

## **TECHNICAL NOTE**

### **Drainage Calculations**

#### **Dappers Lane, Angmering**

#### **1.0 Introduction**

- 1.1 Lanmor Consulting Ltd has been appointed by CountyOak Homes Ltd to prepare drainage calculations for the proposed development at Dappers Lane, Angmering, West Sussex, BN16 4EN. The development proposals include for the construction of 6 new residential dwellings comprising of different tenure, with the existing house to be retained. A new access road is to be constructed along with a new parking area for the existing house.

#### **2.0 Existing Site Conditions**

- 2.1 The application site is approximately 0.61 ha in size and is currently occupied by a detached residential dwelling, along with open grassland for horses and small stables. The site is located on the edge of a primarily residential area, with the addition of an industrial area to the east and further grassland beyond. Figure 2.1 below shows the location of the site.

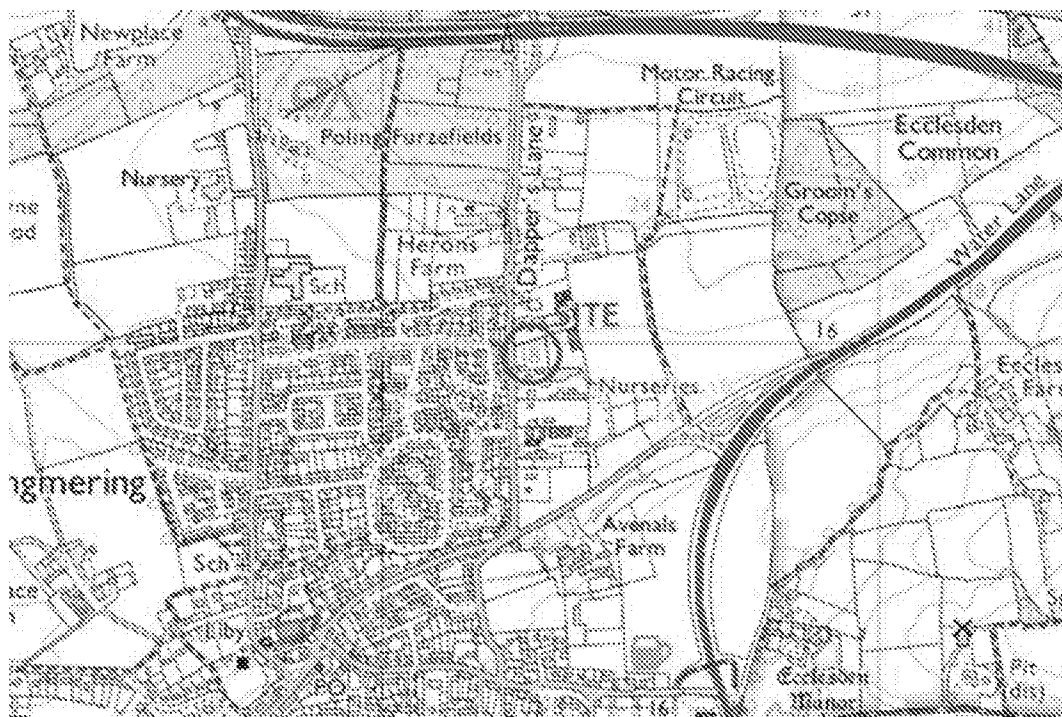


**Figure 2.1 – Location Plan**

- 2.2 The British Geological Survey records for the site indicate that the bedrock is underlain by London Clay Formation, containing clay, silt and sand. This sedimentary bedrock formed approximately 48 to 56 million years ago in the Palaeogene Period. Superficial deposits have also been recorded as consisting of clay, silt, sand and gravel.
- 2.3 A site investigation was undertaken on the 4<sup>th</sup> December 2018, conducted by Constructive Evaluation Limited, with the purpose being to establish the highest annual groundwater levels, calculate infiltration rates and determine more accurate records of geology.
- 2.4 As part of the investigation, 3 no. windowless sample boreholes (WS1, WS2 and WS3) were completed to a maximum depth of 2.50mbgl. Furthermore, 1 no. machine excavated trial pit (TP1) was completed to allow for a soakaway infiltration test. The trial pit was undertaken in accordance with BRE365. The following strata conditions were encountered in Table 2.1 below.

| Stratum                  | Depth Range Encountered                 | Strata Description                                                                                                                          |
|--------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Topsoil                  | Ground level to max 0.20m               | Dark brown slightly sandy Silt with abundant roots and rootlets, and occasional gravels of flint                                            |
| Made Ground              | Exclusive to TP1 from 0.15m to 0.30mbgl | Brown silty slightly gravelly Clay, with gravels of flint and rarely concrete. Abundant roots and rootlets were also recorded               |
| Silty CLAY / Clayey SILT | 0.15m to 0.75mbgl                       | Soft to firm dark brown sometimes brown mottled silty CLAY / clayey SILT, with abundant roots and rootlets, and occasional gravels of flint |
| Head Deposit             | 0.30m to 2.00mbgl                       | Predominantly dense light brown and light grey slightly silty slightly sandy GRAVEL of flint, with rare cobbles and boulders of flint       |
| London Clay              | Exclusive to WS2 from 1.60m to 2.50mbgl | Firm to stiff brown mottled grey silty CLAY, with occasional gravels of flint and rare rootlets                                             |

**Table 2.1 – Strata Conditions**

### 3.0 Existing Drainage

- 3.1 Southern Water asset records were acquired as part of the drainage investigation. The records show that there is no existing drainage network along Dappers Lane for either surface water or foul water. A copy of the Southern Water asset mapping is provided in Appendix A.

### 4.0 Proposed Drainage

#### Foul Water

- 4.1 A new network of foul pipes and manholes are to be installed on site to serve the proposed development. This network will connect to a Klargester BioFicient 6 Domestic facility, before discharging to the existing culvert located along the western boundary of the site.

- 4.2 The culvert is present due to a ditch which runs along the western boundary of the site, adjacent to Dappers Lane. Therefore, the discharge to the culvert will be subject to the approval of the local drainage authority and an Environmental Permit from the EA.

### Surface Water

- 4.3 With regards to discharge of surface water runoff from the development, the SuDS hierarchy has been considered when designing the drainage strategy for the site. As the proposed dwellings will incorporate sloping roofs, the use of green roofs will not be possible.
- 4.4 Rainwater harvesting was also considered to reuse surface water runoff within the dwellings. These systems require a separate network of pipework within the property, tanks and pumps to store the rainwater and distribute it throughout. To implement a rainwater harvesting systems on the site was considered impractical and also an excessive cost for the development.
- 4.5 In addition, for these systems to be successfully implemented there must be sufficient demand for water reuse otherwise this may lead to water quality issues. Furthermore, rainwater harvesting tanks should not be included in the assessment of attenuation required to store runoff from a development as there is no guarantee that the tank will be sufficiently empty to receive another storm.
- 4.6 Should the rainwater harvesting tank be full at the start of the storm, it will not be able to receive any more runoff, therefore additional storage of a similar size would be required to cater for all storm events and the rainwater harvesting tank will provide no benefit in terms of attenuation. For those reasons, and the excessive cost of providing the system, this method has been discounted.
- 4.7 A site investigation was undertaken, as mentioned previously, which provided information regarding infiltration rates. The results can be found below in Table 4.1.

| Test Hole ID | Test | PI Depth (m) | Time at 25% (min) | Time at 75% (min) | Permeability Coefficient (m/s) | Drainage Condition |
|--------------|------|--------------|-------------------|-------------------|--------------------------------|--------------------|
| TP1          | 1    | 0.90         | 0.35              | 1.90              | $8.96 \times 10^{-4}$          | Good               |
|              | 2    | 0.90         | 1.10              | 3.20              | $5.50 \times 10^{-4}$          | Good               |
|              | 3    | 0.90         | 0.80              | 2.70              | $5.13 \times 10^{-4}$          | Good               |

**Table 4.1 – Infiltration results**

- 4.8 The results found the ground to have good drainage conditions and that it would be possible to implement infiltration techniques into the proposed drainage strategy for surface water run-off. Therefore, the proposed drainage regime for surface water run-off will implement the use of permeable paving for all driveways. Runoff from the roofs will drain to the sub-base of either the paving or patios, whilst the new access road will adopt the use of a filter drain to discharge surface water to ground.

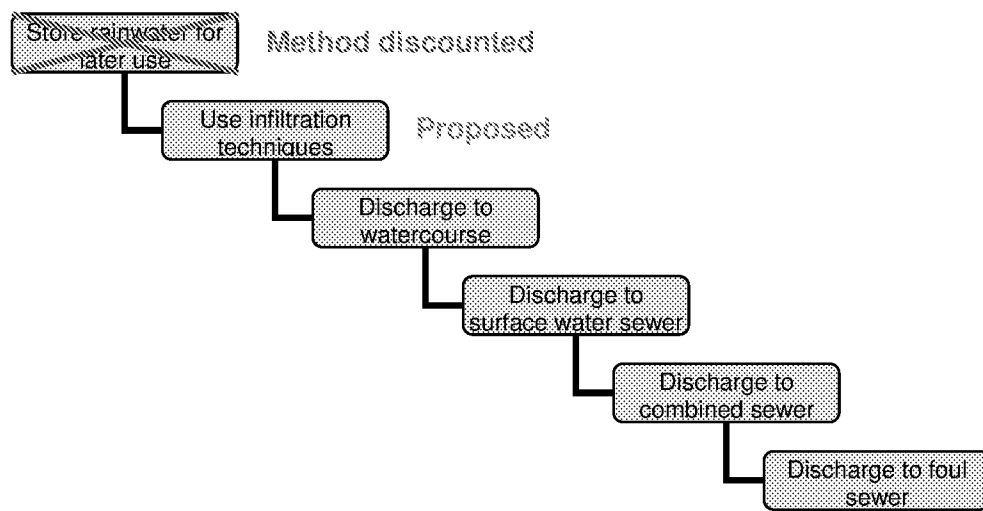


Figure 6.1 – SuDS Hierarchy

- 4.9 As mentioned, the use of infiltration techniques has been implemented into the design for discharging the surface water run-off. For both the proposed permeable paving areas and the filter drain, the infiltration rate of  $5.13 \times 10^{-4}$  m/s (1.8468 m/h) has been used. To ensure no flooding occurs on site, MicroDrainage calculations have been produced for the 1 in 100 year return period plus 40% climate change.

- 4.10 MicroDrainage calculations for both the driveways, patios and the filter drain can be found in Appendix C of this report. The maximum depth of water in the driveways is 182mm in the 225mm sub-base, and in the patios is 61mm in the 150mm sub-base. The water level rises above the top of Filter Drain 2 by 46mm but does not cause flooding.

## 5.0 Surface Water Drainage Maintenance

- 5.1 Regularly inspecting the surface water drainage network for blockages and clearing unwanted debris / silt from the system should improve the performance of the surface water network and decrease the need for future repairs. In the event that road gullies become blocked, high pressure water jets can be used to clear the gully and ensure they are functioning correctly, this should be undertaken by certified trained professionals.

- 5.2 The level and frequency of maintenance required on site is dependent on the type of facility. The type of maintenance will fall into one of three categories “regular maintenance”, “occasional maintenance” and “remedial maintenance”. Regular maintenance of the drainage and SuDS features will include, inspections, removal of litter / debris and sweeping of the surfaces. Occasional maintenance will include removal of sediment etc. and remedial maintenance may include structural repairs and infiltration reconditioning if required.
- 5.3 The drainage and SuDS elements, after an initial inspection following construction, should be inspected on a monthly basis for the first 12 months and after large storms, thereafter the following maintenance regime should be applied and adjusted if the 12 month monitoring process has identified any issues. For specialist pieces of equipment such as the treatment plant, maintenance brochures will be provided by the manufacturers. These will set out the frequency of inspections and correct methods of cleaning etc. that should be followed. It is recommended that once installed the facility should be inspected monthly for the first three months and thereafter at six monthly intervals or as advised in the maintenance brochure.
- 5.4 The foul and surface water drainage, including the treatment plant and SuDS will remain private under the ownership of a management company, who will also be responsible for all communal areas of the site including the access road. It will be their responsibility to maintain the foul and surface water drainage in accordance with these recommendations.
- 5.5 For Permeable Paving Areas, the following maintenance is recommended:

| <b>Permeable Paving Maintenance Schedule</b> |                                                                                                                       |                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              | Required Action                                                                                                       | Typical Frequency                                                                                                                                                                                                                                                                                                              |
| Regular maintenance                          | Brushing and vacuuming (standard cosmetic sweep over whole surface)                                                   | Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer’s recommendations – pay particular attention to areas where water runs onto pervious surfaces from adjacent impermeable areas as this area is most likely to collect the most sediment. |
| Occasional maintenance                       | Stabilise and mow contributing and adjacent areas                                                                     | As required                                                                                                                                                                                                                                                                                                                    |
|                                              | Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying | As required- once per year on less frequently used pavements                                                                                                                                                                                                                                                                   |

|                  |                                                                                                                                                                                      |                                                                                                          |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Remedial Actions | Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving                                             | As required                                                                                              |
|                  | Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material | As required                                                                                              |
|                  | Rehabilitation of surface and upper substructure by remedial sweeping                                                                                                                | Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging) |
| Monitoring       | Inspect for evidence of poor operation and/or weed growth - if required, take remedial action.                                                                                       | Three-monthly, 48 hours after large storms in the first six months                                       |
|                  | Inspect silt accumulation rates and establish appropriate brushing frequencies                                                                                                       | Annually                                                                                                 |
|                  | Monitor inspection chambers                                                                                                                                                          | Annually                                                                                                 |

5.6 For the filter drain, the following maintenance is recommended:

| Filter Drain Maintenance Schedule |                                                                                                                                          |                             |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
|                                   | Required Action                                                                                                                          | Typical Frequency           |
| Regular maintenance               | Remove litter and debris from filter drain surface, access chambers and pre-treatment devices.                                           | Monthly                     |
|                                   | Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage.   | Monthly                     |
|                                   | Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies. | Six Monthly                 |
|                                   | Remove Sediment from pre-treatment devices                                                                                               | As required                 |
| Occasional maintenance            | Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods.                        | As required                 |
|                                   | At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium.              | Five yearly, or as required |
|                                   | Clear perforated pipework of blockages.                                                                                                  |                             |

## Replacement at end of Design Life

- 5.7 Both the permeable paving and the filter drain use a granular material to store the runoff while allowing it to drain into the ground below. For the driveways and part of the filter drain this is then covered by the road construction. As part of the ongoing maintenance this material will be inspected to determine if it is still functioning as intended. At the end of the manufactures recommended design life the material will be assessed to determine if it needs replacing.
- 5.8 When it does need replacing, for the driveways this will mean the full reconstruction of the pavement. Given that the design life of the pavement is expected to be beyond 25 years it is likely that the surfacing will also require replacement in this timescale. Therefore, the remedial works will provide a completely new pavement structure restoring the permeability and the aesthetics of the driveway.
- 5.9 For the filter drain that is adjacent to the turning head, the gravel material can simply be excavated and replaced. Care will need to be taken not to damage the access manholes or surrounding structures, and the permeable pipe should be relayed at the same level.
- 5.10 For the filter drain under the access road this will require a trench slot to be excavated through the pavement construction which will need to be reinstated following the renewal of the gravel material as per the above.

## Maintenance of Ditch and Culvert

- 5.11 There is an existing watercourse passing along the boundary between the site and Dappers Lane which has been culverted under the existing access into the site. The ditch and the culvert will be in the ownership and responsibility of the maintenance company. The following maintenance regime is recommended for the ditch.

| <b>Ditch Maintenance Schedule</b> |                                                                  |                                                 |
|-----------------------------------|------------------------------------------------------------------|-------------------------------------------------|
|                                   | Required Action                                                  | Typical Frequency                               |
| Regular maintenance               | Remove letter and debris                                         | Monthly, or as required                         |
|                                   | Cut grass – to retain grass height within specified design range | Monthly (during growing season), or as required |

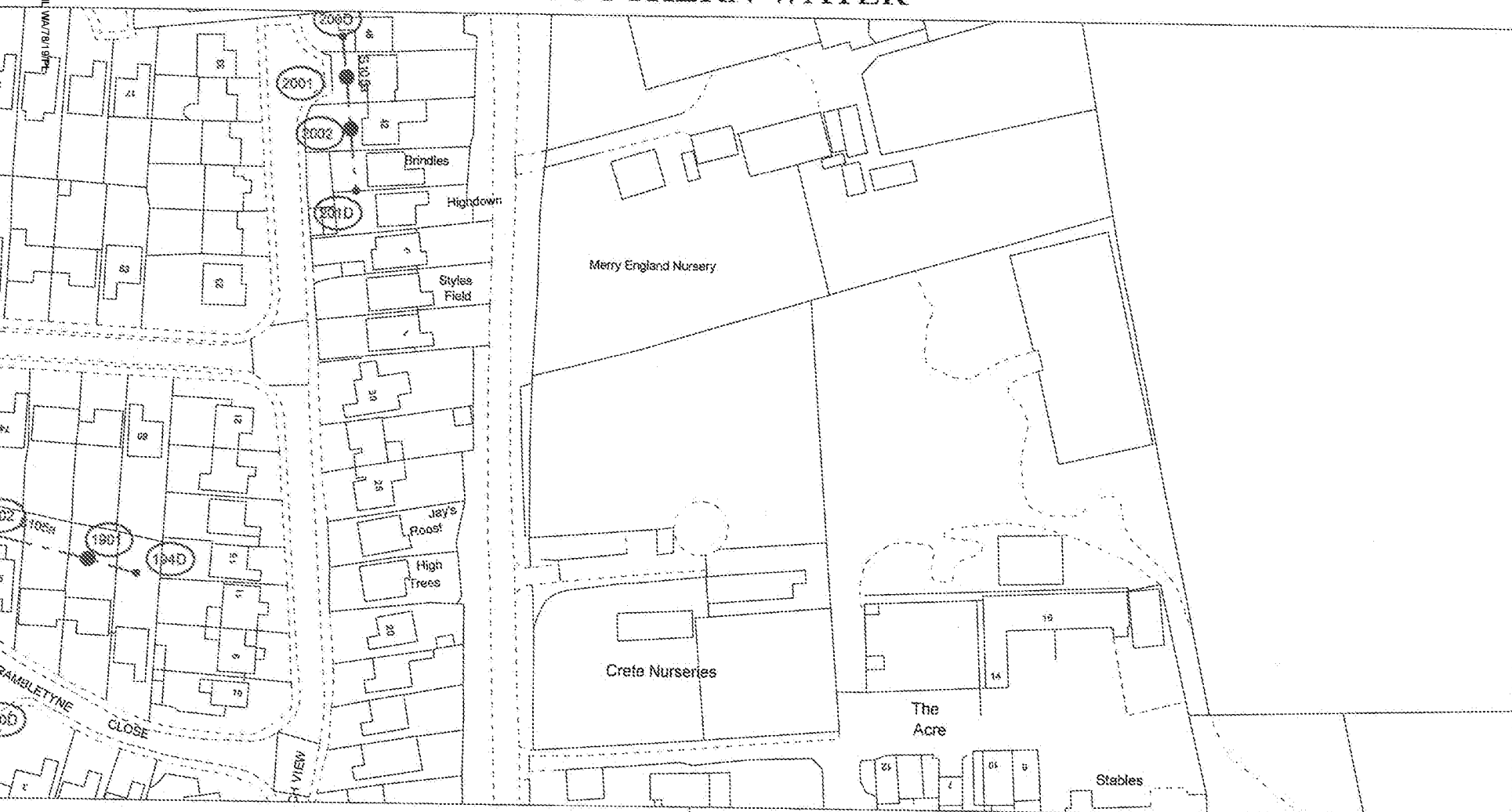
|                        |                                                                                                                              |                                                               |
|------------------------|------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
|                        | Manage other vegetation and remove nuisance plants                                                                           | Monthly at start, then as required                            |
|                        | Inspect inlets, outlets and overflows for blockages, and clear if required                                                   | Monthly                                                       |
|                        | Inspect infiltration surface for ponding, compaction, silt accumulation, records areas where water is ponding for > 48 hours | Monthly, or when required                                     |
|                        | Inspect vegetation coverage                                                                                                  | Monthly for 6 months, quarterly for 2 years, then half yearly |
|                        | Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies                    | Half yearly                                                   |
| Occasional maintenance | Reseed areas of poor vegetation growth, alter plant types to better suit conditions if required                              | As required                                                   |

- 5.12 A CCTV survey of the culvert is required prior to construction to confirm the exact route and depth of the pipe. Following construction another survey should be completed to ensure the pipe is clear of any debris that might have entered during the construction phase.
- 5.13 Following completion, it is recommended that a visual inspection of the pipe and the area around it is undertaken annually, or as required. In addition, every 10 years a detailed inspection of the pipe via CCTV camera to determine if any remedial works are required.

## **APPENDIX A**

### Southern Water Asset Mapping

# SOUTHERN WATER



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

Ordnance Survey Digital Data with the permission of the controller of  
Crown Copyright Reserved Licence No. W13 298330

EF: TQ0704NW

Scale: 1:1250

r Plot

ING: BAC pipes are constructed of Bonded Asbestos Cement

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



Printed By: SB

Date: 26-3-2019

Creta Nursery Dappers Lane

Requested By:

## **APPENDIX B**

### Soil Investigation



Date: 04/04/2019  
Our Ref: 18.1157

Crete Nurseries,  
Dappers Lane,  
Angmering,  
West Sussex,  
BN16 4EN

Dear Ms. Frampton, on behalf of Country Oak Homes Ltd

**RE: Winter Groundwater Monitoring and Soil Infiltration Rates at Crete Nurseries**

**Introduction**

I write further to the completion of soakaway/soil infiltration testing and winter groundwater monitoring carried out at Crete Nurseries, Dappers Lane, Angmering, West Sussex, BN16 4EN (hereafter referred to as the 'site'), as instructed by yourself, and Country Oak Homes Ltd – the client (EQ12972, September 2018).

This letter report provides copies of the test data, observations made during works and stratigraphic logs.

The site currently comprises a two-storey residential dwelling with front and rear garden, together with horse stables with an associated paddock and training ground. The entire site area is approximately 0.58Ha. Access can be afforded via a private driveway directly off from Dappers Lane.

The area highlighted for the investigation specifically includes the horse paddock making up approximately 0.29Ha. The paddock is entirely laid to soft-standing as turfed grass.

**Scope**

The scope of works were undertaken in respect of Condition 9.0 within the associated planning application (Ref: A/178/17/OUT), and after correspondence between Constructive Evaluation Ltd and the Client.

The purposes of this investigation were to establish highest annual groundwater levels as well as to calculate infiltration rate values in order to ascertain drainage characteristics of the underlying soils for soakaway design.

### **Fieldworks**

The following site works were completed over a single day operation on 4<sup>th</sup> December 2018, supervised by an Engineer from CE. The investigation was undertaken in relation to statutory guidance BS5930: 1999 *Code of Practice for Site Investigations (Amendment 3: 2015)*, and in general accordance with BRE365; approved methods by ADC (Arun District Council). A site plan with indicative locations of the tests is enclosed.

- Prior to excavations taking place a Cable Avoidance Tool (CAT) was used to check for the position of any underlying electrical services; accessible manhole covers were lifted to confirm the direction of underlying drainage.
- 3no. windowless sample boreholes (WS1, WS2 and WS3) were completed through the base of their respective starter trial pits, to a maximum depth of 2.50mbgl (metres below ground level), using a tracked dynamic sampling rig. On completion all three boreholes were installed with groundwater monitoring wells, constructed with 50mm diameter HDPE plain and slotted pipe. A filter pack of washed gravel was placed in each well annulus to approximately just above the screen section, and the annulus sealed with bentonite. The monitoring wells were finished with a secure raised steel barrel cover.
- 1no. machine excavated trial pit (TP1) was completed to allow for a soakaway infiltration test, in accordance with BRE365, to provide information for soakaway design. The pit was excavated using an 8 tonne excavator to a depth of approximately 0.90mbgl, with dimensions approximately consistent from top to bottom. Following which the pit was rapidly filled with potable water. Measurements were taken to monitor the drop in water level over time. On completion the trial pit was backfilled with arisings and reinstated at the surface (as best as practically possible) in respect of existing conditions.
- All intrusive locations were logged and any visual or olfactory evidence of contamination noted in accordance with current protocol.
- Following installation, monitoring wells were developed on 12<sup>th</sup> December 2018 using either disposable bailers. Development enabled the removal of materials that may have entered the well during drilling and installation. Additionally, the development allows settlement of the gravel surround and ensures free flow of liquids through the well screen. Development continued until at least three well volumes had been removed.

A site plan indicating intrusive positions is enclosed.

### **Ground Conditions**

The following strata conditions were encountered during both stages of works:

| Stratum                  | Depth Range Encountered                 | Detail Description                                                                                                                          |
|--------------------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Topsoil                  | Ground level to max 0.20m               | Dark brown slightly sandy Silt with abundant roots and rootlets, and occasional gravels of flint                                            |
| Made Ground              | Exclusive to TP1 from 0.15m to 0.30mbgl | Brown silty slightly gravelly Clay, with gravels of flint and rarely concrete. Abundant roots and rootlets were also recorded               |
| Silty CLAY / Clayey SILT | 0.15m to 0.75mbgl                       | Soft to firm dark brown sometimes brown mottled silty CLAY / clayey SILT, with abundant roots and rootlets, and occasional gravels of flint |
| Head Deposit             | 0.30m to 2.00mbgl                       | Predominantly dense light brown and light grey slightly silty slightly sandy GRAVEL of flint, with rare cobbles and boulders of flint       |
| London Clay              | Exclusive to WS2 from 1.60m to 2.50mbgl | Firm to stiff brown mottled grey silty CLAY, with occasional gravels of flint and rare rootlets                                             |

During intrusive works groundwater was encountered ranging depths of 0.50m to 1.80mbgl, and shallowest within WS3. A winter groundwater monitoring regime was completed cooperatively by CE and the client over the winter of 2018-2019. This is detailed in subsequent report sections. Other than the anthropogenic material recorded within the Made Ground soils, no other visual and olfactory evidence of contamination was encountered.

### **Groundwater Monitoring**

A total of 25no groundwater gauging rounds were completed within the winter period of October to March, the first reading being taken upon installation of standpipes on 10<sup>th</sup> December 2018, and the last on the 29<sup>th</sup> March 2019. Readings were taken monthly from December to January, then approximately twice per week between January and March. All gauge rounds involved the dipping of wells with an interceptor probe.

In general, groundwater levels in all locations were found to slightly decline between December and mid-January (from 0.66-1.61mbgl to 0.89-1.67mbgl), then rise relatively rapidly until early February (0.43-1.48mbgl). Levels were noted to relatively rapidly decline again until the end of February (0.94-1.68mbgl). At the beginning of March, levels were seen to steeply rise once more for the first week (up to 0.67-1.51mbgl), then remain relatively consistent until mid-March, before gradually declining to levels akin to those observed at the end of February (1.04-1.69mbgl).

Highest (shallowest) groundwater levels were almost ubiquitously observed in standpipe WS3 (north east corner of site), with a minimum depth recorded as 0.43mbgl on 10<sup>th</sup> February 2019.

Levels in WS2 (north west corner of site) were recorded as generally 0.20-0.40m lower than those in WS3, and recorded the lowest (deepest) groundwater level in the northern section of the site as 1.13mbgl on 20<sup>th</sup> January 2019.

Lowest (deepest) groundwater depths were consistently recorded within WS1 (south west corner of site), with a minimum of 1.48mbgl on 7<sup>th</sup> – 10<sup>th</sup> February 2019 and maximum of 1.69mbgl on 27<sup>th</sup> – 29<sup>th</sup> March 2019.

There is a drainage ditch noted running along the western boundary of the site; this considered likely to have an influence on groundwater levels across the site, and may explain shallowest groundwater depths having been recorded in the north east of the site (WS3).

### **Soil Infiltration Testing**

Infiltration testing in general accordance with BRE 365 was conducted in location TP1, the test comprised the excavation of the trial pit to a depth of 0.90mbgl, the squaring of the excavation sides and the subsequent rapid filling of the pits using potable water. The subsequent fall in water level within each pit was monitored over a nominal period. The soil infiltration rate is calculated by the rate of outflow from 75% to 25% effective fill depth. The table below summarises the results.

| Trial Hole ID | Test | Pit Depth (m) | Time at 75% (mins) | Time at 25% (mins) | Permeability Coefficient (m/s) | Drainage Conditions |
|---------------|------|---------------|--------------------|--------------------|--------------------------------|---------------------|
| TP1           | 1    | 0.90          | 0.35               | 1.90               | $8.96 \times 10^{-4}$          | Good                |
|               | 2    | 0.90          | 1.10               | 3.20               | $5.50 \times 10^{-4}$          | Good                |
|               | 3    | 0.90          | 0.80               | 2.70               | $5.13 \times 10^{-4}$          | Good                |

The infiltration results calculated from the tests completed indicate an initial rate of  $8.96 \times 10^{-4}$  m/s. During subsequent second and third tests (saturated conditions), rates of  $5.50 \times 10^{-4}$  m/s to  $5.13 \times 10^{-4}$  m/s are calculated. The results calculated correspond to low end of 'good' drainage conditions, or alternatively clean sands and gravel mixtures (Ref: Soil Mechanics in Engineering practice by Karl Terzaghi, Ralph B. Peck and Gholamreza Mesri; Table 14.1 Permeability and drainage characteristics of soils (after casagrande and Fadum 1940)).

I trust the above information is sufficient for your requirements in this matter, should you have any queries please do not hesitate to contact the undersigned.

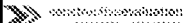
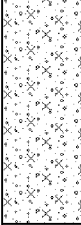
Kind regards,  
Spencer Robinson BSc

**Graduate Geo-Environmental Scientist**

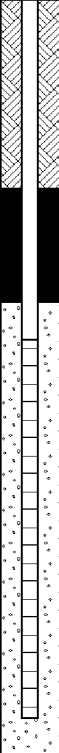
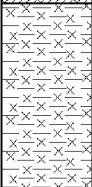
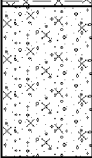
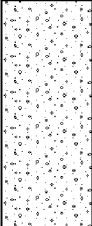
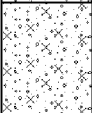
**Constructive Evaluation Limited**

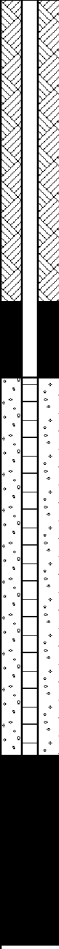
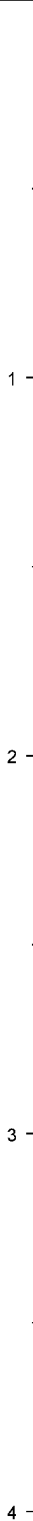
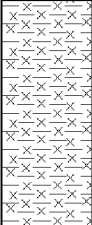
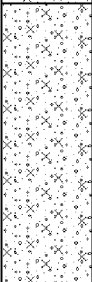
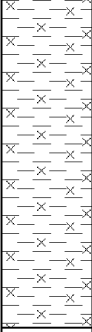
Enclosed:      Site Plan  
                    Groundwater Gauging Results  
                    Infiltration Testing Records  
                    Soil Logs

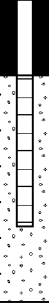
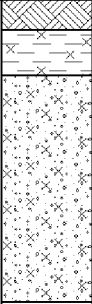
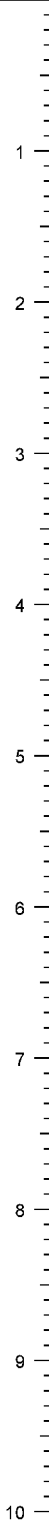


|  |                             |      |         | <h1 style="text-align: center;">Trial Pit Log</h1> |              |                                                                                   | Trialpit No<br><b>TP1</b><br>Sheet 1 of 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |  |
|-----------------------------------------------------------------------------------|-----------------------------|------|---------|----------------------------------------------------|--------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--|
| Project Name: Crete Nurseries                                                     |                             |      |         | Project No.<br>18.1157                             |              | Co-ords: -<br>Level:                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Date<br>04/12/2018 |  |
| Location: Dappers Lane, Angmering, BN16 4EN                                       |                             |      |         |                                                    |              | Dimensions (m):                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Scale<br>1:20      |  |
| Client: Mrs Claire Frampton / Country Oak Homes Ltd                               |                             |      |         |                                                    |              | Depth<br>0.90                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Logged<br>RG       |  |
| Water<br>Strike                                                                   | Samples and In Situ Testing |      |         | Depth<br>(m)                                       | Level<br>(m) | Legend                                                                            | Stratum Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |  |
|                                                                                   | Depth                       | Type | Results |                                                    |              |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |  |
|                                                                                   | 0.40                        | B    |         | 0.15                                               |              |  | <p>Turfed grass over TOPSOIL: Dark brown slightly sandy Silt. Sand is fine and medium. Abundant roots and rootlets. Occasional sub-angular and sub-rounded fine and medium Gravel of flint.</p> <p>MADE GROUND: Brown silty slightly gravelly Clay. Gravel is sub-angular to rounded fine and medium flint. Abundant roots and rootlets. Rare angular to sub-rounded medium Gravel of concrete.</p> <p>Light brown speckled light grey slightly silty slightly sandy angular to sub-rounded fine to coarse GRAVEL of flint. Sand is fine to coarse. Occasional cobbles of flint. Rare boulders of flint. (HEAD DEPOSIT).</p> |                    |  |
|                                                                                   |                             |      |         | 0.30                                               |              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |  |
|                                                                                   |                             |      |         | 0.90                                               |              |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |  |
|                                                                                   |                             |      |         |                                                    |              |                                                                                   | End of pit at 0.90 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |  |
| Remarks: CAT scanned prior to excavation. Groundwater not encountered.            |                             |      |         |                                                    |              |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |  |
| Stability: Somewhat unstable from 0.30m to 0.90mbgl.                              |                             |      |         |                                                    |              |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |  |



|  <b>constructiveevaluation</b><br><small>site investigation • building pathology</small>                                                                         |               |                            |                        | <h1 style="text-align: center;">Borehole Log</h1> |           |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                            | Borehole No.<br><b>WS1</b><br>Sheet 1 of 1 |                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------|------------------------|---------------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------|
| Project Name:      Crete Nurseries                                                                                                                                                                                                               |               |                            |                        | Project No.<br>18.1157                            |           | Co-ords:                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                            | Hole Type<br>WLS                           |                                                                                       |
| Location:              Dappers Lane, Angmering, BN16 4EN                                                                                                                                                                                         |               |                            |                        | Level:                                            |           | Scale<br>1:20                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                            |                                            |                                                                                       |
| Client:                  Mrs Claire Frampton / Country Oak Homes Ltd                                                                                                                                                                             |               |                            |                        | Dates:                  04/12/2018                |           | Logged By<br>RG                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                            |                                            |                                                                                       |
| Well                                                                                                                                                                                                                                             | Water Strikes | Sample and In Situ Testing |                        |                                                   | Depth (m) | Level (m AOD)                                                                                                                                                                                                                                        | Legend                                                                                                                                                                                                                                                     | Stratum Description                        |                                                                                       |
|                                                                                                                                                                                                                                                  |               | Depth (m)                  | Type                   | Results                                           |           |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                            |                                            |                                                                                       |
|                                                                                                                                                                |               |                            |                        |                                                   | 0.20      |                                                                                                                                                                                                                                                      |  Turfed grass over TOPSOIL: Dark brown slightly sandy Silt. Sand is fine and medium. Abundant roots and rootlets.                                                         |                                            |                                                                                       |
|                                                                                                                                                                                                                                                  |               |                            |                        |                                                   | 0.70      |                                                                                                                                                                                                                                                      |  Soft to firm dark brown and brown mottled silty CLAY / clayey SILT. Abundant roots and rootlets. Occasional sub-angular and sub-rounded fine and medium Gravel of flint. |                                            |                                                                                       |
|                                                                                                                                                                                                                                                  | 1.00<br>1.00  | D<br>SPT                   | N=32 (8,7/9,9,6,8)     | 1.10                                              |           |  Dense light brown speckled light grey slightly silty slightly sandy angular to sub-rounded fine to coarse GRAVEL of flint. Sand is fine to coarse. (HEAD DEPOSIT). | 1                                                                                                                                                                                                                                                          |                                            |                                                                                       |
|                                                                                                                                                                                                                                                  |               |                            |                        | 1.70                                              |           |  Dense light grey sandy angular to sub-rounded fine to coarse GRAVEL of flint. Sand is medium and coarse. (HEAD DEPOSIT).                                          |                                                                                                                                                                                                                                                            |                                            |                                                                                       |
|                                                                                                                                                                                                                                                  | 2.00<br>2.00  | D<br>SPT                   | N=45 (7,9/11,11,11,12) | 2.00                                              |           |  Dense brown silty slightly sandy angular to sub-rounded fine to coarse GRAVEL of flint. Sand is fine to coarse. Locally clayey. (HEAD DEPOSIT).                  | 2                                                                                                                                                                                                                                                          |                                            |                                                                                       |
|                                                                                                                                                                                                                                                  |               |                            |                        |                                                   |           |                                                                                                                                                                                                                                                      | End of Borehole at 2.000m                                                                                                                                                                                                                                  |                                            | 3                                                                                     |
|                                                                                                                                                                                                                                                  |               |                            |                        |                                                   |           |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                            |                                            | 4                                                                                     |
| Remarks<br>CAT scanned prior to excavation. Buried service clearance pit hand-dug to ~1.00mbgl. Borehole advanced using a tracked dynamic windowless drilling rig. Groundwater strike at 1.80m, rising to 1.70mbgl after a period of 20 minutes. |               |                            |                        |                                                   |           |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                            |                                            |  |

|  <b>constructiveevaluation</b><br><small>site investigation • building pathology</small>                            |               |                            |      | <h1 style="text-align: center;">Borehole Log</h1> |           |                 |                                                                                                                                                                                                                                            | Borehole No.<br><b>WS2</b><br>Sheet 1 of 1                                           |                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------|------|---------------------------------------------------|-----------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Name:      Crete Nurseries                                                                                                                                                                  |               |                            |      | Project No.<br>18.1157                            |           | Co-ords:        |                                                                                                                                                                                                                                            | Hole Type<br>WLS                                                                     |                                                                                                                                                                                                                                                              |
| Location:              Dappers Lane, Angmering, BN16 4EN                                                                                                                                            |               |                            |      | Level:                                            |           | Scale<br>1:20   |                                                                                                                                                                                                                                            |                                                                                      |                                                                                                                                                                                                                                                              |
| Client:                  Mrs Claire Frampton / Country Oak Homes Ltd                                                                                                                                |               |                            |      | Dates:                  04/12/2018                |           | Logged By<br>RG |                                                                                                                                                                                                                                            |                                                                                      |                                                                                                                                                                                                                                                              |
| Well                                                                                                                                                                                                | Water Strikes | Sample and In Situ Testing |      |                                                   | Depth (m) | Level (m AOD)   | Legend                                                                                                                                                                                                                                     | Stratum Description                                                                  |                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                     |               | Depth (m)                  | Type | Results                                           |           |                 |                                                                                                                                                                                                                                            |                                                                                      |                                                                                                                                                                                                                                                              |
|                                                                                                                   |               |                            |      |                                                   | 0.15      |                 |  Turfed grass over TOPSOIL: Dark brown slightly sandy Silt. Sand is fine and medium. Abundant roots and rootlets.                                         |  |                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                     |               |                            |      |                                                   |           |                 |  Soft to firm brown silty CLAY / clayey SILT. Abundant roots and rootlets to 0.50mbgl. Occasional angular to sub-rounded fine and medium Gravel of flint. |                                                                                      |                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                     |               | 0.50                       | D    |                                                   |           | 0.75            |                                                                                                                                                                                                                                            |                                                                                      |  Medium dense light brown speckled light grey slightly silty slightly sandy angular to sub-rounded fine to coarse GRAVEL of flint. Sand is fine to coarse. (HEAD DEPOSIT). |
|                                                                                                                                                                                                     |               | 1.00                       | D    |                                                   |           | 1.50            |                                                                                                                                                                                                                                            |                                                                                      |  Medium dense brown clayey slightly sandy angular to sub-rounded fine to coarse GRAVEL of flint. Sand is fine to coarse.                                                  |
|                                                                                                                                                                                                     |               | 1.00                       | SPT  | N=19 (4,7/6,5,4,4)                                | 1.60      |                 |  Firm to stiff brown mottled grey silty CLAY. Occasional angular medium Gravel of flint. Rare rootlets. (LONDON CLAY FORMATION).                        |                                                                                      |                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                     |               | 1.55                       | D    |                                                   |           | 2.00            |                                                                                                                                                                                                                                            |                                                                                      |                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                     |               | 2.00                       | D    |                                                   |           | 2.50            |                                                                                                                                                                                                                                            |                                                                                      | End of Borehole at 2.500m                                                                                                                                                                                                                                    |
|                                                                                                                                                                                                     |               | 2.00                       | SPT  | N=15 (1,2/3,4,4,4)                                |           |                 |                                                                                                                                                                                                                                            |                                                                                      |                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                     |               |                            |      |                                                   |           |                 |                                                                                                                                                                                                                                            |                                                                                      |                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                     |               |                            |      |                                                   |           |                 |                                                                                                                                                                                                                                            |                                                                                      |                                                                                                                                                                                                                                                              |
| Remarks<br>CAT scanned prior to excavation. Buried service clearance pit hand-dug to ~1.00mbgl. Borehole advanced using a tracked dynamic windowless drilling rig. Groundwater seepage at 0.90mbgl. |               |                            |      |                                                   |           |                 |                                                                                                                                                                                                                                            |                                                                                      |                                                                                                                                                                                                                                                              |
|                                                                                                                |               |                            |      |                                                   |           |                 |                                                                                                                                                                                                                                            |                                                                                      |                                                                                                                                                                                                                                                              |

|  <b>constructiveevaluation</b><br><small>site investigation • building pathology</small>                                                                         |                                                                                   |                            |      | <h1 style="text-align: center;">Borehole Log</h1> |           |                 |                                                                                   | Borehole No.<br><b>WS3</b><br>Sheet 1 of 1                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------|------|---------------------------------------------------|-----------|-----------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Project Name:      Crete Nurseries                                                                                                                                                                                                               |                                                                                   |                            |      | Project No.<br>18.1157                            |           | Co-ords:        |                                                                                   | Hole Type<br>WLS                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                      |
| Location:              Dappers Lane, Angmering, BN16 4EN                                                                                                                                                                                         |                                                                                   |                            |      | Level:                                            |           | Scale<br>1:50   |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
| Client:                  Mrs Claire Frampton / Country Oak Homes Ltd                                                                                                                                                                             |                                                                                   |                            |      | Dates:                  04/12/2018                |           | Logged By<br>RG |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
| Well                                                                                                                                                                                                                                             | Water Strikes                                                                     | Sample and In Situ Testing |      |                                                   | Depth (m) | Level (m AOD)   | Legend                                                                            | Stratum Description                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                      |
|                                                                                                                                                                                                                                                  |                                                                                   | Depth (m)                  | Type | Results                                           |           |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
|                                                                                                                                                                 |  |                            |      |                                                   | 0.20      |                 |  | Turfed grass over TOPSOIL: Dark brown slightly sandy Silt. Sand is fine and medium. Abundant roots and rootlets. Occasional sub-angular and sub-rounded fine and medium Gravel of flint.<br>Firm dark brown silty CLAY. Abundant roots and rootlets.<br>Dense to very dense light brown speckled light grey slightly silty slightly sandy angular to sub-rounded fine to coarse GRAVEL of flint. Sand is fine to coarse. (HEAD DEPOSIT). |  |
|                                                                                                                                                                                                                                                  |                                                                                   |                            |      |                                                   | 0.50      |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
|                                                                                                                                                                                                                                                  |                                                                                   | 1.00                       | D    | N=50 (2,9/50 for 260mm)                           |           |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
|                                                                                                                                                                                                                                                  |                                                                                   | 1.00                       | SPT  |                                                   |           |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
|                                                                                                                                                                                                                                                  |                                                                                   | 1.50                       | D    |                                                   |           |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
|                                                                                                                                                                                                                                                  |                                                                                   | 2.00                       | D    | N=37 (1,4/8,7,9,13)                               | 2.00      |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
|                                                                                                                                                                                                                                                  |                                                                                   | 2.00                       | SPT  |                                                   |           |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
| End of Borehole at 2.000m                                                                                                                                                                                                                        |                                                                                   |                            |      |                                                   |           |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
| Remarks<br>CAT scanned prior to excavation. Buried service clearance pit hand-dug to ~1.00mbgl. Borehole advanced using a tracked dynamic windowless drilling rig. Groundwater strike at 0.80m, rising to 0.50mbgl after a period of 20 minutes. |                                                                                   |                            |      |                                                   |           |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |
|                                                                                                                                                             |                                                                                   |                            |      |                                                   |           |                 |                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                      |

## **APPENDIX C**

### MicroDrainage Calculations

|                                                                  |                                  |                                                                                     |
|------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| Lanmor Consulting Ltd                                            |                                  | Page 1                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File Cascade.casx                              | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Cascade Summary of Results for FILTER DRAIN 1.srcx

**Upstream    Outflow To    Overflow To**  
**Structures**  
 (None)                      (None) FILTER DRAIN 2.srcx

Half Drain Time : 7 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Overflow<br>(l/s) | Max<br>Σ Outflow<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|--------------------------|---------------------------|-----------------------|------------|
| 15 min Summer    | 10.704              | 0.924               | 4.4                          | 6.6                      | 11.0                      | 2.0                   | Flood Risk |
| 30 min Summer    | 10.691              | 0.911               | 4.3                          | 6.1                      | 10.4                      | 2.0                   | Flood Risk |
| 60 min Summer    | 10.659              | 0.879               | 4.2                          | 4.1                      | 8.3                       | 1.9                   | O K        |
| 120 min Summer   | 10.582              | 0.802               | 3.9                          | 0.4                      | 4.3                       | 1.8                   | O K        |
| 180 min Summer   | 10.420              | 0.640               | 3.3                          | 0.0                      | 3.3                       | 1.4                   | O K        |
| 240 min Summer   | 10.291              | 0.511               | 2.8                          | 0.0                      | 2.8                       | 1.2                   | O K        |
| 360 min Summer   | 10.129              | 0.349               | 2.2                          | 0.0                      | 2.2                       | 0.8                   | O K        |
| 480 min Summer   | 10.027              | 0.247               | 1.8                          | 0.0                      | 1.8                       | 0.6                   | O K        |
| 600 min Summer   | 9.954               | 0.174               | 1.6                          | 0.0                      | 1.6                       | 0.4                   | O K        |
| 720 min Summer   | 9.907               | 0.127               | 1.4                          | 0.0                      | 1.4                       | 0.3                   | O K        |
| 960 min Summer   | 9.847               | 0.067               | 1.2                          | 0.0                      | 1.2                       | 0.1                   | O K        |
| 1440 min Summer  | 9.819               | 0.039               | 0.9                          | 0.0                      | 0.9                       | 0.1                   | O K        |
| 2160 min Summer  | 9.809               | 0.029               | 0.6                          | 0.0                      | 0.6                       | 0.1                   | O K        |
| 2880 min Summer  | 9.803               | 0.023               | 0.5                          | 0.0                      | 0.5                       | 0.0                   | O K        |
| 4320 min Summer  | 9.797               | 0.017               | 0.4                          | 0.0                      | 0.4                       | 0.0                   | O K        |
| 5760 min Summer  | 9.793               | 0.013               | 0.3                          | 0.0                      | 0.3                       | 0.0                   | O K        |
| 7200 min Summer  | 9.791               | 0.011               | 0.2                          | 0.0                      | 0.2                       | 0.0                   | O K        |
| 8640 min Summer  | 9.790               | 0.010               | 0.2                          | 0.0                      | 0.2                       | 0.0                   | O K        |
| 10080 min Summer | 9.789               | 0.009               | 0.2                          | 0.0                      | 0.2                       | 0.0                   | O K        |
| 15 min Winter    | 10.711              | 0.931               | 4.4                          | 6.9                      | 11.3                      | 2.0                   | Flood Risk |
| 30 min Winter    | 10.677              | 0.897               | 4.3                          | 5.2                      | 9.5                       | 2.0                   | O K        |
| 60 min Winter    | 10.631              | 0.851               | 4.1                          | 2.5                      | 6.6                       | 1.9                   | O K        |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Overflow<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|----------------------------|---------------------|
| 15 min Summer    | 129.682         | 0.0                       | 0.9                        | 11                  |
| 30 min Summer    | 87.133          | 0.0                       | 1.1                        | 18                  |
| 60 min Summer    | 55.837          | 0.0                       | 0.8                        | 34                  |
| 120 min Summer   | 34.509          | 0.0                       | 0.1                        | 66                  |
| 180 min Summer   | 25.637          | 0.0                       | 0.0                        | 98                  |
| 240 min Summer   | 20.604          | 0.0                       | 0.0                        | 128                 |
| 360 min Summer   | 15.169          | 0.0                       | 0.0                        | 188                 |
| 480 min Summer   | 12.185          | 0.0                       | 0.0                        | 248                 |
| 600 min Summer   | 10.272          | 0.0                       | 0.0                        | 310                 |
| 720 min Summer   | 8.930           | 0.0                       | 0.0                        | 370                 |
| 960 min Summer   | 7.152           | 0.0                       | 0.0                        | 490                 |
| 1440 min Summer  | 5.221           | 0.0                       | 0.0                        | 720                 |
| 2160 min Summer  | 3.803           | 0.0                       | 0.0                        | 1088                |
| 2880 min Summer  | 3.033           | 0.0                       | 0.0                        | 1460                |
| 4320 min Summer  | 2.201           | 0.0                       | 0.0                        | 2164                |
| 5760 min Summer  | 1.751           | 0.0                       | 0.0                        | 2904                |
| 7200 min Summer  | 1.466           | 0.0                       | 0.0                        | 3664                |
| 8640 min Summer  | 1.270           | 0.0                       | 0.0                        | 4248                |
| 10080 min Summer | 1.124           | 0.0                       | 0.0                        | 5088                |
| 15 min Winter    | 129.682         | 0.0                       | 1.3                        | 11                  |
| 30 min Winter    | 87.133          | 0.0                       | 1.4                        | 18                  |
| 60 min Winter    | 55.837          | 0.0                       | 0.8                        | 34                  |

|                                                                  |                                  |                                                                                     |
|------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| Lanmor Consulting Ltd                                            |                                  | Page 2                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File Cascade.casx                              | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

Cascade Summary of Results for FILTER DRAIN 1.srcx

| Storm Event      | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Overflow (l/s) | Max Σ Outflow (l/s) | Max Volume (m³) | Status |
|------------------|---------------|---------------|------------------------|--------------------|---------------------|-----------------|--------|
| 120 min Winter   | 10.484        | 0.704         | 3.5                    | 0.0                | 3.5                 | 1.6             | O K    |
| 180 min Winter   | 10.284        | 0.504         | 2.8                    | 0.0                | 2.8                 | 1.1             | O K    |
| 240 min Winter   | 10.154        | 0.374         | 2.3                    | 0.0                | 2.3                 | 0.9             | O K    |
| 360 min Winter   | 10.002        | 0.222         | 1.7                    | 0.0                | 1.7                 | 0.5             | O K    |
| 480 min Winter   | 9.912         | 0.132         | 1.4                    | 0.0                | 1.4                 | 0.3             | O K    |
| 600 min Winter   | 9.859         | 0.079         | 1.2                    | 0.0                | 1.2                 | 0.2             | O K    |
| 720 min Winter   | 9.828         | 0.048         | 1.1                    | 0.0                | 1.1                 | 0.1             | O K    |
| 960 min Winter   | 9.819         | 0.039         | 0.8                    | 0.0                | 0.8                 | 0.1             | O K    |
| 1440 min Winter  | 9.808         | 0.028         | 0.6                    | 0.0                | 0.6                 | 0.1             | O K    |
| 2160 min Winter  | 9.801         | 0.021         | 0.5                    | 0.0                | 0.5                 | 0.0             | O K    |
| 2880 min Winter  | 9.797         | 0.017         | 0.4                    | 0.0                | 0.4                 | 0.0             | O K    |
| 4320 min Winter  | 9.792         | 0.012         | 0.3                    | 0.0                | 0.3                 | 0.0             | O K    |
| 5760 min Winter  | 9.790         | 0.010         | 0.2                    | 0.0                | 0.2                 | 0.0             | O K    |
| 7200 min Winter  | 9.788         | 0.008         | 0.2                    | 0.0                | 0.2                 | 0.0             | O K    |
| 8640 min Winter  | 9.787         | 0.007         | 0.2                    | 0.0                | 0.2                 | 0.0             | O K    |
| 10080 min Winter | 9.786         | 0.006         | 0.1                    | 0.0                | 0.1                 | 0.0             | O K    |

| Storm Event      | Rain (mm/hr) | Flooded Volume (m³) | Overflow Volume (m³) | Time-Peak (mins) |
|------------------|--------------|---------------------|----------------------|------------------|
| 120 min Winter   | 34.509       | 0.0                 | 0.0                  | 70               |
| 180 min Winter   | 25.637       | 0.0                 | 0.0                  | 100              |
| 240 min Winter   | 20.604       | 0.0                 | 0.0                  | 130              |
| 360 min Winter   | 15.169       | 0.0                 | 0.0                  | 190              |
| 480 min Winter   | 12.185       | 0.0                 | 0.0                  | 252              |
| 600 min Winter   | 10.272       | 0.0                 | 0.0                  | 310              |
| 720 min Winter   | 8.930        | 0.0                 | 0.0                  | 366              |
| 960 min Winter   | 7.152        | 0.0                 | 0.0                  | 482              |
| 1440 min Winter  | 5.221        | 0.0                 | 0.0                  | 732              |
| 2160 min Winter  | 3.803        | 0.0                 | 0.0                  | 1084             |
| 2880 min Winter  | 3.033        | 0.0                 | 0.0                  | 1464             |
| 4320 min Winter  | 2.201        | 0.0                 | 0.0                  | 2216             |
| 5760 min Winter  | 1.751        | 0.0                 | 0.0                  | 2824             |
| 7200 min Winter  | 1.466        | 0.0                 | 0.0                  | 3528             |
| 8640 min Winter  | 1.270        | 0.0                 | 0.0                  | 4328             |
| 10080 min Winter | 1.124        | 0.0                 | 0.0                  | 5016             |

|                                                                  |                                  |                                                                                     |
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| Lanmor Consulting Ltd                                            |                                  | Page 3                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File Cascade.casx                              | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Cascade Rainfall Details for FILTER DRAIN 1.srcx

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

Time Area Diagram

Total Area (ha) 0.020

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |
| 0           | 4 0.020  |

|                                                                  |                                  |                                                                                     |
|------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| Lanmor Consulting Ltd                                            |                                  | Page 4                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File Cascade.casx                              | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

Cascade Model Details for FILTER DRAIN 1.srcx

Storage is Online Cover Level (m) 10.980

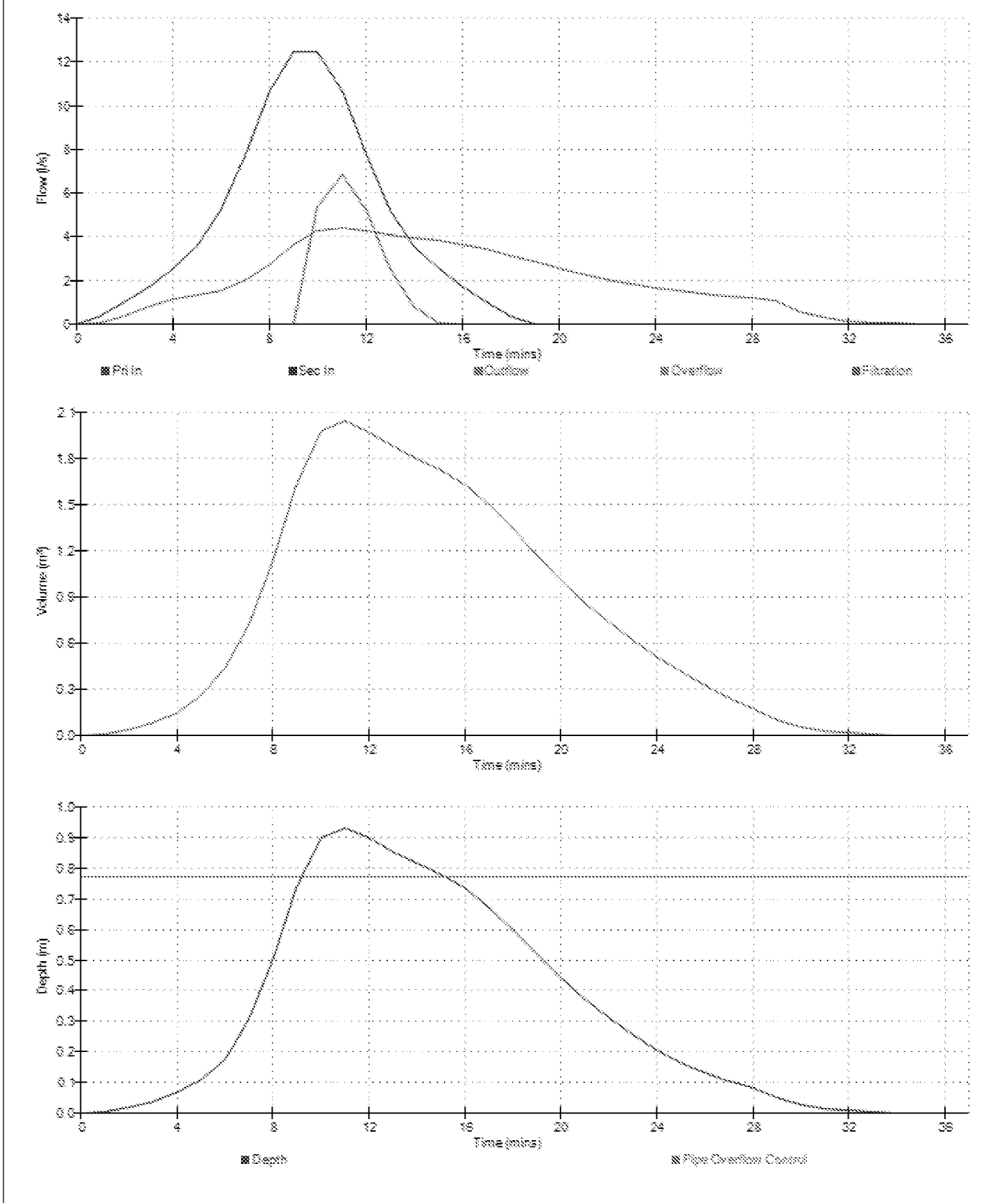
Filter Drain Structure

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Trench Length (m)           | 14.1  |
| Infiltration Coefficient Side (m/hr) | 1.84680 | Pipe Diameter (m)           | 0.100 |
| Safety Factor                        | 4.0     | Pipe Depth above Invert (m) | 0.075 |
| Porosity                             | 0.30    | Slope (1:X)                 | 0.0   |
| Invert Level (m)                     | 9.780   | Cap Volume Depth (m)        | 0.000 |
| Trench Width (m)                     | 0.5     | Cap Infiltration Depth (m)  | 0.000 |

Pipe Overflow Control

|              |       |                            |       |                           |        |
|--------------|-------|----------------------------|-------|---------------------------|--------|
| Diameter (m) | 0.100 | Roughness k (mm)           | 0.600 | Upstream Invert Level (m) | 10.553 |
| Slope (1:X)  | 9.0   | Entry Loss Coefficient     | 0.500 |                           |        |
| Length (m)   | 5.995 | Coefficient of Contraction | 0.600 |                           |        |

Cascade Event: 15 min Winter for FILTER DRAIN 1.srcx



|                                                                  |                                  |                                                                                     |
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| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File Cascade.casx                              | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Cascade Summary of Results for FILTER DRAIN 2.srcx

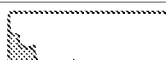
**Upstream                      Outflow To      Overflow To**  
**Structures**

FILTER DRAIN 1.srcx                      (None)                      (None)

Half Drain Time : 5 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status |
|------------------|---------------------|---------------------|------------------------------|-----------------------|--------|
| 15 min Summer    | 9.849               | 0.772               | 6.2                          | 2.4                   | O K    |
| 30 min Summer    | 9.877               | 0.800               | 6.5                          | 2.6                   | O K    |
| 60 min Summer    | 9.784               | 0.707               | 5.6                          | 2.1                   | O K    |
| 120 min Summer   | 9.603               | 0.526               | 3.6                          | 1.2                   | O K    |
| 180 min Summer   | 9.530               | 0.453               | 2.9                          | 0.9                   | O K    |
| 240 min Summer   | 9.480               | 0.403               | 2.4                          | 0.7                   | O K    |
| 360 min Summer   | 9.414               | 0.337               | 1.9                          | 0.5                   | O K    |
| 480 min Summer   | 9.370               | 0.293               | 1.5                          | 0.4                   | O K    |
| 600 min Summer   | 9.338               | 0.261               | 1.3                          | 0.3                   | O K    |
| 720 min Summer   | 9.313               | 0.236               | 1.2                          | 0.2                   | O K    |
| 960 min Summer   | 9.277               | 0.200               | 0.9                          | 0.2                   | O K    |
| 1440 min Summer  | 9.234               | 0.157               | 0.7                          | 0.1                   | O K    |
| 2160 min Summer  | 9.198               | 0.121               | 0.5                          | 0.1                   | O K    |
| 2880 min Summer  | 9.177               | 0.100               | 0.4                          | 0.0                   | O K    |
| 4320 min Summer  | 9.152               | 0.075               | 0.3                          | 0.0                   | O K    |
| 5760 min Summer  | 9.138               | 0.061               | 0.2                          | 0.0                   | O K    |
| 7200 min Summer  | 9.130               | 0.053               | 0.2                          | 0.0                   | O K    |
| 8640 min Summer  | 9.125               | 0.048               | 0.2                          | 0.0                   | O K    |
| 10080 min Summer | 9.122               | 0.045               | 0.2                          | 0.0                   | O K    |
| 15 min Winter    | 9.923               | 0.846               | 6.3                          | 2.9                   | O K    |
| 30 min Winter    | 9.905               | 0.828               | 6.7                          | 2.8                   | O K    |
| 60 min Winter    | 9.749               | 0.672               | 5.2                          | 1.9                   | O K    |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 15 min Summer    | 129.682         | 0.0                       | 13                  |
| 30 min Summer    | 87.133          | 0.0                       | 21                  |
| 60 min Summer    | 55.837          | 0.0                       | 36                  |
| 120 min Summer   | 34.509          | 0.0                       | 68                  |
| 180 min Summer   | 25.637          | 0.0                       | 96                  |
| 240 min Summer   | 20.604          | 0.0                       | 126                 |
| 360 min Summer   | 15.169          | 0.0                       | 186                 |
| 480 min Summer   | 12.185          | 0.0                       | 246                 |
| 600 min Summer   | 10.272          | 0.0                       | 306                 |
| 720 min Summer   | 8.930           | 0.0                       | 368                 |
| 960 min Summer   | 7.152           | 0.0                       | 490                 |
| 1440 min Summer  | 5.221           | 0.0                       | 734                 |
| 2160 min Summer  | 3.803           | 0.0                       | 1100                |
| 2880 min Summer  | 3.033           | 0.0                       | 1460                |
| 4320 min Summer  | 2.201           | 0.0                       | 2180                |
| 5760 min Summer  | 1.751           | 0.0                       | 2936                |
| 7200 min Summer  | 1.466           | 0.0                       | 3672                |
| 8640 min Summer  | 1.270           | 0.0                       | 4288                |
| 10080 min Summer | 1.124           | 0.0                       | 5056                |
| 15 min Winter    | 129.682         | 0.0                       | 13                  |
| 30 min Winter    | 87.133          | 0.0                       | 21                  |
| 60 min Winter    | 55.837          | 0.0                       | 38                  |

|                                                                  |                                  |                                                                                     |
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| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File Cascade.casx                              | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions Source Control 2015.1                               |                                  |                                                                                     |

Cascade Summary of Results for FILTER DRAIN 2.srcx

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status |
|------------------|---------------------|---------------------|------------------------------|-----------------------|--------|
| 120 min Winter   | 9.545               | 0.468               | 3.0                          | 0.9                   | O K    |
| 180 min Winter   | 9.469               | 0.392               | 2.3                          | 0.7                   | O K    |
| 240 min Winter   | 9.417               | 0.340               | 1.9                          | 0.5                   | O K    |
| 360 min Winter   | 9.352               | 0.275               | 1.4                          | 0.3                   | O K    |
| 480 min Winter   | 9.312               | 0.235               | 1.1                          | 0.2                   | O K    |
| 600 min Winter   | 9.283               | 0.206               | 1.0                          | 0.2                   | O K    |
| 720 min Winter   | 9.262               | 0.185               | 0.8                          | 0.1                   | O K    |
| 960 min Winter   | 9.232               | 0.155               | 0.7                          | 0.1                   | O K    |
| 1440 min Winter  | 9.197               | 0.120               | 0.5                          | 0.1                   | O K    |
| 2160 min Winter  | 9.169               | 0.092               | 0.4                          | 0.0                   | O K    |
| 2880 min Winter  | 9.152               | 0.075               | 0.3                          | 0.0                   | O K    |
| 4320 min Winter  | 9.133               | 0.056               | 0.2                          | 0.0                   | O K    |
| 5760 min Winter  | 9.125               | 0.048               | 0.2                          | 0.0                   | O K    |
| 7200 min Winter  | 9.121               | 0.044               | 0.1                          | 0.0                   | O K    |
| 8640 min Winter  | 9.118               | 0.041               | 0.1                          | 0.0                   | O K    |
| 10080 min Winter | 9.115               | 0.038               | 0.1                          | 0.0                   | O K    |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 120 min Winter   | 34.509          | 0.0                       | 68                  |
| 180 min Winter   | 25.637          | 0.0                       | 98                  |
| 240 min Winter   | 20.604          | 0.0                       | 128                 |
| 360 min Winter   | 15.169          | 0.0                       | 188                 |
| 480 min Winter   | 12.185          | 0.0                       | 246                 |
| 600 min Winter   | 10.272          | 0.0                       | 308                 |
| 720 min Winter   | 8.930           | 0.0                       | 366                 |
| 960 min Winter   | 7.152           | 0.0                       | 482                 |
| 1440 min Winter  | 5.221           | 0.0                       | 716                 |
| 2160 min Winter  | 3.803           | 0.0                       | 1080                |
| 2880 min Winter  | 3.033           | 0.0                       | 1444                |
| 4320 min Winter  | 2.201           | 0.0                       | 2176                |
| 5760 min Winter  | 1.751           | 0.0                       | 2832                |
| 7200 min Winter  | 1.466           | 0.0                       | 3576                |
| 8640 min Winter  | 1.270           | 0.0                       | 4352                |
| 10080 min Winter | 1.124           | 0.0                       | 4968                |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File Cascade.casx                              | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Cascade Rainfall Details for FILTER DRAIN 2.srcx

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

Time Area Diagram

Total Area (ha) 0.016

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |         |
|---|---------|
| 0 | 4 0.016 |
|---|---------|

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File Cascade.casx                              | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

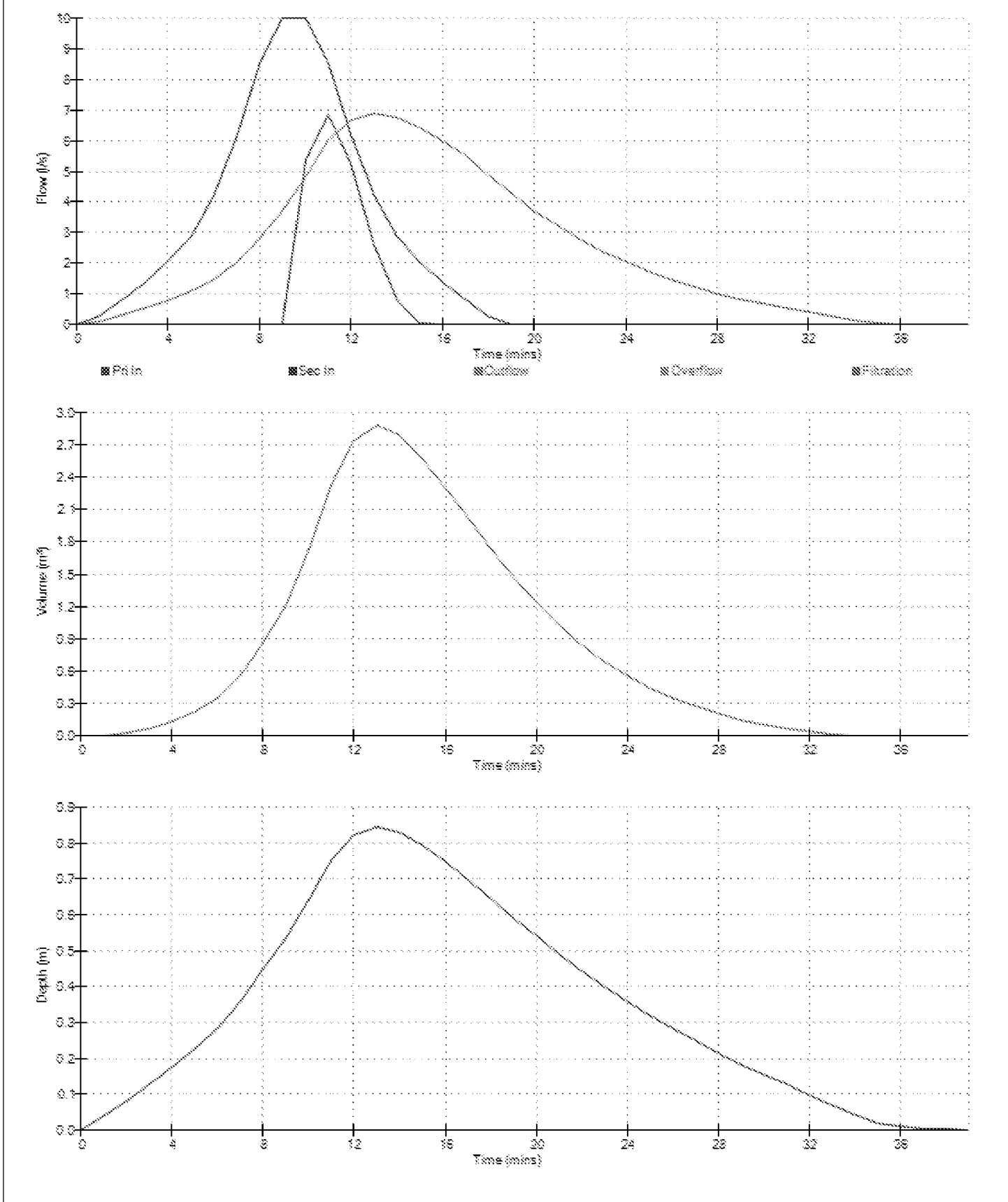
Cascade Model Details for FILTER DRAIN 2.srcx

Storage is Online Cover Level (m) 10.328

Filter Drain Structure

|                                      |         |                             |       |
|--------------------------------------|---------|-----------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Trench Length (m)           | 35.8  |
| Infiltration Coefficient Side (m/hr) | 1.84680 | Pipe Diameter (m)           | 0.100 |
| Safety Factor                        | 4.0     | Pipe Depth above Invert (m) | 0.075 |
| Porosity                             | 0.30    | Slope (1:X)                 | 51.0  |
| Invert Level (m)                     | 9.077   | Cap Volume Depth (m)        | 0.800 |
| Trench Width (m)                     | 0.5     | Cap Infiltration Depth (m)  | 0.800 |

Cascade Event: 15 min Winter for FILTER DRAIN 2.srcx



|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 1 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 2 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 15 min Summer    | 10.732              | 0.157               | 5.1                          | 0.9                   | Flood Risk |
| 30 min Summer    | 10.730              | 0.155               | 5.0                          | 0.9                   | Flood Risk |
| 60 min Summer    | 10.706              | 0.131               | 4.3                          | 0.7                   | Flood Risk |
| 120 min Summer   | 10.673              | 0.098               | 3.2                          | 0.4                   | Flood Risk |
| 180 min Summer   | 10.653              | 0.078               | 2.6                          | 0.2                   | Flood Risk |
| 240 min Summer   | 10.640              | 0.065               | 2.1                          | 0.2                   | Flood Risk |
| 360 min Summer   | 10.625              | 0.050               | 1.6                          | 0.1                   | Flood Risk |
| 480 min Summer   | 10.620              | 0.045               | 1.3                          | 0.1                   | Flood Risk |
| 600 min Summer   | 10.616              | 0.041               | 1.1                          | 0.1                   | Flood Risk |
| 720 min Summer   | 10.613              | 0.038               | 1.0                          | 0.1                   | Flood Risk |
| 960 min Summer   | 10.609              | 0.034               | 0.8                          | 0.0                   | Flood Risk |
| 1440 min Summer  | 10.604              | 0.029               | 0.6                          | 0.0                   | Flood Risk |
| 2160 min Summer  | 10.600              | 0.025               | 0.4                          | 0.0                   | Flood Risk |
| 2880 min Summer  | 10.597              | 0.022               | 0.3                          | 0.0                   | O K        |
| 4320 min Summer  | 10.594              | 0.019               | 0.2                          | 0.0                   | O K        |
| 5760 min Summer  | 10.592              | 0.017               | 0.2                          | 0.0                   | O K        |
| 7200 min Summer  | 10.591              | 0.016               | 0.2                          | 0.0                   | O K        |
| 8640 min Summer  | 10.590              | 0.015               | 0.1                          | 0.0                   | O K        |
| 10080 min Summer | 10.589              | 0.014               | 0.1                          | 0.0                   | O K        |
| 15 min Winter    | 10.733              | 0.164               | 5.4                          | 1.0                   | Flood Risk |
| 30 min Winter    | 10.726              | 0.151               | 4.9                          | 0.9                   | Flood Risk |
| 60 min Winter    | 10.692              | 0.117               | 3.8                          | 0.5                   | Flood Risk |
| 120 min Winter   | 10.654              | 0.079               | 2.6                          | 0.2                   | Flood Risk |
| 180 min Winter   | 10.635              | 0.060               | 1.9                          | 0.1                   | Flood Risk |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 15 min Summer    | 129.682         | 0.0                       | 12                  |
| 30 min Summer    | 87.133          | 0.0                       | 19                  |
| 60 min Summer    | 55.837          | 0.0                       | 34                  |
| 120 min Summer   | 34.509          | 0.0                       | 64                  |
| 180 min Summer   | 25.637          | 0.0                       | 94                  |
| 240 min Summer   | 20.604          | 0.0                       | 124                 |
| 360 min Summer   | 15.169          | 0.0                       | 184                 |
| 480 min Summer   | 12.185          | 0.0                       | 244                 |
| 600 min Summer   | 10.272          | 0.0                       | 302                 |
| 720 min Summer   | 8.930           | 0.0                       | 366                 |
| 960 min Summer   | 7.152           | 0.0                       | 480                 |
| 1440 min Summer  | 5.221           | 0.0                       | 736                 |
| 2160 min Summer  | 3.803           | 0.0                       | 1076                |
| 2880 min Summer  | 3.033           | 0.0                       | 1444                |
| 4320 min Summer  | 2.201           | 0.0                       | 2136                |
| 5760 min Summer  | 1.751           | 0.0                       | 2904                |
| 7200 min Summer  | 1.466           | 0.0                       | 3616                |
| 8640 min Summer  | 1.270           | 0.0                       | 4256                |
| 10080 min Summer | 1.124           | 0.0                       | 4968                |
| 15 min Winter    | 129.682         | 0.0                       | 12                  |
| 30 min Winter    | 87.133          | 0.0                       | 20                  |
| 60 min Winter    | 55.837          | 0.0                       | 36                  |
| 120 min Winter   | 34.509          | 0.0                       | 64                  |
| 180 min Winter   | 25.637          | 0.0                       | 94                  |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 1 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

| Storm Event      | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status     |
|------------------|---------------|---------------|------------------------|-----------------|------------|
| 240 min Winter   | 10.624        | 0.049         | 1.6                    | 0.1             | Flood Risk |
| 360 min Winter   | 10.617        | 0.042         | 1.2                    | 0.1             | Flood Risk |
| 480 min Winter   | 10.613        | 0.038         | 0.9                    | 0.1             | Flood Risk |
| 600 min Winter   | 10.610        | 0.035         | 0.8                    | 0.0             | Flood Risk |
| 720 min Winter   | 10.608        | 0.033         | 0.7                    | 0.0             | Flood Risk |
| 960 min Winter   | 10.604        | 0.029         | 0.6                    | 0.0             | Flood Risk |
| 1440 min Winter  | 10.600        | 0.025         | 0.4                    | 0.0             | O K        |
| 2160 min Winter  | 10.596        | 0.021         | 0.3                    | 0.0             | O K        |
| 2880 min Winter  | 10.594        | 0.019         | 0.2                    | 0.0             | O K        |
| 4320 min Winter  | 10.591        | 0.016         | 0.2                    | 0.0             | O K        |
| 5760 min Winter  | 10.590        | 0.015         | 0.1                    | 0.0             | O K        |
| 7200 min Winter  | 10.588        | 0.013         | 0.1                    | 0.0             | O K        |
| 8640 min Winter  | 10.587        | 0.012         | 0.1                    | 0.0             | O K        |
| 10080 min Winter | 10.587        | 0.012         | 0.1                    | 0.0             | O K        |

| Storm Event      | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|------------------|--------------|---------------------|------------------|
| 240 min Winter   | 20.604       | 0.0                 | 122              |
| 360 min Winter   | 15.169       | 0.0                 | 180              |
| 480 min Winter   | 12.185       | 0.0                 | 246              |
| 600 min Winter   | 10.272       | 0.0                 | 298              |
| 720 min Winter   | 8.930        | 0.0                 | 366              |
| 960 min Winter   | 7.152        | 0.0                 | 478              |
| 1440 min Winter  | 5.221        | 0.0                 | 714              |
| 2160 min Winter  | 3.803        | 0.0                 | 1100             |
| 2880 min Winter  | 3.033        | 0.0                 | 1492             |
| 4320 min Winter  | 2.201        | 0.0                 | 2236             |
| 5760 min Winter  | 1.751        | 0.0                 | 2992             |
| 7200 min Winter  | 1.466        | 0.0                 | 3736             |
| 8640 min Winter  | 1.270        | 0.0                 | 4280             |
| 10080 min Winter | 1.124        | 0.0                 | 5312             |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 1 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

#### Time Area Diagram

Total Area (ha) 0.013

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |   |       |
|---|---|-------|
| 0 | 4 | 0.013 |
|---|---|-------|

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 1 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

#### Model Details

Storage is Online Cover Level (m) 10.900

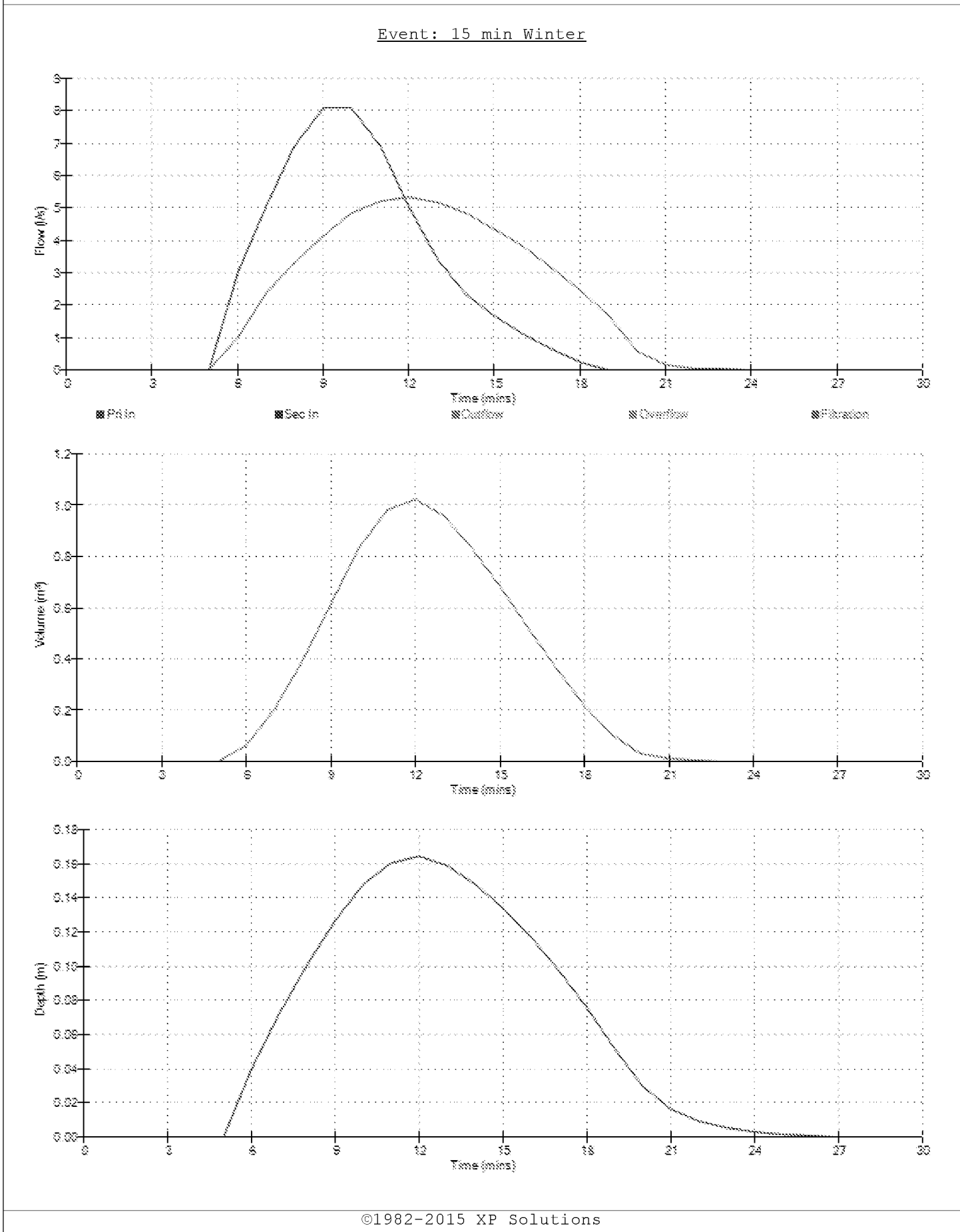
#### Complex Structure

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Width (m)               | 7.7   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 8.4   |
| Max Percolation (l/s)                | 18.0    | Slope (1:X)             | 33.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.575  | Cap Volume Depth (m)    | 0.225 |

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 7.7   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 3.2     | Slope (1:X)             | 33.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.830  | Cap Volume Depth (m)    | 0.225 |



|                                                                  |                                  |                                                                                     |
|------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| Lanmor Consulting Ltd                                            |                                  | Page 1                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PLOT 2 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 2 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 15 min Summer    | 10.823              | 0.143               | 4.5                          | 0.7                   | Flood Risk |
| 30 min Summer    | 10.821              | 0.141               | 4.4                          | 0.7                   | Flood Risk |
| 60 min Summer    | 10.798              | 0.118               | 3.7                          | 0.5                   | Flood Risk |
| 120 min Summer   | 10.768              | 0.088               | 2.7                          | 0.3                   | Flood Risk |
| 180 min Summer   | 10.750              | 0.070               | 2.2                          | 0.2                   | Flood Risk |
| 240 min Summer   | 10.737              | 0.057               | 1.8                          | 0.1                   | Flood Risk |
| 360 min Summer   | 10.727              | 0.047               | 1.4                          | 0.1                   | Flood Risk |
| 480 min Summer   | 10.722              | 0.042               | 1.1                          | 0.1                   | Flood Risk |
| 600 min Summer   | 10.719              | 0.039               | 0.9                          | 0.1                   | Flood Risk |
| 720 min Summer   | 10.716              | 0.036               | 0.8                          | 0.0                   | Flood Risk |
| 960 min Summer   | 10.712              | 0.032               | 0.7                          | 0.0                   | Flood Risk |
| 1440 min Summer  | 10.708              | 0.028               | 0.5                          | 0.0                   | Flood Risk |
| 2160 min Summer  | 10.704              | 0.024               | 0.4                          | 0.0                   | O K        |
| 2880 min Summer  | 10.701              | 0.021               | 0.3                          | 0.0                   | O K        |
| 4320 min Summer  | 10.698              | 0.018               | 0.2                          | 0.0                   | O K        |
| 5760 min Summer  | 10.696              | 0.016               | 0.2                          | 0.0                   | O K        |
| 7200 min Summer  | 10.695              | 0.015               | 0.1                          | 0.0                   | O K        |
| 8640 min Summer  | 10.694              | 0.014               | 0.1                          | 0.0                   | O K        |
| 10080 min Summer | 10.693              | 0.013               | 0.1                          | 0.0                   | O K        |
| 15 min Winter    | 10.822              | 0.142               | 4.7                          | 0.8                   | Flood Risk |
| 30 min Winter    | 10.816              | 0.136               | 4.3                          | 0.7                   | Flood Risk |
| 60 min Winter    | 10.784              | 0.104               | 3.3                          | 0.4                   | Flood Risk |
| 120 min Winter   | 10.750              | 0.070               | 2.2                          | 0.2                   | Flood Risk |
| 180 min Winter   | 10.733              | 0.053               | 1.7                          | 0.1                   | Flood Risk |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 15 min Summer    | 129.682         | 0.0                       | 12                  |
| 30 min Summer    | 87.133          | 0.0                       | 19                  |
| 60 min Summer    | 55.837          | 0.0                       | 34                  |
| 120 min Summer   | 34.509          | 0.0                       | 64                  |
| 180 min Summer   | 25.637          | 0.0                       | 94                  |
| 240 min Summer   | 20.604          | 0.0                       | 124                 |
| 360 min Summer   | 15.169          | 0.0                       | 182                 |
| 480 min Summer   | 12.185          | 0.0                       | 244                 |
| 600 min Summer   | 10.272          | 0.0                       | 302                 |
| 720 min Summer   | 8.930           | 0.0                       | 360                 |
| 960 min Summer   | 7.152           | 0.0                       | 478                 |
| 1440 min Summer  | 5.221           | 0.0                       | 714                 |
| 2160 min Summer  | 3.803           | 0.0                       | 1100                |
| 2880 min Summer  | 3.033           | 0.0                       | 1468                |
| 4320 min Summer  | 2.201           | 0.0                       | 2192                |
| 5760 min Summer  | 1.751           | 0.0                       | 2848                |
| 7200 min Summer  | 1.466           | 0.0                       | 3544                |
| 8640 min Summer  | 1.270           | 0.0                       | 4360                |
| 10080 min Summer | 1.124           | 0.0                       | 5096                |
| 15 min Winter    | 129.682         | 0.0                       | 12                  |
| 30 min Winter    | 87.133          | 0.0                       | 20                  |
| 60 min Winter    | 55.837          | 0.0                       | 34                  |
| 120 min Winter   | 34.509          | 0.0                       | 64                  |
| 180 min Winter   | 25.637          | 0.0                       | 94                  |

|                                                                  |                                  |                                                                                     |
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| Lanmor Consulting Ltd                                            |                                  | Page 2                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PLOT 2 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

Summary of Results for 100 year Return Period (+40%)

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 240 min Winter   | 10.726              | 0.046               | 1.3                          | 0.1                   | Flood Risk |
| 360 min Winter   | 10.720              | 0.040               | 1.0                          | 0.1                   | Flood Risk |
| 480 min Winter   | 10.716              | 0.036               | 0.8                          | 0.0                   | Flood Risk |
| 600 min Winter   | 10.713              | 0.033               | 0.7                          | 0.0                   | Flood Risk |
| 720 min Winter   | 10.711              | 0.031               | 0.6                          | 0.0                   | Flood Risk |
| 960 min Winter   | 10.707              | 0.027               | 0.5                          | 0.0                   | Flood Risk |
| 1440 min Winter  | 10.703              | 0.023               | 0.3                          | 0.0                   | O K        |
| 2160 min Winter  | 10.700              | 0.020               | 0.2                          | 0.0                   | O K        |
| 2880 min Winter  | 10.698              | 0.018               | 0.2                          | 0.0                   | O K        |
| 4320 min Winter  | 10.695              | 0.015               | 0.1                          | 0.0                   | O K        |
| 5760 min Winter  | 10.694              | 0.014               | 0.1                          | 0.0                   | O K        |
| 7200 min Winter  | 10.693              | 0.013               | 0.1                          | 0.0                   | O K        |
| 8640 min Winter  | 10.692              | 0.012               | 0.1                          | 0.0                   | O K        |
| 10080 min Winter | 10.691              | 0.011               | 0.1                          | 0.0                   | O K        |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 240 min Winter   | 20.604          | 0.0                       | 124                 |
| 360 min Winter   | 15.169          | 0.0                       | 184                 |
| 480 min Winter   | 12.185          | 0.0                       | 244                 |
| 600 min Winter   | 10.272          | 0.0                       | 306                 |
| 720 min Winter   | 8.930           | 0.0                       | 360                 |
| 960 min Winter   | 7.152           | 0.0                       | 482                 |
| 1440 min Winter  | 5.221           | 0.0                       | 726                 |
| 2160 min Winter  | 3.803           | 0.0                       | 1044                |
| 2880 min Winter  | 3.033           | 0.0                       | 1468                |
| 4320 min Winter  | 2.201           | 0.0                       | 2132                |
| 5760 min Winter  | 1.751           | 0.0                       | 2904                |
| 7200 min Winter  | 1.466           | 0.0                       | 3680                |
| 8640 min Winter  | 1.270           | 0.0                       | 4352                |
| 10080 min Winter | 1.124           | 0.0                       | 4960                |

|                                                                  |                                  |                                                                                     |
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| Lanmor Consulting Ltd                                            |                                  | Page 3                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PLOT 2 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

#### Time Area Diagram

Total Area (ha) 0.011

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |         |
|---|---------|
| 0 | 4 0.011 |
|---|---------|

|                                                                  |                                  |                                                                                     |
|------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| Lanmor Consulting Ltd                                            |                                  | Page 4                                                                              |
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| Date July 2019<br>File PLOT 2 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Model Details

Storage is Online Cover Level (m) 11.005

#### Complex Structure

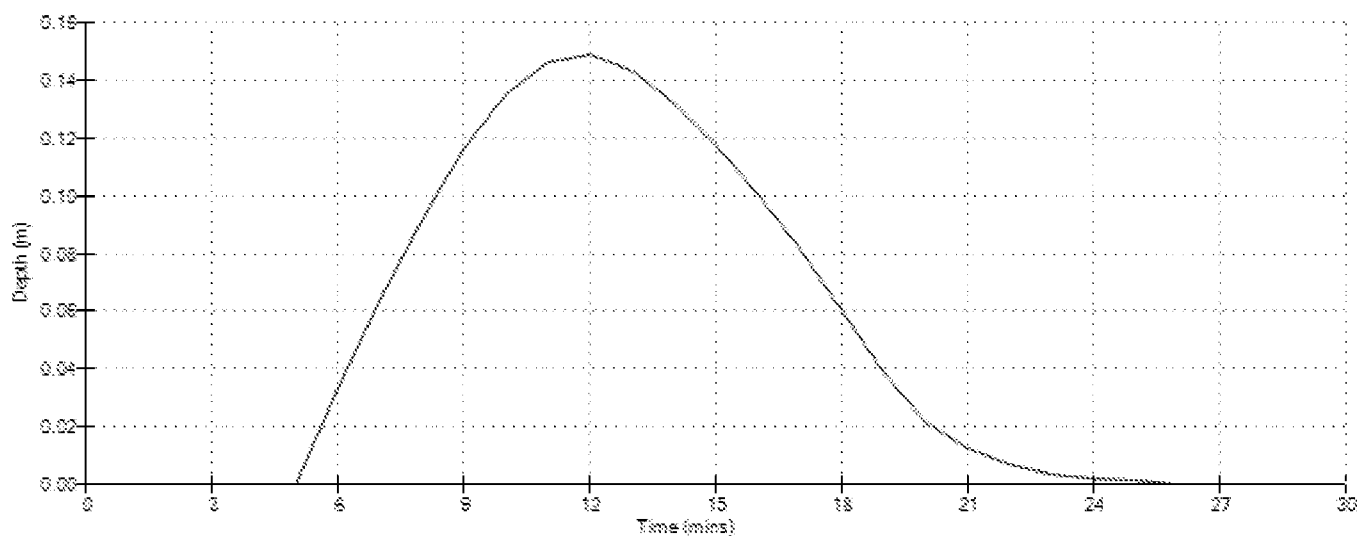
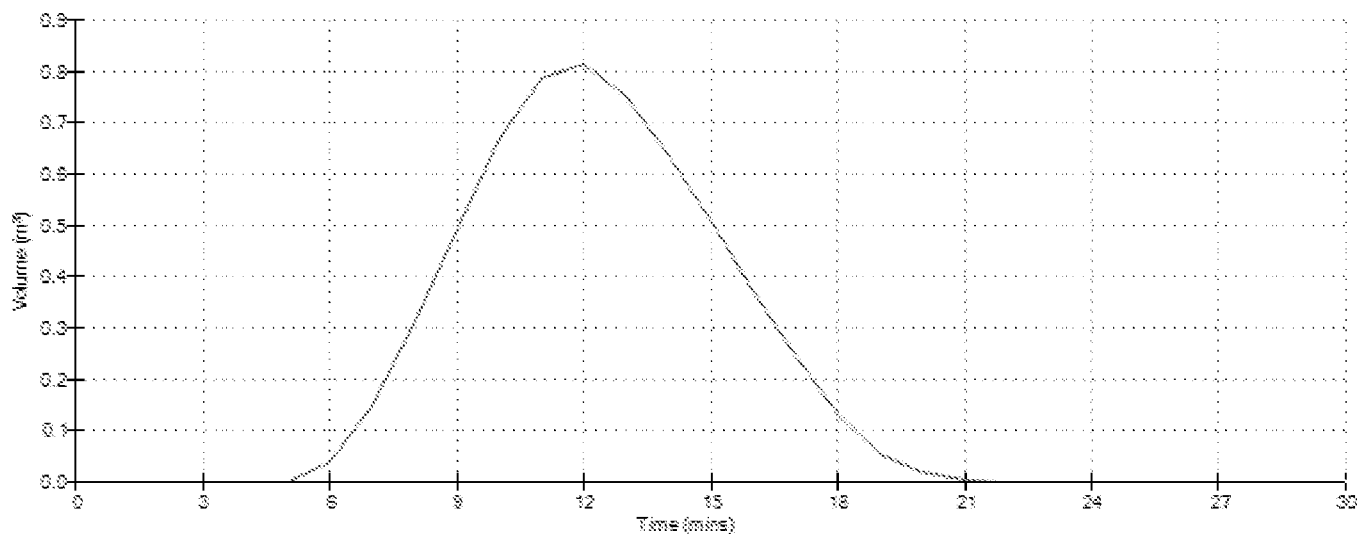
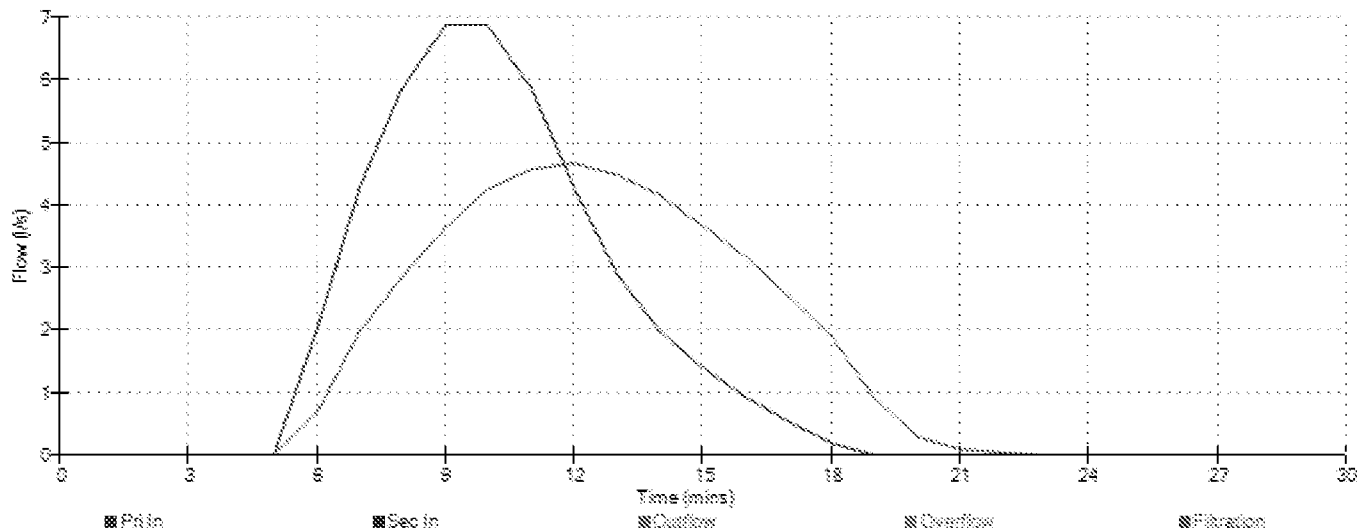
##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Width (m)               | 7.4   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 8.1   |
| Max Percolation (l/s)                | 16.7    | Slope (1:X)             | 33.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.680  | Cap Volume Depth (m)    | 0.225 |

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 7.4   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 3.1     | Slope (1:X)             | 33.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.925  | Cap Volume Depth (m)    | 0.225 |

Event: 15 min Winter



|                                                                  |                                  |                                                                                     |
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| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PLOT 3 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 2 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 15 min Summer    | 10.923              | 0.128               | 4.6                          | 0.7                   | Flood Risk |
| 30 min Summer    | 10.921              | 0.126               | 4.6                          | 0.7                   | Flood Risk |
| 60 min Summer    | 10.900              | 0.105               | 3.8                          | 0.5                   | Flood Risk |
| 120 min Summer   | 10.872              | 0.077               | 2.8                          | 0.2                   | Flood Risk |
| 180 min Summer   | 10.856              | 0.061               | 2.2                          | 0.2                   | Flood Risk |
| 240 min Summer   | 10.845              | 0.050               | 1.8                          | 0.1                   | Flood Risk |
| 360 min Summer   | 10.838              | 0.043               | 1.4                          | 0.1                   | Flood Risk |
| 480 min Summer   | 10.834              | 0.039               | 1.1                          | 0.1                   | Flood Risk |
| 600 min Summer   | 10.831              | 0.036               | 0.9                          | 0.1                   | Flood Risk |
| 720 min Summer   | 10.828              | 0.033               | 0.8                          | 0.0                   | Flood Risk |
| 960 min Summer   | 10.825              | 0.030               | 0.6                          | 0.0                   | Flood Risk |
| 1440 min Summer  | 10.821              | 0.026               | 0.5                          | 0.0                   | Flood Risk |
| 2160 min Summer  | 10.817              | 0.022               | 0.3                          | 0.0                   | O K        |
| 2880 min Summer  | 10.815              | 0.020               | 0.3                          | 0.0                   | O K        |
| 4320 min Summer  | 10.812              | 0.017               | 0.2                          | 0.0                   | O K        |
| 5760 min Summer  | 10.810              | 0.015               | 0.2                          | 0.0                   | O K        |
| 7200 min Summer  | 10.809              | 0.014               | 0.1                          | 0.0                   | O K        |
| 8640 min Summer  | 10.808              | 0.013               | 0.1                          | 0.0                   | O K        |
| 10080 min Summer | 10.807              | 0.012               | 0.1                          | 0.0                   | O K        |
| 15 min Winter    | 10.928              | 0.133               | 4.8                          | 0.7                   | Flood Risk |
| 30 min Winter    | 10.916              | 0.121               | 4.4                          | 0.6                   | Flood Risk |
| 60 min Winter    | 10.886              | 0.091               | 3.3                          | 0.4                   | Flood Risk |
| 120 min Winter   | 10.856              | 0.061               | 2.2                          | 0.2                   | Flood Risk |
| 180 min Winter   | 10.843              | 0.048               | 1.7                          | 0.1                   | Flood Risk |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 15 min Summer    | 129.682         | 0.0                       | 11                  |
| 30 min Summer    | 87.133          | 0.0                       | 19                  |
| 60 min Summer    | 55.837          | 0.0                       | 34                  |
| 120 min Summer   | 34.509          | 0.0                       | 64                  |
| 180 min Summer   | 25.637          | 0.0                       | 94                  |
| 240 min Summer   | 20.604          | 0.0                       | 122                 |
| 360 min Summer   | 15.169          | 0.0                       | 182                 |
| 480 min Summer   | 12.185          | 0.0                       | 244                 |
| 600 min Summer   | 10.272          | 0.0                       | 302                 |
| 720 min Summer   | 8.930           | 0.0                       | 360                 |
| 960 min Summer   | 7.152           | 0.0                       | 488                 |
| 1440 min Summer  | 5.221           | 0.0                       | 714                 |
| 2160 min Summer  | 3.803           | 0.0                       | 1084                |
| 2880 min Summer  | 3.033           | 0.0                       | 1460                |
| 4320 min Summer  | 2.201           | 0.0                       | 2140                |
| 5760 min Summer  | 1.751           | 0.0                       | 2840                |
| 7200 min Summer  | 1.466           | 0.0                       | 3536                |
| 8640 min Summer  | 1.270           | 0.0                       | 4312                |
| 10080 min Summer | 1.124           | 0.0                       | 5072                |
| 15 min Winter    | 129.682         | 0.0                       | 12                  |
| 30 min Winter    | 87.133          | 0.0                       | 20                  |
| 60 min Winter    | 55.837          | 0.0                       | 34                  |
| 120 min Winter   | 34.509          | 0.0                       | 64                  |
| 180 min Winter   | 25.637          | 0.0                       | 92                  |

|                                                                  |                                  |                                                                                     |
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| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PLOT 3 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 240 min Winter   | 10.838              | 0.043               | 1.3                          | 0.1                   | Flood Risk |
| 360 min Winter   | 10.832              | 0.037               | 1.0                          | 0.1                   | Flood Risk |
| 480 min Winter   | 10.828              | 0.033               | 0.8                          | 0.0                   | Flood Risk |
| 600 min Winter   | 10.826              | 0.031               | 0.7                          | 0.0                   | Flood Risk |
| 720 min Winter   | 10.823              | 0.028               | 0.6                          | 0.0                   | Flood Risk |
| 960 min Winter   | 10.820              | 0.025               | 0.5                          | 0.0                   | Flood Risk |
| 1440 min Winter  | 10.817              | 0.022               | 0.3                          | 0.0                   | O K        |
| 2160 min Winter  | 10.814              | 0.019               | 0.3                          | 0.0                   | O K        |
| 2880 min Winter  | 10.812              | 0.017               | 0.2                          | 0.0                   | O K        |
| 4320 min Winter  | 10.809              | 0.014               | 0.1                          | 0.0                   | O K        |
| 5760 min Winter  | 10.808              | 0.013               | 0.1                          | 0.0                   | O K        |
| 7200 min Winter  | 10.807              | 0.012               | 0.1                          | 0.0                   | O K        |
| 8640 min Winter  | 10.806              | 0.011               | 0.1                          | 0.0                   | O K        |
| 10080 min Winter | 10.805              | 0.010               | 0.1                          | 0.0                   | O K        |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 240 min Winter   | 20.604          | 0.0                       | 124                 |
| 360 min Winter   | 15.169          | 0.0                       | 182                 |
| 480 min Winter   | 12.185          | 0.0                       | 250                 |
| 600 min Winter   | 10.272          | 0.0                       | 304                 |
| 720 min Winter   | 8.930           | 0.0                       | 358                 |
| 960 min Winter   | 7.152           | 0.0                       | 474                 |
| 1440 min Winter  | 5.221           | 0.0                       | 714                 |
| 2160 min Winter  | 3.803           | 0.0                       | 1056                |
| 2880 min Winter  | 3.033           | 0.0                       | 1448                |
| 4320 min Winter  | 2.201           | 0.0                       | 2100                |
| 5760 min Winter  | 1.751           | 0.0                       | 2920                |
| 7200 min Winter  | 1.466           | 0.0                       | 3576                |
| 8640 min Winter  | 1.270           | 0.0                       | 4208                |
| 10080 min Winter | 1.124           | 0.0                       | 4968                |

|                                                                  |                                  |                                                                                     |
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| Lanmor Consulting Ltd                                            |                                  | Page 3                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PLOT 3 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

#### Time Area Diagram

Total Area (ha) 0.011

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |         |
|---|---------|
| 0 | 4 0.011 |
|---|---------|

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 3 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Model Details

Storage is Online Cover Level (m) 11.120

#### Complex Structure

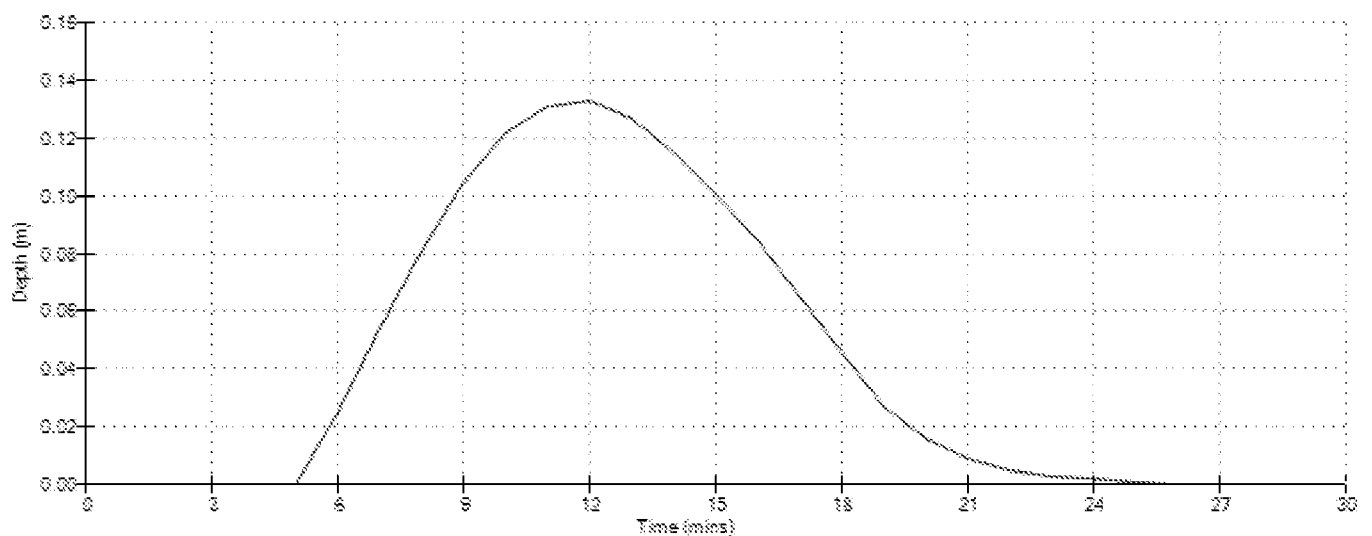
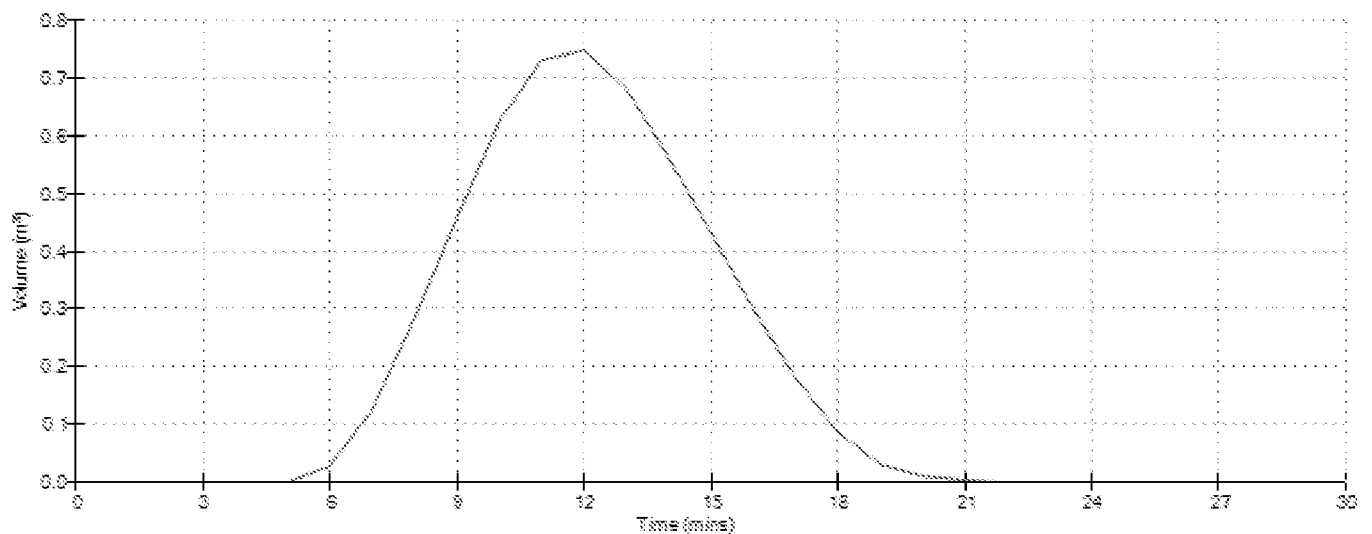
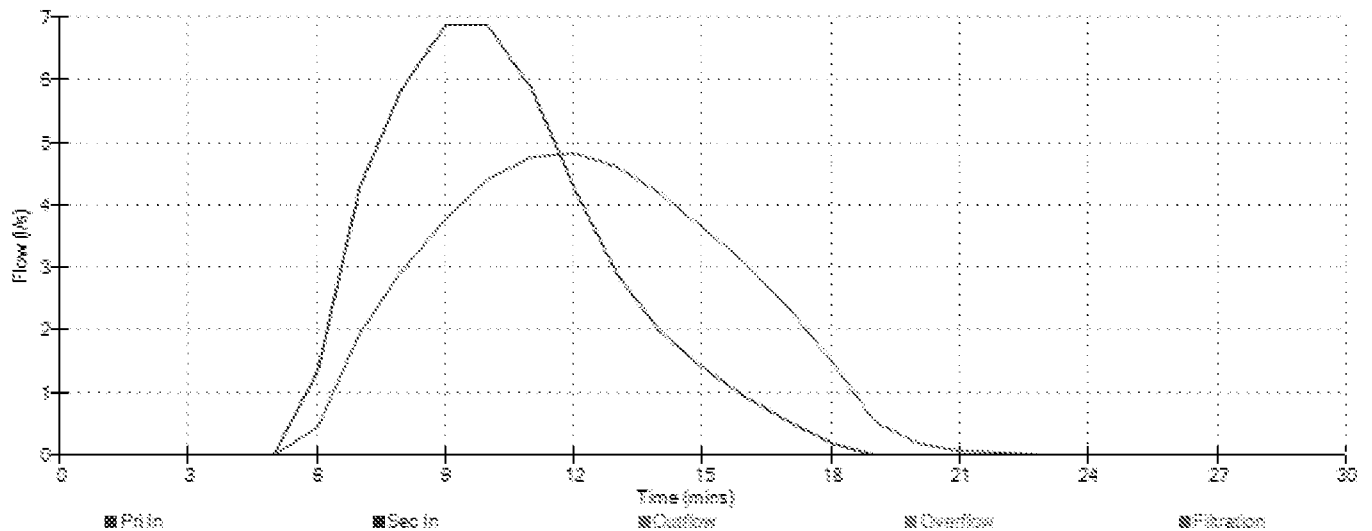
##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Width (m)               | 7.4   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 9.2   |
| Max Percolation (l/s)                | 18.9    | Slope (1:X)             | 38.2  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.795  | Cap Volume Depth (m)    | 0.225 |

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 7.4   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 3.1     | Slope (1:X)             | 38.2  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 11.035  | Cap Volume Depth (m)    | 0.225 |

Event: 15 min Winter



|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 4 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 2 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 15 min Summer    | 11.110              | 0.155               | 4.4                          | 0.8                   | Flood Risk |
| 30 min Summer    | 11.107              | 0.152               | 4.3                          | 0.8                   | Flood Risk |
| 60 min Summer    | 11.083              | 0.128               | 3.6                          | 0.5                   | Flood Risk |
| 120 min Summer   | 11.051              | 0.096               | 2.7                          | 0.3                   | Flood Risk |
| 180 min Summer   | 11.032              | 0.077               | 2.2                          | 0.2                   | Flood Risk |
| 240 min Summer   | 11.018              | 0.063               | 1.8                          | 0.1                   | Flood Risk |
| 360 min Summer   | 11.004              | 0.049               | 1.4                          | 0.1                   | Flood Risk |
| 480 min Summer   | 10.999              | 0.044               | 1.1                          | 0.1                   | Flood Risk |
| 600 min Summer   | 10.996              | 0.041               | 0.9                          | 0.1                   | Flood Risk |
| 720 min Summer   | 10.993              | 0.038               | 0.8                          | 0.0                   | Flood Risk |
| 960 min Summer   | 10.989              | 0.034               | 0.6                          | 0.0                   | Flood Risk |
| 1440 min Summer  | 10.984              | 0.029               | 0.5                          | 0.0                   | Flood Risk |
| 2160 min Summer  | 10.980              | 0.025               | 0.3                          | 0.0                   | O K        |
| 2880 min Summer  | 10.977              | 0.022               | 0.3                          | 0.0                   | O K        |
| 4320 min Summer  | 10.974              | 0.019               | 0.2                          | 0.0                   | O K        |
| 5760 min Summer  | 10.972              | 0.017               | 0.2                          | 0.0                   | O K        |
| 7200 min Summer  | 10.971              | 0.016               | 0.1                          | 0.0                   | O K        |
| 8640 min Summer  | 10.970              | 0.015               | 0.1                          | 0.0                   | O K        |
| 10080 min Summer | 10.969              | 0.014               | 0.1                          | 0.0                   | O K        |
| 15 min Winter    | 11.117              | 0.162               | 4.6                          | 0.9                   | Flood Risk |
| 30 min Winter    | 11.103              | 0.148               | 4.2                          | 0.7                   | Flood Risk |
| 60 min Winter    | 11.069              | 0.114               | 3.2                          | 0.4                   | Flood Risk |
| 120 min Winter   | 11.032              | 0.077               | 2.2                          | 0.2                   | Flood Risk |
| 180 min Winter   | 11.013              | 0.058               | 1.6                          | 0.1                   | Flood Risk |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 15 min Summer    | 129.682         | 0.0                       | 12                  |
| 30 min Summer    | 87.133          | 0.0                       | 19                  |
| 60 min Summer    | 55.837          | 0.0                       | 34                  |
| 120 min Summer   | 34.509          | 0.0                       | 64                  |
| 180 min Summer   | 25.637          | 0.0                       | 94                  |
| 240 min Summer   | 20.604          | 0.0                       | 124                 |
| 360 min Summer   | 15.169          | 0.0                       | 182                 |
| 480 min Summer   | 12.185          | 0.0                       | 242                 |
| 600 min Summer   | 10.272          | 0.0                       | 304                 |
| 720 min Summer   | 8.930           | 0.0                       | 362                 |
| 960 min Summer   | 7.152           | 0.0                       | 482                 |
| 1440 min Summer  | 5.221           | 0.0                       | 720                 |
| 2160 min Summer  | 3.803           | 0.0                       | 1088                |
| 2880 min Summer  | 3.033           | 0.0                       | 1420                |
| 4320 min Summer  | 2.201           | 0.0                       | 2156                |
| 5760 min Summer  | 1.751           | 0.0                       | 2888                |
| 7200 min Summer  | 1.466           | 0.0                       | 3672                |
| 8640 min Summer  | 1.270           | 0.0                       | 4392                |
| 10080 min Summer | 1.124           | 0.0                       | 5128                |
| 15 min Winter    | 129.682         | 0.0                       | 12                  |
| 30 min Winter    | 87.133          | 0.0                       | 20                  |
| 60 min Winter    | 55.837          | 0.0                       | 36                  |
| 120 min Winter   | 34.509          | 0.0                       | 64                  |
| 180 min Winter   | 25.637          | 0.0                       | 94                  |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 4 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

| Storm Event      | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status     |
|------------------|---------------|---------------|------------------------|-----------------|------------|
| 240 min Winter   | 11.004        | 0.049         | 1.3                    | 0.1             | Flood Risk |
| 360 min Winter   | 10.997        | 0.042         | 1.0                    | 0.1             | Flood Risk |
| 480 min Winter   | 10.993        | 0.038         | 0.8                    | 0.0             | Flood Risk |
| 600 min Winter   | 10.990        | 0.035         | 0.7                    | 0.0             | Flood Risk |
| 720 min Winter   | 10.987        | 0.032         | 0.6                    | 0.0             | Flood Risk |
| 960 min Winter   | 10.984        | 0.029         | 0.5                    | 0.0             | Flood Risk |
| 1440 min Winter  | 10.980        | 0.025         | 0.3                    | 0.0             | O K        |
| 2160 min Winter  | 10.976        | 0.021         | 0.3                    | 0.0             | O K        |
| 2880 min Winter  | 10.974        | 0.019         | 0.2                    | 0.0             | O K        |
| 4320 min Winter  | 10.971        | 0.016         | 0.1                    | 0.0             | O K        |
| 5760 min Winter  | 10.969        | 0.014         | 0.1                    | 0.0             | O K        |
| 7200 min Winter  | 10.968        | 0.013         | 0.1                    | 0.0             | O K        |
| 8640 min Winter  | 10.967        | 0.012         | 0.1                    | 0.0             | O K        |
| 10080 min Winter | 10.967        | 0.012         | 0.1                    | 0.0             | O K        |

| Storm Event      | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|------------------|--------------|---------------------|------------------|
| 240 min Winter   | 20.604       | 0.0                 | 126              |
| 360 min Winter   | 15.169       | 0.0                 | 182              |
| 480 min Winter   | 12.185       | 0.0                 | 242              |
| 600 min Winter   | 10.272       | 0.0                 | 302              |
| 720 min Winter   | 8.930        | 0.0                 | 368              |
| 960 min Winter   | 7.152        | 0.0                 | 476              |
| 1440 min Winter  | 5.221        | 0.0                 | 728              |
| 2160 min Winter  | 3.803        | 0.0                 | 1104             |
| 2880 min Winter  | 3.033        | 0.0                 | 1464             |
| 4320 min Winter  | 2.201        | 0.0                 | 2136             |
| 5760 min Winter  | 1.751        | 0.0                 | 2848             |
| 7200 min Winter  | 1.466        | 0.0                 | 3672             |
| 8640 min Winter  | 1.270        | 0.0                 | 4480             |
| 10080 min Winter | 1.124        | 0.0                 | 4960             |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 4 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

#### Time Area Diagram

Total Area (ha) 0.011

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |         |
|---|---------|
| 0 | 4 0.011 |
|---|---------|

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 4 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Model Details

Storage is Online Cover Level (m) 11.280

#### Complex Structure

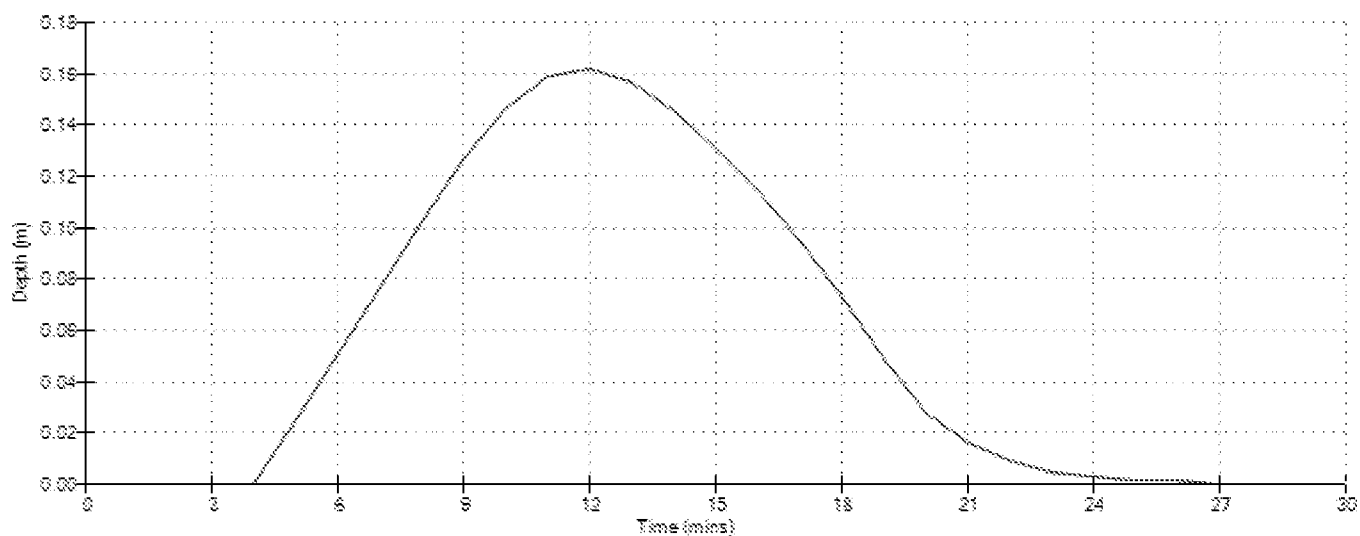
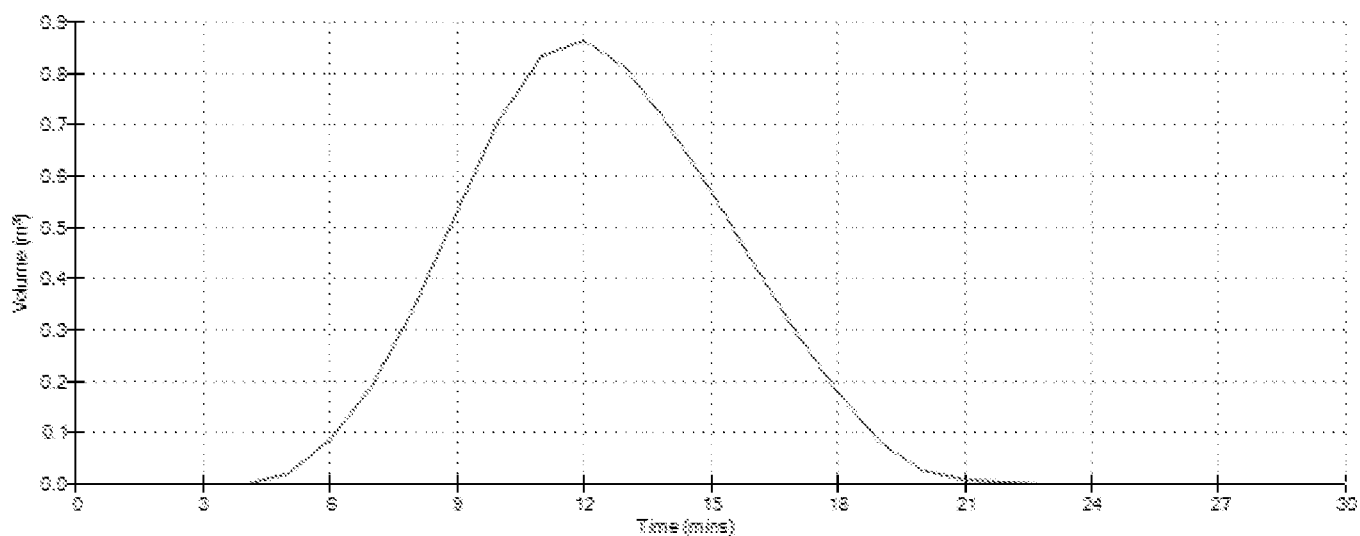
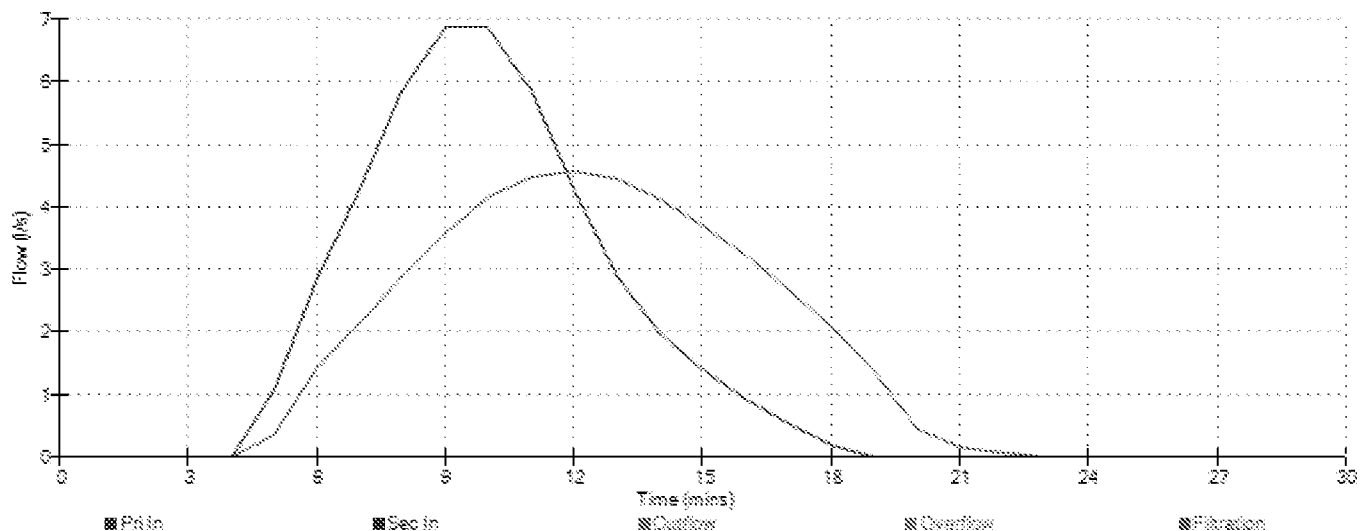
##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Width (m)               | 7.7   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 4.8   |
| Max Percolation (l/s)                | 10.3    | Slope (1:X)             | 28.6  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.955  | Cap Volume Depth (m)    | 0.225 |

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 7.7   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 3.2     | Slope (1:X)             | 28.6  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 11.125  | Cap Volume Depth (m)    | 0.225 |

Event: 15 min Winter



|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 5 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 2 minutes.

| Storm Event      | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status     |
|------------------|---------------|---------------|------------------------|-----------------|------------|
| 15 min Summer    | 10.618        | 0.113         | 4.8                    | 0.9             | Flood Risk |
| 30 min Summer    | 10.616        | 0.111         | 4.8                    | 0.9             | Flood Risk |
| 60 min Summer    | 10.598        | 0.093         | 4.0                    | 0.6             | Flood Risk |
| 120 min Summer   | 10.574        | 0.069         | 3.0                    | 0.4             | Flood Risk |
| 180 min Summer   | 10.560        | 0.055         | 2.4                    | 0.3             | Flood Risk |
| 240 min Summer   | 10.553        | 0.048         | 2.0                    | 0.2             | Flood Risk |
| 360 min Summer   | 10.546        | 0.041         | 1.5                    | 0.2             | O K        |
| 480 min Summer   | 10.542        | 0.037         | 1.2                    | 0.1             | O K        |
| 600 min Summer   | 10.539        | 0.034         | 1.0                    | 0.1             | O K        |
| 720 min Summer   | 10.537        | 0.032         | 0.9                    | 0.1             | O K        |
| 960 min Summer   | 10.534        | 0.029         | 0.7                    | 0.1             | O K        |
| 1440 min Summer  | 10.530        | 0.025         | 0.5                    | 0.1             | O K        |
| 2160 min Summer  | 10.526        | 0.021         | 0.4                    | 0.1             | O K        |
| 2880 min Summer  | 10.524        | 0.019         | 0.3                    | 0.0             | O K        |
| 4320 min Summer  | 10.521        | 0.016         | 0.2                    | 0.0             | O K        |
| 5760 min Summer  | 10.519        | 0.014         | 0.2                    | 0.0             | O K        |
| 7200 min Summer  | 10.518        | 0.013         | 0.2                    | 0.0             | O K        |
| 8640 min Summer  | 10.517        | 0.012         | 0.1                    | 0.0             | O K        |
| 10080 min Summer | 10.517        | 0.012         | 0.1                    | 0.0             | O K        |
| 15 min Winter    | 10.623        | 0.118         | 5.1                    | 1.0             | Flood Risk |
| 30 min Winter    | 10.613        | 0.108         | 4.6                    | 0.8             | Flood Risk |
| 60 min Winter    | 10.587        | 0.082         | 3.5                    | 0.5             | Flood Risk |
| 120 min Winter   | 10.560        | 0.055         | 2.4                    | 0.3             | Flood Risk |
| 180 min Winter   | 10.551        | 0.046         | 1.8                    | 0.2             | Flood Risk |

| Storm Event      | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|------------------|--------------|---------------------|------------------|
| 15 min Summer    | 129.682      | 0.0                 | 12               |
| 30 min Summer    | 87.133       | 0.0                 | 19               |
| 60 min Summer    | 55.837       | 0.0                 | 34               |
| 120 min Summer   | 34.509       | 0.0                 | 64               |
| 180 min Summer   | 25.637       | 0.0                 | 94               |
| 240 min Summer   | 20.604       | 0.0                 | 124              |
| 360 min Summer   | 15.169       | 0.0                 | 184              |
| 480 min Summer   | 12.185       | 0.0                 | 242              |
| 600 min Summer   | 10.272       | 0.0                 | 302              |
| 720 min Summer   | 8.930        | 0.0                 | 366              |
| 960 min Summer   | 7.152        | 0.0                 | 488              |
| 1440 min Summer  | 5.221        | 0.0                 | 724              |
| 2160 min Summer  | 3.803        | 0.0                 | 1100             |
| 2880 min Summer  | 3.033        | 0.0                 | 1452             |
| 4320 min Summer  | 2.201        | 0.0                 | 2192             |
| 5760 min Summer  | 1.751        | 0.0                 | 2936             |
| 7200 min Summer  | 1.466        | 0.0                 | 3608             |
| 8640 min Summer  | 1.270        | 0.0                 | 4384             |
| 10080 min Summer | 1.124        | 0.0                 | 4960             |
| 15 min Winter    | 129.682      | 0.0                 | 12               |
| 30 min Winter    | 87.133       | 0.0                 | 20               |
| 60 min Winter    | 55.837       | 0.0                 | 36               |
| 120 min Winter   | 34.509       | 0.0                 | 64               |
| 180 min Winter   | 25.637       | 0.0                 | 94               |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 5 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status |
|------------------|---------------------|---------------------|------------------------------|-----------------------|--------|
| 240 min Winter   | 10.546              | 0.041               | 1.5                          | 0.2                   | O K    |
| 360 min Winter   | 10.540              | 0.035               | 1.1                          | 0.1                   | O K    |
| 480 min Winter   | 10.537              | 0.032               | 0.9                          | 0.1                   | O K    |
| 600 min Winter   | 10.534              | 0.029               | 0.7                          | 0.1                   | O K    |
| 720 min Winter   | 10.532              | 0.027               | 0.6                          | 0.1                   | O K    |
| 960 min Winter   | 10.529              | 0.024               | 0.5                          | 0.1                   | O K    |
| 1440 min Winter  | 10.526              | 0.021               | 0.4                          | 0.0                   | O K    |
| 2160 min Winter  | 10.523              | 0.018               | 0.3                          | 0.0                   | O K    |
| 2880 min Winter  | 10.521              | 0.016               | 0.2                          | 0.0                   | O K    |
| 4320 min Winter  | 10.519              | 0.014               | 0.2                          | 0.0                   | O K    |
| 5760 min Winter  | 10.517              | 0.012               | 0.1                          | 0.0                   | O K    |
| 7200 min Winter  | 10.516              | 0.011               | 0.1                          | 0.0                   | O K    |
| 8640 min Winter  | 10.515              | 0.010               | 0.1                          | 0.0                   | O K    |
| 10080 min Winter | 10.515              | 0.010               | 0.1                          | 0.0                   | O K    |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 240 min Winter   | 20.604          | 0.0                       | 124                 |
| 360 min Winter   | 15.169          | 0.0                       | 188                 |
| 480 min Winter   | 12.185          | 0.0                       | 240                 |
| 600 min Winter   | 10.272          | 0.0                       | 304                 |
| 720 min Winter   | 8.930           | 0.0                       | 366                 |
| 960 min Winter   | 7.152           | 0.0                       | 480                 |
| 1440 min Winter  | 5.221           | 0.0                       | 712                 |
| 2160 min Winter  | 3.803           | 0.0                       | 1064                |
| 2880 min Winter  | 3.033           | 0.0                       | 1456                |
| 4320 min Winter  | 2.201           | 0.0                       | 2104                |
| 5760 min Winter  | 1.751           | 0.0                       | 2784                |
| 7200 min Winter  | 1.466           | 0.0                       | 3560                |
| 8640 min Winter  | 1.270           | 0.0                       | 4320                |
| 10080 min Winter | 1.124           | 0.0                       | 5136                |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 5 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

#### Time Area Diagram

Total Area (ha) 0.012

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |   |       |
|---|---|-------|
| 0 | 4 | 0.012 |
|---|---|-------|

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 5 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

#### Model Details

Storage is Online Cover Level (m) 10.850

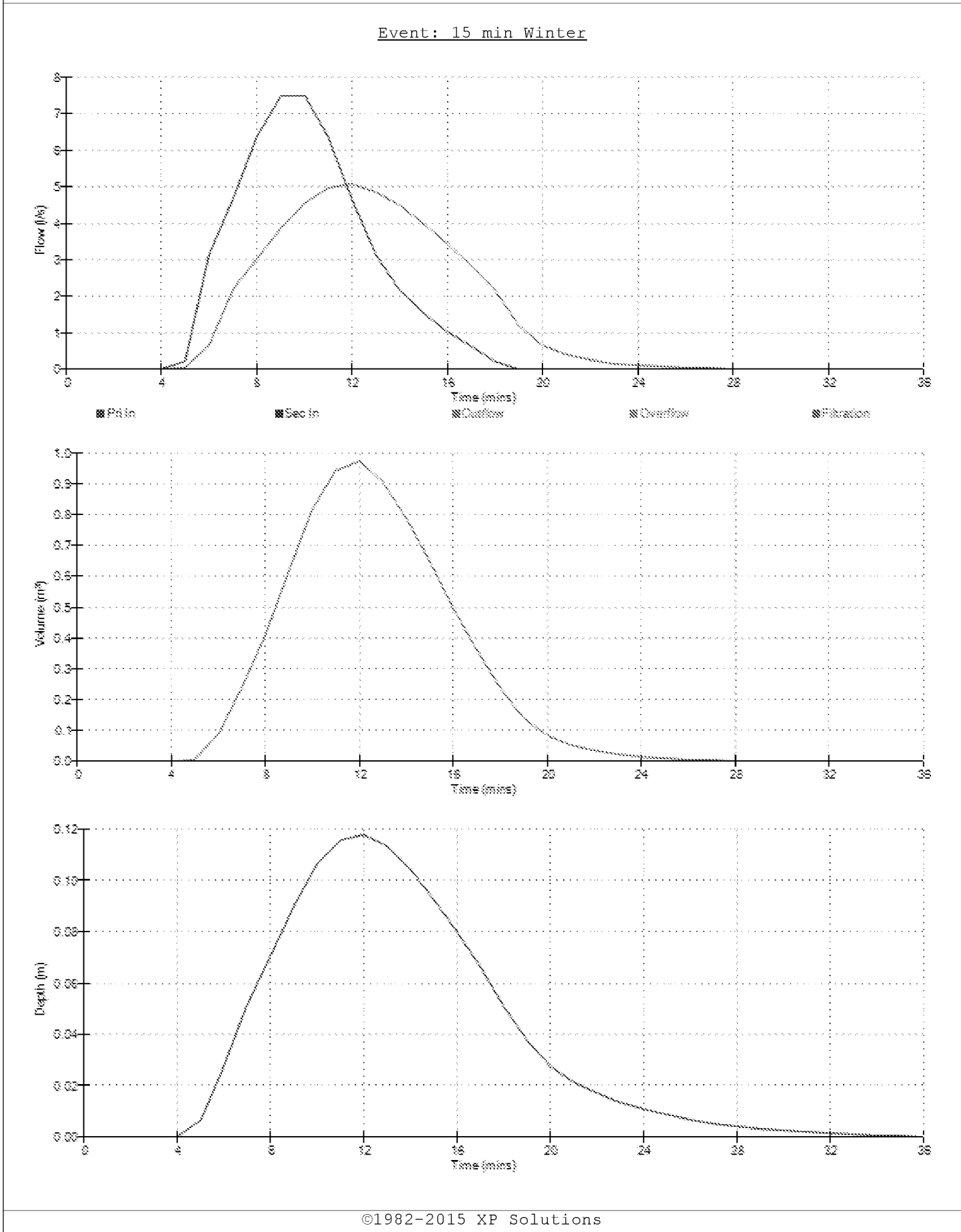
#### Complex Structure

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Width (m)               | 5.7   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 9.7   |
| Max Percolation (l/s)                | 15.4    | Slope (1:X)             | 58.8  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.505  | Cap Volume Depth (m)    | 0.225 |

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 5.7   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 2.4     | Slope (1:X)             | 75.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.505  | Cap Volume Depth (m)    | 0.225 |



|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PLOT 6 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 5 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 15 min Summer    | 10.678              | 0.173               | 2.7                          | 1.0                   | Flood Risk |
| 30 min Summer    | 10.682              | 0.177               | 2.8                          | 1.0                   | Flood Risk |
| 60 min Summer    | 10.663              | 0.158               | 2.5                          | 0.8                   | Flood Risk |
| 120 min Summer   | 10.630              | 0.125               | 2.0                          | 0.6                   | Flood Risk |
| 180 min Summer   | 10.607              | 0.102               | 1.6                          | 0.4                   | Flood Risk |
| 240 min Summer   | 10.592              | 0.087               | 1.4                          | 0.3                   | Flood Risk |
| 360 min Summer   | 10.572              | 0.067               | 1.1                          | 0.2                   | Flood Risk |
| 480 min Summer   | 10.560              | 0.055               | 0.9                          | 0.2                   | Flood Risk |
| 600 min Summer   | 10.554              | 0.049               | 0.8                          | 0.1                   | Flood Risk |
| 720 min Summer   | 10.550              | 0.045               | 0.6                          | 0.1                   | Flood Risk |
| 960 min Summer   | 10.546              | 0.041               | 0.5                          | 0.1                   | O K        |
| 1440 min Summer  | 10.540              | 0.035               | 0.4                          | 0.1                   | O K        |
| 2160 min Summer  | 10.535              | 0.030               | 0.3                          | 0.1                   | O K        |
| 2880 min Summer  | 10.532              | 0.027               | 0.2                          | 0.1                   | O K        |
| 4320 min Summer  | 10.528              | 0.023               | 0.2                          | 0.0                   | O K        |
| 5760 min Summer  | 10.525              | 0.020               | 0.1                          | 0.0                   | O K        |
| 7200 min Summer  | 10.524              | 0.019               | 0.1                          | 0.0                   | O K        |
| 8640 min Summer  | 10.522              | 0.017               | 0.1                          | 0.0                   | O K        |
| 10080 min Summer | 10.521              | 0.016               | 0.1                          | 0.0                   | O K        |
| 15 min Winter    | 10.687              | 0.182               | 2.9                          | 1.1                   | Flood Risk |
| 30 min Winter    | 10.684              | 0.179               | 2.8                          | 1.0                   | Flood Risk |
| 60 min Winter    | 10.653              | 0.148               | 2.4                          | 0.8                   | Flood Risk |
| 120 min Winter   | 10.612              | 0.107               | 1.7                          | 0.5                   | Flood Risk |
| 180 min Winter   | 10.588              | 0.083               | 1.3                          | 0.3                   | Flood Risk |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 15 min Summer    | 129.682         | 0.0                       | 12                  |
| 30 min Summer    | 87.133          | 0.0                       | 20                  |
| 60 min Summer    | 55.837          | 0.0                       | 36                  |
| 120 min Summer   | 34.509          | 0.0                       | 66                  |
| 180 min Summer   | 25.637          | 0.0                       | 96                  |
| 240 min Summer   | 20.604          | 0.0                       | 126                 |
| 360 min Summer   | 15.169          | 0.0                       | 186                 |
| 480 min Summer   | 12.185          | 0.0                       | 246                 |
| 600 min Summer   | 10.272          | 0.0                       | 302                 |
| 720 min Summer   | 8.930           | 0.0                       | 366                 |
| 960 min Summer   | 7.152           | 0.0                       | 488                 |
| 1440 min Summer  | 5.221           | 0.0                       | 714                 |
| 2160 min Summer  | 3.803           | 0.0                       | 1072                |
| 2880 min Summer  | 3.033           | 0.0                       | 1468                |
| 4320 min Summer  | 2.201           | 0.0                       | 2200                |
| 5760 min Summer  | 1.751           | 0.0                       | 2912                |
| 7200 min Summer  | 1.466           | 0.0                       | 3664                |
| 8640 min Summer  | 1.270           | 0.0                       | 4352                |
| 10080 min Summer | 1.124           | 0.0                       | 4960                |
| 15 min Winter    | 129.682         | 0.0                       | 13                  |
| 30 min Winter    | 87.133          | 0.0                       | 21                  |
| 60 min Winter    | 55.837          | 0.0                       | 36                  |
| 120 min Winter   | 34.509          | 0.0                       | 68                  |
| 180 min Winter   | 25.637          | 0.0                       | 96                  |

|                                                                  |                                  |                                                                                     |
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| Lanmor Consulting Ltd                                            |                                  | Page 2                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PLOT 6 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

Summary of Results for 100 year Return Period (+40%)

| Storm Event      | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status     |
|------------------|---------------|---------------|------------------------|-----------------|------------|
| 240 min Winter   | 10.573        | 0.068         | 1.1                    | 0.2             | Flood Risk |
| 360 min Winter   | 10.555        | 0.050         | 0.8                    | 0.2             | Flood Risk |
| 480 min Winter   | 10.550        | 0.045         | 0.6                    | 0.1             | Flood Risk |
| 600 min Winter   | 10.547        | 0.042         | 0.6                    | 0.1             | O K        |
| 720 min Winter   | 10.544        | 0.039         | 0.5                    | 0.1             | O K        |
| 960 min Winter   | 10.540        | 0.035         | 0.4                    | 0.1             | O K        |
| 1440 min Winter  | 10.535        | 0.030         | 0.3                    | 0.1             | O K        |
| 2160 min Winter  | 10.530        | 0.025         | 0.2                    | 0.1             | O K        |
| 2880 min Winter  | 10.528        | 0.023         | 0.2                    | 0.0             | O K        |
| 4320 min Winter  | 10.524        | 0.019         | 0.1                    | 0.0             | O K        |
| 5760 min Winter  | 10.522        | 0.017         | 0.1                    | 0.0             | O K        |
| 7200 min Winter  | 10.521        | 0.016         | 0.1                    | 0.0             | O K        |
| 8640 min Winter  | 10.520        | 0.015         | 0.1                    | 0.0             | O K        |
| 10080 min Winter | 10.519        | 0.014         | 0.1                    | 0.0             | O K        |

| Storm Event      | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|------------------|--------------|---------------------|------------------|
| 240 min Winter   | 20.604       | 0.0                 | 126              |
| 360 min Winter   | 15.169       | 0.0                 | 186              |
| 480 min Winter   | 12.185       | 0.0                 | 246              |
| 600 min Winter   | 10.272       | 0.0                 | 302              |
| 720 min Winter   | 8.930        | 0.0                 | 362              |
| 960 min Winter   | 7.152        | 0.0                 | 486              |
| 1440 min Winter  | 5.221        | 0.0                 | 732              |
| 2160 min Winter  | 3.803        | 0.0                 | 1084             |
| 2880 min Winter  | 3.033        | 0.0                 | 1432             |
| 4320 min Winter  | 2.201        | 0.0                 | 2152             |
| 5760 min Winter  | 1.751        | 0.0                 | 2896             |
| 7200 min Winter  | 1.466        | 0.0                 | 3568             |
| 8640 min Winter  | 1.270        | 0.0                 | 4208             |
| 10080 min Winter | 1.124        | 0.0                 | 5128             |

|                                                                  |                                  |                                                                                     |
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| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PLOT 6 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

#### Time Area Diagram

Total Area (ha) 0.009

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |         |
|---|---------|
| 0 | 4 0.009 |
|---|---------|

|                                                                  |                                  |                                                                                     |
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| Lanmor Consulting Ltd                                            |                                  | Page 4                                                                              |
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| Date July 2019<br>File PLOT 6 DRIVEWAY.SRCX                      | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

#### Model Details

Storage is Online Cover Level (m) 10.850

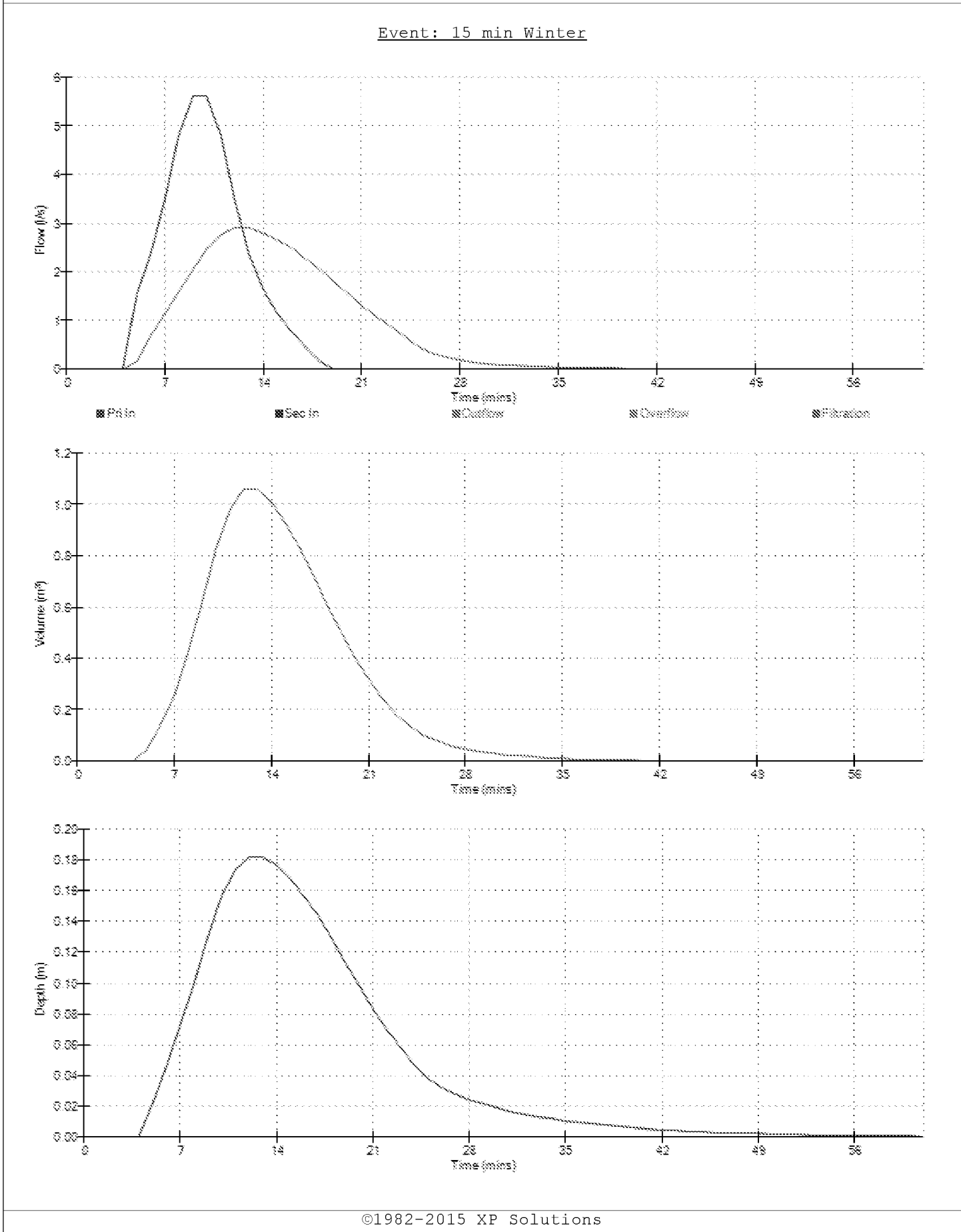
#### Complex Structure

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Width (m)               | 5.7   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 4.0   |
| Max Percolation (l/s)                | 6.3     | Slope (1:X)             | 21.7  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.505  | Cap Volume Depth (m)    | 0.225 |

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 5.7   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 2.4     | Slope (1:X)             | 75.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.505  | Cap Volume Depth (m)    | 0.225 |



|                                                                  |                                  |                                                                                     |
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| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PATIO 1 (PLOTS 1 & 4).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 1 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 15 min Summer    | 10.965              | 0.055               | 2.5                          | 0.2                   | Flood Risk |
| 30 min Summer    | 10.960              | 0.050               | 2.5                          | 0.2                   | Flood Risk |
| 60 min Summer    | 10.950              | 0.040               | 1.9                          | 0.1                   | Flood Risk |
| 120 min Summer   | 10.943              | 0.033               | 1.3                          | 0.1                   | Flood Risk |
| 180 min Summer   | 10.939              | 0.029               | 1.0                          | 0.1                   | Flood Risk |
| 240 min Summer   | 10.936              | 0.026               | 0.8                          | 0.0                   | Flood Risk |
| 360 min Summer   | 10.933              | 0.023               | 0.6                          | 0.0                   | Flood Risk |
| 480 min Summer   | 10.930              | 0.020               | 0.5                          | 0.0                   | Flood Risk |
| 600 min Summer   | 10.929              | 0.019               | 0.4                          | 0.0                   | Flood Risk |
| 720 min Summer   | 10.928              | 0.018               | 0.4                          | 0.0                   | Flood Risk |
| 960 min Summer   | 10.926              | 0.016               | 0.3                          | 0.0                   | Flood Risk |
| 1440 min Summer  | 10.923              | 0.013               | 0.2                          | 0.0                   | Flood Risk |
| 2160 min Summer  | 10.922              | 0.012               | 0.2                          | 0.0                   | Flood Risk |
| 2880 min Summer  | 10.920              | 0.010               | 0.1                          | 0.0                   | Flood Risk |
| 4320 min Summer  | 10.919              | 0.009               | 0.1                          | 0.0                   | Flood Risk |
| 5760 min Summer  | 10.918              | 0.008               | 0.1                          | 0.0                   | Flood Risk |
| 7200 min Summer  | 10.917              | 0.007               | 0.1                          | 0.0                   | Flood Risk |
| 8640 min Summer  | 10.917              | 0.007               | 0.1                          | 0.0                   | Flood Risk |
| 10080 min Summer | 10.916              | 0.006               | 0.0                          | 0.0                   | Flood Risk |
| 15 min Winter    | 10.966              | 0.056               | 2.5                          | 0.2                   | Flood Risk |
| 30 min Winter    | 10.955              | 0.045               | 2.3                          | 0.1                   | Flood Risk |
| 60 min Winter    | 10.946              | 0.036               | 1.6                          | 0.1                   | Flood Risk |
| 120 min Winter   | 10.939              | 0.029               | 1.0                          | 0.1                   | Flood Risk |
| 180 min Winter   | 10.935              | 0.025               | 0.8                          | 0.0                   | Flood Risk |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 15 min Summer    | 129.682         | 0.0                       | 11                  |
| 30 min Summer    | 87.133          | 0.0                       | 18                  |
| 60 min Summer    | 55.837          | 0.0                       | 34                  |
| 120 min Summer   | 34.509          | 0.0                       | 62                  |
| 180 min Summer   | 25.637          | 0.0                       | 94                  |
| 240 min Summer   | 20.604          | 0.0                       | 124                 |
| 360 min Summer   | 15.169          | 0.0                       | 184                 |
| 480 min Summer   | 12.185          | 0.0                       | 244                 |
| 600 min Summer   | 10.272          | 0.0                       | 306                 |
| 720 min Summer   | 8.930           | 0.0                       | 368                 |
| 960 min Summer   | 7.152           | 0.0                       | 488                 |
| 1440 min Summer  | 5.221           | 0.0                       | 712                 |
| 2160 min Summer  | 3.803           | 0.0                       | 1076                |
| 2880 min Summer  | 3.033           | 0.0                       | 1456                |
| 4320 min Summer  | 2.201           | 0.0                       | 2192                |
| 5760 min Summer  | 1.751           | 0.0                       | 2856                |
| 7200 min Summer  | 1.466           | 0.0                       | 3592                |
| 8640 min Summer  | 1.270           | 0.0                       | 4552                |
| 10080 min Summer | 1.124           | 0.0                       | 5128                |
| 15 min Winter    | 129.682         | 0.0                       | 11                  |
| 30 min Winter    | 87.133          | 0.0                       | 18                  |
| 60 min Winter    | 55.837          | 0.0                       | 34                  |
| 120 min Winter   | 34.509          | 0.0                       | 64                  |
| 180 min Winter   | 25.637          | 0.0                       | 92                  |

|                                                                  |                                  |                                                                                     |
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| Lanmor Consulting Ltd                                            |                                  | Page 2                                                                              |
| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PATIO 1 (PLOTS 1 & 4).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

| Storm Event      | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status     |
|------------------|---------------|---------------|------------------------|-----------------|------------|
| 240 min Winter   | 10.932        | 0.022         | 0.6                    | 0.0             | Flood Risk |
| 360 min Winter   | 10.929        | 0.019         | 0.4                    | 0.0             | Flood Risk |
| 480 min Winter   | 10.927        | 0.017         | 0.4                    | 0.0             | Flood Risk |
| 600 min Winter   | 10.926        | 0.016         | 0.3                    | 0.0             | Flood Risk |
| 720 min Winter   | 10.925        | 0.015         | 0.3                    | 0.0             | Flood Risk |
| 960 min Winter   | 10.923        | 0.013         | 0.2                    | 0.0             | Flood Risk |
| 1440 min Winter  | 10.921        | 0.011         | 0.2                    | 0.0             | Flood Risk |
| 2160 min Winter  | 10.920        | 0.010         | 0.1                    | 0.0             | Flood Risk |
| 2880 min Winter  | 10.919        | 0.009         | 0.1                    | 0.0             | Flood Risk |
| 4320 min Winter  | 10.918        | 0.008         | 0.1                    | 0.0             | Flood Risk |
| 5760 min Winter  | 10.917        | 0.007         | 0.1                    | 0.0             | Flood Risk |
| 7200 min Winter  | 10.916        | 0.006         | 0.0                    | 0.0             | Flood Risk |
| 8640 min Winter  | 10.916        | 0.006         | 0.0                    | 0.0             | Flood Risk |
| 10080 min Winter | 10.916        | 0.006         | 0.0                    | 0.0             | Flood Risk |

| Storm Event      | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|------------------|--------------|---------------------|------------------|
| 240 min Winter   | 20.604       | 0.0                 | 126              |
| 360 min Winter   | 15.169       | 0.0                 | 180              |
| 480 min Winter   | 12.185       | 0.0                 | 248              |
| 600 min Winter   | 10.272       | 0.0                 | 304              |
| 720 min Winter   | 8.930        | 0.0                 | 372              |
| 960 min Winter   | 7.152        | 0.0                 | 490              |
| 1440 min Winter  | 5.221        | 0.0                 | 710              |
| 2160 min Winter  | 3.803        | 0.0                 | 1120             |
| 2880 min Winter  | 3.033        | 0.0                 | 1424             |
| 4320 min Winter  | 2.201        | 0.0                 | 2128             |
| 5760 min Winter  | 1.751        | 0.0                 | 3000             |
| 7200 min Winter  | 1.466        | 0.0                 | 3640             |
| 8640 min Winter  | 1.270        | 0.0                 | 4128             |
| 10080 min Winter | 1.124        | 0.0                 | 5008             |

|                                                                  |                                  |                                                                                     |
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| Thorogood House<br>34 Tolworth Close<br>Surbition Surrey KT6 7EW | Dappers Lane<br>Angmering        |  |
| Date July 2019<br>File PATIO 1 (PLOTS 1 & 4).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

#### Time Area Diagram

Total Area (ha) 0.005

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |         |
|---|---------|
| 0 | 4 0.005 |
|---|---------|

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PATIO 1 (PLOTS 1 & 4).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

#### Model Details

Storage is Online Cover Level (m) 11.140

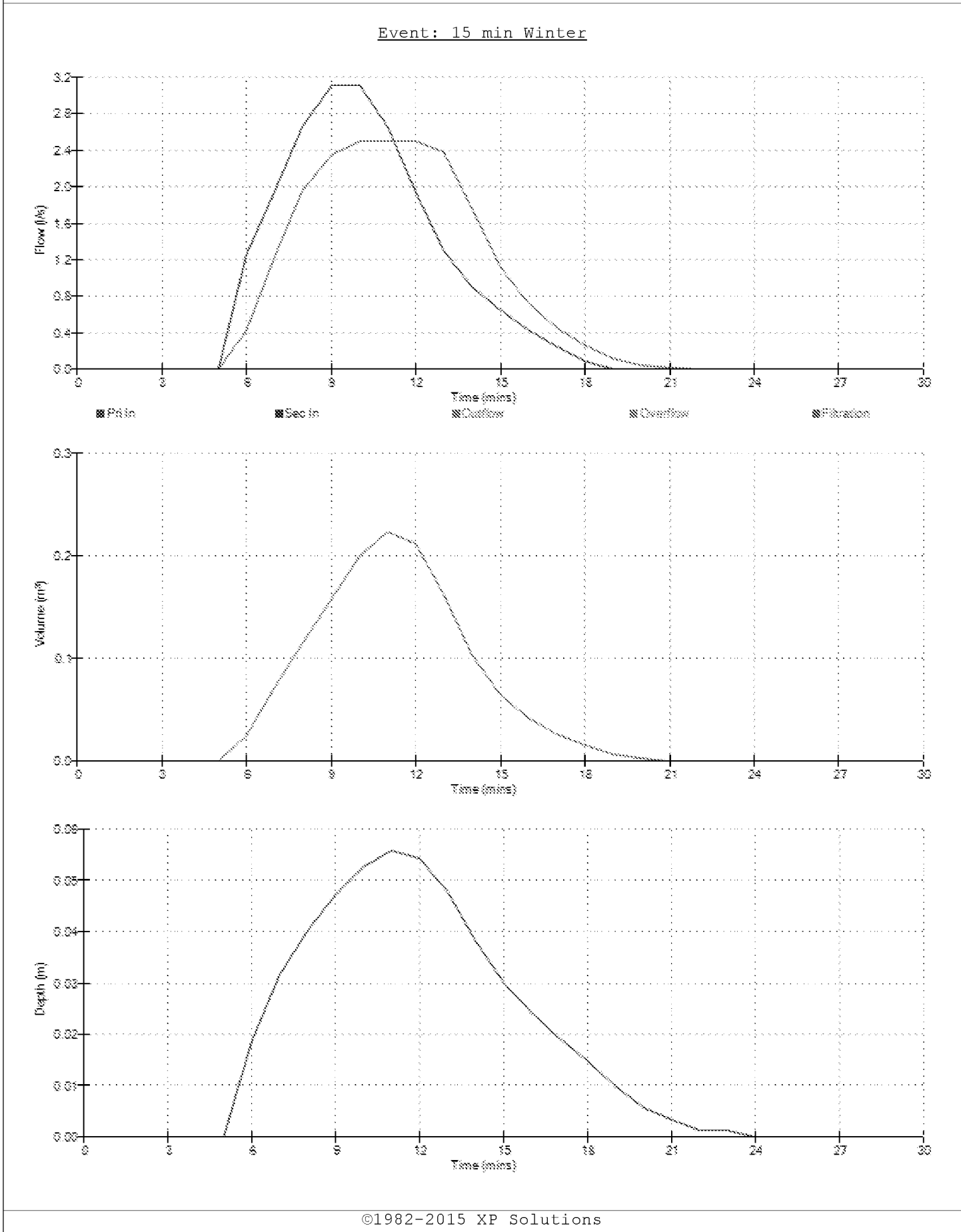
#### Complex Structure

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Width (m)               | 5.9   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 3.3   |
| Max Percolation (l/s)                | 5.4     | Slope (1:X)             | 80.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.910  | Cap Volume Depth (m)    | 0.150 |

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 5.9   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 2.5     | Slope (1:X)             | 80.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.950  | Cap Volume Depth (m)    | 0.150 |



|                                                                  |                           |                                                                                     |
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| Date July 2019                                                   | Designed by RS            |                                                                                     |
| File PATIO 2 (PLOTS 2 & 3).SRCX                                  | Checked by KBL            |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1     |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 1 minutes.

| Storm Event      | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status     |
|------------------|---------------|---------------|------------------------|-----------------|------------|
| 15 min Summer    | 11.069        | 0.059         | 2.8                    | 0.3             | Flood Risk |
| 30 min Summer    | 11.063        | 0.053         | 2.8                    | 0.2             | Flood Risk |
| 60 min Summer    | 11.051        | 0.041         | 2.3                    | 0.1             | Flood Risk |
| 120 min Summer   | 11.044        | 0.034         | 1.6                    | 0.1             | Flood Risk |
| 180 min Summer   | 11.040        | 0.030         | 1.2                    | 0.1             | Flood Risk |
| 240 min Summer   | 11.037        | 0.027         | 1.0                    | 0.1             | Flood Risk |
| 360 min Summer   | 11.034        | 0.024         | 0.8                    | 0.0             | Flood Risk |
| 480 min Summer   | 11.031        | 0.021         | 0.6                    | 0.0             | Flood Risk |
| 600 min Summer   | 11.029        | 0.019         | 0.5                    | 0.0             | Flood Risk |
| 720 min Summer   | 11.028        | 0.018         | 0.5                    | 0.0             | Flood Risk |
| 960 min Summer   | 11.026        | 0.016         | 0.4                    | 0.0             | Flood Risk |
| 1440 min Summer  | 11.024        | 0.014         | 0.3                    | 0.0             | Flood Risk |
| 2160 min Summer  | 11.022        | 0.012         | 0.2                    | 0.0             | Flood Risk |
| 2880 min Summer  | 11.021        | 0.011         | 0.2                    | 0.0             | Flood Risk |
| 4320 min Summer  | 11.019        | 0.009         | 0.1                    | 0.0             | Flood Risk |
| 5760 min Summer  | 11.019        | 0.009         | 0.1                    | 0.0             | Flood Risk |
| 7200 min Summer  | 11.018        | 0.008         | 0.1                    | 0.0             | Flood Risk |
| 8640 min Summer  | 11.017        | 0.007         | 0.1                    | 0.0             | Flood Risk |
| 10080 min Summer | 11.017        | 0.007         | 0.1                    | 0.0             | Flood Risk |
| 15 min Winter    | 11.071        | 0.061         | 2.8                    | 0.3             | Flood Risk |
| 30 min Winter    | 11.058        | 0.048         | 2.7                    | 0.2             | Flood Risk |
| 60 min Winter    | 11.047        | 0.037         | 1.9                    | 0.1             | Flood Risk |
| 120 min Winter   | 11.040        | 0.030         | 1.2                    | 0.1             | Flood Risk |
| 180 min Winter   | 11.036        | 0.026         | 0.9                    | 0.1             | Flood Risk |

| Storm Event      | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|------------------|--------------|---------------------|------------------|
| 15 min Summer    | 129.682      | 0.0                 | 11               |
| 30 min Summer    | 87.133       | 0.0                 | 19               |
| 60 min Summer    | 55.837       | 0.0                 | 34               |
| 120 min Summer   | 34.509       | 0.0                 | 62               |
| 180 min Summer   | 25.637       | 0.0                 | 92               |
| 240 min Summer   | 20.604       | 0.0                 | 122              |
| 360 min Summer   | 15.169       | 0.0                 | 182              |
| 480 min Summer   | 12.185       | 0.0                 | 246              |
| 600 min Summer   | 10.272       | 0.0                 | 306              |
| 720 min Summer   | 8.930        | 0.0                 | 358              |
| 960 min Summer   | 7.152        | 0.0                 | 486              |
| 1440 min Summer  | 5.221        | 0.0                 | 734              |
| 2160 min Summer  | 3.803        | 0.0                 | 1080             |
| 2880 min Summer  | 3.033        | 0.0                 | 1436             |
| 4320 min Summer  | 2.201        | 0.0                 | 2196             |
| 5760 min Summer  | 1.751        | 0.0                 | 2880             |
| 7200 min Summer  | 1.466        | 0.0                 | 3592             |
| 8640 min Summer  | 1.270        | 0.0                 | 4432             |
| 10080 min Summer | 1.124        | 0.0                 | 5080             |
| 15 min Winter    | 129.682      | 0.0                 | 11               |
| 30 min Winter    | 87.133       | 0.0                 | 18               |
| 60 min Winter    | 55.837       | 0.0                 | 34               |
| 120 min Winter   | 34.509       | 0.0                 | 64               |
| 180 min Winter   | 25.637       | 0.0                 | 94               |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PATIO 2 (PLOTS 2 & 3).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

Summary of Results for 100 year Return Period (+40%)

| Storm Event      | Max Level (m) | Max Depth (m) | Max Infiltration (l/s) | Max Volume (m³) | Status     |
|------------------|---------------|---------------|------------------------|-----------------|------------|
| 240 min Winter   | 11.033        | 0.023         | 0.7                    | 0.0             | Flood Risk |
| 360 min Winter   | 11.030        | 0.020         | 0.6                    | 0.0             | Flood Risk |
| 480 min Winter   | 11.028        | 0.018         | 0.4                    | 0.0             | Flood Risk |
| 600 min Winter   | 11.027        | 0.017         | 0.4                    | 0.0             | Flood Risk |
| 720 min Winter   | 11.025        | 0.015         | 0.3                    | 0.0             | Flood Risk |
| 960 min Winter   | 11.024        | 0.014         | 0.3                    | 0.0             | Flood Risk |
| 1440 min Winter  | 11.022        | 0.012         | 0.2                    | 0.0             | Flood Risk |
| 2160 min Winter  | 11.020        | 0.010         | 0.1                    | 0.0             | Flood Risk |
| 2880 min Winter  | 11.019        | 0.009         | 0.1                    | 0.0             | Flood Risk |
| 4320 min Winter  | 11.018        | 0.008         | 0.1                    | 0.0             | Flood Risk |
| 5760 min Winter  | 11.017        | 0.007         | 0.1                    | 0.0             | Flood Risk |
| 7200 min Winter  | 11.017        | 0.007         | 0.1                    | 0.0             | Flood Risk |
| 8640 min Winter  | 11.016        | 0.006         | 0.1                    | 0.0             | Flood Risk |
| 10080 min Winter | 11.016        | 0.006         | 0.0                    | 0.0             | Flood Risk |

| Storm Event      | Rain (mm/hr) | Flooded Volume (m³) | Time-Peak (mins) |
|------------------|--------------|---------------------|------------------|
| 240 min Winter   | 20.604       | 0.0                 | 126              |
| 360 min Winter   | 15.169       | 0.0                 | 180              |
| 480 min Winter   | 12.185       | 0.0                 | 248              |
| 600 min Winter   | 10.272       | 0.0                 | 296              |
| 720 min Winter   | 8.930        | 0.0                 | 374              |
| 960 min Winter   | 7.152        | 0.0                 | 480              |
| 1440 min Winter  | 5.221        | 0.0                 | 714              |
| 2160 min Winter  | 3.803        | 0.0                 | 1136             |
| 2880 min Winter  | 3.033        | 0.0                 | 1448             |
| 4320 min Winter  | 2.201        | 0.0                 | 2196             |
| 5760 min Winter  | 1.751        | 0.0                 | 2816             |
| 7200 min Winter  | 1.466        | 0.0                 | 3616             |
| 8640 min Winter  | 1.270        | 0.0                 | 4560             |
| 10080 min Winter | 1.124        | 0.0                 | 4592             |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PATIO 2 (PLOTS 2 & 3).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

#### Time Area Diagram

Total Area (ha) 0.006

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |         |
|---|---------|
| 0 | 4 0.006 |
|---|---------|

|                                                                  |                                  |                                                                                     |
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| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

#### Model Details

Storage is Online Cover Level (m) 11.240

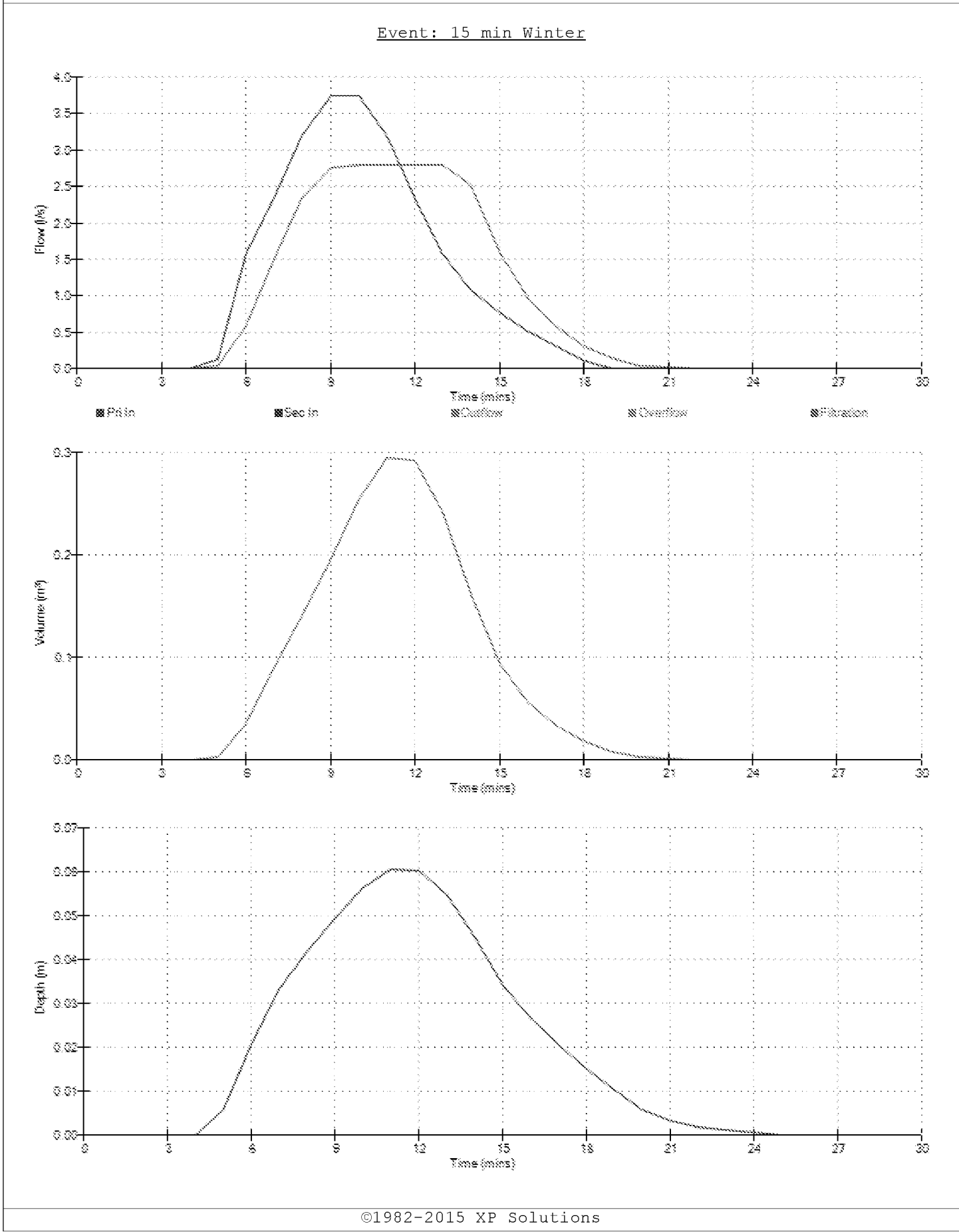
#### Complex Structure

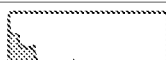
##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Width (m)               | 6.6   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 3.3   |
| Max Percolation (l/s)                | 6.1     | Slope (1:X)             | 80.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 11.010  | Cap Volume Depth (m)    | 0.150 |

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 6.6   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 2.8     | Slope (1:X)             | 80.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 11.050  | Cap Volume Depth (m)    | 0.150 |



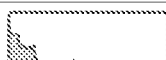
|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PATIO 3 (PLOTS 5 & 6).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 2 minutes.

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 15 min Summer    | 10.629              | 0.049               | 1.8                          | 0.2                   | Flood Risk |
| 30 min Summer    | 10.627              | 0.047               | 1.7                          | 0.2                   | Flood Risk |
| 60 min Summer    | 10.619              | 0.039               | 1.4                          | 0.2                   | Flood Risk |
| 120 min Summer   | 10.608              | 0.028               | 1.0                          | 0.1                   | Flood Risk |
| 180 min Summer   | 10.602              | 0.022               | 0.8                          | 0.1                   | Flood Risk |
| 240 min Summer   | 10.599              | 0.019               | 0.7                          | 0.0                   | Flood Risk |
| 360 min Summer   | 10.597              | 0.017               | 0.5                          | 0.0                   | Flood Risk |
| 480 min Summer   | 10.595              | 0.015               | 0.4                          | 0.0                   | Flood Risk |
| 600 min Summer   | 10.594              | 0.014               | 0.3                          | 0.0                   | Flood Risk |
| 720 min Summer   | 10.593              | 0.013               | 0.3                          | 0.0                   | Flood Risk |
| 960 min Summer   | 10.592              | 0.012               | 0.2                          | 0.0                   | Flood Risk |
| 1440 min Summer  | 10.590              | 0.010               | 0.2                          | 0.0                   | Flood Risk |
| 2160 min Summer  | 10.588              | 0.008               | 0.1                          | 0.0                   | Flood Risk |
| 2880 min Summer  | 10.588              | 0.008               | 0.1                          | 0.0                   | Flood Risk |
| 4320 min Summer  | 10.587              | 0.007               | 0.1                          | 0.0                   | Flood Risk |
| 5760 min Summer  | 10.586              | 0.006               | 0.1                          | 0.0                   | Flood Risk |
| 7200 min Summer  | 10.586              | 0.006               | 0.1                          | 0.0                   | Flood Risk |
| 8640 min Summer  | 10.585              | 0.005               | 0.0                          | 0.0                   | Flood Risk |
| 10080 min Summer | 10.585              | 0.005               | 0.0                          | 0.0                   | Flood Risk |
| 15 min Winter    | 10.630              | 0.050               | 1.8                          | 0.3                   | Flood Risk |
| 30 min Winter    | 10.625              | 0.045               | 1.6                          | 0.2                   | Flood Risk |
| 60 min Winter    | 10.613              | 0.033               | 1.2                          | 0.1                   | Flood Risk |
| 120 min Winter   | 10.602              | 0.022               | 0.8                          | 0.1                   | Flood Risk |
| 180 min Winter   | 10.598              | 0.018               | 0.6                          | 0.0                   | Flood Risk |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 15 min Summer    | 129.682         | 0.0                       | 11                  |
| 30 min Summer    | 87.133          | 0.0                       | 19                  |
| 60 min Summer    | 55.837          | 0.0                       | 34                  |
| 120 min Summer   | 34.509          | 0.0                       | 64                  |
| 180 min Summer   | 25.637          | 0.0                       | 94                  |
| 240 min Summer   | 20.604          | 0.0                       | 122                 |
| 360 min Summer   | 15.169          | 0.0                       | 182                 |
| 480 min Summer   | 12.185          | 0.0                       | 242                 |
| 600 min Summer   | 10.272          | 0.0                       | 302                 |
| 720 min Summer   | 8.930           | 0.0                       | 368                 |
| 960 min Summer   | 7.152           | 0.0                       | 488                 |
| 1440 min Summer  | 5.221           | 0.0                       | 730                 |
| 2160 min Summer  | 3.803           | 0.0                       | 1100                |
| 2880 min Summer  | 3.033           | 0.0                       | 1452                |
| 4320 min Summer  | 2.201           | 0.0                       | 2188                |
| 5760 min Summer  | 1.751           | 0.0                       | 2904                |
| 7200 min Summer  | 1.466           | 0.0                       | 3648                |
| 8640 min Summer  | 1.270           | 0.0                       | 4392                |
| 10080 min Summer | 1.124           | 0.0                       | 5096                |
| 15 min Winter    | 129.682         | 0.0                       | 12                  |
| 30 min Winter    | 87.133          | 0.0                       | 19                  |
| 60 min Winter    | 55.837          | 0.0                       | 34                  |
| 120 min Winter   | 34.509          | 0.0                       | 64                  |
| 180 min Winter   | 25.637          | 0.0                       | 92                  |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PATIO 3 (PLOTS 5 & 6).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

Summary of Results for 100 year Return Period (+40%)

| Storm<br>Event   | Max<br>Level<br>(m) | Max<br>Depth<br>(m) | Max<br>Infiltration<br>(l/s) | Max<br>Volume<br>(m³) | Status     |
|------------------|---------------------|---------------------|------------------------------|-----------------------|------------|
| 240 min Winter   | 10.596              | 0.016               | 0.5                          | 0.0                   | Flood Risk |
| 360 min Winter   | 10.594              | 0.014               | 0.4                          | 0.0                   | Flood Risk |
| 480 min Winter   | 10.593              | 0.013               | 0.3                          | 0.0                   | Flood Risk |
| 600 min Winter   | 10.592              | 0.012               | 0.2                          | 0.0                   | Flood Risk |
| 720 min Winter   | 10.591              | 0.011               | 0.2                          | 0.0                   | Flood Risk |
| 960 min Winter   | 10.590              | 0.010               | 0.2                          | 0.0                   | Flood Risk |
| 1440 min Winter  | 10.588              | 0.008               | 0.1                          | 0.0                   | Flood Risk |
| 2160 min Winter  | 10.587              | 0.007               | 0.1                          | 0.0                   | Flood Risk |
| 2880 min Winter  | 10.587              | 0.007               | 0.1                          | 0.0                   | Flood Risk |
| 4320 min Winter  | 10.586              | 0.006               | 0.1                          | 0.0                   | Flood Risk |
| 5760 min Winter  | 10.585              | 0.005               | 0.0                          | 0.0                   | Flood Risk |
| 7200 min Winter  | 10.585              | 0.005               | 0.0                          | 0.0                   | Flood Risk |
| 8640 min Winter  | 10.584              | 0.004               | 0.0                          | 0.0                   | Flood Risk |
| 10080 min Winter | 10.584              | 0.004               | 0.0                          | 0.0                   | Flood Risk |

| Storm<br>Event   | Rain<br>(mm/hr) | Flooded<br>Volume<br>(m³) | Time-Peak<br>(mins) |
|------------------|-----------------|---------------------------|---------------------|
| 240 min Winter   | 20.604          | 0.0                       | 126                 |
| 360 min Winter   | 15.169          | 0.0                       | 192                 |
| 480 min Winter   | 12.185          | 0.0                       | 244                 |
| 600 min Winter   | 10.272          | 0.0                       | 302                 |
| 720 min Winter   | 8.930           | 0.0                       | 368                 |
| 960 min Winter   | 7.152           | 0.0                       | 476                 |
| 1440 min Winter  | 5.221           | 0.0                       | 726                 |
| 2160 min Winter  | 3.803           | 0.0                       | 1028                |
| 2880 min Winter  | 3.033           | 0.0                       | 1368                |
| 4320 min Winter  | 2.201           | 0.0                       | 2160                |
| 5760 min Winter  | 1.751           | 0.0                       | 3008                |
| 7200 min Winter  | 1.466           | 0.0                       | 3336                |
| 8640 min Winter  | 1.270           | 0.0                       | 4568                |
| 10080 min Winter | 1.124           | 0.0                       | 5096                |

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PATIO 3 (PLOTS 5 & 6).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     |                                  | Source Control 2015.1                                                               |

#### Rainfall Details

|                       |                   |                       |       |
|-----------------------|-------------------|-----------------------|-------|
| Rainfall Model        | FSR               | Winter Storms         | Yes   |
| Return Period (years) | 100               | Cv (Summer)           | 0.750 |
| Region                | England and Wales | Cv (Winter)           | 0.840 |
| M5-60 (mm)            | 19.700            | Shortest Storm (mins) | 15    |
| Ratio R               | 0.350             | Longest Storm (mins)  | 10080 |
| Summer Storms         | Yes               | Climate Change %      | +40   |

#### Time Area Diagram

Total Area (ha) 0.004

| Time (mins) | Area     |
|-------------|----------|
| From:       | To: (ha) |

|   |         |
|---|---------|
| 0 | 4 0.004 |
|---|---------|

|                                                                  |                                  |                                                                                     |
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| Date July 2019<br>File PATIO 3 (PLOTS 5 & 6).SRCX                | Designed by RS<br>Checked by KBL |                                                                                     |
| XP Solutions                                                     | Source Control 2015.1            |                                                                                     |

#### Model Details

Storage is Online Cover Level (m) 10.810

#### Complex Structure

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 1.84680 | Width (m)               | 9.4   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 3.9     | Slope (1:X)             | 75.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.580  | Cap Volume Depth (m)    | 0.150 |

##### Porous Car Park

|                                      |         |                         |       |
|--------------------------------------|---------|-------------------------|-------|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m)               | 9.4   |
| Membrane Percolation (mm/hr)         | 1000    | Length (m)              | 1.5   |
| Max Percolation (l/s)                | 3.9     | Slope (1:X)             | 75.0  |
| Safety Factor                        | 4.0     | Depression Storage (mm) | 5     |
| Porosity                             | 0.30    | Evaporation (mm/day)    | 3     |
| Invert Level (m)                     | 10.600  | Cap Volume Depth (m)    | 0.150 |

