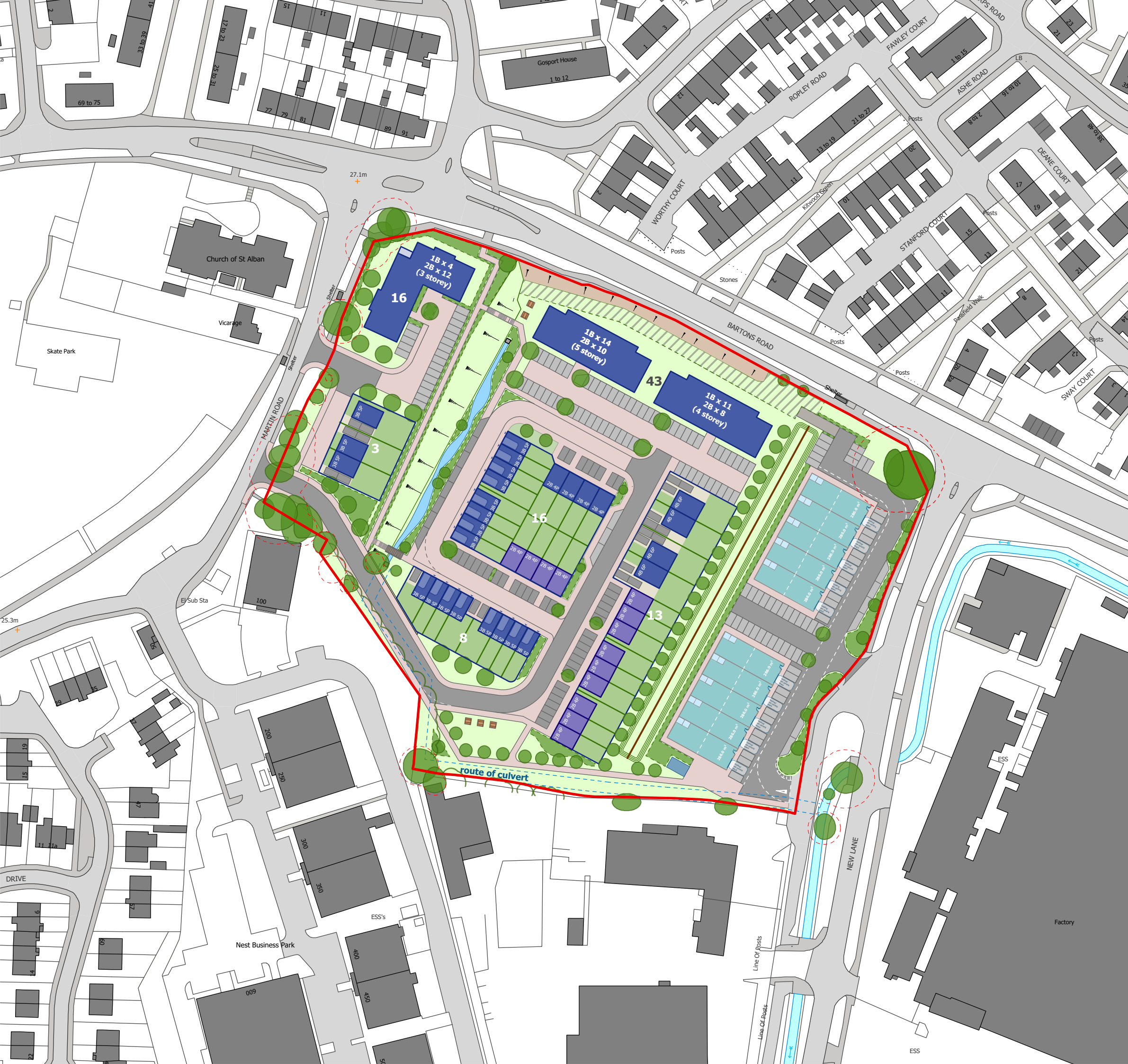
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Project:
NEW LANE, HAVANT

Drawing Title:
FIGURE 2
CURRENT SITE LAYOUT

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Project No.	A090070-182	Office	28	Type	Drawing No.		Revision



WYG



Colt International,
New Lane, Havant
Residential option 17

31

Land use

- Employment (0.83 Hectares)
- Residential (1.93 Hectares)
Private / Starter Homes

Total no. of dwellings - 99

Quantum

1 bed (apt)	29	29.3 %
2 bed (apt)	30	30.3 %
2 bed (house)	17	17.2 %
3 bed	19	19.2 %
4 bed	4	4 %
Total	99	

Total employment space provided - 30,784 ft²

Total full-time employment provided - 120

Key:

- Maintenance access to highway retaining wall
- Acoustic fence
- Root protection zone
- Route of underground culvert
- Acoustic bund
- Ancillary building (potential sub-station)
- Street furniture



North

A090070-182[ST1]31

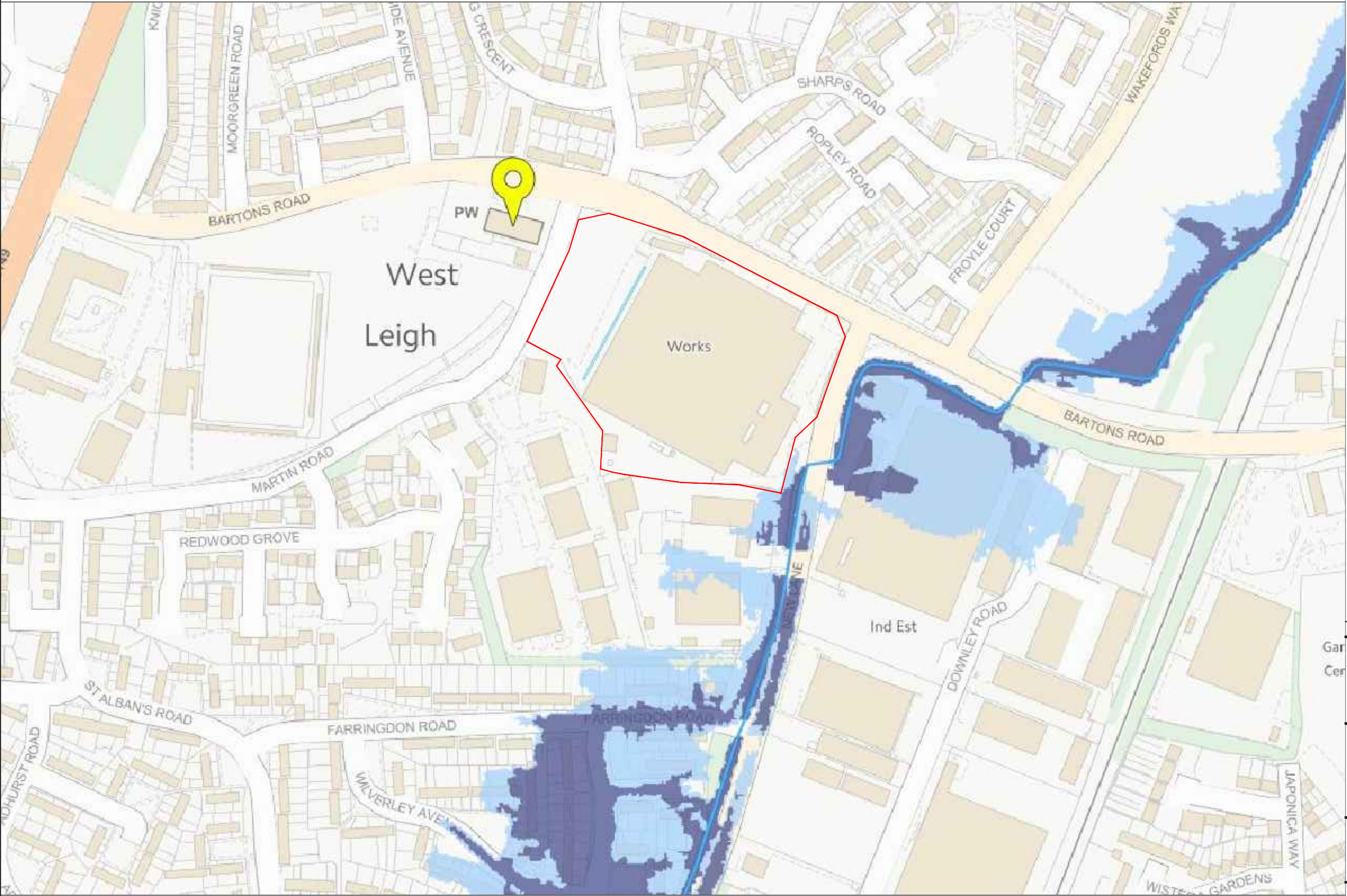
Scale 1:1250 @ A3

File: A090070-182[ST1]drf01_v15.vwx

WYG
Floor 5, Longcross Court, 47 Newport Road, Cardiff, CF24 0AD
Tel: (+44) 029 2082 9200 Fax: (+44) 029 2039 5965
Email: info@wyg.com www.wyg.com

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FILENAME : K:\DATA\A090000-A090999\A090070-182 - COLT INTERNATIONAL HAVANT\A090070-182 DRAINAGE\03 DOCUMENTS\01 REPORTS\FRA\FRA FIGURES.DWG | PLOTTED BY : SAMUEL BUTLER | PLOTTED DATE : 23 August 2018 15:18:32



Selected location



Flood zone 3



Areas benefiting from flood defences



Flood zone 2



Flood zone 1



Flood defence



Main river



Flood storage area

REV	DESCRIPTION	BY	CHK	APP	DATE
-----	-------------	----	-----	-----	------

Client
HOMES AND COMMUNITIES AGENCY

90 Victoria Street
BRISTOL
BS1 6DP

Tel.WYG: +44 (0)117 925 4393
Tel.SBA: +44 (0)117 311 6387
FAX: +44 (0)117 925 4239

Project:
NEW LANE, HAVANT

Drawing Title:
FIGURE 4
EA FLOOD MAP FOR PLANNING

Scale @	A3	Drawn	Date	Checked	Date	Approved	Date
Project No.	Office	Type	Drawing No.	Revision			
A090070-182	28						

FILENAME : K:\DATA\A090000-A090999\A090070-182 - COLT INTERNATIONAL HAVANT\A090070-182 DRAINAGE\03 DOCUMENTS\FRA\FIGURES\FRA FIGURES.DWG | PLOTTED DATE : 23 August 2018 15:29:36



Flood risk

High

Medium

Low

Very low

Location you selected

REV	DESCRIPTION	BY	CHK	APP	DATE
Client					
HOMES AND COMMUNITIES AGENCY					

90 Victoria Street
BRISTOL
BS1 6DP

Tel.WYG: +44 (0)117 925 4393
Tel.SBA: +44 (0)117 311 6387
FAX: +44 (0)117 925 4239



Project:

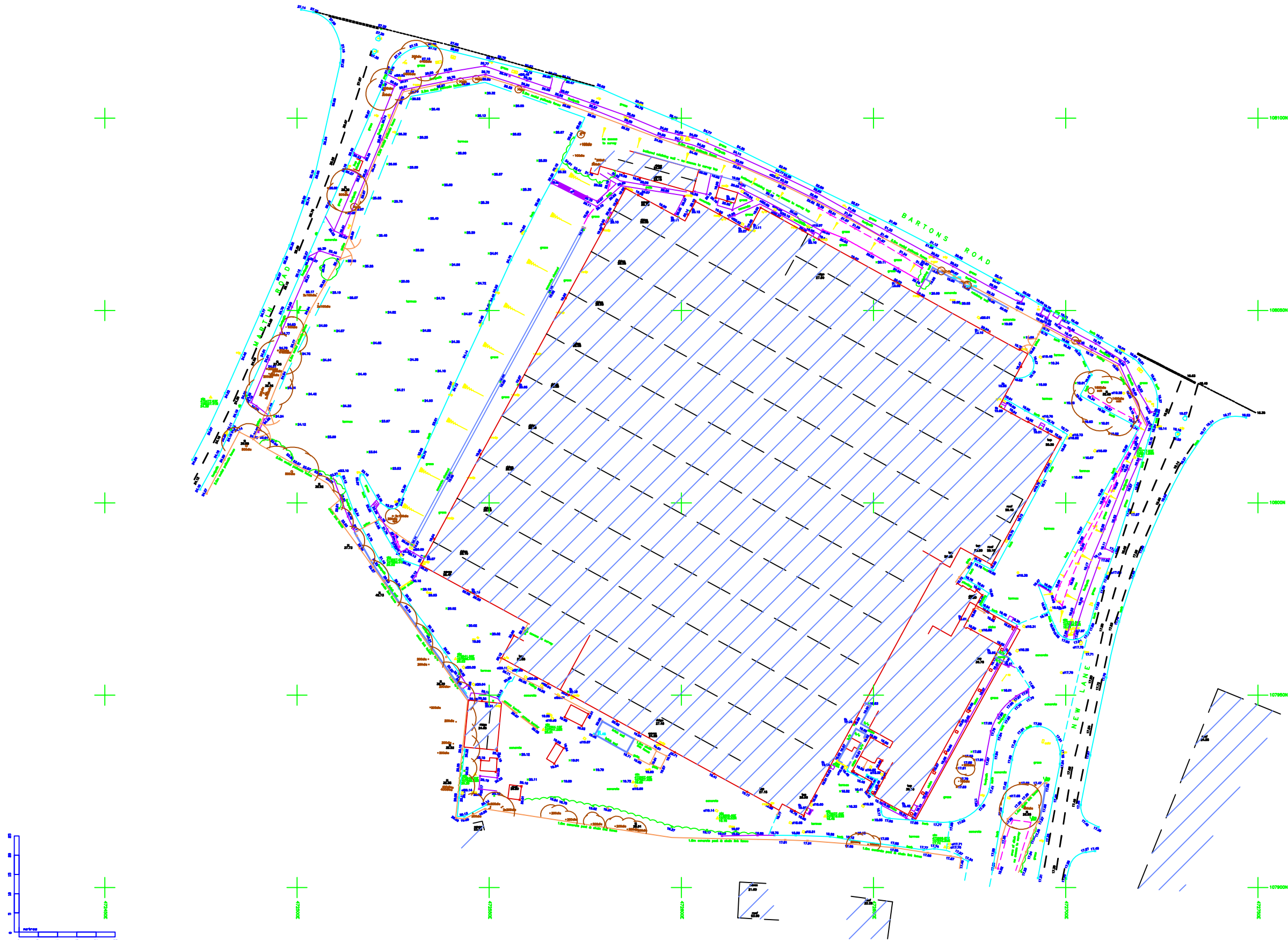
NEW LANE, HAVANT

Drawing Title:

FIGURE 5
GOVERNMENT SURFACE WATER FLOOD RISK MAP

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Project No.	A090070-182	Office	28	Type		Drawing No.	Revision

FILENAME : \\CARDIFF31\DATA\DATA\A090000-A090999\A090070-182 - COLT INTERNATIONAL HAVANT\A090070-182 DRAINAGE\03 DOCUMENTS\01 REPORTS\FRA\FRA FIGURES.DWG | PLOTTED BY : JACK.SO | PLOTTED DATE : 27 June 2017 16:30:38



DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

REV	DESCRIPTION	BY	CHK	APP	DATE
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Client
HOMES AND COMMUNITIES AGENCY

90 Victoria Street
BRISTOL
BS1 6DP

Tel.WYG: +44 (0)117 925 4393
Tel.SBA: +44 (0)117 311 6387
FAX: +44 (0)117 925 4239



Project:
NEW LANE, HAVANT

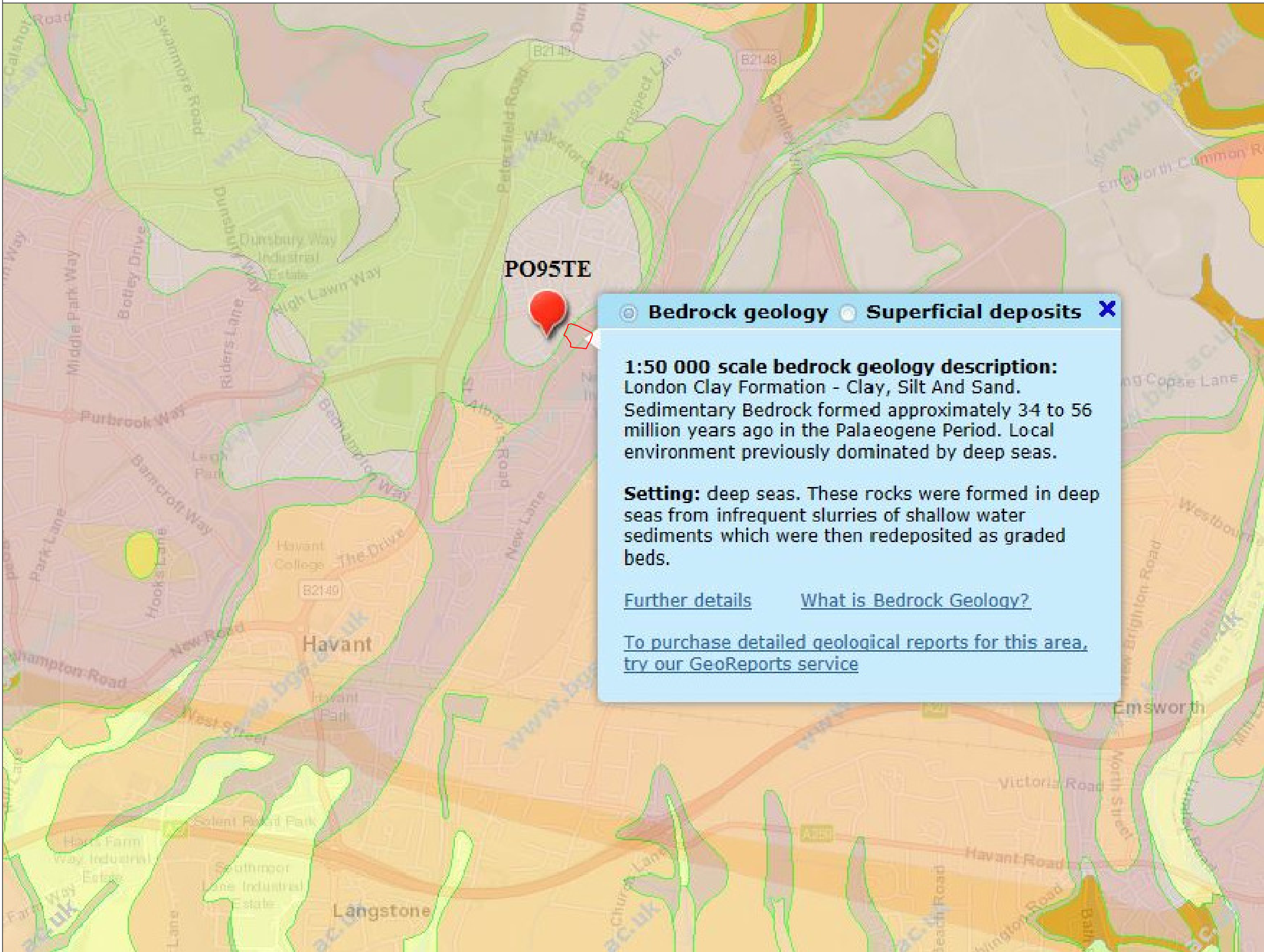
Drawing Title:
FIGURE 6
TOPOGRAPHICAL SURVEY

Scale @	A3	Drawn	Date	Checked	Date	Approved	Date
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Project No.	Office	Type	Drawing No.	Revision
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FILENAME : \\CARDIFF3\1\DATA\DATA\A090000-A090999\A090070-182 - COLT INTERNATIONAL HAVANT\A090070-182 DRAINAGE\03 DOCUMENTS\01 REPORTS\RA\RA FIGURES.DWG | PLOTTED BY : JACK.SO | PLOTTED DATE : 27 June 2017 15:46:10



REV	DESCRIPTION	BY	CHK	APP	DATE
Client	HOMES AND COMMUNITIES AGENCY				

90 Victoria Street
BRISTOL
BS1 6DP

Tel.WYG: +44 (0)117 925 4393
Tel.SBA: +44 (0)117 311 6387
FAX: +44 (0)117 925 4239

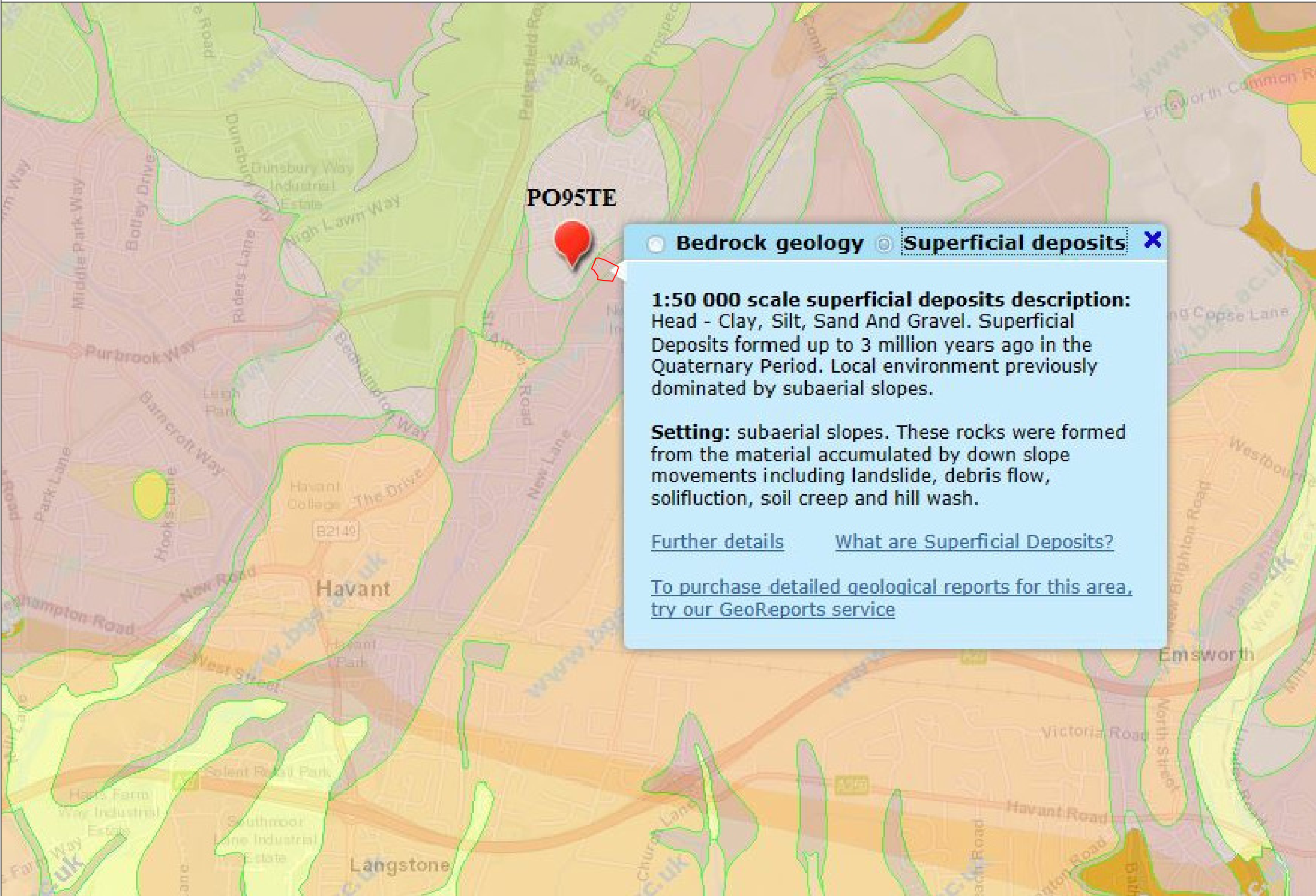


Project:
NEW LANE, HAVANT

Drawing Title:
FIGURE 7
BGS MAPS

Scale @	A3	Drawn	Date	Checked	Date	Approved	Date
Project No.	A090070-182	Office	28	Type	Drawing No.	Revision	

FILENAME : I:\CARDIFF\1\DATA\A090000-A090000-A090000-182 - COLT INTERNATIONAL HAVANT\A090070-182 DRAINAGE\03 DOCUMENTS\01 REPORTS\RA\RA FIGURES.DWG | PLOTTED BY : JACK.SO | PLOTTED DATE : 27 June 2017 15:45:21



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REV	DESCRIPTION	BY	CHK	APP	DATE
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Client
HOMES AND COMMUNITIES AGENCY

90 Victoria Street
BRISTOL
BS1 6DP

Tel.WYG: +44 (0)117 925 4393
Tel.SBA: +44 (0)117 311 6387
FAX: +44 (0)117 925 4239

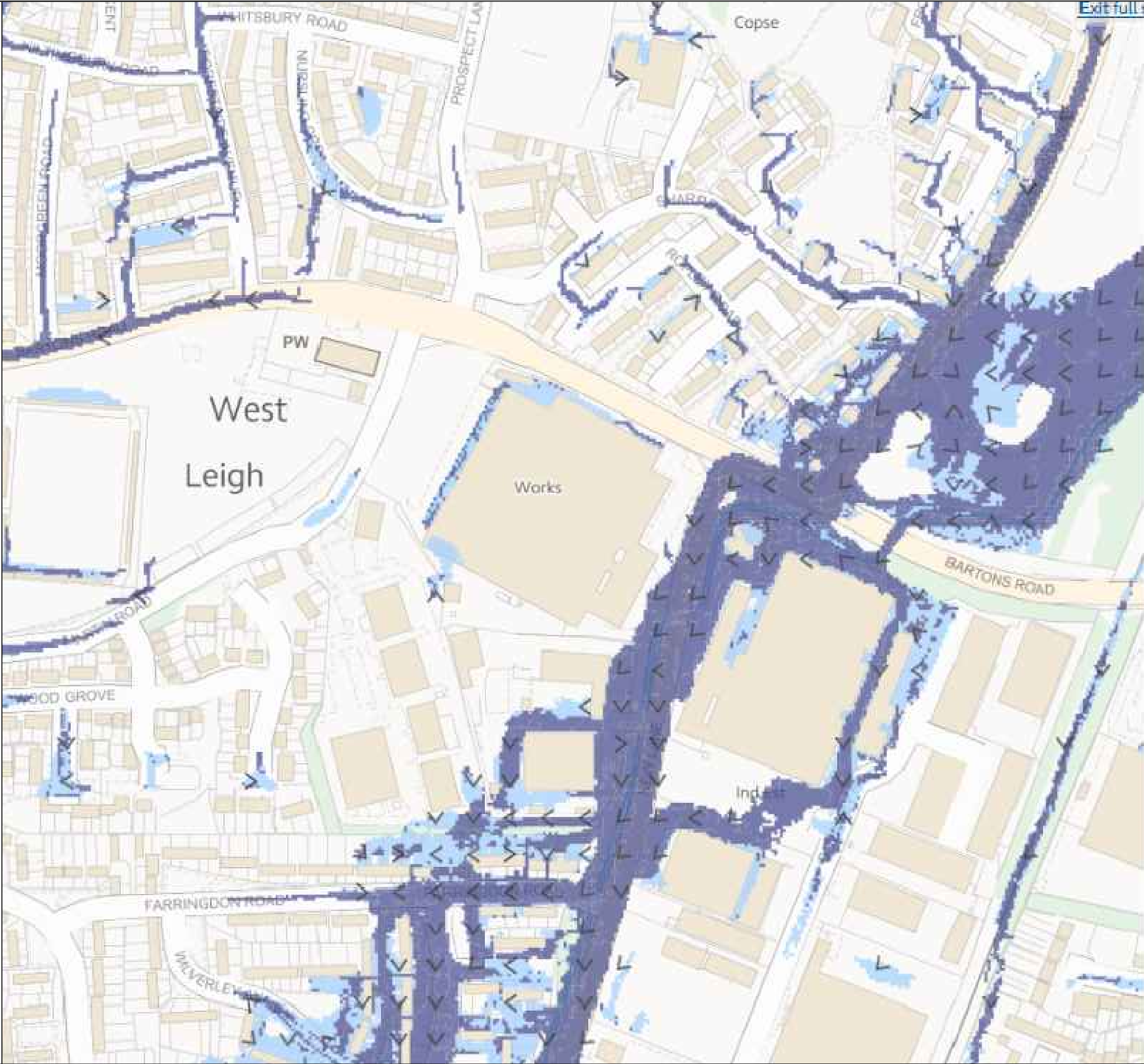


Project:
NEW LANE, HAVANT

Drawing Title:
FIGURE 7
BGS MAPS

Scale @	A3	Drawn	Date	Checked	Date	Approved	Date
Project No.	A090070-182	Office	28	Type	Drawing No.	Revision	

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DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

Low risk scenario

Flood velocity (metres/second)

Over 0.25 m/s

Less than 0.25 m/s

Direction of water flow

Location you selected

REV	DESCRIPTION	BY	CHK	APP	DATE
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Client
HOMES AND COMMUNITIES AGENCY

90 Victoria Street
BRISTOL
BS1 6DP

Tel.WYG: +44 (0)117 925 4393
Tel.SBA: +44 (0)117 311 6387
FAX: +44 (0)117 925 4239



Project:
NEW LANE, HAVANT

Drawing Title:
FIGURE 8
GOVERNMENT SURFACE WATER FLOOD RISK
VELOCITIES MAP

Scale @	A3	Drawn	Date	Checked	Date	Approved	Date
Project No.	Office	Type	Drawing No.	Revision			
A090070-182	28						

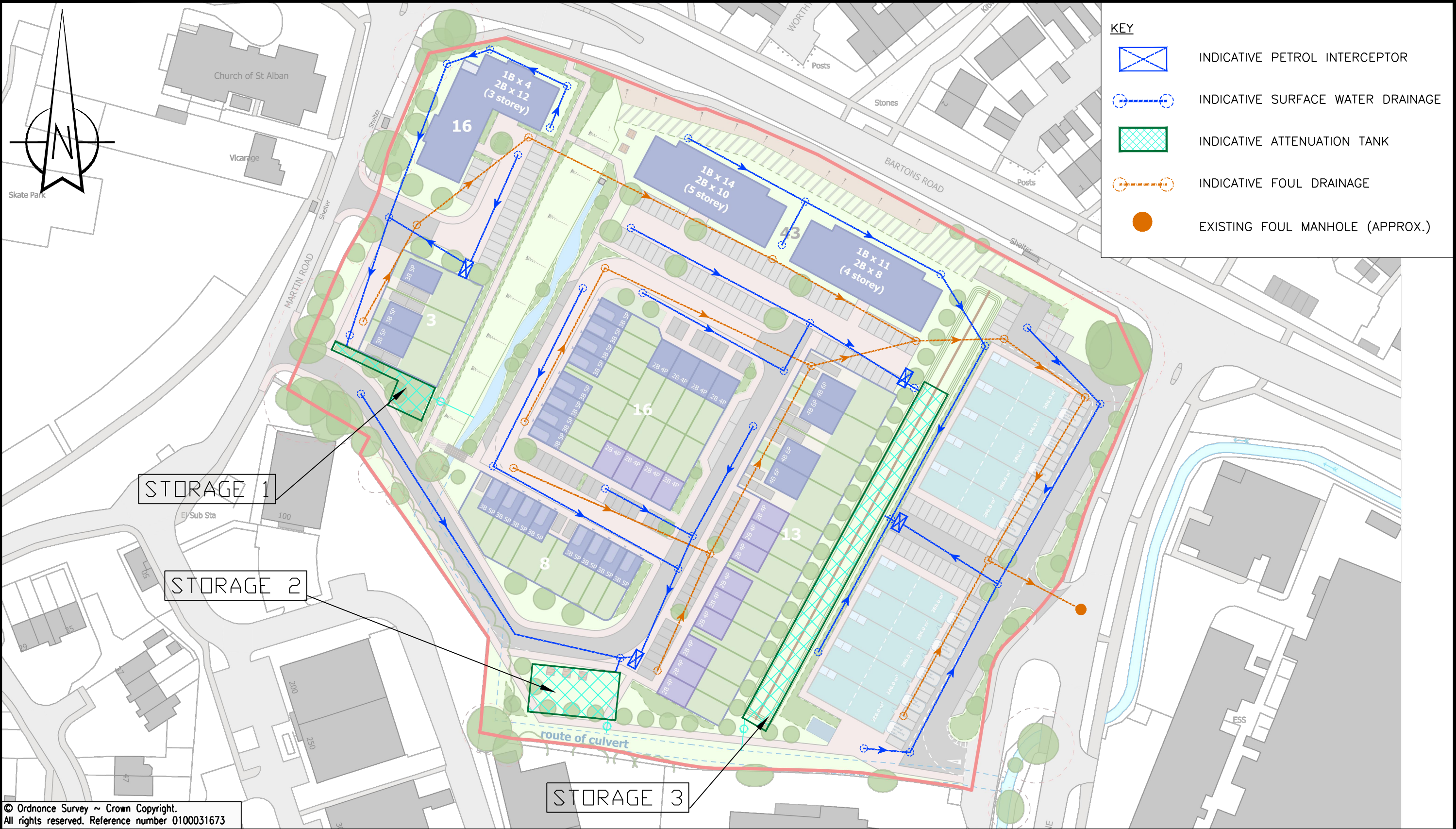
New Lane, Havent FRA



Appendices



Appendix A – Indicative Drainage Strategy



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REV	DETAILS	DRAWN	CHECKED	DATE
A	ATTENUATION UPDATED TO ACCOUNT FOR URBAN CREEP	SB	TA	23.08.2018

--

PROJECT: NEW LANE, HAVANT	
DRAWING TITLE: INDICATIVE DRAINAGE STRATEGY	
DRAWN: SB	CHECKED: TA
DATE: 23/08/2018	SCALE: 1:1000
SHEET SIZE: A3	

CLIENT: Homes and Communities Agency	
WYG Transport part of WYG group 5th Floor, Longcross Court 47 Newport Road, Cardiff, CF24 0AD t: 029 2082 9200 f: 029 2045 5321 e: transport.cardiff@wyg.com	
DRAWING NUMBER: SK01	REVISION: A

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Appendix B – Calculations

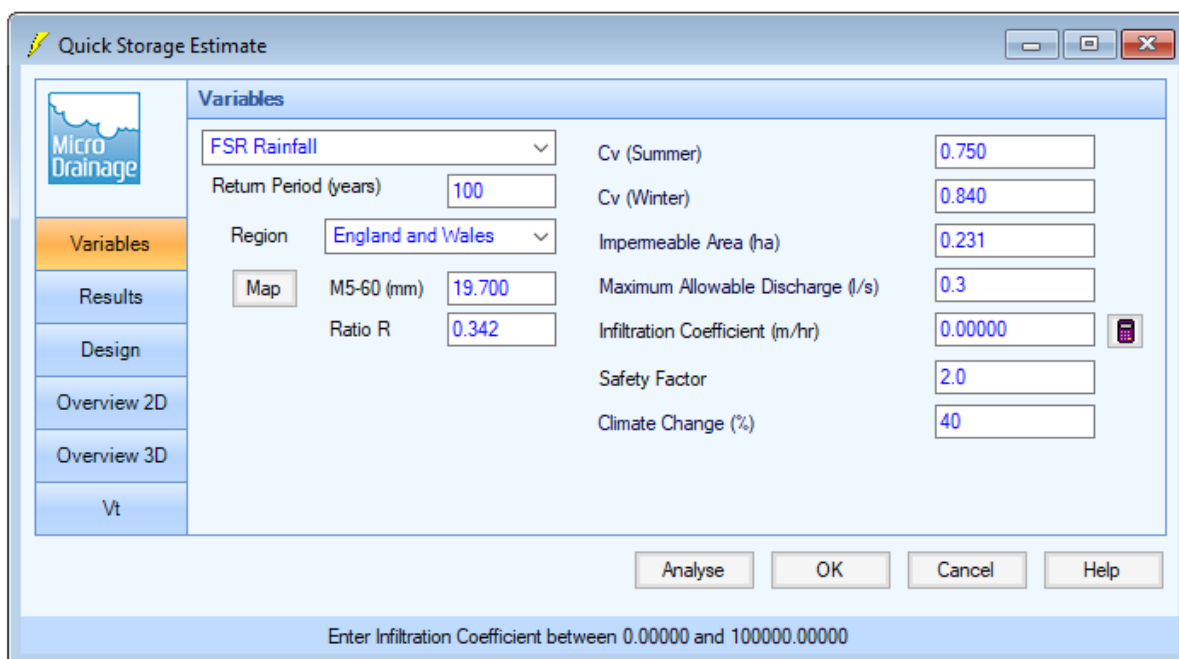
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5th Floor, Longcross Court 47 Newport Road Cardiff CF24 0AD		
Date 23/08/2018 11:48 File Colt, Havant.SRCX	Designed by samuel.butler Checked by	
Micro Drainage		Source Control 2017.1.2
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.450 Area (ha) 0.231 Urban 0.000 SAAR (mm) 800 Region Number Region 7 Results 1/s QBAR Rural 1.2 QBAR Urban 1.2 Q100 years 3.8 Q1 year 1.0 Q30 years 2.7 Q100 years 3.8		
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WYG		Page 1
5th Floor, Longcross Court 47 Newport Road Cardiff CF24 0AD		
Date 23/08/2018 11:49 File Colt, Havant.SRCX	Designed by samuel.butler Checked by	
Micro Drainage		Source Control 2017.1.2
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.450 Area (ha) 0.607 Urban 0.000 SAAR (mm) 800 Region Number Region 7 Results 1/s QBAR Rural 3.1 QBAR Urban 3.1 Q100 years 9.9 Q1 year 2.6 Q30 years 7.1 Q100 years 9.9		
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WYG		Page 1
5th Floor, Longcross Court 47 Newport Road Cardiff CF24 0AD		
Date 23/08/2018 11:49 File Colt, Havant.SRCX	Designed by samuel.butler Checked by	
Micro Drainage		Source Control 2017.1.2
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.450 Area (ha) 1.010 Urban 0.000 SAAR (mm) 800 Region Number Region 7 Results l/s QBAR Rural 5.2 QBAR Urban 5.2 Q100 years 16.5 Q1 year 4.4 Q30 years 11.8 Q100 years 16.5		
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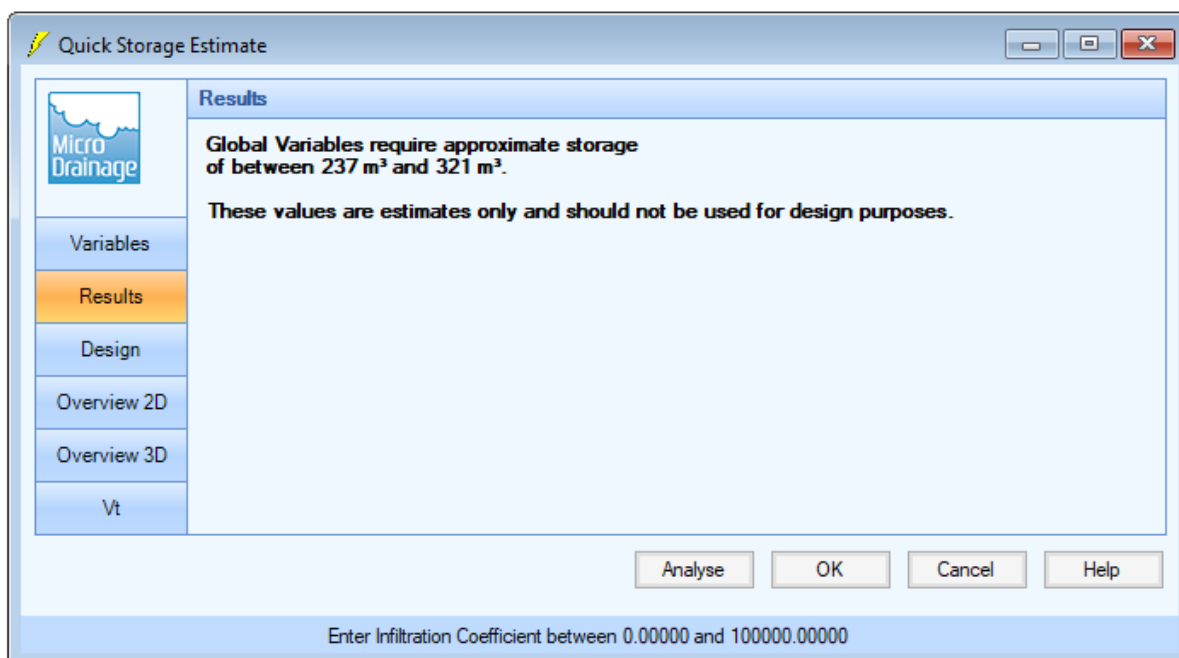
Appendix B1 — Quick Storage Estimate (Micro Drainage 2017)

Catchment / Storage 1



The 'Variables' window in the Micro Drainage software is shown. It features a sidebar on the left with buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area is titled 'Variables' and contains several input fields. The 'FSR Rainfall' dropdown is set to 'England and Wales'. The 'Return Period (years)' is 100. The 'Region' dropdown is also set to 'England and Wales'. The 'Map' button is visible. The 'M5-60 (mm)' is 19.700 and the 'Ratio R' is 0.342. On the right, there are input fields for 'Cv (Summer)' (0.750), 'Cv (Winter)' (0.840), 'Impervious Area (ha)' (0.231), 'Maximum Allowable Discharge (l/s)' (0.3), 'Infiltration Coefficient (m/hr)' (0.00000), 'Safety Factor' (2.0), and 'Climate Change (%)' (40). At the bottom, there are 'Analyse', 'OK', 'Cancel', and 'Help' buttons. A status bar at the very bottom reads 'Enter Infiltration Coefficient between 0.00000 and 100000.00000'.

Variable	Value
FSR Rainfall	England and Wales
Return Period (years)	100
Region	England and Wales
M5-60 (mm)	19.700
Ratio R	0.342
Cv (Summer)	0.750
Cv (Winter)	0.840
Impervious Area (ha)	0.231
Maximum Allowable Discharge (l/s)	0.3
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	40



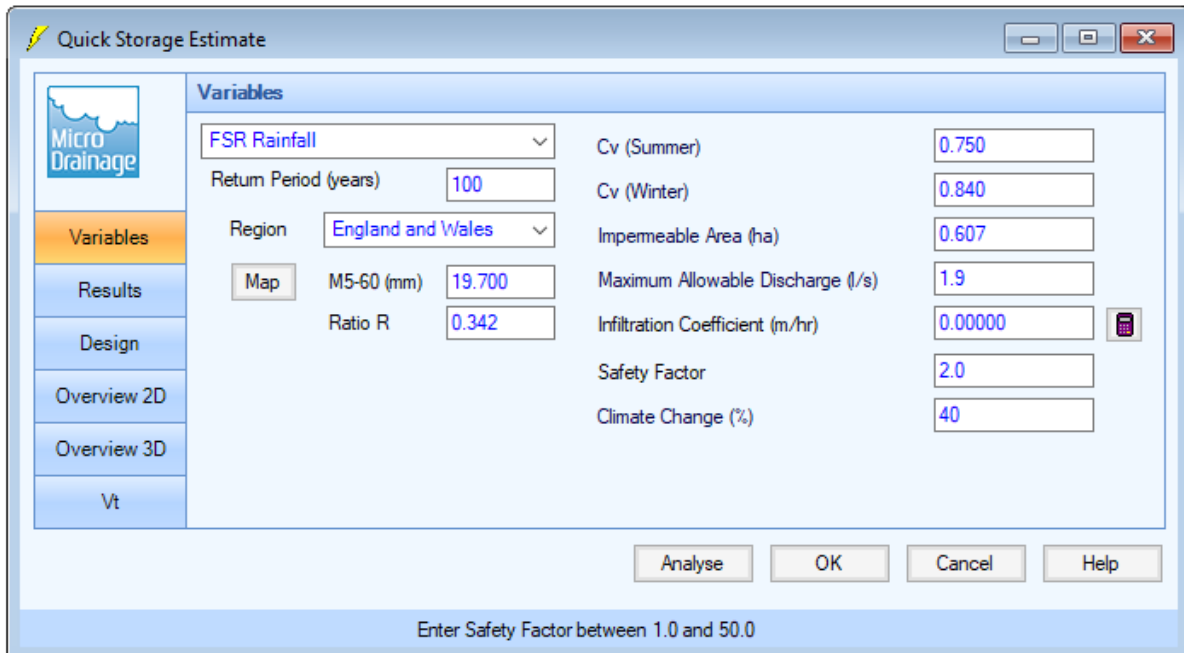
The 'Results' window in the Micro Drainage software is shown. The sidebar on the left has the 'Results' button highlighted. The main area is titled 'Results' and displays the following text: 'Global Variables require approximate storage of between 237 m³ and 321 m³. These values are estimates only and should not be used for design purposes.' At the bottom, there are 'Analyse', 'OK', 'Cancel', and 'Help' buttons. A status bar at the very bottom reads 'Enter Infiltration Coefficient between 0.00000 and 100000.00000'.

Global Variables require approximate storage of between 237 m³ and 321 m³.

These values are estimates only and should not be used for design purposes.

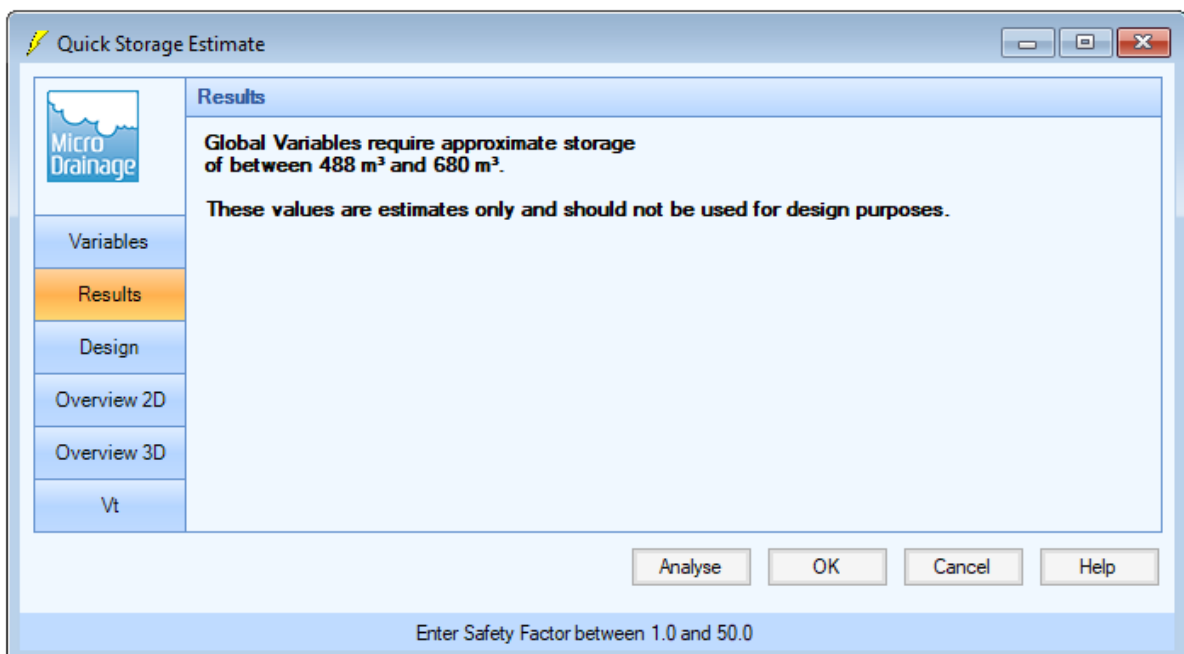
Appendix B2 — Quick Storage Estimate (Micro Drainage 2017)

Catchment / Storage 2



The screenshot shows the 'Variables' tab of the 'Quick Storage Estimate' window. The left sidebar contains a vertical menu with 'Variables' selected. The main area is divided into two columns. The left column contains a dropdown for 'FSR Rainfall', a text box for 'Return Period (years)' with the value '100', a dropdown for 'Region' with 'England and Wales' selected, a 'Map' button, a text box for 'M5-60 (mm)' with '19.700', and a text box for 'Ratio R' with '0.342'. The right column contains text boxes for 'Cv (Summer)' (0.750), 'Cv (Winter)' (0.840), 'Impervious Area (ha)' (0.607), 'Maximum Allowable Discharge (l/s)' (1.9), 'Infiltration Coefficient (m/hr)' (0.00000), 'Safety Factor' (2.0), and 'Climate Change (%)' (40). At the bottom are 'Analyse', 'OK', 'Cancel', and 'Help' buttons. A status bar at the very bottom reads 'Enter Safety Factor between 1.0 and 50.0'.

Variable	Value
FSR Rainfall	[Dropdown]
Return Period (years)	100
Region	England and Wales
M5-60 (mm)	19.700
Ratio R	0.342
Cv (Summer)	0.750
Cv (Winter)	0.840
Impervious Area (ha)	0.607
Maximum Allowable Discharge (l/s)	1.9
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	40



The screenshot shows the 'Results' tab of the 'Quick Storage Estimate' window. The left sidebar has 'Results' selected. The main area displays the following text: 'Global Variables require approximate storage of between 488 m³ and 680 m³.' and 'These values are estimates only and should not be used for design purposes.' At the bottom are 'Analyse', 'OK', 'Cancel', and 'Help' buttons. A status bar at the very bottom reads 'Enter Safety Factor between 1.0 and 50.0'.

Global Variables require approximate storage of between 488 m³ and 680 m³.

These values are estimates only and should not be used for design purposes.

Appendix B3 — Quick Storage Estimate (Micro Drainage 2017)

Catchment / Storage 3

The 'Quick Storage Estimate' dialog box is shown with the 'Variables' tab selected. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area contains the following fields:

Variable	Value
FSR Rainfall	FSR Rainfall
Return Period (years)	100
Region	England and Wales
Map	
M5-60 (mm)	19.700
Ratio R	0.342
Cv (Summer)	0.750
Cv (Winter)	0.840
Impermeable Area (ha)	1.010
Maximum Allowable Discharge (l/s)	5.3
Infiltration Coefficient (m/hr)	0.00000
Safety Factor	2.0
Climate Change (%)	40

Buttons: Analyse, OK, Cancel, Help

Enter Safety Factor between 1.0 and 50.0

The 'Quick Storage Estimate' dialog box is shown with the 'Results' tab selected. The left sidebar contains buttons for 'Variables', 'Results', 'Design', 'Overview 2D', 'Overview 3D', and 'Vt'. The main area displays the following results:

Global Variables require approximate storage of between 695 m³ and 986 m³.

These values are estimates only and should not be used for design purposes.

Buttons: Analyse, OK, Cancel, Help

Enter Safety Factor between 1.0 and 50.0



Appendix C – Correspondence



Department of Planning and
Development
Havant Borough Council
Public Service Plaza
Civic Centre Road
Havant
Hampshire
PO9 2AX

Developer Services
Southern Water
Sparrowgrove House
Sparrowgrove
Otterbourne
Hampshire
SO21 2SW

Tel: 0330 303 0119

Email: developerservices@southernwater.co.uk

Your Ref
GEN/17/00824

Our Ref
PLAN-019337

Date
15/08/2017

Dear Sirs,

Proposal: Mixed Residential and employment use.
Colt International Ltd, New Lane, Havant, PO9 2LY.
GEN/17/00824

Thank you for your letter of 26/07/2017.

Further to your scoping document for the above site I have the following observations to make in respect of the proposed development:-

- Southern Water's current sewerage/water records shows that there is a 375mm (CP) foul gravity in the immediate vicinity of the proposed development site.
- No new development/building works will be permitted to be constructed within 3 metres either side of the centre line of existing foul sewer.
Sewer record attached for your information.
- In addition due to changes in legislation that came in to force on 1st October 2011 regarding the future ownership of sewers it is possible that a sewer/s now deemed to be public could be crossing the above property.
- Due to the size of the development an assessment is required to ascertain an appropriate point of connection to the foul and surface water sewerage network, in order to protect existing premises from the impact of sewage flooding.
- Land uses such as general hardstanding that may be subject to oil/petrol spillages should be drained by means of oil trap gullies or petrol/oil interceptors.
- Southern Water does not supply water to this area.



- The proposed development would lie within a Source Protection Zone as defined under the Environment Agency's Groundwater Protection Policy. Southern Water will rely on your consultations with the Environment Agency to ensure the protection of the public water supply source.

If you require any further information please do not hesitate to contact our office on the above telephone number.

Yours sincerely

A handwritten signature in black ink, appearing to be "A. [unclear]".

Developer Services

SOUTHERN WATER



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site.

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O.S. REF: SU7208SE

Scale: 1:1250

Screen Print

WARNING: BAC pipes are constructed of Bonded Asbestos Cement

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement



Printed By: Ponnannv

Date: 7-8-2017

Southern Water MapGuide Browser

Requested By:





Appendix D – SuDS Management Plan



Sustainable Drainage Systems (SuDS)

Maintenance Plan

With reference to the CIRIA SuDS Manual and Technical Guidance Note produced by the Landscape Institute.

1 Introduction

Sustainable Drainage Systems (SuDS) are a variety of water management techniques which are designed to drain storm water in a more sustainable manner than via conventional practices of directing runoff through pipework only systems.

Many national policy documents are promoting the importance of SuDS, and the consideration of SuDS maintenance is important for the success of a scheme. A successful scheme is dependant on thinking about longer term maintenance and land management at the outset of a project.

2 Useful Principles

It is essential to involve those ultimately responsible for maintenance of the system to ensure the design can be maintained realistically. It may also be necessary to refer to requirements published in Local Plans and by the SuDS Approval Body (SAB).

When soils are exposed during the construction phase of any development there is a possible risk of soil erosion which can lead to silt-laden runoff, potentially damaging SuDS and polluting watercourses downstream. According to SEPA (2006), temporary treatment systems which are separate to the main SuDS system should be provided unless it is intended that they will be replaced or restored.

Pre-treatment features, such as swales and filter strips, can help improve resilience with downstream landscapes, which can reduce maintenance both during construction and post construction. Oil interceptors can contain large spillages by capturing coarse sediment and oil. It is essential that there is a system in place to manage emergency spillages.

Visible facilities tend to receive more maintenance, as resources for maintenance are usually limited. To avoid SuDS failure, above ground and close to source features are preferred.



Maintenance should also take account of SuDS features that are not immediately visible or obvious. These include elements such as manholes and pipework.

SuDS elements which are considered:

- Permeable Paving
- Swales
- Soakaways
- Infiltration Trenches
- Filter Drains
- Oil Interceptors

Maintenance requirements are specific to each SuDS element. Referring to CIRIA C697 SuDS Manual, the following requirements have been produced for the SuDS elements shown above.

3 Permeable Paving

During installation

1. Soft landscape regions to be approximately 30-50mm below the top of the kerb, adjacent to the pavement.
2. Soft landscape regions to be sloped away from permeable paving.
3. Soft landscape regions that drain onto permeable paving should be stabilised to minimise debris mitigation.
4. Geotextile materials should be used where appropriate to prevent clogging.

Maintenance

1. The paving must have an initial inspection and an inspection monthly for the first three months. After this period, they must be inspected annually.
2. An inspection must also take place 48 hours after large storm events.
3. Regular cleaning of silt and other sediment on the paving surfaces must take place to preserve infiltration capacity and reduce pollutant build up.
4. Inlets must be cleaned a minimum three times a year and regularly inspected. They should be cleaned with a brush and suction cleaner/ sweeper. The minimum occasions of inspection of these inlets are:



- At the end of April to collect winter debris.
- Middle of summer to collect dust and vegetation deposits.
- November, after autumn leaf fall.

4 Swales

During installation

1. Less than 1:3 gradient side slopes, ideally 1 in 4-5.
2. Minimum longitudinal slope of 1 in 300 for conveyance swales to prevent ponding.
There is no minimum requirement for under drained swales.
3. Minimum length of 30m to maximise treatment.
4. Minimise point inflow to avoid erosion, using low earth weirs or kerb cuts.
5. Do not route water through until grass is established.
6. Plant selection for the swale should be based on soil type, vigorousness, available light and ability to tolerate silt, etc.

Maintenance

1. The swale should be mowed in the first year to prevent establishment of weeds.
2. The ideal grass height for a swale is 100mm.

5 Soakaways

During installation

1. Pre-treatment should be provided to prevent clogging.
2. Adequate vehicle access should be provided for subsequent maintenance.

Maintenance

1. Regular inspection, particularly after heavy rainfall.
2. Regular removal of sediment as necessary to prevent clogging.

6 Infiltration Trenches

During installation

1. Design appropriately to prevent clogging.



2. Grass can be planted along with appropriate management.

Maintenance

1. Regular inspections to take place, to remove litter, debris and unwanted vegetation, preventing blockages.

7 Filter Drains

During installation

1. Recommended minimum width is 6m for a filter drain.
2. Sufficient access for mowing equipment should be provided.
3. The filter strip should be designed to provide a water depth of less than 50mm for water quality treatment purposes.
4. Surrounding landscape should deter pedestrians, animals and unwanted vehicles.
5. Dry and wet area grasses should be planted to promote resilience to various conditions.

Maintenance

1. Regular inspections should take place to inform the need to mow or remove litter and debris, etc.

8 Oil Interceptors

During installation

1. Selection of interceptor based on treatment objectives using site specific risk assessment of pollution to receiving watercourse.

Maintenance

1. Initial inspections should be monthly, with following inspections to remain regular.
2. Cleaning to assess sediment and oil levels to prevent accumulated oil and grit from escaping.
3. Vehicular access should be provided as cleaning usually involves a vacuum pump tanker.