



## **Flood Risk Assessment**

Proposed Photovoltaic Array  
Land at Brookbarn Farm, Littlehampton, West Sussex

Prepared for:  
**Anesco Limited**

Prepared by:  
**RMA Environmental Ltd**

Date:  
**December 2014**

Project Number:  
**RMA-C1394**

**Issued by:** RMA Environmental Limited  
 Suite 4  
 Swallow Court  
 Devonshire Gate  
 Nr Tiverton  
 Devon  
 EX16 7EJ

[www.rma-environmental.co.uk](http://www.rma-environmental.co.uk)

**Client:** ANESCO LIMITED

**Project:** PROPOSED PHOTOVOLTAIC ARRAY  
 LAND AT BROOKBARN FARM, LITTLEHAMPTON, WEST SUSSEX

**Title:** FLOOD RISK ASSESSMENT

**Status:** FINAL

**Date:** DECEMBER 2014

**Document Production Record:**

| Issue Number | Name         | Signature                                                                            |
|--------------|--------------|--------------------------------------------------------------------------------------|
| Prepared     | Matt Langdon |  |
| Checked      | Rob Murdock  |                                                                                      |
| Approved     | Rob Murdock  |                                                                                      |

**Document Revision Record:**

| Issue Number | Date                           | Revision Details |
|--------------|--------------------------------|------------------|
| 1            | 27 <sup>th</sup> November 2014 | Client Issue     |
| 2            | 2 <sup>nd</sup> December 2014  | Final            |

*RMA Environmental Limited has prepared this report in accordance with the instructions of the above named client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.*

## CONTENTS

|          |                                                            |          |
|----------|------------------------------------------------------------|----------|
| <b>1</b> | <b>INTRODUCTION .....</b>                                  | <b>1</b> |
|          | Background .....                                           | 1        |
|          | Site Location.....                                         | 1        |
|          | Proposed Development.....                                  | 1        |
|          | Requirements for a Flood Risk Assessment.....              | 1        |
|          | Consultation .....                                         | 2        |
| <b>2</b> | <b>BASELINE ENVIRONMENTAL CONDITIONS.....</b>              | <b>3</b> |
|          | Topography and Land Use .....                              | 3        |
|          | Hydrology .....                                            | 3        |
|          | Flood Zone Classification.....                             | 3        |
|          | Historic Flooding.....                                     | 3        |
|          | Geology and Hydrogeology .....                             | 4        |
| <b>3</b> | <b>EXTERNAL FLOOD RISK.....</b>                            | <b>5</b> |
|          | Flooding Mechanisms .....                                  | 5        |
|          | Land Use Vulnerability .....                               | 5        |
| <b>4</b> | <b>DRAINAGE ASSESSMENT .....</b>                           | <b>6</b> |
|          | Introduction.....                                          | 6        |
|          | Runoff Rates for Existing Land Use.....                    | 6        |
|          | Runoff Rates and Volumes for the Proposed Development..... | 7        |
|          | Potential for Soil Erosion.....                            | 7        |
|          | Proposed Surface Water Drainage Scheme.....                | 8        |
|          | Designing for Exceedance Events .....                      | 8        |
| <b>5</b> | <b>CONCLUSIONS .....</b>                                   | <b>9</b> |

### FIGURES

- Figure 1.1: Site Location Plan  
 Figure 2.1: EA Indicative Flood Map

### APPENDICES

- Appendix A: Site Layout Plan  
 Appendix B: EA Correspondence  
 Appendix C: Site Topographical Survey  
 Appendix D: Micro Drainage Calculations

# 1 INTRODUCTION

## Background

- 1.1. RMA Environmental Limited was commissioned by the Pegasus Group on behalf of Anesco Limited to carry out a Flood Risk Assessment (FRA) for a proposed solar park on land at Brookbarn Farm, Courtwick Lane, Wick, Littlehampton, West Sussex, BN17 7PE.
- 1.2. This FRA has been prepared in accordance with the National Planning Policy Framework (NPPF), associated Planning Practice Guidance (PPG) and Environment Agency (EA) standing advice on flood risk for new development.

## Site Location

- 1.3. The application site comprises a total area of approximately 5.2 hectares (ha) which is set within a larger field centred on National Grid Reference (NGR) TQ 019 042 (refer to Figure 1.1).
- 1.4. The site is located to the north of Littlehampton approximately 3 km from the coast. Arundel it located approximately 2.8 km to the north and the River Arundel is located 800 m to the west at its closest point. Access to the site is to the east from Old Mead Road which connects to Lyminster Road (A284)
- 1.5. Further details on site topography, geology and sources of flood risk are set out in Section 2.

## Proposed Development

- 1.6. The proposed development is for the erection of temporary photovoltaic (PV) panels, security fencing, substations and associated track (refer to Appendix A). The PV panels will be fixed to the existing surface using piles and, therefore, the footprint of the structures at ground level will be minimal.
- 1.7. The PV panels are designed to be removed after 25 years at which time the site will be restored to its original state. The underlying ground will remain grassed and it is intended for the site to be cut for silage.

## Requirements for a Flood Risk Assessment

- 1.8. The requirements for FRA are provided in the NPPF and associated PPG, which came into effect in March 2012 and March 2014, respectively. This policy states that flood risk is a material consideration that must be taken into account when considering all planning applications. In addition, the requirements of the EA and the local Strategic Flood Risk Assessment (SFRA) should be considered.

- 1.9. Paragraph 103 of the NPPF requires that a site-specific FRA should be submitted with planning applications for all sites greater than 1 ha in Flood Zone 1 or for sites of any size within Flood Zones 2 or 3.
- 1.10. Flood Zone 1 is defined as land with little or no flood risk (an annual probability of flooding of less than 0.1%); Flood Zone 2 is defined as having a medium flood risk (an annual probability of between 0.1% and 0.5% for tidal areas and 0.1% and 1.0% for rivers); and Flood Zone 3 is defined as high risk (with an annual probability of flooding of greater than 0.5% for tidal areas and greater than 1.0% for rivers).
- 1.11. FRAs should describe and assess all flood risks (from rivers, the sea, sewers and groundwater) to and from the development and demonstrate how they will be managed, including an evaluation of climate change effects.
- 1.12. Guidance on the content of FRAs is contained in the NPPF PPG: Flood Risk and Coastal Change (March 2014) and associated EA standing advice<sup>1</sup>. These documents have been consulted with regard to the acceptability of the development proposals described in this FRA.

### Consultation

- 1.13. Written consultation has been carried out with the EA and their comments have been taken into consideration (refer to Appendix B).

---

<sup>1</sup> FRA Guidance Note 1: Development within a critical drainage area or greater than 1 hectare (ha) in Flood Zone 1, EA Standing Advice, April 2012

## 2 BASELINE ENVIRONMENTAL CONDITIONS

### Topography and Land Use

- 2.1. The site is currently used for agriculture and slopes to the north from a maximum elevation of approximately 5 metres Above Ordnance Datum (mAOD) along the southern boundary to a minimum elevation of approximately 3 mAOD along the northern boundary.
- 2.2. The topographic survey is included as Appendix C.

### Hydrology

- 2.3. The closest 'main river'<sup>2</sup> is the Black Ditch, located immediately to the north of the application site. The Black Ditch drains the land to the north of Littlehampton and discharges into the River Arundel (also a 'main river') approximately 800 m to the west of the site. There are a number of small land drains located to the north and west of the site that drain the surrounding floodplain.
- 2.4. There are no other significant watercourses or water bodies within the surrounding area.

### Flood Zone Classification

- 2.5. The EA's indicative flood map (Figure 2.1) shows that the site lies within Flood Zone 1 (low risk). Land within Flood Zone 1 is classed in the NPPF as having 'little or no flood risk', having an annual probability of flooding of less than 0.1% from rivers or the sea.

### Historic Flooding

- 2.6. The British Hydrological Society database<sup>3</sup> of historical flood events has been reviewed for records of flooding in the area and no specific data has been found for the site or immediate vicinity.
- 2.7. A review of the Arun District Council Strategic Flood Risk Assessment (SFRA; Capita Symonds, 2008) has identified four records of historic flooding from sewers to the east of the application site. This area is at a lower elevation than the site and, therefore, it is anticipated that these historic flood events would not have impacted the site.

---

<sup>2</sup> Main river is defined by the EA as any watercourse that contributes significantly to the hydrology of a catchment.

<sup>3</sup> Chronology of British Hydrological Events ([www.dundee.ac.uk/geography/cbhe/](http://www.dundee.ac.uk/geography/cbhe/))

## Geology and Hydrogeology

- 2.8. According to the BGS Geology of Britain Viewer, the site is underlain by the bedrock geology of the White Chalk Subgroup comprised solely of chalk. The superficial geology is recorded as Raised Marine Deposits (comprising clay, silt, sand and gravel) beneath the northern half of the application site and Raised Beach Deposits (comprising sand and gravel) on the southern half.
- 2.9. According to EA mapping the bedrock geology is classified as Principal Aquifer, which is defined as *“layers of rock or drift deposits that have high intergranular and/or fracture permeability – meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.”*
- 2.10. Both superficial deposits are classified as Secondary A Aquifer, which is described as *“permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.”*
- 2.11. The site is not located within a groundwater Source Protection Zone (SPZ).
- 2.12. According to the Wallingford Procedure Winter Rain Acceptance Potential (WRAP) map, the soils on the site are classified as WRAP Class 3, which is indicative of *“Permeable soils with shallow ground-water in low lying areas.”*
- 2.13. The Flood Estimation Handbook (FEH) derived SPRHOST makes use of higher resolution data than the WRAP classification. The FEH SPRHOST value of 16.4 would indicate that the soils have a high permeability. The SPRHOST value will be utilised in the runoff calculations as it makes use of the higher resolution dataset.

### 3 EXTERNAL FLOOD RISK

#### Flooding Mechanisms

- 3.1. The EA's indicative flood map (Figure 2.1) for the area confirms that the entire site lies within Flood Zone 1 (low risk).
- 3.2. The SFRA identifies that the site is located within a Groundwater Emergence Zone with a high risk of flooding from this source. The SFRA notes that the groundwater flooding maps are indicative and that deep foundations, basements and underground infrastructure are most at risk. Furthermore, the site slopes to the north and, therefore, any groundwater emerging on site is unlikely to pond and cause significant flooding within the site.
- 3.3. A review of the EA's reservoir and surface water flood maps also identified that flood risk from these sources is low. Based on a review of further information (i.e. the SFRA), no other sources of potential flooding, i.e. from sewers, have been identified for the site.
- 3.4. Access/egress to the site is located within Flood Zone 3; however, following construction, access would only be required for periodic maintenance and, if the access was flooded, maintenance personnel would postpone their visit until the floodwater had receded.

#### Land Use Vulnerability

- 3.5. Table 2 of the PPG sets out a schedule of land uses based on their vulnerability or sensitivity to flooding. The proposed development is likely to be classified as a land use that is 'less vulnerable' to flooding as set out in Table 2. Referring to Table 3 of the PPG, all land uses are considered appropriate within Flood Zone 1.
- 3.6. Therefore, on the basis of land use vulnerability, the development should be deemed appropriate in planning policy terms in its proposed location.

## 4 DRAINAGE ASSESSMENT

### Introduction

- 4.1. The NPPF states that those proposing development are responsible for drainage designs which reduce flood risk to the development and elsewhere, potentially through the use of Sustainable Drainage Systems (SUDS).
- 4.2. Surface water arising from a developed site should, as far as is practicable, be managed to mimic the surface water flows arising from the site prior to the proposed development while reducing the flood risk to the site itself and elsewhere.

### Runoff Rates for Existing Land Use

- 4.3. The latest CIRIA guidance on SUDS (CIRIA C609), adopted by the EA, recommends the use of the Institute of Hydrology Report No 124 (IH124) for greenfield calculations for sites of less than 200 ha and the Flood Estimation Handbook (FEH) for areas larger than 200 ha. Where the catchment area is less than 50 ha, the recommended approach is to use 50 ha in the IH124 calculations with flow rates linearly interpolated based on the ratio of the site catchment area to 50 ha. This approach has been adopted below.
- 4.4. IH124 is based on an equation for the mean annual flood (QBAR) and the Flood Studies Report (FSR) regional growth curve to provide T year flood estimates. The equation for the mean annual flood is:

$$QBAR (m^3/s) = 0.00108 * (AREA^{0.89} * SAAR^{1.17} * SOIL^{2.17})$$

- 4.5. Where: AREA = Catchment Area (km<sup>2</sup>); SAAR = Standard Average Annual Rainfall (mm) and SOIL = the soil parameter.
- 4.6. The overall catchment descriptors from the FEH CD for the nearest 1 km grid point provides a SAAR of 824 mm. Given the higher spatial resolution available through the use of SPRHOST, a SOIL value of 0.16 has been used in the runoff rate and volume calculations.
- 4.7. The 100 year peak flow was calculated using Micro Drainage (refer to Appendix D) for an area of 50 ha which resulted in a flow of 89.9 l/s, this is equivalent to 1.8 l/s/ha. For the site area of 5.2 ha, this is factored down to 9.4 l/s.
- 4.8. The 100 year greenfield runoff volume has also been estimated using Micro Drainage. Based on rainfall data taken from the FEH, the 30 minute storm would result in a runoff volume of 279.5 m<sup>3</sup>; the 6 hour storm would generate 719.6 m<sup>3</sup>.

## Runoff Rates and Volumes for the Proposed Development

- 4.9. There would be an insignificant increase in impermeable surface area due to the erection of the solar panels, as water intercepted by a panel would run off onto the ground and infiltrate underneath the downslope panel. As such, only the panel feet, substation and inverter buildings will increase the impermeable surface area at ground level. This has been estimated to be less than 0.1% of the total site area.
- 4.10. For the site area of 5.16 ha, the post development 100 year peak runoff rate with an impermeable extent of 0.1% is equal to 9.4 l/s, i.e. no perceptible increase. The 100 year runoff volumes for the site have been estimated and indicate no significant increase (refer to Appendix D).
- 4.11. The proposed development will have an insignificant impact on surface water runoff, with no perceptible increase in peak flow rates and volumes. Therefore, the principal increase in surface runoff rates and volumes will be from the predicted increase in rainfall intensities as a result of climate change.
- 4.12. In accordance with Table 5 of the NPPF Technical Guidance, the post-development 100 year runoff rates have been increased by 20%. For the site, this produces a climate change corrected peak runoff rate of 11.3 l/s for the critical 100 year storm. However, this is the same as the future rate (11.3 l/s) for the existing land use (without any development).

## Potential for Soil Erosion

- 4.13. Natural England has provided guidance on solar parks in the form of *Technical Information Note (TIN) 101*<sup>4</sup>. This guidance provides an overview of the potential effects and possible mitigation measures for soil erosion and increased runoff, amongst others. TIN101 states that *"The key to avoiding increased run-off and soil into watercourses is to maintain soil permeability and vegetative cover. Permeable land surfaces underneath and between panels should be able to absorb rainfall as long as they are not compacted and there is some vegetation to bind the soil surface"*.
- 4.14. The erection of the solar panels will require the use of light machinery; however, it is anticipated that this would not lead to irreversible compaction of soils on the site. Therefore, infiltration should not be limited by compaction of soils.
- 4.15. Many large-scale solar parks have been constructed in the UK for a number of years, our experience of a number of existing sites is that vegetation is able to grow beneath the solar panels, thereby maintaining a vegetative cover.
- 4.16. TIN101 concludes that *"the risks of run-off and soil erosion are lowest on low gradient land with cohesive soils and highest on dry, sandy and steeply sloping soil surfaces"*; this highlights the effect of slope on runoff rates and soil erosion. Furthermore, the slope aspect of the land can also have an effect on runoff rates and soil erosion.

<sup>4</sup> Technical Information Note (TIN) 101 Solar parks: maximising environmental benefits, Natural England (September 2011)

- 4.17. The aspect of the solar panels will always be south-facing (in the UK) and, therefore, north or south facing slopes will result in runoff flowing in a parallel direction to that of the runoff from the panels thereby remaining relatively diffuse and unlikely to result in concentrated flows that could cause soil erosion, apart from where very steep slopes occur.
- 4.18. East or west-facing slopes would result in runoff flowing in a perpendicular direction to that of runoff from the panels; this would result in runoff becoming concentrated along the drip-line of each row, which could lead to increased soil erosion. TIN101 suggests the use of “grass soakaways” to divert runoff so as to avoid soil erosion. Shallow swales could also be used to intercept and dissipate runoff in circumstances such as this.
- 4.19. With regard to the proposed development, the site is considered to have a low gradient, with a northerly slope. A grassed surface will be maintained for the site to reduce the likelihood of overland flow or soil erosion occurring which, based on this assessment, is considered to be very low.

### Proposed Surface Water Drainage Scheme

- 4.20. There are a number of sustainable drainage measures (SUDS) that could be adopted to manage surface runoff resulting from the development.
- 4.21. As the proposed development would only increase the percentage impermeable surface area at ground level by less than 0.1%, it is proposed to allow the development to drain to the soil surface, where infiltration into the underlying soils would occur, to mimic the existing hydrological characteristics of the site.

### Designing for Exceedance Events

- 4.22. Any overland flow occurring within the proposed development would flow in a northerly direction towards the Black Ditch as would occur for the existing scenario. There are no properties immediately down gradient that would be adversely affected by any overland flow originating within the site.

## 5 CONCLUSIONS

- 5.1. The requirements for Flood Risk Assessment are provided in the National Planning Policy Framework and associated Technical Guidance, together with the Environment Agency's Guidance Notes. This policy and associated guidance have been followed in the preparation of this FRA.
- 5.2. The EA's indicative flood map for the area identifies that the entire site is located within Flood Zone 1 and, therefore, flood risk is considered to be low. No other sources of flooding, i.e. from sewers or groundwater, have been identified for the site.
- 5.3. Access/egress to the site is located within Flood Zone 3; however, following construction, access would only be required for periodic maintenance and, if the access was flooded, maintenance personnel would postpone their visit until the floodwater had receded.
- 5.4. The proposed development would increase the percentage impermeable surface area at ground level by significantly less than 0.1%, so it is proposed to allow the development to drain to the soil surface, where infiltration into the underlying soils would occur, to mimic the existing hydrological characteristics of the site.
- 5.5. Should any overland flow occur on the site, this would be routed in a northerly direction as it would for the existing site. The site will be maintained with a grassed surface to reduce the likelihood of overland flow or soil erosion occurring which, based on this assessment, is considered to be low.
- 5.6. Based on the conceptual drainage strategy, the hydrology of the site post-development would remain essentially the same as for the existing land use, with runoff rates from the site not exceeding the estimated greenfield runoff rates for the existing site.
- 5.7. This FRA has therefore demonstrated that the proposed development will be safe and that it would not increase flood risk elsewhere. The proposed land use is classified as 'less vulnerable' to flooding and is therefore considered appropriate in relation to the flood risk vulnerability classifications set out in Table 3 of the NPPF. The development should therefore be considered acceptable in planning policy terms.

## *Figures*

# LYMINSTER AND CROSSBUSH CP



## KEY:

— Approximate Site Boundary

**Figure 1.1:**  
Site Location Plan

## Project Name:

Brookbarn Farm  
PV FRA

## Client:

Anesco Ltd.

## Project Number:

RMA-C1394

## Date:

27th November 2014

## Drawn by:

RMA Environmental/DM

RMA Environmental Limited  
Suite 4, Swallow Court, Devonshire Gate,  
Tiverton, Devon EX16 7EJ  
Tel: 01884 842740  
Web: [www.rma-environmental.co.uk](http://www.rma-environmental.co.uk)

**KEY:**

——— Approximate Site Boundary

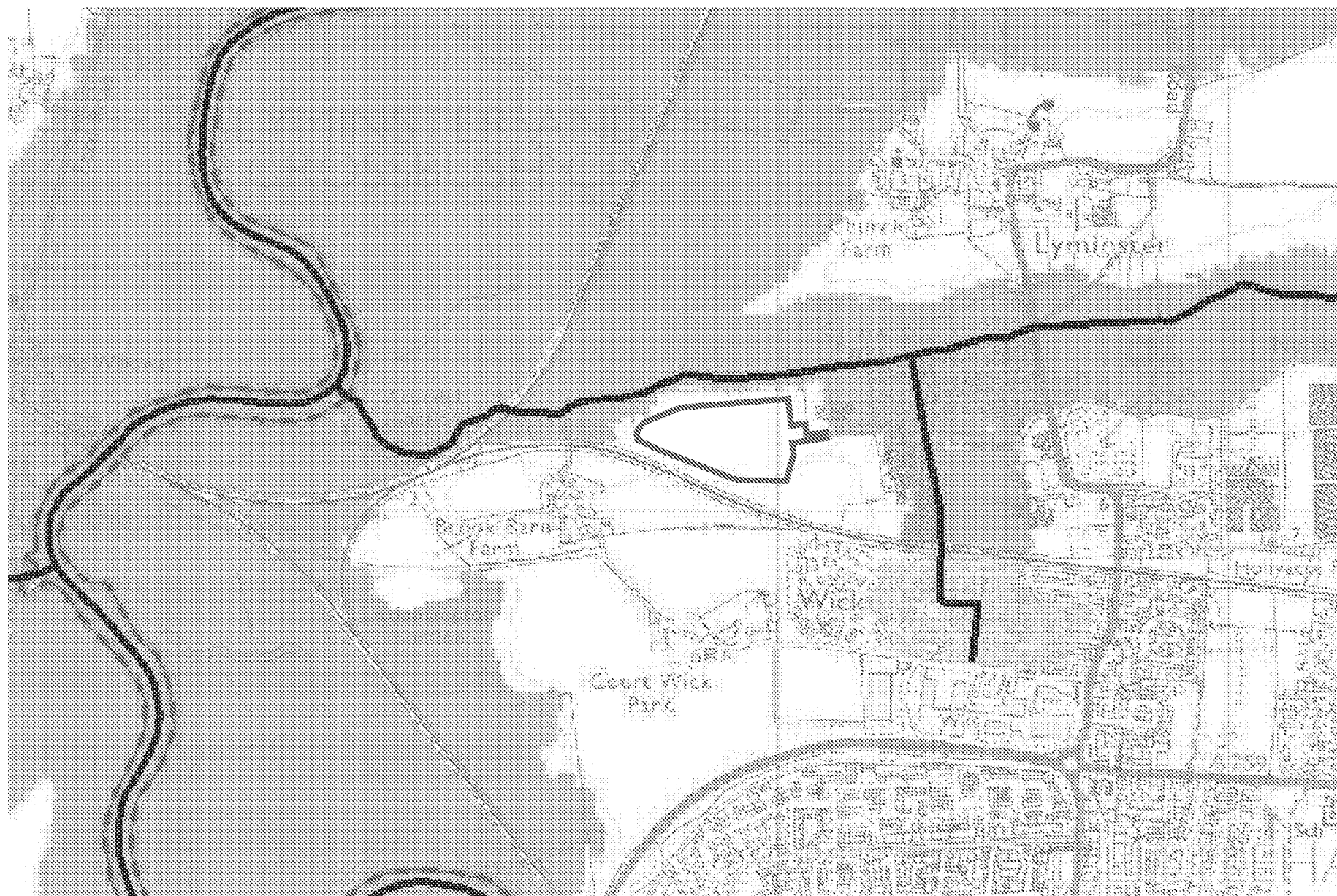


**Figure 2.1:**  
Indicative Flood Map

**Project Name:**

Brook Barn Farm  
PV FRA

**Client:**

Anesco Ltd.

**Project Number:**

RMA-C1394

**Date:**

27th November 2014

**Drawn by:**

RMA Environmental/DM

## ***Appendix A: Site Layout Plan***

[illegible]

## ***Appendix B: EA Consultation***

## Matt Langdon

---

**From:** PlanningSSD <[REDACTED]>  
**Sent:** 17 November 2014 16:54  
**To:** Matt Langdon  
**Cc:** Enquiries, Unit  
**Subject:** FW: 141110/RF17 - Pre-Application Enquiry: Horsey Level (RMA-C1394)  
**Attachments:** RMA-C1394 - EA Pre-App.pdf; 001065\_01\_RevA.pdf

Dear Matt

Thank you for your pre-planning enquiry.

Having screened the enquiry with regard to the low risk of the development type and location of the proposal, I can confirm that we are unable to provide a detailed response. No comments will be provided from us to the Local Authority at the planning application stage, however we hope the following information will be useful.

As the development proposal is in flood zone 1 and less than 5 hectares it would fall into our flood risk standing advice which can be found at the following link: <https://www.gov.uk/planning-applications-assessing-flood-risk>

Although the site falls within flood zone 1 an FRA will still need to be submitted with any application as the site is over 1 ha. Information about the scope and detail can be found on our standing advice pages. All surface water drainage issues are now dealt with by the relevant Local Authority or Lead Local Flood Authority (LLFA), in this instance West Sussex County Council.

Should you have any further queries, please do not hesitate to get in touch.

Kind Regards,

Mark Luker  
Environment Agency – Solent and South Downs  
Sustainable Places Planning Advisor  
Tel: [REDACTED]  
Team email: [REDACTED]

*Guildbourne House, Chatsworth Road, Worthing BN11 1LD*

- ▶ [Our Website](#)
- ▶ [Our Flood Risk Standing Advice](#)
- ▶ [Our Pollution Prevention guidance](#)
- ▶ [Our Charging scheme for planning advice](#)

---

**From:** Enquiries, Unit  
**Sent:** 10 November 2014 15:38  
**To:** [REDACTED]  
**Subject:** FW: 141110/RF17 - Pre-Application Enquiry: Horsey Level (RMA-C1394)

Good afternoon Matt,

Thank you for your pre-planning enquiry.

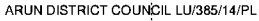
I have passed your enquiry to our Sustainable Places Team for the relevant area and they will be in touch with you shortly.

The Freedom of Information Act and Environmental Information Regulations state that a public authority must respond to requests for information within 20 working days, but we aim to respond to all enquiries as quickly as we can.

You can find more information about our service commitment by clicking on the link below:

## ***Appendix C: Topographic Survey***





## ***Appendix D: Micro Drainage Calculations***

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|-----------------------|-----|------|-------|-----------|--------|-------|-------|-----------|-----|---------------|----------|------------|------|------------|------|------------|------|---------|------|----------|------|----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|------------|------|------------|-------|------------|-------|-------------|-------|
| RMA Environmental Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                       | Page 1                                                                              |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Suite 4 Swallow Court<br>Devonshire Gate<br>Tiverton EX16 7EJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                       |  |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Date 24/11/2014 19:57<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Designed by MattLangdon<br>Checked by |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Micro Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Source Control 2013.1                 |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| <p align="center"><u>IH 124 Mean Annual Flood</u></p> <p align="center">Input</p> <table> <tr> <td>Return Period (years)</td> <td>100</td> <td>Soil</td> <td>0.160</td> </tr> <tr> <td>Area (ha)</td> <td>50.000</td> <td>Urban</td> <td>0.000</td> </tr> <tr> <td>SAAR (mm)</td> <td>824</td> <td>Region Number</td> <td>Region 7</td> </tr> </table> <p align="center"><b>Results      l/s</b></p> <table> <tr> <td>QBAR Rural</td> <td>28.2</td> </tr> <tr> <td>QBAR Urban</td> <td>28.2</td> </tr> <tr> <td>Q100 years</td> <td>89.9</td> </tr> <tr> <td>Q1 year</td> <td>24.0</td> </tr> <tr> <td>Q2 years</td> <td>24.8</td> </tr> <tr> <td>Q5 years</td> <td>36.1</td> </tr> <tr> <td>Q10 years</td> <td>45.7</td> </tr> <tr> <td>Q20 years</td> <td>56.5</td> </tr> <tr> <td>Q25 years</td> <td>60.6</td> </tr> <tr> <td>Q30 years</td> <td>63.9</td> </tr> <tr> <td>Q50 years</td> <td>73.9</td> </tr> <tr> <td>Q100 years</td> <td>89.9</td> </tr> <tr> <td>Q200 years</td> <td>105.7</td> </tr> <tr> <td>Q250 years</td> <td>110.8</td> </tr> <tr> <td>Q1000 years</td> <td>145.5</td> </tr> </table> |                                       |                                                                                     | Return Period (years) | 100 | Soil | 0.160 | Area (ha) | 50.000 | Urban | 0.000 | SAAR (mm) | 824 | Region Number | Region 7 | QBAR Rural | 28.2 | QBAR Urban | 28.2 | Q100 years | 89.9 | Q1 year | 24.0 | Q2 years | 24.8 | Q5 years | 36.1 | Q10 years | 45.7 | Q20 years | 56.5 | Q25 years | 60.6 | Q30 years | 63.9 | Q50 years | 73.9 | Q100 years | 89.9 | Q200 years | 105.7 | Q250 years | 110.8 | Q1000 years | 145.5 |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 100                                   | Soil                                                                                | 0.160                 |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Area (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 50.000                                | Urban                                                                               | 0.000                 |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| SAAR (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 824                                   | Region Number                                                                       | Region 7              |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| QBAR Rural                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 28.2                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| QBAR Urban                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 28.2                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q100 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 89.9                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q1 year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 24.0                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q2 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 24.8                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q5 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 36.1                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q10 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 45.7                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q20 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 56.5                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q25 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 60.6                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q30 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 63.9                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q50 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 73.9                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q100 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 89.9                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q200 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 105.7                                 |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q250 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 110.8                                 |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q1000 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 145.5                                 |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| ©1982-2012 Micro Drainage Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                       |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|-----------------------|-----|-----------------------|----|---------------|---------------------------------|---------|--------|----------|-------|----------|-------|----------|-------|---------|-------|---------|-------|------------------------|------|-----------|-------|-----------|-----|-----|---------|----------|--------|---------------|--------|-----------------------|-------|-------------------------------|---------|
| RMA Environmental Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                       | Page 1                                                                              |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Suite 4 Swallow Court<br>Devonshire Gate<br>Tiverton EX16 7EJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |  |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Date 26/11/2014 17:47<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Designed by mattlangdon<br>Checked by |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Micro Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       | Source Control 2013.1                                                               |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| <p style="text-align: center;"><u>Greenfield Runoff Volume</u></p> <p style="text-align: center;">FEH Data</p> <table> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>Storm Duration (mins)</td> <td>30</td> </tr> <tr> <td>Site Location</td> <td>GB 501500 104250 TQ 01500 04250</td> </tr> <tr> <td>C (1km)</td> <td>-0.027</td> </tr> <tr> <td>D1 (1km)</td> <td>0.390</td> </tr> <tr> <td>D2 (1km)</td> <td>0.280</td> </tr> <tr> <td>D3 (1km)</td> <td>0.399</td> </tr> <tr> <td>E (1km)</td> <td>0.314</td> </tr> <tr> <td>F (1km)</td> <td>2.331</td> </tr> <tr> <td>Areal Reduction Factor</td> <td>1.00</td> </tr> <tr> <td>Area (ha)</td> <td>5.200</td> </tr> <tr> <td>SAAR (mm)</td> <td>824</td> </tr> <tr> <td>CWI</td> <td>118.503</td> </tr> <tr> <td>SPR Host</td> <td>16.440</td> </tr> <tr> <td>URBEXT (USER)</td> <td>0.0000</td> </tr> </table> <p style="text-align: center;">Results</p> <table> <tr> <td>Percentage Runoff (%)</td> <td>14.82</td> </tr> <tr> <td>Greenfield Runoff Volume (m³)</td> <td>279.493</td> </tr> </table> |                                       |                                                                                     | Return Period (years) | 100 | Storm Duration (mins) | 30 | Site Location | GB 501500 104250 TQ 01500 04250 | C (1km) | -0.027 | D1 (1km) | 0.390 | D2 (1km) | 0.280 | D3 (1km) | 0.399 | E (1km) | 0.314 | F (1km) | 2.331 | Areal Reduction Factor | 1.00 | Area (ha) | 5.200 | SAAR (mm) | 824 | CWI | 118.503 | SPR Host | 16.440 | URBEXT (USER) | 0.0000 | Percentage Runoff (%) | 14.82 | Greenfield Runoff Volume (m³) | 279.493 |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 100                                   |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Storm Duration (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30                                    |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Site Location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | GB 501500 104250 TQ 01500 04250       |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| C (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -0.027                                |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D1 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.390                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D2 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.280                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D3 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.399                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| E (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.314                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| F (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2.331                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Areal Reduction Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1.00                                  |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Area (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5.200                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| SAAR (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 824                                   |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| CWI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 118.503                               |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| SPR Host                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 16.440                                |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| URBEXT (USER)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0000                                |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Percentage Runoff (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 14.82                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Greenfield Runoff Volume (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 279.493                               |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| ©1982-2012 Micro Drainage Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|-----------------------|-----|-----------------------|-----|---------------|---------------------------------|---------|--------|----------|-------|----------|-------|----------|-------|---------|-------|---------|-------|------------------------|------|-----------|-------|-----------|-----|-----|---------|----------|--------|---------------|--------|-----------------------|-------|-------------------------------|---------|
| RMA Environmental Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       | Page 1                                                                              |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Suite 4 Swallow Court<br>Devonshire Gate<br>Tiverton EX16 7EJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |  |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Date 26/11/2014 17:47<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Designed by mattlangdon<br>Checked by |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Micro Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       | Source Control 2013.1                                                               |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| <p style="text-align: center;"><u>Greenfield Runoff Volume</u></p> <p style="text-align: center;">FEH Data</p> <table> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>Storm Duration (mins)</td> <td>360</td> </tr> <tr> <td>Site Location</td> <td>GB 501500 104250 TQ 01500 04250</td> </tr> <tr> <td>C (1km)</td> <td>-0.027</td> </tr> <tr> <td>D1 (1km)</td> <td>0.390</td> </tr> <tr> <td>D2 (1km)</td> <td>0.280</td> </tr> <tr> <td>D3 (1km)</td> <td>0.399</td> </tr> <tr> <td>E (1km)</td> <td>0.314</td> </tr> <tr> <td>F (1km)</td> <td>2.331</td> </tr> <tr> <td>Areal Reduction Factor</td> <td>1.00</td> </tr> <tr> <td>Area (ha)</td> <td>5.200</td> </tr> <tr> <td>SAAR (mm)</td> <td>824</td> </tr> <tr> <td>CWI</td> <td>118.503</td> </tr> <tr> <td>SPR Host</td> <td>16.440</td> </tr> <tr> <td>URBEXT (USER)</td> <td>0.0000</td> </tr> </table> <p style="text-align: center;">Results</p> <table> <tr> <td>Percentage Runoff (%)</td> <td>19.71</td> </tr> <tr> <td>Greenfield Runoff Volume (m³)</td> <td>719.645</td> </tr> </table> |                                       |                                                                                     | Return Period (years) | 100 | Storm Duration (mins) | 360 | Site Location | GB 501500 104250 TQ 01500 04250 | C (1km) | -0.027 | D1 (1km) | 0.390 | D2 (1km) | 0.280 | D3 (1km) | 0.399 | E (1km) | 0.314 | F (1km) | 2.331 | Areal Reduction Factor | 1.00 | Area (ha) | 5.200 | SAAR (mm) | 824 | CWI | 118.503 | SPR Host | 16.440 | URBEXT (USER) | 0.0000 | Percentage Runoff (%) | 19.71 | Greenfield Runoff Volume (m³) | 719.645 |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 100                                   |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Storm Duration (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 360                                   |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Site Location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GB 501500 104250 TQ 01500 04250       |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| C (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -0.027                                |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D1 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.390                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D2 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.280                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D3 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.399                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| E (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.314                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| F (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2.331                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Areal Reduction Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.00                                  |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Area (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5.200                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| SAAR (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 824                                   |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| CWI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 118.503                               |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| SPR Host                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 16.440                                |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| URBEXT (USER)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.0000                                |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Percentage Runoff (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 19.71                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Greenfield Runoff Volume (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 719.645                               |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| ©1982-2012 Micro Drainage Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                       |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|-----------------------|-----|------|-------|-----------|--------|-------|-------|-----------|-----|---------------|----------|------------|------|------------|------|------------|------|---------|------|----------|------|----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|------------|------|------------|-------|------------|-------|-------------|-------|
| RMA Environmental Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       | Page 1                                                                              |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Suite 4 Swallow Court<br>Devonshire Gate<br>Tiverton EX16 7EJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       |  |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Date 24/11/2014 20:00<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Designed by MattLangdon<br>Checked by |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Micro Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Source Control 2013.1                 |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| <p style="text-align: center;"><u>IH 124 Mean Annual Flood</u></p> <p style="text-align: center;">Input</p> <table> <tr> <td>Return Period (years)</td> <td>100</td> <td>Soil</td> <td>0.160</td> </tr> <tr> <td>Area (ha)</td> <td>50.000</td> <td>Urban</td> <td>0.001</td> </tr> <tr> <td>SAAR (mm)</td> <td>824</td> <td>Region Number</td> <td>Region 7</td> </tr> </table> <p style="text-align: center;"><b>Results      l/s</b></p> <table> <tr> <td>QBAR Rural</td> <td>28.2</td> </tr> <tr> <td>QBAR Urban</td> <td>28.3</td> </tr> <tr> <td>Q100 years</td> <td>90.1</td> </tr> <tr> <td>Q1 year</td> <td>24.0</td> </tr> <tr> <td>Q2 years</td> <td>24.9</td> </tr> <tr> <td>Q5 years</td> <td>36.2</td> </tr> <tr> <td>Q10 years</td> <td>45.8</td> </tr> <tr> <td>Q20 years</td> <td>56.6</td> </tr> <tr> <td>Q25 years</td> <td>60.7</td> </tr> <tr> <td>Q30 years</td> <td>64.0</td> </tr> <tr> <td>Q50 years</td> <td>74.0</td> </tr> <tr> <td>Q100 years</td> <td>90.1</td> </tr> <tr> <td>Q200 years</td> <td>105.9</td> </tr> <tr> <td>Q250 years</td> <td>111.0</td> </tr> <tr> <td>Q1000 years</td> <td>145.7</td> </tr> </table> |                                       |                                                                                     | Return Period (years) | 100 | Soil | 0.160 | Area (ha) | 50.000 | Urban | 0.001 | SAAR (mm) | 824 | Region Number | Region 7 | QBAR Rural | 28.2 | QBAR Urban | 28.3 | Q100 years | 90.1 | Q1 year | 24.0 | Q2 years | 24.9 | Q5 years | 36.2 | Q10 years | 45.8 | Q20 years | 56.6 | Q25 years | 60.7 | Q30 years | 64.0 | Q50 years | 74.0 | Q100 years | 90.1 | Q200 years | 105.9 | Q250 years | 111.0 | Q1000 years | 145.7 |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100                                   | Soil                                                                                | 0.160                 |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Area (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 50.000                                | Urban                                                                               | 0.001                 |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| SAAR (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 824                                   | Region Number                                                                       | Region 7              |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| QBAR Rural                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 28.2                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| QBAR Urban                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 28.3                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q100 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 90.1                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q1 year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 24.0                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q2 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 24.9                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q5 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 36.2                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q10 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 45.8                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q20 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 56.6                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q25 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 60.7                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q30 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 64.0                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q50 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 74.0                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q100 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 90.1                                  |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q200 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 105.9                                 |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q250 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 111.0                                 |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| Q1000 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 145.7                                 |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |
| ©1982-2012 Micro Drainage Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       |                                                                                     |                       |     |      |       |           |        |       |       |           |     |               |          |            |      |            |      |            |      |         |      |          |      |          |      |           |      |           |      |           |      |           |      |           |      |            |      |            |       |            |       |             |       |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|-----------------------|-----|-----------------------|----|---------------|---------------------------------|---------|--------|----------|-------|----------|-------|----------|-------|---------|-------|---------|-------|------------------------|------|-----------|-------|-----------|-----|-----|---------|----------|--------|---------------|--------|-----------------------|-------|-------------------------------|---------|
| RMA Environmental Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                       | Page 1                                                                              |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Suite 4 Swallow Court<br>Devonshire Gate<br>Tiverton EX16 7EJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |  |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Date 26/11/2014 17:48<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Designed by mattlangdon<br>Checked by |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Micro Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       | Source Control 2013.1                                                               |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| <p style="text-align: center;"><u>Greenfield Runoff Volume</u></p> <p style="text-align: center;">FEH Data</p> <table> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>Storm Duration (mins)</td> <td>30</td> </tr> <tr> <td>Site Location</td> <td>GB 501500 104250 TQ 01500 04250</td> </tr> <tr> <td>C (1km)</td> <td>-0.027</td> </tr> <tr> <td>D1 (1km)</td> <td>0.390</td> </tr> <tr> <td>D2 (1km)</td> <td>0.280</td> </tr> <tr> <td>D3 (1km)</td> <td>0.399</td> </tr> <tr> <td>E (1km)</td> <td>0.314</td> </tr> <tr> <td>F (1km)</td> <td>2.331</td> </tr> <tr> <td>Areal Reduction Factor</td> <td>1.00</td> </tr> <tr> <td>Area (ha)</td> <td>5.200</td> </tr> <tr> <td>SAAR (mm)</td> <td>824</td> </tr> <tr> <td>CWI</td> <td>118.503</td> </tr> <tr> <td>SPR Host</td> <td>16.440</td> </tr> <tr> <td>URBEXT (USER)</td> <td>0.0001</td> </tr> </table> <p style="text-align: center;">Results</p> <table> <tr> <td>Percentage Runoff (%)</td> <td>14.82</td> </tr> <tr> <td>Greenfield Runoff Volume (m³)</td> <td>279.493</td> </tr> </table> |                                       |                                                                                     | Return Period (years) | 100 | Storm Duration (mins) | 30 | Site Location | GB 501500 104250 TQ 01500 04250 | C (1km) | -0.027 | D1 (1km) | 0.390 | D2 (1km) | 0.280 | D3 (1km) | 0.399 | E (1km) | 0.314 | F (1km) | 2.331 | Areal Reduction Factor | 1.00 | Area (ha) | 5.200 | SAAR (mm) | 824 | CWI | 118.503 | SPR Host | 16.440 | URBEXT (USER) | 0.0001 | Percentage Runoff (%) | 14.82 | Greenfield Runoff Volume (m³) | 279.493 |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 100                                   |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Storm Duration (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30                                    |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Site Location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | GB 501500 104250 TQ 01500 04250       |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| C (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -0.027                                |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D1 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.390                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D2 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.280                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D3 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.399                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| E (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.314                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| F (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2.331                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Areal Reduction Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1.00                                  |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Area (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 5.200                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| SAAR (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 824                                   |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| CWI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 118.503                               |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| SPR Host                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 16.440                                |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| URBEXT (USER)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.0001                                |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Percentage Runoff (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 14.82                                 |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Greenfield Runoff Volume (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 279.493                               |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| ©1982-2012 Micro Drainage Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       |                                                                                     |                       |     |                       |    |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------|-----------------------|-----|-----------------------|-----|---------------|---------------------------------|---------|--------|----------|-------|----------|-------|----------|-------|---------|-------|---------|-------|------------------------|------|-----------|-------|-----------|-----|-----|---------|----------|--------|---------------|--------|-----------------------|-------|-------------------------------|---------|
| RMA Environmental Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                       | Page 1                                                                              |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Suite 4 Swallow Court<br>Devonshire Gate<br>Tiverton EX16 7EJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |  |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Date 26/11/2014 17:48<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Designed by mattlangdon<br>Checked by |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Micro Drainage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                       | Source Control 2013.1                                                               |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| <p style="text-align: center;"><u>Greenfield Runoff Volume</u></p> <p style="text-align: center;">FEH Data</p> <table> <tr> <td>Return Period (years)</td> <td>100</td> </tr> <tr> <td>Storm Duration (mins)</td> <td>360</td> </tr> <tr> <td>Site Location</td> <td>GB 501500 104250 TQ 01500 04250</td> </tr> <tr> <td>C (1km)</td> <td>-0.027</td> </tr> <tr> <td>D1 (1km)</td> <td>0.390</td> </tr> <tr> <td>D2 (1km)</td> <td>0.280</td> </tr> <tr> <td>D3 (1km)</td> <td>0.399</td> </tr> <tr> <td>E (1km)</td> <td>0.314</td> </tr> <tr> <td>F (1km)</td> <td>2.331</td> </tr> <tr> <td>Areal Reduction Factor</td> <td>1.00</td> </tr> <tr> <td>Area (ha)</td> <td>5.200</td> </tr> <tr> <td>SAAR (mm)</td> <td>824</td> </tr> <tr> <td>CWI</td> <td>118.503</td> </tr> <tr> <td>SPR Host</td> <td>16.440</td> </tr> <tr> <td>URBEXT (USER)</td> <td>0.0001</td> </tr> </table> <p style="text-align: center;">Results</p> <table> <tr> <td>Percentage Runoff (%)</td> <td>19.71</td> </tr> <tr> <td>Greenfield Runoff Volume (m³)</td> <td>719.645</td> </tr> </table> |                                       |                                                                                     | Return Period (years) | 100 | Storm Duration (mins) | 360 | Site Location | GB 501500 104250 TQ 01500 04250 | C (1km) | -0.027 | D1 (1km) | 0.390 | D2 (1km) | 0.280 | D3 (1km) | 0.399 | E (1km) | 0.314 | F (1km) | 2.331 | Areal Reduction Factor | 1.00 | Area (ha) | 5.200 | SAAR (mm) | 824 | CWI | 118.503 | SPR Host | 16.440 | URBEXT (USER) | 0.0001 | Percentage Runoff (%) | 19.71 | Greenfield Runoff Volume (m³) | 719.645 |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 100                                   |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Storm Duration (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 360                                   |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Site Location                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | GB 501500 104250 TQ 01500 04250       |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| C (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -0.027                                |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D1 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.390                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D2 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.280                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| D3 (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.399                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| E (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.314                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| F (1km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2.331                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Areal Reduction Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.00                                  |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Area (ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5.200                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| SAAR (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 824                                   |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| CWI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 118.503                               |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| SPR Host                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 16.440                                |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| URBEXT (USER)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.0001                                |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Percentage Runoff (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 19.71                                 |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| Greenfield Runoff Volume (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 719.645                               |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |
| ©1982-2012 Micro Drainage Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                       |                                                                                     |                       |     |                       |     |               |                                 |         |        |          |       |          |       |          |       |         |       |         |       |                        |      |           |       |           |     |     |         |          |        |               |        |                       |       |                               |         |