

Adam Littler Lead Local Flood Authority Post Point CHN 215 Hertfordshire County Council County Hall, Pegs Lane HERTFORD SG13 8DN

19 August 2022 CONFIDENTIAL

Dear Adam,

RE: RE: 6/2021/3422/MAJ - Salisbury Square, Hatfield, AL9 5AD

We are aware that Hertfordshire County Council, as the Lead Local Flood Authority (LLFA), issued an additional holding objection to the Planning Application for 6/2021/3422/MAJ – Salisbury Square, Hatfield in July 2022.

To overcome the objection, the report states the following:

"The applicant should address the points raised in the above in the form of a Sustainable Surface Water Management Strategy Compliance Report. This must clearly demonstrate how the proposal is aligned with Local and National Standards, CIRIA C753 and Local Policy" (LLFA Response: July 2022)

Each of the points raised in the letter have been addressed below:

1) The LLFA expect to see infiltration test results to BRE365 standards for the site at this stage in the design iteration. The use of infiltration has been ruled out by the applicant without robust evidence that this form of drainage, in line with the drainage hierarchy, cannot be utilised. The applicant should undertake such testing and submit results to the LLFA for technical assessment.

We have received correspondence from Affinity Water (attached, reference 6.2021.3422.MAJ 150422) with regard to water quality for the site, which strictly rules out the use of infiltration for the scheme due to the risk of groundwater pollutant migration, the relevant excerpt can be found below.

3. Infiltration

Surface water should not be disposed of via direct infiltration into the ground via a soakaway due to the potential impact that could be caused to the bromate plume. Condition

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C) Prior to the commencement of development, details of a Surface Water Drainage Scheme that does not include infiltration shall be submitted to and approved in writing by the Local Planning Authority in conjunction with Affinity Water.

Reason: To provide confirmation that direct infiltration via soakaways will not be used due to the potential presence of contamination and the risk for contaminants to migrate causing further groundwater pollution, potentially impacting public water supply.

We assume this fulfils the justification for no infiltration and as such will not be undertaking infiltration testing.

2) Furthermore, the soil type used in the Wallingford Procedure identifies soil type as 2. The applicant should validate why there is an assertion the site is based on clay, yet soil 2 is used for calculation purposes.

I believe this is a misreading of the greenfield run off rate appendix, the default value given for the site is Soil Type 2, however this has been overwritten with the custom 'edited' value of Soil Type 4 which represents the clay soil type.

| Soil characteristics | Default | Edited |
|----------------------|---------|--------|
| SOIL type: | 2 | 4 |
| HOST class: | N/A | N/A |
| SPR/SPRHOST: | 0.3 | 0.47 |

Figure 1 – Greenfield Run-off Soil Characteristics

Please refer to enclosed Appendix F of the FRA (8003-WSP-ZZ-RP-D-0001-P03) – Greenfield Run Off Rates

3) The applicant should also re-run the calculation files for all impermeable area using a Cv value of 0.95 for roofed areas and 0.9 for all hardstanding, as a sensitivity test. The LLFA does not currently have confidence the default Cv values used accurately represent the site conditions. If the applicant does not agree with this, they should justify clearly why they believe this is not required.

We have undertaken a sensitivity check with Cv values of 0.9 for hardstanding and 0.95 for roof area respectively. However, we have used a lower value (0.84) for the areas of permeable asphalt as we feel is more representative, given that there is an element of migration through the permeable surface and storage sub-base and long-term storage. We feel that this is a conservative approach given the critical storm occurs in the summer and the CIRIA SuDS guide Table 11.4 suggests that run-off coefficients for paving when dry are of the order 0.75.

Please find enclosed updated source control calculations with the revised Cv values as a sensitivity test. This results in no flooding in the 1 in 30 or 1 in 100 year event with the EA central 25% climate change allowance applied. When the upper forecast of 40% climate change is applied this results in small quantities of flooding of 11.1m³ and 6.8m³ for catchments 1 and 2 respectively. This is not an



excessive quantum of flooding and will not produce undue effects on site. Any flooding that may occur will be directed towards the pedestrian access though to Park Street on the eastern side of the site for catchment 1 and will be directed to the localise low spot in the centre of the far southern area in catchment 2. Furthermore, we are providing betterment over the existing situation where no known attenuation or specific flow control exists, and therefore this potential flooding does not represent an increase in flood risk off site.

4) Suitable Drainage Strategy including assessment of the SuDS hierarchy. The applicant should now provide a compliance report detailing how the proposed Surface Water Drainage Strategy conform to local and national standards

The Drainage Strategy for the site follows both local and national policy, detailed explanation of compliance can be found below:

Runoff Rates

Hertfordshire (HCC) LLFA guidance and the Local Flood Risk Management Strategy (LFRMS) states that peak discharge rates from the site should not increase as a result of development, as detailed in our FRA we are providing betterment over existing rates in all return period events assessed up to the 1 in 100 year. HCC guidance also states that for Brownfield sites the run-off should aim to provide greenfield rates where possible, in our case Greenfield flows are matched for all events up to the 1 in 100-year storm as closely as possible. This also provides betterment in line with Welwyn-Hatfield SFRA, Hertfordshire LFRMS and DEFRA national requirements in the Non-statutory technical standards for sustainable drainage systems.

Storage Volumes

In line with HCC policy storage has been provided to attenuate for storm events up to and including the 1 in 100 year with a 40% allowance for climate change (the EA upper end allowance for the Upper Lee Management Catchment for developments with a lifespan exceeding 2100). No flooding occurs in the 1 in 30 or 1 in 100 year event with upper end climate change allowance. As previously explained when a sensitivity test is carried out for the elevated Cv values, flooding does occur but only in the 1 in 100year event with upper end climate change scenario and volumes are not significant. This is in line with the Welwyn Hatfield SFRA, LFRMS and NPPF and DEFRA guidance.

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Sustainable Drainage Techniques

| | SuDS Features | Flood Reduction | Pollution Reduction | Biodiversity Benefit |
|----------------------|---|--------------------|------------------------|-------------------------|
| Most | Living roofs and walls | | | |
| Sustainable | Basins and ponds | | | |
| | Filter strips and swales | | | |
| | Infiltration devices | | | |
| | Permeable surfaces and filter drains | | | |
| Least Sustainable | Tanked and piped systems | | | |

Figure 2 – SuDS Hierarchy

The SuDs regime for the site follows chapter 1 of the CIRIA SuDS Manual (C753), The Philosophy of SuDS and complies with the SuDS hierarchy as outlined in the HCC LLFA guidance (above):

- Green roofs/walls are not suitable for this site due to the provision of traditional pitched roofs on the scheme in response to the historic context of Salisbury Square. As a brownfield site, there is a lack of external space for basins/ponds due to the parking provision and access requirements of the scheme.
- As a brownfield site, there is a lack of external space for swales/filter strips due to the parking provision and access requirements of the scheme.
- Infiltration devices are not suitable as explained previously due to Affinity Waters assertion that there is a risk of potential for migration of contaminants within the underlying geology
- Permeable surfaces have been included for the scheme which will provide an element of attenuation and long-term storage.
- Tanked and piped systems have been included to attenuate and convey flows.

Water Quality

The drainage strategy meets the water quality requirements for discharge to surface water in the CIRIA SuDS Manual (C753) Chapter 26 – Water Quality Management and the Simple Index Approach. The worst-case hazard indices represented for the site are 'non-residential car parks with frequent change and all low traffic roads' This gives indices of 0.7, 0.6 and 0.7 for Total Suspended Solids (TSS), Metals and Hydrocarbons respectively. The use of permeable pavement gives mitigation indices that provide sufficient treatment with indices of 0.7, 0.6 & 0.7 respectively.

5) As previously highlighted to the applicant the site is deemed to be at low, medium and high risk of surface water flooding. We require further clarification establishing the location/extent of any existing and potential surface water flood risk alongside surface water flood maps. In areas where flooding from surface water is identified, we require clarification on the mitigation methods

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used to overcome this to ensure there is no increase in flooding both on and off site from the proposed development. Pre and post development mitigated surface water flow paths should be identified on plan, this should

include explanation of safe ingress/egress in times of exceedance.

As per surface water flood risk mapping (figure 3, below) safe access/egress of the site will be possible through the identified vehicular access in the north-western corner of the site from Arm and Sword Lane and pedestrian access from the A1000 on the western side of the site in all return period events up to the 1 in 1000 year return period. No significant re-profiling of the site is proposed, and the proposed drainage strategy captures and attenuates flows – therefore betterment is anticipated over the scenarios shown in these flood risk maps. We have included arrows on the drainage strategy drawing (enclosed) indicating exceedance flow routes in flooding scenarios, flows from catchment 2 are directed to a localised low spot in the south of the site adjacent to a pedestrian access to Park Street and for catchment 1 the additional pedestrian access through to Park Street on the eastern side of site respectively.

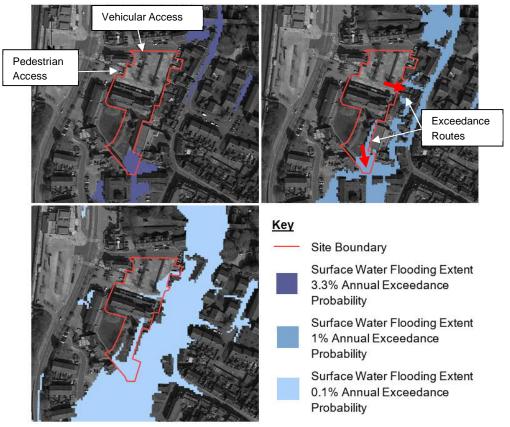


Figure 3 – Surface Water Flood Risk Maps

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Comparing the extents shown to the surveyed topography of the site gives the following approximate flood levels represented on the site;

| Annual Exceedance Probability | Approximate Maximum Flood level | Approximate Maximum Flood level |
|----------------------------------|------------------------------------|------------------------------------|
| | (mAOD) Catchment 1 | (mAOD) Catchment 2 |
| 3.3% | n/a | 72.2 |
| 1% | 71.1 | 72.5 |
| 0.1% | 71.8 | 72.9 |

Finished Floor Levels (FFLs) will be set a minimum of 150mm above the maximum surface water flood level of 72.9mAOD. The topographical survey has been enclosed.

We have enclosed documentation referred to within our response. We hope you concur with our opinion, and we trust that on the basis of the above additional information the LLFA can now withdraw its objection to the planning application without further delay. If there are any aspects of the above that you need clarification on, or if there are any issues which you wish to discuss further, then please do not hesitate to contact me.

Yours sincerely



Joe Leslie Senior Engineer

Enclosures.: Affinity Water Correspondence, reference 6.2021.3422.MAJ 150422 Additional Microdrainage Modelling Outputs Appendix F of the FRA (8003-WSP-ZZ-RP-D-0001-P03) – Greenfield Run Off Rates Topographical Survey by Plowman Craven 30279T-01-1



Welwyn Hatfield Borough Council, The Campus, Welwyn Garden City, Herts AL8 6AE

Reference Number: 6/2021/3422/MAJ

14 April 2022

Dear Madam/Sir

DESCRIPTION: Erection of 1 x building containing 3 x flats, 11 x offices and 1 x retail unit (Use Class E), erection of 5 x terrace houses with parking and associated works, involving demolition of existing shopping parade with 7 x maisonettes above, alterations to existing parking area and erection of a parking area

LOCATION: Salisbury Square Hatfield AL9 5AD

Thank you for notification of the above planning application. Planning applications are referred to us where our input on issues relating to water quality or quantity may be required.

You should be aware that the proposed development site is located within an area that is impacted by Bromate contamination.

Our main concern is the potential for deep excavation works for foundations and drainage (e.g. soakaways) to require penetration through the Lowestoff formation creating a pathway between to two aquifers, **which must be avoided**. The Bromate plume is present in the upper aquifer and connections between the two risk the migration of bromate plume into the Chalk/lower aquifer towards other abstractions.

We ask that the above concern is considered throughout further plans of the development and for the following conditions are implemented:

1. Contamination

Any works involving excavations that penetrate into the Lowestoft formation should be avoided. If these are necessary, then the following condition needs to be implemented:

Condition

AffinityWater

Taking care of your water

- A) No works involving excavations shall be carried until the following has been submitted to and approved in writing by the Local Planning Authority in conjunction with Affinity Water:
 - i) An Intrusive Ground Investigation to identify the current state of the site and appropriate techniques to avoid displacing any shallow contamination to a greater depth.
 - ii) A **Risk Assessment** identifying both the aquifer and the abstraction points as potential receptors of contamination.
 - iii) A Method Statement detailing the depth and type of excavations (e.g. piling) to be undertaken including mitigation measures (e.g. appropriate piling design, off site monitoring boreholes etc.) to prevent and/or minimise any potential migration of pollutants to public water supply. Any excavations must be undertaken in accordance with the terms of the approved method statement.

Reason: Excavation works into the Lowestoft formation have the potential to cause migration of contaminants into the lower aquifer and towards public water supply abstractions. This can cause critical abstractions to switch off resulting in the immediate need for water to be sourced from another location, which incurs significant costs and risks of loss of supply.

2. Contamination during construction

Construction works may exacerbate any known or previously unidentified contamination. If any pollution is found at the site, then works should cease immediately and appropriate monitoring and remediation will need to be undertaken to avoid any impact on water quality in the chalk aquifer.

Condition

B) If, during development, contamination not previously identified is found to be present at the site, then no further development shall be carried out until a **Remediation Strategy** detailing how this contamination will be dealt with has been submitted to and approved in writing by the Local Planning Authority in conjunction with Affinity Water. The remediation strategy shall be implemented as approved with a robust pre and post monitoring plan to determine its effectiveness.

Reason: To ensure that the development does not contribute to unacceptable concentrations of pollution posing a risk to public water supply from previously unidentified contamination sources at the development site and to prevent deterioration of groundwater and/or surface water.

3. Infiltration

Surface water should not be disposed of via direct infiltration into the ground via a soakaway due to the potential impact that could be caused to the bromate plume.

Condition

AffinityWater

Taking care of your water

C) Prior to the commencement of development, details of a Surface Water Drainage Scheme that does not include infiltration shall be submitted to and approved in writing by the Local Planning Authority in conjunction with Affinity Water.

Reason: To provide confirmation that direct infiltration via soakaways will not be used due to the potential presence of contamination and the risk for contaminants to migrate causing further groundwater pollution, potentially impacting public water supply.

The construction works and operation of the proposed development site should be done in accordance with the relevant British Standards and Best Management Practices, thereby significantly reducing the groundwater pollution risk.

For further information we refer you to CIRIA Publication C532 "Control of water pollution from construction - guidance for consultants and contractors".

Water efficiency

Being within a water stressed area, we expect that the development includes water efficient fixtures and fittings. Measures such as rainwater harvesting and grey water recycling help the environment by reducing pressure for abstractions in chalk stream catchments. They also minimise potable water use by reducing the amount of potable water used for washing, cleaning and watering gardens. This in turn reduces the carbon emissions associated with treating this water to a standard suitable for drinking, and will help in our efforts to get emissions down in the borough.

Infrastructure connections and diversions

There are potentially water mains running through or near to part of proposed development site. If the development goes ahead as proposed, the developer will need to get in contact with our Developer Services Team to discuss asset protection or diversionary measures. This can be done through the My Developments Portal (<u>https://affinitywater.custhelp.com/</u>) or <u>aw_developerservices@custhelp.com</u>.

In this location Affinity Water will supply drinking water to the development. To apply for a new or upgraded connection, please contact our Developer Services Team by going through their My Developments Portal (<u>https://affinitywater.custhelp.com/</u>) or <u>aw_developerservices@custhelp.com</u>. The Team also handle C3 and C4 requests to cost potential water mains diversions. If a water mains plan is required, this can also be obtained by emailing <u>maps@affinitywater.co.uk</u>. Please note that charges may apply.

Thank you for your consideration.

Yours sincerely



Taking care of your water

Laurence Chalk Catchment Officer Catchment Management planning@affinitywater.co.uk laurence.chalk@affinitywater.co.uk

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| | | | Model De | tails | | | |
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| | H | ydro-Brake | ® Optimur | n Outflow | Control | | |
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| mb a bradaa la ai a | | | _ | | d (Diashawa | . wolationa | bin for th |
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| 0.100 | 2.5 | 1.200 | 3.4 | 3.000 | 5.2 | 7.000 | 7.7 |
| 0.200 | 3.0 | 1.400 | 3.6 | 3.500 | 5.5 | 7.500 | 7.9 |
| 0.300 | 3.1 | 1.600 | 3.8 | 4.000 | 5.9 | 8.000 | 8.2 |
| 0.400 | 3.0 | 1.800 | 4.1 | 4.500 | 6.2 | 8.500 | 8.4 |
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| | | | 5 | SALISBURY | SQUARE | | | |
| | | | C | CATCHMENT | 2 | | | |
| | | | F | REVISED CV | 7 - 25% C | C | | Micco |
| te 17/08/ | /2022 | | г | Designed b | DV HL | | | |
| ,, | | iand an | | | | | | Draina |
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| Solutior | 15 | | | Source Cor | ntrol 201 | .9.1 | | |
| | a | ()) | | 100 | . | - · · | (| ` |
| | Summary | of Resul | ts IOI | r 100 yea | r Return | Period | (+25% | <u>)</u> |
| | | Hal | lf Drain | n Time : 39 | 5 minutes. | | | |
| | Storm | Max M | lax | Max | Max | Max | Max | Status |
| | Event | Level De | pth Inf | Eiltration | Control E | Outflow | Volume | |
| | | (m) (| m) | (l/s) | (l/s) | (l/s) | (m³) | |
| | | | | | | | | |
| | min Summer | | | 0.0 | 2.7 | 2.7 | 48.8 | ОК |
| | min Summer | | | 0.0 | 2.8 | 2.8 | 64.4 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 79.4 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 95.4 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 105.7 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 113.2 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 123.2 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 129.6 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 133.2 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 135.0 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 134.8 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 126.7 | ОК |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 109.4 | ΟK |
| | min Summer | | | 0.0 | 2.9 | 2.9 | 92.9 | O K |
| | min Summer | | | 0.0 | 2.8 | 2.8 | 66.8 | ОК |
| | min Summer | | | 0.0 | 2.7 | 2.7 | 50.2 | ОК |
| | min Winter | | | 0.0 | 2.7 | 2.7 | 48.9 | ОК |
| | min Winter | | | 0.0 | 2.8 | 2.8 | 64.4 | ОК |
| | min Winter | | | 0.0 | 2.9 | 2.9 | 79.4 | ОК |
| 120 | min Winter | 0.288 0. | 288 | 0.0 | 2.9 | 2.9 | 95.5 | O K |
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| | | Storm | Rai | | - | | | |
| | | Storm Event | | hr) Volume | Volume | e lime-P (mins | ;) | |
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| | 15 | | (mm/) | hr) Volume (m³) | Volume (m³) | (mins | ;) 25 | |
| | | Event | (mm/) er 115. | hr) Volume (m ³) 450 0.0 | Volume (m ³) 48. | (mins | | |
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| | 30 60 120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760 | Event min Summe min Summe | (mm/) er 115. er 77. er 48. er 30. er 23. er 19. er 15. er 13. er 11. er 10. er 8. er 6. er 4. er 3. er 2. er 1. | hr) Volume (m³) 450 0.0 125 0.0 863 0.0 888 0.0 871 0.0 978 0.0 629 0.0 360 0.0 075 0.0 104 0.0 419 0.0 488 0.0 945 0.0 | Volume (m ³) 48. (m ³) 48. (n) 50.(n) 50.(n) | (mins 3 2 0 8 1 7 1 3 8 6 0 9 4 1 3 2 7 3 | 25 39 68 126 184 242 328 396 464 530 668 942 340 728 428 120 | |
| | 30 60 120 240 360 480 600 720 960 1440 2160 2880 4320 5760 15 | Event min Summe min Summe | (mm/) er 115. er 77. er 48. er 30. er 23. er 19. er 15. er 13. er 11. er 8. er 6. er 4. er 3. er 2. er 1. er 1. er 1. | hr) Volume (m³) 450 0.0 125 0.0 863 0.0 888 0.0 871 0.0 978 0.0 629 0.0 360 0.0 075 0.0 104 0.0 419 0.0 488 0.0 476 0.0 945 0.0 | Volume (m ³) 48. (m ³) 48. (5) (5) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7 | (mins 3 2 0 8 1 7 1 3 8 6 0 9 4 1 3 2 7 3 3 | 25 39 68 126 184 242 328 396 464 530 668 942 340 728 428 120 25 | |
| | 30 60 120 240 360 480 600 720 960 1440 2160 2880 4320 5760 15 30 | Event min Summe min Summe | (mm/) er 115. er 77. er 48. er 30. er 23. er 19. er 15. er 13. er 11. er 10. er 8. er 4. er 3. er 2. er 1. er 1. er 3. er 1. er 7. | hr) Volume (m³) 450 0.0 125 0.0 863 0.0 888 0.0 871 0.0 978 0.0 629 0.0 360 0.0 075 0.0 104 0.0 419 0.0 476 0.0 945 0.0 125 0.0 | Volume (m ³) 48. (m ³) 48. (5. (107. 107. 107. 109. 109. 109. 109. 109. 109. 109. 109 | (mins 3 2 0 8 1 7 1 3 8 6 0 9 4 1 3 2 7 3 2 2 | 25 39 68 126 184 242 328 396 464 530 668 942 340 728 428 120 25 39 | |
| | 30 60 120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760 15 30 60 | Event min Summe min Summe | (mm/) er 115. er 77. er 48. er 30. er 23. er 19. er 15. er 13. er 11. er 8. er 6. er 4. er 3. er 2. er 1. er 115. er 77. er 148. | hr) Volume (m³) 450 0.0 125 0.0 863 0.0 888 0.0 871 0.0 978 0.0 629 0.0 095 0.0 360 0.0 075 0.0 252 0.0 104 0.0 419 0.0 450 0.0 125 0.0 863 0.0 | Volume (m ³) 48. (m ³) 48. (5. (107. 107. 107. 109. 109. 109. 109. 109. 109. 109. 109 | (mins 3 2 0 8 1 7 1 3 8 6 0 9 4 1 3 2 7 3 3 2 0 | 25 39 68 126 184 242 328 396 464 530 668 942 340 728 428 120 25 | |

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|--------|------------------------------|--------------------------------------|------------------------------|----------------------------------|--------------------------|------------------------------|--------------------------|--------------------------|----------|
| | | | | SAL | ISBURY | SQUARE | | | |
| | | | | CATO | CHMENT | 2 | | | |
| | | | | | | - - 25% C | | | |
| | | | | | | | .C | | — Micro |
| 17/08/ | | | | | lgned b | Y HL | | | Drain |
| Catchm | ent 2 rev | ised (| Cv | . Cheo | cked by | JJL | | | Dian |
| lution | S | | | Soui | cce Con | trol 201 | 9.1 | | |
| | Summary | of Doc |]+a | for 1 | | Doturn | Doriod | (.) 5 9 | .) |
| | Summary | OI REE | SUILS | IOI I | UU year | Recurn | Periou | (+23% | <u>)</u> |
| | Storm | Max | Max | | ax | Max | Max | Max | Status |
| | Event | | | | | Control Σ | | | |
| | | (m) | (m) | (1, | /s) | (l/s) | (l/s) | (m³) | |
| 180 | min Winter | 0 320 | 0 320 | | 0.0 | 2.9 | 29 | 105.9 | ОК |
| | min Winter | | | | 0.0 | 2.9 | | 113.4 | |
| | min Winter | | | | 0.0 | 2.9 | 2.9 | | |
| | min Winter | | | | 0.0 | 2.9 | | 123.5 | |
| | | | | | | | | | |
| | min Winter | | | | 0.0 | 2.9 | 2.9 | | ОК |
| | min Winter | | | | 0.0 | 2.9 | 2.9 | 132.6 | |
| | min Winter | | | | 0.0 | 2.9 | 2.9 | | |
| | min Winter | | | | 0.0 | 2.9 | 2.9 | | |
| | min Winter | | | | 0.0 | 2.9 | 2.9 | 92.7 | ОК |
| 2880 | min Winter | 0.216 | 0.216 | | 0.0 | 2.8 | 2.8 | 71.7 | ОК |
| 4320 | min Winter | 0.132 | 0.132 | | 0.0 | 2.6 | 2.6 | 43.8 | ОК |
| 5760 | min Winter | 0.097 | 0.097 | | 0.0 | 2.3 | 2.3 | 32.0 | ОК |
| | | Storm Event | | Rain (mm/hr) | Flooded Volume | Discharge Volume | e Time-P (mins) | | |
| | | | | | (m³) | (m³) | | | |
| | 180 | min Wi | nter | 23.871 | 0.0 | 125. | 1 | 180 | |
| | | | | 19.978 | 0.0 | | | 236 | |
| | | | | 15.629 | | | | 344 | |
| | | | | 13.025 | 0.0 | | | 432 | |
| | | | | | | | | | |
| | | min Wi min Wi | | 11.360 | 0.0 | | | 476 556 | |
| | 120 | urtu MJ | | 10.075 | 0.0 | 211. | | 556 | |
| | 0.00 | min 1.7- | n+ c | 0 050 | | 001 | า | | |
| | | min Wi | | 8.252 | 0.0 | | | 710 | |
| | 1440 | min Wi | nter | 6.104 | 0.0 | 256. | 0 1 | 004 | |
| | 1440 2160 | min Wi min Wi | nter nter | 6.104 4.419 | 0.0 0.0 | 256. 280. | 0 1 4 1 | 004 412 | |
| | 1440 2160 2880 | min Wi min Wi min Wi | nter nter nter | 6.104 4.419 3.488 | 0.0 0.0 0.0 | 256. 280. 295. | 0 1 4 1 0 1 | 004 412 788 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 | 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |
| | 1440 2160 2880 4320 | min Wi min Wi min Wi min Wi | nter nter nter nter | 6.104 4.419 3.488 2.476 | 0.0 0.0 0.0 0.0 | 256. 280. 295. 313. | 0 1 4 1 0 1 4 2 | 004 412 788 464 | |

| SP Group Ltd | | | | | | Page 3 |
|---|------------------------------|------------------------|----------------|--------------|---------------------------|--------------|
| | 5 | SALISBUI | RY SQUA | RE | | |
| | 0 | CATCHMEI | NT 2 | | | |
| | I | REVISED | CV - 2 | 5% CC | | Micro |
| ate 17/08/2022 | I | Designe | d by HL | | | |
| ile Catchment 2 revise | d Cv (| Checked | by JJL | | | Drainag |
| P Solutions | | Source (| | | | |
| | | | | | | |
| | Mc | odel Det | ails | | | |
| St | orage is Onl | ine Cove | r Level | (m) 1.000 | | |
| | <u>Cellular</u> | Storag | e Struc | ture | | |
| Infiltration C Infiltration C | oefficient B | ase (m/h | r) 0.000 | | Cactor 2.0 Cosity 0.33 | |
| Depth (m) Area (m | ²) Inf. Area | (m²) De | pth (m) | Area (m²) | Inf. Area (| (m²) |
| 0.000 1004 0.450 1004 | | 0.0 | 0.451 | 0.0 | | 0.0 |
| Hyd | ro-Brake® | Optimum | Outflo | w Control | <u>.</u> | |
| | Unit 1 | Reference | MD-SHE | -0081-2900- | 1000-2900 | |
| | - | Head (m) | | | 1.000 | |
| | Design F | | | a | 2.9 | |
| | | lush-Flo" Objective | | upstrea | alculated | |
| | | plication | | ibe upbered | Surface | |
| | | Available | | | Yes | |
| | Diam | eter (mm) |) | | 81 | |
| | | Level (m) | | | 0.000 | |
| Minimum Outl Suggested | et Pipe Diam Manhole Diam | | | | 100 1200 | |
| | Control Poir | nts | Head (m |) Flow (l/s | 3) | |
| Desig | n Point (Cal | culated) | 1.00 | 0 2. | 9 | |
| _ | | ush-Flo™ | | | 9 | |
| | | ick-Flo® | | | | |
| Mean | Flow over He | ad Range | | - 2. | 5 | |
| The hydrological calculat | ions have be | en based | on the H | Head/Discha: | rge relatio | onship for t |
| Hydro-Brake® Optimum as s Hydro-Brake Optimum® be u invalidated | pecified. S | hould and | other typ | pe of contro | ol device d | other than a |
| Depth (m) Flow (1/s) Dep | th (m) Flow | (1/s) De | pth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
| 0.100 2.4 | 1.200 | 3.2 | 3.000 | 4.8 | 7.000 | 7.2 |
| 0.200 2.8 | 1.400 | 3.4 | 3.500 | 5.2 | 7.500 | 7.2 |
| 0.300 2.9 | 1.600 | 3.6 | 4.000 | 5.5 | 8.000 | 7.7 |
| 0.400 2.9 | 1.800 | 3.8 | 4.500 | 5.8 | 8.500 | 7.9 |
| 0.500 2.7 | 2.000 | 4.0 | 5.000 | 6.1 | 9.000 | 8.1 |
| 0.600 2.4 | 2.200 | 4.2 | 5.500 | 6.4 | 9.500 | 8.3 |
| 0.800 2.6 1.000 2.9 | 2.400 2.600 | 4.3 4.5 | 6.000 6.500 | 6.7 6.9 | | |
| 2.27 | | | | 0.9 | I | |
| | | | | | | |
| | | 2-2019 1 | | | | |

| | | | | | | | | Page |
|--|---|--|---|--|---|--|---|------------|
| | | | SALI | SBURY | SQUARE | 6 | | |
| | | | CATO | HMENT | 1 | | | |
| | | | REVI | SED CV | - 408 | CC C | | — Micr |
| 17/08/2022 | | | Desi | gned b | y HL | | | |
| Catchment 1 re | evised | Cv | . Chec | ked by | JJL | | | Draii |
| olutions | | | | ce Con | | 2019.1 | | |
| | | | | | | | | |
| Summary | y of Rea | sults | for 10 |)0 year | Retu | rn Perio | od (+4 | 0%) |
| | | | | | | | | |
| | | Half . | Drain Ti | me : 245 | minute | 25. | | |
| Storm | | Max | Max | | lax | Max | Max | Status |
| Event | | (m) | (1/s) | | ./s) | Outflow (l/s) | (m ³) | |
| 15 min Summer | 1 601 0 | E 0 1 | | 0.0 | 3.7 | 3.7 | 53.3 | ОК |
| 30 min Summer | | | | 0.0 | 3.7 | 3.7 | | O K O K |
| 60 min Summer | | | | 0.0 | 3.9 4.1 | 4.1 | | Flood Risk |
| 120 min Summer | | | | 0.0 | 4.1 4.2 | 4.1 | | Flood Risk |
| 120 min Summer | | | | 0.0 | 4.2 | | | Flood Risk |
| 240 min Summer | | | | | 4.3 4.3 | | 104.7 | |
| | | | | 0.0 | | | | |
| 360 min Summer | | | | 0.0 | 4.3 | 4.3 | | |
| 480 min Summer | | | | 0.0 | 4.4 | 4.4 | | |
| 600 min Summer | | | | 0.0 | 4.4 | | 117.5 | |
| 720 min Summer | | | | 0.0 | 4.4 | 4.4 | | |
| 960 min Summer | | | | 0.0 | 4.3 | | 113.7 | FLOOD |
| 1440 min Summer | | | | 0.0 | 4.2 | | | Flood Risk |
| 2160 min Summer | | | | 0.0 | 4.0 | 4.0 | | Flood Risk |
| 2880 min Summer | | | | 0.0 | 3.8 | 3.8 | | O K |
| 4320 min Summer | | | | 0.0 | 3.5 | 3.5 | | |
| 5760 min Summer | | | | 0.0 | 3.3 | 3.3 | | |
| 15 min Winter | | | | 0.0 | 3.7 | 3.7 | | |
| 30 min Winter | | | | 0.0 | 3.9 | 3.9 | | ОК |
| 60 min Winter | | | | 0.0 | 4.1 | 4.1 | | Flood Risk |
| 120 min Winter | 1.928 0 | .928 | | 0.0 | 4.2 | 4.2 | 98.7 | Flood Risk |
| | Storm | | Rain | Flooded | Discha | rge Time | -Peak | |
| | Event | | (mm/hr) | Volume (m³) | Volu (m³ | | .ns) | |
| | | | | | | | | |
| 1 | L5 min Sı | ummer | 129.304 | 0.0 | 5 | 58.4 | 25 | |
| | L5 min Sı 30 min Sı | | 129.304 86.380 | 0.0 | | 58.4 78.1 | 25 39 | |
| 3 | | ummer | | | 7 | | | |
| 3 | 30 min Sı | ummer ummer | 86.380 | 0.0 | 7 9 | 78.1 | 39 | |
| 3 6 12 | 30 min Sı 50 min Sı | ummer ummer ummer | 86.380 54.726 | 0.0 0.0 | 7 9 12 | 78.1 99.1 | 39 66 | |
| 3 6 12 18 | 30 min Su 50 min Su 20 min Su | ummer ummer ummer | 86.380 54.726 34.594 | 0.0 0.0 0.0 | 7 9 12 14 | 78.1 99.1 25.2 | 39 66 124 | |
| 3 6 12 18 24 | 30 min Su 50 min Su 20 min Su 30 min Su | ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 | 0.0 0.0 0.0 0.0 | 7 9 12 14 16 | 28.1 99.1 25.2 45.2 | 39 66 124 180 | |
| 3 6 12 18 24 36 | 30 min Su 50 min Su 20 min Su 30 min Su 40 min Su | ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 | 0.0 0.0 0.0 0.0 2.3 | 7 9 12 14 16 19 | 78.1 99.1 25.2 45.2 51.8 | 39 66 124 180 216 | |
| 3 6 12 18 24 36 48 | 30 min Su 50 min Su 20 min Su 30 min Su 40 min Su 50 min Su | ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 | 0.0 0.0 0.0 2.3 7.4 | 7 9 12 14 16 19 21 | 78.1 99.1 25.2 95.2 91.8 90.1 | 39 66 124 180 216 284 | |
| 3 6 12 18 24 36 48 60 | 30 min Su 50 min Su 20 min Su 30 min Su 40 min Su 50 min Su 30 min Su | ummer ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 14.667 | 0.0 0.0 0.0 2.3 7.4 10.1 | 7 9 12 14 16 19 21 23 | 28.1 29.1 25.2 25.2 51.8 00.1 .2.3 | 39 66 124 180 216 284 352 | |
| 3 6 12 18 24 36 48 60 72 | 30 min St 50 min St 20 min St 30 min St 40 min St 50 min St 30 min St 30 min St 30 min St 30 min St | ummer ummer ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 | 0.0 0.0 0.0 2.3 7.4 10.1 11.1 | 7 9 12 14 16 19 21 23 24 | 78.1 99.1 25.2 45.2 61.8 90.1 .2.3 60.3 | 39 66 124 180 216 284 352 422 | |
| 3 6 12 18 24 36 48 60 72 96 | 30 min Si 50 min Si 20 min Si 30 min Si 40 min Si 50 min Si 60 min Si 30 min Si 50 min Si 30 min Si | ummer ummer ummer ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 | 0.0 0.0 0.0 2.3 7.4 10.1 11.1 10.7 | 7 9 12 14 16 19 21 23 24 24 26 | <pre>28.1 199.1 15.2 15.2 15.2 10.1 2.3 10.3 15.1</pre> | 39 66 124 180 216 284 352 422 492 | |
| 3 6 12 18 24 36 48 60 72 96 144 | 30 min St 50 min St 20 min St 30 min St 40 min St 50 min St 50 min St 30 min St 50 min St 50 min St 20 min St 50 min St 50 min St | ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 | 0.0 0.0 0.0 2.3 7.4 10.1 11.1 10.7 7.3 | 7 9 12 14 16 19 21 23 24 26 29 | <pre>28.1 199.1 15.2 15.2 15.2 10.1 2.3 10.3 15.1 77.4</pre> | 39 66 124 180 216 284 352 422 492 632 | |
| 3 6 12 18 24 36 48 60 72 96 144 216 | 30 min St 50 min St 20 min St 20 min St 30 min St 40 min St 50 min St 30 min St | ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 | 0.0 0.0 0.0 2.3 7.4 10.1 11.1 10.7 7.3 0.0 | 7 9 12 14 16 19 21 23 24 26 29 32 | 28.1 99.1 25.2 51.8 90.1 .2.3 50.3 15.1 57.4 96.7 22.4 | 39 66 124 180 216 284 352 422 492 632 906 | |
| 3 6 12 18 24 36 48 60 72 96 144 216 288 | 30 min St 50 min St 20 min St 20 min St 30 min St 40 min St 50 min St | ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 | 0.0 0.0 0.0 2.3 7.4 10.1 11.1 10.7 7.3 0.0 0.0 0.0 | 7 9 12 14 16 19 21 23 24 26 29 32 33 | 28.1 99.1 25.2 51.8 90.1 .2.3 50.3 15.1 57.4 96.7 22.4 99.3 | 39 66 124 180 216 284 352 422 492 632 906 1300 1676 | |
| 3 6 12 18 24 36 48 60 72 96 144 216 288 432 | 30 min St 50 min St 20 min St 30 min St 40 min St 50 min St 60 min St 70 min St | ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 2.773 | 0.0 0.0 0.0 2.3 7.4 10.1 11.1 10.7 7.3 0.0 0.0 0.0 0.0 | 7 9 12 14 16 19 21 23 24 26 29 32 33 36 | 28.1 99.1 25.2 51.8 90.1 .2.3 50.3 15.1 57.4 96.7 22.4 99.3 51.2 | 39 66 124 180 216 284 352 422 492 632 906 1300 1676 2388 | |
| 3 6 12 18 24 36 48 60 72 96 144 216 288 432 576 | 30 min Su 50 min Su 20 min Su 30 min Su 40 min Su 50 min Su 60 min Su 70 min Su | ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 2.773 2.178 | 0.0 0.0 0.0 2.3 7.4 10.1 11.1 10.7 7.3 0.0 0.0 0.0 0.0 0.0 | 7 9 12 14 16 19 21 23 24 26 29 32 33 36 37 | 28.1 29.1 25.2 31.8 00.1 .2.3 30.3 15.1 57.4 96.7 22.4 39.3 31.2 28.2 | 39 66 124 180 216 284 352 422 492 632 906 1300 1676 2388 3072 | |
| 3 6 12 18 24 36 48 60 72 96 144 216 288 432 576 | 30 min Su 50 min Su 20 min Su 30 min Su 40 min Su 50 min Su | ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer ummer | 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 2.773 2.178 129.304 | 0.0 0.0 0.0 2.3 7.4 10.1 11.1 10.7 7.3 0.0 0.0 0.0 0.0 0.0 0.0 | 7 9 12 14 16 19 21 23 24 26 29 32 33 36 37 5 | 28.1 29.1 25.2 31.8 30.1 .2.3 30.3 15.1 37.4 36.7 32.4 39.3 31.2 28.2 38.4 | 39 66 124 180 216 284 352 422 492 632 906 1300 1676 2388 3072 25 | |
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| 180 m: 240 m: 360 m: 480 m: 600 m: | summary Summary torm vent in Winter in Winter in Winter in Winter in Winter in Winter in Winter | Of F Max Level (m) 1.997 2.036 2.079 2.093 | Max Depth (m) 0.997 1.036 | CATO REV Des: Cheo Sour s for 1 Max | CHMENT ISED (igned cked k rce Co 00 yea | CV - 40 by HL by JJL phtrol ar Retu Max | & CC | Max | Status |
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| 240 m: 360 m: 480 m: 600 m: | in Winter in Winter in Winter in Winter in Winter in Winter | 2.036 2.079 2.093 | 1.036 | | 0.0 | | | | |
| 360 m: 480 m: 600 m: | in Winter in Winter in Winter in Winter in Winter | 2.079 2.093 | | | - | 4.3 | 4.3 | 106.1 | Flood Ris |
| 480 m: 600 m: | in Winter in Winter in Winter in Winter | 2.093 | 1.079 | | 0.0 | 4.3 | | 110.3 | |
| 600 m: | in Winter in Winter in Winter | | | | 0.0 | 4.3 | | 114.8 | |
| | in Winter in Winter | 2 000 | | | 0.0 | 4.4 | | 116.3 | |
| 720 m: | in Winter | | | | 0.0 | 4.4 | | 115.8 | |
| 0.6.5 | | | | | 0.0 | 4.3 | 4.3 | | |
| | | | | | 0.0 | 4.3 | | 107.4 | |
| | in Winter | | | | 0.0 | 4.1 | 4.1 | | Flood Ris |
| | in Winter | | | | 0.0 | 3.8 | 3.8 | | |
| | in Winter in Winter | | | | 0.0 | 3.6 | 3.6 | | |
| | in Winter | | | | 0.0 0.0 | 3.2 2.8 | 3.2 | | |
| | | Stor Ever | | Rain (mm/hr) | | | arge Time | e-Peak ins) | |
| | | Ever. | | (1007) | (m ³) | | | 1118) | |
| | 18 | 0 min | Winter | 26.735 | 0 | .0 1 | 45.2 | 178 | |
| | | | | 22.376 | | | 61.7 | 230 | |
| | | | | 17.505 | | | 90.2 | 292 | |
| | | | | 14.667 | | | 12.4 | 370 | |
| | | | Winter | | | | 30.0 | 450 | |
| | | | Winter | | | | 45.1 | 526 | |
| | | | Winter | 9.243 | | | 67.3 | 678 066 | |
| | | | Winter | 6.837 | | | 96.6 | 966 1369 | |
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| ISP Group Ltd | | | | | | P | age 3 |
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| | | | SALISBU | JRY SQUARE | | | |
| | | | CATCHME | INT 1 | | | |
| | | | REVISED | 0 CV - 40% | CC | | Micro |
| ate 17/08/202 | 22 | | Designe | ed by HL | | | Drainaq |
| ile Catchment | t 1 revi | sed Cv | Checked | l by JJL | | | Jianiagi |
| IP Solutions | | | Source | Control 2 | 019.1 | l. | |
| | | | Model De | tails | | | |
| | | Storage is (| Online Cov | er Level (m |) 2.000 | | |
| | | Cellul | ar Storag | ge Structu | ire | | |
| Ini | Eiltratior | Inve n Coefficient | | (m) 1.000 nr) 0.00000 | - | ctor 2.0 sity 0.95 | |
| Ini | Eiltratior | n Coefficient | Side (m/h | nr) 0.00000 | | - | |
| Depth | (m) Area | (m²) Inf. A | rea (m²) D | epth (m) Ar | ea (m²) In | f. Area (m² |) |
| 0. | 000 1 | .12.0 | 500.0 | 1.000 | 112.0 | 500. | 0 |
| | H | ydro-Brake | ® Optimur | n Outflow | Control | | |
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| | | Debigii | Flush-Flo | | Cal | culated | |
| | | | • | re Minimise | - | - | |
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| | | | Kick-Flo | | 2.5 | | |
| | Mea | an Flow over | Head Range | e – | 2.7 | | |
| The hydrologic | al calcul | ations have | been based | l on the Hea | d/Discharg | e relations | ship for th |
| Hydro-Brake® (| | | | | | | |
| Hydro-Brake Op invalidated | otimum® be | utilised th | en these s | storage rout | ing calcul | ations will | be |
| invariaacea | | | | | | | |
| Depth (m) Flo | w (l/s) I | Oepth (m) Flo | ow (l/s) D | epth (m) Fl | ow (1/s) D | epth (m) Fl | low (l/s) |
| 0.100 | 2.5 | 1.200 | 3.4 | 3.000 | 5.2 | 7.000 | 7.7 |
| 0.200 | 3.0 | 1.400 | 3.6 | 3.500 | 5.5 | 7.500 | 7.9 |
| 0.300 | 3.1 | 1.600 | 3.8 | 4.000 | 5.9 | 8.000 | 8.2 |
| 0.400 0.500 | 3.0 | 1.800 2.000 | 4.1 4.3 | 4.500 5.000 | 6.2 6.6 | 8.500 9.000 | 8.4 8.7 |
| 0.600 | 2.9 | 2.200 | 4.5 | 5.500 | 6.9 | 9.500 | 8.9 |
| 0.800 | 2.8 | 2.400 | 4.6 | 6.000 | 7.1 | | |
| 1.000 | 3.1 | 2.600 | 4.8 | 6.500 | 7.4 | | |
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| | Ltd | | | | | | | | Page 1 |
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| | | | | SALI | ISBURY | SQUARE | | | |
| | | | | CATO | CHMENT | 2 | | | |
| | | | | REVI | ISED CV | - 40% | CC | | — Micro |
| ate 17/08 | 3/2022 | | | Desi | igned b | v HL | | | |
| | ment 2 re | vised | Cv | | cked by | - | | | Drainag |
| IIC Cuttin | | | | | rce Con | | 010 1 | | |
| F BOIUCIC | 115 | | | 5001 | | | .019.1 | | |
| | Summary | r of R | equilto | s for 10 | 00 vear | Retur | n Deri | od (+4) | 1 2) |
| | Dammary | OI N | CDUIC | 5 101 1 | JU YCUI | iteeui | | 04 (11) | |
| | | | Half | Drain Ti | .me : 457 | minute | es. | | |
| | 1 + | Marr | ¥~~~ | Marr | | | Ver | Marr | Chaburg |
| | Storm Event | Max Level | Max Depth | Max Infiltra | | fax ntrol Σ | Max Outflow | Max Volume | Status |
| | | (m) | (m) | (1/s) | | ./s) | (1/s) | (m ³) | |
| | | | | | | | | | |
| | min Summer | | | | 0.0 | 2.7 | 2.7 | | ОК |
| | min Summer | | | | 0.0 | 2.8 | 2.8 | | ОК |
| | min Summer | | | | 0.0 | 2.9 | 2.9 | | 0 K |
| | min Summer | | | | 0.0 | 2.9 | 2.9 | 108.1 | O K |
| 180 | min Summer | 0.363 | 0.363 | | 0.0 | 2.9 | 2.9 | 120.3 | O K |
| 240 | min Summer | 0.390 | 0.390 | | 0.0 | 2.9 | 2.9 | 129.4 | ОК |
| 360 | min Summer | 0.428 | 0.428 | | 0.0 | 2.9 | 2.9 | | O K |
| | min Summer | | | | 0.0 | 2.9 | 2.9 | | Flood Risk |
| | min Summer | | | | 0.0 | 2.9 | 2.9 | | FLOOD |
| | min Summer | | | | 0.0 | 2.9 | 2.9 | | FLOOD |
| | | | | | | | | | |
| | min Summer | | | | 0.0 | 2.9 | 2.9 | | FLOOD |
| | min Summer | | | | 0.0 | 2.9 | 2.9 | | ОК |
| | min Summer | | | | 0.0 | 2.9 | 2.9 | | O K |
| 2880 | min Summer | 0.338 | 0.338 | | 0.0 | 2.9 | 2.9 | 112.1 | O K |
| 4320 | min Summer | 0.247 | 0.247 | | 0.0 | 2.9 | 2.9 | 81.8 | O K |
| 5760 | min Summer | 0.186 | 0.186 | | 0.0 | 2.8 | 2.8 | 61.5 | ОК |
| | min Winter | | | | 0.0 | 2.7 | 2.7 | | 0 K |
| | min Winter | | | | 0.0 | 2.8 | 2.8 | | 0 K |
| | min Winter | | | | 0.0 | 2.0 | 2.0 | | 0 K |
| | min Winter | | | | | | | | |
| 120 | min wincer | 0.327 | 0.327 | | 0.0 | 2.9 | 2.9 | 108.2 | O K |
| | | | | | | | | | |
| | | Stor | m | Rain | Flooded | Discha | rge Time | -Peak | |
| | | Stor Even | | Rain (mm/hr) | | Discha Volu | | -Peak ins) | |
| | | | | | | | me (m. | | |
| | 1 | Even | t | (mm/hr) | Volume (m³) | Volu (m³ | me (m.) | ins) | |
| | | Even .5 min | t Summer | (mm/hr) | Volume (m³) 0.0 | Volu (m³ | me (m.) 54.4 | ins) 26 | |
| | 3 | Even | t Summer Summer | (mm/hr) 129.304 86.380 | Volume (m ³) 0.0 0.0 | Volu (m ³ 5 7 | me (m.) 54.4 3.3 | ins) 26 40 | |
| | 3 | Even | t Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 | Volume (m ³) 0.0 0.0 0.0 | Volun (m ³ 5 7 9 | me (m.) ;4.4 ;3.3 ;5.3 | ins) 26 40 68 | |
| | 3 6 12 | Even 5 min 30 min 50 min 20 min | t Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 | Volume (m ³) 0.0 0.0 0.0 0.0 | Volu (m ³ 5 7 9 12 | me (m.) 4.4 23.3 25.3 20.8 | ins) 26 40 68 126 | |
| | 3 6 12 18 | Even 5 min 30 min 50 min 80 min 80 min | t Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 | Volu (m ³ 5 7 9 12 14 | me (m.) 64.4 23.3 95.3 20.8 20.2 | ins) 26 40 68 126 184 | |
| | 3 6 12 18 24 | Even 5 min 60 min 70 min 80 min 80 min 80 min | t Summer Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 | Volume (m ³) 0.0 0.0 0.0 0.0 | Volu (m ³ 5 7 9 12 14 | me (m.) 4.4 23.3 25.3 20.8 | 26 40 68 126 184 242 | |
| | 3 6 12 18 24 | Even 5 min 60 min 70 min 80 min 80 min 80 min | t Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 | Volu (m ³ 5 7 9 12 14 15 | me (m.) 64.4 23.3 95.3 20.8 20.2 | ins) 26 40 68 126 184 | |
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| | 3 6 12 18 24 36 48 | Even 5 min 6 min 7 min 8 min 8 min 8 min 6 min 5 min | t Summer Summer Summer Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Volu (m ³ 5 7 9 12 14 15 18 20 | me (m.) 44.4 (3.3 (5.3 (0.8 (0.2) (6.6 (3.8) | 26 40 68 126 184 242 360 | |
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| | 3 6 12 18 24 36 48 60 72 96 | Even 5 min 30 min 50 min 30 min 30 min 30 min 30 min 30 min 50 min | t Summer Summer Summer Summer Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0. | Volu (m ³ 5 7 9 12 14 15 18 20 22 23 25 | me (m.) 44.4 (3.3 (5.3 (0.8 (0.2) (6.6 (3.8) (5.4) (2.8) (7.1) (8.8) | 26 40 68 126 184 242 360 432 482 548 682 | |
| | 3 6 12 18 24 36 48 60 72 96 144 | Even 5 min 30 min 50 min 30 min 30 min 30 min 30 min 30 min 30 min 30 min 40 min 40 min | t Summer Summer Summer Summer Summer Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0. | Volu (m ³ 5 7 9 12 14 15 18 20 22 23 25 28 | me (m.) 44.4 (3.3 (5.3 (0.8 (0.2) (6.6 (3.8) (5.4) (5.4) (2.8) (7.1) (8.8) (6.5) | 26 40 68 126 184 242 360 432 482 548 682 966 | |
| | 3 6 12 18 24 36 48 60 72 96 144 216 | Even 5 min 30 min 30 min 30 min 30 min 40 min 30 min 3 | t Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0. | Volu (m ³) 5 7 9 12 14 15 18 20 22 23 25 28 31 | me (m.) 44.4 (3.3 (5.3 (0.8 (0.2) (6.6 (3.8) (5.4) (2.8) (5.4) (2.8) (7.1) (8.8) (6.5) (4.1) | 26 40 68 126 184 242 360 432 482 548 682 966 1364 | |
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| | 3 6 12 18 24 36 48 60 72 96 144 216 288 432 | Even 5 min 30 min 3 | t Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 2.773 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4.2 6.4 6.8 0.0 0.0 0.0 0.0 | Volu (m ³) 5 7 9 12 14 15 18 20 22 23 25 28 31 33 35 | me (m. 44.4 3.3 3.3 5.3 40.8 3.3 40.8 3.8 40.2 4.6 3.8 5.4 42.8 7.1 8.8 6.5 4.1 5.5 4.1 5.5 4.1 5.5 | 26 40 68 126 184 242 360 432 482 548 682 966 1364 1756 2472 | |
| | 3 6 12 18 24 36 48 60 72 96 144 216 288 432 576 | Even 5 min 30 min 3 | t Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 2.773 2.178 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4.2 6.4 6.8 0.0 0.0 0.0 | Volu (m ³) 5 7 9 12 14 15 18 20 22 23 25 28 31 33 35 | me (m. 44.4 3.3 35.3 0.8 40.2 6.6 3.8 5.4 22.8 7.1 88.8 6.5 4.1 0.5 | <pre>ins) 26 40 68 126 184 242 360 432 482 548 682 966 1364 1756</pre> | |
| | 3 6 12 18 24 36 48 60 72 96 144 216 288 432 576 | Even 5 min 30 min 3 | t Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 2.773 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4.2 6.4 6.8 0.0 0.0 0.0 0.0 | Volu (m ³) 5 7 9 12 14 15 18 20 22 23 25 28 31 33 35 36 | me (m. 44.4 3.3 3.3 5.3 40.8 3.3 40.8 3.8 40.2 4.6 3.8 5.4 42.8 7.1 8.8 6.5 4.1 5.5 4.1 5.5 4.1 5.5 | 26 40 68 126 184 242 360 432 482 548 682 966 1364 1756 2472 | |
| | 3 6 12 18 24 36 48 60 72 96 144 216 288 432 576 | Even 5 min 30 min 30 min 30 min 30 min 40 min 30 min 3 | t Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 2.773 2.178 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4.2 6.4 6.8 0.0 0.0 0.0 0.0 0.0 0.0 | Volu (m ³) 5 7 9 12 14 15 18 20 22 23 25 28 31 33 35 36 5 | me (m.) 44.4 (3.3 (5.3 (0.8 (0.2 (6.6 (3.8) (5.4 (2.8) (5.4 (2.8) (7.1) (8.8) (6.5 (4.1) (0.5) (1.1) (9.3) | ins) 26 40 68 126 184 242 360 432 482 548 682 966 1364 1756 2472 3176 | |
| | 3 6 12 18 24 36 48 60 72 96 144 216 288 432 576 1 3 | Even 5 min 30 min 30 min 30 min 30 min 40 min 30 min 30 min 40 min 50 min 5 | t Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Winter Winter | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 2.773 2.178 129.304 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0. | Volu (m ³) 5 7 9 12 14 15 18 20 22 23 25 28 31 33 35 36 5 7 | me (m. 44.4 3.3 3.3 5.3 40.8 3.3 5.3 6.6 3.8 5.4 22.8 7.1 8.8 6.5 4.1 5.5 9.3 4.4 | ins) 26 40 68 126 184 242 360 432 482 548 682 966 1364 1756 2472 3176 25 | |
| | 3 6 12 18 24 36 48 60 72 96 144 216 288 432 576 1 3 6 | Even 5 min 30 min 30 min 30 min 30 min 40 min 30 min 3 | t Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer Winter Winter | (mm/hr) 129.304 86.380 54.726 34.594 26.735 22.376 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 2.773 2.178 129.304 86.380 54.726 | Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0. | Volu (m ³) 5 7 9 12 14 15 18 20 22 23 25 28 31 33 35 36 5 7 9 | me (m. 44.4 3.3 3.3 5.3 40.8 3.3 5.3 6.6 3.8 5.4 22.8 7.1 8.8 6.5 4.1 6.5 1.1 9.3 4.4 3.3 | ins) 26 40 68 126 184 242 360 432 482 548 682 966 1364 1756 2472 3176 25 39 | |

| Group | Ltd | | | | | | | | Page 2 |
|---------|--|--|--|--|--|--|--|--|------------|
| | | | | SAL | ISBURY | SQUARE |] | | |
| | | | | CAT | CHMENT | 2 | | | |
| | | | | REV | ISED CV | r – 40% | CC | | — Micro |
| e 17/08 | 3/2022 | | | Des | igned k | y HL | | | |
| e Catch | nment 2 re | evised | Cv . | | cked by | | | | Draina |
| Solutio | | 012000 | | | cce Cor | | 019 1 | | |
| DOTUCIO | | | | 500 | | | | | |
| | Summar | y of R | esults | for 1 | 00 yea | Retur | n Peri | od (+4 | 0%) |
| | Storm | Max | Max | Max | , | Max | Max | Max | Status |
| | Event | | | | | | Outflow | | blacab |
| | | (m) | (m) | (1/s | | l/s) | (1/s) | (m ³) | |
| 180 | min Winter | 0.364 | 0.364 | | 0.0 | 2.9 | 2.9 | 120.5 | ОК |
| 240 | min Winter | 0.391 | 0.391 | | 0.0 | 2.9 | 2.9 | 129.6 | ОК |
| 360 | min Winter | 0.429 | 0.429 | | 0.0 | 2.9 | 2.9 | 142.2 | O K |
| | min Winter | | | | 0.0 | 2.9 | | | Flood Risk |
| | min Winter | | | | 0.0 | 2.9 | | 152.2 | FLOOD |
| | min Winter | | | | 0.0 | 2.9 | | 154.0 | FLOOD |
| | min Winter | | | | 0.0 | 2.9 | | 152.6 | |
| | min Winter | | | | 0.0 | 2.9 | | 140.0 | |
| | min Winter min Winter | | | | 0.0 | 2.9 | 2.9 | | ОК |
| | min Winter | | | | 0.0 0.0 | 2.9 2.7 | 2.9 2.7 | | ОК |
| | min Winter | | | | 0.0 | 2.7 | 2.7 | | ОК |
| | | Stor | m | Rain | Flooded | Discha | rge Time | -Peak | |
| | | Even | t | (mm/hr) | Volume | Volu | ne (m | ins) | |
| | | | | | (m³) | (m³ |) | | |
| | | 80 min | | 26.735 | 0.0 | 14 | 0.2 | 180 | |
| | 1. | | | 22 276 | 0.0 | 15 | 6.6 | 238 | |
| | 24 | 40 min | | | | | | | |
| | 24 36 | 40 min 60 min | Winter | 17.505 | 0.0 | | 3.9 | 348 | |
| | 24 30 48 | 40 min 60 min 80 min | Winter Winter | 17.505 14.667 | 0.0 | 20 | 5.4 | 460 | |
| | 24 36 48 | 40 min 60 min 80 min 00 min | Winter Winter Winter | 17.505 14.667 12.723 | 0.0 3.0 | 20 22 | 5.4 2.8 | 460 492 | |
| | 24 36 41 60 72 | 40 min 60 min 80 min 00 min 20 min | Winter Winter Winter Winter | 17.505 14.667 12.723 11.284 | 0.0 3.0 4.8 | 20 22 23 | 5.4 2.8 7.1 | 460 492 568 | |
| | 24 30 48 60 72 90 | 40 min 60 min 80 min 00 min 20 min 60 min | Winter Winter Winter Winter Winter | 17.505 14.667 12.723 11.284 9.243 | 0.0 3.0 4.8 3.4 | 20 22 23 25 | 5.4 2.8 7.1 8.8 | 460 492 568 722 | |
| | 2 3 4 6 7 7 9 9 | 40 min 60 min 80 min 00 min 20 min 60 min 40 min | Winter Winter Winter Winter Winter Winter | 17.505 14.667 12.723 11.284 9.243 6.837 | 0.0 3.0 4.8 3.4 0.0 | 20 22 23 25 28 | 5.4 2.8 7.1 8.8 6.6 | 460 492 568 722 1030 | |
| | 24 31 41 61 72 91 14 21 | 40 min 60 min 80 min 00 min 20 min 60 min | Winter Winter Winter Winter Winter Winter | 17.505 14.667 12.723 11.284 9.243 | 0.0 3.0 4.8 3.4 | 20 22 23 25 28 31 | 5.4 2.8 7.1 8.8 | 460 492 568 722 | |
| | 24 36 66 72 99 14 216 28 | 40 min 60 min 80 min 00 min 20 min 60 min 40 min | Winter Winter Winter Winter Winter Winter Winter | 17.505 14.667 12.723 11.284 9.243 6.837 4.949 | 0.0 3.0 4.8 3.4 0.0 0.0 | 20 22 23 25 28 31 33 | 5.4 2.8 7.1 8.8 6.6 4.1 | 460 492 568 722 1030 1448 | |
| | 24 31 41 61 72 99 144 214 288 432 | 40 min 60 min 80 min 00 min 20 min 60 min 40 min 60 min 80 min | Winter Winter Winter Winter Winter Winter Winter Winter | 17.505 14.667 12.723 11.284 9.243 6.837 4.949 3.907 | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 | 460 492 568 722 1030 1448 1824 | |
| | 24 31 41 61 72 99 144 214 288 432 | 40 min 60 min 80 min 20 min 60 min 40 min 60 min 80 min 20 min | Winter Winter Winter Winter Winter Winter Winter Winter | $17.505 \\ 14.667 \\ 12.723 \\ 11.284 \\ 9.243 \\ 6.837 \\ 4.949 \\ 3.907 \\ 2.773 \\ \end{array}$ | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 1.2 | 460 492 568 722 1030 1448 1824 2512 | |
| | 24 31 41 61 72 99 144 214 288 432 | 40 min 60 min 80 min 20 min 60 min 40 min 60 min 80 min 20 min | Winter Winter Winter Winter Winter Winter Winter Winter | $17.505 \\ 14.667 \\ 12.723 \\ 11.284 \\ 9.243 \\ 6.837 \\ 4.949 \\ 3.907 \\ 2.773 \\ \end{array}$ | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 1.2 | 460 492 568 722 1030 1448 1824 2512 | |
| | 24 31 41 61 72 99 144 214 288 432 | 40 min 60 min 80 min 20 min 60 min 40 min 60 min 80 min 20 min | Winter Winter Winter Winter Winter Winter Winter Winter | $17.505 \\ 14.667 \\ 12.723 \\ 11.284 \\ 9.243 \\ 6.837 \\ 4.949 \\ 3.907 \\ 2.773 \\ \end{array}$ | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 1.2 | 460 492 568 722 1030 1448 1824 2512 | |
| | 24 31 41 61 72 99 144 214 288 432 | 40 min 60 min 80 min 20 min 60 min 40 min 60 min 80 min 20 min | Winter Winter Winter Winter Winter Winter Winter Winter | $17.505 \\ 14.667 \\ 12.723 \\ 11.284 \\ 9.243 \\ 6.837 \\ 4.949 \\ 3.907 \\ 2.773 \\ \end{array}$ | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 1.2 | 460 492 568 722 1030 1448 1824 2512 | |
| | 24 31 41 61 72 99 144 214 288 432 | 40 min 60 min 80 min 20 min 60 min 40 min 60 min 80 min 20 min | Winter Winter Winter Winter Winter Winter Winter Winter | $17.505 \\ 14.667 \\ 12.723 \\ 11.284 \\ 9.243 \\ 6.837 \\ 4.949 \\ 3.907 \\ 2.773 \\ \end{array}$ | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 1.2 | 460 492 568 722 1030 1448 1824 2512 | |
| | 24 31 41 61 72 99 144 214 288 432 | 40 min 60 min 80 min 20 min 60 min 40 min 60 min 80 min 20 min | Winter Winter Winter Winter Winter Winter Winter Winter | $17.505 \\ 14.667 \\ 12.723 \\ 11.284 \\ 9.243 \\ 6.837 \\ 4.949 \\ 3.907 \\ 2.773 \\ \end{array}$ | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 1.2 | 460 492 568 722 1030 1448 1824 2512 | |
| | 24 31 41 61 72 99 14 21 288 432 | 40 min 60 min 80 min 20 min 60 min 40 min 60 min 80 min 20 min | Winter Winter Winter Winter Winter Winter Winter Winter | $17.505 \\ 14.667 \\ 12.723 \\ 11.284 \\ 9.243 \\ 6.837 \\ 4.949 \\ 3.907 \\ 2.773 \\ \end{array}$ | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 1.2 | 460 492 568 722 1030 1448 1824 2512 | |
| | 24 31 41 61 72 99 14 21 288 432 | 40 min 60 min 80 min 20 min 60 min 40 min 60 min 80 min 20 min | Winter Winter Winter Winter Winter Winter Winter Winter | $17.505 \\ 14.667 \\ 12.723 \\ 11.284 \\ 9.243 \\ 6.837 \\ 4.949 \\ 3.907 \\ 2.773 \\ \end{array}$ | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 1.2 | 460 492 568 722 1030 1448 1824 2512 | |
| | 24 31 41 61 72 99 14 21 288 432 | 40 min 60 min 80 min 20 min 60 min 40 min 60 min 80 min 20 min | Winter Winter Winter Winter Winter Winter Winter Winter | $17.505 \\ 14.667 \\ 12.723 \\ 11.284 \\ 9.243 \\ 6.837 \\ 4.949 \\ 3.907 \\ 2.773 \\ \end{array}$ | 0.0 3.0 4.8 3.4 0.0 0.0 0.0 0.0 | 20 22 23 25 28 31 33 35 | 5.4 2.8 7.1 8.8 6.6 4.1 0.5 1.2 | 460 492 568 722 1030 1448 1824 2512 | |

| SP Group Ltd | | | | | | | Page 3 | | |
|---|-------------|----------------|---|------------|--------------|----------------------------|--------------|--|--|
| | | | SALIS | BURY SQU | JARE | | | | |
| | CATCHMENT 2 | | | | | | | | |
| | | | ED CV - | 40% CC | | Micro | | | |
| ate 17/08/2022 Designed by HL | | | | | | | | | |
| ile Catchment 2 revised Cv Checked by JJL | | | | | | | | | |
| P Solutions | | | | | | | | | |
| | | | | | | | | | |
| | | | Model : | Details | | | | | |
| | | Storage | is Online C | over Leve | l (m) 1.000 | | | | |
| | | Cel | lular Stor | age Stru | ucture | | | | |
| | | on Coeffic | Invert Leve ient Base (1 ient Side (1 | m/hr) 0.00 | | Factor 2.0 prosity 0.33 | | | |
| Depth (m |) Area | (m²) Inf | . Area (m²) | Depth (m |) Area (m²) | Inf. Area | (m²) | | |
| 0.00 0.45 | | 004.0 004.0 | 0.0 | | 1 0.0 | | 0.0 | | |
| | <u>]</u> | Hydro-Bra | ake® Optim | um Outf | Low Contro | 1 | | | |
| | | | Unit Refere | ence MD-SH | E-0081-2900 | -1000-2900 | | | |
| | | | Design Head | | | 1.000 | | | |
| | | Des | sign Flow (1 | | | 2.9 | | | |
| | | | Flush-F | | mise upstre | Calculated | | | |
| | | | Applicat | | mise upscie | Surface | | | |
| | | | Sump Availa | | | Yes | | | |
| | | | Diameter (| | | 81 | | | |
| | | In | nvert Level | (m) | | 0.000 | | | |
| | | _ | e Diameter (| | | 100 | | | |
| S | uggest | ed Manhole | e Diameter (| mm) | | 1200 | | | |
| | | Contro | ol Points | Head | (m) Flow (l/ | /s) | | | |
| | De | esign Poin | t (Calculate | ed) 1.0 | 000 2 | 2.9 | | | |
| | | | Flush-F | lo™ 0.2 | 299 2 | 2.9 | | | |
| | | | Kick-F | | | 2.3 | | | |
| | Me | an Flow o | ver Head Rai | nge | - 2 | 2.5 | | | |
| The hydrological | calcu | lations ha | ave been bas | sed on the | Head/Disch | arge relatio | onship for t | | |
| Hydro-Brake® Opt Hydro-Brake Opti invalidated | imum a | s specifie | ed. Should | another t | ype of cont: | rol device (| other than a | | |
| Depth (m) Flow | (l/s) | Depth (m) | Flow (l/s) | Depth (m |) Flow (l/s) |) Depth (m) | Flow (l/s) | | |
| 0.100 | 2.4 | 1.200 | 3.2 | 3.00 | 0 4.8 | 3 7.000 | 7.2 | | |
| 0.200 | 2.9 | 1.400 | 3.4 | 3.50 | | | 7.2 | | |
| 0.300 | 2.9 | 1.600 | 3.6 | 4.00 | | | 7.7 | | |
| 0.400 | 2.9 | 1.800 | 3.8 | 4.50 | | | 7.9 | | |
| 0.500 | 2.7 | 2.000 | 4.0 | 5.00 | 0 6.2 | | 8.1 | | |
| 0.600 | 2.4 | 2.200 | | | | | 8.3 | | |
| 0.800 | 2.6 | 2.400 | 4.3 | | | | | | |
| 1.000 | 2.9 | 2.600 | 4.5 | 6.50 | 0 6.9 | z | | | |
| | | | | | | | | | |
| | | | ©1982-201 | 9 Innovv | ze | | | | |
| | | | | 1 | | | | | |



Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

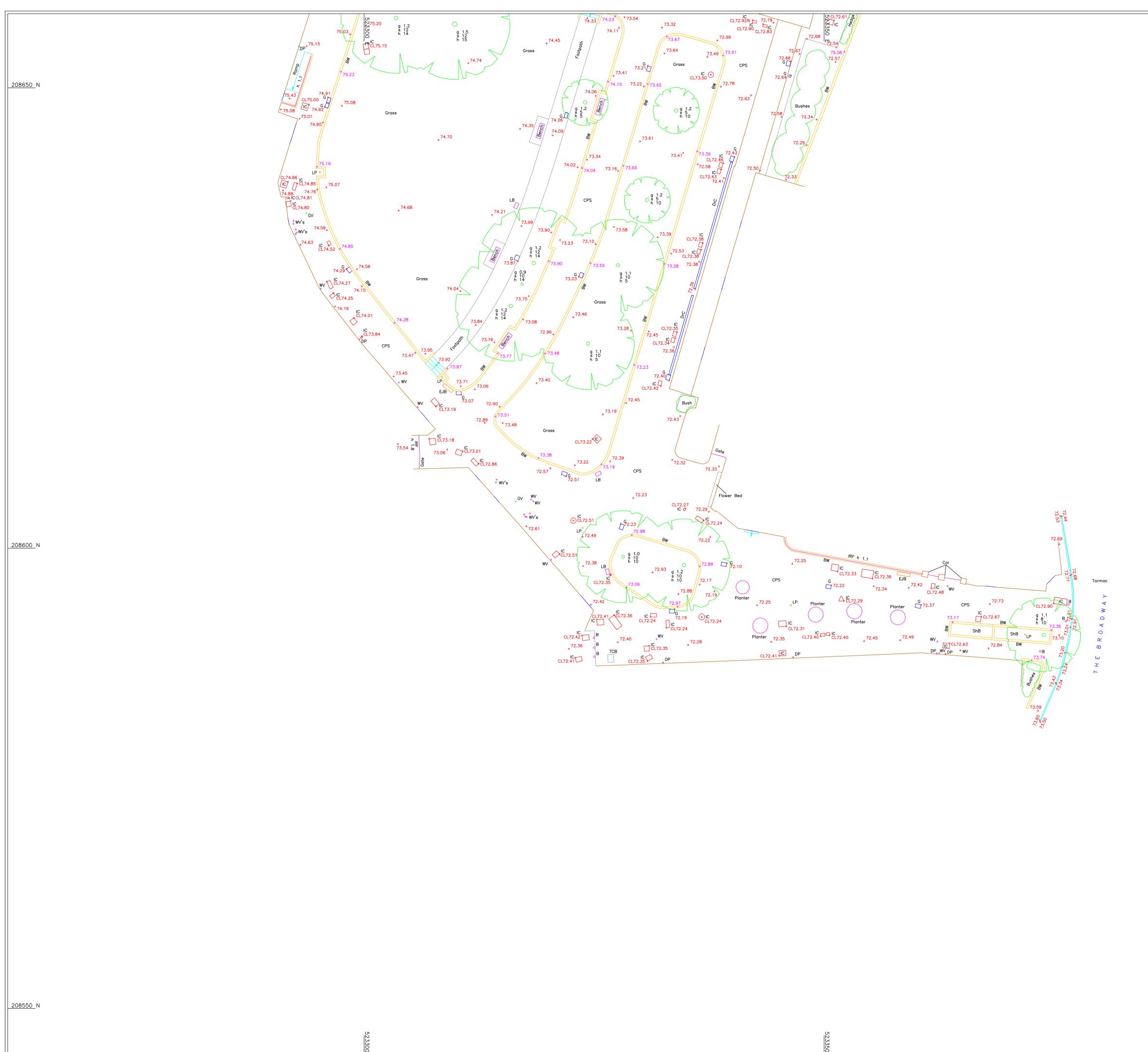
| Calculated by: | Josep | oh Leslie | | | | Site Details | 1 | | | |
|-------------------------------|-------------------------------------|---------------------------------------|----------------------------------|-----------------------------|------------------|--|---------------------|---------------------------------|--|--|
| - | | | | | | Latitude: | 51.76320° N | | | |
| Site name: | Salisc | oury Squa | are | | | | Longitude: | 0.21418° W | | |
| Site location: | Old H | latfield | | | | | | 0.21410 11 | | |
| in line with Environme | ent Agenc he SuDS M formation | y guidance Manual C7 on greenfi | e "Rainf 53 (Ciri eld runc | all runoff m a, 2015) ar | anagement for de | ry standards for SuDS | Reference: Date: | 2066103417 Oct 07 2021 15:45 | | |
| Runoff estimati | ion app | oroach | IH124 | 4 | | | | | | |
| Site characteris | stics | | | | | Notes | | | | |
| Total site area (ha |): 1.0 | | | | | (1) Is Q _{BAR} < 2. | 0 l/s/ba? | | | |
| Methodology | | | | | | (1) 13 QBAR < 2. | 0 0 3/114: | | | |
| Q _{BAR} estimation r | nethod: | Calcu | ulate fr | om SPR | and SAAR | When Q _{BAR} is | < 2.0 l/s/ha then | limiting discharge rates are se | | |
| SPR estimation m | nethod: | Calcu | ulate fr | om SOIL | type | at $2 \Omega I/c/ba$ | | | | |
| Soil characteris | stics | Defau | | Edit | | | | | | |
| SOIL type: | | 2 | | 4 | | (2) Are flow rat | es < 5.0 l/s? | | | |
| HOST class: | | N/A | | N/A | | | | | | |
| SPR/SPRHOST: | | 0.3 | | 0.47 | | Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other | | | | |
| Hydrological cł | naracte | ristics | D | efault | Edited | | | nsent flow rates may be set | | |
| SAAR (mm): | | | 661 | 661 | | where the blockage risk is addressed by using appropriate drainage elements. | | | | |
| Hydrological regic | on: | | 6 | 6 | | (3) Is SPR/SPRHOST ≤ 0.3? | | | | |
| Growth curve fac | tor 1 yea | ar: | 0.85 | 5 | 0.85 | | | | | |
| Growth curve fac | tor 30 ye | ears: | 2.3 3.19 | | 2.3 | Where groundwater levels are low enough the us | | • | | |
| Growth curve fac | tor 100 y | years: | | | 3.19 | soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff. | | | | |
| | | | 3.74 | 1 | 3.74 | | | | | |

| Greenfield ru | noff rates | Default | Edited |
|-------------------------|------------|---------|--------|
| Q _{BAR} (l/s): | | 1.7 | 4.51 |
| 1 in 1 year (l/s): | | 1.45 | 3.84 |
| 1 in 30 years (l/ | /s): | 3.92 | 10.38 |
| 1 in 100 year (l/ | /s): | 5.44 | 14.4 |
| 1 in 200 years (| (l/s): | 6.37 | 16.88 |

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/termsand-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.



| | 523400 | STANDARD ABBREVIATIONS |
|---|------------------|--|
| | 2 <u>08750 N</u> | AC Air Conditioner LB Litter Bin ATM Automated Talling Machine LP Lamp Post B Belahrad Max Maximum BB Belahrad Beacon Mb Mathole BB Bortele MH Mathole Br Bortele MH Mathole Br Bortele MH Mathole Br Bortele MH Mathole Br British Telecon OBF Open Boarded Fence BV British Telecon OBF Open Boarded Fence CFC Close Boarded Fence P Post CFC Close Boarded Fence P P CFC Constanded Fence P P CGC Control ferviaion PB Pilla Pavement Light CGC Control ferviaion PB Pilla Pavement Light CGC Control ferviaion PS Paving Mather P CGC Control ferviaion PS Paving Mather P CGC Contretere PS |
| PLOWMAN CRAVEN LIMITED | 523400 | THE IDENTIFICATION OF SERVICE COVERS HAS BEEN MADE BY A SURFACE INSPECTION ONLY. CRITICAL IDENTIFICATIONS SMOULD BE VERIFIED BY THE UPTINO OF COVERS OR A NULL UTILITIES SURVEY. DRE TO THE INVERSE THE TRATE INTERSINUE. SHOULD THEREPORE BE TREATED WITH COVERS HAVE BE STRONG OF THE PURPORE BE TREATED WITH COVERSE HAVE BE STRONG OF THE PURPORE DUE TO MENDONS SCALED FROM PAPER PLOTS SHOULD THEREPORE BE TREATED WITH COVER THE ADDRESS HAVE BEEN CARPINED ON TO COVE LINES UNIT AND DEVELOPMENT AND BEEN CARPINED OUT TO AN ACCURACY CONSISTENT WITH A PRESENTATION SCALE OF 1.200. SWEED WITH THIS AND SMALLER SCALES ONLY. JULIEVES ARE IN METRES AND ARE ABOVE ORDINATOR REVERSES ASSOCIATED DIMENSIONS ARE IN METRES DORONANCE SURVEY (OS) NATIONAL GRID AT THE FOLLOWING POINT SCALES OF 2.200. THIS SURVEY MAS BEEN CARPINED OUT TO AN ACCURACY CONSISTENT WITH A PRESENTATION SCALE OF 1.200. CONSISTENT WITH A PRESENTATION SCALE OF 1.200. ADJUSTION ON THIS DRAWING IS ONLY REFERENCED TO RODUKING DIMENSIONS ARE IN METRES DIMENSIONS ARE IN METRES ABOVE ORDINANCE SURVEY NEW YND AND DERVED BUY MULTIPLE NEWTONK RTK GPS INSERVATIONS. ALLOUTED DIMENSIONS ARE IN METRES DRAWING WITH A REMETRES CLIENT BROOCKS / MUURRALY BIOLOGIA SURVEY SURVEYED AND DRAWIN BY PLOOVER AND DRAWIN BY PLOOVERS OF SERVEY NUMENSIONS ARE IN METRES DRAWING WITH SARE METRES DIALOUTED DIMENSIONS ARE IN METRES DRAWING WITH A REMETRES SURVEYED AND DRAWIN BY PLOOVERS OF SERVEY NUMENDATE ARE METRES SURVEYED AND DRAWIN BY PLOOVERS OF SERVEY NUMENDATE AREMETRES SURVEYED AND DRAWIN BY |
| NOT TO BE REPRODUCED WITHOUT PERMISSION | о т | A |



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|--------------------------|------------------|---|
| | | LEGEND STAIR/STEP ARROWS POINT UP |
| | | THE IDENTIFICATION OF SERVICE COVERS HAS BEEN MADE BY A SURFACE INSPECTION ONLY. CRITICAL IDENTIFICATIONS SHOULD BE VERIFIED BY THE LIFTING OF COVERS OR A FULL UTILITIES SURVEY. DUE TO THE INHERENT INSTABILITY OF PAPER MATERIALS, DRAWINGS PLOTTED ON PAPER MAY BE STRETCHED AND DISTORTED. DIMENSIONS SCALED FROM PAPER PLOTS SHOULD THEREFORE BE TREATED WITH CAUTION. This drawing has been produced for the purpose of the original commissioning agent. Plowman Craven Limited will accept no responsibility for details that are subsequently found to be the consequence of undisclosed facts or that were obscured from view at the time of survey or that have been altered since the survey. All data remains the property of Plowman Craven Limited until full payment has been received. See www.plowmancraven.co.uk for full terms and conditions of contract. ISSUES & REVISIONS |
| | | Issue Details By Date A Original Issue CGM 18/12/13 |
| | | |
| | 2 <u>08600 N</u> | SHEET LAYOUT 30279T-01-1 30279T-01-2 THIS SURVEY HAS BEEN CARRIED OUT TO AN ACCURACY |
| | | CONSISTENT WITH A PRESENTATION SCALE OF 1:200 . INTERROGATED DIMENSIONS WILL BE WITHIN THE TOLERANCE ASSOCIATED WITH THIS AND SMALLER SCALES ONLY. ALL LEVELS ARE IN METRES AND ARE ABOVE ORDNANCE SURVEY NEWLYN DATUM DERIVED BY MULTIPLE NETWORK RTK GPS OBSERVATIONS. THE SURVEY GRID SHOWN ON THIS DRAWING IS ONLY REFERENCED TO ORDNANCE SURVEY (OS) NATIONAL GRID AT THE FOLLOWING POINT: 523286.762E, 208711.293N / STN 2S, OBTAINED BY MULTIPLE NETWORK RTK GPS OBSERVATIONS. ALL QUOTED DIMENSIONS ARE IN METRES DRAWING UNITS ARE METRES |
| | | CLIENT BROOKS / MURRAY 8-10 New North Place London EC2A 4JA |
| | | PROJECT TITLE Salisbury Square Hatfield 3D Topographical Survey SURVEYED AND DRAWN BY Plowman Craven Harpenden Hertfordshire AL5 5EQ |
| | | 1 +44(0)1582 765566 Image: bit info@plowmancraven.co.uk 1 +44(0)1582 765370 Image: bit www.plowmancraven.co.uk 1 +44(0)1582 765370 Image: bit www.plowmancraven.co.uk |
| | | PRESENTATION SCALE 1:200 @ A1 |
| | 2 <u>08550 N</u> | DATE OF ORIGINAL SURVEY 06/12/2013 PC PROJECT No. 30279 CHECKED DRAWING No. CHECKED CHECKED |
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