



**ORKNEY**  
ISLANDS COUNCIL

**Item: 4**

**Local Review Body: 13 December 2024.**

**Proposed Erection of Ten Houses with Air Source Heat Pumps and Associated Infrastructure near Cairston Road, Stromness (22/382/PP).**

**Report by Corporate Director for Strategy, Performance and Business Solutions.**

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## **1. Overview**

- 1.1. Planning application 22/382/PP in respect of the proposed erection of ten houses with air source heat pumps, construction of a road and associated landscaping and infrastructure near Cairston Road, Stromness, was granted by the Appointed Officer on 28 June 2024, subject to conditions.
- 1.2. Under the Town and Country Planning (Scotland) Act 1997 and the Town and Country Planning (Schemes of Delegation and Local Review Procedure) (Scotland) Regulations 2013, where an application for planning permission for local development has been determined by the Appointed Officer in accordance with the Council's Planning Scheme of Delegation, the applicant is entitled to seek a review of that decision by the Local Review Body.
- 1.3. The applicant has submitted a Notice of Review (see Appendix 1) requesting that the decision of the Appointed Officer, referred to at paragraph 1.1 above, be reviewed, specifically Condition 7 imposed on the consent by the Appointed Officer. The applicant has indicated that they think the most appropriate way for their review to be conducted is by the assessment of the review documents only, with no further procedure.
- 1.4. A letter from the Chief Planner, Scottish Government, issued in July 2011, confirmed that a review by a Local Review Body should be conducted by means of a full consideration of the application afresh.

- 1.5. Section 21 of the Scheme of Administration states that the Local Review Body will undertake unaccompanied site inspections for all planning applications subject to a local review, prior to meeting to consider the review. The purpose of the site inspection, together with the procedure to be adopted, are set out in section 21.2 of the Scheme of Administration. The applicant and interested parties have been advised that an unaccompanied site inspection to the site at Cairston Road, Stromness, is due to be undertaken on 13 December 2024 at approximately 09:30.
- 1.6. The applicant has submitted new information as part of their Notice of Review. This is, however, considered as new information on an existing matter and, as a result, its submission to the Local Review Body is permitted. Further details are provided in section 4.1 below.
- 1.7. The review procedure is set out in section 5 below.

## **2. Recommendations**

- 2.1. The Local Review Body is required to:
  - i. Determine whether it has sufficient information to proceed to determination of the review, and if so whether to uphold, reverse or vary the decision of the Appointed Officer.
- 2.2. Should the Local Review Body determine that the decision is reversed or varied, it is required to:
  - i. Determine the reasons, and, if applicable, the relevant matters in respect of potential conditions to be attached to the decision notice.
- 2.3. Should the Local Review Body determine that the decision is varied, it is recommended that members of the Local Review Body:
  - i. Delegates powers to the Corporate Director for Strategy, Performance and Business Solutions, following consultation with the Planning Advisor and the Legal Advisor, to determine the necessary conditions to attach to the Decision Notice.
- 2.4. Should the Local Review Body determine that it does not have sufficient information to proceed to determination of the review, it is required to:

- i. Determine what further information is required, which parties are to be requested to provide the information, and whether to obtain further information by one or more of the following methods:
  - By means of written submissions under the procedure set out in Regulation 15 of the Town and Country Planning (Schemes of Delegation and Local Review Procedure) (Scotland) Regulations 2013; and/or
  - By the holding of one or more hearing under the Hearing Session Rules set out in Schedule 1 of the Town and Country Planning (Schemes of Delegation and Local Review Procedure) (Scotland) Regulations 2013.

### **3. Planning Authority Decision**

3.1. The Planning Handling Report, Planning Services file and the Decision Notice are attached as Appendices 2, 3 and 4 to this report.

3.2. On 28 June 2024, the Appointed Officer granted planning application 22/382/PP subject to conditions (see Decision Notice attached as Appendix 4). The Notice of Review relates specifically to Condition 7, attached to the approval, as noted below.

- No development shall commence until full details of a footway across the Cairston Road frontage of the site have been submitted to and approved, in writing, by the Planning Authority. These details shall include:
  - The extent of the footway from the south corner of the site adjoining the third-party access, to the east corner of the site adjacent to Karlea, comprising the whole frontage of the application site with Cairston Road, other than the approved access.
  - Full construction details of the footway, which shall be not less than 1.8 metres wide, to a standard Roads Services footway construction.
  - Location and full construction details of pedestrian crossing points.
  - Associated street lighting, including any alterations to existing street lighting columns.
  - Any drainage included within the footway construction.
  - Construction (including replacement of the existing wall where relevant) of a dry stone wall along the length of the back edge of the footway.

Thereafter, the development shall be completed wholly in accordance with approved details prior to first occupation of any house, unless otherwise approved, in writing, under the provisions of condition 06.

Reason: In the interest of road safety, and as the development of an allocated housing site within the settlement boundary.

## **4. Local Review Procedure**

- 4.1. The applicant's Notice of Review contains a new footpath layout detailed as "Plan C" on page 8 of Appendix 1. "Plan C" could not have been before the Appointed Officer when they made their determination on 28 June 2024, as it was provided to the planning service on 24 July 2024. This is considered new information on an existing matter and, as a result, its submission as part of the Notice of Review is permitted.
- 4.2. In response to a Notice of Review, "interested parties" are permitted to make a representation to the Local Review Body. "Interested parties" include any party who has made, and not withdrawn, a representation in connection with the application. A representation was received from Development Management and is attached as Appendix 5.
- 4.3. In instances where a representation is received from an "interested party", the applicant is afforded the opportunity to make comments on any representation received. No further comments from the applicant and/or agent were received.
- 4.4. The Local Review Body may uphold, reverse or vary the decision of the Appointed Officer.
- 4.5. All conditions should be in accordance with Planning Circular 4/1998 regarding the use of conditions in planning permissions. As a matter of policy, all conditions should only be imposed when they are:
  - Necessary.
  - Relevant to planning.
  - Relevant to the development to be permitted.
  - Enforceable.
  - Precise.
  - Reasonable in all other respects.
- 4.6. Paragraph 85 of Planning Circular 4/1998 indicates that, in exceptional circumstances, conditions may be imposed to restrict further development which would normally be permitted by the provisions of the Town and Country Planning (General Permitted Development) (Scotland) Order or the Town and Country Planning (Use Classes) (Scotland) Order 1997.

- 4.7. If the decision is varied, it is proposed that powers are delegated to the Corporate Director for Strategy, Performance and Business Solutions, following consultation with the Planning Advisor and the Legal Advisor, to determine the necessary conditions.
- 4.8. If the Local Review Body decides that further procedure is required, it may decide to hold a pre-examination meeting to consider what procedures to follow in the review, or to obtain further information by one or more of the following methods:
- By means of written submissions under the procedure set out in Regulation 15 of the Town and Country Planning (Schemes of Delegation and Local Review Procedure) (Scotland) Regulations 2013; and/or.
  - By the holding of one or more hearing under the Hearing Session Rules set out in Schedule 1 of the Town and Country Planning (Schemes of Delegation and Local Review Procedure) (Scotland) Regulations 2013.

## **5. Relevant Planning Policy and Guidance**

- 5.1. Section 25 of the Town and Country Planning (Scotland) Act 1997 as amended states, “Where, in making any determination under the Planning Acts, regard is to be had to the development plan, the determination is, unless material considerations indicate otherwise ... to be made in accordance with that plan...”
- 5.2. The full text of the Orkney Local Development Plan 2017 (OLDP 2017) and other supplementary planning advice and guidance can be read on the Council website [here](#). Although the Orkney Local Development Plan is “out-of-date” and has been since April 2022, it is still a significant material consideration when considering planning applications. The primacy of the plan should be maintained until a new plan is adopted. However, the weight to be attached to the Plan will be diminished where policies within the plan are subsequently superseded.
- 5.3. National Planning Framework 4 was approved by Parliament on 11 January 2023 and formally adopted by Scottish Ministers on 13 February 2023. The statutory development plan for Orkney consists of the National Planning Framework and the Orkney Local Development Plan 2017 and its supplementary guidance. In the event of any incompatibility between a provision of National Planning Framework 4 and a provision of the Orkney Local Development Plan 2017, National Planning Framework 4 is to prevail as it was adopted later. It is important to note that National Planning Framework 4 must be read and applied as a whole, and that the intent of each of the 33 policies is set out in National Planning Framework 4 and can be used to guide decision-making.

5.4. It is for the Local Review Body to determine which policies are relevant to this application; however the policies listed below were referred to by the Appointed Officer in the Planning Handling Report:

- Orkney Local Development Plan 2017:
  - Policy 1 – Criteria for All Development.
  - Policy 2 – Design.
  - Policy 5A – Housing.
  - Policy 9G – Natural Heritage and Landscape.
  - Policy 14C – Transport, Travel and Road Network Infrastructure.

5.5. With regard to National Planning Framework 4 (NPF4), no specific policies were referred to by the Appointed Officer, but they noted that the development complies with relevant policy provisions of NPF4.

**For Further Information please contact:**

Susan Shearer, Planning Advisor to the Local Review Body, extension 2433, Email: [susan.shearer@orkney.gov.uk](mailto:susan.shearer@orkney.gov.uk).

**Implications of Report**

1. **Financial:** All resources associated with supporting the review procedure, mainly in the form of staff time, are contained within existing revenue budgets.
2. **Legal:** The legal implications are set out in the body of the report.
3. **Corporate Governance:** In accordance with the Scheme of Administration, determination of Notices of Review is delegated to the Local Review Body.
4. **Human Resources:** None.
5. **Equalities:** None.
6. **Island Communities Impact:** None.
7. **Links to Council Plan:** The proposals in this report support and contribute to improved outcomes for communities as outlined in the following Council Plan strategic priorities:
  - Growing our economy.
  - Strengthening our Communities.
  - Developing our Infrastructure.
  - Transforming our Council.
8. **Links to Local Outcomes Improvement Plan:** The proposals in this report support and contribute to improved outcomes for communities as outlined in the following Local Outcomes Improvement Plan priorities:
  - Cost of Living.
  - Sustainable Development.
  - Local Equality.
9. **Environmental and Climate Risk:** None.

10. **Risk:** None.
11. **Procurement:** None.
12. **Health and Safety:** None.
13. **Property and Assets:** None.
14. **Information Technology:** None.
15. **Cost of Living:** None.

### **List of Background Papers**

Orkney Local Development Plan 2017, available [here](#).

National Planning Framework 4, available [here](#).

Planning Circular 4/1988, available [here](#).

### **Appendices**

Appendix 1 – Notice of Review (pages 1 – 26).

Appendix 2 – Planning Handling Report (pages 27 - 32).

Appendix 3 – Planning Services File (pages 33 - 359).

Appendix 4 – Decision Notice (pages 360 - 371).

Appendix 5 – Representation from Development Management (page 372).

Pages 1 to 371 can be viewed [here](#), clicking on “Accept and Search” and inserting the planning reference”24/028/PP.”.

Print Form

## NOTICE OF REVIEW

Under Section 43A(8) Of the Town and Country Planning (SCOTLAND) ACT 1997 (As amended) In Respect  
of Decisions on Local Developments

The Town and Country Planning (Schemes of Delegation and Local Review Procedure) (SCOTLAND)  
Regulations 2013

The Town and Country Planning (Appeals) (SCOTLAND) Regulations 2013

**IMPORTANT: Please read and follow the guidance notes provided when completing this form. Failure to supply all the relevant information could invalidate your notice of review.**

**PLEASE NOTE IT IS FASTER AND SIMPLER TO SUBMIT PLANNING APPLICATIONS  
ELECTRONICALLY VIA <https://www.eplanning.scot>**

1. Applicant's Details		2. Agent's Details (if any)	
Title	<input type="text"/>	Ref No.	<input type="text"/>
Forename	<input type="text"/>	Forename	<input type="text"/>
Surname	<input type="text"/>	Surname	<input type="text"/>
Company Name	ORKNEY BUILDERS LTD	Company Name	NESS PLANNING
Building No./Name	<input type="text"/>	Building No./Name	WESTFIELD
Address Line 1	C/O NESS PLANNING	Address Line 1	BRAE OF CANTRAY
Address Line 2	<input type="text"/>	Address Line 2	CROY
Town/City	<input type="text"/>	Town/City	<input type="text"/>
Postcode	<input type="text"/>	Postcode	IV2 5PW
Telephone	<input type="text"/>	Telephone	<input type="text"/>
Mobile	<input type="text"/>	Mobile	07827716786
Fax	<input type="text"/>	Fax	<input type="text"/>
Email	info@nessplanning.co.uk	Email	info@nessplanning.co.uk
3. Application Details			
Planning authority	ORKNEY ISLAND COUNCIL		
Planning authority's application reference number	22/382/PP		
Site address	<div style="border: 1px solid black; padding: 5px; min-height: 80px;">           LAND AT CAIRSTON ROAD, STROMNESS, KW16 3JS         </div>		
Description of proposed development	<div style="border: 1px solid black; padding: 5px; min-height: 40px;">           ERECTION OF 10 HOUSES WITH AIR SOURCE HEAT PUMPS AND ASSOCIATED INFRASTRUCTURE         </div>		



Date of application	<input type="text" value="19/10/22"/>	Date of decision (if any)	<input type="text" value="28/06/24"/>
<p><b>Note.</b> This notice must be served on the planning authority within three months of the date of decision notice or from the date of expiry of the period allowed for determining the application.</p>			
<b>4. Nature of Application</b>			
Application for planning permission (including householder application)		X	<input checked="" type="checkbox"/>
Application for planning permission in principle			<input type="checkbox"/>
Further application (including development that has not yet commenced and where a time limit has been imposed; renewal of planning permission and/or modification, variation or removal of a planning condition)			<input type="checkbox"/>
Application for approval of matters specified in conditions			<input type="checkbox"/>
<b>5. Reasons for seeking review</b>			
Refusal of application by appointed officer			<input type="checkbox"/>
Failure by appointed officer to determine the application within the period allowed for determination of the application			<input type="checkbox"/>
Conditions imposed on consent by appointed officer		X	<input checked="" type="checkbox"/>
<b>6. Review procedure</b>			
<p>The Local Review Body will decide on the procedure to be used to determine your review and may at any time during the review process require that further information or representations be made to enable them to determine the review. Further information may be required by one or a combination of procedures, such as: written submissions; the holding of one or more hearing sessions and/or inspecting the land which is the subject of the review case.</p> <p>Please indicate what procedure (or combination of procedures) you think is most appropriate for the handling of your review. You may tick more than one box if you wish the review to be conducted by a combination of procedures.</p>			
Further written submissions			<input type="checkbox"/>
One or more hearing sessions			<input type="checkbox"/>
Site inspection			<input type="checkbox"/>
Assessment of review documents only, with no further procedure		X	<input checked="" type="checkbox"/>
<p>If you have marked either of the first 2 options, please explain here which of the matters (as set out in your statement below) you believe ought to be subject of that procedure, and why you consider further submissions or a hearing necessary.</p>			
<div style="border: 1px solid black; height: 40px; width: 100%;"></div>			
<b>7. Site inspection</b>			
<p>In the event that the Local Review Body decides to inspect the review site, in your opinion:</p>			
Can the site be viewed entirely from public land?		YES	<input type="checkbox"/>
Is it possible for the site to be accessed safely, and without barriers to entry?		YES	<input type="checkbox"/>

If there are reasons why you think the Local Review Body would be unable to undertake an unaccompanied site inspection, please explain here:

#### 8. Statement

You must state, in full, why you are seeking a review on your application. Your statement must set out all matters you consider require to be taken into account in determining your review. **Note:** you may not have a further opportunity to add to your statement of review at a later date. It is therefore essential that you submit with your notice of review, all necessary information and evidence that you rely on and wish the Local Review Body to consider as part of your review.

If the Local Review Body issues a notice requesting further information from any other person or body, you will have a period of 14 days in which to comment on any additional matter which has been raised by that person or body.

State here the reasons for your notice of review and all matters you wish to raise. If necessary, this can be continued or provided in full in a separate document. You may also submit additional documentation with this form.

PLEASE SEE THE ATTACHED STATEMENT AND PRODUCTIONS

Have you raised any matters which were not before the appointed officer at the time your application was determined? Yes  No  NO

If yes, please explain below a) why your are raising new material b) why it was not raised with the appointed officer before your application was determined and c) why you believe it should now be considered with your review.

### 9. List of Documents and Evidence

Please provide a list of all supporting documents, materials and evidence which you wish to submit with your notice of review

AS SET OUT IN THE REVIEW STATEMENT

**Note.** The planning authority will make a copy of the notice of review, the review documents and any notice of the procedure of the review available for inspection at an office of the planning authority until such time as the review is determined. It may also be available on the planning authority website.

### 10. Checklist

Please mark the appropriate boxes to confirm that you have provided all supporting documents and evidence relevant to your review:

Full completion of all parts of this form YES

Statement of your reasons for requesting a review YES

All documents, materials and evidence which you intend to rely on (e.g. plans and drawings or other documents) which are now the subject of this review. YES

**Note.** Where the review relates to a further application e.g. renewal of planning permission or modification, variation or removal of a planning condition or where it relates to an application for approval of matters specified in conditions, it is advisable to provide the application reference number, approved plans and decision notice from that earlier consent.

### DECLARATION

I, the applicant/agent hereby serve notice on the planning authority to review the application as set out on this form and in the supporting documents. I hereby confirm that the information given in this form is true and accurate to the best of my knowledge.

Signature:  Name:  Date:

**Any personal data that you have been asked to provide on this form will be held and processed in accordance with Data Protection Legislation.**

**REQUEST FOR PLANNING REVIEW AGAINST THE TERMS OF CONDITION 7  
PLANNING PERMISSION 22/382/PP****ERECT 10 HOUSES WITH AIR SOURCE HEAT PUMPS, CONSTRUCT A ROAD AND ASSOCIATED  
LANDSCAPING AND INFRASTRUCTURE****CAIRSTON ROAD, STROMNESS, ORKNEY, KW16 3JS**

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**BACKGROUND**

This report sets out the grounds of appeal against the terms of Condition 7 of planning permission 22/382/PP which involves the erection of 10 affordable homes on land at Cairston Road, Stromness. The Review Statement sets out the background to the development proposal and confirms there are no outstanding technical or infrastructure matters which would preclude the grant of planning permission.

The planning application was submitted on 19 October 2022 and the planning permission issued on 28 June 2024.

This Review is submitted within the three month deadline as specified by the relevant Regulations.

**PURPOSE OF REVIEW REQUEST**

Planning permission was issued following detailed assessment and amended layout details to accord with the statutory consultee requirements, most particularly drainage matters and road layout details.

The permission was issued subject to a number of conditions. This Review seeks the deletion of Condition 7 on the grounds that it is not necessary, relevant or justified. It fails to meet the Scottish Government advice on the Use of Conditions (Circular4/1998). It results in an unduly onerous requirement on the developer, involves land outwith the redline application site boundary and will significantly increase the site development costs and potentially render part of the approved site layout incapable of development.

**CONDITION 7**

Condition 7 states:

07. No development shall commence until full details of a footway across the Cairston Road frontage of the site have been submitted to and approved, in writing, by the Planning Authority. These details shall include:

- The extent of the footway from the south corner of the site adjoining the third party access, to the east corner of the site adjacent to Karlea, comprising the whole frontage of the application site with Cairston Road, other than the approved access.
- Full construction details of the footway, which shall be not less than 1.8 metres wide, to a standard Roads Services footway construction.
- Location and full construction details of pedestrian crossing points.

- Associated street lighting, including any alterations to existing street lighting columns.
- Any drainage included within the footway construction.
- Construction (including replacement of the existing wall where relevant) of a dry stone wall along the length of the back edge of the footway.

Thereafter, the development shall be completed wholly in accordance with approved details prior to first occupation of any house, unless otherwise approved, in writing, under the provisions of condition 06.

Reason: In the interests of road safety, and as the development of an allocated housing site within the settlement boundary.

### **REVIEW OF THE TERMS OF CONDITION 7**

First and foremost, the terms of the condition exceed that of the requirements specified by the Roads Service. In their consultation memo dated 6 November 2023 (their final comment) they stated that they had no objections and supported the proposed layout including the access arrangements. The response did include a reference to the provision of a footpath and stated:

*However, it is noted that there has been no amendment made to the footpath from the development at its junction with Cairston Road, where it was previously requested that the sections of footway should be extended to provide pedestrian crossing points. However, this is something that could be achieved by an appropriate planning condition.*

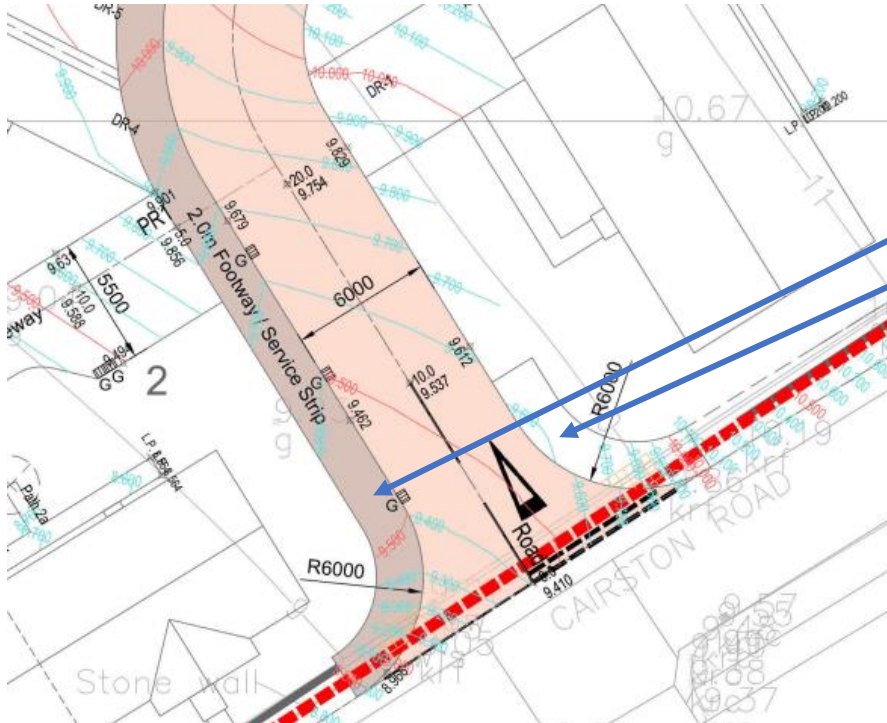
For the avoidance of any doubt, what the Roads Service are seeking is

- Extend the footpath from the new access junction serving the new development to provide pedestrian crossing points.
- This can be secured by planning condition.

To be clear, the proposed site layout indicated a footway that extended the length of the new access through the development site but had not extended the footway east to a point where safe pedestrian crossing points could be formed. The crossing point would provide safe access to the existing footway which extends both east up the hill and west to the town centre.

The following plans explain the situation and the applicant's willingness to accord with the Roads Service request and provide an extended footway and appropriate crossing points (Plan C below.

**Plan A – plan as approved with footway that extends to either side of the bellmouth of the new access.**



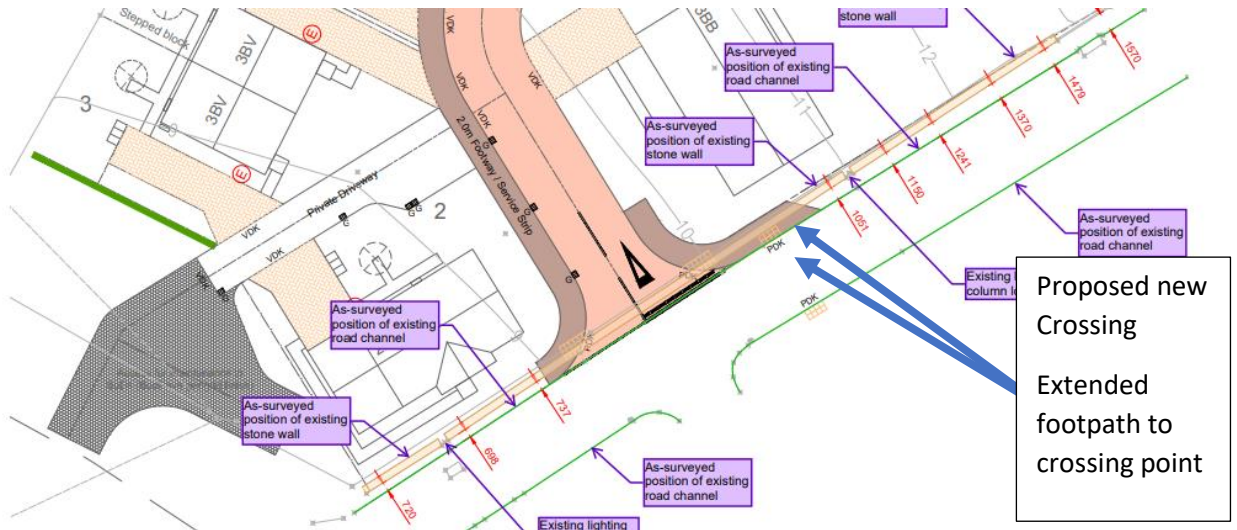
Proposed footpaths extending along the new access and terminating at Cairston Road.

This is the APPROVED ROAD LAYOUT plan.

**Plan B – APPROVED SITE LAYOUT PLAN with footpath crossing identified on the new access road (Red arrow)**



Plan C – details to address the terms of the Condition and comply with the Roads Service requirements and was submitted to the planning service on 24 July 2024 but has not been responded to. It provides an extended footway and pedestrian crossing to secure access to the existing footway on Cairston Road. Just as required by the Roads Service.



These drawings demonstrate two fundamental points.

Firstly Plans A and B above are stamped as the approved plans pertaining to the planning permission. The condition contradicts the details of the approved plans.

Secondly, Plan C was submitted to demonstrate that the terms of the Condition can be achieved but *in line with the requirements of the Roads Service – that is, extend the pavement to a safe (new) crossing point which in turn provides safe access to the existing footway on the opposite side of Cairston Road.*



View of the development site and existing footway on the south side of Cairston Road.  
  
Approximate location of crossing point marked



*Application site marked by red arrow*

## **REPORT OF HANDLING**

The Officer advises at the paragraph described as Access and Parking that a public footway is to be constructed along the roadside boundary of the application site. The justification for this is based on Policy 14C of the adopted Local Development Plan 2017.

However Policy 14C does not specify nor require a new footpath adjacent to a new site as mandatory, or indeed at all. The proposal as submitted and as set out on Plan C above entirely accords with the requirements of the Roads Service and meets the objectives of Policy 14C which states:  
(comments added in blue text to demonstrate compliance).

### **Policy 14C.**

*Road Network Infrastructure Development will only be permitted where due regard has been paid to Designing Streets and the proposal demonstrates that:*

*i. It is well connected to the existing network of roads, paths and cycleways and will not create a barrier to future development; it is well connected and provides a new and dedicated crossing. There are no footpaths adjoining the application site to the west or east of the site on the application side of the road to connect into. The complete footpath is on the opposite side of the road. This proposal will connect to that.*



*ii. It can be safely and conveniently accessed by service, delivery and other goods vehicles, as appropriate to the development; it can, the new access accords with the Roads Service design guidance and provides a full footway throughout the site*

*iii. Any new access, or upgrades to an existing access, linking to the adopted road network has been designed to an adoptable standard as defined by the National Roads Development Guide (new accesses should be resource-efficient, safe for all road users, and convenient for sustainable travel modes); the new road and access is designed to adoptable standards*

*iv. It is designed to cause minimal impact on the character of the site and the surrounding area; and the Roads Service has no issue with the design, layout or location of the proposed new access arrangements and new road within the site boundary*

*v. There are satisfactory arrangements to ensure that there is provision for the long-term maintenance. The road will be adopted and constructed in accordance with Council requirements*

Policy 14C does not require a footpath adjacent to a development site. The Roads Service do not require a footpath along the length of the application site boundary. It will serve no useful purpose, does not link into an existing footpath and creates a section of path that will be isolated and lead to indiscriminate crossing of Cairnsay Road.

The pedestrian-safe option is as shown on Plan C above: an extended footway that provides a pedestrian-safe crossing to the existing footway on the opposite side of the road.

There is therefore no specific requirement for the footpath as specified in Condition 7. The new road layout and safe pedestrian crossings which provide safe access to the footpath network is more than adequate to serve the new development and accords with Road Service requirements.

The narrow width of the existing verge means that the provision of a 1.8metre wide path will involve encroachment into the application site, demolition and reconstruction of the wall and resiting of the existing lighting column. The additional cost of this for an affordable housing development is self evident.



*Site area – note narrow width of the verge, well below 1.8m wide and note safe and well maintained footpath opposite to which the site can connect*



*Note narrow verge and the existing wall to be demolished and reconstructed within the application site*

Put simply, Condition 7 exceeds what is necessary and was not a requirement of the Roads Service. Instead it is an onerous requirement that cannot be delivered without significant financial outlay for the applicant and cannot be situated on the existing narrow verge, forcing demolition and reconstruction of the stone wall and potential adjustment of the position of the house that is proposed immediately to the rear of the boundary. All of this is also outwith the red line application site boundary.

This means that in addition to using land outside the application site boundary, the terms of Condition 7 will likely require a change in the position of the 3 bedroom bungalow. The cost of replacing the stone wall and relocation of the existing lighting column will amount to some £65,000.

Changes to the house layout will be considered material and likely require a new application. The condition effectively renders the permission incapable of implementation without a material change.

All it achieves is a path that leads from the site, runs adjacent to the site boundary and terminates some way to the east, leading nowhere and taking pedestrians further away from the town and services. It meets no identified need and is unnecessary.

## **PLANNING POLICY AND USE OF CONDITIONS**

NPF4 Policy 18 makes clear that planning conditions should only be imposed where they meet all of the tests, reinforcing the terms of the Circular.

Circular 4/1998 advises that planning conditions imposed on the grant of planning permission can enable development proposals to proceed. The power to impose conditions needs to be exercised in a manner that is 'fair, reasonable and practicable'. Conditions should not be imposed unless they are both necessary and effective and do not place unjustifiable burdens on applicants.

The Circular further advises that planning conditions should only be imposed where they meet **all** the following tests:

- Necessary
- Relevant to planning
- Relevant to the development to be permitted
- Enforceable
- Precise
- Reasonable in all other respects

Condition 7 does place an unjustifiable burden on the applicant. It is not necessary and it is not effective.

It fails the Six Tests for Conditions set out in the Circular. The construction and replacement of the stone wall is a considerable financial burden on the applicant, disproportionate to the scale of development and is not necessary. Because, as Drawing SK009 clearly demonstrates (and the photographs), the existing verge is at no point 1.8m wide, either the existing wall must be removed and relocated further into the site or the road must be correspondingly narrowed.

It is considered unlikely the Roads Service will agree to that. The cost of a replacement stone wall, including sourcing the raw material from a quarry, is in the region of £65,000. It must not be overlooked that the development provides a total of 10 much-needed affordable homes that will be delivered in partnership with Scottish Government funding and provide much-needed homes for local people.

In addition, there will be a cost of relocating the streetlights, the actual construction of the footpath and drainage. In addition, the land adjacent to the nearest plot will require considerable earth modelling resulting in a steep and unusable area of garden ground.

The Chief Planner, in his letter dated 28 June 2024 noted that Scotland has declared a national housing emergency and reinforces the Intent of NPF4 which, under Policy 16, seeks to

*“to encourage, promote and facilitate the delivery of more high quality, affordable and sustainable homes, in the right locations, providing choice across tenures that meet the diverse housing needs of people and communities across Scotland.”*

The onerous implications of meeting the terms of the condition does not meet this Intent.

The Circular advises on each of the six tests.

### **Necessary**

Conditions should be used to address a particular issue not impose unjustifiable controls. The Roads Service has not requested the footpath, only that suitable pedestrian crossings are incorporated into an extended area of footpath. We have submitted a drawing showing two pedestrian crossings, providing safe crossings for users across both the access and Cairston Road., in a location that ensures pedestrian safety and relates directly to the development proposal. The condition is not necessary as worded: it is not required by any general policy, was not required by the Roads Service and serves no purpose directly associated with the scope of development.

The condition fails the test of need.

### **Relevance to the development to be permitted**

The terms of the condition do not fairly and reasonably relate to the development to be permitted. It is not justified by the nature of the development permitted. It requires works on land outwith the control of the applicant, for which additional consents will be required as it directly affects the adopted road. The footpath has not been identified as necessary in terms of the scope of development.

It is in conflict with the approved Road Layout Plan and site layout. The effect of the development is not such that it requires a full width footway which terminates at the boundary of the site. It serves no road safety purpose. Where it terminates at the east of the site boundary will force pedestrians to cross the road to join the existing footway on the south side. What possible purpose does it achieve. The proposed path will be heading away from the town centre and main services. It does not connect to any existing path either to the east or west and is completely superfluous.

The Cameron and Ross drawings (Plan C), demonstrate that a pedestrian crossing close to the site access will serve a direct purpose enabling pedestrians, pupils etc to cross the road close to the site entrance all as required by the Roads Service and set out in their consultation response.

The condition fails the test of relevance to the development permitted.

### **Enforceable**

The Condition may be enforceable because it is suspensive to development commencing on site but that does not render it appropriate. However, for the planning authority to initiate enforcement action as a Breach of Condition Notice for example, would be to enforce against the Council as it is the Council who own the verge and existing road. Moreover, should the applicant submit details but fail to implement the works identified as stipulated, the breach of condition would relate to the occupants of each of the houses. This is not an appropriate use of a condition that places unnecessary and unwelcome burdens on the Council as landowner.

### **Reasonableness**

The condition fails this test because it is unduly restrictive and unduly onerous. Firstly this is not what the Roads Service has requested, it has never formed part of any discussion during the processing of the application and is not justified by the Reason stated in the condition.

LDP Policy 14C does not require footways adjacent to boundaries of new developments. The applicant does not have control over all the land, the verge is insufficient to enable a 1.8m wide footway and will require to either extend into the existing road or involve the reconstruction of a stone wall for its entire length and create an unreasonable and unnecessary requirement of a condition that at no time during the application process was raised as an issue or requirement of the grant of planning permission.

The condition fails the test of reasonableness.

### **Summary**

In summary, the condition requires works that are unduly onerous, unnecessary and unreasonable. The Roads Service consultation response seeks only that the footpath adjacent to the access site is extended to enable safe pedestrian crossing points. The drawing by Cameron & Ross, Ref: 210321-000-CAM-DR-C-200 Rev.F, submitted in July to satisfy the terms of the condition, demonstrates this amended layout. This layout is reasonable in the context of the planning permission. It provides safe

pedestrian access to and from the site and connects to an existing footpath. There is no footway on the north side of Cairston Road as it heads east toward Howe Road but a full length footpath does extend along the southside of Cairston Road. It is a connection to this existing footpath that will serve a purpose rather than creating an isolated section of footway that does not connect to any existing footway and will result in pedestrians taking risks to cross a busy road in order to obtain the existing footpath.

The Review is lodged because not only does the condition fail to meet all of the 6 tests as required by the Circular but it was also not required by the Roads Service in their assessment of the application nor is it required by the terms of Policy 14C as suggested in the officer report.

Circular 4/1998 makes clear that a condition can only be considered competent if it meets ALL of the tests. This condition fails the test of reasonableness, necessity and relevance.

For all these reasons, the condition should be deleted. For the avoidance of doubt the applicant has no difficulty in complying with the Roads Services requirement to provide an extended section of footpath and safe pedestrian crossing points to gain access to the existing footway. A condition to that effect would be acceptable to the applicant.

## LIST OF PRODUCTIONS

- 1 APPLICATION FORM \*
- 2 APPLICATION DRAWINGS \*
  - i) SITE LAYOUT (APPROVED)\*
  - ii) ROAD LAYOUT (APPROVED)\*
- 3 ROADS SERVICE CONSULTEE RESPONSE DATED 6 NOVEMBER \*
- 4 DECISION NOTICE\*
- 5 CHIEF PLANNER LETTER DATED 28 JULY 2024
- 6 POLICY 14C – EXTRACT FROM THE ORKNEY LOCAL DEVELOPMENT PLAN 2017
- 7 NPF4 POLICY 18 - EXTRACT
- 8 PHOTOGRAPHS
  - I) Existing verge
  - II) Existing footpath on Cairson Road and extending west to the town centre
  - III) Lack of existing footways on north side of Cairston Road
  - IV) Location of the proposed termination of the proposed footway
- 9 REVIEW STATEMENT
- 10 REVIEW APPLICATION FORM

- Denotes documents held on the planning case file and not provided



*Cairston Road and existing footway running along the south side of the road*



*Existing footway running on the south side of Cairston Road to which the new development would gain access as set out in Plan C . Development site is on the left of the photograph*



*Existing footpath on the south side of Cairston Road. Note narrow width of the verge and stone wall. This would require to be removed and the road narrowed or site layout altered to accommodate the 1.8m wide path required*

*E*



*Existing footway which extends the full length of Cairston Road with no available footpath on the north side. The proposed path would not connect to any existing path*





*Location of the end point of the required footpath, which will terminate abruptly and force pedestrians to cross the road on a bend and close to the brow of a hill*



*Application site (blue arrow) looking west with narrow existing verge that will involve detailed engineering works to create a 1.8 m wide new footway and the clearly evident existing footway on the opposite side of the road.*

**Re-Consultation****INTERNAL MEMORANDUM TO: Roads Services**

Date of Consultation	22nd August 2023
Response required by	12th September 2023
Planning Authority Reference	22/382/PP
Nature of Proposal (Description)	Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure
Site	Cairston Road (Land Near), Stromness, Orkney, KW16 3JS
Proposal Location Easting	326018
Proposal Location Northing	1010016
Area of application site (Metres)	4962
Supporting Documentation URL	<a href="http://planningandwarrant.orkney.gov.uk/online-applications/">http://planningandwarrant.orkney.gov.uk/online-applications/</a>  Please enter - 22/382/PP
PA Office	Development Management
Case Officer	Mr Jamie Macvie
Case Officer Phone number	01856 873535 EXT 2529
Case Officer email address	jamie.macvie@orkney.gov.uk
PA Response To	planningconsultation@orkney.gov.uk

**Comments:**

As previously advised while the formation of crossroads should generally be avoided, however in this instance to ensure adequate visibility from the access to the development site there is little option other than to create a crossroads style of junction, therefore in this instance it would be acceptable.

However, it is noted that there has been no amendment made to the footpath from the development at its junction with Cairston Road, where it was previously requested that the sections of footway should be extended to provide pedestrian crossing points. However, this is something that could be achieved by an appropriate planning condition.

D.W.

E: [chief.planner@gov.scot](mailto:chief.planner@gov.scot)

26 June 2024

Dear Colleagues

## **Planning for Housing**

Scotland has declared a national housing emergency. In setting out the Scottish Government's key priorities, the First Minister confirmed his intention to engage constructively to expand housing supply to meet the needs of the population and tackle homelessness. An all-tenure approach to the provision of new homes, which diversifies supply and provides a mix of tenures, will help to achieve these priorities.

Planning is just one of many factors that impact on the delivery of housing, but it must play its part. Delivery of homes depends on building the confidence of investors – and planning plays a crucial role in this.

Following the [Miller Homes vs. Scottish Ministers, XA41/23](#) court judgement and the more recent declaration of the housing emergency, this letter looks to provide further clarification on application of National Planning Framework 4 (NPF), including Policy 16 'Quality Homes'.

## **Implementation of NPF Policy**

The Scottish Ministers have continued to reinforce that policies in NPF4 should be **read and applied as a whole** and that conflicts between policies are normal and to be expected. The planning system requires decision makers to weigh up all relevant policies, for example, quality homes, brownfield development and town centre living, as well as relevant material considerations in applying balanced planning judgement (section 25 of the Town and Country Planning (Scotland) Act, 1997, as amended). The introduction of NPF4 has not changed this.

The approach to planning for housing in NPF4 is different to that in previous, now superseded, Scottish Planning Policy (SPP). The SPP concepts including an effective five-year housing land supply, shortfalls in supply and the tilted balance, no longer apply. The above court judgement confirmed 'the changes to the development plan move housing policy away from disputes over numbers to an approach which seeks to provide homes in suitable locations' and that 'looking at the policies as a whole there is an emphasis on quality, diversity and sustainability'.

The sections on ‘policy intent’ within NPF4 are provided to help decision makers deliver on policy aspirations. The **intent** of Policy 16 is:

“to encourage, promote and facilitate the delivery of more high quality, affordable and sustainable homes, in the right locations, providing choice across tenures that meet the diverse housing needs of people and communities across Scotland.”

NPF4 expects local development plans to take an **ambitious** approach, with Local Housing Land Requirements that exceed the MATHLR (Minimum All-Tenure Housing Land Requirement). This expectation is reinforced in published guidance supporting preparation of local development plans. The guidance indicates that the same evidence can be used to inform the MATHLR but that where more recent information is available it should be used. It is expected all information used to inform plan preparation is robust.

An ambitious approach, providing land to accommodate a wide choice of homes across a range of scales of sites and locations, will support the above policy intent. It is vitally important that local development plans are brought forward timeously. On land allocated for housing in local development plans, there is support for development in principle from policy **16 part a)**.

NPF4 provides at policy **16 part b)** for proposals to explain how they will contribute positively to meeting local housing requirements, to local infrastructure services and facilities, and to residential amenity, using new Statements of Community Benefit.

Policy **16 part c)** supports proposals that improve affordability and choice, and address identified gaps in provision. A list of examples of the types of proposals this policy could support is provided. In relation to ‘identified gaps in provision’, decision makers may wish to consider the extent to which a proposed development of new homes will contribute to addressing recognised priorities of an area. This can be evidenced by a range of information available on local housing matters, such as Local Housing Strategies, local authority housing emergency action plans or planned actions to support emerging economic opportunities.

Policy **16 part e)** supports proposals for new homes where they make provision for affordable homes to meet an identified need and it strengthened contributions to affordable housing from market sites to ‘at least 25%, with flexibility to local circumstances. Policy **16 part f)** includes a limited exception that can allow proposals of less than 50 affordable homes on unallocated sites, where they accord with criteria relating to build-out and the plan’s spatial strategy and other relevant policies.

A significant element of the previously mentioned legal case related to policy **16 part f)** and a deliverable housing land pipeline. At the same time as publishing this letter, Scottish Ministers have also written to planning authorities to require that action programmes associated with local development plans be reviewed, up-dated and re-published as delivery programmes, and for this to be done by 31 March 2025. Under transitional arrangements, this will ensure they include the sequencing of, and timescale for, the delivery of housing sites allocated in local development plans.

As outlined above, policy 16 contains different parts with some aspects relating to location and others to types of homes. They should be weighed up as relevant to the proposal: there is no hierarchy and no one part of policy should always outweigh others. A balanced planning judgement should be reached in each case.

## Positive and Constructive Collaboration

We are seeking to develop a more positive dialogue on planning for housing, recognising the benefits quality homes and places can bring. We need to find constructive solutions to challenges, and to work collectively on the issues with strong commitment and buy-in across sectors.

The Scottish Government remains committed to working collaboratively with all those with an interest in planning and housing. We are currently giving careful consideration to the Competition and Markets Authority report on the housebuilding sector, and in particular the options put forward on planning.

Late last year, the Planning and Housing Ministers jointly convened a roundtable to consider the issues affecting new homes and possible actions to address them. This group will be reconvened after the Parliamentary summer recess, and in the meantime we are progressing some initial actions. These include:

- Convening a discussion on research produced on behalf of Homes for Scotland on housing need;
- Discussing with SME housebuilders how their experiences of the planning system can be better supported;
- Working across sectors on the implementation of Statements of Community Benefit for housing proposals;
- Finalising guidance on Housing Land Audits and seeking to secure support from across sectors to enable their roll out; and
- Promoting place and delivery focused Masterplan Consent Areas in areas seeking to be early adopters of this new tool.

The housing emergency is a challenge that must be tackled on many fronts. We intend to work positively and constructively to ensure the planning system contributes all it can to support delivery of the quality homes Scotland needs, where and when they are needed.

We trust the above advice supports this.

Yours faithfully



**Dr Fiona Simpson**  
Chief Planner



**Ivan McKee MSP**  
Minister for Public Finance

## EXTRACT OIC LOCAL DEVELOPMENT PLAN

### POLICY 14C

#### C. Road Network Infrastructure

Development will only be permitted where due regard has been paid to Designing Streets and the proposal demonstrates that:

- i. It is well connected to the existing network of roads, paths and cycleways and will not create a barrier to future development;
- ii. It can be safely and conveniently accessed by service, delivery and other goods vehicles, as appropriate to the development;
- iii. Any new access, or upgrades to an existing access, linking to the adopted road network has been designed to an adoptable standard as defined by the National Roads Development Guide (new accesses should be resource efficient, safe for all road users, and convenient for sustainable travel modes);
- iv. It is designed to cause minimal impact on the character of the site and the surrounding area; and
- v. There are satisfactory arrangements to ensure that there is provision for the long term maintenance.

## Infrastructure first

### Policy Principles

#### Policy Intent:

To encourage, promote and facilitate an infrastructure first approach to land use planning, which puts infrastructure considerations at the heart of placemaking.

#### Policy Outcomes:

- Infrastructure considerations are integral to development planning and decision making and potential impacts on infrastructure and infrastructure needs are understood early in the development planning process as part of an evidenced based approach.
- Existing infrastructure assets are used sustainably, prioritising low-carbon solutions.
- Infrastructure requirements, and their planned delivery to meet the needs of communities, are clear.

#### Local Development Plans:

LDPs and delivery programmes should be based on an integrated infrastructure first approach. Plans should:

- be informed by evidence on infrastructure capacity, condition, needs and deliverability within the plan area, including cross boundary infrastructure;
- set out the infrastructure requirements to deliver the spatial strategy, informed by the evidence base, identifying the infrastructure priorities, and where, how, when and by whom they will be delivered; and
- indicate the type, level (or method of calculation) and location of the financial or in-kind contributions, and the types of development from which they will be required.

Plans should align with relevant national, regional and local infrastructure plans and policies and take account of the Scottish Government infrastructure investment hierarchy and sustainable travel and investment hierarchies in developing the spatial strategy. Consistent early engagement and collaboration between relevant stakeholders will better inform decisions on land use and investment.

#### Policy 18

- a) Development proposals which provide (or contribute to) infrastructure in line with that identified as necessary in LDPs and their delivery programmes will be supported.
- b) The impacts of development proposals on infrastructure should be mitigated. Development proposals will only be supported where it can be demonstrated that provision is made to address the impacts on infrastructure. Where planning conditions, planning obligations, or other legal agreements are to be used, the relevant tests will apply.

Where planning obligations are entered into, they should meet the following tests:

- be necessary to make the proposed development acceptable in planning terms
- serve a planning purpose
- relate to the impacts of the proposed development
- fairly and reasonably relate in scale and kind to the proposed development
- be reasonable in all other respects

Planning conditions should only be imposed where they meet all of the following tests. They should be:

- necessary
- relevant to planning
- relevant to the development to be permitted
- enforceable
- precise
- reasonable in all other respects

**Policy impact:**

- ✔ Just Transition
- ✔ Conserving and recycling assets
- ✔ Local living
- ✔ Compact urban growth
- ✔ Rebalanced development

**Key policy connections:**

[Tackling the climate and nature crises](#)

[Climate mitigation and adaptation](#)

[Biodiversity](#)

[Brownfield, vacant and derelict land and empty buildings](#)

[Energy](#)

[Zero waste](#)

[Sustainable transport](#)

[Design, quality and place](#)

[Local Living and 20 minute neighbourhoods](#)

[Heat and cooling](#)

[Quality homes](#)

[Rural homes](#)

[Blue and green infrastructure](#)

[Play, recreation and sport](#)

[Flood risk and water management](#)

[Health and safety](#)

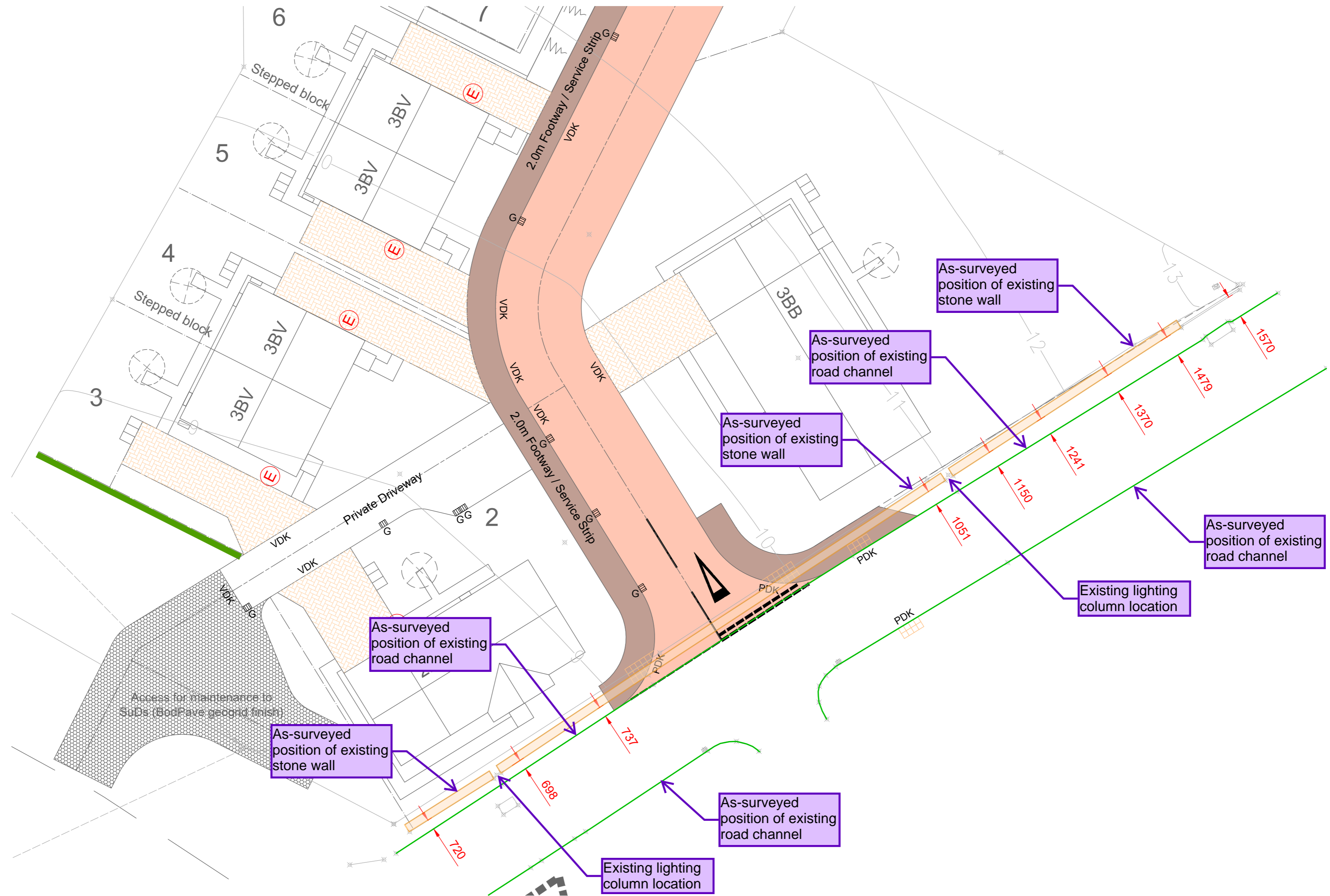
[Digital infrastructure](#)

[Business and industry](#)

[City, town, local and commercial centres](#)

[Rural development](#)





## Planning Handling Report

### Determination under delegated powers

Planning Application No.:	22/382/PP
Application address:	Cairston Road (Land Near), Stromness, Orkney, KW16 3JS
Proposal:	Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure

This proposal has been considered against relevant development plan policies and has been judged to comply. There have been no objections and any matters raised by consultees have been addressed by planning conditions. There are no other material considerations that warrant a decision other than approval. Full details of the proposal, plans and consultation replies can be viewed via the Online Planning facility on the Orkney Islands Council web site.

Reasons for approval or refusal:	<p>It is proposed to erect 10 houses, comprising two detached houses, two pairs of semi-detached houses, and a terrace of four houses. The site is adjacent to and would be accessed from Cairston Road. The development would comprise appropriate landscaping, management of surface water, and appropriate upgrades to footways and means of walking, wheeling and cycling, either by embedded design or subject to condition.</p> <p><b>Principle</b></p> <p>The site is within the settlement boundary of Stromness. It is allocated in the Local Development Plan as short-term housing allocation STR-5. Supplementary Guidance 'Settlement Statements' (2017) requires development of this allocation to include provision of vehicular access to allocation STR-3, which would be included as proposed. The site has an indicative capacity of five houses; however, the layout and detailed design are of sufficient merit to justify the higher density and number of units provided, including the key requirement that the application includes the layout of the entirety of the allocation. The density would be similar to other housing developments nearby, and make efficient use of the land available, whilst still providing adequate communal and private outside amenity space.</p> <p>The principle of the development is acceptable in accordance with Policy 5A – Housing and Settlements of the Orkney Local Development Plan 2017, which confirms that the development of housing allocations will be supported where it accords with the relevant settlement statement and any adopted development brief.</p> <p><b>Access and parking</b></p> <p>Roads Services was consulted, and has no objection to the development as proposed, following submission of additional information in relation to earlier comments from Roads Services. The access would be constructed to a standard specification, and the road would be required to be completed prior to occupation of any of the houses. To ensure connection with later parts of the development/allocated land, the road construction would allow a continuation of the road network into the adjoining field.</p> <p>As a development within the settlement boundary, it would be required to construct public footway along the roadside boundary of the application site, including necessary drainage and street lighting ducting (and amendment to the street lighting column that would be affected), in conjunction with reconstruction of the existing dry stone wall.</p> <p>The application is therefore considered to comply with Policy 14C – Road Network Infrastructure of the Orkney Local Development Plan 2017.</p>
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### **Surface water drainage**

The significant delay in determination of the application was to secure appropriate surface water drainage calculations and specification. This includes the discharge to the adjacent burn, which flows under the public road. Engineering Services has confirmed that satisfactory responses have been provided to all previous queries raised regarding the surface water system proposed for the development, and Engineering Services has no objection.

### **Design and appearance**

The proposed development includes a central road, with houses mainly on the west side of the road. A plot is located on each side of the access to the development, both of which are dual fronted to address both Cairston Road and the new road through the site. The remainder of the houses front on to the newly created road. The roadside detached houses are single storey, with the remainder of the development two-storey, comprising two pairs of semi-detached units and a terrace of four houses.

Parking would be a mix of curtilage, on-street parking adjacent to the houses, and some visitor parking, with a turning head, and the future connection referenced above.

As noted above, the development exceeds the allocation within the Local Development Plan, but the Design Statement provides context in relation to the density of development nearby. Areas of relatively dense housing development exist throughout Stromness, not only in the town centre, so it would not be out of character for a development of this density in this location. The arrangement of the houses provides a simple layout, reflective of the adjacent housing development. Proposed open space and planting can be enhanced by planning condition.

The palette of materials proposed is a simple mix of white/off-white render with dark tiled roofs with matching fascias and soffits, and grey windows and doors.

In relation to Policy 1, part (i), the development is considered to take into consideration the location and wider townscape character, and in relation to part (ii), the proposed density is appropriate to the application. Policy 2 requires that development must reinforce the distinctive identity of Orkney's built environment and be sympathetic to the character of the local area and have a positive or neutral effect on the appearance of the area. In relation to the scale, form, massing, proportions, materials, layout, density and landscaping of the proposed housing, the application is considered to accord with Policy 2 of the Orkney Local Development Plan 2017. In a wider landscape context, the development would protect the overall integrity of the Hoy and West Mainland National Scenic Area and have no adverse impact on its special qualities, in accordance with Policy 9G – Landscape of the Orkney Local Development Plan 2017.

### **Residential Amenity**

The houses are designed to face into the proposed new street, or the existing public road. Windows would be included in the rear elevations of the houses; the alignment and footprint of the proposed houses have been designed to ensure that none of the proposed windows would directly face and be within 21 metres of any windows of any existing neighbouring properties. The proposed houses are an adequate distance from neighbouring houses that there would be no unacceptable impact in relation to sunlight or daylight. Construction noise and disruption would be controlled by planning condition.

The application is considered to comply with Policies 1(iv) and 2(ii) of the Orkney Local Development Plan 2017, by ensuring that the amenity of the surrounding area would be preserved with no unacceptable adverse impacts on adjacent and nearby properties, and by ensuring a positive or neutral effect on the amenity of the area.

	<p><b>Affordable Housing</b></p> <p>Policy 5B requires that “All housing proposals within Orkney’s settlements must demonstrate that they have considered and incorporated housing types and tenures which meet local housing requirements as outlined in relevant settlement statements, developments brief and masterplans”. There is no set number or proportion of units that would have to be delivered as affordable units by this policy provision, and it is a matter for the developer to reach agreement with the Planning Authority, in consultation with Housing Services, in relation to local housing requirements and the number and tenure of affordable units to be provided. It is available to the developer during that correspondence to provide a viability assessment; this would be addressed by planning condition.</p> <p><b>Conclusion</b></p> <p>The development is acceptable in principle, as development of an allocated site within the settlement boundary of Stromness. Management of surface water has been adequately addressed. Roads Services has no objections. Representations have been received. The development is considered to accord with Policies 1, 2, 5A, 9G and 14C of the Orkney Local Development Plan 2017, and the relevant provisions of National Planning Framework 4.</p>
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**Delegated decision:**

## **RECOMMENDATION**

### **GRANT SUBJECT TO CONDITIONS**

#### **CONDITIONS**

##### **Duration of consent**

01. The development hereby approved to which this planning permission relates must be begun not later than the expiration of three years, beginning with the date on which the permission is granted, which is the date of this decision notice. If development has not commenced within this period, this planning permission shall lapse.

Reason: In accordance with Section 58 of the Town and Country Planning (Scotland) Act 1997, as amended, which limits the duration of planning permission.

##### **Construction Method Statement**

02. No development, including any site clearance works, shall commence until a Construction Method Statement has been submitted to, and approved in writing by, the Planning Authority. The statement shall provide for:

- The means of access to and from the site for plant, machinery and all construction traffic.
- Parking of vehicles of site operatives and visitors.
- Loading and unloading of plant and materials.
- Construction compound.
- Welfare facilities.
- Storage of plant and materials used in constructing the development.
- Stockpiling of soils.
- The erection and maintenance of security hoarding.
- Construction lighting.
- Measures to control the emission of dust and dirt during construction.
- A scheme for recycling/disposing of waste resulting from demolition and construction works.
- Where relevant in terms of occupation, the phasing of the development.

For the avoidance of doubt there shall be no burning or burying of waste within the site.

Thereafter, and throughout all construction phases, the site and development shall be undertaken wholly in accordance with the approved Construction Method Statement.

Reason: To safeguard the amenity of neighbouring properties and occupants.

## Landscaping

03. Notwithstanding the details included within the site plan hereby approved, no development shall commence until a Scheme of Landscaping for all hard and soft landscaping is submitted to, and approved in writing by, the Planning Authority, including substantial tree planting surrounding the amenity space to the south of the site. The Scheme of Landscaping shall include:

- The location of all proposed tree, shrub, hedging and grass planting.
- A planting schedule comprising layout, number, density, species, height of all trees and shrubs and seed mix of all grass areas.
- The location, design (including height where applicable) and materials of all hard landscaping works, including walls, retaining walls, fences and gates.
- A timescale for implementation and completion of all soft and hard landscaping contained in the Scheme of Landscaping, including all tree and shrub planting in the first planting season following commencement of development. All roads, footpaths, parking, bin storage and all other hard landscaping shall be completed wholly in accordance with approved details prior to first occupation of any residential unit within the development.

All soft and hard landscaping shall be carried out wholly in accordance with the approved Scheme of Landscaping, unless otherwise agreed, in writing, with the Planning Authority.

Any tree or shrub planting which, within a period of five years from planting, in the opinion of the Planning Authority, is dead, dying, diseased or severely damaged, shall be replaced by a tree or shrub of similar size and species to that originally planted, unless otherwise agreed, in writing, with the Planning Authority.

Thereafter, the development shall be maintained in accordance with the details included in the Scheme of Landscaping throughout the lifetime of the development.

Reason: To protect the character and appearance of the area and residential amenity.

## EV chargers

04. In conjunction with landscaping details submitted in pursuance of condition 03, no development shall commence until full details of not less than four electric vehicle chargers within the application site, and infrastructure for future installation of further chargers at each parking bay, are submitted to and agreed, in writing, by the Planning Authority. Thereafter, the electric vehicle chargers and infrastructure shall be provided in accordance with the approved details prior to first occupation of any part of the development.

Reason: To ensure adequate provision of electric vehicle charging infrastructure.

## Access

05. The development shall not be brought into use until the junction of the access hereby approved with the public road has been constructed to the Council's Roads Services standard 'Carriageway Construction', attached to and forming part of this decision notice, and in accordance with the dimensions included in the site plan hereby approved.

Any damage caused to the existing road infrastructure during construction of the development shall be repaired prior to first occupation of the development, to the satisfaction of the Planning Authority, in conjunction with Roads Services.

Reason: In the interests of road safety.

## Complete roads and footpaths

06. No house within the development hereby approved shall be occupied until the full extent of approved road and footpath surface has been completed to full construction including the final wearing surface, unless an alternative phased approach to occupation is approved under the terms of condition 02.

Reason: To ensure that an adequate level of access is timeously provided for the development; in the interests of road safety and amenity.

## Footway

07. No development shall commence until full details of a footway across the Cairston Road frontage of the site have been submitted to and approved, in writing, by the Planning Authority. These details shall include:

- The extent of the footway from the south corner of the site adjoining the third-party access, to the east corner of the site adjacent to Karlea, comprising the whole frontage of the application site with Cairston Road, other than the approved access.
- Full construction details of the footway, which shall be not less than 1.8 metres wide, to a standard Roads Services footway construction.
- Location and full construction details of pedestrian crossing points.
- Associated street lighting, including any alterations to existing street lighting columns.

- Any drainage included within the footway construction.
- Construction (including replacement of the existing wall where relevant) of a dry stone wall along the length of the back edge of the footway.

Thereafter, the development shall be completed wholly in accordance with approved details prior to first occupation of any house, unless otherwise approved, in writing, under the provisions of condition 06.

Reason: In the interests of road safety, and as the development of an allocated housing site within the settlement boundary.

#### **Link to future development**

08. No development shall commence until full details of the 'Potential Future Connection' at the north-west boundary of the application site have been submitted to and approved, in writing, by the Planning Authority. Notwithstanding details included in the site plan, the submitted details shall include construction of the road and footway to the property boundary, including service ducting and future foul and surface water drainage connections where relevant, so that development of the adjoining land can include continuation of the road and footway with no further works required within the current application site area. No construction detail shall inhibit future free access from the application site to the adjoining land. Thereafter, the 'Potential Future Connection' shall be constructed wholly in accordance with approved details prior to first occupation of any house, unless otherwise approved, in writing, under the provisions of condition 06.

Reason: To ensure access to other allocated land, to ensure connectivity within the settlement.

#### **SuDS**

09. Prior to occupation of any part of the development hereby approved, all surface water drainage works hereby approved, shall be constructed wholly in accordance with the approved drawings and submitted documents, including the 'Drainage Report' dated March 2024. Thereafter, and throughout the lifetime of the development, the drainage shall be maintained in accordance with the approved details, and in accordance with the principles of Sustainable Drainage Systems (SuDS) and be compliant with the guidance set out in the CIRIA SuDS Manual C753.

Reason: To ensure the provision of an adequate surface water drainage system and to accord with Policy 13B - Sustainable Drainage Systems (SuDS) of Orkney Local Development Plan 2017.

#### **Maintenance and Management Schedule**

10. No development shall commence until a Maintenance and Management Schedule is submitted to, and approved in writing by, the Planning Authority. This Schedule shall include:

- Confirmation of maintenance responsibilities and arrangements for all surface water devices, roads, footways and landscaping.
- Full maintenance details, including a maintenance schedule, of all roads and footways.
- Full maintenance details, including a maintenance schedule, of all surface water devices, including permeable paving.
- A maintenance schedule for all surface water devices.

The approved Maintenance and Management Schedule shall be applied and complied with throughout the lifetime of the development.

Reason: To ensure the proper maintenance and management of surface water devices, roads and footways and landscaping in perpetuity.

#### **Affordable housing**

11. No development shall commence until details of affordable housing provision have been submitted to, and agreed in writing by, the Planning Authority, in conjunction with Housing Services. These details shall include consideration and incorporation of housing types and tenures which meet local housing requirements and phasing of the development, and/or a viability assessment. Thereafter, the development shall be delivered wholly in accordance with all agreed details.

Reason: To ensure the development meets local housing requirements in accordance with Policy 5B of the Orkney Local Development Plan 2017.

#### **ASHP noise**

12. Total noise from each of the Air Source Heat Pumps installed shall not exceed NR25 within any residential property outwith the development, where NR25 is the Noise Rating Curve at 25, (noise measurements to be made with a window of any residential property outwith the development open no more than 50 mm).

Reason: To protect any nearby residents from excessive noise disturbance from the air source heat pumps.

**Foul drainage connection**

13. Prior to the dwellings hereby approved being occupied and brought into first use, they shall be connected to Scottish Water's public waste water system.

Reason: In the interests of environmental protection and to accord with Policy 13C - Waste Water Drainage of Orkney Local Development Plan 2017.

**Materials**

14. Notwithstanding details included in the elevations hereby approved, all fascias, soffits, windows, and weatherboard cladding shall be dark/anthracite grey.


Reason: To ensure continuity of design through the development, to match the colours specified in the two houses at the entrance to the development, as indicated in the submitted visualisation.

**Hours of construction**


15. Hours of construction work on site involving the use of machinery and powered tools, or any other operation, for example hammering, that would generate noise audible beyond the boundary of the site, shall only take place between the hours of 07:30 and 19:00 Mondays to Fridays, 09:00 to 17:00 Saturdays, and not at all on Sundays or the Christmas or New Year Public Holidays, unless otherwise agreed, in writing, with the Planning Authority.


Reason: To safeguard the amenity of nearby residents.


Mr Jamie Macvie MRTPI  
Service Manager  
Date: 5th June 2024


Cameron & Ross						Page 1	
15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File A210321 - Filter Trench...			Designed by JMA Checked by				
CADS				Source Control 2017.1.2			
<p>Summary of Results for 30 year Return Period (+35%)</p> <p>Half Drain Time : 5 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	7.229	0.729	0.0	29.3	29.3	10.7	O K
30 min Summer	7.251	0.751	0.0	33.7	33.7	11.0	O K
60 min Summer	7.247	0.747	0.0	33.0	33.0	11.0	O K
120 min Summer	7.216	0.716	0.0	26.6	26.6	10.5	O K
180 min Summer	7.192	0.692	0.0	22.0	22.0	10.2	O K
240 min Summer	7.176	0.676	0.0	18.9	18.9	9.9	O K
360 min Summer	7.149	0.649	0.0	15.0	15.0	9.5	O K
480 min Summer	7.133	0.633	0.0	12.7	12.7	9.3	O K
600 min Summer	7.124	0.624	0.0	11.1	11.1	9.1	O K
720 min Summer	7.118	0.618	0.0	9.8	9.8	9.0	O K
960 min Summer	7.109	0.609	0.0	8.2	8.2	8.9	O K
1440 min Summer	7.095	0.595	0.0	6.2	6.2	8.7	O K
2160 min Summer	7.082	0.582	0.0	4.8	4.8	8.5	O K
2880 min Summer	7.075	0.575	0.0	4.0	4.0	8.4	O K
4320 min Summer	7.065	0.565	0.0	3.0	3.0	8.3	O K
5760 min Summer	7.059	0.559	0.0	2.5	2.5	8.2	O K
7200 min Summer	7.054	0.554	0.0	2.1	2.1	8.1	O K
8640 min Summer	7.051	0.551	0.0	1.9	1.9	8.0	O K
10080 min Summer	7.049	0.549	0.0	1.7	1.7	8.0	O K
15 min Winter	7.249	0.749	0.0	33.3	33.3	11.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	16.5	16			
30 min Summer	39.673	0.0	26.0	23			
60 min Summer	26.745	0.0	37.6	38			
120 min Summer	17.385	0.0	51.1	68			
180 min Summer	13.417	0.0	60.3	98			
240 min Summer	11.137	0.0	67.6	128			
360 min Summer	8.542	0.0	78.8	188			
480 min Summer	7.068	0.0	87.7	246			
600 min Summer	6.098	0.0	95.2	306			
720 min Summer	5.403	0.0	101.6	368			
960 min Summer	4.463	0.0	112.7	484			
1440 min Summer	3.406	0.0	130.0	730			
2160 min Summer	2.598	0.0	149.9	1080			
2880 min Summer	2.144	0.0	165.6	1444			
4320 min Summer	1.634	0.0	190.3	2180			
5760 min Summer	1.346	0.0	209.9	2920			
7200 min Summer	1.158	0.0	226.2	3672			
8640 min Summer	1.024	0.0	240.5	4264			
10080 min Summer	0.923	0.0	253.2	5072			
15 min Winter	56.548	0.0	19.3	16			
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Cameron & Ross							Page 2
15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File A210321 - Filter Trench...			Designed by JMA Checked by				
CADS			Source Control 2017.1.2				
Summary of Results for 30 year Return Period (+35%)							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	7.266	0.766	0.0	36.3	36.3	11.3	O K
60 min Winter	7.238	0.738	0.0	31.1	31.1	10.8	O K
120 min Winter	7.193	0.693	0.0	22.1	22.1	10.2	O K
180 min Winter	7.165	0.665	0.0	17.4	17.4	9.8	O K
240 min Winter	7.145	0.645	0.0	14.5	14.5	9.5	O K
360 min Winter	7.125	0.625	0.0	11.2	11.2	9.2	O K
480 min Winter	7.115	0.615	0.0	9.4	9.4	9.0	O K
600 min Winter	7.108	0.608	0.0	8.0	8.0	8.9	O K
720 min Winter	7.103	0.603	0.0	7.1	7.1	8.8	O K
960 min Winter	7.092	0.592	0.0	5.9	5.9	8.7	O K
1440 min Winter	7.080	0.580	0.0	4.5	4.5	8.5	O K
2160 min Winter	7.070	0.570	0.0	3.5	3.5	8.3	O K
2880 min Winter	7.063	0.563	0.0	2.9	2.9	8.2	O K
4320 min Winter	7.055	0.555	0.0	2.2	2.2	8.1	O K
5760 min Winter	7.050	0.550	0.0	1.8	1.8	8.0	O K
7200 min Winter	7.046	0.546	0.0	1.5	1.5	8.0	O K
8640 min Winter	7.043	0.543	0.0	1.4	1.4	7.9	O K
10080 min Winter	7.041	0.541	0.0	1.2	1.2	7.9	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	39.673	0.0	30.0	23			
60 min Winter	26.745	0.0	43.0	38			
120 min Winter	17.385	0.0	58.1	68			
180 min Winter	13.417	0.0	68.5	98			
240 min Winter	11.137	0.0	76.5	128			
360 min Winter	8.542	0.0	89.2	190			
480 min Winter	7.068	0.0	99.1	248			
600 min Winter	6.098	0.0	107.5	308			
720 min Winter	5.403	0.0	114.7	372			
960 min Winter	4.463	0.0	127.1	488			
1440 min Winter	3.406	0.0	146.5	736			
2160 min Winter	2.598	0.0	168.7	1092			
2880 min Winter	2.144	0.0	186.4	1444			
4320 min Winter	1.634	0.0	214.1	2184			
5760 min Winter	1.346	0.0	235.9	2856			
7200 min Winter	1.158	0.0	254.3	3648			
8640 min Winter	1.024	0.0	270.2	4368			
10080 min Winter	0.923	0.0	284.4	5088			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	30	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.224		
<b>Time (mins)</b>	<b>Area</b>	<b>Time (mins)</b>
<b>From: To: (ha)</b>	<b>From: To: (ha)</b>	<b>From: To: (ha)</b>
0 4 0.074	4 8 0.075	8 12 0.075
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File			Designed by JMA Checked by				
CADS						Source Control 2017.1.2	
<p><u>Summary of Results for 200 year Return Period (+35%)</u></p> <p>Half Drain Time : 4 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.324	0.824	0.0	43.8	43.8	12.1	O K
30 min Summer	7.381	0.881	0.0	50.0	50.0	13.0	O K
60 min Summer	7.374	0.874	0.0	49.3	49.3	12.9	O K
120 min Summer	7.291	0.791	0.0	39.7	39.7	11.6	O K
180 min Summer	7.247	0.747	0.0	32.9	32.9	11.0	O K
240 min Summer	7.223	0.723	0.0	28.1	28.1	10.6	O K
360 min Summer	7.193	0.693	0.0	22.1	22.1	10.2	O K
480 min Summer	7.173	0.673	0.0	18.5	18.5	9.9	O K
600 min Summer	7.156	0.656	0.0	16.1	16.1	9.6	O K
720 min Summer	7.143	0.643	0.0	14.2	14.2	9.4	O K
960 min Summer	7.128	0.628	0.0	11.8	11.8	9.2	O K
1440 min Summer	7.112	0.612	0.0	8.8	8.8	9.0	O K
2160 min Summer	7.099	0.599	0.0	6.6	6.6	8.8	O K
2880 min Summer	7.088	0.588	0.0	5.5	5.5	8.6	O K
4320 min Summer	7.076	0.576	0.0	4.1	4.1	8.4	O K
5760 min Summer	7.069	0.569	0.0	3.4	3.4	8.3	O K
7200 min Summer	7.063	0.563	0.0	2.9	2.9	8.2	O K
8640 min Summer	7.059	0.559	0.0	2.5	2.5	8.2	O K
10080 min Summer	7.056	0.556	0.0	2.3	2.3	8.1	O K
15 min Winter	7.370	0.870	0.0	48.9	48.9	12.8	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	28.0	16			
30 min Summer	59.880	0.0	43.0	23			
60 min Summer	40.721	0.0	61.1	38			
120 min Summer	26.227	0.0	80.8	68			
180 min Summer	20.088	0.0	94.0	98			
240 min Summer	16.566	0.0	104.0	128			
360 min Summer	12.577	0.0	119.5	188			
480 min Summer	10.324	0.0	131.5	248			
600 min Summer	8.850	0.0	141.4	308			
720 min Summer	7.800	0.0	150.0	368			
960 min Summer	6.386	0.0	164.4	486			
1440 min Summer	4.811	0.0	186.7	734			
2160 min Summer	3.624	0.0	211.9	1080			
2880 min Summer	2.964	0.0	231.7	1460			
4320 min Summer	2.228	0.0	262.2	2136			
5760 min Summer	1.817	0.0	285.7	2848			
7200 min Summer	1.550	0.0	305.2	3552			
8640 min Summer	1.361	0.0	322.0	4272			
10080 min Summer	1.219	0.0	336.8	5128			
15 min Winter	83.965	0.0	32.2	16			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc						
Date 09/08/2022 File	Designed by JMA Checked by						
CADS	Source Control 2017.1.2						
<u>Summary of Results for 200 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	7.417	0.917	0.0	53.5	53.5	13.5	O K
60 min Winter	7.350	0.850	0.0	46.7	46.7	12.5	O K
120 min Winter	7.249	0.749	0.0	33.3	33.3	11.0	O K
180 min Winter	7.213	0.713	0.0	26.0	26.0	10.5	O K
240 min Winter	7.190	0.690	0.0	21.6	21.6	10.1	O K
360 min Winter	7.160	0.660	0.0	16.6	16.6	9.7	O K
480 min Winter	7.139	0.639	0.0	13.6	13.6	9.4	O K
600 min Winter	7.128	0.628	0.0	11.8	11.8	9.2	O K
720 min Winter	7.120	0.620	0.0	10.3	10.3	9.1	O K
960 min Winter	7.111	0.611	0.0	8.5	8.5	8.9	O K
1440 min Winter	7.096	0.596	0.0	6.4	6.4	8.7	O K
2160 min Winter	7.082	0.582	0.0	4.8	4.8	8.5	O K
2880 min Winter	7.075	0.575	0.0	4.0	4.0	8.4	O K
4320 min Winter	7.065	0.565	0.0	3.0	3.0	8.2	O K
5760 min Winter	7.058	0.558	0.0	2.4	2.4	8.1	O K
7200 min Winter	7.053	0.553	0.0	2.1	2.1	8.1	O K
8640 min Winter	7.050	0.550	0.0	1.8	1.8	8.0	O K
10080 min Winter	7.048	0.548	0.0	1.6	1.6	8.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	59.880	0.0	49.0	23			
60 min Winter	40.721	0.0	69.3	38			
120 min Winter	26.227	0.0	91.4	68			
180 min Winter	20.088	0.0	106.1	96			
240 min Winter	16.566	0.0	117.4	128			
360 min Winter	12.577	0.0	134.7	186			
480 min Winter	10.324	0.0	148.1	246			
600 min Winter	8.850	0.0	159.2	304			
720 min Winter	7.800	0.0	168.8	364			
960 min Winter	6.386	0.0	185.0	488			
1440 min Winter	4.811	0.0	210.0	738			
2160 min Winter	3.624	0.0	238.2	1092			
2880 min Winter	2.964	0.0	260.4	1472			
4320 min Winter	2.228	0.0	294.5	2172			
5760 min Winter	1.817	0.0	320.9	2864			
7200 min Winter	1.550	0.0	342.7	3648			
8640 min Winter	1.361	0.0	361.5	4368			
10080 min Winter	1.219	0.0	378.1	4992			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.224		
<b>Time (mins)</b>	<b>Area</b>	<b>Time (mins)</b>
<b>From: To:</b>	<b>(ha)</b>	<b>From: To:</b>
0 4	0.074	4 8
		0.075
		8 12
		0.075
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File			Designed by JMA Checked by				
CADS						Source Control 2017.1.2	
<p><u>Summary of Results for 100 year Return Period (+35%)</u></p> <p>Half Drain Time : 5 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.278	0.778	0.0	38.1	38.1	11.5	O K
30 min Summer	7.320	0.820	0.0	43.3	43.3	12.1	O K
60 min Summer	7.314	0.814	0.0	42.7	42.7	12.0	O K
120 min Summer	7.254	0.754	0.0	34.4	34.4	11.1	O K
180 min Summer	7.225	0.725	0.0	28.4	28.4	10.6	O K
240 min Summer	7.204	0.704	0.0	24.3	24.3	10.3	O K
360 min Summer	7.178	0.678	0.0	19.2	19.2	10.0	O K
480 min Summer	7.157	0.657	0.0	16.1	16.1	9.6	O K
600 min Summer	7.142	0.642	0.0	14.0	14.0	9.4	O K
720 min Summer	7.132	0.632	0.0	12.5	12.5	9.3	O K
960 min Summer	7.120	0.620	0.0	10.2	10.2	9.1	O K
1440 min Summer	7.107	0.607	0.0	7.8	7.8	8.9	O K
2160 min Summer	7.092	0.592	0.0	5.9	5.9	8.7	O K
2880 min Summer	7.083	0.583	0.0	4.9	4.9	8.5	O K
4320 min Summer	7.072	0.572	0.0	3.7	3.7	8.4	O K
5760 min Summer	7.065	0.565	0.0	3.0	3.0	8.3	O K
7200 min Summer	7.060	0.560	0.0	2.6	2.6	8.2	O K
8640 min Summer	7.056	0.556	0.0	2.3	2.3	8.1	O K
10080 min Summer	7.053	0.553	0.0	2.0	2.0	8.1	O K
15 min Winter	7.314	0.814	0.0	42.6	42.6	12.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	23.2	16			
30 min Summer	51.518	0.0	36.0	23			
60 min Summer	34.923	0.0	51.4	38			
120 min Summer	22.569	0.0	68.5	68			
180 min Summer	17.334	0.0	80.1	98			
240 min Summer	14.329	0.0	89.0	128			
360 min Summer	10.919	0.0	102.8	188			
480 min Summer	8.989	0.0	113.5	248			
600 min Summer	7.724	0.0	122.5	308			
720 min Summer	6.821	0.0	130.2	366			
960 min Summer	5.602	0.0	143.3	490			
1440 min Summer	4.241	0.0	163.7	734			
2160 min Summer	3.209	0.0	186.8	1088			
2880 min Summer	2.633	0.0	205.0	1464			
4320 min Summer	1.989	0.0	233.3	2152			
5760 min Summer	1.628	0.0	255.3	2904			
7200 min Summer	1.394	0.0	273.7	3664			
8640 min Summer	1.227	0.0	289.5	4296			
10080 min Summer	1.101	0.0	303.5	5128			
15 min Winter	72.673	0.0	26.9	16			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc						
Date 09/08/2022 File	Designed by JMA Checked by						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 100 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	7.348	0.848	0.0	46.5	46.5	12.5	O K
60 min Winter	7.295	0.795	0.0	40.3	40.3	11.7	O K
120 min Winter	7.226	0.726	0.0	28.6	28.6	10.7	O K
180 min Winter	7.195	0.695	0.0	22.4	22.4	10.2	O K
240 min Winter	7.174	0.674	0.0	18.7	18.7	9.9	O K
360 min Winter	7.144	0.644	0.0	14.3	14.3	9.4	O K
480 min Winter	7.128	0.628	0.0	11.8	11.8	9.2	O K
600 min Winter	7.120	0.620	0.0	10.2	10.2	9.1	O K
720 min Winter	7.113	0.613	0.0	9.0	9.0	9.0	O K
960 min Winter	7.105	0.605	0.0	7.5	7.5	8.9	O K
1440 min Winter	7.090	0.590	0.0	5.6	5.6	8.6	O K
2160 min Winter	7.077	0.577	0.0	4.2	4.2	8.4	O K
2880 min Winter	7.071	0.571	0.0	3.5	3.5	8.3	O K
4320 min Winter	7.061	0.561	0.0	2.7	2.7	8.2	O K
5760 min Winter	7.055	0.555	0.0	2.2	2.2	8.1	O K
7200 min Winter	7.051	0.551	0.0	1.9	1.9	8.0	O K
8640 min Winter	7.048	0.548	0.0	1.6	1.6	8.0	O K
10080 min Winter	7.045	0.545	0.0	1.5	1.5	8.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	51.518	0.0	41.2	23			
60 min Winter	34.923	0.0	58.4	38			
120 min Winter	22.569	0.0	77.6	68			
180 min Winter	17.334	0.0	90.6	98			
240 min Winter	14.329	0.0	100.6	128			
360 min Winter	10.919	0.0	116.0	188			
480 min Winter	8.989	0.0	128.0	246			
600 min Winter	7.724	0.0	138.1	306			
720 min Winter	6.821	0.0	146.7	370			
960 min Winter	5.602	0.0	161.4	488			
1440 min Winter	4.241	0.0	184.2	736			
2160 min Winter	3.209	0.0	210.1	1072			
2880 min Winter	2.633	0.0	230.5	1432			
4320 min Winter	1.989	0.0	262.2	2200			
5760 min Winter	1.628	0.0	286.9	2840			
7200 min Winter	1.394	0.0	307.4	3640			
8640 min Winter	1.227	0.0	325.1	4352			
10080 min Winter	1.101	0.0	340.8	5072			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.224		
<b>Time (mins)</b>	<b>Area</b>	<b>Time (mins)</b>
<b>From: To: (ha)</b>	<b>From: To: (ha)</b>	<b>From: To: (ha)</b>
0 4 0.074	4 8 0.075	8 12 0.075
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File A210321 - Filter Trench...			Designed by JMA Checked by				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 10 year Return Period</u>							
Half Drain Time : 8 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.146	0.646	0.0	14.6	14.6	9.5	O K
30 min Summer	7.171	0.671	0.0	18.1	18.1	9.8	O K
60 min Summer	7.175	0.675	0.0	18.8	18.8	9.9	O K
120 min Summer	7.152	0.652	0.0	15.4	15.4	9.5	O K
180 min Summer	7.134	0.634	0.0	12.9	12.9	9.3	O K
240 min Summer	7.124	0.624	0.0	11.1	11.1	9.1	O K
360 min Summer	7.113	0.613	0.0	8.9	8.9	9.0	O K
480 min Summer	7.106	0.606	0.0	7.6	7.6	8.9	O K
600 min Summer	7.098	0.598	0.0	6.6	6.6	8.8	O K
720 min Summer	7.092	0.592	0.0	5.9	5.9	8.7	O K
960 min Summer	7.083	0.583	0.0	4.9	4.9	8.5	O K
1440 min Summer	7.073	0.573	0.0	3.8	3.8	8.4	O K
2160 min Summer	7.064	0.564	0.0	2.9	2.9	8.2	O K
2880 min Summer	7.058	0.558	0.0	2.4	2.4	8.1	O K
4320 min Summer	7.051	0.551	0.0	1.9	1.9	8.0	O K
5760 min Summer	7.046	0.546	0.0	1.5	1.5	8.0	O K
7200 min Summer	7.043	0.543	0.0	1.3	1.3	7.9	O K
8640 min Summer	7.040	0.540	0.0	1.2	1.2	7.9	O K
10080 min Summer	7.038	0.538	0.0	1.1	1.1	7.9	O K
15 min Winter	7.162	0.662	0.0	16.9	16.9	9.7	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	6.7	18			
30 min Summer	23.154	0.0	12.2	24			
60 min Summer	15.530	0.0	18.8	38			
120 min Summer	10.149	0.0	26.8	68			
180 min Summer	7.867	0.0	32.4	98			
240 min Summer	6.555	0.0	36.8	128			
360 min Summer	5.058	0.0	43.7	188			
480 min Summer	4.204	0.0	49.2	248			
600 min Summer	3.641	0.0	53.9	308			
720 min Summer	3.236	0.0	58.0	368			
960 min Summer	2.686	0.0	64.9	488			
1440 min Summer	2.065	0.0	76.0	722			
2160 min Summer	1.587	0.0	88.7	1096			
2880 min Summer	1.317	0.0	98.9	1452			
4320 min Summer	1.011	0.0	115.1	2192			
5760 min Summer	0.838	0.0	127.9	2864			
7200 min Summer	0.725	0.0	138.8	3592			
8640 min Summer	0.643	0.0	148.4	4336			
10080 min Summer	0.582	0.0	156.9	4960			
15 min Winter	33.317	0.0	8.4	18			
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15 Victoria Street Aberdeen AB10 1XB				A/210321 - Cairston Road North - Filter Trench Calc			
Date 09/08/2022 File A210321 - Filter Trench...				Designed by JMA Checked by			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 10 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	7.183	0.683	0.0	20.1	20.1	10.0	O K
60 min Winter	7.169	0.669	0.0	17.9	17.9	9.8	O K
120 min Winter	7.134	0.634	0.0	12.8	12.8	9.3	O K
180 min Winter	7.120	0.620	0.0	10.2	10.2	9.1	O K
240 min Winter	7.111	0.611	0.0	8.6	8.6	8.9	O K
360 min Winter	7.099	0.599	0.0	6.6	6.6	8.8	O K
480 min Winter	7.089	0.589	0.0	5.5	5.5	8.6	O K
600 min Winter	7.082	0.582	0.0	4.8	4.8	8.5	O K
720 min Winter	7.078	0.578	0.0	4.3	4.3	8.4	O K
960 min Winter	7.071	0.571	0.0	3.6	3.6	8.3	O K
1440 min Winter	7.062	0.562	0.0	2.7	2.7	8.2	O K
2160 min Winter	7.054	0.554	0.0	2.1	2.1	8.1	O K
2880 min Winter	7.049	0.549	0.0	1.7	1.7	8.0	O K
4320 min Winter	7.043	0.543	0.0	1.3	1.3	7.9	O K
5760 min Winter	7.039	0.539	0.0	1.1	1.1	7.9	O K
7200 min Winter	7.036	0.536	0.0	1.0	1.0	7.8	O K
8640 min Winter	7.034	0.534	0.0	0.9	0.9	7.8	O K
10080 min Winter	7.032	0.532	0.0	0.8	0.8	7.8	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	23.154	0.0	14.5	24			
60 min Winter	15.530	0.0	21.9	38			
120 min Winter	10.149	0.0	30.9	68			
180 min Winter	7.867	0.0	37.1	96			
240 min Winter	6.555	0.0	42.0	126			
360 min Winter	5.058	0.0	49.8	188			
480 min Winter	4.204	0.0	56.0	250			
600 min Winter	3.641	0.0	61.2	312			
720 min Winter	3.236	0.0	65.8	368			
960 min Winter	2.686	0.0	73.6	490			
1440 min Winter	2.065	0.0	86.0	722			
2160 min Winter	1.587	0.0	100.2	1096			
2880 min Winter	1.317	0.0	111.6	1432			
4320 min Winter	1.011	0.0	129.7	2168			
5760 min Winter	0.838	0.0	144.2	2904			
7200 min Winter	0.725	0.0	156.4	3656			
8640 min Winter	0.643	0.0	167.1	4408			
10080 min Winter	0.582	0.0	176.6	5000			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.224


Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.074	4	8	0.075	8	12	0.075


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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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15 Victoria Street Aberdeen AB10 1XB				A/210321 - Cairston Road North - Filter Trench Calc			
Date 09/08/2022 File A210321 - Filter Trench...				Designed by JMA Checked by			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 1 year Return Period</u>							
Half Drain Time : 18 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	7.033	0.533	0.0	0.8	0.8	7.8	O K
30 min Summer	7.093	0.593	0.0	6.0	6.0	8.7	O K
60 min Summer	7.112	0.612	0.0	8.7	8.7	8.9	O K
120 min Summer	7.112	0.612	0.0	8.8	8.8	9.0	O K
180 min Summer	7.106	0.606	0.0	7.6	7.6	8.9	O K
240 min Summer	7.098	0.598	0.0	6.6	6.6	8.8	O K
360 min Summer	7.087	0.587	0.0	5.4	5.4	8.6	O K
480 min Summer	7.080	0.580	0.0	4.6	4.6	8.5	O K
600 min Summer	7.076	0.576	0.0	4.1	4.1	8.4	O K
720 min Summer	7.072	0.572	0.0	3.7	3.7	8.4	O K
960 min Summer	7.066	0.566	0.0	3.1	3.1	8.3	O K
1440 min Summer	7.058	0.558	0.0	2.4	2.4	8.1	O K
2160 min Summer	7.051	0.551	0.0	1.9	1.9	8.0	O K
2880 min Summer	7.047	0.547	0.0	1.6	1.6	8.0	O K
4320 min Summer	7.041	0.541	0.0	1.3	1.3	7.9	O K
5760 min Summer	7.038	0.538	0.0	1.1	1.1	7.8	O K
7200 min Summer	7.035	0.535	0.0	0.9	0.9	7.8	O K
8640 min Summer	7.033	0.533	0.0	0.8	0.8	7.8	O K
10080 min Summer	7.031	0.531	0.0	0.7	0.7	7.7	O K
15 min Winter	7.063	0.563	0.0	2.9	2.9	8.2	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	0.7	24			
30 min Summer	13.218	0.0	3.8	28			
60 min Summer	8.918	0.0	7.7	42			
120 min Summer	5.920	0.0	12.6	68			
180 min Summer	4.641	0.0	16.1	98			
240 min Summer	3.903	0.0	18.9	128			
360 min Summer	3.055	0.0	23.5	188			
480 min Summer	2.569	0.0	27.2	248			
600 min Summer	2.246	0.0	30.4	308			
720 min Summer	2.013	0.0	33.3	368			
960 min Summer	1.694	0.0	38.3	490			
1440 min Summer	1.326	0.0	46.2	734			
2160 min Summer	1.034	0.0	55.2	1080			
2880 min Summer	0.866	0.0	62.5	1464			
4320 min Summer	0.675	0.0	74.4	2140			
5760 min Summer	0.566	0.0	84.1	2864			
7200 min Summer	0.494	0.0	92.3	3672			
8640 min Summer	0.441	0.0	99.4	4288			
10080 min Summer	0.401	0.0	105.8	5128			
15 min Winter	19.000	0.0	1.7	21			
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15 Victoria Street Aberdeen AB10 1XB		A/210321 - Cairston Road North - Filter Trench Calc					
Date 09/08/2022 File A210321 - Filter Trench...		Designed by JMA Checked by					
CADS		Source Control 2017.1.2					
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (1/s)</b>	<b>Max Control (1/s)</b>	<b>Max Σ Outflow (1/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	7.108	0.608	0.0	8.0	8.0	8.9	O K
60 min Winter	7.116	0.616	0.0	9.6	9.6	9.0	O K
120 min Winter	7.105	0.605	0.0	7.5	7.5	8.9	O K
180 min Winter	7.093	0.593	0.0	6.0	6.0	8.7	O K
240 min Winter	7.085	0.585	0.0	5.1	5.1	8.5	O K
360 min Winter	7.075	0.575	0.0	4.0	4.0	8.4	O K
480 min Winter	7.070	0.570	0.0	3.4	3.4	8.3	O K
600 min Winter	7.065	0.565	0.0	3.0	3.0	8.2	O K
720 min Winter	7.061	0.561	0.0	2.7	2.7	8.2	O K
960 min Winter	7.056	0.556	0.0	2.3	2.3	8.1	O K
1440 min Winter	7.050	0.550	0.0	1.8	1.8	8.0	O K
2160 min Winter	7.043	0.543	0.0	1.4	1.4	7.9	O K
2880 min Winter	7.040	0.540	0.0	1.2	1.2	7.9	O K
4320 min Winter	7.035	0.535	0.0	0.9	0.9	7.8	O K
5760 min Winter	7.032	0.532	0.0	0.8	0.8	7.8	O K
7200 min Winter	7.029	0.529	0.0	0.7	0.7	7.7	O K
8640 min Winter	7.027	0.527	0.0	0.6	0.6	7.7	O K
10080 min Winter	7.025	0.525	0.0	0.5	0.5	7.7	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	5.1	27			
60 min Winter	8.918	0.0	9.5	40			
120 min Winter	5.920	0.0	15.0	68			
180 min Winter	4.641	0.0	18.9	98			
240 min Winter	3.903	0.0	22.1	128			
360 min Winter	3.055	0.0	27.2	186			
480 min Winter	2.569	0.0	31.4	248			
600 min Winter	2.246	0.0	35.0	310			
720 min Winter	2.013	0.0	38.2	368			
960 min Winter	1.694	0.0	43.7	492			
1440 min Winter	1.326	0.0	52.6	732			
2160 min Winter	1.034	0.0	62.7	1108			
2880 min Winter	0.866	0.0	70.9	1452			
4320 min Winter	0.675	0.0	84.2	2216			
5760 min Winter	0.566	0.0	95.0	2912			
7200 min Winter	0.494	0.0	104.2	3576			
8640 min Winter	0.441	0.0	112.2	4288			
10080 min Winter	0.401	0.0	119.4	5008			
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Cameron & Ross		Page 3
15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.224		
<b>Time (mins)</b>	<b>Area</b>	<b>Time (mins)</b>
<b>From: To: (ha)</b>	<b>From: To: (ha)</b>	<b>From: To: (ha)</b>
0 4 0.074	4 8 0.075	8 12 0.075
©1982-2017 XP Solutions		

Cameron & Ross		Page 4
15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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## Design Statement

**Cairston Road North (STR-5), Stromness**

Proposed development of 10no. Residential houses



## INTRODUCTION

This design statement has been prepared on behalf of Orkney Builders (Contractors) Ltd in support of a planning application for 10 no. Residential houses at Cairston Road, Stromness.

The application site is shown in a red boundary line on the adjacent map, which highlights its location at the north end of main Stromness settlement and its proximity to existing housing developments, Stromness Primary School and Stromness Academy, both located within 5 minutes walking distance of the site.

The site is located in a predominantly residential area within walking distance of Stromness Town Centre. Local amenities include a doctors surgery, dentist, bank, Co-op along with a range of other services.



VIEW OF SITE LOOKING NORTH-EAST ALONG CAIRSTON ROAD



VIEW OF SITE LOOKING SOUTH-WEST ALONG CAIRSTON ROAD

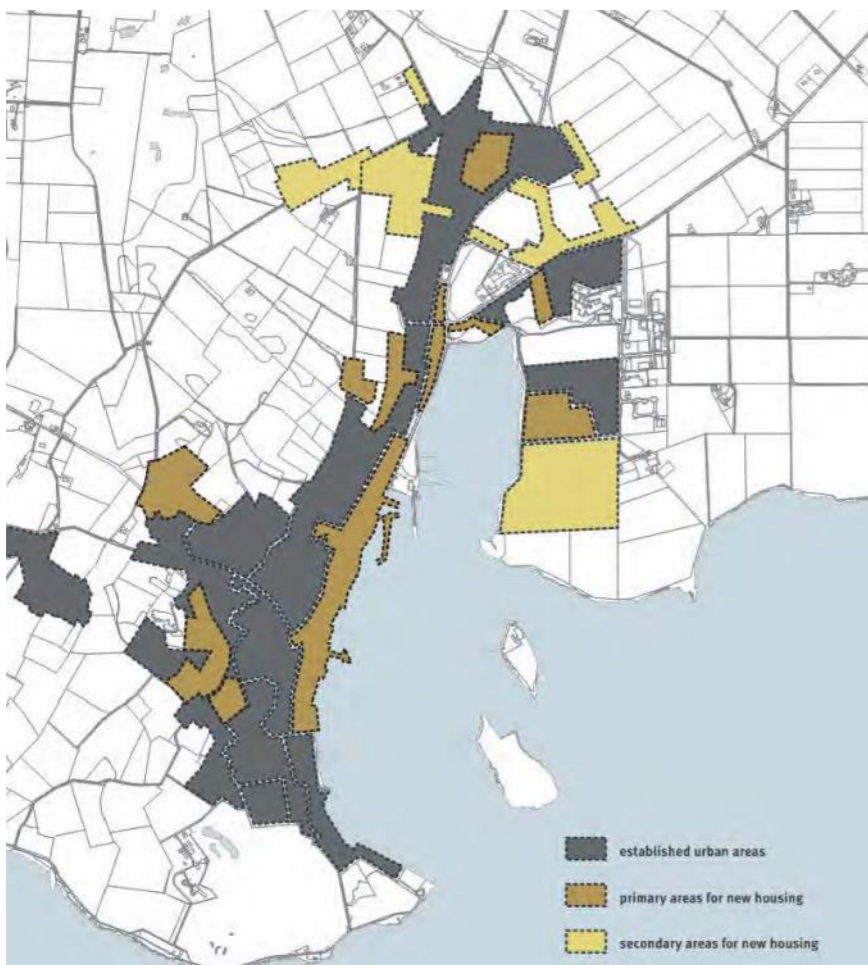


VIEW OF SITE LOOKING NORTH-WEST FROM GARSON DRIVE

**POLICY BACKGROUND & CONTEXT**

Within the Orkney Islands Local Plan the site is designated for housing development, under land allocation STR-5. The extract on the right is taken from the Orkney Islands Local Plan shows the entirety of the Stromness development plan designations, which highlights the requirement for housing throughout the town.

The proposed site sits to the north of the main Stromness settlement and is adjacent to existing housing, small commercial sites and the new Stromness Academy. There are existing housing settlements to the east of the site and to the south of the A965.



**FIGURE 1 - Extract from Stromness Urban Design Framework**

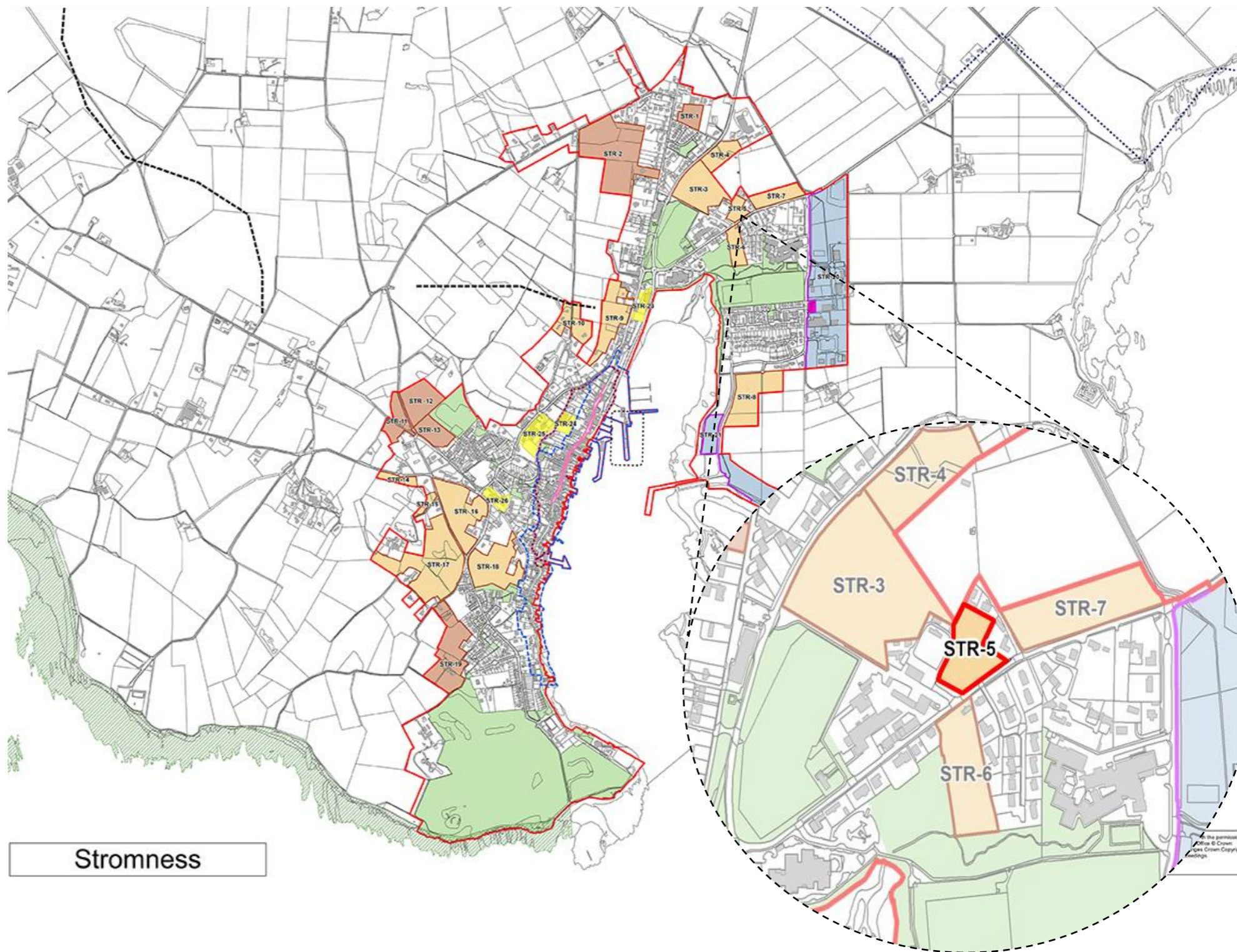


Figure 1 is an extract taken from Page 85 of the Stromness Urban Design Framework and shows the area highlighted as a secondary area for new housing with the site proposed as a new lower density housing development within the Stromness area. As the proposals are in respect of a residential housing development, a design statement is required in accordance with the Urban Design Framework for Stromness.

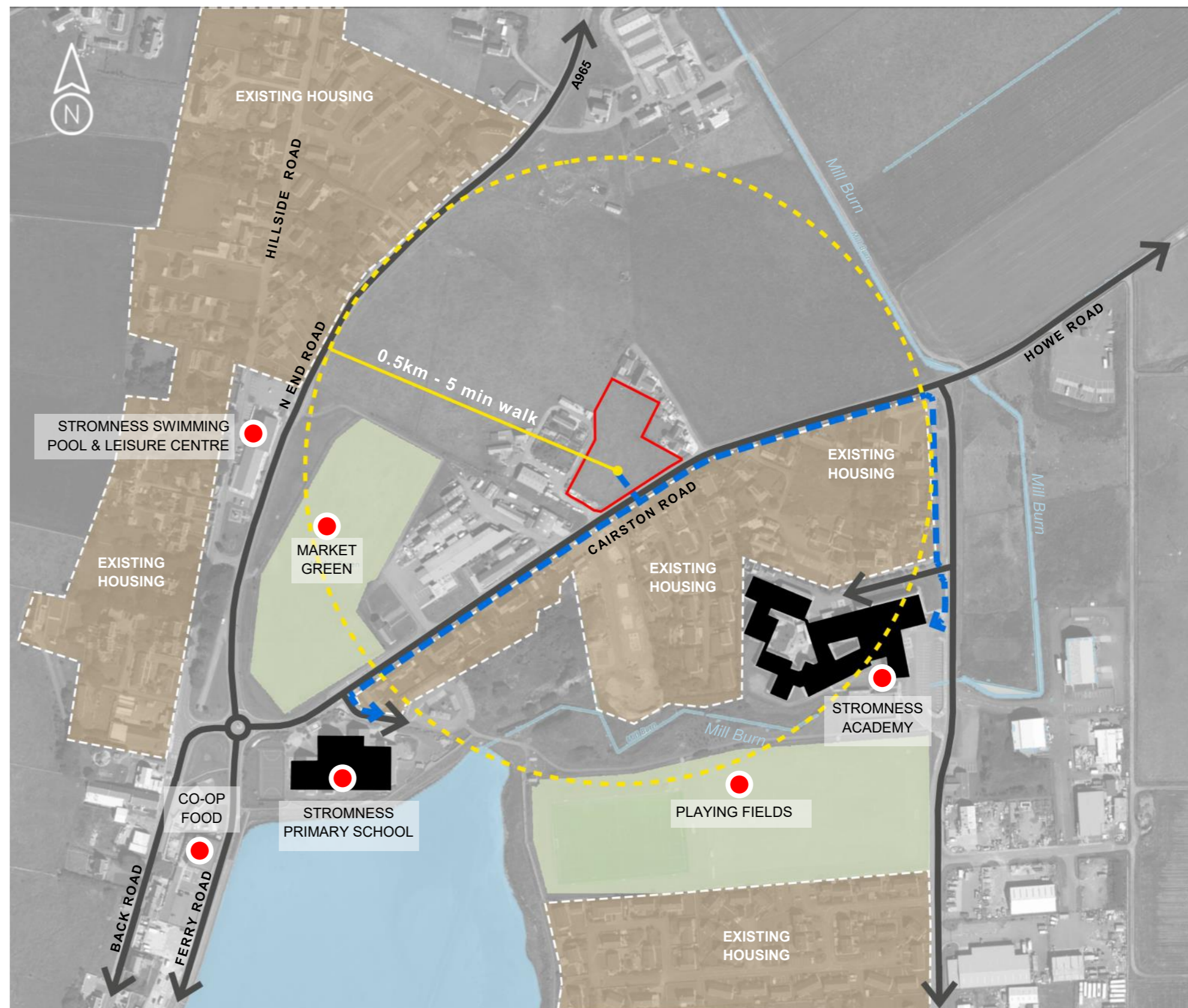
## SITE CONTEXT

The site is located to the north of Cairston Road and is surrounded on all three sides by existing development which provides a degree of shelter. Land use along Cairston Road includes buildings which vary in mix from residential housing to light industrial buildings and it is considered the proposed residential development will sit well within the existing site context.

The site is well located to encourage access to local facilities by foot. For this reason, pedestrian accessibility will form a major element in the design of the internal road and footpath network which will link directly to the existing provision on Cairston Road. This will afford the development excellent walking accessibility with safe and direct routes to Stromness Primary School, Stromness Academy and other local amenities which are all located within a short walking distance from the site.

The proposed footway links within the development will also provide access to the existing bus stop located on Cairston Road with bus services providing good public transport accessibility from the proposed development to the town centre and surrounding areas.

The majority of the site is currently being utilised as a site compound including material laydown and parking associated with the adjacent residential development works currently being undertaken on the opposite side of the road.



## SITE CONSTRAINTS / OPPORTUNITIES

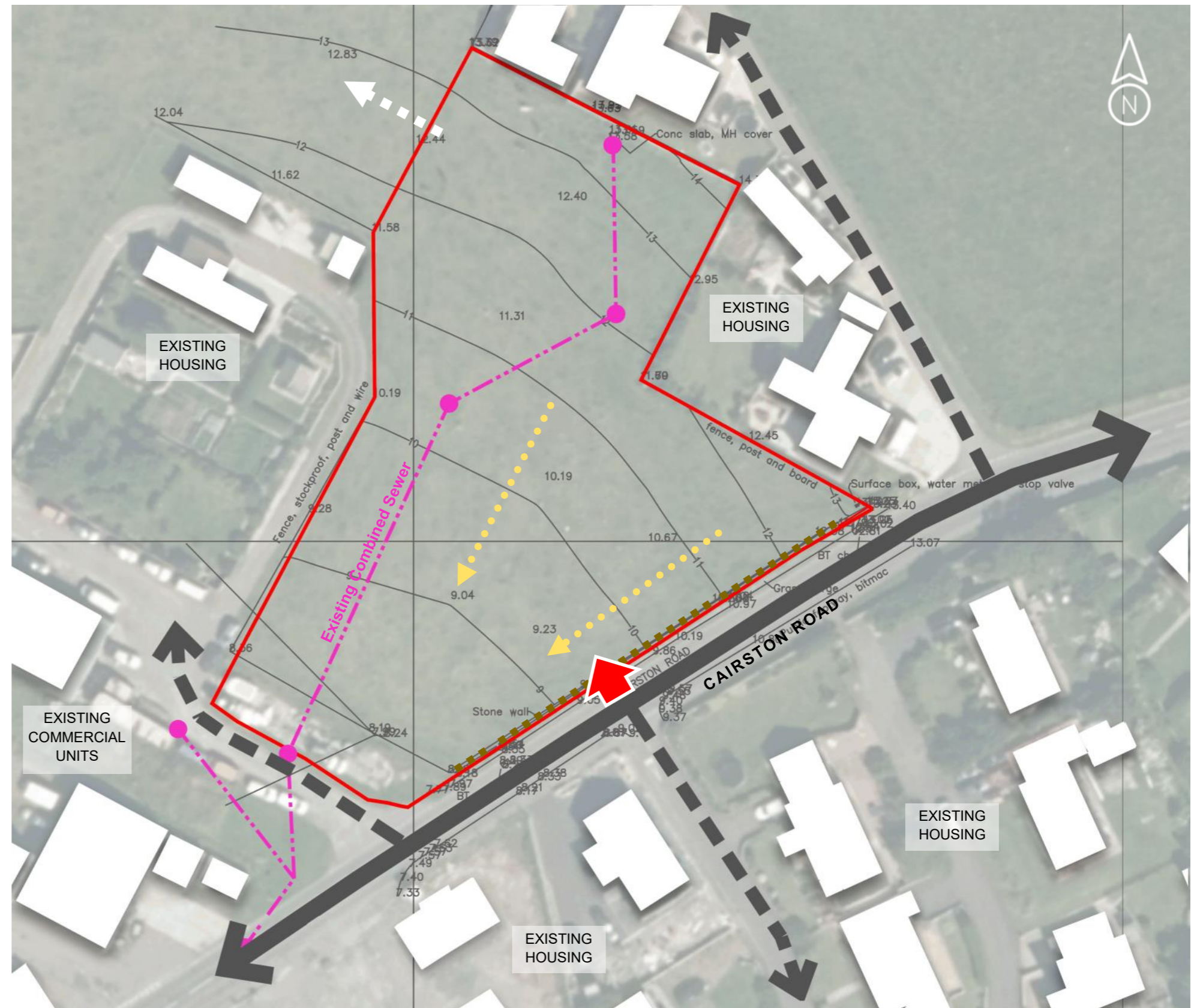
There are a number of constraints and opportunities which have been taken into consideration whilst informing the development proposals, these are as follows:

### Constraints:

- The site has a gradual slope from the north east boundary down to the south west.
- Existing combined sewer running north to south through the site will require to be diverted.
- Existing housing to north, east and west of site - appropriate offset to be provided.
- Allow for potential future connection through to future development site to north-west of site.

### Opportunities:

- Create pleasant and attractive new access gateway into site from Cairston Road.
- Provide development frontage onto Cairston Road consistent with existing site context.
- Retain existing stone wall to edge of Cairston Road.
- The site will benefit from solar gain for much of the day.
- The site is not considered to be at risk of flooding and any development on the site is unlikely to increase flood risk elsewhere.

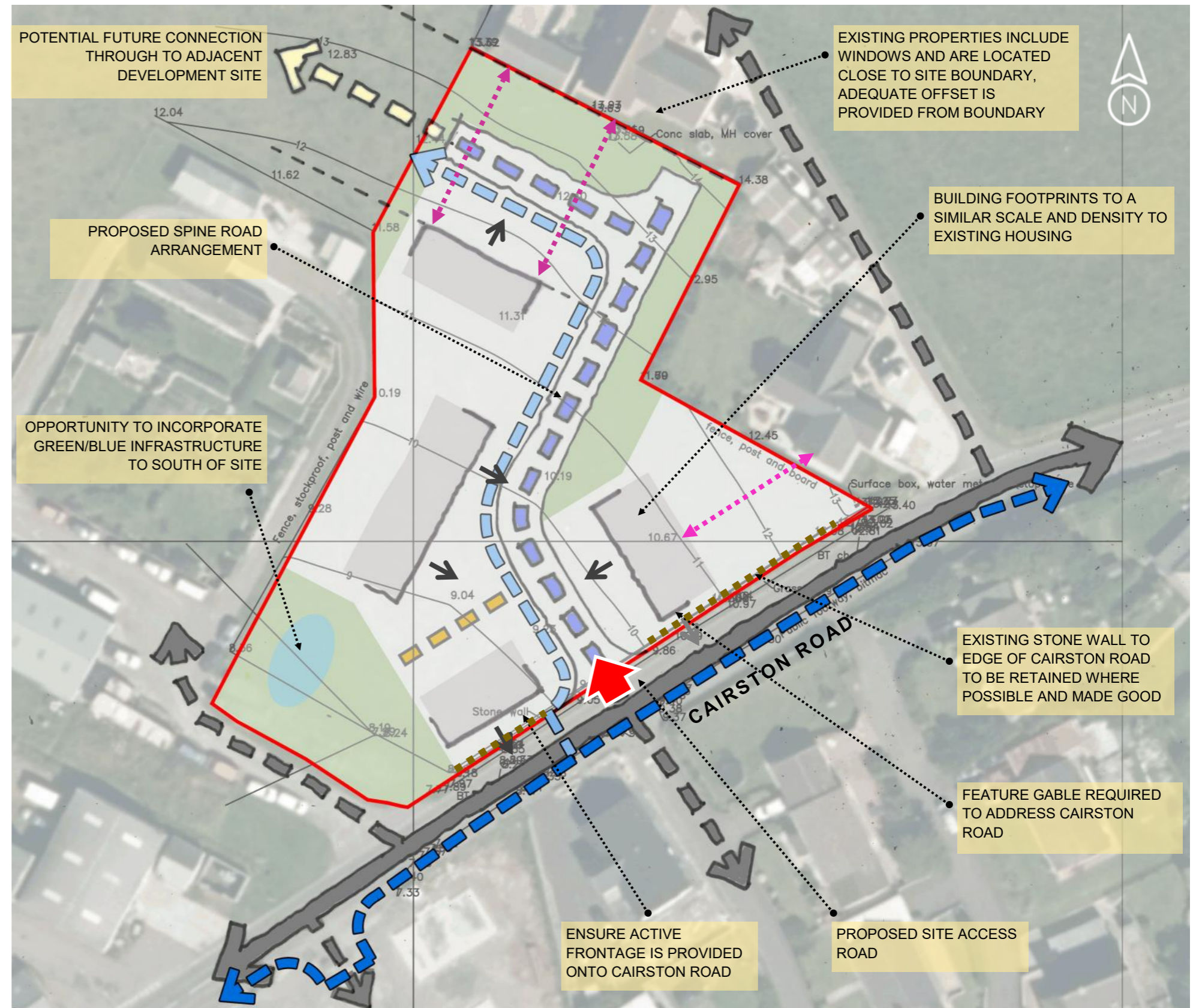




## SITE ANALYSIS

The boundary edges of the proposed site address different situations and must therefore respond accordingly.

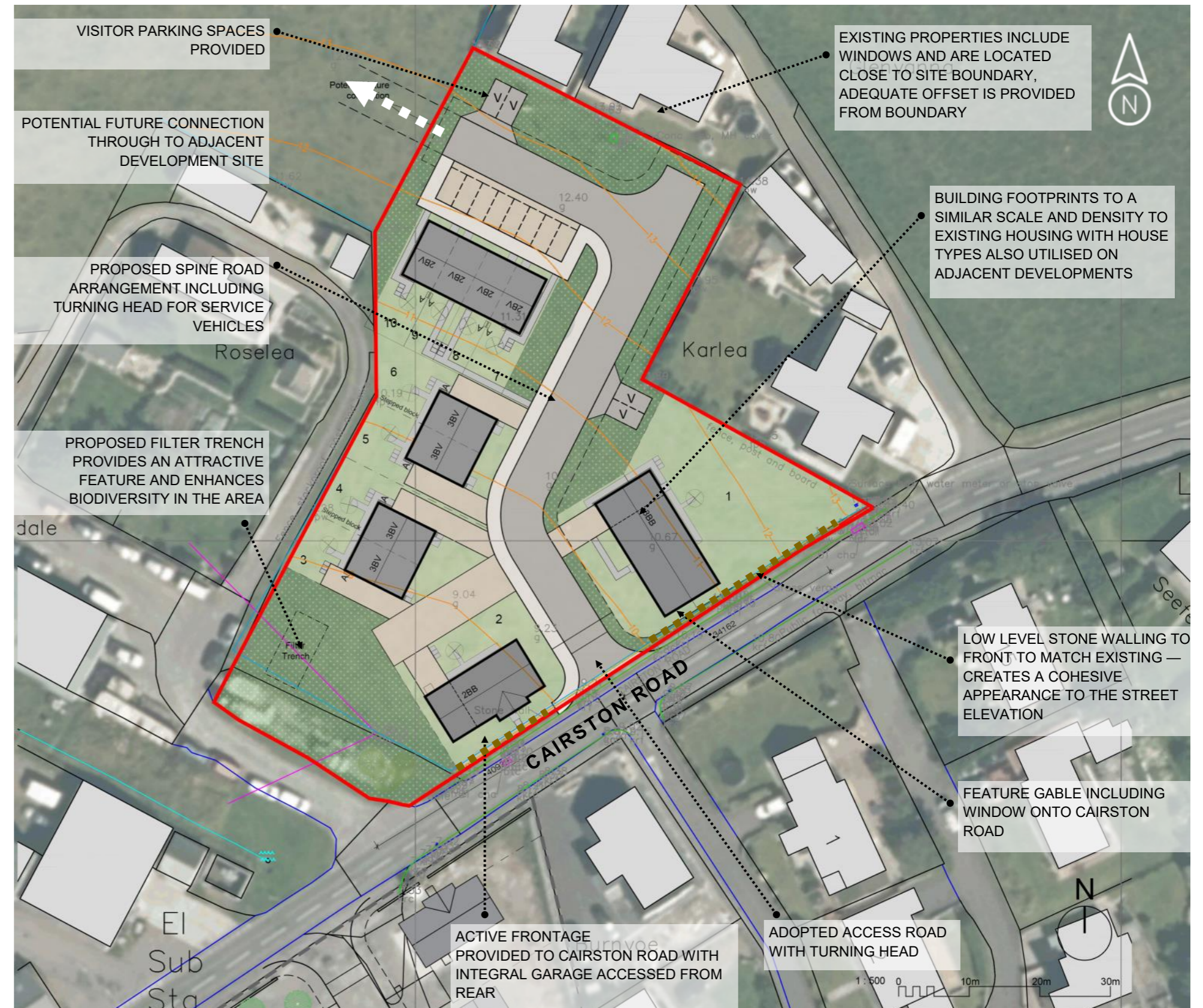
- **Street frontage:** The front of the site addresses the street frontage to Cairston Road. It is important for any new development to address the existing street elevation and respond in a sympathetic manner.
- **Vehicular and Pedestrian Access:** Access into the site is proposed off Cairston Road connecting to the existing network.
- **Existing Housing:** Existing housing is located close to the edges of the northern and eastern boundary. Issues of overlooking and distance to neighbouring boundaries are to be addressed through the site layout of the proposed.
- **Scale & Density:** The density of the proposed houses will be similar to the nearby existing developments and will follow a similar development pattern whilst also being sympathetic to adjacent development.
- **Boundary Treatment:** there is existing low level walling following the edge of the public footpath, the proposal is to retain this to ensure the development proposals are well integrated and consistent with the existing street character.
- **Greenspace:** Opportunities to introduce amenity space within the application site to ensure the proposals are well integrated into the existing development.
- **Public buildings:** Close proximity to public buildings, with the public swimming pool to the north west and both primary and secondary schools within 10 minutes walking distance of the site.
- **Town centre & services:** To the south-west of the site a newly opened Co-op supermarket will provide services for any new housing development off Cairston Road. Further south along Ferry Road the historic core of the town can be accessed within a 15 minute walk or by bus.



## DESIGN RESPONSE

- Low level stone walling feature to be retained along front to match existing and create cohesive appearance along the street elevation.
- Bungalows addressing Cairston Road following the form of adjacent properties with a wide frontage and shallow plan.
- Bungalows also addressing the new access road and entrance into the site.
- Where possible new dwellings positioned in such a way that will not disturb the key views of neighbouring properties.
- A simple palette of materials will be adopted throughout the development following the local vernacular of materials. The house types will include white roughcast to external walls with flat concrete interlocking tiles to roofs.
- A mix of dwellings are proposed to meet the demand of house types in the Stromness area. Two and three bed villas offset from one another to avoid overlooking.
- Adopted access road with gentle kink to reduce speed of car movement. Adoptable roads design will follow guidance from OIC Roads Department
- Bungalows located at the termination of the access road in keeping with the existing street character on Cairston Road.

\*NOTE—Site layout is indicative for Site Development Statement. Plot layouts and footprints may change at detailed planning stage.



### HOUSING DENSITY ANALYSIS

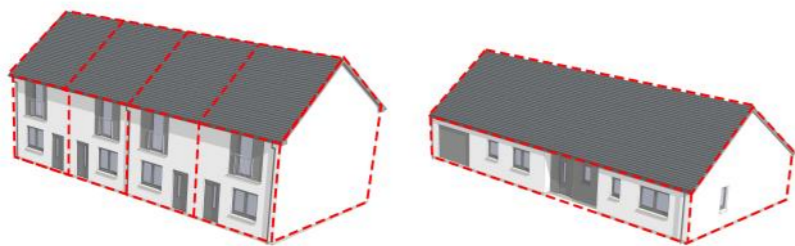
The diagram to the right shows the comparison in housing density between the application site and nearby existing developments. It should be noted that the neighbouring development to the south of Cairston Road includes a higher density layout when compared to the proposed development.

The requirements of land allocation STR-5 within the Stromness settlement statement confirms the site has capacity for 5 houses (equivalent to 10 units per hectare). Whilst planning policy considerations are respected, a development with an increased number of units is considered to be more appropriate for this location given the proximity to nearby schools, local businesses and existing amenities with people more likely to consider more sustainable modes of travel. The development proposals acknowledge this by including a mix of varying housing typologies which also looks to address demand for lower cost housing in comparison to larger, more expensive houses.

Whilst housing densities are a useful way of determining the impact of a development on neighbouring areas, they only really consider one factor when considering the layout. In terms of scale and proportion of the individual house types, consideration should also be given to the comparisons in plot coverage between various house types (for e.g. a single bungalow unit is to a similar footprint when compared to a terraced block of 4 units – please refer to below visuals for direct comparison).

The development footprints are also to a similar scale and size to existing neighbouring properties. The scale and density of the proposed development is therefore considered appropriate within the context of the site with consideration also given to the existing site topography and landscape setting.

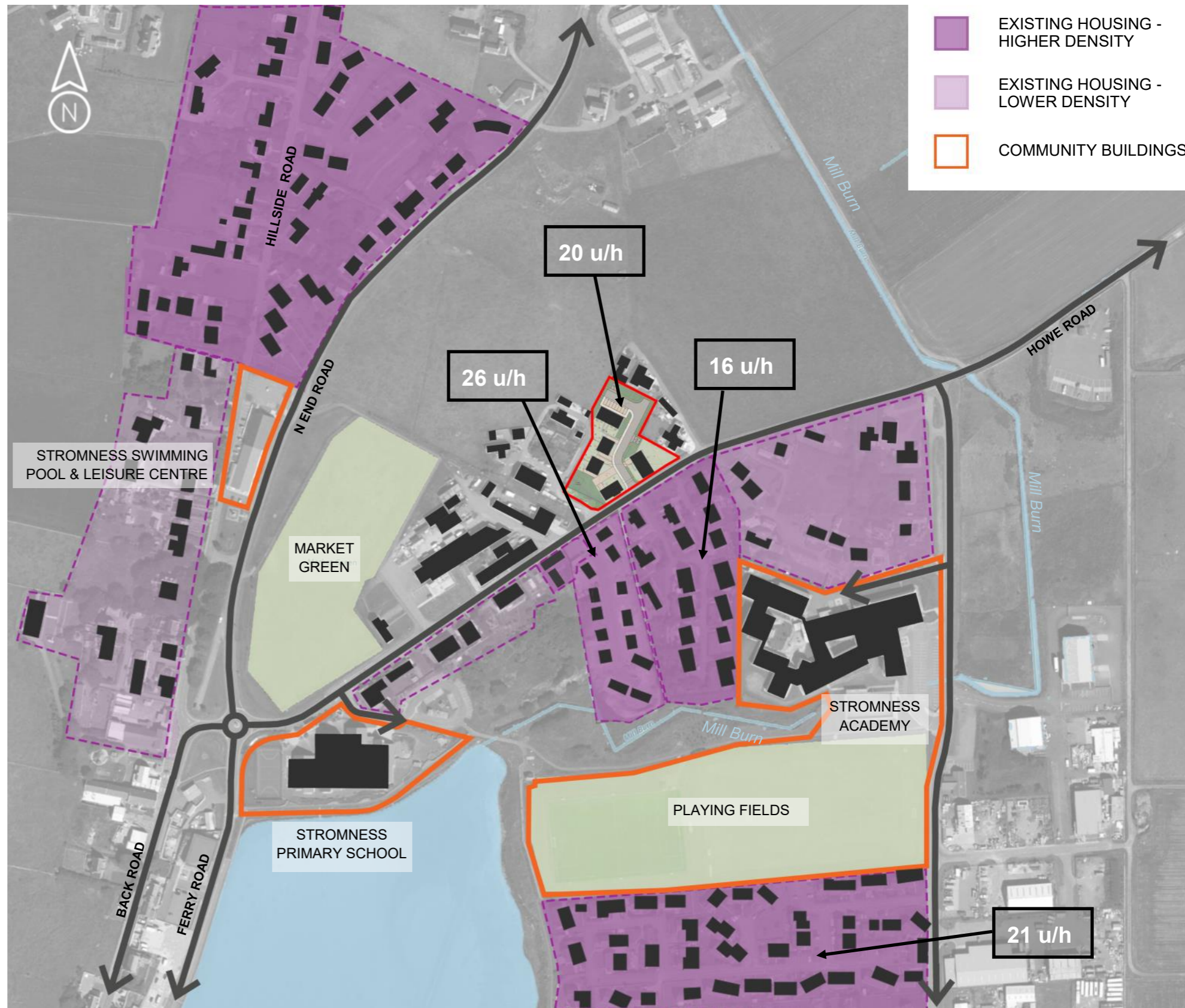
\*NOTE - Approx. density' shown on plan (units per hectare).



TERRACED UNIT OF 4

SINGLE BUNGALOW

#### HOUSING TYPOLOGY COMPARISON



**STREETSCENE / 3D VISUALS**



**VIEW LOOKING NORTH-EAST ALONG CAIRSTON ROAD**



**VIEW LOOKING NORTH-WEST FROM GARSON DRIVE**



**VIEW LOOKING WEST ALONG CAIRSTON ROAD**



**VIEW OF TERRACED BLOCK LOOKING SOUTH-WEST**

## COMPLIANCE WITH POLICY

Within the Orkney Islands Local Development Plan, the following criteria and key design principles have been followed which demonstrate why the chosen development proposals is suitable for the application site.

Consideration has also been given to the relevant national policy and guidance documents, including Creating Places, Designing Places, Designing Streets and Planning Advice Note 77.

### PRIMARY POLICIES:

#### POLICY 2—DESIGN

##### Character & Identity

- The design is in context with the surrounding building heights, settlement pattern and character of Stromness.
- There are no existing landscape or topographical features on the site but the design is orientated to provide frontage onto Cairston Road whilst also providing adequate offsets from neighbouring houses.
- The scale and density of the proposed development is in keeping with the settlement pattern of the surrounding neighbourhood.
- Is appropriately connected to pedestrian, vehicular and public transport routes encouraging and prioritising pedestrian access.
- The proposed boundary treatments are in keeping with the surrounding area and comprise of a mixture of low level natural stone walls and hedging.

##### Landscaping

- The site layout provides pockets of landscaping to enhance the streetscape and provides attractive area of amenity space to the south with an opportunity to incorporate a filter trench for surface water run off.
- A range of native planting (including trees, shrubs and hedgerows) are proposed to further enhance the existing landscape and to encourage biodiversity in the area.

##### Parking

- The visual impact of the parking is minimised by locating all parking to the side or rear of houses and screening parking areas with robust planting.

#### POLICY 5—HOUSING

The Policy 5—Housing document states:

*The Plan aims to ensure there are sufficient options and opportunities for the development of new houses of a variety of types and tenures throughout Orkney in order to support existing communities and to allow them to grow in a sustainable manner. It is also important that enough strategic land is allocated to enable growth within settlements to ensure there is housing provision to support potential demand from emerging industries such as renewables.*

- The development is for residential housing and the density is in accordance with policy.
- The design is high quality and is consistent with adjacent development sites and existing neighbouring houses.
- The house types have been fully considered and respond to local demand for 2 and 3 bedroom properties in the Stromness area.

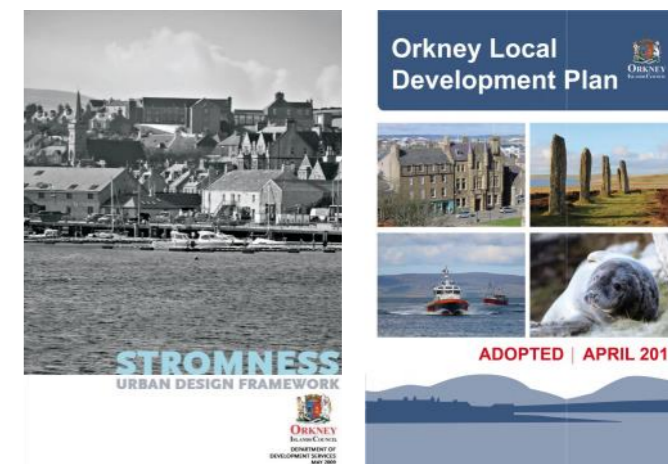
#### POLICY 9—NATURAL HERITAGE & LANDSCAPE

##### Policy 9G—Landscape

*Development that affects the National Scenic Area (NSA) will only be permitted where it is demonstrated that:*

- a) the proposal will not have a significant effect on the overall integrity of the area or the qualities for which it has been designated; or*
- b) any such adverse effects are clearly outweighed by social, environmental or economic benefits of national importance.*

- The development proposals which are located within the National Scenic area of Hoy & West Mainland will not detract from the quality of the landscape.
- The development proposals are well designed and incorporate a range of high quality materials whilst also being sympathetic to the surrounding landscape.
- Opportunities to enhance biodiversity in the area have been added through the addition of amenity space to the south of the development which also incorporates green/blue infrastructure.



**SUSTAINABLE DESIGN**

**OFFSITE FABRICATION**



**SHORTER PERIOD ON SITE**



**HIGH QUALITY HOUSING**



Energy and sustainability strategy focusing on 'Fabric First' and 'low tech' energy options

**CARBON EMISSIONS – DOMESTIC USE**

The new Building Standards Section 6 and Section 7 implements the requirements of the Sullivan report and the proposals are fully compliant with these.

The first principal to meet these targets is 'fabric first'. The houses will be highly insulated with close attention to detailing to avoid cold bridging and minimise the energy required to heat them.

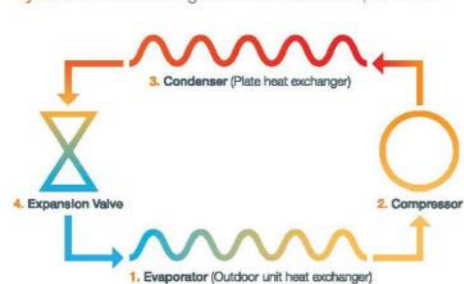
Mains gas is not available for this site so some form of electric heating is likely to be the main heating source. Air source heat pump will be considered alongside other options.

A combination of the following other measures will be considered to supplement requirements and further improve performance:

- Use of large panel timber frame construction to minimise air leakage and improve build quality,
- Solar thermal panels
- Optimising the orientation of dwellings to maximise passive solar gain.
- Specification of materials with a high recycled content.
- Specification of construction with a high rating in the "Green Design Guide".



The operation of a heat pump is similar to a refrigerator - but in reverse. This process is known as the **vapour compression cycle** and the following is a more detailed explanation.



Friday, 09 December 2022



Local Planner  
Development Management, Development and Infrastructure  
Orkney Islands Council  
Kirkwall  
KW15 1NY

Development Operations  
The Bridge  
Buchanan Gate Business Park  
Cumbernauld Road  
Stepps  
Glasgow  
G33 6FB

Development Operations  
Freephone Number - 0800 3890379  
E-Mail - [DevelopmentOperations@scottishwater.co.uk](mailto:DevelopmentOperations@scottishwater.co.uk)  
[www.scottishwater.co.uk](http://www.scottishwater.co.uk)



Dear Customer,

**Cairston Road (Land Near), Stromness, KW16 3JS**  
**Planning Ref: 22/382/PP**  
**Our Ref: DSCAS-0077180-P5Q**  
**Proposal: Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure**

**Please quote our reference in all future correspondence**

## Audit of Proposal

Scottish Water has no objection to this planning application; however, the applicant should be aware that this does not confirm that the proposed development can currently be serviced. Please read the following carefully as there may be further action required. Scottish Water would advise the following:

### Water Capacity Assessment

Scottish Water has carried out a Capacity review and we can confirm the following:

- ▶ There is currently sufficient capacity in the Boardhouse Water Treatment Works to service your development. However, please note that further investigations may be required to be carried out once a formal application has been submitted to us.

### Waste Water Capacity Assessment

- ▶ There is currently sufficient capacity for a foul only connection in the Bu Point Waste Water Treatment works to service your development. However, please note that further investigations may be required to be carried out once a formal application has been submitted to us.

## Please Note

- ▶ The applicant should be aware that we are unable to reserve capacity at our water and/or waste water treatment works for their proposed development. Once a formal connection application is submitted to Scottish Water after full planning permission has been granted, we will review the availability of capacity at that time and advise the applicant accordingly.

---

## Asset Impact Assessment

Scottish Water records indicate that there is live infrastructure in the proximity of your development area that may impact on existing Scottish Water assets.

The applicant must identify any potential conflicts with Scottish Water assets and contact our Asset Impact Team via our Customer Portal for an appraisal of the proposals.

The applicant should be aware that any conflict with assets identified will be subject to restrictions on proximity of construction. Please note the disclaimer at the end of this response.

Written permission must be obtained before any works are started within the area of our apparatus

## Surface Water

For reasons of sustainability and to protect our customers from potential future sewer flooding, Scottish Water will not accept any surface water connections into our combined sewer system.

There may be limited exceptional circumstances where we would allow such a connection for brownfield sites only, however this will require significant justification from the customer taking account of various factors including legal, physical, and technical challenges.

In order to avoid costs and delays where a surface water discharge to our combined sewer system is anticipated, the developer should contact Scottish Water at the earliest opportunity with strong evidence to support the intended drainage plan prior to making a connection request. We will assess this evidence in a robust manner and provide a decision that reflects the best option from environmental and customer perspectives.

## General notes:

- ▶ Scottish Water asset plans can be obtained from our appointed asset plan providers:
  - ▶ Site Investigation Services (UK) Ltd
  - ▶ Tel: 0333 123 1223
  - ▶ Email: [sw@sisplan.co.uk](mailto:sw@sisplan.co.uk)
  - ▶ [www.sisplan.co.uk](http://www.sisplan.co.uk)



- ▶ Scottish Water's current minimum level of service for water pressure is 1.0 bar or 10m head at the customer's boundary internal outlet. Any property which cannot be adequately serviced from the available pressure may require private pumping arrangements to be installed, subject to compliance with Water Byelaws. If the developer wishes to enquire about Scottish Water's procedure for checking the water pressure in the area, then they should write to the Customer Connections department at the above address.
  - ▶ If the connection to the public sewer and/or water main requires to be laid through land out-with public ownership, the developer must provide evidence of formal approval from the affected landowner(s) by way of a deed of servitude.
  - ▶ Scottish Water may only vest new water or waste water infrastructure which is to be laid through land out with public ownership where a Deed of Servitude has been obtained in our favour by the developer.
  - ▶ The developer should also be aware that Scottish Water requires land title to the area of land where a pumping station and/or SUDS proposed to vest in Scottish Water is constructed.
  - ▶ Please find information on how to submit application to Scottish Water at [our Customer Portal](#).
- 

## **Next Steps:**

### **▶ All Proposed Developments**

All proposed developments require to submit a Pre-Development Enquiry (PDE) Form to be submitted directly to Scottish Water via [our Customer Portal](#) prior to any formal Technical Application being submitted. This will allow us to fully appraise the proposals.

Where it is confirmed through the PDE process that mitigation works are necessary to support a development, the cost of these works is to be met by the developer, which Scottish Water can contribute towards through Reasonable Cost Contribution regulations.

### **▶ Non Domestic/Commercial Property:**

Since the introduction of the Water Services (Scotland) Act 2005 in April 2008 the water industry in Scotland has opened to market competition for non-domestic customers. All Non-domestic Household customers now require a Licensed Provider to act on their behalf for new water and waste water connections. Further details can be obtained at [www.scotlandontap.gov.uk](http://www.scotlandontap.gov.uk)

### **▶ Trade Effluent Discharge from Non-Domestic Property:**

- ▶ Certain discharges from non-domestic premises may constitute a trade effluent in terms of the Sewerage (Scotland) Act 1968. Trade effluent arises from activities including; manufacturing, production and engineering; vehicle,

plant and equipment washing, waste and leachate management. It covers both large and small premises, including activities such as car washing and laundrettes. Activities not covered include hotels, caravan sites or restaurants.

- ▶ If you are in any doubt as to whether the discharge from your premises is likely to be trade effluent, please contact us on 0800 778 0778 or email [TEQ@scottishwater.co.uk](mailto:TEQ@scottishwater.co.uk) using the subject "Is this Trade Effluent?". Discharges that are deemed to be trade effluent need to apply separately for permission to discharge to the sewerage system. The forms and application guidance notes can be found [here](#).
- ▶ Trade effluent must never be discharged into surface water drainage systems as these are solely for draining rainfall run off.
- ▶ For food services establishments, Scottish Water recommends a suitably sized grease trap is fitted within the food preparation areas, so the development complies with Standard 3.7 a) of the Building Standards Technical Handbook and for best management and housekeeping practices to be followed which prevent food waste, fat oil and grease from being disposed into sinks and drains.
- ▶ The Waste (Scotland) Regulations which require all non-rural food businesses, producing more than 50kg of food waste per week, to segregate waste disposal units that dispose of food waste to the public sewer. Further information can be found at [www.resourceefficientscotland.com](http://www.resourceefficientscotland.com)

I trust the above is acceptable however if you require any further information regarding this matter please contact me on **0800 389 0379** or via the e-mail address below or at [planningconsultations@scottishwater.co.uk](mailto:planningconsultations@scottishwater.co.uk).

Yours sincerely,

**Angela Allison**

Development Services Analyst

[PlanningConsultations@scottishwater.co.uk](mailto:PlanningConsultations@scottishwater.co.uk)

### Scottish Water Disclaimer:

*"It is important to note that the information on any such plan provided on Scottish Water's infrastructure, is for indicative purposes only and its accuracy cannot be relied upon. When the exact location and the nature of the infrastructure on the plan is a material requirement then you should undertake an appropriate site investigation to confirm its actual position in the ground and to determine if it is suitable for its intended purpose. By using the plan you agree that Scottish Water will not be liable for any loss, damage or costs caused by relying upon it or from carrying out any such site investigation."*

**From:** Sam Walker <Sam.Walker@orkney.gov.uk>  
**Sent:** 09 December 2022 16:08  
**To:** planningconsultation <planningconsultation@orkney.gov.uk>  
**Subject:** Re: 22/382/PP

**Classification: OFFICIAL**

**22/382/PP Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure  
Cairston Road (Land Near), Stromness KW16 3JS**

Having considered the information provided by the applicant Environmental Health recommend the following condition be applied:

Total noise from each of the Air Source Heat Pumps installed shall not exceed NR25 within any residential property outwith the development, where NR25 is the Noise Rating Curve at 25, (noise measurements to be made with a window of any residential property outwith the development open no more than 50 mm).

Reason: to protect any nearby residents from excessive noise disturbance from the air source heat pumps.

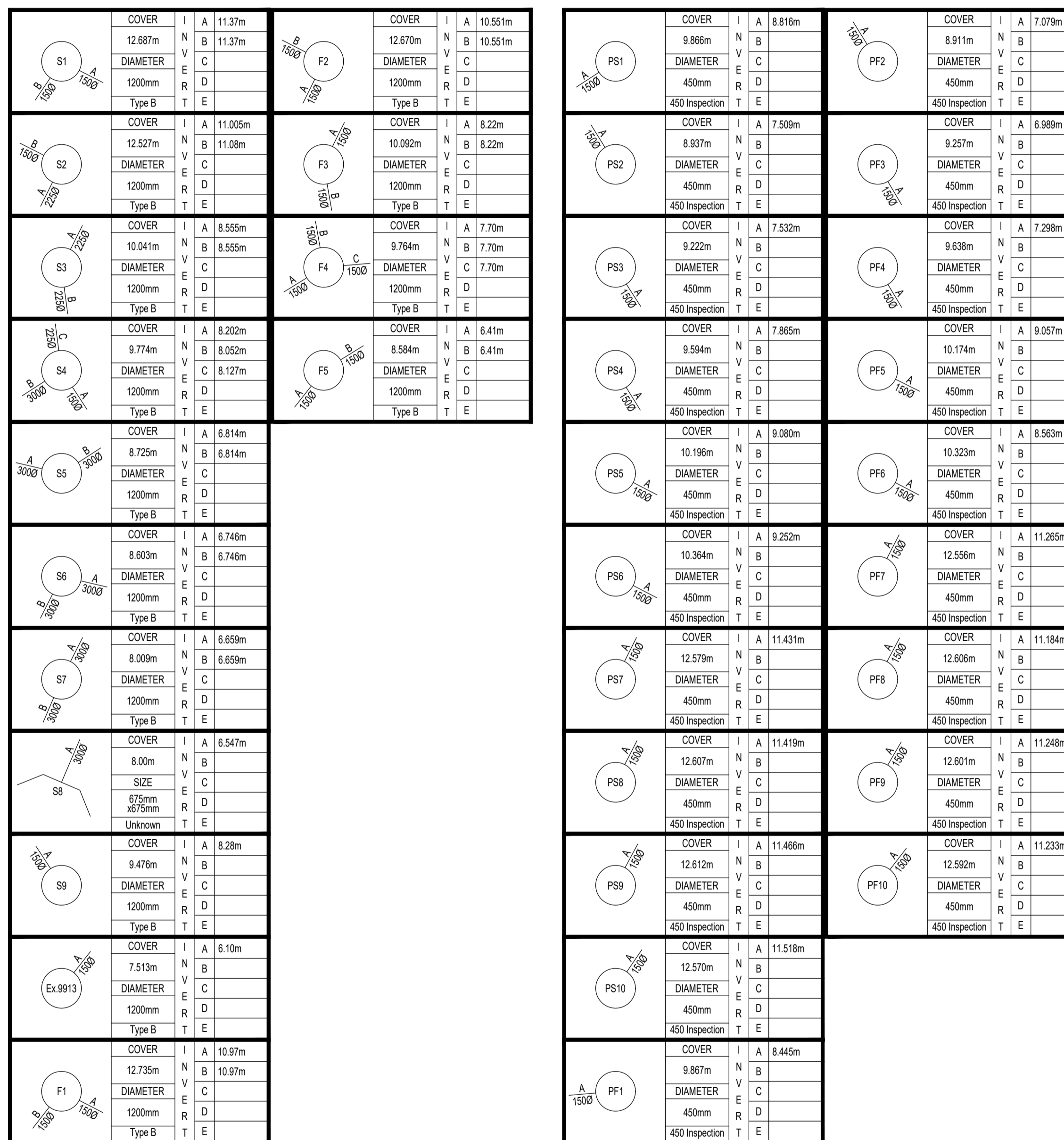
Regards

Sam Walker  
Environmental Health Officer  
Environmental Health | Planning and Community Protection  
Neighbourhood Services and Infrastructure  
Orkney Islands Council  
School Place  
KIRKWALL  
KW15 1NY

Tel: 01856 873535 ext 2802

PHASE: 0							
MH No.	MANHOLE DIAMETER (mm)	MANHOLE TYPE	COVER LEVEL (m)	INVERT LEVEL (m)	DEPTH TO SOFFIT (m)	EASTING (m)	NORTHING (m)
S1	1200	Type B	12.687	11.370	1.167	326009.304	1010053.482
S2	1200	Type B	12.527	11.005	1.297	326031.572	1010042.108
S3	1200	Type B	10.041	8.555	1.261	326013.912	1010006.776
S4	1200	Type B	9.774	8.052	1.422	326015.066	1009998.160
S5	1200	Type B	8.725	6.814	1.612	325994.416	1009984.815
S6	1200	Type B	8.603	6.746	1.557	325984.621	1009987.114
S7	1200	Type B	8.009	6.659	1.050	325978.709	1009975.393
S8	---	HEADWALL	8.000	6.547	1.153	325972.096	1009959.918
S9	1200	Type B	9.476	8.280	1.046	326022.933	1009986.116
Ex.9913	1200	Type B	7.513	6.100	1.263	325982.587	1009968.975
F1	1200	Type B	12.735	10.970	1.615	326011.376	1010054.143
F2	1200	Type B	12.670	10.551	1.969	326033.731	1010042.638
F3	1200	Type B	10.092	8.220	1.722	326015.745	1010006.265
F4	1200	Type B	9.764	7.700	1.914	326017.286	1009997.596
F5	1200	Type B	8.584	6.410	2.024	325993.604	1009982.938

PHASE: 0 (PRIVATE)							
MH No.	MANHOLE DIAMETER (mm)	MANHOLE TYPE	COVER LEVEL (m)	INVERT LEVEL (m)	DEPTH TO SOFFIT (m)	EASTING (m)	NORTHING (m)
PS1	450	450 Inspection	9.866	8.816	0.900	326023.655	1009997.576
PS2	450	450 Inspection	8.937	7.509	1.278	326000.900	1009985.306
PS3	450	450 Inspection	9.222	7.532	1.540	326001.162	1009991.064
PS4	450	450 Inspection	9.594	7.865	1.579	326006.827	1009994.494
PS5	450	450 Inspection	10.196	9.080	0.966	326011.406	1010010.396
PS6	450	450 Inspection	10.364	9.252	0.962	326012.579	1010012.781
PS7	450	450 Inspection	12.579	11.431	0.998	326017.350	1010039.668
PS8	450	450 Inspection	12.607	11.419	1.038	326012.689	1010041.965
PS9	450	450 Inspection	12.612	11.466	0.996	326009.014	1010043.796
PS10	450	450 Inspection	12.570	11.518	0.902	326004.311	1010046.151
PF1	450	450 Inspection	9.867	8.445	1.273	326023.308	1009998.121
PF2	450	450 Inspection	8.911	7.079	1.683	326000.321	1009984.974
PF3	450	450 Inspection	9.257	6.989	2.119	326001.809	1009991.495
PF4	450	450 Inspection	9.638	7.298	2.189	326007.539	1009994.964
PF5	450	450 Inspection	10.174	9.057	0.967	326011.085	1010009.630
PF6	450	450 Inspection	10.323	8.563	1.610	326012.271	1010012.037
PF7	450	450 Inspection	12.556	11.265	1.141	326018.019	1010039.314
PF8	450	450 Inspection	12.606	11.184	1.272	326013.365	1010041.618
PF9	450	450 Inspection	12.601	11.248	1.203	326009.666	1010043.436
PF10	450	450 Inspection	12.592	11.233	1.209	326004.924	1010045.828



Issue	Revision	Initial	Date

**Cameron+Ross**  
 CIVIL + STRUCTURAL ENGINEERING  
 Forbes House | 15 Victoria Street | Aberdeen | AB10 1XB  
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Client:  
 Orkney Builders

Project:  
 Housing Development  
 Cairnston Road North  
 Stromness

Drawing Title:  
 Manhole and Drainage Schedules

Status:  
 Planning

Scale: NTS Date: 11/01/23  
 By: JMA Checked: JMA Approved: RAG

Dwg. No. 210321-000-CAM-DR-C-480 Rev. -

## Design Statement

### **Cairston Road North (STR-5), Stromness**

Proposed development of 10no. Residential houses



Rev.A - 10.01.23

## INTRODUCTION

This design statement has been prepared on behalf of Orkney Builders (Contractors) Ltd in support of a planning application for 10 no. Residential houses at Cairston Road, Stromness.

The application site is shown in a red boundary line on the adjacent map, which highlights its location at the north end of main Stromness settlement and its proximity to existing housing developments, Stromness Primary School and Stromness Academy, both located within 5 minutes walking distance of the site.

The site is located in a predominantly residential area within walking distance of Stromness Town Centre. Local amenities include a doctors surgery, dentist, bank, Co-op along with a range of other services.



VIEW OF SITE LOOKING NORTH-EAST ALONG CAIRSTON ROAD



VIEW OF SITE LOOKING SOUTH-WEST ALONG CAIRSTON ROAD

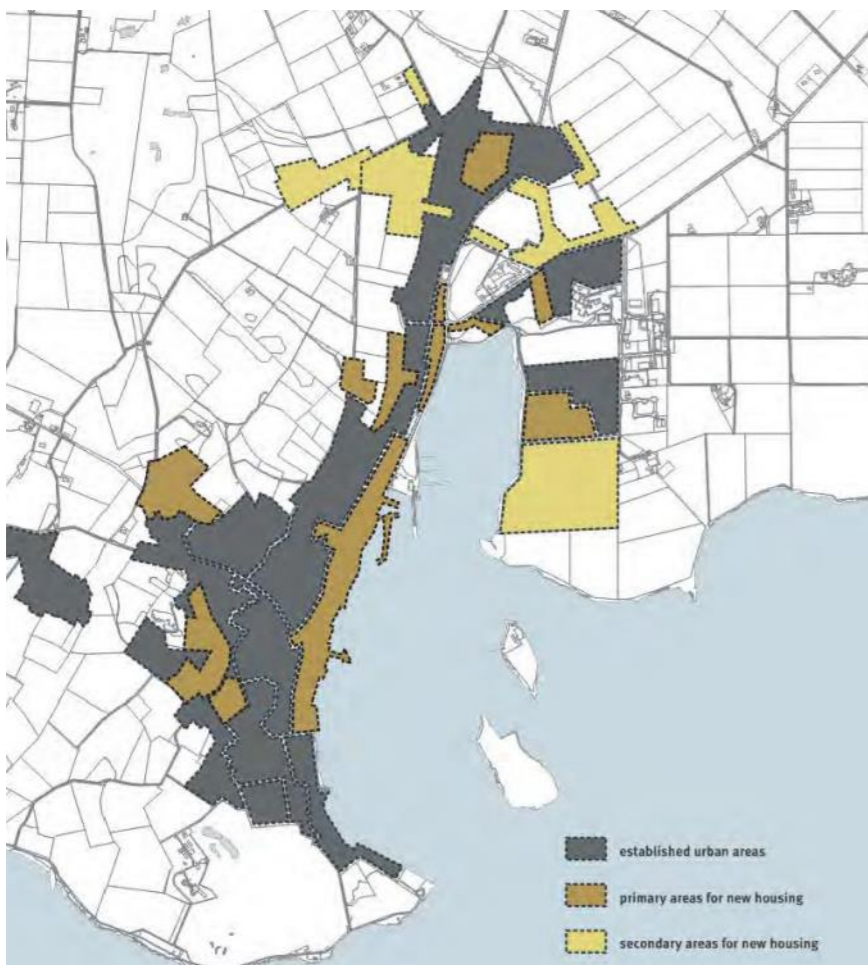


VIEW OF SITE LOOKING NORTH-WEST FROM GARSON DRIVE

**POLICY BACKGROUND & CONTEXT**

Within the Orkney Islands Local Plan the site is designated for housing development, under land allocation STR-5. The extract on the right is taken from the Orkney Islands Local Plan shows the entirety of the Stromness development plan designations, which highlights the requirement for housing throughout the town.

The proposed site sits to the north of the main Stromness settlement and is adjacent to existing housing, small commercial sites and the new Stromness Academy. There are existing housing settlements to the east of the site and to the south of the A965.



**FIGURE 1 - Extract from Stromness Urban Design Framework**

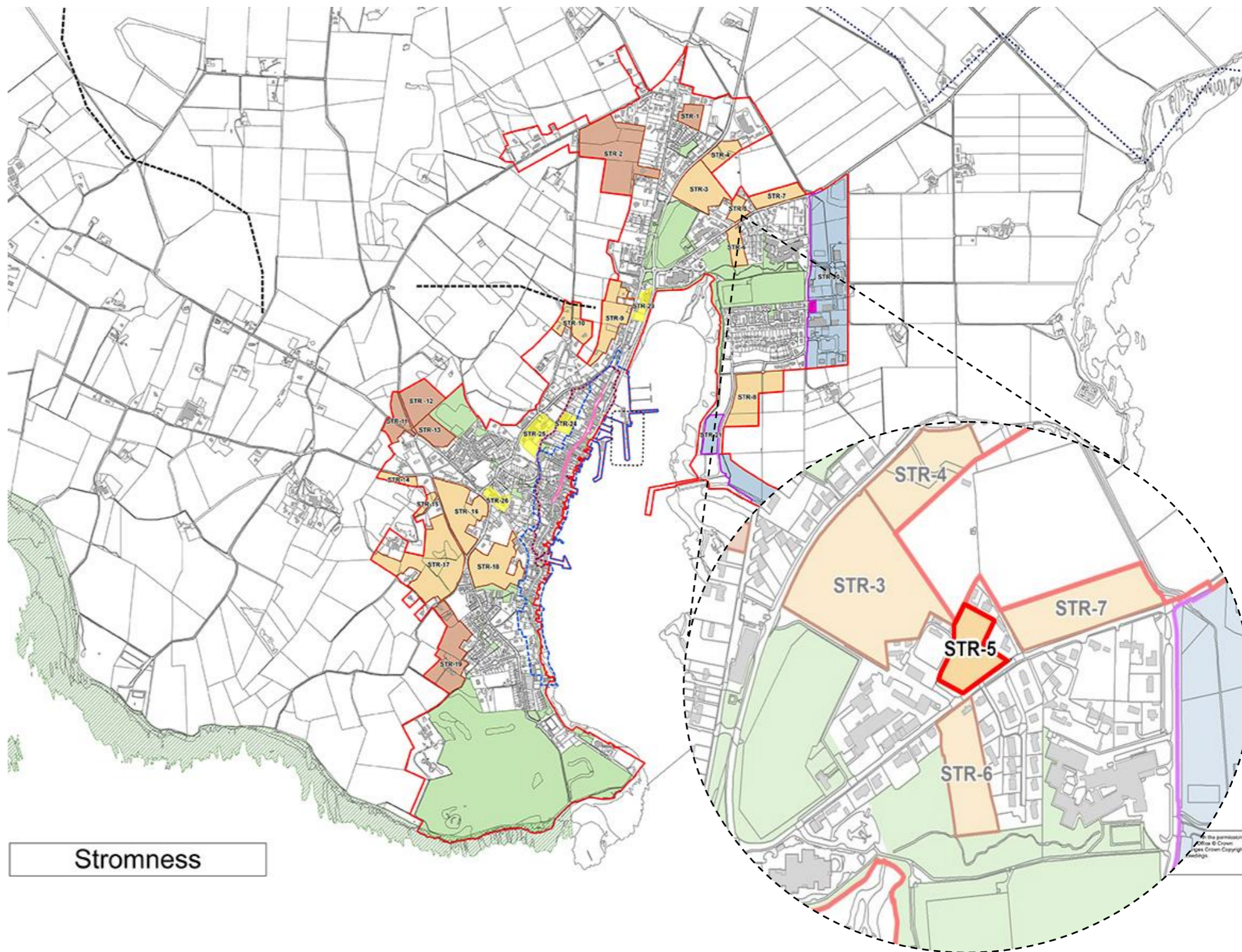


Figure 1 is an extract taken from Page 85 of the Stromness Urban Design Framework and shows the area highlighted as a secondary area for new housing with the site proposed as a new lower density housing development within the Stromness area. As the proposals are in respect of a residential housing development, a design statement is required in accordance with the Urban Design Framework for Stromness.

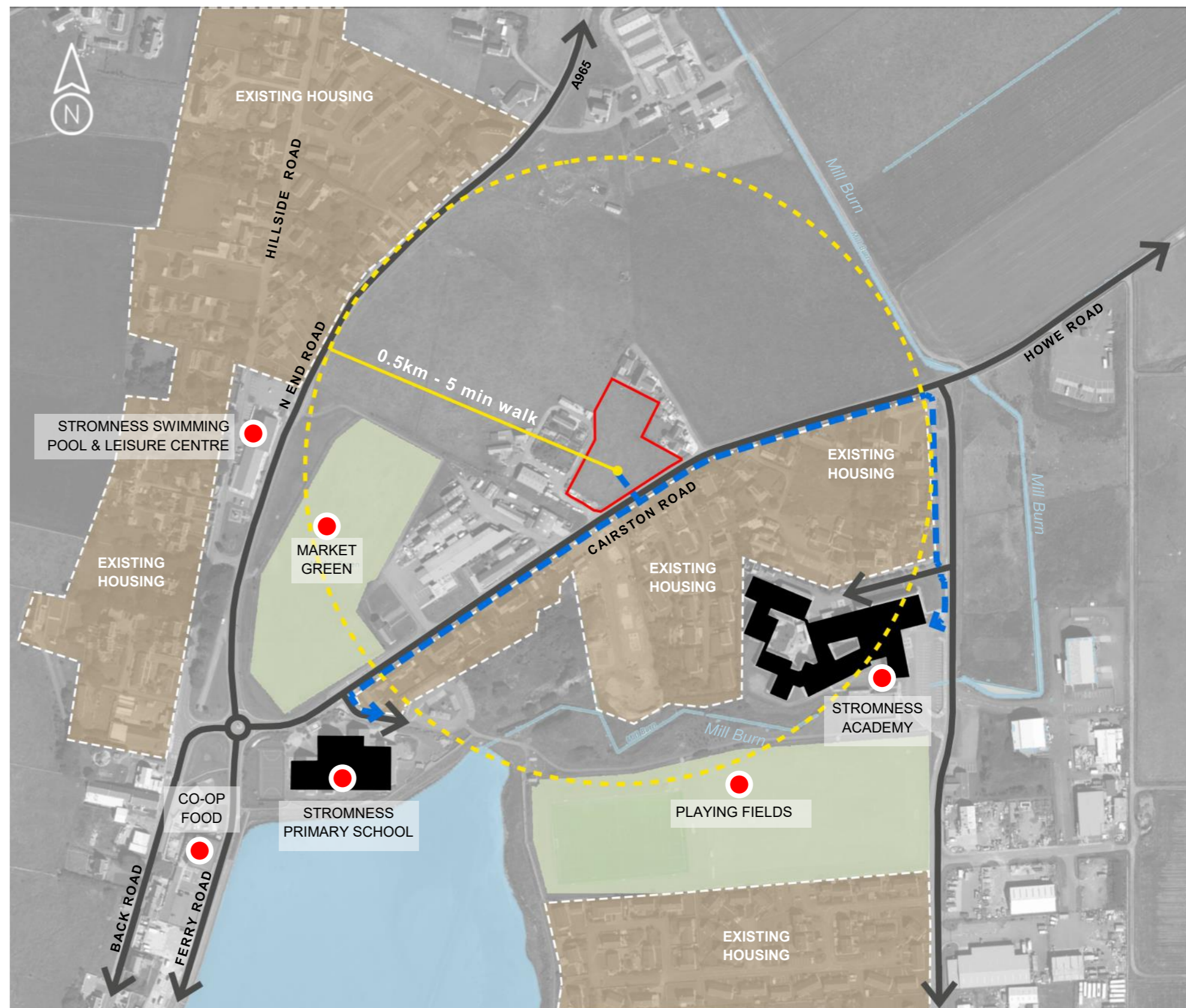
## SITE CONTEXT

The site is located to the north of Cairston Road and is surrounded on all three sides by existing development which provides a degree of shelter. Land use along Cairston Road includes buildings which vary in mix from residential housing to light industrial buildings and it is considered the proposed residential development will sit well within the existing site context.

The site is well located to encourage access to local facilities by foot. For this reason, pedestrian accessibility will form a major element in the design of the internal road and footpath network which will link directly to the existing provision on Cairston Road. This will afford the development excellent walking accessibility with safe and direct routes to Stromness Primary School, Stromness Academy and other local amenities which are all located within a short walking distance from the site.

The proposed footway links within the development will also provide access to the existing bus stop located on Cairston Road with bus services providing good public transport accessibility from the proposed development to the town centre and surrounding areas.

The majority of the site is currently being utilised as a site compound including material laydown and parking associated with the adjacent residential development works currently being undertaken on the opposite side of the road.









## DESIGN RESPONSE

- Existing low level stone walling feature to be retained to create cohesive appearance along the street elevation.
- Bungalows addressing Cairston Road following the form of adjacent properties with a wide frontage and shallow plan with active frontage where topography permits.
- Bungalows also addressing the new access road and entrance into the site.
- Where possible new dwellings positioned in such a way that will not disturb the key views of neighbouring properties.
- A simple palette of materials will be adopted throughout the development following the local vernacular of materials. The house types will include white roughcast to external walls with flat concrete interlocking tiles to roofs.
- A mix of dwellings are proposed to meet the demand of house types in the Stromness area. Two and three bed villas offset from one another to avoid overlooking.
- Adopted access road with gentle kink to reduce speed of car movement. Adoptable roads design will follow guidance from OIC Roads Department
- Bungalows located at the termination of the access road in keeping with the existing street character on Cairston Road.



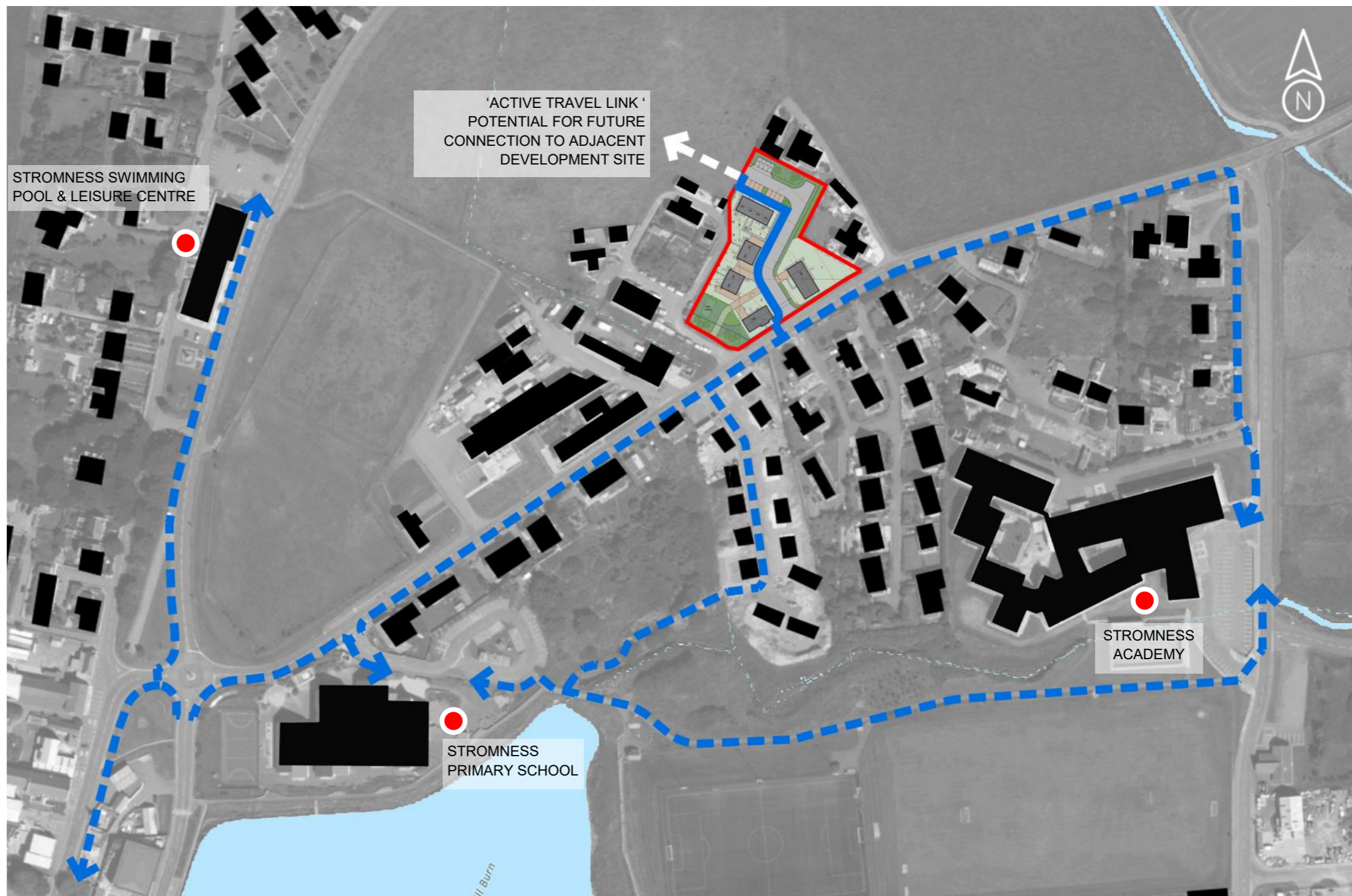
## ACTIVE TRAVEL LINK

An active travel link has been provided through the proposed development in line with the requirements of land allocation STR-5. Please refer to below text extract from the OIC Settlement Statement - April 2017).

***“Development of this allocation should include provision of vehicular access to allocation STR-3”***

The proposed road design will allow for potential vehicular and pedestrian connectivity into the future housing allocation to the north-west.

There are also good overall links to the existing footpath connectivity to the south which allow safe and direct routes to schools, the swimming pool and town centre as indicated in the diagram to the right.



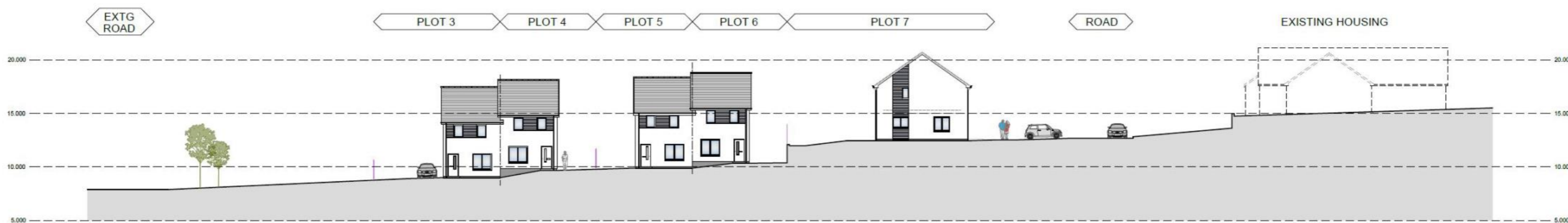
## SITE SECTION

The below site section A-A shows how the proposals will sit within the surrounding site context, including the relationship to the existing neighbouring houses to the north.

The site topography slopes down from north to south with the finished floor level to Plots 7-10 sitting approx. 1.8m lower than the adjacent house 'Lynndene'. This demonstrates the 2 storey houses are to an appropriate scale/density when considered against the existing topography and development pattern.

Given there is a requirement to provide a future link to the north-west corner of the site into the short term allocation STR-3, the 2 storey terraced house types to Plots 7-10 have been orientated to provide positive frontage onto the street. This will provide an attractive link into the future land allocation and a high quality street-scene is therefore provided between the two developments.

A 26.0m offset is also provided between the neighbouring houses and the build line of Plots 7-10 which takes into consideration privacy requirements to adjacent housing with adequate separation distances provided.



SITE SECTION A-A

### HOUSING DENSITY ANALYSIS

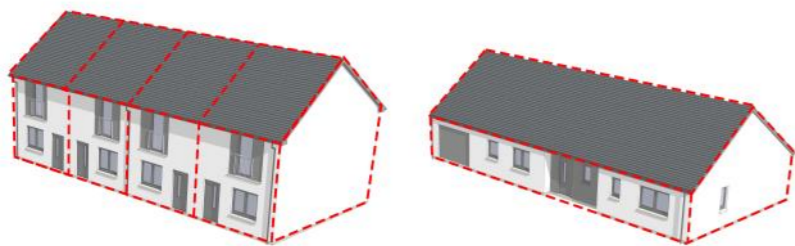
The diagram to the right shows the comparison in housing density between the application site and nearby existing developments. It should be noted that the neighbouring development to the south of Cairston Road includes a higher density layout when compared to the proposed development.

The requirements of land allocation STR-5 within the Stromness settlement statement confirms the site has capacity for 5 houses (equivalent to 10 units per hectare). Whilst planning policy considerations are respected, a development with an increased number of units is considered to be more appropriate for this location given the proximity to nearby schools, local businesses and existing amenities with people more likely to consider more sustainable modes of travel. The development proposals acknowledge this by including a mix of varying housing typologies which also looks to address demand for lower cost housing in comparison to larger, more expensive houses.

Whilst housing densities are a useful way of determining the impact of a development on neighbouring areas, they only really consider one factor when considering the layout. In terms of scale and proportion of the individual house types, consideration should also be given to the comparisons in plot coverage between various house types (for e.g. a single bungalow unit is to a similar footprint when compared to a terraced block of 4 units – please refer to below visuals for direct comparison).

The development footprints are also to a similar scale and size to existing neighbouring properties. The scale and density of the proposed development is therefore considered appropriate within the context of the site with consideration also given to the existing site topography and landscape setting.

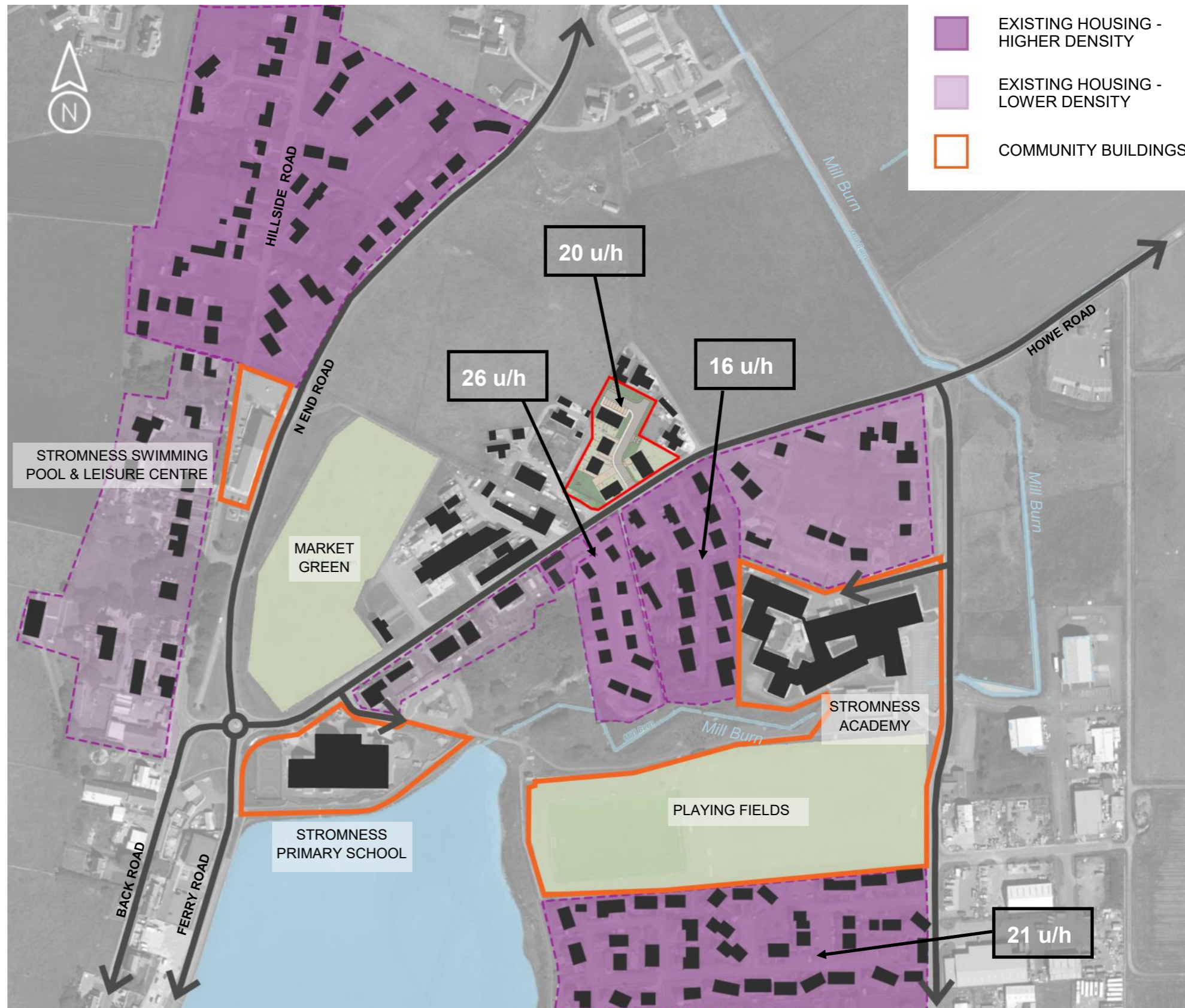
\*NOTE - Approx. density' shown on plan (units per hectare).



TERRACED UNIT OF 4

SINGLE BUNGALOW

#### HOUSING TYPOLOGY COMPARISON



**STREETSCENE / 3D VISUALS**



**VIEW LOOKING NORTH-EAST ALONG CAIRSTON ROAD**



**VIEW LOOKING NORTH-WEST FROM GARSON DRIVE**



**VIEW LOOKING WEST ALONG CAIRSTON ROAD**



**VIEW OF TERRACED BLOCK LOOKING SOUTH-WEST**

## COMPLIANCE WITH POLICY

Within the Orkney Islands Local Development Plan, the following criteria and key design principles have been followed which demonstrate why the chosen development proposals is suitable for the application site.

Consideration has also been given to the relevant national policy and guidance documents, including Creating Places, Designing Places, Designing Streets and Planning Advice Note 77.

### PRIMARY POLICIES:

#### POLICY 2—DESIGN

##### Character & Identity

- The design is in context with the surrounding building heights, settlement pattern and character of Stromness.
- There are no existing landscape or topographical features on the site but the design is orientated to provide frontage onto Cairston Road whilst also providing adequate offsets from neighbouring houses.
- The scale and density of the proposed development is in keeping with the settlement pattern of the surrounding neighbourhood.
- Is appropriately connected to pedestrian, vehicular and public transport routes encouraging and prioritising pedestrian access.
- The proposed boundary treatments are in keeping with the surrounding area and comprise of a mixture of low level natural stone walls and hedging.

##### Landscaping

- The site layout provides pockets of landscaping to enhance the streetscape and provides attractive area of amenity space to the south with an opportunity to incorporate a filter trench for surface water run off.
- A range of native planting (including trees, shrubs and hedgerows) are proposed to further enhance the existing landscape and to encourage biodiversity in the area.

##### Parking

- The visual impact of the parking is minimised by locating all parking to the side or rear of houses and screening parking areas with robust planting.

#### POLICY 5—HOUSING

The Policy 5—Housing document states:

*The Plan aims to ensure there are sufficient options and opportunities for the development of new houses of a variety of types and tenures throughout Orkney in order to support existing communities and to allow them to grow in a sustainable manner. It is also important that enough strategic land is allocated to enable growth within settlements to ensure there is housing provision to support potential demand from emerging industries such as renewables.*

- The development is for residential housing and the density is in accordance with policy.
- The design is high quality and is consistent with adjacent development sites and existing neighbouring houses.
- The house types have been fully considered and respond to local demand for 2 and 3 bedroom properties in the Stromness area.

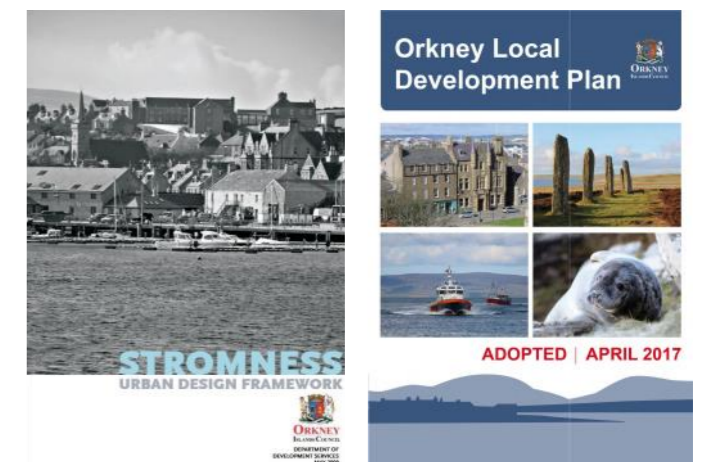
#### POLICY 9—NATURAL HERITAGE & LANDSCAPE

Policy 9G—Landscape

*Development that affects the National Scenic Area (NSA) will only be permitted where it is demonstrated that:*

- a) the proposal will not have a significant effect on the overall integrity of the area or the qualities for which it has been designated; or*
- b) any such adverse effects are clearly outweighed by social, environmental or economic benefits of national importance.*

- The development proposals which are located within the National Scenic area of Hoy & West Mainland will not detract from the quality of the landscape.
- The development proposals are well designed and incorporate a range of high quality materials whilst also being sympathetic to the surrounding landscape.
- Opportunities to enhance biodiversity in the area have been added through the addition of amenity space to the south of the development which also incorporates green/blue infrastructure.





**SUSTAINABLE DESIGN**

**OFFSITE FABRICATION**



**SHORTER PERIOD ON SITE**



**HIGH QUALITY HOUSING**



Energy and sustainability strategy focusing on 'Fabric First' and 'low tech' energy options

**CARBON EMISSIONS – DOMESTIC USE**

The new Building Standards Section 6 and Section 7 implements the requirements of the Sullivan report and the proposals are fully compliant with these.

The first principal to meet these targets is 'fabric first'. The houses will be highly insulated with close attention to detailing to avoid cold bridging and minimise the energy required to heat them.

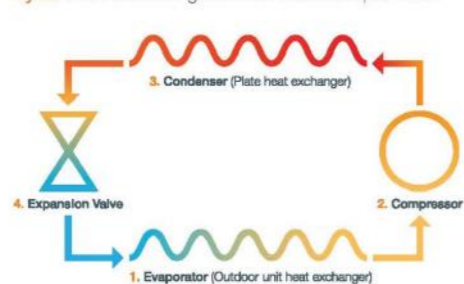
Mains gas is not available for this site so some form of electric heating is likely to be the main heating source. Air source heat pump will be considered alongside other options.

A combination of the following other measures will be considered to supplement requirements and further improve performance:

- Use of large panel timber frame construction to minimise air leakage and improve build quality,
- Solar thermal panels
- Optimising the orientation of dwellings to maximise passive solar gain.
- Specification of materials with a high recycled content.
- Specification of construction with a high rating in the "Green Design Guide".



The operation of a heat pump is similar to a refrigerator - but in reverse. This process is known as the **vapour compression cycle** and the following is a more detailed explanation.



**INTERNAL MEMORANDUM TO: Development & Marine Planning - Policy Advice**

Date of Consultation	30th May 2023
Response required by	20th June 2023
Planning Authority Reference	22/382/PP
Nature of Proposal (Description)	Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure
Site	Cairston Road (Land Near), Stromness, Orkney, KW16 3JS
Proposal Location Easting	326018
Proposal Location Northing	1010016
Area of application site (Metres)	4962
Supporting Documentation URL	<a href="http://planningandwarrant.orkney.gov.uk/online-applications/">http://planningandwarrant.orkney.gov.uk/online-applications/</a>  Please enter - 22/382/PP
PA Office	Development Management
Case Officer	Mr Jamie Macvie
Case Officer Phone number	01856 873535 EXT 2529
Case Officer email address	jamie.macvie@orkney.gov.uk
PA Response To	planningconsultation@orkney.gov.uk

**Comments:**

Development and Marine Planning previously assisted with pre-application advice (dated 25<sup>th</sup> November 2022), which is referred to within the following comments.

1. As noted in the pre-application discussions, the massing and heights of plots 7-10 remain a dominant feature of the proposals and are not in-keeping with their immediate surroundings, which are predominately single storey with some 1.5 storey. The Design Statement (pg. 10) notes the plot coverage similarities between a single bungalow and a terrace of 4, however, this plan-based assessment fails to address the impact that heights have on neighbouring properties and the proposals relationship to its wider context. The use of 2-storeys on the highest parts of the development is therefore not deemed appropriate. Building heights should reflect the typographic sensitivities of the site, with lower storey units on higher ground to minimise landscape impacts from both within and outwith the site boundary, with special attention paid due to the site's location within the Hoy and West Mainland National Scenic Area. To address this, consideration should be given to potential reconfiguration of the site to locate the 2-storey units within the lower parts of the site, or opportunities to reduce the height of plots 7-10 to 1.5 storeys, utilising bedrooms within the eaves to balance unit sizes with external building heights.
2. As noted in pre-application discussions, Plot One should have a principle/form of active frontage facing onto Cairston Road. The current proposed gable is predominately blank with one small window. In its current form this does not provide sufficient active frontage onto the existing street. It is noted in correspondence to pre-application advice (dated 11.1.23) that reorientation of the building could result in level issues, however in this instance internal reorganisation of the unit could provide the opportunity to include additional and/or larger windows to the gable end, encouraging passive surveillance whilst positively addressing the existing street.
3. Inclusion of a 2m wide footway through the development to facilitate a future link with STR-3 is welcomed.
4. Inclusion of additional planting/landscape within the parking area to the north of the site is also welcomed.

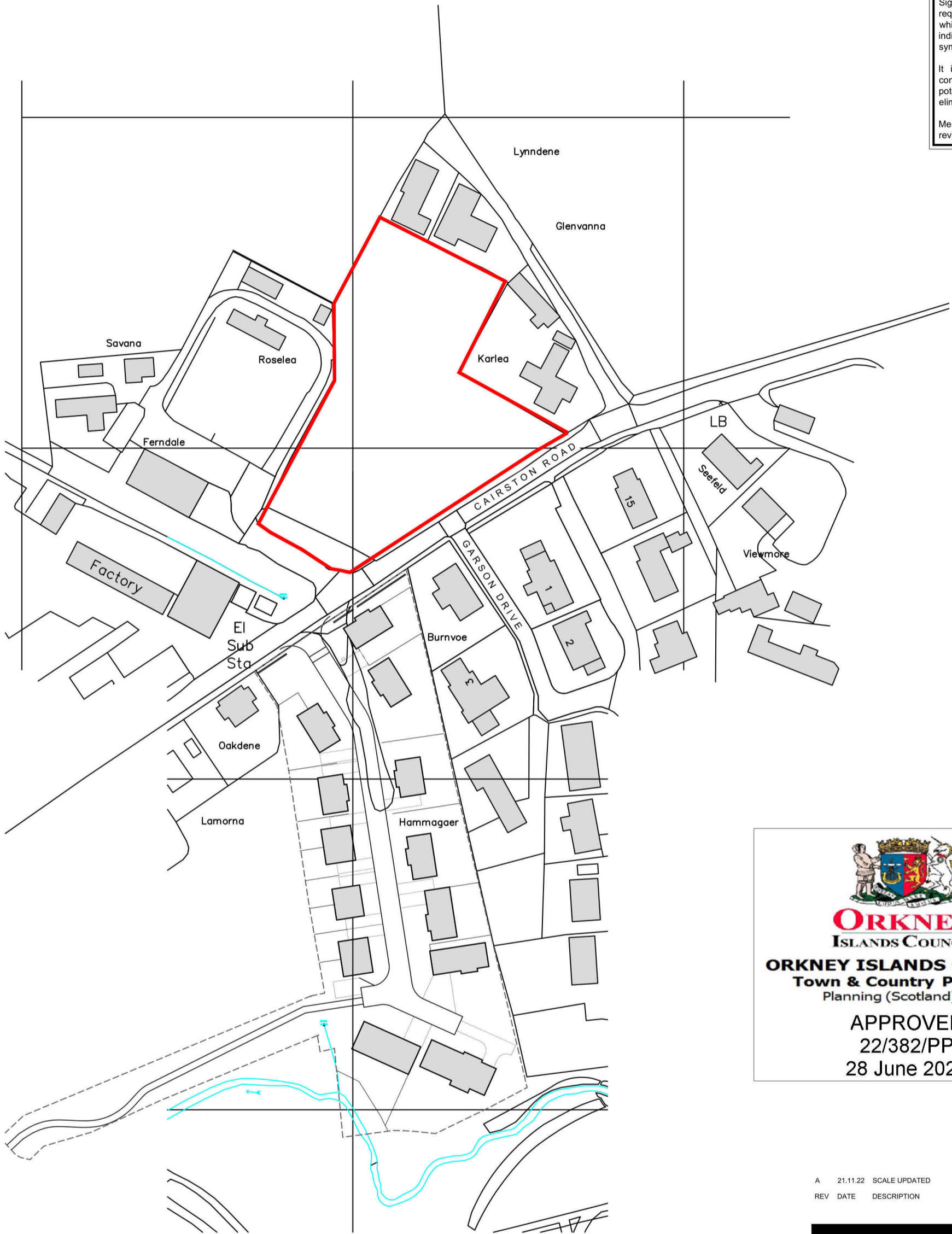
**Note to Designers and Contractors**

Under the CDM2015 regulations BSC has sought to eliminate or reduce risks where possible as part of the design process.

Significant residual risks, or areas of work that require special attention during construction, which have been identified by BSC, are indicated on project drawings by the following symbol .

It is anticipated that other designers and contractors will co-operate to identify any potential construction hazards and to eliminate them where possible.

Measures to minimise residual hazards will be reviewed on a regular basis.




**ORKNEY ISLANDS COUNCIL**  
**ORKNEY ISLANDS COUNCIL**  
 Town & Country Planning  
 Planning (Scotland) Acts

**APPROVED**  
 22/382/PP  
 28 June 2024

A	21.11.22	SCALE UPDATED	LMid
REV	DATE	DESCRIPTION	DRN

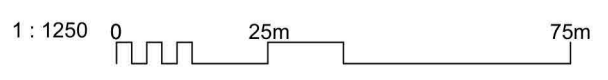
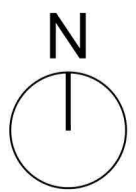
**Bracewell Stirling CONSULTING**

38 WALKER TERRACE, TILlicOUNTRY, FK13 6EF 01259 750301  
 5 NESS BANK, INVERNESS, IV2 4SF 01463 233760  
 15 LOCHSIDE STREET, OBAN, PA34 4HP 01631 359054

PROPOSED HOUSING DEVELOPMENT  
 CAIRSTON ROAD NORTH, STROMNESS  
 ORKNEY BUILDERS LTD

LOCATION PLAN

STATUS:	<b>PLANNING</b>		
SCALE:	1 : 1250	DRAWN:	--
PAPER SIZE:	A3	DATE:	Nov 2022
DWG No.	4765-01-001	REV.	A



## Re-Consultation Request Notification - Roads Services

Planning Authority Name	<b>Orkney Islands Council</b>
Date of Consultation	<b>30th May 2023</b>
Response required by	<b>20th June 2023</b>
Planning Authority Reference	<b>22/382/PP</b>
Nature of Proposal (Description)	<b>Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure</b>
Site	<b>Cairston Road (Land Near), Stromness, Orkney, KW16 3JS</b>
Site Postcode	<b>N/A</b>
Site Gazetteer UPRN	
Proposal Location Easting	<b>326018</b>
Proposal Location Northing	<b>1010016</b>
Area of application site (Metres)	<b>4962</b>
Clarification of Specific Reasons for Consultation	
Development Hierarchy Level	<b>N/A</b>
Supporting Documentation URL	<a href="http://planningandwarrant.orkney.gov.uk/online-applications/">http://planningandwarrant.orkney.gov.uk/online-applications/</a> <b>Please enter - 22/382/PP</b>
List of Available Supporting Documentation	<b>As above URL</b>
Offline Documents available?	<b>N/A</b>
Date of Validation by Planning Authority	<b>23rd November 2022</b>
Governing Legislation	TOWN AND COUNTRY PLANNING (SCOTLAND) ACTS DEVELOPMENT MANAGEMENT PROCEDURE (SCOTLAND) REGULATIONS 2013
Consultation Type	<b>Planning Permission</b>
Consultation Stage	<b>N/A</b>
Is this a re-consultation of an existing application?	<b>YES</b>
EIA Required	<b>No</b>
EIA Regulations	<b>N/A</b>
Use Class (Current)	
Use Class (Proposed)	
Does the application conform with the Structure Plan / Local Plan Land Use	
Additional Comments relating to Structure Plan / Local Plan Use	<b>N/A</b>
Transport Assessment or Travel Plan	<b>N/A</b>
Applicant Name	<b>Orkney Builders Ltd</b>
Applicant Organisation Name	
Applicant Address	<b>Orkney Builders Ltd Hatston Road Crowness</b>

	<b>Kirkwall Orkney KW15 1RG</b>
Agent Name	<b>Bracewell Stirling</b>
Agent Organisation Name	
Agent Address	<b>C/o Lisa Balnave 5 Ness Bank Inverness United Kingdom IV2 4SF</b>
Agent Phone Number	<b>N/A</b>
Agent Email Address	<b>N/A</b>
PA Office	<b>Development Management</b>
Case Officer	<b>Mr Jamie Macvie</b>
Case Officer Phone number	<b>01856 873535 EXT 2529</b>
Case Officer email address	<b>jamie.macvie@orkney.gov.uk</b>
PA Response To	<b>planningconsultation@orkney.gov.uk</b>


As indicated in the pre-application advise for this development the formation of a crossroads is not an ideal, it is however accepted that given the geometry of the existing road and the position and proximity to existing junctions and accesses there no ideal location to site a new access. Therefore, the access location as proposed would be acceptable in this instance, however the short sections of footway indicated at either side of the junction must be extended and pedestrian crossing points formed as part of the development.


With regard to the proposed drainage for the site the comments noted below must all be suitably addressed prior to any planning permission being granted.

- The proposed access to the SuDS area is via an unadopted section of road / access which is unacceptable. Access should be provided directly from an adoptable section of road, with turning facilities also being provided to enable the largest expected maintenance vehicle to access and egress the area in a forward direction.
- When assessed using the Simple Index Approach from The SuDS Manual 2015, the water quality treatment provided by the proposed filter drain is not adequate. In addition, the implications of using filter drains without prior removal of course sediment must be taken into consideration in system design and the Maintenance Plan (settled sediments could be washed out of the sumps of the gullies proposed during periods of turbulent high runoff flow). A system offering adequate water quality treatment should be proposed.
- No explanation of the proposed surface water drainage system or justification for the proposal not to provide flow control has been provided. This development is not comparable to Oakdene with regard to discharges, as suggested, because increases in discharge rates beyond greenfield runoff rate do have potential to contribute to flooding elsewhere.
- Discharges should not exceed the greenfield runoff in terms of volume or rate up to the 1in200 year + climate change rainfall event. This is most easily achieved by restricting maximum discharge rates so that they do not exceed the 1in2 year greenfield runoff rate. Discharge rates proposed exceed this for all return periods for which calculations have been provided.
- A maintenance plan detailing maintenance responsibilities, arrangements and operational procedures must be provided. This must set out the inspection regime and describe all planned maintenance up to and including the periodic excavation and replacement of all filter media.
- No description or details of proposed construction phase SuDS has been provided.


- The design information provided appears to consider only impermeable areas and does not take into account runoff originating within the development or running into the development from the land uphill.


D.W.


Cameron & Ross						Page 1	
15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File			Designed by JMA Checked by				
CADS						Source Control 2017.1.2	
<p><u>Summary of Results for 200 year Return Period (+35%)</u></p> <p>Half Drain Time : 4 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.324	0.824	0.0	43.8	43.8	12.1	O K
30 min Summer	7.381	0.881	0.0	50.0	50.0	13.0	O K
60 min Summer	7.374	0.874	0.0	49.3	49.3	12.9	O K
120 min Summer	7.291	0.791	0.0	39.7	39.7	11.6	O K
180 min Summer	7.247	0.747	0.0	32.9	32.9	11.0	O K
240 min Summer	7.223	0.723	0.0	28.1	28.1	10.6	O K
360 min Summer	7.193	0.693	0.0	22.1	22.1	10.2	O K
480 min Summer	7.173	0.673	0.0	18.5	18.5	9.9	O K
600 min Summer	7.156	0.656	0.0	16.1	16.1	9.6	O K
720 min Summer	7.143	0.643	0.0	14.2	14.2	9.4	O K
960 min Summer	7.128	0.628	0.0	11.8	11.8	9.2	O K
1440 min Summer	7.112	0.612	0.0	8.8	8.8	9.0	O K
2160 min Summer	7.099	0.599	0.0	6.6	6.6	8.8	O K
2880 min Summer	7.088	0.588	0.0	5.5	5.5	8.6	O K
4320 min Summer	7.076	0.576	0.0	4.1	4.1	8.4	O K
5760 min Summer	7.069	0.569	0.0	3.4	3.4	8.3	O K
7200 min Summer	7.063	0.563	0.0	2.9	2.9	8.2	O K
8640 min Summer	7.059	0.559	0.0	2.5	2.5	8.2	O K
10080 min Summer	7.056	0.556	0.0	2.3	2.3	8.1	O K
15 min Winter	7.370	0.870	0.0	48.9	48.9	12.8	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	28.0	16			
30 min Summer	59.880	0.0	43.0	23			
60 min Summer	40.721	0.0	61.1	38			
120 min Summer	26.227	0.0	80.8	68			
180 min Summer	20.088	0.0	94.0	98			
240 min Summer	16.566	0.0	104.0	128			
360 min Summer	12.577	0.0	119.5	188			
480 min Summer	10.324	0.0	131.5	248			
600 min Summer	8.850	0.0	141.4	308			
720 min Summer	7.800	0.0	150.0	368			
960 min Summer	6.386	0.0	164.4	486			
1440 min Summer	4.811	0.0	186.7	734			
2160 min Summer	3.624	0.0	211.9	1080			
2880 min Summer	2.964	0.0	231.7	1460			
4320 min Summer	2.228	0.0	262.2	2136			
5760 min Summer	1.817	0.0	285.7	2848			
7200 min Summer	1.550	0.0	305.2	3552			
8640 min Summer	1.361	0.0	322.0	4272			
10080 min Summer	1.219	0.0	336.8	5128			
15 min Winter	83.965	0.0	32.2	16			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc						
Date 09/08/2022 File	Designed by JMA Checked by						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 200 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	7.417	0.917	0.0	53.5	53.5	13.5	O K
60 min Winter	7.350	0.850	0.0	46.7	46.7	12.5	O K
120 min Winter	7.249	0.749	0.0	33.3	33.3	11.0	O K
180 min Winter	7.213	0.713	0.0	26.0	26.0	10.5	O K
240 min Winter	7.190	0.690	0.0	21.6	21.6	10.1	O K
360 min Winter	7.160	0.660	0.0	16.6	16.6	9.7	O K
480 min Winter	7.139	0.639	0.0	13.6	13.6	9.4	O K
600 min Winter	7.128	0.628	0.0	11.8	11.8	9.2	O K
720 min Winter	7.120	0.620	0.0	10.3	10.3	9.1	O K
960 min Winter	7.111	0.611	0.0	8.5	8.5	8.9	O K
1440 min Winter	7.096	0.596	0.0	6.4	6.4	8.7	O K
2160 min Winter	7.082	0.582	0.0	4.8	4.8	8.5	O K
2880 min Winter	7.075	0.575	0.0	4.0	4.0	8.4	O K
4320 min Winter	7.065	0.565	0.0	3.0	3.0	8.2	O K
5760 min Winter	7.058	0.558	0.0	2.4	2.4	8.1	O K
7200 min Winter	7.053	0.553	0.0	2.1	2.1	8.1	O K
8640 min Winter	7.050	0.550	0.0	1.8	1.8	8.0	O K
10080 min Winter	7.048	0.548	0.0	1.6	1.6	8.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	59.880	0.0	49.0	23			
60 min Winter	40.721	0.0	69.3	38			
120 min Winter	26.227	0.0	91.4	68			
180 min Winter	20.088	0.0	106.1	96			
240 min Winter	16.566	0.0	117.4	128			
360 min Winter	12.577	0.0	134.7	186			
480 min Winter	10.324	0.0	148.1	246			
600 min Winter	8.850	0.0	159.2	304			
720 min Winter	7.800	0.0	168.8	364			
960 min Winter	6.386	0.0	185.0	488			
1440 min Winter	4.811	0.0	210.0	738			
2160 min Winter	3.624	0.0	238.2	1092			
2880 min Winter	2.964	0.0	260.4	1472			
4320 min Winter	2.228	0.0	294.5	2172			
5760 min Winter	1.817	0.0	320.9	2864			
7200 min Winter	1.550	0.0	342.7	3648			
8640 min Winter	1.361	0.0	361.5	4368			
10080 min Winter	1.219	0.0	378.1	4992			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File	Designed by JMA Checked by	
CADS	Source Control 2017.1.2	
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.224		
<b>Time (mins)</b>	<b>Area</b>	<b>Time (mins)</b>
<b>From: To: (ha)</b>	<b>From: To: (ha)</b>	<b>From: To: (ha)</b>
0 4 0.074	4 8 0.075	8 12 0.075
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File	Designed by JMA Checked by	
CADS	Source Control 2017.1.2	
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File			Designed by JMA Checked by				
CADS						Source Control 2017.1.2	
<p><u>Summary of Results for 100 year Return Period (+35%)</u></p> <p>Half Drain Time : 5 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.278	0.778	0.0	38.1	38.1	11.5	O K
30 min Summer	7.320	0.820	0.0	43.3	43.3	12.1	O K
60 min Summer	7.314	0.814	0.0	42.7	42.7	12.0	O K
120 min Summer	7.254	0.754	0.0	34.4	34.4	11.1	O K
180 min Summer	7.225	0.725	0.0	28.4	28.4	10.6	O K
240 min Summer	7.204	0.704	0.0	24.3	24.3	10.3	O K
360 min Summer	7.178	0.678	0.0	19.2	19.2	10.0	O K
480 min Summer	7.157	0.657	0.0	16.1	16.1	9.6	O K
600 min Summer	7.142	0.642	0.0	14.0	14.0	9.4	O K
720 min Summer	7.132	0.632	0.0	12.5	12.5	9.3	O K
960 min Summer	7.120	0.620	0.0	10.2	10.2	9.1	O K
1440 min Summer	7.107	0.607	0.0	7.8	7.8	8.9	O K
2160 min Summer	7.092	0.592	0.0	5.9	5.9	8.7	O K
2880 min Summer	7.083	0.583	0.0	4.9	4.9	8.5	O K
4320 min Summer	7.072	0.572	0.0	3.7	3.7	8.4	O K
5760 min Summer	7.065	0.565	0.0	3.0	3.0	8.3	O K
7200 min Summer	7.060	0.560	0.0	2.6	2.6	8.2	O K
8640 min Summer	7.056	0.556	0.0	2.3	2.3	8.1	O K
10080 min Summer	7.053	0.553	0.0	2.0	2.0	8.1	O K
15 min Winter	7.314	0.814	0.0	42.6	42.6	12.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	23.2	16			
30 min Summer	51.518	0.0	36.0	23			
60 min Summer	34.923	0.0	51.4	38			
120 min Summer	22.569	0.0	68.5	68			
180 min Summer	17.334	0.0	80.1	98			
240 min Summer	14.329	0.0	89.0	128			
360 min Summer	10.919	0.0	102.8	188			
480 min Summer	8.989	0.0	113.5	248			
600 min Summer	7.724	0.0	122.5	308			
720 min Summer	6.821	0.0	130.2	366			
960 min Summer	5.602	0.0	143.3	490			
1440 min Summer	4.241	0.0	163.7	734			
2160 min Summer	3.209	0.0	186.8	1088			
2880 min Summer	2.633	0.0	205.0	1464			
4320 min Summer	1.989	0.0	233.3	2152			
5760 min Summer	1.628	0.0	255.3	2904			
7200 min Summer	1.394	0.0	273.7	3664			
8640 min Summer	1.227	0.0	289.5	4296			
10080 min Summer	1.101	0.0	303.5	5128			
15 min Winter	72.673	0.0	26.9	16			
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15 Victoria Street Aberdeen AB10 1XB				A/210321 - Cairston Road North - Filter Trench Calc			
Date 09/08/2022				Designed by JMA			
File				Checked by			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 100 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	7.348	0.848	0.0	46.5	46.5	12.5	O K
60 min Winter	7.295	0.795	0.0	40.3	40.3	11.7	O K
120 min Winter	7.226	0.726	0.0	28.6	28.6	10.7	O K
180 min Winter	7.195	0.695	0.0	22.4	22.4	10.2	O K
240 min Winter	7.174	0.674	0.0	18.7	18.7	9.9	O K
360 min Winter	7.144	0.644	0.0	14.3	14.3	9.4	O K
480 min Winter	7.128	0.628	0.0	11.8	11.8	9.2	O K
600 min Winter	7.120	0.620	0.0	10.2	10.2	9.1	O K
720 min Winter	7.113	0.613	0.0	9.0	9.0	9.0	O K
960 min Winter	7.105	0.605	0.0	7.5	7.5	8.9	O K
1440 min Winter	7.090	0.590	0.0	5.6	5.6	8.6	O K
2160 min Winter	7.077	0.577	0.0	4.2	4.2	8.4	O K
2880 min Winter	7.071	0.571	0.0	3.5	3.5	8.3	O K
4320 min Winter	7.061	0.561	0.0	2.7	2.7	8.2	O K
5760 min Winter	7.055	0.555	0.0	2.2	2.2	8.1	O K
7200 min Winter	7.051	0.551	0.0	1.9	1.9	8.0	O K
8640 min Winter	7.048	0.548	0.0	1.6	1.6	8.0	O K
10080 min Winter	7.045	0.545	0.0	1.5	1.5	8.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	51.518	0.0	41.2	23			
60 min Winter	34.923	0.0	58.4	38			
120 min Winter	22.569	0.0	77.6	68			
180 min Winter	17.334	0.0	90.6	98			
240 min Winter	14.329	0.0	100.6	128			
360 min Winter	10.919	0.0	116.0	188			
480 min Winter	8.989	0.0	128.0	246			
600 min Winter	7.724	0.0	138.1	306			
720 min Winter	6.821	0.0	146.7	370			
960 min Winter	5.602	0.0	161.4	488			
1440 min Winter	4.241	0.0	184.2	736			
2160 min Winter	3.209	0.0	210.1	1072			
2880 min Winter	2.633	0.0	230.5	1432			
4320 min Winter	1.989	0.0	262.2	2200			
5760 min Winter	1.628	0.0	286.9	2840			
7200 min Winter	1.394	0.0	307.4	3640			
8640 min Winter	1.227	0.0	325.1	4352			
10080 min Winter	1.101	0.0	340.8	5072			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.224		
<b>Time (mins)</b>	<b>Area</b>	<b>Time (mins)</b>
<b>From: To: (ha)</b>	<b>From: To: (ha)</b>	<b>From: To: (ha)</b>
0 4 0.074	4 8 0.075	8 12 0.075
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File A210321 - Filter Trench...			Designed by JMA Checked by				
CADS				Source Control 2017.1.2			
<p>Summary of Results for 30 year Return Period (+35%)</p> <p>Half Drain Time : 5 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.229	0.729	0.0	29.3	29.3	10.7	O K
30 min Summer	7.251	0.751	0.0	33.7	33.7	11.0	O K
60 min Summer	7.247	0.747	0.0	33.0	33.0	11.0	O K
120 min Summer	7.216	0.716	0.0	26.6	26.6	10.5	O K
180 min Summer	7.192	0.692	0.0	22.0	22.0	10.2	O K
240 min Summer	7.176	0.676	0.0	18.9	18.9	9.9	O K
360 min Summer	7.149	0.649	0.0	15.0	15.0	9.5	O K
480 min Summer	7.133	0.633	0.0	12.7	12.7	9.3	O K
600 min Summer	7.124	0.624	0.0	11.1	11.1	9.1	O K
720 min Summer	7.118	0.618	0.0	9.8	9.8	9.0	O K
960 min Summer	7.109	0.609	0.0	8.2	8.2	8.9	O K
1440 min Summer	7.095	0.595	0.0	6.2	6.2	8.7	O K
2160 min Summer	7.082	0.582	0.0	4.8	4.8	8.5	O K
2880 min Summer	7.075	0.575	0.0	4.0	4.0	8.4	O K
4320 min Summer	7.065	0.565	0.0	3.0	3.0	8.3	O K
5760 min Summer	7.059	0.559	0.0	2.5	2.5	8.2	O K
7200 min Summer	7.054	0.554	0.0	2.1	2.1	8.1	O K
8640 min Summer	7.051	0.551	0.0	1.9	1.9	8.0	O K
10080 min Summer	7.049	0.549	0.0	1.7	1.7	8.0	O K
15 min Winter	7.249	0.749	0.0	33.3	33.3	11.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	16.5	16			
30 min Summer	39.673	0.0	26.0	23			
60 min Summer	26.745	0.0	37.6	38			
120 min Summer	17.385	0.0	51.1	68			
180 min Summer	13.417	0.0	60.3	98			
240 min Summer	11.137	0.0	67.6	128			
360 min Summer	8.542	0.0	78.8	188			
480 min Summer	7.068	0.0	87.7	246			
600 min Summer	6.098	0.0	95.2	306			
720 min Summer	5.403	0.0	101.6	368			
960 min Summer	4.463	0.0	112.7	484			
1440 min Summer	3.406	0.0	130.0	730			
2160 min Summer	2.598	0.0	149.9	1080			
2880 min Summer	2.144	0.0	165.6	1444			
4320 min Summer	1.634	0.0	190.3	2180			
5760 min Summer	1.346	0.0	209.9	2920			
7200 min Summer	1.158	0.0	226.2	3672			
8640 min Summer	1.024	0.0	240.5	4264			
10080 min Summer	0.923	0.0	253.2	5072			
15 min Winter	56.548	0.0	19.3	16			
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Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by						
CADS	Source Control 2017.1.2						
<u>Summary of Results for 30 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	7.266	0.766	0.0	36.3	36.3	11.3	O K
60 min Winter	7.238	0.738	0.0	31.1	31.1	10.8	O K
120 min Winter	7.193	0.693	0.0	22.1	22.1	10.2	O K
180 min Winter	7.165	0.665	0.0	17.4	17.4	9.8	O K
240 min Winter	7.145	0.645	0.0	14.5	14.5	9.5	O K
360 min Winter	7.125	0.625	0.0	11.2	11.2	9.2	O K
480 min Winter	7.115	0.615	0.0	9.4	9.4	9.0	O K
600 min Winter	7.108	0.608	0.0	8.0	8.0	8.9	O K
720 min Winter	7.103	0.603	0.0	7.1	7.1	8.8	O K
960 min Winter	7.092	0.592	0.0	5.9	5.9	8.7	O K
1440 min Winter	7.080	0.580	0.0	4.5	4.5	8.5	O K
2160 min Winter	7.070	0.570	0.0	3.5	3.5	8.3	O K
2880 min Winter	7.063	0.563	0.0	2.9	2.9	8.2	O K
4320 min Winter	7.055	0.555	0.0	2.2	2.2	8.1	O K
5760 min Winter	7.050	0.550	0.0	1.8	1.8	8.0	O K
7200 min Winter	7.046	0.546	0.0	1.5	1.5	8.0	O K
8640 min Winter	7.043	0.543	0.0	1.4	1.4	7.9	O K
10080 min Winter	7.041	0.541	0.0	1.2	1.2	7.9	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	39.673	0.0	30.0	23			
60 min Winter	26.745	0.0	43.0	38			
120 min Winter	17.385	0.0	58.1	68			
180 min Winter	13.417	0.0	68.5	98			
240 min Winter	11.137	0.0	76.5	128			
360 min Winter	8.542	0.0	89.2	190			
480 min Winter	7.068	0.0	99.1	248			
600 min Winter	6.098	0.0	107.5	308			
720 min Winter	5.403	0.0	114.7	372			
960 min Winter	4.463	0.0	127.1	488			
1440 min Winter	3.406	0.0	146.5	736			
2160 min Winter	2.598	0.0	168.7	1092			
2880 min Winter	2.144	0.0	186.4	1444			
4320 min Winter	1.634	0.0	214.1	2184			
5760 min Winter	1.346	0.0	235.9	2856			
7200 min Winter	1.158	0.0	254.3	3648			
8640 min Winter	1.024	0.0	270.2	4368			
10080 min Winter	0.923	0.0	284.4	5088			
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Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+35


Time Area Diagram


Total Area (ha) 0.224

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.074	4	8	0.075
			8	12	0.075

Cameron & Ross		Page 4
15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File A210321 - Filter Trench...			Designed by JMA Checked by				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 10 year Return Period</u>							
Half Drain Time : 8 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.146	0.646	0.0	14.6	14.6	9.5	O K
30 min Summer	7.171	0.671	0.0	18.1	18.1	9.8	O K
60 min Summer	7.175	0.675	0.0	18.8	18.8	9.9	O K
120 min Summer	7.152	0.652	0.0	15.4	15.4	9.5	O K
180 min Summer	7.134	0.634	0.0	12.9	12.9	9.3	O K
240 min Summer	7.124	0.624	0.0	11.1	11.1	9.1	O K
360 min Summer	7.113	0.613	0.0	8.9	8.9	9.0	O K
480 min Summer	7.106	0.606	0.0	7.6	7.6	8.9	O K
600 min Summer	7.098	0.598	0.0	6.6	6.6	8.8	O K
720 min Summer	7.092	0.592	0.0	5.9	5.9	8.7	O K
960 min Summer	7.083	0.583	0.0	4.9	4.9	8.5	O K
1440 min Summer	7.073	0.573	0.0	3.8	3.8	8.4	O K
2160 min Summer	7.064	0.564	0.0	2.9	2.9	8.2	O K
2880 min Summer	7.058	0.558	0.0	2.4	2.4	8.1	O K
4320 min Summer	7.051	0.551	0.0	1.9	1.9	8.0	O K
5760 min Summer	7.046	0.546	0.0	1.5	1.5	8.0	O K
7200 min Summer	7.043	0.543	0.0	1.3	1.3	7.9	O K
8640 min Summer	7.040	0.540	0.0	1.2	1.2	7.9	O K
10080 min Summer	7.038	0.538	0.0	1.1	1.1	7.9	O K
15 min Winter	7.162	0.662	0.0	16.9	16.9	9.7	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	6.7	18			
30 min Summer	23.154	0.0	12.2	24			
60 min Summer	15.530	0.0	18.8	38			
120 min Summer	10.149	0.0	26.8	68			
180 min Summer	7.867	0.0	32.4	98			
240 min Summer	6.555	0.0	36.8	128			
360 min Summer	5.058	0.0	43.7	188			
480 min Summer	4.204	0.0	49.2	248			
600 min Summer	3.641	0.0	53.9	308			
720 min Summer	3.236	0.0	58.0	368			
960 min Summer	2.686	0.0	64.9	488			
1440 min Summer	2.065	0.0	76.0	722			
2160 min Summer	1.587	0.0	88.7	1096			
2880 min Summer	1.317	0.0	98.9	1452			
4320 min Summer	1.011	0.0	115.1	2192			
5760 min Summer	0.838	0.0	127.9	2864			
7200 min Summer	0.725	0.0	138.8	3592			
8640 min Summer	0.643	0.0	148.4	4336			
10080 min Summer	0.582	0.0	156.9	4960			
15 min Winter	33.317	0.0	8.4	18			
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15 Victoria Street Aberdeen AB10 1XB				A/210321 - Cairston Road North - Filter Trench Calc			
Date 09/08/2022 File A210321 - Filter Trench...				Designed by JMA Checked by			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 10 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	7.183	0.683	0.0	20.1	20.1	10.0	O K
60 min Winter	7.169	0.669	0.0	17.9	17.9	9.8	O K
120 min Winter	7.134	0.634	0.0	12.8	12.8	9.3	O K
180 min Winter	7.120	0.620	0.0	10.2	10.2	9.1	O K
240 min Winter	7.111	0.611	0.0	8.6	8.6	8.9	O K
360 min Winter	7.099	0.599	0.0	6.6	6.6	8.8	O K
480 min Winter	7.089	0.589	0.0	5.5	5.5	8.6	O K
600 min Winter	7.082	0.582	0.0	4.8	4.8	8.5	O K
720 min Winter	7.078	0.578	0.0	4.3	4.3	8.4	O K
960 min Winter	7.071	0.571	0.0	3.6	3.6	8.3	O K
1440 min Winter	7.062	0.562	0.0	2.7	2.7	8.2	O K
2160 min Winter	7.054	0.554	0.0	2.1	2.1	8.1	O K
2880 min Winter	7.049	0.549	0.0	1.7	1.7	8.0	O K
4320 min Winter	7.043	0.543	0.0	1.3	1.3	7.9	O K
5760 min Winter	7.039	0.539	0.0	1.1	1.1	7.9	O K
7200 min Winter	7.036	0.536	0.0	1.0	1.0	7.8	O K
8640 min Winter	7.034	0.534	0.0	0.9	0.9	7.8	O K
10080 min Winter	7.032	0.532	0.0	0.8	0.8	7.8	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	23.154	0.0	14.5	24			
60 min Winter	15.530	0.0	21.9	38			
120 min Winter	10.149	0.0	30.9	68			
180 min Winter	7.867	0.0	37.1	96			
240 min Winter	6.555	0.0	42.0	126			
360 min Winter	5.058	0.0	49.8	188			
480 min Winter	4.204	0.0	56.0	250			
600 min Winter	3.641	0.0	61.2	312			
720 min Winter	3.236	0.0	65.8	368			
960 min Winter	2.686	0.0	73.6	490			
1440 min Winter	2.065	0.0	86.0	722			
2160 min Winter	1.587	0.0	100.2	1096			
2880 min Winter	1.317	0.0	111.6	1432			
4320 min Winter	1.011	0.0	129.7	2168			
5760 min Winter	0.838	0.0	144.2	2904			
7200 min Winter	0.725	0.0	156.4	3656			
8640 min Winter	0.643	0.0	167.1	4408			
10080 min Winter	0.582	0.0	176.6	5000			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0


Time Area Diagram

Total Area (ha) 0.224


Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	(ha)	From:	To:	(ha)
0	4	0.074	4	8	0.075
			8	12	0.075


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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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15 Victoria Street Aberdeen AB10 1XB			A/210321 - Cairston Road North - Filter Trench Calc				
Date 09/08/2022 File A210321 - Filter Trench...			Designed by JMA Checked by				
CADS			Source Control 2017.1.2				
<u>Summary of Results for 1 year Return Period</u>							
Half Drain Time : 18 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.033	0.533	0.0	0.8	0.8	7.8	O K
30 min Summer	7.093	0.593	0.0	6.0	6.0	8.7	O K
60 min Summer	7.112	0.612	0.0	8.7	8.7	8.9	O K
120 min Summer	7.112	0.612	0.0	8.8	8.8	9.0	O K
180 min Summer	7.106	0.606	0.0	7.6	7.6	8.9	O K
240 min Summer	7.098	0.598	0.0	6.6	6.6	8.8	O K
360 min Summer	7.087	0.587	0.0	5.4	5.4	8.6	O K
480 min Summer	7.080	0.580	0.0	4.6	4.6	8.5	O K
600 min Summer	7.076	0.576	0.0	4.1	4.1	8.4	O K
720 min Summer	7.072	0.572	0.0	3.7	3.7	8.4	O K
960 min Summer	7.066	0.566	0.0	3.1	3.1	8.3	O K
1440 min Summer	7.058	0.558	0.0	2.4	2.4	8.1	O K
2160 min Summer	7.051	0.551	0.0	1.9	1.9	8.0	O K
2880 min Summer	7.047	0.547	0.0	1.6	1.6	8.0	O K
4320 min Summer	7.041	0.541	0.0	1.3	1.3	7.9	O K
5760 min Summer	7.038	0.538	0.0	1.1	1.1	7.8	O K
7200 min Summer	7.035	0.535	0.0	0.9	0.9	7.8	O K
8640 min Summer	7.033	0.533	0.0	0.8	0.8	7.8	O K
10080 min Summer	7.031	0.531	0.0	0.7	0.7	7.7	O K
15 min Winter	7.063	0.563	0.0	2.9	2.9	8.2	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	0.7	24			
30 min Summer	13.218	0.0	3.8	28			
60 min Summer	8.918	0.0	7.7	42			
120 min Summer	5.920	0.0	12.6	68			
180 min Summer	4.641	0.0	16.1	98			
240 min Summer	3.903	0.0	18.9	128			
360 min Summer	3.055	0.0	23.5	188			
480 min Summer	2.569	0.0	27.2	248			
600 min Summer	2.246	0.0	30.4	308			
720 min Summer	2.013	0.0	33.3	368			
960 min Summer	1.694	0.0	38.3	490			
1440 min Summer	1.326	0.0	46.2	734			
2160 min Summer	1.034	0.0	55.2	1080			
2880 min Summer	0.866	0.0	62.5	1464			
4320 min Summer	0.675	0.0	74.4	2140			
5760 min Summer	0.566	0.0	84.1	2864			
7200 min Summer	0.494	0.0	92.3	3672			
8640 min Summer	0.441	0.0	99.4	4288			
10080 min Summer	0.401	0.0	105.8	5128			
15 min Winter	19.000	0.0	1.7	21			
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15 Victoria Street Aberdeen AB10 1XB				A/210321 - Cairston Road North - Filter Trench Calc			
Date 09/08/2022 File A210321 - Filter Trench...				Designed by JMA Checked by			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	7.108	0.608	0.0	8.0	8.0	8.9	O K
60 min Winter	7.116	0.616	0.0	9.6	9.6	9.0	O K
120 min Winter	7.105	0.605	0.0	7.5	7.5	8.9	O K
180 min Winter	7.093	0.593	0.0	6.0	6.0	8.7	O K
240 min Winter	7.085	0.585	0.0	5.1	5.1	8.5	O K
360 min Winter	7.075	0.575	0.0	4.0	4.0	8.4	O K
480 min Winter	7.070	0.570	0.0	3.4	3.4	8.3	O K
600 min Winter	7.065	0.565	0.0	3.0	3.0	8.2	O K
720 min Winter	7.061	0.561	0.0	2.7	2.7	8.2	O K
960 min Winter	7.056	0.556	0.0	2.3	2.3	8.1	O K
1440 min Winter	7.050	0.550	0.0	1.8	1.8	8.0	O K
2160 min Winter	7.043	0.543	0.0	1.4	1.4	7.9	O K
2880 min Winter	7.040	0.540	0.0	1.2	1.2	7.9	O K
4320 min Winter	7.035	0.535	0.0	0.9	0.9	7.8	O K
5760 min Winter	7.032	0.532	0.0	0.8	0.8	7.8	O K
7200 min Winter	7.029	0.529	0.0	0.7	0.7	7.7	O K
8640 min Winter	7.027	0.527	0.0	0.6	0.6	7.7	O K
10080 min Winter	7.025	0.525	0.0	0.5	0.5	7.7	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	5.1	27			
60 min Winter	8.918	0.0	9.5	40			
120 min Winter	5.920	0.0	15.0	68			
180 min Winter	4.641	0.0	18.9	98			
240 min Winter	3.903	0.0	22.1	128			
360 min Winter	3.055	0.0	27.2	186			
480 min Winter	2.569	0.0	31.4	248			
600 min Winter	2.246	0.0	35.0	310			
720 min Winter	2.013	0.0	38.2	368			
960 min Winter	1.694	0.0	43.7	492			
1440 min Winter	1.326	0.0	52.6	732			
2160 min Winter	1.034	0.0	62.7	1108			
2880 min Winter	0.866	0.0	70.9	1452			
4320 min Winter	0.675	0.0	84.2	2216			
5760 min Winter	0.566	0.0	95.0	2912			
7200 min Winter	0.494	0.0	104.2	3576			
8640 min Winter	0.441	0.0	112.2	4288			
10080 min Winter	0.401	0.0	119.4	5008			
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.224		
<b>Time (mins)</b>	<b>Area</b>	<b>Time (mins)</b>
<b>From: To: (ha)</b>	<b>From: To: (ha)</b>	<b>From: To: (ha)</b>
0 4 0.074	4 8 0.075	8 12 0.075
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15 Victoria Street Aberdeen AB10 1XB	A/210321 - Cairston Road North - Filter Trench Calc	
Date 09/08/2022 File A210321 - Filter Trench...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 7.500		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 150.0
Porosity	0.30	Cap Volume Depth (m) 0.000
Invert Level (m)	6.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	5.0	Number of Pipes 1
Trench Length (m)	10.0	
<u>Pipe Outflow Control</u>		
Diameter (m)	0.225	Entry Loss Coefficient 0.500
Slope (1:X)	150.0	Coefficient of Contraction 0.600
Length (m)	13.500	Upstream Invert Level (m) 7.000
Roughness k (mm)	0.600	
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**INTERNAL MEMORANDUM TO: Development & Marine Planning - Policy Advice**

Date of Consultation	30th May 2023
Response required by	20th June 2023
Planning Authority Reference	22/382/PP
Nature of Proposal (Description)	Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure
Site	Cairston Road (Land Near), Stromness, Orkney, KW16 3JS
Proposal Location Easting	326018
Proposal Location Northing	1010016
Area of application site (Metres)	4962
Supporting Documentation URL	<a href="http://planningandwarrant.orkney.gov.uk/online-applications/">http://planningandwarrant.orkney.gov.uk/online-applications/</a>  Please enter - 22/382/PP
PA Office	Development Management
Case Officer	Mr Jamie Macvie
Case Officer Phone number	01856 873535 EXT 2529
Case Officer email address	jamie.macvie@orkney.gov.uk
PA Response To	planningconsultation@orkney.gov.uk

**Comments:**

Development and Marine Planning previously assisted with pre-application advice (dated 25<sup>th</sup> November 2022), followed by an initial application response (dated 20<sup>th</sup> June 2023) which is referred to within the following comments.

1. Following submission of additional visuals of the proposed development from wider viewpoints around the North Stromness Area, we are satisfied that the proposed heights within the development do not adversely impact the surrounding area and are appropriate to this part of Stromness given the site's context and location.
2. Amendments to the internal configuration of Plot One, with the inclusion of the additional window to create more active frontage onto Cairston Road is welcomed and addresses DMP's previous comment on the need for more passive surveillance within the design.
3. The use of a permeable surface within the amended SUDS maintenance area in the south of the site is welcomed and supported.

Based on the design amendments and supporting information previous comments submitted by Development and Marine have now been satisfactorily addressed.

**Re-Consultation****INTERNAL MEMORANDUM TO: Engineering Services**

Date of Consultation	22nd August 2023
Response required by	12th September 2023
Planning Authority Reference	22/382/PP
Nature of Proposal (Description)	Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure
Site	Cairston Road (Land Near), Stromness, Orkney, KW16 3JS
Proposal Location Easting	326018
Proposal Location Northing	1010016
Area of application site (Metres)	4962
Supporting Documentation URL	<a href="http://planningandwarrant.orkney.gov.uk/online-applications/">http://planningandwarrant.orkney.gov.uk/online-applications/</a>  Please enter - 22/382/PP
PA Office	Development Management
Case Officer	Mr Jamie Macvie
Case Officer Phone number	01856 873535 EXT 2529
Case Officer email address	jamie.macvie@orkney.gov.uk
PA Response To	planningconsultation@orkney.gov.uk

Comments:

Flood Risk

Previous comments relating to flood risk were included in the OIC Roads response to 22/382/PP following consultation with OIC Engineering.

- Water quality: The proposed system is buried and therefore offers no co-benefits in terms of green space or potential for increased biodiversity and is heavily reliant upon planned inspection and maintenance. As such the system does not represent best practice for a new development.

With no information provided on the proposed vortex separator device we are not able to assess its immediate or long-term performance.

- Description of system: The proposed development does not discharge directly to the sea. It is therefore not comparable to the existing Cairston Road development which does. There are no flooding receptors between the existing Cairston Road development and the sea. In contrast, the proposed development could contribute to flooding downstream, with potential receptors including the existing Cairston Road development and the Oakdene development.

The proposed development does not discharge directly to the sea but to a surface water drainage system. The ability of that system to take flows from developments at greater than greenfield rates and volumes is unknown and the resilience of the existing system

to predicted increased flows resulting from climate change is likely to be adversely affected.

- A maintenance plan has not been provided. Comment from C&R advises that this would be provided when an overall SuDS and drainage strategy has been agreed.
- C&R comment advises that information on proposed construction phase SuDS would be provided in a surface water drainage statement [which would be provide after an overall SuDS drainage strategy had been agreed].

OIC Engineering does not consider the existing SuDS and drainage to be suitable for the reasons described above.

PW

**Re-Consultation****INTERNAL MEMORANDUM TO: Roads Services**

Date of Consultation	22nd August 2023
Response required by	12th September 2023
Planning Authority Reference	22/382/PP
Nature of Proposal (Description)	Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure
Site	Cairston Road (Land Near), Stromness, Orkney, KW16 3JS
Proposal Location Easting	326018
Proposal Location Northing	1010016
Area of application site (Metres)	4962
Supporting Documentation URL	<a href="http://planningandwarrant.orkney.gov.uk/online-applications/">http://planningandwarrant.orkney.gov.uk/online-applications/</a>  Please enter - 22/382/PP
PA Office	Development Management
Case Officer	Mr Jamie Macvie
Case Officer Phone number	01856 873535 EXT 2529
Case Officer email address	jamie.macvie@orkney.gov.uk
PA Response To	planningconsultation@orkney.gov.uk

**Comments:**

As previously advised while the formation of crossroads should generally be avoided, however in this instance to ensure adequate visibility from the access to the development site there is little option other than to create a crossroads style of junction, therefore in this instance it would be acceptable.

However, it is noted that there has been no amendment made to the footpath from the development at its junction with Cairston Road, where it was previously requested that the sections of footway should be extended to provide pedestrian crossing points. However, this is something that could be achieved by an appropriate planning condition.

D.W.

## Re-Consultation Request Notification - Engineering Services

Planning Authority Name	<b>Orkney Islands Council</b>
Date of Consultation	<b>16th January 2024</b>
Response required by	<b>6th February 2024</b>
Planning Authority Reference	<b>22/382/PP</b>
Nature of Proposal (Description)	<b>Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure</b>
Site	<b>Cairston Road (Land Near), Stromness, Orkney, KW16 3JS</b>
Site Postcode	<b>N/A</b>
Site Gazetteer UPRN	
Proposal Location Easting	<b>326018</b>
Proposal Location Northing	<b>1010016</b>
Area of application site (Metres)	<b>4962</b>
Clarification of Specific Reasons for Consultation	
Development Hierarchy Level	<b>N/A</b>
Supporting Documentation URL	<a href="http://planningandwarrant.orkney.gov.uk/online-applications/">http://planningandwarrant.orkney.gov.uk/online-applications/</a> <b>Please enter - 22/382/PP</b>
List of Available Supporting Documentation	<b>As above URL</b>
Offline Documents available?	<b>N/A</b>
Date of Validation by Planning Authority	<b>23rd November 2022</b>
Governing Legislation	TOWN AND COUNTRY PLANNING (SCOTLAND) ACTS DEVELOPMENT MANAGEMENT PROCEDURE (SCOTLAND) REGULATIONS 2013
Consultation Type	<b>Planning Permission</b>
Consultation Stage	<b>N/A</b>
Is this a re-consultation of an existing application?	<b>YES</b>
EIA Required	<b>No</b>
EIA Regulations	<b>N/A</b>
Use Class (Current)	
Use Class (Proposed)	
Does the application conform with the Structure Plan / Local Plan Land Use	
Additional Comments relating to Structure Plan / Local Plan Use	<b>N/A</b>
Transport Assessment or Travel Plan	<b>N/A</b>
Applicant Name	<b>Orkney Builders Ltd</b>
Applicant Organisation Name	
Applicant Address	<b>Orkney Builders Ltd Hatston Road Crowness</b>

	<b>Kirkwall Orkney KW15 1RG</b>
Agent Name	<b>Bracewell Stirling</b>
Agent Organisation Name	
Agent Address	<b>C/o Lisa Balnave 5 Ness Bank Inverness United Kingdom IV2 4SF</b>
Agent Phone Number	<b>N/A</b>
Agent Email Address	<b>N/A</b>
PA Office	<b>Development Management</b>
Case Officer	<b>Mr Jamie Macvie</b>
Case Officer Phone number	<b>01856 873535 EXT 2529</b>
Case Officer email address	<b>jamie.macvie@orkney.gov.uk</b>
PA Response To	<b>planningconsultation@orkney.gov.uk</b>

### Flood Risk

A peak rainfall intensity allowance matching the requirement in Version 1 of SEPA LUPS-CC1 of 35% is acceptable as we transition towards the current SEPA recommendation of 40% from Version 2 of the document.

The approach presented on Sketch 007 Option 1 - Surface Water and SuDS Layout Plan, described in correspondence J. Anderson (C&R) to P Woodward (OIC Eng) 15<sup>th</sup> Jan 2024 and summarised in Surface Water Drainage Design information is generally acceptable. However, the following points should be addressed:

- Surface water which will currently flow onto the site from adjacent land must be prevented from entering the development site and attenuated prior to discharge. Information on how this would be done is required.
- The discharge from the proposed development should be to the underground surface water system downstream from the culvert inlet screen – as discussed during the Teams meeting regarding this application on 15<sup>th</sup> November last year – and not to the ditch as indicated on Sketch 007.

Further information is required on the following:

- Filter drain construction – confirming that these are designed in accordance with The SuDS Manual 2015.
- It is understood from the meeting on 15<sup>th</sup> November that the surface water drainage system would remain private and that maintenance of the surface water system would be by factors. Information on the type and frequency of the maintenance proposed is required.

PW



**210321**

**Orkney Builders  
Cairston Road North  
Stromness**

**Responses to OIC Engineering Comments, received on 04/03/24**

The following document provides responses to the specific comments received from OIC engineering in relation to the surface water design proposals and calculations submitted for review on 15/01/24.

**Comment 1**

Surface water which will currently flow onto the site from adjacent land must be prevented from entering the development site and attenuated prior to discharge. Information on how this would be done is required.

**Response 1**

C+R has carried out a review of the areas of land out-with the proposed site boundary to assess which, if any, of these areas may drain towards the proposed development site.

In carrying out this assessment C+R has utilised the 3D topographical survey of the development site, which includes some of the area out-with the development boundary to the northwest of the site. Using 3D design software, C+R can generate overland flow arrows on the 3D topo survey, which show the direction of overland flow based on the as-surveyed levels and contours.

We do not have any survey levels for the area to the north of the development site, where the existing property boundaries meet the Cairston Road North boundary. However, we are aware that these existing properties have a retaining wall along their southern boundary, with the high side of the wall being on the side for the existing properties. The retaining walls should be constructed with drainage to the rear of the walls, therefore preventing any run-off from these properties entering the Cairston Road North site.

The area to the northwest of the development site, currently open fields, has been partially surveyed. An analysis of the overland flow arrows has been carried out by C+R using the 3D topo survey information, as described in the 2<sup>nd</sup> paragraph, above. The results of the analysis show that surface water run-off from the adjacent field is running past the northwestern boundary of the site, towards the existing properties along the western boundary of the Cairston Road North development, rather than flowing towards the development.

C+R have created a drawing, 210321-000-CAM-DR-C-260, which shows the overland flow arrows based on the 3D topo survey levels and contours. The aforementioned drawing has been submitted with this response.

**Comment 2**

The discharge from the proposed development should be to the underground surface water system downstream from the culvert inlet screen – as discussed during the Teams meeting regarding this application on 15th November last year – and not to the ditch as indicated on Sketch 007.

**Response 2**

James Anderson from C+R discussed the above comment with Peter Woodward from OIC Engineering on 05/03/24. Peter agreed that as there were no existing manholes or chamber on the line of the 600mm culvert to connect into, he would be satisfied for the proposed outfall headwall to discharge directly to the existing ditch, as shown on C+R Drg. 210321-000-CAM-DR-C-400 – Rev H.

Peter confirmed this conversation via email on 06/03/24, with the planning department in copy.

**Comment 3**

Filter drain construction – confirming that these are designed in accordance with The SuDS Manual 2015.

**Response 3**

C+R can confirm that all SuDS components, including the filter drains, pervious paving and the cellular attenuation tank, will be constructed in accordance with the recommendations and guidance within CIRIA C753, The SuDS Manual – 2015.

**Comment 4**

It is understood from the meeting on 15th November that the surface water drainage system would remain private and that maintenance of the surface water system would be by factors. Information on the type and frequency of the maintenance proposed is required.”

**Response 4**

As stated above, due to the design of the surface water drainage system, which meets the requirements of OIC Engineering, the entire system including pipework, SuDS components and attenuation tanks, will need to remain private, as Scottish Water or OIC would not adopt such a system.

The in-curtilage SuDS measures, i.e. the pervious pavements, will be the responsibility of the individual property owners to inspect and maintain, or to appoint a responsible person to do this on their behalf. An operation and maintenance guidance schedule has been provided in Appendix H of the Drainage Report submitted with this response (Report No: 210321-000-CAM-RP-C-001). The operation and maintenance schedule is in accordance with the guidance in CIRIA C753, The SuDS Manual.

The surface water drainage system outwith the plot curtilages will be maintained by a suitably qualified factor, to be appointed by Orkney Builders. The factor will be responsible for the surface water sewer pipes, the SuDS filter drains, the cellular attenuation and all inlet and outlet chamber, headwalls and orifices associated with the surface water drainage network.

As with the private SuDS devices, C+R has provided operation and maintenance schedules for the SuDS filter drains and cellular storage area within Appendix H of the Drainage Report submitted with this response (Report No: 210321-000-CAM-RP-C-001). The operation and maintenance schedules are in accordance with the guidance in CIRIA C753, The SuDS Manual.

Orkney Builders will arrange for legal agreements to be put in place to ensure that the aforementioned maintenance regimes are implemented and the burden on maintenance is clear and falls on the relevant parties.

**End of response**

JMA – 07/03/24

**Drainage Report**  
Cairston Road North, Stromness



prepared for

**Orkney Builders**


210321-000-CAM-RP-C-001 – March 2024

## Document Issue Record

Revision	Description	Issued by	Checked by	Date
-	Initial Issue	J. Anderson	R. Gibb	07/03/24

This report has been prepared for the sole benefit, use, and information for the client. The liability of Cameron + Ross with respect to the information contained in the report will not extent to any third party.

## Authorisation Record

Author		Signature	Date
Name:	James Anderson		07/03/24
Position:	Engineer		

Approver		Signature	Date
Name:	Russell Gibb		07/03/24
Position:	Director		

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## Appendices

Appendix A – Location Site Plan.

Appendix B – Extract of Scottish Water GIS.

Appendix C – SEPA Flood Map.

Appendix D – Development Layout Plan.

Appendix E – Drainage Layout Plan.

Appendix F – Pre & Post Development Greenfield Run-off Calculations.

Appendix G – Surface Water SuDS Calculations (M1 to M200 + 35% Results).

Appendix H – SuDS Operation and Maintenance Guidance.

## 1. Introduction

- 1.1 Cameron + Ross have been appointed by Orkney Builders to prepare a Drainage Statement in support of a planning application for the development of 10 domestic properties at Cairston Road, Stromness, Orkney. The application consists of the 10 proposed domestic properties, along with access roads, individual plot driveways, and associated surface water and foul drainage infrastructure.
- 1.2 This Drainage Statement concentrates on the drainage infrastructure for the development and considers the appropriate drainage proposals in accordance with the following documents.
- Water Assessment & Drainage Assessment Guide – A guidance document for developers, planners and others involved in water & drainage, produced by SEPA on behalf of the Sustainable Urban Drainage Scottish Working Party (SUDSWP), January 2016.
  - Planning Advice Note (PAN) 61: Planning and Sustainable Urban Drainage Systems, issued by the Scottish Executive Development Department, July 2001.
  - The SUDS Manual – (CIRIA C753), Published 2015.
  - Sewers for Scotland, Fourth Edition, October 2018, published by WRc plc.
  - The Water Environment (Controlled Activities) (Scotland) Regulations.
- 1.3 This report will establish the suitability of the site for development and identify the drainage principles in recognition of the aforementioned documents to satisfy source control, conveyance, attenuation, treatment, and enhanced amenity.

## 2. Site Description

- 2.1 The proposed development site extends to approximately 0.49 hectares. The development site is currently greenfield agricultural land.
- 2.2 The development site is located on the north side of Cairston Road, Stromness, Orkney. The approximate site centre co-ordinates are: 326013N, 1010013N (HY 26013 10013).

*Refer to Location Site Plan in Appendix A of this report.*

- 2.3 There is an existing 150mm diameter public combined sewer within the Cairston Road North development boundary. This existing sewer provides adequate opportunity to connect the foul waste from the development to a public sewerage network. However, the line of the existing combined sewer will require to be amended to suit the alignment of the proposed development roads, and the existing property connections from the 3 properties to the north of the development site will require to be altered to connect into the diverted combined sewer. There are no suitable surface water sewers within the immediate vicinity of the development site, therefore alternative methods of draining surface water run-off from the development have been investigated.

*Refer to Location Site Plan in Appendix A of this report.*

*Refer to extract of Scottish Water GIS in Appendix B of this report.*

## 3. Site Investigation

- 3.1 No intrusive site investigations have been carried out on this site. However, an appraisal of the Wallingford Maps has been undertaken to establish likely site conditions. The appraisal of the Wallingford Maps provided the following information:

SAAR = 1,050

M5-60 rainfall depth = 13mm



M5-60 ratio  $R = 0.25$

Soil Index = 0.5

## 4. Development Proposals

- 4.1 The proposed development comprises a total of 10 private domestic dwellings. An adoptable access road is to be constructed to serve all 10 properties, with 8 properties served directly off the proposed adoptable access road. Two of the properties, Plots 2 & 3, will be served off a private access driveway which connects to the proposed adoptable public road. Plots 1 to 6 will each have their own private driveway, with Plots 7-10 served by parking bays adjacent to the adoptable access road. Appropriate surface water, SUDS and foul drainage infrastructure are required to serve the development, alongside relevant utilities, such as electricity and telecoms services.

*Refer to Development Layout Plan in Appendix D of this report.*

## 5. Foul Drainage Proposals

- 5.1 As noted under item 2.3, above, there is an existing 150mm VC public combined sewer running through the development site from northeast to southwest. The existing combined sewer accepts foul plot connections from the 3 existing properties to the north of the development site. The alignment of the existing combined sewers will require to be amended to suit the position of the proposed road carriageways, thus ensuring that the mainline sewers infrastructure is mostly located within an adoptable road. The southern end of the realigned combined sewer will require to be beneath the proposed private driveway and SuDS access area. A pipe servitude will therefore require to be agreed with Scottish Water to allow for future access and maintenance of the combined sewer within this area.
- 5.2 The 10 proposed properties will connect to the realigned adopted combined sewer via traditional gravity connections. Each property will be provided with its own disconnecting chamber and pipework to the mainline sewer.
- 5.3 No pumping of foul effluent is required for this development.

Refer to Drainage Layout Plan in Appendix E of this report.

## 6. Surface Water Drainage Proposals

- 6.1 An assessment of the pre-development greenfield run-off calculations has been undertaken. The results of the analysis are as follows:

### Pre-Development Greenfield Run-off Calculations

Total development area = 4,897m<sup>2</sup>

M1	3.7 l/s
M10	6.3 l/s
M30	8.3 l/s
M100	10.6 l/s
M200	12.2 l/s

Refer to pre & post-development run-off calculations in Appendix F of this report.

- 6.2 The proposed site is to be developed for residential use and will likely result in a low risk of contamination from surface water run-off. In accordance with SEPA's Regulatory Method (WAT-RM-08), the expected levels of treatment for roofs and roads are summarised in the table below:

**Table 1: SUDS Treatment Proposals**

Site Element	Pollutant Source	Required Treatment Level
1	Housing Roads (<50 dwellings)	Light vehicular traffic movements, one level of treatment.
2	Housing Roads (>50 dwellings)	Moderate vehicular traffic movements, two levels of treatment.
3	Commercial Parking Areas	Potential for regular Service Vehicles, two levels of treatment.
4	Roofs	One level of treatment.

- 6.3 All of the SUDS devices suggested in CIRIA's publication C753 "SUDS (Sustainable Urban Drainage Systems) Design Manual" Table 1.1, have been considered as part of the surface water drainage network for this development.

Due to the impermeability of the existing sub-soils, it is considered that SuDS infiltration devices are not suitable for use within this development site as part of any

SuDS train. Alternative methods of treating and disposing of surface water run-off have therefore been assessed.

It is proposed that the driveways for Plots 1 to 6 will be constructed with pervious block pavements. The pervious paving sub-base will be designed of sufficient depth to also allow for the roof water drainage to connect into the driveway sub-base. Each plot will have a control chamber with a simple orifice plate, restricting the outflow to the mainline surface water sewer as much as is reasonably practicable. The pervious block pavements and sub-base will provide sufficient levels of treatment for the roof and driveway run-off.

It should be noted that the pervious paving system does not allow for any infiltration into the sub-soils. This would be considered as a Type C system.

Plot 1 to 6 contributing development hard-standing areas are summarized in the table below:

Plot Number	House Roof Area (m <sup>2</sup> )	Driveway Area (m <sup>2</sup> )	Total + 10% for urban creep
1	171	40	235
2	119	37	172
3	49	45	103
4	49	50	109
5	49	41	99
6	49	36	94

Individual pervious paving calculations have been produced for each of the 6 plots, with the M1 to M200 + 35% results contained within **Appendix G** of this report.

The pervious paving calculations results are summarised in the table below:

Plot Number	M1	M10	M30 + 35%	M100 + 35%	M200 + 35%
1	0.4	0.6	0.9	1.0	1.1
2	0.4	0.6	0.8	0.9	1.0

3	0.3	0.4	0.5	0.6	0.7
4	0.3	0.4	0.5	0.6	0.7
5	0.3	0.4	0.5	0.6	0.6
6	0.3	0.4	0.5	0.6	0.6

Based on the above pervious paving calculations results, the total outflow from Plots 1 to 6 to the surface water sewers network would be 3.7 l/s in the M30 + 35% storm event, and 4.7 l/s in the M200 + 35% storm event.

- 6.4 For run-off from the development roads and footways it is proposed to treat and attenuate the surface water within road-side filter trenches. Due to the gradients of the main access road into the development, it is not feasible to drain all of the roads and footways to the road-side filter drains, therefore a further filter drain is specified at the downstream end of the surface water network, specifically to treat the section of road which cannot be discharged to the road-side filter drains on the upstream surface water network.

Rather than provide one continuous road-side filter drain, the surface water design allows for two separate filter drains, with control chambers at the downstream end of both trenches. The reason for this is that due to the access road gradients, and therefore the gradients of the base of the filter drains, the attenuation capacity within a single continuous trench would not be maximised, with the attenuated water spilling out at the downstream end, with no attenuation provided at the upstream end. Providing two shorter lengths of filter drain with a control manhole on each, allows for the attenuation capacity within each trench to be better utilised.

The proposed filter trenches, both the road-side filter trenches and the filter trench at the end of the surface water network provide a level of treatment for the roads water run-off.

The filter drain at the downstream end of the surface water network is designed to provide treatment only, as surface water run-off attenuation is provided upstream within the pervious paving areas, the road-side filter drains and the cellular attenuation area.

Individual SuDS filter drain calculations have been run for the two road-side filter drains, based on the contributing areas to those devices. The results of the filter drainage calculations including cascade results of Filter Drain 1 connecting to Filter Drain 2 can be found in **Appendix G** of this report.

The following is a summary of the filter drain designs and calculation results:

#### Road-side Filter Drain 1

- Contributing area = 740m<sup>2</sup> (*This includes the roof areas for Plots 7-10 which discharge directly into the surface water sewer upstream of Filter Drain 1*).
- Filter drain structure = 12.0m long x 1.0m wide x 1.5m deep.
- Orifice outflow control = 80mm orifice plate in Mh. S3.

Discharge results

M1	= 6.2 l/s
M10	= 9.2 l/s
M30 + 35%	= 12.5 l/s
M100 + 35%	= 14.5 l/s
M200 + 35%	= 15.8 l/s

#### Road-side Filter Drain 2

- Contributing area = 240m<sup>2</sup>
- Filter drain structure = 21.0m long x 1.0m wide x 1.5m deep.
- Orifice outflow control = 80mm orifice plate in Mh. S4.

Discharge results

M1	= 2.2 l/s
M10	= 3.8 l/s
M30 + 35%	= 6.0 l/s
M100 + 35%	= 7.3 l/s
M200 + 35%	= 8.1 l/s

The above Filter Drain 2 calculation results only account for the outflow in relation to the contributing areas directly associated with Filter Drain 2 but, do not include the total outflow when also accounting for the flows entering Filter Drain 2 from Filter Drain 1. As such, a 'cascade' calculation has been run in WinDes Source Control which allows for analysis of Filter Drain 2, including the direct contributing areas + the inflow from Filter Drain 1.

The following is a summary of the cascade results, which shows the total outflow from Filter Drain 2 (*Refer also to cascade results in Appendix G of this report*):

M1	= 7.3 l/s
----	-----------

M10 = 10.1 l/s  
 M30 + 35% = 12.8 l/s  
 M100 + 35% = 14.4 l/s  
 M200 + 35% = 15.4 l/s

At this stage of the surface water drainage design, we carried out a comparison of the pre-development greenfield run-off rates versus the design outflow rates from Filter Trench 2 + the design outflow rates from the pervious paving from Plots 1-6.

The following table details the total outflow rates from the pervious paving and road-side filter drains.

SuDS Device	M1	M10	M30 + 35%	M100 + 35%	M200 + 35%
Pervious paving	2.0	2.8	3.7	4.3	4.7
Filter Drain 2	7.3	10.1	12.8	14.4	15.4
<b>Totals</b>	<b>9.3</b>	<b>12.9</b>	<b>16.5</b>	<b>18.7</b>	<b>20.1</b>

When compared with the pre-development greenfield run-off rates shown in section 6.1 of this report, we can determine that the current design outflow rates are significantly higher than the pre-development rates. Consequently, we can conclude from these results that additional attenuation and restriction measures are required to reduce the post-development outflow rate to equal to or better than the pre-development rates for each storm event.

- 6.5 As treatment of roof and driveway water is already provided by the pervious paving driveways, and the majority of roads water run-off receives treatment through the road-side filter drains, it was determined that the further attenuation required to restrict the outflow rates would not also have to provide any treatment. For this reason, cellular attenuation crates have been specified as these provide significantly more storage volume per m<sup>2</sup> footprint area than a stone filled trench, for example. The void ratio of typical cellular storage crates is 95%, whereas the void ratio for a stone filled trench is between 30 and 35%.

The cellular storage area has therefore been designed to attenuate all flows from both the pervious paving areas, the road-side filter drains, and also from the first 30m of the adoptable road carriageway and the private access driveway, both of which have, up until this point, been excluded from the calculations due to the fact that the road gradients would not allow for these areas to drain to the road-side filter drains located upstream.

The cellular attenuation has been designed with a footprint area of 7.5m x 8.0m, with a depth of 1.20m. At 95% void ratio, this provides an overall storage volume of 68.4m<sup>3</sup>. A further control chamber is located at the downstream end of the cellular storage area, further throttling back the outflow rates from the development site.

Cascade calculations have been run in WinDes Source Control, analysing the outflow rates from the cellular attenuation area, including the flows entering the cells from all upstream areas, including the restricted flows from the pervious paving, the restricted flows from Filter Drain 2, and the unrestricted flows from the first 30m of adoptable road carriageway and the private access driveway.

The following is a summary of the cascade results for the outflow from the cellular attenuation area:

M1	= 2.9 l/s
M10	= 4.0 l/s
M30 + 35%	= 5.5 l/s
M100 + 35%	= 6.4 l/s
M200 + 35%	= 7.0 l/s

*Copies of the cellular attenuation cascade results are contained in Appendix G of this report.*

- 6.6 Comparing the pre-development greenfield run-off rates (see section 6.1) to the post-development outflow rates from the cellular storage area (see section 6.5, above), it can be determined that the post-development outflow rates are significantly lower than the pre-development rates in each of the analyses storm events. The below table provides a summary of the pre and post development outflow rates.

	M1	M10	M30	M100	M200
Pre-development Greenfield Run-off Rate	3.7	6.3	8.3	10.6	12.2
Post-development outflow rate	2.9	4.0	5.5	6.4	7.0
<b>Reduction in flow rate</b>	<b>0.8</b>	<b>2.3</b>	<b>2.8</b>	<b>4.2</b>	<b>5.2</b>

While it would have been feasible to allow for a greater post-development outflow rate to be released through the cellular attenuation control chamber (Mh.S8), it was determined that, for this development, it would be beneficial to reduce the total development outflow rate as much as possible to avoid the receiving watercourse

being inundated with the outflow from this site, hence the outflow rates have been reduced to be below the pre-development greenfield run-off rates.

- 6.7 Determining the hazard posed by the land use activities at a site can be established by using a simple index approach by allocating pollution hazard indices for the proposed land use as outlined in Table 5.1 below.

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks and housing roads.	Low	0.5	0.4	0.4
<b>Pollution Hazard index</b>	<b>Low</b>	<b>0.5</b>	<b>0.4</b>	<b>0.4</b>

Table 5.1: Pollution hazard Indices for residential land use classifications (CIRIA C753 Table 26.2)

Proposed SuDS Components for Roof & Driveway Water Run-off	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Pervious paving driveways	0.7	0.6	0.7
<b>Total Mitigation Index</b>	<b>0.7</b>	<b>0.7</b>	<b>0.7</b>

Table 5.2: Indicative SuDS mitigation indices for discharge to ground water (CIRIA C753 Table 26.3 & 26.4)

Proposed SuDS Components for Roads Water Run-off	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Filter Drains	0.4	0.4	0.4
<b>Total Mitigation Index</b>	<b>0.4</b>	<b>0.4</b>	<b>0.4</b>

Table 5.2: Indicative SuDS mitigation indices for discharge to ground water (CIRIA C753 Table 26.3 & 26.4)



- 6.8 To deliver adequate surface water treatment, the selected SuDS components suggested in Table 5.2 should have a total pollution mitigation index (for each contaminant type) that is equal to or exceeds the pollution hazard index specified in Table 5.1.

### Total SuDS Mitigation Index > Pollution Hazard Index

- 6.9 Where the mitigation index of an individual component is insufficient on its own, two components (or more) can be used in series where required. A factor of 0.5 is then used to account for the reduced performance of the secondary or tertiary components associated with the already reduced inflow concentrates. As a result, the existing SuDS components identified in table 5.2 equate to or exceed the land use pollution hazard indices, providing the required level of treatment for a development of this nature.

*Refer to Drainage Layout Plan in Appendix E this report.*

*Refer to surface water drainage calculations in Appendix G of this report.*

## 7. Assessment of Flood Risk

- 7.1 The existing site is 'greenfield' and located above the 8.00mAOD contour line, with a minimum property finished floor level of 8.745m. Access to the development will be from a new adoptable road off Cairston Road, Stromness.
- 7.2 Sources of Flood Risk: Scottish Planning Policy, February 2010 (SPP7) highlights that there are several potential sources of flooding that could impact any site, comprising:

7.3 Fluvial (originating from a watercourse), coastal, groundwater, pluvial (surface water run-off), sewers and blocked culverts.

7.4 **Groundwater Flooding:** Flooding of this nature is caused by unusually high groundwater levels or flow rates. Due to the gradient of the site and surrounding area it is not anticipated for this site to be affected by groundwater flooding.

7.5 **Coastal Flooding:** The site is located approximately 225m inland from the tidal reach of the North Sea, at an elevation of approximately 8.00mAOD, and above. SEPA's current flood maps do not indicate that this site would be at risk from coastal flooding.

*Refer to extract of SEPA's Flood Map in Appendix C of this report.*

7.6 **Fluvial Flooding:** The site lies out with the 0.5% AP (200 year) fluvial flood outline as shown on the SEPA Flood Maps. The Mill Brun is located approximately 200m to the east of the proposed development site, and whilst SEPA's flood maps do show significant flooding of the Mill Burn in the 200yr storm event, the estimated flooding does not have any impact on the proposed development.

*Refer to extract of SEPA's Flood Map in Appendix C of this report.*

7.7 **Pluvial (surface water) Flooding:** Occurs from rainfall which is ponding in localised depressions. There are no areas of pluvial flooding identified within the proposed development area on SEPA's flood maps.

*Refer to extract of SEPA's Flood Map in Appendix C of this report.*

7.8 It should be noted that the installation of the surface water drainage infrastructure and development access road will continually improve the overall site drainage. Any existing network of field drainage will inevitably be cut off by the development, therefore, should it prove necessary, these field drains will be redirected and/ or connected to a new perimeter land drain to intercept any ground water.

- 7.9 Sewers and Blocked Culverts: There are no existing public surface water sewers within close proximity to the site. There is an existing adopted combined sewer within the development boundary which will be receiving some surface water run-off. We are not aware of any historic flooding issues relating to the existing combined sewer network. There are existing culverts out-with the development site, to the southwest. One culvert 450mm and runs along Cairston Road from east to west. The other culvert is 600mm and crosses underneath Cairston Road, heading south towards the Mill Burn before discharging to the sea. The headwalls on both culverts have the potential to block if debris is caught in the trash screens. It is therefore essential that regular inspections and maintenance of the trash screens are undertaken to ensure blockages do not occur or are remedied at the soonest possible time. Due to the proposed finished site levels within the development site, if the existing culverts were to block, it is very unlikely that the proposed development site would flood, with any flood water likely to run west along Cairston Road.
- 7.10 Flood Summary: with reference to the extract of SEPA's current flood map for the Cairston Road area in *Appendix C* of this report, there is no anticipated flood risk to the proposed development site from fluvial, pluvial or coastal flooding.
- 7.11 It will be important to manage the installation of new drainage measures including re-directed and/or connection of new perimeter land drains to intercept any ground water.
- 7.12 To this end the development has been designed to ensure that the residual risk from flooding will be low.

## 8. Future Maintenance

- 8.1 The main access roads to the development will be offered for adoption by Orkney Islands Council.

- 8.2 The proposed surface water infrastructure for each property, including rainwater pipework and SuDS components, i.e. pervious pavements, will be maintained by the individual property owners. To ensure that each SuDS component operates optimally, a detailed maintenance regime should be established to ensure regular inspection of the SuDS devices and associated chambers. C+R provides such operation and maintenance guidance in *Appendix H* of this report, detailing the frequency of inspections and the remedial actions to be implemented.
- 8.3
- 8.4 The surface water infrastructure out-with the plot curtilages, including the surface water pipework, road-side filter drains, and cellular attenuation will be private. A factoring agreement will be set up by the developer to ensure that the surface water system, including the relevant SuDS components, are inspected at regular intervals and, where necessary, remedial works carried out. C+R provides such operation and maintenance guidance in *Appendix H* of this report, detailing the frequency of inspections and the remedial actions to be implemented.
- 8.5 The foul sewerage infrastructure from the plot disconnection chambers to the mainline sewer, and the realigned combined sewer will be put forward for adoption by Scottish Water.

## 9. Construction Phase

- 9.1 The measures for controlling surface water run-off will be continually reviewed in line with each stage of construction by the groundwork's contractor, and any influencing factors should generally consider the following measures:

### Control:

- 9.2 The contractor should give consideration, in the main, to surface water run-off during and after topsoil strip, as well as after re-grading of the land during site construction. Stripping of topsoil and vegetation is to be limited, wherever possible, and undertaken just prior to the construction of that area. This is to provide a means

of reducing surface water run-off, to remove silts/fines from the water and to aid natural absorption into the soils.

### **Interception:**

- 9.3 Any existing network of field drainage that may be cut off by the development, should it prove necessary, will be redirected and / or connected to a new perimeter land drain to intercept any ground water.

### **Prevention:**

- 9.4 The installation of the drains and roadways will follow the earthworks operations continually improving the overall site drainage. It is not recommended to utilise any of the proposed SuDS components as temporary methods of attenuation or treatment of surface water run-off from the development site during construction. However, should the appointed contractor choose to do so, it is essential that these SuDS components are fully rehabilitated or reconstructed at the end of the construction works and before occupation of the properties.
- 9.5 If the construction site area exceeds 4 Hectares, it would require a Construction Site License from SEPA in accordance with Controlled Activities Regulations (CAR). However, the proposed development site only extends to approximately 0.49 Ha, so is exempt from such licensing.

## **10. Summary & Conclusions**

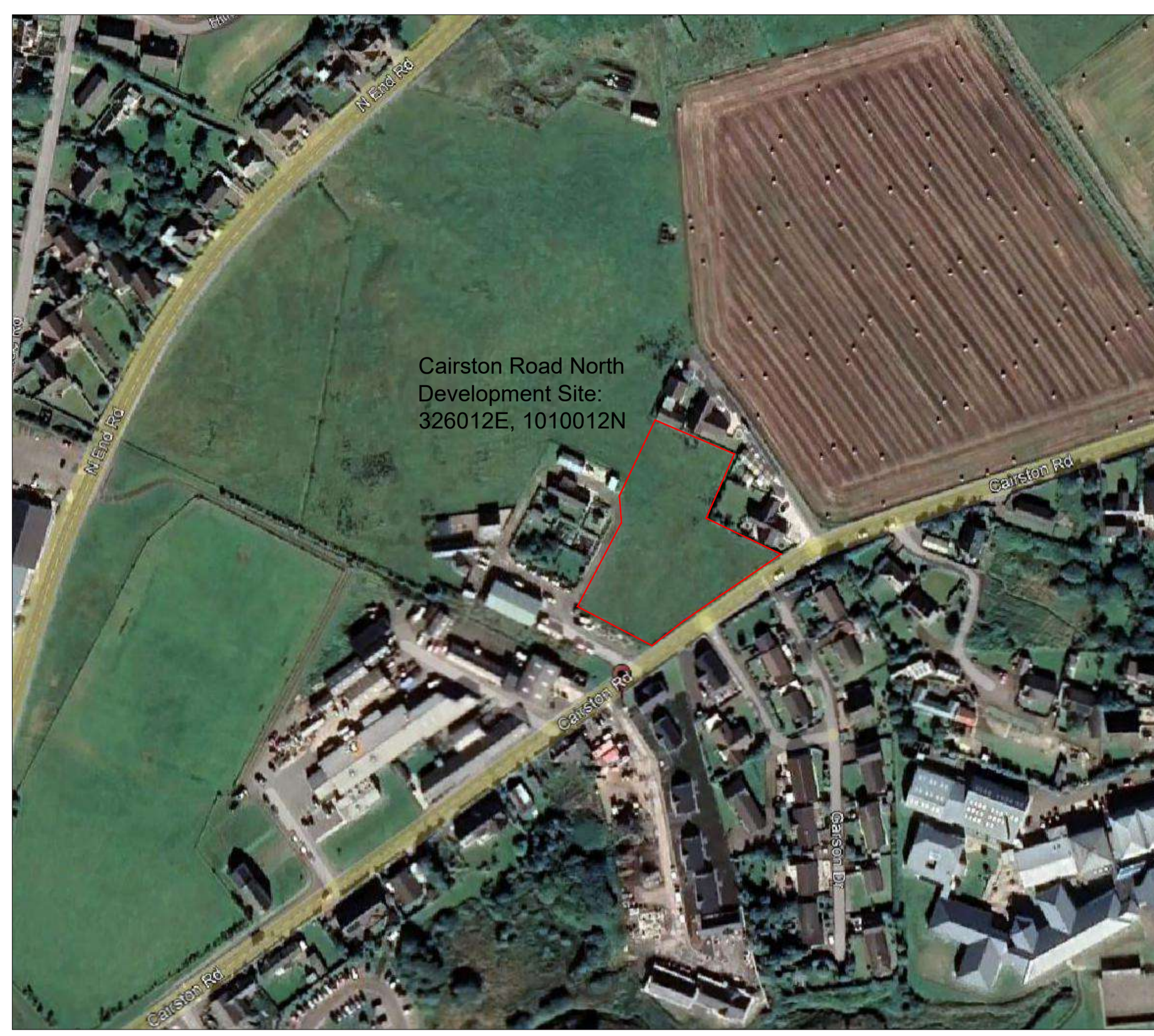
- 10.1 This Drainage Statement has been prepared in support of the proposed development to construct 10 private domestic properties and associated infrastructure on behalf of Orkney Builders.
- 10.2 The existing site characteristics, topography and natural drainage patterns have been reviewed and suitable drainage proposals identified. In developing a suitable, sustainable, and robust drainage scheme for the site current best practice and relevant guidance documents have been referenced and adopted within the proposed designs.

- 10.3 The proposed foul drainage requires the existing adopted combined sewers pipe which traverses the development site to be realigned to suit the locations of the proposed development roads.
- 10.4 The proposed surface water drainage scheme consists of a number of SuDS components to both treat and attenuate the surface water run-off from the development site. Plot roof and driveway water will be treated and attenuated via pervious paving driveways with the outflow restricted to the mainline surface water sewer. The majority of roads water will be treated and attenuated in roadside filter drains, with the outflow from both filter drains restricted. Downstream of the filter drains, a cellular attenuation area is provided, attenuating all run-off from the upstream areas. The outflow from the cellular attenuation is restricted to outflow rates below the pre-development greenfield run-off rates.
- 10.5 The drainage proposals, as set out above, demonstrate that the site is suitable for the proposed development and that a sustainable drainage solution can be implemented in accordance with the relevant guidance documents and publications.



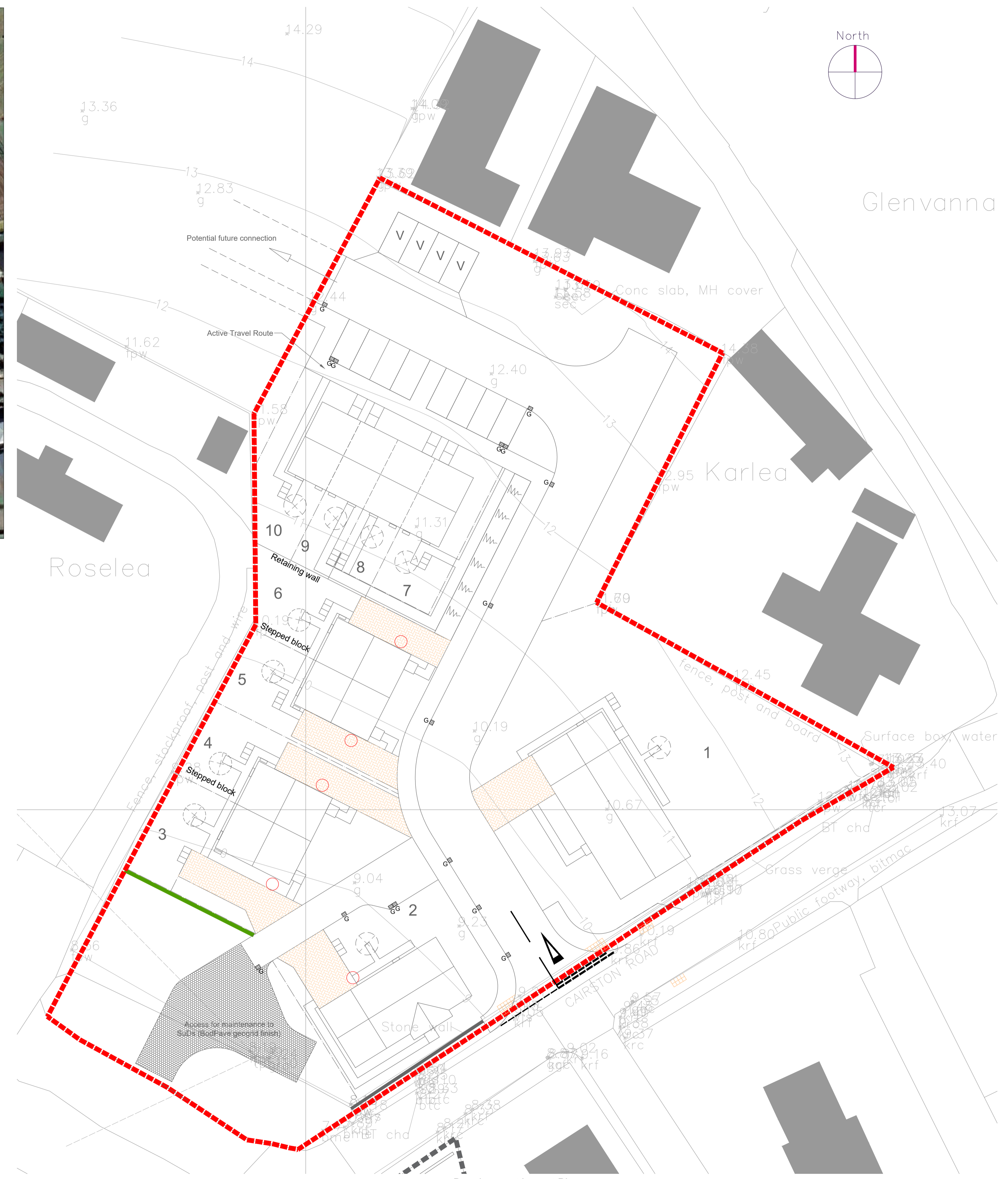
# APPENDIX A

## Development Location Plan

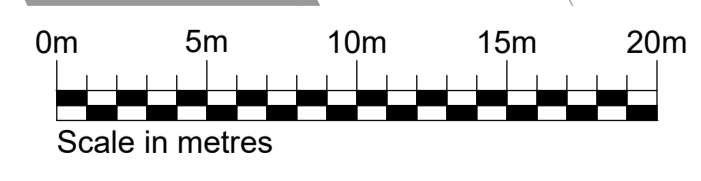
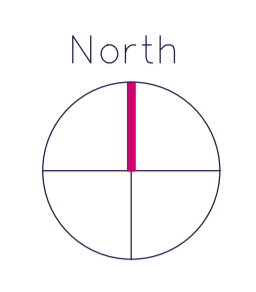


Cairston Road North  
Development Site:  
326012E, 1010012N

Development Location Plan  
(Scale 1:2000)



Development Layout Plan  
(Scale 1:250)



Issue	Revision	Initial	Date
E	Development layout updated to correspond with architects current drawings.	JMA	27/02/24
D	Development layout updated to account for alterations to position of Plot 1.	JMA	17/08/23
C	Development layout updated to correspond with amendments to SuDS maintenance track.	JMA	14/08/23
B	Development layout updated to correspond with architects current drawings.	JMA	11/01/23
A	Development layout updated to correspond with architects current drawings.	JMA	21/11/22

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T: 01463 570 100 | W: cameronross.co.uk

Client:  
Orkney Builders

Project:  
Housing Development  
Cairston Road North  
Stromness

Drawing Title:  
Location Site Plan

Status:  
Planning

Scale: 1:250 @ A1 | Date: 08/09/22  
By: JMA | Checked: JMA | Approved: RAG

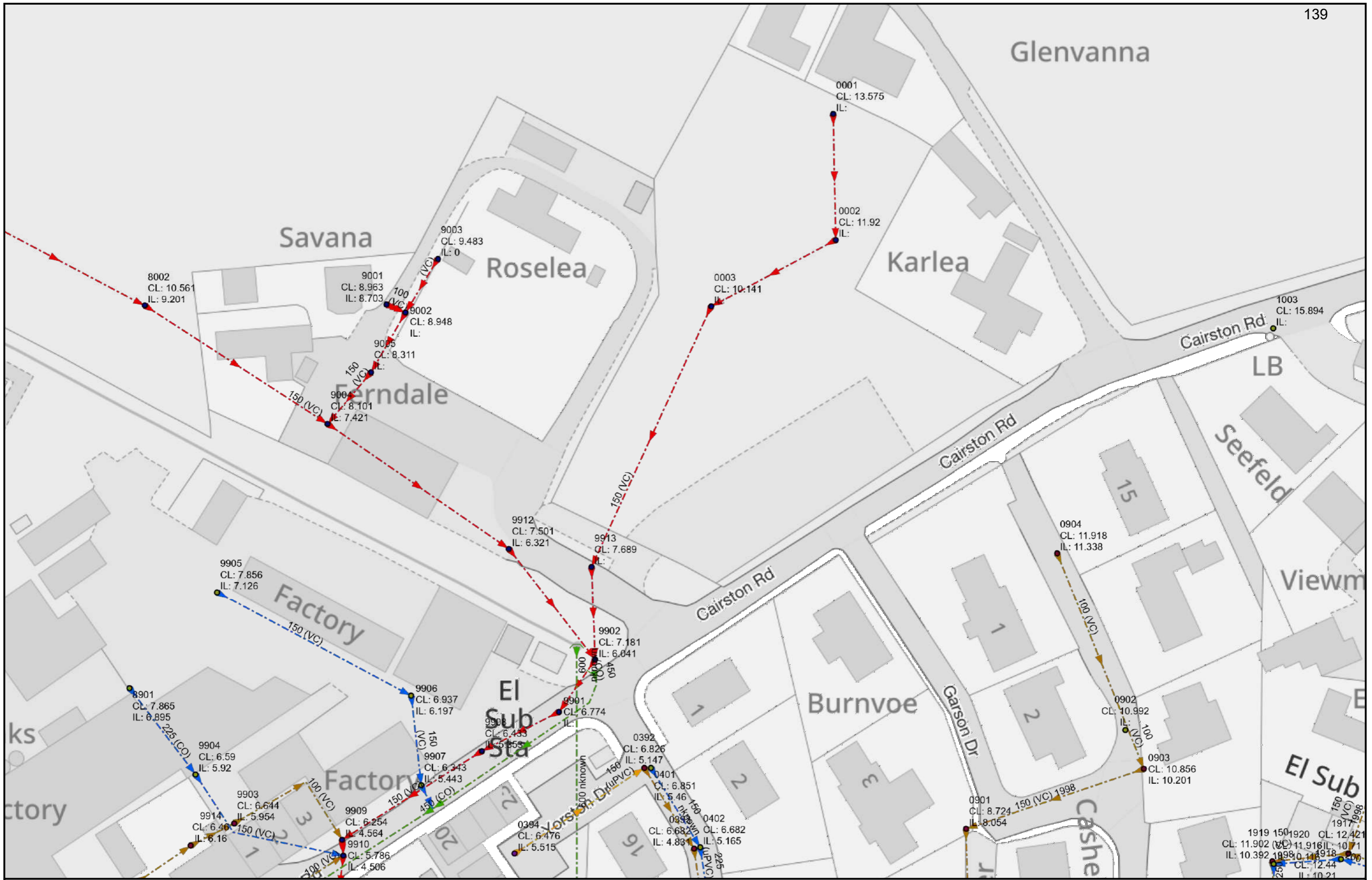
Dwg. No. 210321-000-CAM-DR-C-001 | Rev. E





## **APPENDIX B**

Extract of Scottish Water GIS



Warning! Damaging a large diameter trunk main (12"/300mm and above) can result in loss of life and major water supply and water quality problems. If you're planning any extension work in the vicinity of any large diameter mains shown on our maps, you must contact Scottish Water to arrange a site visit 08000 778 778 WELL IN ADVANCE OF THE WORKS

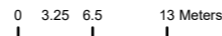
Plotted By: Jmanderson@cameronross.co.uk



The representation of physical assets and the boundaries of areas in which Scottish Water and others have an interest does not necessarily imply their true positions. For further details contact the appropriate District office.

Date: 06/03/2024

### Cairston Road Sewers



SCALE: 1:661

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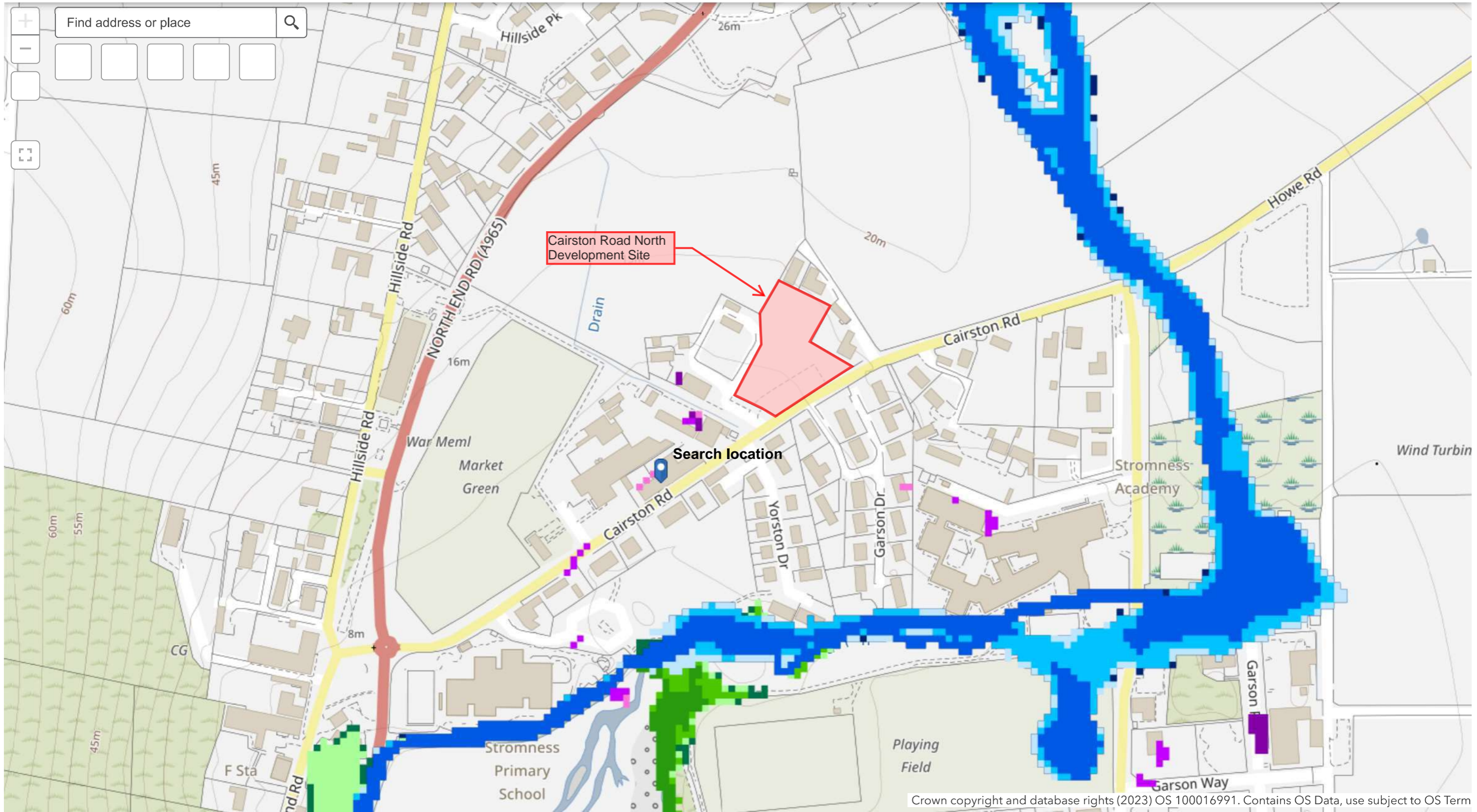


Tel No: 08000 778 778



## **APPENDIX C**

SEPA Flood Map





## **APPENDIX D**

### Development Layout Plan



**Housing Mix:**

4	2BV	2 bed villa
4	3BV	3 bed villa
1	2BB	2 bed bungalow
1	3BB	3 bed bungalow
<b>10 Overall Total</b>		

- Key:**
- Application boundary
  - - - - Plot division line
  - - - - Retaining wall
  - Existing stone wall retained
  - Proposed hedging
  - Proposed roadway
  - Proposed footpaths
  - Private gardens
  - Amenity space
  - Proposed shrub mix
  - Proposed Trees
  - A ASHP position
  - Bin stance area
  - Rotary clothes dryer

**EV Charging:**

(E) Indicative in-curtilage EV charging point location

**In-Curtilage EV Charging Provision**

Provision for up to 7kW Electric Car Charging in accordance with Approved Document P: Electrical safety – dwellings, Electricity at Work Regulations HSR25, BS7671:18th edition (2018) and the IET Code of Practice for EV Charging. External socket device to come complete with isolation switch and be suitable for upgrading in the future to a fast-charge device. External socket device to have a dedicated supply from the consumer unit, be certified for continuous load and suitably earthed. External socket device to be located 1.1m above finished ground level.)

REV	DATE	DESCRIPTION	DRN
A	20.02.24	FFL'S ADDED.	LMid

**Bracewell Stirling CONSULTING**

38 WALKER TERRACE, TILlicouLTRY, FK13 6EF 01259 750301  
 5 NESS BANK, INVERNESS, IV2 4SF 01463 233760  
 15 LOCHSIDE STREET, OBAN, PA34 4HP 01631 359054

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**PROPOSED HOUSING DEVELOPMENT  
 CAIRSTON ROAD NORTH, STROMNESS  
 ORKNEY BUILDERS LTD**

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**PROPOSED SITE LAYOUT**

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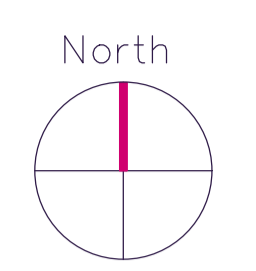
**STATUS: BUILDING WARRANT**

SCALE:	1 : 500	DRAWN:	LM
PAPER SIZE:	A3	DATE:	Feb 2024
DWG No.	<b>4765-02-050</b>		REV. <b>A</b>



## **APPENDIX E**

### Drainage Layout Plan



- DRAINAGE NOTES:**
- Invert levels of existing sewer manholes extracted from Scottish Waters GIS data. All invert levels to be checked on site prior to construction.
  - Surface water & foul sewers infrastructure to be constructed in accordance with the relevant sections of Scottish Water document, 'Sewers for Scotland, 4th Edition'.
  - Construction & maintenance of SuDS devices to comply with the relevant sections of CIRIA C753 'The SuDS Manual'.
  - Unreinforced and reinforced concrete pipes & fittings shall comply with the relevant provisions of BS EN 1916 & BS EN 5911-1.
  - uPVC pipes, joints & fittings for gravity sewers shall comply with the relevant provisions of BS 4660 and BS EN 1401-1.
  - Pre-cast concrete manhole units for manholes, chambers and wet wells shall comply with the relevant provisions of BS EN 1917 & BS 5911-3.
  - Pre-cast concrete slabs and cover frame seating rings shall comply with the relevant provisions of BS EN 1917 and BS 5911-3.
  - Manhole covers & frames shall comply with the relevant provisions of BS EN 124, BS 7903 and the 'Design Manual for Roads & Bridges: HA/104/09 Geotechnics & Drainage: Chamber Tops & Gully Tops for Road Drainage & Services: Installation & Maintenance'.
  - As a Minimum, Class D400 covers shall be used in carriageways of Roads (including pedestrian streets), hard shoulders and parking areas.
  - Class B125 covers shall be used in footways, pedestrian areas and comparable locations.
  - No planting should occur within 2.0m of the filter trenches to ensure that no root penetration takes place.
  - Grasses planted within adoptable roads water swales should be maintained at a length of between 75mm -150mm to ensure performance during regular events (Refer to CIRIA Document, The SuDS Manual, C753, Section 17.10 - Landscape Design & Planting).

- LEGEND:**
- Surface Water Sewers (New)
  - Combined Sewers (New)
  - Combined Sewers (Existing) to be diverted
  - Proposed SuDS Filter Trench
  - Pervious block paving driveways. (Treatment and attenuation for driveway and roof water for each plot).
  - Cellular attenuation area

Issue	Revision	Initial	Date
H	Surface water drainage design amended to suit the requirements of OIC engineering.	JMA	06/03/24
G	Development layout updated to correspond with architects current drawings.	JMA	27/02/24
F	Drainage layout updated to show existing property connections connecting to proposed new combined sewers.	JMA	22/08/23

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 01463 370 100 | w: cameronross.co.uk

Client:	Orkney Builders
Project:	Housing Development Cairston Road North Stromness
Drawing Title:	Drainage Layout Plan
Status:	APPROVAL
Scale:	1:250 @ A1
Date:	08/09/22
By:	JMA
Checked:	JMA
Approved:	RAG
Dwg. No.	210321-000-CAM-DR-C-400
Rev.	H





## **APPENDIX F**

### Pre & Post Development Greenfield Run-off Calculations

## CALCULATION

Calculation **Pre & Post Development Site Run-Off Calculation**  
 Contract **Housing Development - Cairston Road North, Stromness**

Sheet No.	4
Contract No.	A/210321
Date	28/06/2022
Designer	JMA

Site Area, Total **4897 m<sup>2</sup>** **0.4897 ha**  
**0.5 km<sup>2</sup>** (min. 0.5km)

SAAR **1050 mm** From Wallingford Vol 3  
 Annual Rainfall Chart

Soil Type **5**  
 SOIL (Soil Index) **0.50**

Flow offsite, QBAR rural =  $0.00108 \times \text{AREA}^{0.89} \times \text{SAAR}^{1.17} \times \text{SOIL}^{2.17}$

= **443.67 l/sec**

Therefore QBAR rural / ha = **8.87 l/sec/ha** **4.3 l/sec** for this site

*Equivalent 1, 30, 100 and 200 year throttle rates applicable for hydrological growth curve 1 for North Scotland*

1 year factor **0.85**  
 10 year factor **1.45**  
 30 year factor **1.90**  
 100 year factor **2.45**  
 200 year factor **2.80**

Therefore greenfield limiting discharge rates are:

1 year factor	7.54	l/sec/ha	<b>3.7</b>	l/sec for this site
10 year factor	12.87	l/sec/ha	<b>6.3</b>	l/sec for this site
30 year factor	16.86	l/sec/ha	<b>8.3</b>	l/sec for this site
100 year factor	21.74	l/sec/ha	<b>10.6</b>	l/sec for this site
200 year factor	24.85	l/sec/ha	<b>12.2</b>	l/sec for this site

### Post-development Run-off Calculation


Total Impermeable Area = **2326 m<sup>2</sup>** **0.2 ha**

**Hardstanding covers 47.5 % of site**


Allowable 30yr Post-development Run-off = **3.9 l/sec**

## **APPENDIX G**

Surface Water SuDS Calculations  
M1 to M200 + 35% Results, including  
Cascade results

Cameron & Ross						Page 1	
15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 1 Pervious Paving				
Date 06/03/2024 File 210321 - Plot 1 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 1 year Return Period</u>							
Half Drain Time : 19 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.087	0.087	0.0	0.4	0.4	0.5	O K
30 min Summer	9.105	0.105	0.0	0.4	0.4	0.7	O K
60 min Summer	9.118	0.118	0.0	0.4	0.4	0.8	O K
120 min Summer	9.119	0.119	0.0	0.4	0.4	0.8	O K
180 min Summer	9.114	0.114	0.0	0.4	0.4	0.8	O K
240 min Summer	9.107	0.107	0.0	0.4	0.4	0.7	O K
360 min Summer	9.095	0.095	0.0	0.4	0.4	0.6	O K
480 min Summer	9.085	0.085	0.0	0.4	0.4	0.5	O K
600 min Summer	9.077	0.077	0.0	0.3	0.3	0.4	O K
720 min Summer	9.070	0.070	0.0	0.3	0.3	0.4	O K
960 min Summer	9.059	0.059	0.0	0.3	0.3	0.3	O K
1440 min Summer	9.046	0.046	0.0	0.2	0.2	0.2	O K
2160 min Summer	9.036	0.036	0.0	0.2	0.2	0.1	O K
2880 min Summer	9.032	0.032	0.0	0.2	0.2	0.1	O K
4320 min Summer	9.027	0.027	0.0	0.1	0.1	0.1	O K
5760 min Summer	9.024	0.024	0.0	0.1	0.1	0.1	O K
7200 min Summer	9.022	0.022	0.0	0.1	0.1	0.0	O K
8640 min Summer	9.021	0.021	0.0	0.1	0.1	0.0	O K
10080 min Summer	9.020	0.020	0.0	0.1	0.1	0.0	O K
15 min Winter	9.097	0.097	0.0	0.4	0.4	0.6	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	0.7	15			
30 min Summer	13.218	0.0	1.0	24			
60 min Summer	8.918	0.0	1.5	42			
120 min Summer	5.920	0.0	2.0	76			
180 min Summer	4.641	0.0	2.4	108			
240 min Summer	3.903	0.0	2.7	140			
360 min Summer	3.055	0.0	3.1	202			
480 min Summer	2.569	0.0	3.5	264			
600 min Summer	2.246	0.0	3.9	324			
720 min Summer	2.013	0.0	4.2	384			
960 min Summer	1.694	0.0	4.7	502			
1440 min Summer	1.326	0.0	5.5	738			
2160 min Summer	1.034	0.0	6.4	1100			
2880 min Summer	0.866	0.0	7.2	1468			
4320 min Summer	0.675	0.0	8.4	2176			
5760 min Summer	0.566	0.0	9.3	2864			
7200 min Summer	0.494	0.0	10.1	3632			
8640 min Summer	0.441	0.0	10.8	4376			
10080 min Summer	0.401	0.0	11.4	5008			
15 min Winter	19.000	0.0	0.8	15			
©1982-2017 XP Solutions							

Cameron & Ross		Page 2					
15 Victoria Street Aberdeen AB10 1XB		210321 - Cairston Road North Plot 1 Pervious Paving					
Date 06/03/2024 File 210321 - Plot 1 Pervi...		Designed by JMA Checked by JMA					
CADS		Source Control 2017.1.2					
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (1/s)</b>	<b>Max Control (1/s)</b>	<b>Max Σ Outflow (1/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	9.117	0.117	0.0	0.4	0.4	0.8	O K
60 min Winter	9.128	0.128	0.0	0.4	0.4	0.9	O K
120 min Winter	9.124	0.124	0.0	0.4	0.4	0.8	O K
180 min Winter	9.113	0.113	0.0	0.4	0.4	0.8	O K
240 min Winter	9.102	0.102	0.0	0.4	0.4	0.7	O K
360 min Winter	9.084	0.084	0.0	0.3	0.3	0.5	O K
480 min Winter	9.071	0.071	0.0	0.3	0.3	0.4	O K
600 min Winter	9.061	0.061	0.0	0.3	0.3	0.3	O K
720 min Winter	9.054	0.054	0.0	0.3	0.3	0.3	O K
960 min Winter	9.044	0.044	0.0	0.2	0.2	0.2	O K
1440 min Winter	9.034	0.034	0.0	0.2	0.2	0.1	O K
2160 min Winter	9.029	0.029	0.0	0.1	0.1	0.1	O K
2880 min Winter	9.026	0.026	0.0	0.1	0.1	0.1	O K
4320 min Winter	9.022	0.022	0.0	0.1	0.1	0.0	O K
5760 min Winter	9.020	0.020	0.0	0.1	0.1	0.0	O K
7200 min Winter	9.018	0.018	0.0	0.1	0.1	0.0	O K
8640 min Winter	9.017	0.017	0.0	0.1	0.1	0.0	O K
10080 min Winter	9.016	0.016	0.0	0.1	0.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	1.2	25			
60 min Winter	8.918	0.0	1.7	44			
120 min Winter	5.920	0.0	2.2	80			
180 min Winter	4.641	0.0	2.7	114			
240 min Winter	3.903	0.0	3.0	146			
360 min Winter	3.055	0.0	3.5	210			
480 min Winter	2.569	0.0	4.0	272			
600 min Winter	2.246	0.0	4.4	332			
720 min Winter	2.013	0.0	4.7	390			
960 min Winter	1.694	0.0	5.3	508			
1440 min Winter	1.326	0.0	6.2	726			
2160 min Winter	1.034	0.0	7.2	1064			
2880 min Winter	0.866	0.0	8.1	1436			
4320 min Winter	0.675	0.0	9.4	2184			
5760 min Winter	0.566	0.0	10.5	2896			
7200 min Winter	0.494	0.0	11.4	3576			
8640 min Winter	0.441	0.0	12.2	4416			
10080 min Winter	0.401	0.0	12.8	5016			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram


Total Area (ha) 0.024


Time (mins)		Area
From:	To:	(ha)
0	4	0.024

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.800		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 4.0
Membrane Percolation (mm/hr)	1000	Length (m) 7.0
Max Percolation (l/s)	7.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	9.000	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.000		
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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Plot 1 Pervious Paving			
Date 06/03/2024 File 210321 - Plot 1 Perviou...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 10 year Return Period</u>							
Half Drain Time : 29 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.153	0.153	0.0	0.5	0.5	1.1	O K
30 min Summer	9.187	0.187	0.0	0.5	0.5	1.4	O K
60 min Summer	9.212	0.212	0.0	0.6	0.6	1.6	O K
120 min Summer	9.220	0.220	0.0	0.6	0.6	1.6	O K
180 min Summer	9.212	0.212	0.0	0.6	0.6	1.6	O K
240 min Summer	9.202	0.202	0.0	0.6	0.6	1.5	O K
360 min Summer	9.182	0.182	0.0	0.5	0.5	1.3	O K
480 min Summer	9.163	0.163	0.0	0.5	0.5	1.2	O K
600 min Summer	9.147	0.147	0.0	0.5	0.5	1.0	O K
720 min Summer	9.134	0.134	0.0	0.5	0.5	0.9	O K
960 min Summer	9.113	0.113	0.0	0.4	0.4	0.8	O K
1440 min Summer	9.085	0.085	0.0	0.4	0.4	0.5	O K
2160 min Summer	9.062	0.062	0.0	0.3	0.3	0.3	O K
2880 min Summer	9.049	0.049	0.0	0.2	0.2	0.2	O K
4320 min Summer	9.036	0.036	0.0	0.2	0.2	0.1	O K
5760 min Summer	9.031	0.031	0.0	0.2	0.2	0.1	O K
7200 min Summer	9.028	0.028	0.0	0.1	0.1	0.1	O K
8640 min Summer	9.026	0.026	0.0	0.1	0.1	0.1	O K
10080 min Summer	9.025	0.025	0.0	0.1	0.1	0.1	O K
15 min Winter	9.172	0.172	0.0	0.5	0.5	1.2	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	1.4	16			
30 min Summer	23.154	0.0	1.9	26			
60 min Summer	15.530	0.0	2.7	44			
120 min Summer	10.149	0.0	3.5	78			
180 min Summer	7.867	0.0	4.1	112			
240 min Summer	6.555	0.0	4.6	144			
360 min Summer	5.058	0.0	5.3	208			
480 min Summer	4.204	0.0	5.9	270			
600 min Summer	3.641	0.0	6.4	332			
720 min Summer	3.236	0.0	6.8	392			
960 min Summer	2.686	0.0	7.5	512			
1440 min Summer	2.065	0.0	8.7	752			
2160 min Summer	1.587	0.0	10.0	1104			
2880 min Summer	1.317	0.0	11.1	1468			
4320 min Summer	1.011	0.0	12.7	2200			
5760 min Summer	0.838	0.0	14.0	2920			
7200 min Summer	0.725	0.0	15.1	3664			
8640 min Summer	0.643	0.0	16.0	4304			
10080 min Summer	0.582	0.0	16.9	4992			
15 min Winter	33.317	0.0	1.5	16			
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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Plot 1 Pervious Paving			
Date 06/03/2024 File 210321 - Plot 1 Perviou...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 10 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (1/s)</b>	<b>Max Control (1/s)</b>	<b>Max Σ Outflow (1/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	9.211	0.211	0.0	0.6	0.6	1.6	O K
60 min Winter	9.237	0.237	0.0	0.6	0.6	1.8	O K
120 min Winter	9.236	0.236	0.0	0.6	0.6	1.8	O K
180 min Winter	9.220	0.220	0.0	0.6	0.6	1.7	O K
240 min Winter	9.203	0.203	0.0	0.6	0.6	1.5	O K
360 min Winter	9.170	0.170	0.0	0.5	0.5	1.2	O K
480 min Winter	9.144	0.144	0.0	0.5	0.5	1.0	O K
600 min Winter	9.124	0.124	0.0	0.4	0.4	0.8	O K
720 min Winter	9.108	0.108	0.0	0.4	0.4	0.7	O K
960 min Winter	9.085	0.085	0.0	0.4	0.4	0.5	O K
1440 min Winter	9.059	0.059	0.0	0.3	0.3	0.3	O K
2160 min Winter	9.041	0.041	0.0	0.2	0.2	0.2	O K
2880 min Winter	9.034	0.034	0.0	0.2	0.2	0.1	O K
4320 min Winter	9.029	0.029	0.0	0.1	0.1	0.1	O K
5760 min Winter	9.025	0.025	0.0	0.1	0.1	0.1	O K
7200 min Winter	9.023	0.023	0.0	0.1	0.1	0.0	O K
8640 min Winter	9.022	0.022	0.0	0.1	0.1	0.0	O K
10080 min Winter	9.020	0.020	0.0	0.1	0.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	23.154	0.0	2.2	28			
60 min Winter	15.530	0.0	3.0	46			
120 min Winter	10.149	0.0	3.9	84			
180 min Winter	7.867	0.0	4.6	118			
240 min Winter	6.555	0.0	5.1	152			
360 min Winter	5.058	0.0	6.0	218			
480 min Winter	4.204	0.0	6.6	280			
600 min Winter	3.641	0.0	7.2	342			
720 min Winter	3.236	0.0	7.6	404			
960 min Winter	2.686	0.0	8.5	520			
1440 min Winter	2.065	0.0	9.8	754			
2160 min Winter	1.587	0.0	11.3	1108			
2880 min Winter	1.317	0.0	12.4	1444			
4320 min Winter	1.011	0.0	14.3	2200			
5760 min Winter	0.838	0.0	15.8	2904			
7200 min Winter	0.725	0.0	17.0	3656			
8640 min Winter	0.643	0.0	18.0	4408			
10080 min Winter	0.582	0.0	19.0	5080			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram


Total Area (ha) 0.024


Time (mins)		Area
From:	To:	(ha)
0	4	0.024


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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.800		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 4.0
Membrane Percolation (mm/hr)	1000	Length (m) 7.0
Max Percolation (l/s)	7.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	9.000	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.000		
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 1 Pervious Paving				
Date 06/03/2024 File 210321 - Plot 1 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<p>Summary of Results for 30 year Return Period (+35%)</p> <p>Half Drain Time : 45 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.263	0.263	0.0	0.7	0.7	2.0	O K
30 min Summer	9.332	0.332	0.0	0.7	0.7	2.6	O K
60 min Summer	9.387	0.387	0.0	0.8	0.8	3.1	O K
120 min Summer	9.411	0.411	0.0	0.8	0.8	3.3	O K
180 min Summer	9.407	0.407	0.0	0.8	0.8	3.2	O K
240 min Summer	9.394	0.394	0.0	0.8	0.8	3.1	O K
360 min Summer	9.362	0.362	0.0	0.8	0.8	2.8	O K
480 min Summer	9.332	0.332	0.0	0.7	0.7	2.6	O K
600 min Summer	9.304	0.304	0.0	0.7	0.7	2.4	O K
720 min Summer	9.280	0.280	0.0	0.7	0.7	2.2	O K
960 min Summer	9.239	0.239	0.0	0.6	0.6	1.8	O K
1440 min Summer	9.183	0.183	0.0	0.5	0.5	1.3	O K
2160 min Summer	9.132	0.132	0.0	0.5	0.5	0.9	O K
2880 min Summer	9.102	0.102	0.0	0.4	0.4	0.7	O K
4320 min Summer	9.070	0.070	0.0	0.3	0.3	0.4	O K
5760 min Summer	9.053	0.053	0.0	0.3	0.3	0.2	O K
7200 min Summer	9.043	0.043	0.0	0.2	0.2	0.2	O K
8640 min Summer	9.036	0.036	0.0	0.2	0.2	0.1	O K
10080 min Summer	9.033	0.033	0.0	0.2	0.2	0.1	O K
15 min Winter	9.296	0.296	0.0	0.7	0.7	2.3	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	2.4	16			
30 min Summer	39.673	0.0	3.4	29			
60 min Summer	26.745	0.0	4.7	46			
120 min Summer	17.385	0.0	6.1	80			
180 min Summer	13.417	0.0	7.1	114			
240 min Summer	11.137	0.0	7.9	148			
360 min Summer	8.542	0.0	9.1	214			
480 min Summer	7.068	0.0	10.0	278			
600 min Summer	6.098	0.0	10.8	340			
720 min Summer	5.403	0.0	11.5	402			
960 min Summer	4.463	0.0	12.7	522			
1440 min Summer	3.406	0.0	14.5	764			
2160 min Summer	2.598	0.0	16.6	1124			
2880 min Summer	2.144	0.0	18.2	1472			
4320 min Summer	1.634	0.0	20.8	2204			
5760 min Summer	1.346	0.0	22.8	2936			
7200 min Summer	1.158	0.0	24.5	3664			
8640 min Summer	1.024	0.0	25.9	4320			
10080 min Summer	0.923	0.0	27.2	4976			
15 min Winter	56.548	0.0	2.7	17			
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Date 06/03/2024 File 210321 - Plot 1 Perviou...		Designed by JMA Checked by JMA					
CADS		Source Control 2017.1.2					
Summary of Results for 30 year Return Period (+35%)							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	9.378	0.378	0.0	0.8	0.8	3.0	O K
60 min Winter	9.436	0.436	0.0	0.8	0.8	3.5	O K
120 min Winter	9.454	0.454	0.0	0.9	0.9	3.6	O K
180 min Winter	9.437	0.437	0.0	0.9	0.9	3.5	O K
240 min Winter	9.412	0.412	0.0	0.8	0.8	3.3	O K
360 min Winter	9.359	0.359	0.0	0.8	0.8	2.8	O K
480 min Winter	9.313	0.313	0.0	0.7	0.7	2.4	O K
600 min Winter	9.274	0.274	0.0	0.7	0.7	2.1	O K
720 min Winter	9.242	0.242	0.0	0.6	0.6	1.8	O K
960 min Winter	9.193	0.193	0.0	0.6	0.6	1.4	O K
1440 min Winter	9.133	0.133	0.0	0.5	0.5	0.9	O K
2160 min Winter	9.088	0.088	0.0	0.4	0.4	0.5	O K
2880 min Winter	9.065	0.065	0.0	0.3	0.3	0.4	O K
4320 min Winter	9.044	0.044	0.0	0.2	0.2	0.2	O K
5760 min Winter	9.035	0.035	0.0	0.2	0.2	0.1	O K
7200 min Winter	9.031	0.031	0.0	0.2	0.2	0.1	O K
8640 min Winter	9.029	0.029	0.0	0.1	0.1	0.1	O K
10080 min Winter	9.027	0.027	0.0	0.1	0.1	0.1	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	39.673	0.0	3.9	30			
60 min Winter	26.745	0.0	5.2	48			
120 min Winter	17.385	0.0	6.9	86			
180 min Winter	13.417	0.0	8.0	124			
240 min Winter	11.137	0.0	8.8	158			
360 min Winter	8.542	0.0	10.2	226			
480 min Winter	7.068	0.0	11.2	290			
600 min Winter	6.098	0.0	12.1	354			
720 min Winter	5.403	0.0	12.9	416			
960 min Winter	4.463	0.0	14.2	538			
1440 min Winter	3.406	0.0	16.3	778			
2160 min Winter	2.598	0.0	18.6	1124			
2880 min Winter	2.144	0.0	20.4	1472			
4320 min Winter	1.634	0.0	23.3	2180			
5760 min Winter	1.346	0.0	25.6	2904			
7200 min Winter	1.158	0.0	27.5	3664			
8640 min Winter	1.024	0.0	29.1	4400			
10080 min Winter	0.923	0.0	30.5	5000			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	30	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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CADS	Source Control 2017.1.2	
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.800		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 4.0
Membrane Percolation (mm/hr)	1000	Length (m) 7.0
Max Percolation (l/s)	7.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	9.000	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.000		
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Date 06/03/2024 File 210321 - Plot 1 Perviou...	Designed by JMA Checked by JMA						
CADS	Source Control 2017.1.2						
<u>Summary of Results for 100 year Return Period (+35%)</u>							
Half Drain Time : 54 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.341	0.341	0.0	0.7	0.7	2.7	O K
30 min Summer	9.441	0.441	0.0	0.9	0.9	3.5	O K
60 min Summer	9.520	0.520	0.0	0.9	0.9	4.2	O K
120 min Summer	9.558	0.558	0.0	1.0	1.0	4.5	O K
180 min Summer	9.555	0.555	0.0	1.0	1.0	4.5	O K
240 min Summer	9.540	0.540	0.0	0.9	0.9	4.3	O K
360 min Summer	9.500	0.500	0.0	0.9	0.9	4.0	O K
480 min Summer	9.460	0.460	0.0	0.9	0.9	3.7	O K
600 min Summer	9.424	0.424	0.0	0.8	0.8	3.4	O K
720 min Summer	9.391	0.391	0.0	0.8	0.8	3.1	O K
960 min Summer	9.336	0.336	0.0	0.7	0.7	2.6	O K
1440 min Summer	9.257	0.257	0.0	0.6	0.6	2.0	O K
2160 min Summer	9.185	0.185	0.0	0.5	0.5	1.4	O K
2880 min Summer	9.142	0.142	0.0	0.5	0.5	1.0	O K
4320 min Summer	9.095	0.095	0.0	0.4	0.4	0.6	O K
5760 min Summer	9.070	0.070	0.0	0.3	0.3	0.4	O K
7200 min Summer	9.056	0.056	0.0	0.3	0.3	0.3	O K
8640 min Summer	9.046	0.046	0.0	0.2	0.2	0.2	O K
10080 min Summer	9.040	0.040	0.0	0.2	0.2	0.1	O K
15 min Winter	9.385	0.385	0.0	0.8	0.8	3.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	3.1	17			
30 min Summer	51.518	0.0	4.5	30			
60 min Summer	34.923	0.0	6.1	48			
120 min Summer	22.569	0.0	8.0	82			
180 min Summer	17.334	0.0	9.2	116			
240 min Summer	14.329	0.0	10.2	150			
360 min Summer	10.919	0.0	11.6	216			
480 min Summer	8.989	0.0	12.8	282			
600 min Summer	7.724	0.0	13.7	344			
720 min Summer	6.821	0.0	14.6	406			
960 min Summer	5.602	0.0	15.9	530			
1440 min Summer	4.241	0.0	18.1	766			
2160 min Summer	3.209	0.0	20.5	1128			
2880 min Summer	2.633	0.0	22.4	1496			
4320 min Summer	1.989	0.0	25.4	2204			
5760 min Summer	1.628	0.0	27.7	2936			
7200 min Summer	1.394	0.0	29.5	3672			
8640 min Summer	1.227	0.0	31.2	4360			
10080 min Summer	1.101	0.0	32.6	5120			
15 min Winter	72.673	0.0	3.5	17			
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15 Victoria Street Aberdeen AB10 1XB		210321 - Cairston Road North Plot 1 Pervious Paving					
Date 06/03/2024 File 210321 - Plot 1 Perviou...		Designed by JMA Checked by JMA					
CADS		Source Control 2017.1.2					
<u>Summary of Results for 100 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	9.502	0.502	0.0	0.9	0.9	4.0	O K
60 min Winter	9.589	0.589	0.0	1.0	1.0	4.7	O K
120 min Winter	9.621	0.621	0.0	1.0	1.0	5.0	O K
180 min Winter	9.605	0.605	0.0	1.0	1.0	4.9	O K
240 min Winter	9.574	0.574	0.0	1.0	1.0	4.6	O K
360 min Winter	9.507	0.507	0.0	0.9	0.9	4.1	O K
480 min Winter	9.446	0.446	0.0	0.9	0.9	3.5	O K
600 min Winter	9.393	0.393	0.0	0.8	0.8	3.1	O K
720 min Winter	9.349	0.349	0.0	0.8	0.8	2.7	O K
960 min Winter	9.280	0.280	0.0	0.7	0.7	2.2	O K
1440 min Winter	9.192	0.192	0.0	0.6	0.6	1.4	O K
2160 min Winter	9.125	0.125	0.0	0.4	0.4	0.9	O K
2880 min Winter	9.091	0.091	0.0	0.4	0.4	0.6	O K
4320 min Winter	9.058	0.058	0.0	0.3	0.3	0.3	O K
5760 min Winter	9.044	0.044	0.0	0.2	0.2	0.2	O K
7200 min Winter	9.036	0.036	0.0	0.2	0.2	0.1	O K
8640 min Winter	9.033	0.033	0.0	0.2	0.2	0.1	O K
10080 min Winter	9.030	0.030	0.0	0.2	0.2	0.1	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	51.518	0.0	5.1	30			
60 min Winter	34.923	0.0	6.9	50			
120 min Winter	22.569	0.0	9.0	88			
180 min Winter	17.334	0.0	10.3	126			
240 min Winter	14.329	0.0	11.4	160			
360 min Winter	10.919	0.0	13.0	230			
480 min Winter	8.989	0.0	14.3	296			
600 min Winter	7.724	0.0	15.4	360			
720 min Winter	6.821	0.0	16.3	422			
960 min Winter	5.602	0.0	17.9	546			
1440 min Winter	4.241	0.0	20.3	780			
2160 min Winter	3.209	0.0	23.0	1144			
2880 min Winter	2.633	0.0	25.2	1496			
4320 min Winter	1.989	0.0	28.5	2204			
5760 min Winter	1.628	0.0	31.0	2928			
7200 min Winter	1.394	0.0	33.2	3664			
8640 min Winter	1.227	0.0	35.0	4384			
10080 min Winter	1.101	0.0	36.6	4960			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.800		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 4.0
Membrane Percolation (mm/hr)	1000	Length (m) 7.0
Max Percolation (l/s)	7.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	9.000	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.000		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving						
Date 06/03/2024 File 210321 - Plot 1 Perviou...	Designed by JMA Checked by JMA						
CADS	Source Control 2017.1.2						
<u>Summary of Results for 200 year Return Period (+35%)</u>							
Half Drain Time : 59 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.397	0.397	0.0	0.8	0.8	3.1	O K
30 min Summer	9.519	0.519	0.0	0.9	0.9	4.2	O K
60 min Summer	9.617	0.617	0.0	1.0	1.0	5.0	O K
120 min Summer	9.664	0.664	0.0	1.1	1.1	5.4	O K
180 min Summer	9.664	0.664	0.0	1.1	1.1	5.4	O K
240 min Summer	9.647	0.647	0.0	1.0	1.0	5.2	O K
360 min Summer	9.602	0.602	0.0	1.0	1.0	4.9	O K
480 min Summer	9.555	0.555	0.0	1.0	1.0	4.5	O K
600 min Summer	9.512	0.512	0.0	0.9	0.9	4.1	O K
720 min Summer	9.473	0.473	0.0	0.9	0.9	3.8	O K
960 min Summer	9.408	0.408	0.0	0.8	0.8	3.2	O K
1440 min Summer	9.313	0.313	0.0	0.7	0.7	2.4	O K
2160 min Summer	9.226	0.226	0.0	0.6	0.6	1.7	O K
2880 min Summer	9.173	0.173	0.0	0.5	0.5	1.3	O K
4320 min Summer	9.115	0.115	0.0	0.4	0.4	0.8	O K
5760 min Summer	9.084	0.084	0.0	0.3	0.3	0.5	O K
7200 min Summer	9.066	0.066	0.0	0.3	0.3	0.4	O K
8640 min Summer	9.054	0.054	0.0	0.3	0.3	0.3	O K
10080 min Summer	9.046	0.046	0.0	0.2	0.2	0.2	O K
15 min Winter	9.447	0.447	0.0	0.9	0.9	3.6	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	3.6	17			
30 min Summer	59.880	0.0	5.2	30			
60 min Summer	40.721	0.0	7.2	48			
120 min Summer	26.227	0.0	9.3	82			
180 min Summer	20.088	0.0	10.7	118			
240 min Summer	16.566	0.0	11.8	152			
360 min Summer	12.577	0.0	13.4	218			
480 min Summer	10.324	0.0	14.7	284			
600 min Summer	8.850	0.0	15.8	346			
720 min Summer	7.800	0.0	16.7	410			
960 min Summer	6.386	0.0	18.2	530			
1440 min Summer	4.811	0.0	20.6	778			
2160 min Summer	3.624	0.0	23.2	1128			
2880 min Summer	2.964	0.0	25.3	1496			
4320 min Summer	2.228	0.0	28.5	2204			
5760 min Summer	1.817	0.0	30.9	2936			
7200 min Summer	1.550	0.0	32.9	3672			
8640 min Summer	1.361	0.0	34.6	4400			
10080 min Summer	1.219	0.0	36.1	5136			
15 min Winter	83.965	0.0	4.1	17			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Summary of Results for 200 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.590	0.590	0.0	1.0	1.0	4.8	O K
60 min Winter	9.699	0.699	0.0	1.1	1.1	5.7	O K
120 min Winter	9.743	0.743	0.0	1.1	1.1	6.0	O K
180 min Winter	9.728	0.728	0.0	1.1	1.1	5.9	O K
240 min Winter	9.694	0.694	0.0	1.1	1.1	5.6	O K
360 min Winter	9.617	0.617	0.0	1.0	1.0	5.0	O K
480 min Winter	9.545	0.545	0.0	1.0	1.0	4.4	O K
600 min Winter	9.483	0.483	0.0	0.9	0.9	3.9	O K
720 min Winter	9.430	0.430	0.0	0.8	0.8	3.4	O K
960 min Winter	9.346	0.346	0.0	0.8	0.8	2.7	O K
1440 min Winter	9.239	0.239	0.0	0.6	0.6	1.8	O K
2160 min Winter	9.155	0.155	0.0	0.5	0.5	1.1	O K
2880 min Winter	9.111	0.111	0.0	0.4	0.4	0.7	O K
4320 min Winter	9.070	0.070	0.0	0.3	0.3	0.4	O K
5760 min Winter	9.051	0.051	0.0	0.3	0.3	0.2	O K
7200 min Winter	9.041	0.041	0.0	0.2	0.2	0.1	O K
8640 min Winter	9.035	0.035	0.0	0.2	0.2	0.1	O K
10080 min Winter	9.032	0.032	0.0	0.2	0.2	0.1	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	59.880	0.0	5.9	30
60 min Winter	40.721	0.0	8.1	50
120 min Winter	26.227	0.0	10.4	88
180 min Winter	20.088	0.0	12.0	126
240 min Winter	16.566	0.0	13.2	162
360 min Winter	12.577	0.0	15.1	232
480 min Winter	10.324	0.0	16.5	298
600 min Winter	8.850	0.0	17.7	362
720 min Winter	7.800	0.0	18.7	426
960 min Winter	6.386	0.0	20.4	550
1440 min Winter	4.811	0.0	23.1	792
2160 min Winter	3.624	0.0	26.0	1144
2880 min Winter	2.964	0.0	28.4	1500
4320 min Winter	2.228	0.0	31.9	2204
5760 min Winter	1.817	0.0	34.7	2936
7200 min Winter	1.550	0.0	36.9	3616
8640 min Winter	1.361	0.0	38.9	4408
10080 min Winter	1.219	0.0	40.6	4960


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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 1 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 1 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.800		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 4.0
Membrane Percolation (mm/hr)	1000	Length (m) 7.0
Max Percolation (l/s)	7.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	9.000	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.000		
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 2 Pervious Paving.				
Date 06/03/2024 File 210321 - Plot 2 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 1 year Return Period</u>							
Half Drain Time : 16 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.825	0.075	0.0	0.3	0.3	0.3	O K
30 min Summer	7.840	0.090	0.0	0.4	0.4	0.4	O K
60 min Summer	7.848	0.098	0.0	0.4	0.4	0.5	O K
120 min Summer	7.844	0.094	0.0	0.4	0.4	0.5	O K
180 min Summer	7.837	0.087	0.0	0.4	0.4	0.4	O K
240 min Summer	7.830	0.080	0.0	0.3	0.3	0.4	O K
360 min Summer	7.818	0.068	0.0	0.3	0.3	0.3	O K
480 min Summer	7.809	0.059	0.0	0.3	0.3	0.2	O K
600 min Summer	7.803	0.053	0.0	0.3	0.3	0.2	O K
720 min Summer	7.798	0.048	0.0	0.2	0.2	0.2	O K
960 min Summer	7.790	0.040	0.0	0.2	0.2	0.1	O K
1440 min Summer	7.783	0.033	0.0	0.2	0.2	0.1	O K
2160 min Summer	7.778	0.028	0.0	0.1	0.1	0.1	O K
2880 min Summer	7.775	0.025	0.0	0.1	0.1	0.1	O K
4320 min Summer	7.772	0.022	0.0	0.1	0.1	0.0	O K
5760 min Summer	7.770	0.020	0.0	0.1	0.1	0.0	O K
7200 min Summer	7.768	0.018	0.0	0.1	0.1	0.0	O K
8640 min Summer	7.767	0.017	0.0	0.1	0.1	0.0	O K
10080 min Summer	7.765	0.015	0.0	0.1	0.1	0.0	O K
15 min Winter	7.834	0.084	0.0	0.3	0.3	0.4	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	0.5	14			
30 min Summer	13.218	0.0	0.7	23			
60 min Summer	8.918	0.0	1.0	40			
120 min Summer	5.920	0.0	1.4	72			
180 min Summer	4.641	0.0	1.7	104			
240 min Summer	3.903	0.0	1.9	136			
360 min Summer	3.055	0.0	2.2	196			
480 min Summer	2.569	0.0	2.5	256			
600 min Summer	2.246	0.0	2.7	316			
720 min Summer	2.013	0.0	2.9	376			
960 min Summer	1.694	0.0	3.3	494			
1440 min Summer	1.326	0.0	3.9	736			
2160 min Summer	1.034	0.0	4.5	1100			
2880 min Summer	0.866	0.0	5.1	1468			
4320 min Summer	0.675	0.0	5.9	2176			
5760 min Summer	0.566	0.0	6.6	2848			
7200 min Summer	0.494	0.0	7.1	3552			
8640 min Summer	0.441	0.0	7.6	4296			
10080 min Summer	0.401	0.0	8.0	5136			
15 min Winter	19.000	0.0	0.6	15			
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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Plot 2 Pervious Paving.			
Date 06/03/2024 File 210321 - Plot 2 Perviou...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	7.849	0.099	0.0	0.4	0.4	0.5	O K
60 min Winter	7.854	0.104	0.0	0.4	0.4	0.5	O K
120 min Winter	7.844	0.094	0.0	0.4	0.4	0.5	O K
180 min Winter	7.831	0.081	0.0	0.3	0.3	0.4	O K
240 min Winter	7.821	0.071	0.0	0.3	0.3	0.3	O K
360 min Winter	7.806	0.056	0.0	0.3	0.3	0.2	O K
480 min Winter	7.796	0.046	0.0	0.2	0.2	0.2	O K
600 min Winter	7.790	0.040	0.0	0.2	0.2	0.1	O K
720 min Winter	7.786	0.036	0.0	0.2	0.2	0.1	O K
960 min Winter	7.782	0.032	0.0	0.2	0.2	0.1	O K
1440 min Winter	7.777	0.027	0.0	0.1	0.1	0.1	O K
2160 min Winter	7.773	0.023	0.0	0.1	0.1	0.0	O K
2880 min Winter	7.771	0.021	0.0	0.1	0.1	0.0	O K
4320 min Winter	7.768	0.018	0.0	0.1	0.1	0.0	O K
5760 min Winter	7.766	0.016	0.0	0.1	0.1	0.0	O K
7200 min Winter	7.764	0.014	0.0	0.0	0.0	0.0	O K
8640 min Winter	7.764	0.014	0.0	0.0	0.0	0.0	O K
10080 min Winter	7.763	0.013	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	0.8	24			
60 min Winter	8.918	0.0	1.2	42			
120 min Winter	5.920	0.0	1.6	76			
180 min Winter	4.641	0.0	1.9	110			
240 min Winter	3.903	0.0	2.1	140			
360 min Winter	3.055	0.0	2.5	202			
480 min Winter	2.569	0.0	2.8	260			
600 min Winter	2.246	0.0	3.1	320			
720 min Winter	2.013	0.0	3.3	370			
960 min Winter	1.694	0.0	3.7	490			
1440 min Winter	1.326	0.0	4.4	734			
2160 min Winter	1.034	0.0	5.1	1096			
2880 min Winter	0.866	0.0	5.7	1468			
4320 min Winter	0.675	0.0	6.6	2140			
5760 min Winter	0.566	0.0	7.4	2928			
7200 min Winter	0.494	0.0	8.0	3672			
8640 min Winter	0.441	0.0	8.6	4280			
10080 min Winter	0.401	0.0	9.1	4984			
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Date 06/03/2024 File 210321 - Plot 2 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.017		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.017		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 2 Pervi...	Designed by JMA Checked by JMA	
CADS	Source Control 2017.1.2	
<u>Model Details</u>		
Storage is Online Cover Level (m) 8.550		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 3.5
Membrane Percolation (mm/hr)	1000	Length (m) 6.0
Max Percolation (l/s)	5.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	7.750	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 7.750		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.						
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 10 year Return Period</u>							
Half Drain Time : 24 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.884	0.134	0.0	0.5	0.5	0.7	O K
30 min Summer	7.912	0.162	0.0	0.5	0.5	0.9	O K
60 min Summer	7.929	0.179	0.0	0.5	0.5	1.0	O K
120 min Summer	7.926	0.176	0.0	0.5	0.5	1.0	O K
180 min Summer	7.915	0.165	0.0	0.5	0.5	0.9	O K
240 min Summer	7.902	0.152	0.0	0.5	0.5	0.8	O K
360 min Summer	7.881	0.131	0.0	0.4	0.4	0.7	O K
480 min Summer	7.864	0.114	0.0	0.4	0.4	0.6	O K
600 min Summer	7.850	0.100	0.0	0.4	0.4	0.5	O K
720 min Summer	7.840	0.090	0.0	0.4	0.4	0.4	O K
960 min Summer	7.823	0.073	0.0	0.3	0.3	0.3	O K
1440 min Summer	7.804	0.054	0.0	0.3	0.3	0.2	O K
2160 min Summer	7.790	0.040	0.0	0.2	0.2	0.1	O K
2880 min Summer	7.784	0.034	0.0	0.2	0.2	0.1	O K
4320 min Summer	7.778	0.028	0.0	0.1	0.1	0.1	O K
5760 min Summer	7.775	0.025	0.0	0.1	0.1	0.0	O K
7200 min Summer	7.773	0.023	0.0	0.1	0.1	0.0	O K
8640 min Summer	7.771	0.021	0.0	0.1	0.1	0.0	O K
10080 min Summer	7.770	0.020	0.0	0.1	0.1	0.0	O K
15 min Winter	7.900	0.150	0.0	0.5	0.5	0.8	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	1.0	15			
30 min Summer	23.154	0.0	1.4	24			
60 min Summer	15.530	0.0	1.9	42			
120 min Summer	10.149	0.0	2.5	76			
180 min Summer	7.867	0.0	2.9	108			
240 min Summer	6.555	0.0	3.2	140			
360 min Summer	5.058	0.0	3.7	202			
480 min Summer	4.204	0.0	4.2	262			
600 min Summer	3.641	0.0	4.5	322			
720 min Summer	3.236	0.0	4.8	384			
960 min Summer	2.686	0.0	5.3	502			
1440 min Summer	2.065	0.0	6.2	738			
2160 min Summer	1.587	0.0	7.1	1100			
2880 min Summer	1.317	0.0	7.8	1468			
4320 min Summer	1.011	0.0	9.0	2180			
5760 min Summer	0.838	0.0	9.9	2904			
7200 min Summer	0.725	0.0	10.7	3552			
8640 min Summer	0.643	0.0	11.3	4264			
10080 min Summer	0.582	0.0	11.9	5056			
15 min Winter	33.317	0.0	1.1	15			
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15 Victoria Street Aberdeen AB10 1XB		210321 - Cairston Road North Plot 2 Pervious Paving.					
Date 06/03/2024 File 210321 - Plot 2 Perviou...		Designed by JMA Checked by JMA					
CADS		Source Control 2017.1.2					
<u>Summary of Results for 10 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (1/s)</b>	<b>Max Control (1/s)</b>	<b>Max Σ Outflow (1/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	7.931	0.181	0.0	0.5	0.5	1.0	O K
60 min Winter	7.946	0.196	0.0	0.6	0.6	1.1	O K
120 min Winter	7.933	0.183	0.0	0.5	0.5	1.0	O K
180 min Winter	7.913	0.163	0.0	0.5	0.5	0.9	O K
240 min Winter	7.894	0.144	0.0	0.5	0.5	0.8	O K
360 min Winter	7.864	0.114	0.0	0.4	0.4	0.6	O K
480 min Winter	7.843	0.093	0.0	0.4	0.4	0.5	O K
600 min Winter	7.828	0.078	0.0	0.3	0.3	0.4	O K
720 min Winter	7.817	0.067	0.0	0.3	0.3	0.3	O K
960 min Winter	7.802	0.052	0.0	0.3	0.3	0.2	O K
1440 min Winter	7.787	0.037	0.0	0.2	0.2	0.1	O K
2160 min Winter	7.781	0.031	0.0	0.2	0.2	0.1	O K
2880 min Winter	7.777	0.027	0.0	0.1	0.1	0.1	O K
4320 min Winter	7.773	0.023	0.0	0.1	0.1	0.0	O K
5760 min Winter	7.771	0.021	0.0	0.1	0.1	0.0	O K
7200 min Winter	7.769	0.019	0.0	0.1	0.1	0.0	O K
8640 min Winter	7.767	0.017	0.0	0.1	0.1	0.0	O K
10080 min Winter	7.766	0.016	0.0	0.1	0.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	23.154	0.0	1.5	25			
60 min Winter	15.530	0.0	2.1	44			
120 min Winter	10.149	0.0	2.8	80			
180 min Winter	7.867	0.0	3.3	114			
240 min Winter	6.555	0.0	3.6	146			
360 min Winter	5.058	0.0	4.2	208			
480 min Winter	4.204	0.0	4.7	270			
600 min Winter	3.641	0.0	5.1	330			
720 min Winter	3.236	0.0	5.4	390			
960 min Winter	2.686	0.0	6.0	504			
1440 min Winter	2.065	0.0	6.9	736			
2160 min Winter	1.587	0.0	8.0	1104			
2880 min Winter	1.317	0.0	8.8	1456			
4320 min Winter	1.011	0.0	10.1	2204			
5760 min Winter	0.838	0.0	11.1	2904			
7200 min Winter	0.725	0.0	12.0	3536			
8640 min Winter	0.643	0.0	12.7	4248			
10080 min Winter	0.582	0.0	13.4	5112			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	10	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.017		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.017		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 8.550		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 3.5
Membrane Percolation (mm/hr)	1000	Length (m) 6.0
Max Percolation (l/s)	5.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	7.750	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 7.750		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.						
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 30 year Return Period (+35%)</u>							
Half Drain Time : 27 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	7.984	0.234	0.0	0.6	0.6	1.3	O K
30 min Summer	8.039	0.289	0.0	0.7	0.7	1.7	O K
60 min Summer	8.079	0.329	0.0	0.7	0.7	1.9	O K
120 min Summer	8.086	0.336	0.0	0.7	0.7	2.0	O K
180 min Summer	8.072	0.322	0.0	0.7	0.7	1.9	O K
240 min Summer	8.054	0.304	0.0	0.7	0.7	1.8	O K
360 min Summer	8.018	0.268	0.0	0.7	0.7	1.6	O K
480 min Summer	7.987	0.237	0.0	0.6	0.6	1.4	O K
600 min Summer	7.962	0.212	0.0	0.6	0.6	1.2	O K
720 min Summer	7.940	0.190	0.0	0.6	0.6	1.1	O K
960 min Summer	7.907	0.157	0.0	0.5	0.5	0.9	O K
1440 min Summer	7.864	0.114	0.0	0.4	0.4	0.6	O K
2160 min Summer	7.830	0.080	0.0	0.3	0.3	0.4	O K
2880 min Summer	7.812	0.062	0.0	0.3	0.3	0.3	O K
4320 min Summer	7.792	0.042	0.0	0.2	0.2	0.1	O K
5760 min Summer	7.784	0.034	0.0	0.2	0.2	0.1	O K
7200 min Summer	7.781	0.031	0.0	0.2	0.2	0.1	O K
8640 min Summer	7.778	0.028	0.0	0.1	0.1	0.1	O K
10080 min Summer	7.777	0.027	0.0	0.1	0.1	0.1	O K
15 min Winter	8.014	0.264	0.0	0.7	0.7	1.5	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	1.7	16			
30 min Summer	39.673	0.0	2.4	25			
60 min Summer	26.745	0.0	3.3	42			
120 min Summer	17.385	0.0	4.3	78			
180 min Summer	13.417	0.0	5.0	110			
240 min Summer	11.137	0.0	5.6	144			
360 min Summer	8.542	0.0	6.4	208			
480 min Summer	7.068	0.0	7.1	268			
600 min Summer	6.098	0.0	7.6	330			
720 min Summer	5.403	0.0	8.1	390			
960 min Summer	4.463	0.0	9.0	510			
1440 min Summer	3.406	0.0	10.3	750			
2160 min Summer	2.598	0.0	11.7	1104			
2880 min Summer	2.144	0.0	12.9	1468			
4320 min Summer	1.634	0.0	14.7	2200			
5760 min Summer	1.346	0.0	16.1	2880			
7200 min Summer	1.158	0.0	17.3	3672			
8640 min Summer	1.024	0.0	18.3	4320			
10080 min Summer	0.923	0.0	19.2	5064			
15 min Winter	56.548	0.0	1.9	16			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.						
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA						
CADS	Source Control 2017.1.2						
<u>Summary of Results for 30 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	8.077	0.327	0.0	0.7	0.7	1.9	O K
60 min Winter	8.118	0.368	0.0	0.8	0.8	2.2	O K
120 min Winter	8.112	0.362	0.0	0.8	0.8	2.2	O K
180 min Winter	8.083	0.333	0.0	0.7	0.7	2.0	O K
240 min Winter	8.052	0.302	0.0	0.7	0.7	1.8	O K
360 min Winter	7.998	0.248	0.0	0.6	0.6	1.4	O K
480 min Winter	7.957	0.207	0.0	0.6	0.6	1.2	O K
600 min Winter	7.925	0.175	0.0	0.5	0.5	1.0	O K
720 min Winter	7.900	0.150	0.0	0.5	0.5	0.8	O K
960 min Winter	7.865	0.115	0.0	0.4	0.4	0.6	O K
1440 min Winter	7.827	0.077	0.0	0.3	0.3	0.4	O K
2160 min Winter	7.801	0.051	0.0	0.3	0.3	0.2	O K
2880 min Winter	7.789	0.039	0.0	0.2	0.2	0.1	O K
4320 min Winter	7.781	0.031	0.0	0.2	0.2	0.1	O K
5760 min Winter	7.777	0.027	0.0	0.1	0.1	0.1	O K
7200 min Winter	7.775	0.025	0.0	0.1	0.1	0.0	O K
8640 min Winter	7.773	0.023	0.0	0.1	0.1	0.0	O K
10080 min Winter	7.772	0.022	0.0	0.1	0.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	39.673	0.0	2.7	27			
60 min Winter	26.745	0.0	3.7	46			
120 min Winter	17.385	0.0	4.9	82			
180 min Winter	13.417	0.0	5.6	118			
240 min Winter	11.137	0.0	6.2	152			
360 min Winter	8.542	0.0	7.2	216			
480 min Winter	7.068	0.0	7.9	278			
600 min Winter	6.098	0.0	8.6	340			
720 min Winter	5.403	0.0	9.1	398			
960 min Winter	4.463	0.0	10.0	520			
1440 min Winter	3.406	0.0	11.5	752			
2160 min Winter	2.598	0.0	13.2	1108			
2880 min Winter	2.144	0.0	14.5	1468			
4320 min Winter	1.634	0.0	16.5	2196			
5760 min Winter	1.346	0.0	18.1	2936			
7200 min Winter	1.158	0.0	19.4	3672			
8640 min Winter	1.024	0.0	20.6	4408			
10080 min Winter	0.923	0.0	21.6	5136			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 2 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	30	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.017		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.017		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 8.550		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 3.5
Membrane Percolation (mm/hr)	1000	Length (m) 6.0
Max Percolation (l/s)	5.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	7.750	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 7.750		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.						
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA						
CADS	Source Control 2017.1.2						
<u>Summary of Results for 100 year Return Period (+35%)</u>							
Half Drain Time : 35 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.055	0.305	0.0	0.7	0.7	1.8	O K
30 min Summer	8.135	0.385	0.0	0.8	0.8	2.3	O K
60 min Summer	8.196	0.446	0.0	0.9	0.9	2.7	O K
120 min Summer	8.211	0.461	0.0	0.9	0.9	2.8	O K
180 min Summer	8.195	0.445	0.0	0.9	0.9	2.7	O K
240 min Summer	8.172	0.422	0.0	0.8	0.8	2.5	O K
360 min Summer	8.125	0.375	0.0	0.8	0.8	2.2	O K
480 min Summer	8.084	0.334	0.0	0.7	0.7	2.0	O K
600 min Summer	8.049	0.299	0.0	0.7	0.7	1.8	O K
720 min Summer	8.019	0.269	0.0	0.7	0.7	1.6	O K
960 min Summer	7.973	0.223	0.0	0.6	0.6	1.3	O K
1440 min Summer	7.912	0.162	0.0	0.5	0.5	0.9	O K
2160 min Summer	7.862	0.112	0.0	0.4	0.4	0.6	O K
2880 min Summer	7.835	0.085	0.0	0.4	0.4	0.4	O K
4320 min Summer	7.806	0.056	0.0	0.3	0.3	0.2	O K
5760 min Summer	7.792	0.042	0.0	0.2	0.2	0.1	O K
7200 min Summer	7.785	0.035	0.0	0.2	0.2	0.1	O K
8640 min Summer	7.782	0.032	0.0	0.2	0.2	0.1	O K
10080 min Summer	7.780	0.030	0.0	0.2	0.2	0.1	O K
15 min Winter	8.095	0.345	0.0	0.8	0.8	2.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	2.2	16			
30 min Summer	51.518	0.0	3.2	27			
60 min Summer	34.923	0.0	4.3	44			
120 min Summer	22.569	0.0	5.6	78			
180 min Summer	17.334	0.0	6.5	112			
240 min Summer	14.329	0.0	7.2	146			
360 min Summer	10.919	0.0	8.2	210			
480 min Summer	8.989	0.0	9.0	272			
600 min Summer	7.724	0.0	9.7	334			
720 min Summer	6.821	0.0	10.3	396			
960 min Summer	5.602	0.0	11.3	514			
1440 min Summer	4.241	0.0	12.8	752			
2160 min Summer	3.209	0.0	14.5	1108			
2880 min Summer	2.633	0.0	15.9	1472			
4320 min Summer	1.989	0.0	18.0	2204			
5760 min Summer	1.628	0.0	19.6	2936			
7200 min Summer	1.394	0.0	20.9	3576			
8640 min Summer	1.227	0.0	22.0	4312			
10080 min Summer	1.101	0.0	23.0	5136			
15 min Winter	72.673	0.0	2.5	16			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.						
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA						
CADS	Source Control 2017.1.2						
<u>Summary of Results for 100 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	8.188	0.438	0.0	0.9	0.9	2.6	O K
60 min Winter	8.252	0.502	0.0	0.9	0.9	3.0	O K
120 min Winter	8.252	0.502	0.0	0.9	0.9	3.0	O K
180 min Winter	8.218	0.468	0.0	0.9	0.9	2.8	O K
240 min Winter	8.179	0.429	0.0	0.8	0.8	2.6	O K
360 min Winter	8.107	0.357	0.0	0.8	0.8	2.1	O K
480 min Winter	8.050	0.300	0.0	0.7	0.7	1.8	O K
600 min Winter	8.005	0.255	0.0	0.6	0.6	1.5	O K
720 min Winter	7.970	0.220	0.0	0.6	0.6	1.3	O K
960 min Winter	7.919	0.169	0.0	0.5	0.5	0.9	O K
1440 min Winter	7.861	0.111	0.0	0.4	0.4	0.6	O K
2160 min Winter	7.822	0.072	0.0	0.3	0.3	0.3	O K
2880 min Winter	7.803	0.053	0.0	0.3	0.3	0.2	O K
4320 min Winter	7.786	0.036	0.0	0.2	0.2	0.1	O K
5760 min Winter	7.781	0.031	0.0	0.2	0.2	0.1	O K
7200 min Winter	7.778	0.028	0.0	0.1	0.1	0.1	O K
8640 min Winter	7.776	0.026	0.0	0.1	0.1	0.1	O K
10080 min Winter	7.774	0.024	0.0	0.1	0.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	51.518	0.0	3.6	29			
60 min Winter	34.923	0.0	4.9	46			
120 min Winter	22.569	0.0	6.3	84			
180 min Winter	17.334	0.0	7.3	120			
240 min Winter	14.329	0.0	8.1	154			
360 min Winter	10.919	0.0	9.2	220			
480 min Winter	8.989	0.0	10.1	284			
600 min Winter	7.724	0.0	10.9	344			
720 min Winter	6.821	0.0	11.6	406			
960 min Winter	5.602	0.0	12.7	524			
1440 min Winter	4.241	0.0	14.4	764			
2160 min Winter	3.209	0.0	16.3	1116			
2880 min Winter	2.633	0.0	17.8	1472			
4320 min Winter	1.989	0.0	20.2	2156			
5760 min Winter	1.628	0.0	22.0	2888			
7200 min Winter	1.394	0.0	23.5	3624			
8640 min Winter	1.227	0.0	24.7	4336			
10080 min Winter	1.101	0.0	25.9	5224			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 2 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+35

Time Area Diagram


Total Area (ha) 0.017


Time (mins)		Area
From:	To:	(ha)
0	4	0.017


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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 8.550		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 3.5
Membrane Percolation (mm/hr)	1000	Length (m) 6.0
Max Percolation (l/s)	5.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	7.750	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 7.750		
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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Plot 2 Pervious Paving.			
Date 06/03/2024 File 210321 - Plot 2 Perviou...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 200 year Return Period (+35%)</u>							
Half Drain Time : 39 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.105	0.355	0.0	0.8	0.8	2.1	O K
30 min Summer	8.204	0.454	0.0	0.9	0.9	2.7	O K
60 min Summer	8.281	0.531	0.0	0.9	0.9	3.2	O K
120 min Summer	8.302	0.552	0.0	1.0	1.0	3.3	O K
180 min Summer	8.285	0.535	0.0	0.9	0.9	3.2	O K
240 min Summer	8.259	0.509	0.0	0.9	0.9	3.1	O K
360 min Summer	8.204	0.454	0.0	0.9	0.9	2.7	O K
480 min Summer	8.156	0.406	0.0	0.8	0.8	2.4	O K
600 min Summer	8.114	0.364	0.0	0.8	0.8	2.2	O K
720 min Summer	8.079	0.329	0.0	0.7	0.7	1.9	O K
960 min Summer	8.023	0.273	0.0	0.7	0.7	1.6	O K
1440 min Summer	7.948	0.198	0.0	0.6	0.6	1.1	O K
2160 min Summer	7.886	0.136	0.0	0.5	0.5	0.7	O K
2880 min Summer	7.853	0.103	0.0	0.4	0.4	0.5	O K
4320 min Summer	7.817	0.067	0.0	0.3	0.3	0.3	O K
5760 min Summer	7.799	0.049	0.0	0.3	0.3	0.2	O K
7200 min Summer	7.790	0.040	0.0	0.2	0.2	0.1	O K
8640 min Summer	7.785	0.035	0.0	0.2	0.2	0.1	O K
10080 min Summer	7.782	0.032	0.0	0.2	0.2	0.1	O K
15 min Winter	8.152	0.402	0.0	0.8	0.8	2.4	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	2.6	16			
30 min Summer	59.880	0.0	3.7	28			
60 min Summer	40.721	0.0	5.1	44			
120 min Summer	26.227	0.0	6.6	80			
180 min Summer	20.088	0.0	7.6	114			
240 min Summer	16.566	0.0	8.3	146			
360 min Summer	12.577	0.0	9.5	212			
480 min Summer	10.324	0.0	10.4	274			
600 min Summer	8.850	0.0	11.2	336			
720 min Summer	7.800	0.0	11.8	398			
960 min Summer	6.386	0.0	12.9	520			
1440 min Summer	4.811	0.0	14.6	754			
2160 min Summer	3.624	0.0	16.4	1108			
2880 min Summer	2.964	0.0	17.9	1472			
4320 min Summer	2.228	0.0	20.2	2204			
5760 min Summer	1.817	0.0	21.9	2936			
7200 min Summer	1.550	0.0	23.3	3672			
8640 min Summer	1.361	0.0	24.5	4352			
10080 min Summer	1.219	0.0	25.6	5136			
15 min Winter	83.965	0.0	2.9	16			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.						
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 200 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	8.267	0.517	0.0	0.9	0.9	3.1	O K
60 min Winter	8.349	0.599	0.0	1.0	1.0	3.6	O K
120 min Winter	8.356	0.606	0.0	1.0	1.0	3.7	O K
180 min Winter	8.319	0.569	0.0	1.0	1.0	3.5	O K
240 min Winter	8.274	0.524	0.0	0.9	0.9	3.2	O K
360 min Winter	8.190	0.440	0.0	0.9	0.9	2.6	O K
480 min Winter	8.121	0.371	0.0	0.8	0.8	2.2	O K
600 min Winter	8.067	0.317	0.0	0.7	0.7	1.9	O K
720 min Winter	8.023	0.273	0.0	0.7	0.7	1.6	O K
960 min Winter	7.960	0.210	0.0	0.6	0.6	1.2	O K
1440 min Winter	7.888	0.138	0.0	0.5	0.5	0.7	O K
2160 min Winter	7.837	0.087	0.0	0.4	0.4	0.4	O K
2880 min Winter	7.814	0.064	0.0	0.3	0.3	0.3	O K
4320 min Winter	7.792	0.042	0.0	0.2	0.2	0.1	O K
5760 min Winter	7.784	0.034	0.0	0.2	0.2	0.1	O K
7200 min Winter	7.780	0.030	0.0	0.2	0.2	0.1	O K
8640 min Winter	7.778	0.028	0.0	0.1	0.1	0.1	O K
10080 min Winter	7.776	0.026	0.0	0.1	0.1	0.1	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	59.880	0.0	4.2	29			
60 min Winter	40.721	0.0	5.7	48			
120 min Winter	26.227	0.0	7.4	86			
180 min Winter	20.088	0.0	8.5	122			
240 min Winter	16.566	0.0	9.3	156			
360 min Winter	12.577	0.0	10.7	222			
480 min Winter	10.324	0.0	11.7	286			
600 min Winter	8.850	0.0	12.5	348			
720 min Winter	7.800	0.0	13.2	410			
960 min Winter	6.386	0.0	14.4	530			
1440 min Winter	4.811	0.0	16.3	764			
2160 min Winter	3.624	0.0	18.4	1124			
2880 min Winter	2.964	0.0	20.1	1472			
4320 min Winter	2.228	0.0	22.6	2188			
5760 min Winter	1.817	0.0	24.5	2928			
7200 min Winter	1.550	0.0	26.1	3640			
8640 min Winter	1.361	0.0	27.5	4392			
10080 min Winter	1.219	0.0	28.7	5128			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.017		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.017		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 2 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 2 Perviou...	Designed by JMA Checked by JMA	
CADS	Source Control 2017.1.2	
<u>Model Details</u>		
Storage is Online Cover Level (m) 8.550		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 3.5
Membrane Percolation (mm/hr)	1000	Length (m) 6.0
Max Percolation (l/s)	5.8	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	7.750	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 7.750		
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 3 Pervious Paving.				
Date 06/03/2024 File 210321 - Plot 3 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 1 year Return Period</u>							
Half Drain Time : 9 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.047	0.047	0.0	0.2	0.2	0.1	O K
30 min Summer	8.057	0.057	0.0	0.3	0.3	0.2	O K
60 min Summer	8.061	0.061	0.0	0.3	0.3	0.2	O K
120 min Summer	8.058	0.058	0.0	0.3	0.3	0.2	O K
180 min Summer	8.052	0.052	0.0	0.3	0.3	0.2	O K
240 min Summer	8.047	0.047	0.0	0.2	0.2	0.1	O K
360 min Summer	8.040	0.040	0.0	0.2	0.2	0.1	O K
480 min Summer	8.035	0.035	0.0	0.2	0.2	0.1	O K
600 min Summer	8.033	0.033	0.0	0.2	0.2	0.1	O K
720 min Summer	8.031	0.031	0.0	0.2	0.2	0.1	O K
960 min Summer	8.028	0.028	0.0	0.1	0.1	0.0	O K
1440 min Summer	8.024	0.024	0.0	0.1	0.1	0.0	O K
2160 min Summer	8.021	0.021	0.0	0.1	0.1	0.0	O K
2880 min Summer	8.018	0.018	0.0	0.1	0.1	0.0	O K
4320 min Summer	8.015	0.015	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.014	0.014	0.0	0.0	0.0	0.0	O K
7200 min Summer	8.013	0.013	0.0	0.0	0.0	0.0	O K
8640 min Summer	8.013	0.013	0.0	0.0	0.0	0.0	O K
10080 min Summer	8.012	0.012	0.0	0.0	0.0	0.0	O K
15 min Winter	8.053	0.053	0.0	0.3	0.3	0.2	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	0.2	13			
30 min Summer	13.218	0.0	0.4	22			
60 min Summer	8.918	0.0	0.5	38			
120 min Summer	5.920	0.0	0.7	70			
180 min Summer	4.641	0.0	0.9	100			
240 min Summer	3.903	0.0	1.0	130			
360 min Summer	3.055	0.0	1.2	190			
480 min Summer	2.569	0.0	1.4	248			
600 min Summer	2.246	0.0	1.5	308			
720 min Summer	2.013	0.0	1.6	368			
960 min Summer	1.694	0.0	1.8	488			
1440 min Summer	1.326	0.0	2.2	728			
2160 min Summer	1.034	0.0	2.5	1092			
2880 min Summer	0.866	0.0	2.8	1428			
4320 min Summer	0.675	0.0	3.3	2200			
5760 min Summer	0.566	0.0	3.6	2792			
7200 min Summer	0.494	0.0	3.9	3656			
8640 min Summer	0.441	0.0	4.1	4280			
10080 min Summer	0.401	0.0	4.3	5144			
15 min Winter	19.000	0.0	0.3	14			
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15 Victoria Street Aberdeen AB10 1XB		210321 - Cairston Road North Plot 3 Pervious Paving.					
Date 06/03/2024 File 210321 - Plot 3 Perviou...		Designed by JMA Checked by JMA					
CADS		Source Control 2017.1.2					
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	8.061	0.061	0.0	0.3	0.3	0.2	O K
60 min Winter	8.062	0.062	0.0	0.3	0.3	0.2	O K
120 min Winter	8.054	0.054	0.0	0.3	0.3	0.2	O K
180 min Winter	8.046	0.046	0.0	0.2	0.2	0.1	O K
240 min Winter	8.039	0.039	0.0	0.2	0.2	0.1	O K
360 min Winter	8.033	0.033	0.0	0.2	0.2	0.1	O K
480 min Winter	8.029	0.029	0.0	0.1	0.1	0.0	O K
600 min Winter	8.027	0.027	0.0	0.1	0.1	0.0	O K
720 min Winter	8.025	0.025	0.0	0.1	0.1	0.0	O K
960 min Winter	8.023	0.023	0.0	0.1	0.1	0.0	O K
1440 min Winter	8.020	0.020	0.0	0.1	0.1	0.0	O K
2160 min Winter	8.016	0.016	0.0	0.1	0.1	0.0	O K
2880 min Winter	8.015	0.015	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.013	0.013	0.0	0.0	0.0	0.0	O K
5760 min Winter	8.012	0.012	0.0	0.0	0.0	0.0	O K
7200 min Winter	8.011	0.011	0.0	0.0	0.0	0.0	O K
8640 min Winter	8.011	0.011	0.0	0.0	0.0	0.0	O K
10080 min Winter	8.010	0.010	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	0.4	23			
60 min Winter	8.918	0.0	0.6	40			
120 min Winter	5.920	0.0	0.9	72			
180 min Winter	4.641	0.0	1.0	102			
240 min Winter	3.903	0.0	1.2	132			
360 min Winter	3.055	0.0	1.4	188			
480 min Winter	2.569	0.0	1.6	248			
600 min Winter	2.246	0.0	1.7	308			
720 min Winter	2.013	0.0	1.9	366			
960 min Winter	1.694	0.0	2.1	488			
1440 min Winter	1.326	0.0	2.5	732			
2160 min Winter	1.034	0.0	2.9	1068			
2880 min Winter	0.866	0.0	3.2	1464			
4320 min Winter	0.675	0.0	3.7	2240			
5760 min Winter	0.566	0.0	4.1	3040			
7200 min Winter	0.494	0.0	4.4	3576			
8640 min Winter	0.441	0.0	4.7	4488			
10080 min Winter	0.401	0.0	4.9	5136			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 3 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 3 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.010		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.010		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 3 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 3 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 8.800		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 11.0
Max Percolation (l/s)	7.6	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.000	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.000		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 3 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 3 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Summary of Results for 10 year Return Period


Half Drain Time : 13 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	8.077	0.077	0.0	0.3	0.3	0.3	O K
30 min Summer	8.089	0.089	0.0	0.4	0.4	0.4	O K
60 min Summer	8.096	0.096	0.0	0.4	0.4	0.5	O K
120 min Summer	8.091	0.091	0.0	0.4	0.4	0.5	O K
180 min Summer	8.084	0.084	0.0	0.3	0.3	0.4	O K
240 min Summer	8.078	0.078	0.0	0.3	0.3	0.3	O K
360 min Summer	8.067	0.067	0.0	0.3	0.3	0.3	O K
480 min Summer	8.058	0.058	0.0	0.3	0.3	0.2	O K
600 min Summer	8.051	0.051	0.0	0.3	0.3	0.1	O K
720 min Summer	8.046	0.046	0.0	0.2	0.2	0.1	O K
960 min Summer	8.039	0.039	0.0	0.2	0.2	0.1	O K
1440 min Summer	8.032	0.032	0.0	0.2	0.2	0.1	O K
2160 min Summer	8.027	0.027	0.0	0.1	0.1	0.0	O K
2880 min Summer	8.024	0.024	0.0	0.1	0.1	0.0	O K
4320 min Summer	8.020	0.020	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.018	0.018	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.016	0.016	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.015	0.015	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.014	0.014	0.0	0.0	0.0	0.0	O K
15 min Winter	8.084	0.084	0.0	0.3	0.3	0.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	33.317	0.0	0.5	14
30 min Summer	23.154	0.0	0.7	23
60 min Summer	15.530	0.0	1.0	40
120 min Summer	10.149	0.0	1.4	74
180 min Summer	7.867	0.0	1.6	106
240 min Summer	6.555	0.0	1.8	136
360 min Summer	5.058	0.0	2.1	196
480 min Summer	4.204	0.0	2.4	256
600 min Summer	3.641	0.0	2.6	314
720 min Summer	3.236	0.0	2.7	374
960 min Summer	2.686	0.0	3.0	492
1440 min Summer	2.065	0.0	3.5	734
2160 min Summer	1.587	0.0	4.0	1080
2880 min Summer	1.317	0.0	4.4	1468
4320 min Summer	1.011	0.0	5.1	2188
5760 min Summer	0.838	0.0	5.6	2920
7200 min Summer	0.725	0.0	6.0	3592
8640 min Summer	0.643	0.0	6.3	4296
10080 min Summer	0.582	0.0	6.6	5088
15 min Winter	33.317	0.0	0.6	15



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Date 06/03/2024 File 210321 - Plot 3 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 10 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	8.096	0.096	0.0	0.4	0.4	0.5	O K
60 min Winter	8.100	0.100	0.0	0.4	0.4	0.5	O K
120 min Winter	8.091	0.091	0.0	0.4	0.4	0.4	O K
180 min Winter	8.079	0.079	0.0	0.3	0.3	0.4	O K
240 min Winter	8.070	0.070	0.0	0.3	0.3	0.3	O K
360 min Winter	8.055	0.055	0.0	0.3	0.3	0.2	O K
480 min Winter	8.045	0.045	0.0	0.2	0.2	0.1	O K
600 min Winter	8.038	0.038	0.0	0.2	0.2	0.1	O K
720 min Winter	8.034	0.034	0.0	0.2	0.2	0.1	O K
960 min Winter	8.030	0.030	0.0	0.2	0.2	0.1	O K
1440 min Winter	8.026	0.026	0.0	0.1	0.1	0.0	O K
2160 min Winter	8.022	0.022	0.0	0.1	0.1	0.0	O K
2880 min Winter	8.020	0.020	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.016	0.016	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.014	0.014	0.0	0.0	0.0	0.0	O K
7200 min Winter	8.014	0.014	0.0	0.0	0.0	0.0	O K
8640 min Winter	8.013	0.013	0.0	0.0	0.0	0.0	O K
10080 min Winter	8.012	0.012	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	23.154	0.0	0.8	24			
60 min Winter	15.530	0.0	1.2	42			
120 min Winter	10.149	0.0	1.6	78			
180 min Winter	7.867	0.0	1.8	110			
240 min Winter	6.555	0.0	2.1	140			
360 min Winter	5.058	0.0	2.4	200			
480 min Winter	4.204	0.0	2.7	256			
600 min Winter	3.641	0.0	2.9	314			
720 min Winter	3.236	0.0	3.1	372			
960 min Winter	2.686	0.0	3.4	490			
1440 min Winter	2.065	0.0	3.9	730			
2160 min Winter	1.587	0.0	4.5	1096			
2880 min Winter	1.317	0.0	5.0	1444			
4320 min Winter	1.011	0.0	5.7	2156			
5760 min Winter	0.838	0.0	6.3	2840			
7200 min Winter	0.725	0.0	6.8	3720			
8640 min Winter	0.643	0.0	7.2	4288			
10080 min Winter	0.582	0.0	7.5	5136			
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Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0


Time Area Diagram

Total Area (ha) 0.010

Time (mins)		Area
From:	To:	(ha)
0	4	0.010

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Date 06/03/2024 File 210321 - Plot 3 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 8.800		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 11.0
Max Percolation (l/s)	7.6	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.000	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.000		
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 3 Pervious Paving.				
Date 06/03/2024 File 210321 - Plot 3 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<p>Summary of Results for 30 year Return Period (+35%)</p> <p>Half Drain Time : 21 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	8.120	0.120	0.0	0.4	0.4	0.7	O K
30 min Summer	8.144	0.144	0.0	0.5	0.5	0.9	O K
60 min Summer	8.159	0.159	0.0	0.5	0.5	1.0	O K
120 min Summer	8.157	0.157	0.0	0.5	0.5	1.0	O K
180 min Summer	8.148	0.148	0.0	0.5	0.5	0.9	O K
240 min Summer	8.138	0.138	0.0	0.5	0.5	0.8	O K
360 min Summer	8.120	0.120	0.0	0.4	0.4	0.7	O K
480 min Summer	8.105	0.105	0.0	0.4	0.4	0.6	O K
600 min Summer	8.094	0.094	0.0	0.4	0.4	0.5	O K
720 min Summer	8.084	0.084	0.0	0.3	0.3	0.4	O K
960 min Summer	8.070	0.070	0.0	0.3	0.3	0.3	O K
1440 min Summer	8.053	0.053	0.0	0.3	0.3	0.2	O K
2160 min Summer	8.038	0.038	0.0	0.2	0.2	0.1	O K
2880 min Summer	8.033	0.033	0.0	0.2	0.2	0.1	O K
4320 min Summer	8.027	0.027	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.024	0.024	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.022	0.022	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.021	0.021	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.019	0.019	0.0	0.1	0.1	0.0	O K
15 min Winter	8.133	0.133	0.0	0.5	0.5	0.8	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	0.9	15			
30 min Summer	39.673	0.0	1.3	24			
60 min Summer	26.745	0.0	1.9	42			
120 min Summer	17.385	0.0	2.5	76			
180 min Summer	13.417	0.0	2.9	108			
240 min Summer	11.137	0.0	3.2	142			
360 min Summer	8.542	0.0	3.7	204			
480 min Summer	7.068	0.0	4.1	264			
600 min Summer	6.098	0.0	4.4	326			
720 min Summer	5.403	0.0	4.7	384			
960 min Summer	4.463	0.0	5.2	502			
1440 min Summer	3.406	0.0	5.9	736			
2160 min Summer	2.598	0.0	6.8	1100			
2880 min Summer	2.144	0.0	7.4	1456			
4320 min Summer	1.634	0.0	8.4	2164			
5760 min Summer	1.346	0.0	9.2	2928			
7200 min Summer	1.158	0.0	9.9	3672			
8640 min Summer	1.024	0.0	10.4	4296			
10080 min Summer	0.923	0.0	10.9	5128			
15 min Winter	56.548	0.0	1.0	16			
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CADS		Source Control 2017.1.2


Summary of Results for 30 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.160	0.160	0.0	0.5	0.5	1.0	O K
60 min Winter	8.174	0.174	0.0	0.5	0.5	1.1	O K
120 min Winter	8.164	0.164	0.0	0.5	0.5	1.1	O K
180 min Winter	8.148	0.148	0.0	0.5	0.5	0.9	O K
240 min Winter	8.132	0.132	0.0	0.5	0.5	0.8	O K
360 min Winter	8.107	0.107	0.0	0.4	0.4	0.6	O K
480 min Winter	8.088	0.088	0.0	0.4	0.4	0.4	O K
600 min Winter	8.075	0.075	0.0	0.3	0.3	0.3	O K
720 min Winter	8.065	0.065	0.0	0.3	0.3	0.2	O K
960 min Winter	8.051	0.051	0.0	0.3	0.3	0.1	O K
1440 min Winter	8.036	0.036	0.0	0.2	0.2	0.1	O K
2160 min Winter	8.030	0.030	0.0	0.2	0.2	0.0	O K
2880 min Winter	8.026	0.026	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.022	0.022	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.020	0.020	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.018	0.018	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.016	0.016	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.015	0.015	0.0	0.1	0.1	0.0	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	39.673	0.0	1.5	26
60 min Winter	26.745	0.0	2.1	44
120 min Winter	17.385	0.0	2.8	82
180 min Winter	13.417	0.0	3.2	116
240 min Winter	11.137	0.0	3.6	148
360 min Winter	8.542	0.0	4.1	212
480 min Winter	7.068	0.0	4.6	272
600 min Winter	6.098	0.0	5.0	332
720 min Winter	5.403	0.0	5.3	390
960 min Winter	4.463	0.0	5.8	502
1440 min Winter	3.406	0.0	6.6	736
2160 min Winter	2.598	0.0	7.6	1072
2880 min Winter	2.144	0.0	8.3	1432
4320 min Winter	1.634	0.0	9.5	2180
5760 min Winter	1.346	0.0	10.4	2912
7200 min Winter	1.158	0.0	11.1	3592
8640 min Winter	1.024	0.0	11.8	4264
10080 min Winter	0.923	0.0	12.3	4864


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Date 06/03/2024 File 210321 - Plot 3 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	30	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.010		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.010		
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Date 06/03/2024 File 210321 - Plot 3 Perviou...	Designed by JMA Checked by JMA	
CADS	Source Control 2017.1.2	
<u>Model Details</u>		
Storage is Online Cover Level (m) 8.800		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 11.0
Max Percolation (l/s)	7.6	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.000	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.000		
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Date 06/03/2024 File 210321 - Plot 3 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 100 year Return Period (+35%)</u>							
Half Drain Time : 26 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.152	0.152	0.0	0.5	0.5	1.0	O K
30 min Summer	8.185	0.185	0.0	0.5	0.5	1.2	O K
60 min Summer	8.209	0.209	0.0	0.6	0.6	1.4	O K
120 min Summer	8.209	0.209	0.0	0.6	0.6	1.4	O K
180 min Summer	8.198	0.198	0.0	0.6	0.6	1.3	O K
240 min Summer	8.186	0.186	0.0	0.5	0.5	1.2	O K
360 min Summer	8.163	0.163	0.0	0.5	0.5	1.0	O K
480 min Summer	8.143	0.143	0.0	0.5	0.5	0.9	O K
600 min Summer	8.127	0.127	0.0	0.4	0.4	0.7	O K
720 min Summer	8.114	0.114	0.0	0.4	0.4	0.6	O K
960 min Summer	8.094	0.094	0.0	0.4	0.4	0.5	O K
1440 min Summer	8.070	0.070	0.0	0.3	0.3	0.3	O K
2160 min Summer	8.051	0.051	0.0	0.3	0.3	0.1	O K
2880 min Summer	8.039	0.039	0.0	0.2	0.2	0.1	O K
4320 min Summer	8.031	0.031	0.0	0.2	0.2	0.1	O K
5760 min Summer	8.027	0.027	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.025	0.025	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.023	0.023	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.021	0.021	0.0	0.1	0.1	0.0	O K
15 min Winter	8.169	0.169	0.0	0.5	0.5	1.1	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	1.2	16			
30 min Summer	51.518	0.0	1.8	25			
60 min Summer	34.923	0.0	2.5	42			
120 min Summer	22.569	0.0	3.2	78			
180 min Summer	17.334	0.0	3.8	110			
240 min Summer	14.329	0.0	4.1	144			
360 min Summer	10.919	0.0	4.8	206			
480 min Summer	8.989	0.0	5.2	268			
600 min Summer	7.724	0.0	5.6	328			
720 min Summer	6.821	0.0	6.0	390			
960 min Summer	5.602	0.0	6.5	510			
1440 min Summer	4.241	0.0	7.4	748			
2160 min Summer	3.209	0.0	8.4	1100			
2880 min Summer	2.633	0.0	9.2	1468			
4320 min Summer	1.989	0.0	10.4	2188			
5760 min Summer	1.628	0.0	11.3	2872			
7200 min Summer	1.394	0.0	12.0	3664			
8640 min Summer	1.227	0.0	12.6	4400			
10080 min Summer	1.101	0.0	13.2	5136			
15 min Winter	72.673	0.0	1.4	16			
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Date 06/03/2024 File 210321 - Plot 3 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 100 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	8.207	0.207	0.0	0.6	0.6	1.4	O K
60 min Winter	8.231	0.231	0.0	0.6	0.6	1.6	O K
120 min Winter	8.223	0.223	0.0	0.6	0.6	1.5	O K
180 min Winter	8.203	0.203	0.0	0.6	0.6	1.4	O K
240 min Winter	8.183	0.183	0.0	0.5	0.5	1.2	O K
360 min Winter	8.149	0.149	0.0	0.5	0.5	0.9	O K
480 min Winter	8.124	0.124	0.0	0.4	0.4	0.7	O K
600 min Winter	8.105	0.105	0.0	0.4	0.4	0.6	O K
720 min Winter	8.090	0.090	0.0	0.4	0.4	0.4	O K
960 min Winter	8.070	0.070	0.0	0.3	0.3	0.3	O K
1440 min Winter	8.048	0.048	0.0	0.2	0.2	0.1	O K
2160 min Winter	8.034	0.034	0.0	0.2	0.2	0.1	O K
2880 min Winter	8.030	0.030	0.0	0.2	0.2	0.1	O K
4320 min Winter	8.025	0.025	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.022	0.022	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.020	0.020	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.019	0.019	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.017	0.017	0.0	0.1	0.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	51.518	0.0	2.0	27			
60 min Winter	34.923	0.0	2.8	46			
120 min Winter	22.569	0.0	3.6	82			
180 min Winter	17.334	0.0	4.2	118			
240 min Winter	14.329	0.0	4.7	152			
360 min Winter	10.919	0.0	5.3	216			
480 min Winter	8.989	0.0	5.9	278			
600 min Winter	7.724	0.0	6.3	338			
720 min Winter	6.821	0.0	6.7	398			
960 min Winter	5.602	0.0	7.3	512			
1440 min Winter	4.241	0.0	8.3	738			
2160 min Winter	3.209	0.0	9.4	1104			
2880 min Winter	2.633	0.0	10.3	1464			
4320 min Winter	1.989	0.0	11.6	2200			
5760 min Winter	1.628	0.0	12.7	2920			
7200 min Winter	1.394	0.0	13.5	3672			
8640 min Winter	1.227	0.0	14.2	4264			
10080 min Winter	1.101	0.0	14.8	5128			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 3 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 3 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.010		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.010		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 3 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 3 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 8.800		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 11.0
Max Percolation (l/s)	7.6	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.000	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.000		
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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Plot 3 Pervious Paving.			
Date 06/03/2024 File 210321 - Plot 3 Perviou...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 200 year Return Period (+35%)</u>							
Half Drain Time : 29 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.174	0.174	0.0	0.5	0.5	1.1	O K
30 min Summer	8.215	0.215	0.0	0.6	0.6	1.5	O K
60 min Summer	8.245	0.245	0.0	0.6	0.6	1.7	O K
120 min Summer	8.248	0.248	0.0	0.6	0.6	1.7	O K
180 min Summer	8.236	0.236	0.0	0.6	0.6	1.6	O K
240 min Summer	8.222	0.222	0.0	0.6	0.6	1.5	O K
360 min Summer	8.195	0.195	0.0	0.6	0.6	1.3	O K
480 min Summer	8.172	0.172	0.0	0.5	0.5	1.1	O K
600 min Summer	8.153	0.153	0.0	0.5	0.5	1.0	O K
720 min Summer	8.138	0.138	0.0	0.5	0.5	0.8	O K
960 min Summer	8.113	0.113	0.0	0.4	0.4	0.6	O K
1440 min Summer	8.083	0.083	0.0	0.3	0.3	0.4	O K
2160 min Summer	8.060	0.060	0.0	0.3	0.3	0.2	O K
2880 min Summer	8.046	0.046	0.0	0.2	0.2	0.1	O K
4320 min Summer	8.034	0.034	0.0	0.2	0.2	0.1	O K
5760 min Summer	8.029	0.029	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.026	0.026	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.024	0.024	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.023	0.023	0.0	0.1	0.1	0.0	O K
15 min Winter	8.194	0.194	0.0	0.6	0.6	1.3	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	1.4	16			
30 min Summer	59.880	0.0	2.1	26			
60 min Summer	40.721	0.0	2.9	44			
120 min Summer	26.227	0.0	3.8	78			
180 min Summer	20.088	0.0	4.4	112			
240 min Summer	16.566	0.0	4.8	144			
360 min Summer	12.577	0.0	5.5	208			
480 min Summer	10.324	0.0	6.0	270			
600 min Summer	8.850	0.0	6.5	332			
720 min Summer	7.800	0.0	6.8	392			
960 min Summer	6.386	0.0	7.5	512			
1440 min Summer	4.811	0.0	8.4	750			
2160 min Summer	3.624	0.0	9.5	1104			
2880 min Summer	2.964	0.0	10.4	1468			
4320 min Summer	2.228	0.0	11.6	2188			
5760 min Summer	1.817	0.0	12.6	2936			
7200 min Summer	1.550	0.0	13.4	3648			
8640 min Summer	1.361	0.0	14.1	4392			
10080 min Summer	1.219	0.0	14.6	4960			
15 min Winter	83.965	0.0	1.6	16			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 3 Pervious Paving.	
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CADS		Source Control 2017.1.2

Summary of Results for 200 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.242	0.242	0.0	0.6	0.6	1.7	O K
60 min Winter	8.273	0.273	0.0	0.7	0.7	1.9	O K
120 min Winter	8.267	0.267	0.0	0.7	0.7	1.9	O K
180 min Winter	8.245	0.245	0.0	0.6	0.6	1.7	O K
240 min Winter	8.222	0.222	0.0	0.6	0.6	1.5	O K
360 min Winter	8.182	0.182	0.0	0.5	0.5	1.2	O K
480 min Winter	8.152	0.152	0.0	0.5	0.5	0.9	O K
600 min Winter	8.128	0.128	0.0	0.4	0.4	0.8	O K
720 min Winter	8.110	0.110	0.0	0.4	0.4	0.6	O K
960 min Winter	8.085	0.085	0.0	0.4	0.4	0.4	O K
1440 min Winter	8.058	0.058	0.0	0.3	0.3	0.2	O K
2160 min Winter	8.039	0.039	0.0	0.2	0.2	0.1	O K
2880 min Winter	8.033	0.033	0.0	0.2	0.2	0.1	O K
4320 min Winter	8.027	0.027	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.024	0.024	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.022	0.022	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.020	0.020	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.019	0.019	0.0	0.1	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	59.880	0.0	2.4	28
60 min Winter	40.721	0.0	3.3	46
120 min Winter	26.227	0.0	4.3	84
180 min Winter	20.088	0.0	4.9	118
240 min Winter	16.566	0.0	5.4	152
360 min Winter	12.577	0.0	6.2	218
480 min Winter	10.324	0.0	6.8	280
600 min Winter	8.850	0.0	7.3	342
720 min Winter	7.800	0.0	7.7	400
960 min Winter	6.386	0.0	8.4	520
1440 min Winter	4.811	0.0	9.5	750
2160 min Winter	3.624	0.0	10.7	1096
2880 min Winter	2.964	0.0	11.6	1456
4320 min Winter	2.228	0.0	13.1	2200
5760 min Winter	1.817	0.0	14.2	2864
7200 min Winter	1.550	0.0	15.1	3624
8640 min Winter	1.361	0.0	15.8	4336
10080 min Winter	1.219	0.0	16.5	5088

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 3 Pervious Paving.	
Date 06/03/2024 File 210321 - Plot 3 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	200	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+35

Time Area Diagram

Total Area (ha) 0.010

Time (mins)		Area
From:	To:	(ha)
0	4	0.010

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 3 Pervious Paving.	
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CADS		Source Control 2017.1.2

Model Details


Storage is Online Cover Level (m) 8.800

Porous Car Park Structure


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	11.0
Max Percolation (l/s)	7.6	Slope (1:X)	150.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.000	Membrane Depth (m)	0


Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.000

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Date 06/03/2024 File 210321 - Plot 4 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 1 year Return Period</u>							
Half Drain Time : 8 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.849	0.049	0.0	0.2	0.2	0.1	O K
30 min Summer	8.859	0.059	0.0	0.3	0.3	0.2	O K
60 min Summer	8.864	0.064	0.0	0.3	0.3	0.2	O K
120 min Summer	8.862	0.062	0.0	0.3	0.3	0.2	O K
180 min Summer	8.857	0.057	0.0	0.3	0.3	0.2	O K
240 min Summer	8.852	0.052	0.0	0.3	0.3	0.2	O K
360 min Summer	8.844	0.044	0.0	0.2	0.2	0.1	O K
480 min Summer	8.838	0.038	0.0	0.2	0.2	0.1	O K
600 min Summer	8.835	0.035	0.0	0.2	0.2	0.1	O K
720 min Summer	8.833	0.033	0.0	0.2	0.2	0.1	O K
960 min Summer	8.829	0.029	0.0	0.1	0.1	0.0	O K
1440 min Summer	8.825	0.025	0.0	0.1	0.1	0.0	O K
2160 min Summer	8.822	0.022	0.0	0.1	0.1	0.0	O K
2880 min Summer	8.820	0.020	0.0	0.1	0.1	0.0	O K
4320 min Summer	8.816	0.016	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.815	0.015	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.814	0.014	0.0	0.0	0.0	0.0	O K
8640 min Summer	8.813	0.013	0.0	0.0	0.0	0.0	O K
10080 min Summer	8.813	0.013	0.0	0.0	0.0	0.0	O K
15 min Winter	8.855	0.055	0.0	0.3	0.3	0.2	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	0.2	14			
30 min Summer	13.218	0.0	0.4	22			
60 min Summer	8.918	0.0	0.6	38			
120 min Summer	5.920	0.0	0.8	70			
180 min Summer	4.641	0.0	1.0	102			
240 min Summer	3.903	0.0	1.1	132			
360 min Summer	3.055	0.0	1.3	190			
480 min Summer	2.569	0.0	1.5	250			
600 min Summer	2.246	0.0	1.6	308			
720 min Summer	2.013	0.0	1.8	368			
960 min Summer	1.694	0.0	2.0	490			
1440 min Summer	1.326	0.0	2.4	726			
2160 min Summer	1.034	0.0	2.8	1096			
2880 min Summer	0.866	0.0	3.1	1464			
4320 min Summer	0.675	0.0	3.6	2192			
5760 min Summer	0.566	0.0	3.9	2936			
7200 min Summer	0.494	0.0	4.2	3584			
8640 min Summer	0.441	0.0	4.5	4248			
10080 min Summer	0.401	0.0	4.7	4968			
15 min Winter	19.000	0.0	0.3	14			
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Date 06/03/2024 File 210321 - Plot 4 Perviou...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (1/s)</b>	<b>Max Control (1/s)</b>	<b>Max Σ Outflow (1/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	8.864	0.064	0.0	0.3	0.3	0.2	O K
60 min Winter	8.866	0.066	0.0	0.3	0.3	0.2	O K
120 min Winter	8.859	0.059	0.0	0.3	0.3	0.2	O K
180 min Winter	8.850	0.050	0.0	0.3	0.3	0.1	O K
240 min Winter	8.844	0.044	0.0	0.2	0.2	0.1	O K
360 min Winter	8.835	0.035	0.0	0.2	0.2	0.1	O K
480 min Winter	8.831	0.031	0.0	0.2	0.2	0.1	O K
600 min Winter	8.829	0.029	0.0	0.1	0.1	0.0	O K
720 min Winter	8.827	0.027	0.0	0.1	0.1	0.0	O K
960 min Winter	8.824	0.024	0.0	0.1	0.1	0.0	O K
1440 min Winter	8.821	0.021	0.0	0.1	0.1	0.0	O K
2160 min Winter	8.818	0.018	0.0	0.1	0.1	0.0	O K
2880 min Winter	8.816	0.016	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.814	0.014	0.0	0.0	0.0	0.0	O K
5760 min Winter	8.813	0.013	0.0	0.0	0.0	0.0	O K
7200 min Winter	8.812	0.012	0.0	0.0	0.0	0.0	O K
8640 min Winter	8.811	0.011	0.0	0.0	0.0	0.0	O K
10080 min Winter	8.811	0.011	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	0.4	23			
60 min Winter	8.918	0.0	0.7	42			
120 min Winter	5.920	0.0	0.9	74			
180 min Winter	4.641	0.0	1.1	104			
240 min Winter	3.903	0.0	1.3	134			
360 min Winter	3.055	0.0	1.5	188			
480 min Winter	2.569	0.0	1.7	246			
600 min Winter	2.246	0.0	1.9	306			
720 min Winter	2.013	0.0	2.0	368			
960 min Winter	1.694	0.0	2.3	492			
1440 min Winter	1.326	0.0	2.7	732			
2160 min Winter	1.034	0.0	3.1	1092			
2880 min Winter	0.866	0.0	3.5	1464			
4320 min Winter	0.675	0.0	4.0	2188			
5760 min Winter	0.566	0.0	4.5	2760			
7200 min Winter	0.494	0.0	4.8	3632			
8640 min Winter	0.441	0.0	5.1	4120			
10080 min Winter	0.401	0.0	5.4	5064			
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Date 06/03/2024 File 210321 - Plot 4 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	1	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram


Total Area (ha) 0.011


Time (mins)		Area
From:	To:	(ha)
0	4	0.011

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 4 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 4 Perviou...	Designed by JMA Checked by JMA	
CADS	Source Control 2017.1.2	
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.600		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 13.0
Max Percolation (l/s)	9.0	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.800	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.800		
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Date 06/03/2024 File 210321 - Plot 4 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 10 year Return Period</u>							
Half Drain Time : 15 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.880	0.080	0.0	0.3	0.3	0.4	O K
30 min Summer	8.893	0.093	0.0	0.4	0.4	0.5	O K
60 min Summer	8.900	0.100	0.0	0.4	0.4	0.6	O K
120 min Summer	8.897	0.097	0.0	0.4	0.4	0.5	O K
180 min Summer	8.891	0.091	0.0	0.4	0.4	0.5	O K
240 min Summer	8.884	0.084	0.0	0.3	0.3	0.4	O K
360 min Summer	8.873	0.073	0.0	0.3	0.3	0.3	O K
480 min Summer	8.865	0.065	0.0	0.3	0.3	0.2	O K
600 min Summer	8.857	0.057	0.0	0.3	0.3	0.2	O K
720 min Summer	8.851	0.051	0.0	0.3	0.3	0.1	O K
960 min Summer	8.843	0.043	0.0	0.2	0.2	0.1	O K
1440 min Summer	8.834	0.034	0.0	0.2	0.2	0.1	O K
2160 min Summer	8.828	0.028	0.0	0.1	0.1	0.0	O K
2880 min Summer	8.825	0.025	0.0	0.1	0.1	0.0	O K
4320 min Summer	8.821	0.021	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.819	0.019	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.817	0.017	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.816	0.016	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.815	0.015	0.0	0.1	0.1	0.0	O K
15 min Winter	8.887	0.087	0.0	0.4	0.4	0.4	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	0.5	15			
30 min Summer	23.154	0.0	0.8	23			
60 min Summer	15.530	0.0	1.1	40			
120 min Summer	10.149	0.0	1.5	74			
180 min Summer	7.867	0.0	1.8	106			
240 min Summer	6.555	0.0	2.0	136			
360 min Summer	5.058	0.0	2.3	198			
480 min Summer	4.204	0.0	2.6	256			
600 min Summer	3.641	0.0	2.8	316			
720 min Summer	3.236	0.0	3.0	376			
960 min Summer	2.686	0.0	3.3	492			
1440 min Summer	2.065	0.0	3.8	734			
2160 min Summer	1.587	0.0	4.4	1076			
2880 min Summer	1.317	0.0	4.9	1468			
4320 min Summer	1.011	0.0	5.6	2200			
5760 min Summer	0.838	0.0	6.1	2936			
7200 min Summer	0.725	0.0	6.5	3632			
8640 min Summer	0.643	0.0	6.9	4352			
10080 min Summer	0.582	0.0	7.2	4968			
15 min Winter	33.317	0.0	0.6	15			
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15 Victoria Street Aberdeen AB10 1XB		210321 - Cairston Road North Plot 4 Pervious Paving					
Date 06/03/2024 File 210321 - Plot 4 Perviou...		Designed by JMA Checked by JMA					
CADS		Source Control 2017.1.2					
<u>Summary of Results for 10 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (1/s)</b>	<b>Max Control (1/s)</b>	<b>Max Σ Outflow (1/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	8.900	0.100	0.0	0.4	0.4	0.6	O K
60 min Winter	8.905	0.105	0.0	0.4	0.4	0.6	O K
120 min Winter	8.897	0.097	0.0	0.4	0.4	0.5	O K
180 min Winter	8.887	0.087	0.0	0.4	0.4	0.4	O K
240 min Winter	8.877	0.077	0.0	0.3	0.3	0.3	O K
360 min Winter	8.862	0.062	0.0	0.3	0.3	0.2	O K
480 min Winter	8.851	0.051	0.0	0.3	0.3	0.1	O K
600 min Winter	8.843	0.043	0.0	0.2	0.2	0.1	O K
720 min Winter	8.837	0.037	0.0	0.2	0.2	0.1	O K
960 min Winter	8.832	0.032	0.0	0.2	0.2	0.1	O K
1440 min Winter	8.827	0.027	0.0	0.1	0.1	0.0	O K
2160 min Winter	8.823	0.023	0.0	0.1	0.1	0.0	O K
2880 min Winter	8.821	0.021	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.817	0.017	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.815	0.015	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.814	0.014	0.0	0.0	0.0	0.0	O K
8640 min Winter	8.813	0.013	0.0	0.0	0.0	0.0	O K
10080 min Winter	8.813	0.013	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	23.154	0.0	0.9	25			
60 min Winter	15.530	0.0	1.3	44			
120 min Winter	10.149	0.0	1.7	78			
180 min Winter	7.867	0.0	2.0	112			
240 min Winter	6.555	0.0	2.2	142			
360 min Winter	5.058	0.0	2.6	202			
480 min Winter	4.204	0.0	2.9	260			
600 min Winter	3.641	0.0	3.2	318			
720 min Winter	3.236	0.0	3.4	376			
960 min Winter	2.686	0.0	3.7	492			
1440 min Winter	2.065	0.0	4.3	732			
2160 min Winter	1.587	0.0	5.0	1076			
2880 min Winter	1.317	0.0	5.5	1424			
4320 min Winter	1.011	0.0	6.3	2132			
5760 min Winter	0.838	0.0	6.9	2984			
7200 min Winter	0.725	0.0	7.4	3552			
8640 min Winter	0.643	0.0	7.8	4296			
10080 min Winter	0.582	0.0	8.2	4976			
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Date 06/03/2024 File 210321 - Plot 4 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	10	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.011		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.011		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 4 Pervious Paving	
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CADS		Source Control 2017.1.2

Model Details


Storage is Online Cover Level (m) 9.600

Porous Car Park Structure


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	13.0
Max Percolation (l/s)	9.0	Slope (1:X)	150.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.800	Membrane Depth (m)	0


Orifice Outflow Control


Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.800


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Date 06/03/2024 File 210321 - Plot 4 Perviou...	Designed by JMA Checked by JMA						
CADS	Source Control 2017.1.2						
<u>Summary of Results for 30 year Return Period (+35%)</u>							
Half Drain Time : 25 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.922	0.122	0.0	0.4	0.4	0.8	O K
30 min Summer	8.945	0.145	0.0	0.5	0.5	1.0	O K
60 min Summer	8.961	0.161	0.0	0.5	0.5	1.2	O K
120 min Summer	8.962	0.162	0.0	0.5	0.5	1.2	O K
180 min Summer	8.954	0.154	0.0	0.5	0.5	1.1	O K
240 min Summer	8.945	0.145	0.0	0.5	0.5	1.0	O K
360 min Summer	8.928	0.128	0.0	0.4	0.4	0.8	O K
480 min Summer	8.914	0.114	0.0	0.4	0.4	0.7	O K
600 min Summer	8.903	0.103	0.0	0.4	0.4	0.6	O K
720 min Summer	8.893	0.093	0.0	0.4	0.4	0.5	O K
960 min Summer	8.879	0.079	0.0	0.3	0.3	0.4	O K
1440 min Summer	8.860	0.060	0.0	0.3	0.3	0.2	O K
2160 min Summer	8.843	0.043	0.0	0.2	0.2	0.1	O K
2880 min Summer	8.835	0.035	0.0	0.2	0.2	0.1	O K
4320 min Summer	8.829	0.029	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.826	0.026	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.823	0.023	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.822	0.022	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.820	0.020	0.0	0.1	0.1	0.0	O K
15 min Winter	8.934	0.134	0.0	0.5	0.5	0.9	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	1.0	16			
30 min Summer	39.673	0.0	1.5	25			
60 min Summer	26.745	0.0	2.0	42			
120 min Summer	17.385	0.0	2.7	76			
180 min Summer	13.417	0.0	3.1	110			
240 min Summer	11.137	0.0	3.5	142			
360 min Summer	8.542	0.0	4.0	206			
480 min Summer	7.068	0.0	4.5	266			
600 min Summer	6.098	0.0	4.8	326			
720 min Summer	5.403	0.0	5.1	386			
960 min Summer	4.463	0.0	5.7	504			
1440 min Summer	3.406	0.0	6.5	738			
2160 min Summer	2.598	0.0	7.4	1100			
2880 min Summer	2.144	0.0	8.1	1468			
4320 min Summer	1.634	0.0	9.3	2200			
5760 min Summer	1.346	0.0	10.1	2936			
7200 min Summer	1.158	0.0	10.8	3608			
8640 min Summer	1.024	0.0	11.4	4280			
10080 min Summer	0.923	0.0	11.9	4984			
15 min Winter	56.548	0.0	1.1	16			
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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Plot 4 Pervious Paving			
Date 06/03/2024 File 210321 - Plot 4 Perviou...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 30 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	8.960	0.160	0.0	0.5	0.5	1.1	O K
60 min Winter	8.976	0.176	0.0	0.5	0.5	1.3	O K
120 min Winter	8.970	0.170	0.0	0.5	0.5	1.2	O K
180 min Winter	8.956	0.156	0.0	0.5	0.5	1.1	O K
240 min Winter	8.941	0.141	0.0	0.5	0.5	1.0	O K
360 min Winter	8.917	0.117	0.0	0.4	0.4	0.7	O K
480 min Winter	8.898	0.098	0.0	0.4	0.4	0.5	O K
600 min Winter	8.885	0.085	0.0	0.4	0.4	0.4	O K
720 min Winter	8.874	0.074	0.0	0.3	0.3	0.3	O K
960 min Winter	8.858	0.058	0.0	0.3	0.3	0.2	O K
1440 min Winter	8.841	0.041	0.0	0.2	0.2	0.1	O K
2160 min Winter	8.832	0.032	0.0	0.2	0.2	0.1	O K
2880 min Winter	8.828	0.028	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.824	0.024	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.821	0.021	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.819	0.019	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.817	0.017	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.816	0.016	0.0	0.1	0.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	39.673	0.0	1.7	26			
60 min Winter	26.745	0.0	2.3	46			
120 min Winter	17.385	0.0	3.0	82			
180 min Winter	13.417	0.0	3.5	118			
240 min Winter	11.137	0.0	3.9	150			
360 min Winter	8.542	0.0	4.5	214			
480 min Winter	7.068	0.0	5.0	276			
600 min Winter	6.098	0.0	5.4	334			
720 min Winter	5.403	0.0	5.8	392			
960 min Winter	4.463	0.0	6.4	508			
1440 min Winter	3.406	0.0	7.3	736			
2160 min Winter	2.598	0.0	8.3	1092			
2880 min Winter	2.144	0.0	9.2	1468			
4320 min Winter	1.634	0.0	10.4	2188			
5760 min Winter	1.346	0.0	11.4	2880			
7200 min Winter	1.158	0.0	12.2	3600			
8640 min Winter	1.024	0.0	12.9	4344			
10080 min Winter	0.923	0.0	13.5	4928			
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Date 06/03/2024 File 210321 - Plot 4 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	30	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.011		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.011		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 4 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 4 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.600		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 13.0
Max Percolation (l/s)	9.0	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.800	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.800		
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Date 06/03/2024 File 210321 - Plot 4 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 100 year Return Period (+35%)</u>							
Half Drain Time : 30 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.952	0.152	0.0	0.5	0.5	1.1	O K
30 min Summer	8.985	0.185	0.0	0.5	0.5	1.4	O K
60 min Summer	9.009	0.209	0.0	0.6	0.6	1.6	O K
120 min Summer	9.012	0.212	0.0	0.6	0.6	1.6	O K
180 min Summer	9.004	0.204	0.0	0.6	0.6	1.6	O K
240 min Summer	8.993	0.193	0.0	0.6	0.6	1.5	O K
360 min Summer	8.972	0.172	0.0	0.5	0.5	1.3	O K
480 min Summer	8.953	0.153	0.0	0.5	0.5	1.1	O K
600 min Summer	8.938	0.138	0.0	0.5	0.5	0.9	O K
720 min Summer	8.925	0.125	0.0	0.4	0.4	0.8	O K
960 min Summer	8.905	0.105	0.0	0.4	0.4	0.6	O K
1440 min Summer	8.879	0.079	0.0	0.3	0.3	0.4	O K
2160 min Summer	8.857	0.057	0.0	0.3	0.3	0.2	O K
2880 min Summer	8.845	0.045	0.0	0.2	0.2	0.1	O K
4320 min Summer	8.833	0.033	0.0	0.2	0.2	0.1	O K
5760 min Summer	8.829	0.029	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.826	0.026	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.824	0.024	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.823	0.023	0.0	0.1	0.1	0.0	O K
15 min Winter	8.968	0.168	0.0	0.5	0.5	1.2	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	1.3	16			
30 min Summer	51.518	0.0	2.0	26			
60 min Summer	34.923	0.0	2.7	44			
120 min Summer	22.569	0.0	3.6	78			
180 min Summer	17.334	0.0	4.1	112			
240 min Summer	14.329	0.0	4.5	146			
360 min Summer	10.919	0.0	5.2	208			
480 min Summer	8.989	0.0	5.7	270			
600 min Summer	7.724	0.0	6.2	332			
720 min Summer	6.821	0.0	6.5	392			
960 min Summer	5.602	0.0	7.2	512			
1440 min Summer	4.241	0.0	8.1	750			
2160 min Summer	3.209	0.0	9.2	1104			
2880 min Summer	2.633	0.0	10.1	1468			
4320 min Summer	1.989	0.0	11.4	2172			
5760 min Summer	1.628	0.0	12.3	2912			
7200 min Summer	1.394	0.0	13.1	3608			
8640 min Summer	1.227	0.0	13.8	4368			
10080 min Summer	1.101	0.0	14.4	4968			
15 min Winter	72.673	0.0	1.5	16			
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Date 06/03/2024 File 210321 - Plot 4 Perviou...	Designed by JMA Checked by JMA	
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Summary of Results for 100 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.006	0.206	0.0	0.6	0.6	1.6	O K
60 min Winter	9.031	0.231	0.0	0.6	0.6	1.8	O K
120 min Winter	9.028	0.228	0.0	0.6	0.6	1.8	O K
180 min Winter	9.012	0.212	0.0	0.6	0.6	1.6	O K
240 min Winter	8.994	0.194	0.0	0.6	0.6	1.5	O K
360 min Winter	8.962	0.162	0.0	0.5	0.5	1.2	O K
480 min Winter	8.937	0.137	0.0	0.5	0.5	0.9	O K
600 min Winter	8.917	0.117	0.0	0.4	0.4	0.7	O K
720 min Winter	8.902	0.102	0.0	0.4	0.4	0.6	O K
960 min Winter	8.880	0.080	0.0	0.3	0.3	0.4	O K
1440 min Winter	8.855	0.055	0.0	0.3	0.3	0.2	O K
2160 min Winter	8.838	0.038	0.0	0.2	0.2	0.1	O K
2880 min Winter	8.832	0.032	0.0	0.2	0.2	0.1	O K
4320 min Winter	8.827	0.027	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.824	0.024	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.821	0.021	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.820	0.020	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.818	0.018	0.0	0.1	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	51.518	0.0	2.2	28
60 min Winter	34.923	0.0	3.1	46
120 min Winter	22.569	0.0	4.0	84
180 min Winter	17.334	0.0	4.6	120
240 min Winter	14.329	0.0	5.1	154
360 min Winter	10.919	0.0	5.9	218
480 min Winter	8.989	0.0	6.4	282
600 min Winter	7.724	0.0	6.9	344
720 min Winter	6.821	0.0	7.4	404
960 min Winter	5.602	0.0	8.1	520
1440 min Winter	4.241	0.0	9.1	748
2160 min Winter	3.209	0.0	10.4	1088
2880 min Winter	2.633	0.0	11.3	1464
4320 min Winter	1.989	0.0	12.8	2140
5760 min Winter	1.628	0.0	13.9	2936
7200 min Winter	1.394	0.0	14.8	3544
8640 min Winter	1.227	0.0	15.6	4360
10080 min Winter	1.101	0.0	16.3	5072

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 4 Pervious Paving	
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Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+35

Time Area Diagram


Total Area (ha) 0.011

Time (mins)		Area
From:	To:	(ha)
0	4	0.011

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 4 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 4 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.600		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 13.0
Max Percolation (l/s)	9.0	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.800	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.800		
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 4 Pervious Paving				
Date 06/03/2024 File 210321 - Plot 4 Perviou...			Designed by JMA Checked by JMA				
CADS						Source Control 2017.1.2	
<u>Summary of Results for 200 year Return Period (+35%)</u>							
Half Drain Time : 34 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.973	0.173	0.0	0.5	0.5	1.3	O K
30 min Summer	9.014	0.214	0.0	0.6	0.6	1.7	O K
60 min Summer	9.044	0.244	0.0	0.6	0.6	2.0	O K
120 min Summer	9.050	0.250	0.0	0.6	0.6	2.0	O K
180 min Summer	9.041	0.241	0.0	0.6	0.6	1.9	O K
240 min Summer	9.029	0.229	0.0	0.6	0.6	1.8	O K
360 min Summer	9.004	0.204	0.0	0.6	0.6	1.6	O K
480 min Summer	8.983	0.183	0.0	0.5	0.5	1.4	O K
600 min Summer	8.965	0.165	0.0	0.5	0.5	1.2	O K
720 min Summer	8.949	0.149	0.0	0.5	0.5	1.0	O K
960 min Summer	8.925	0.125	0.0	0.4	0.4	0.8	O K
1440 min Summer	8.893	0.093	0.0	0.4	0.4	0.5	O K
2160 min Summer	8.868	0.068	0.0	0.3	0.3	0.3	O K
2880 min Summer	8.853	0.053	0.0	0.3	0.3	0.2	O K
4320 min Summer	8.836	0.036	0.0	0.2	0.2	0.1	O K
5760 min Summer	8.831	0.031	0.0	0.2	0.2	0.1	O K
7200 min Summer	8.828	0.028	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.826	0.026	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.824	0.024	0.0	0.1	0.1	0.0	O K
15 min Winter	8.992	0.192	0.0	0.6	0.6	1.4	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	1.6	16			
30 min Summer	59.880	0.0	2.3	27			
60 min Summer	40.721	0.0	3.2	44			
120 min Summer	26.227	0.0	4.2	78			
180 min Summer	20.088	0.0	4.8	112			
240 min Summer	16.566	0.0	5.3	146			
360 min Summer	12.577	0.0	6.0	210			
480 min Summer	10.324	0.0	6.6	274			
600 min Summer	8.850	0.0	7.1	334			
720 min Summer	7.800	0.0	7.5	396			
960 min Summer	6.386	0.0	8.2	518			
1440 min Summer	4.811	0.0	9.3	752			
2160 min Summer	3.624	0.0	10.5	1104			
2880 min Summer	2.964	0.0	11.4	1468			
4320 min Summer	2.228	0.0	12.8	2140			
5760 min Summer	1.817	0.0	13.8	2920			
7200 min Summer	1.550	0.0	14.7	3672			
8640 min Summer	1.361	0.0	15.4	4280			
10080 min Summer	1.219	0.0	16.1	5120			
15 min Winter	83.965	0.0	1.8	16			
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CADS		Source Control 2017.1.2


Summary of Results for 200 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.039	0.239	0.0	0.6	0.6	1.9	O K
60 min Winter	9.071	0.271	0.0	0.7	0.7	2.2	O K
120 min Winter	9.071	0.271	0.0	0.7	0.7	2.2	O K
180 min Winter	9.053	0.253	0.0	0.6	0.6	2.0	O K
240 min Winter	9.033	0.233	0.0	0.6	0.6	1.8	O K
360 min Winter	8.996	0.196	0.0	0.6	0.6	1.5	O K
480 min Winter	8.966	0.166	0.0	0.5	0.5	1.2	O K
600 min Winter	8.943	0.143	0.0	0.5	0.5	1.0	O K
720 min Winter	8.924	0.124	0.0	0.4	0.4	0.8	O K
960 min Winter	8.897	0.097	0.0	0.4	0.4	0.5	O K
1440 min Winter	8.866	0.066	0.0	0.3	0.3	0.2	O K
2160 min Winter	8.844	0.044	0.0	0.2	0.2	0.1	O K
2880 min Winter	8.835	0.035	0.0	0.2	0.2	0.1	O K
4320 min Winter	8.829	0.029	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.825	0.025	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.823	0.023	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.821	0.021	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.820	0.020	0.0	0.1	0.1	0.0	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	59.880	0.0	2.6	29
60 min Winter	40.721	0.0	3.6	48
120 min Winter	26.227	0.0	4.7	84
180 min Winter	20.088	0.0	5.4	120
240 min Winter	16.566	0.0	5.9	156
360 min Winter	12.577	0.0	6.8	222
480 min Winter	10.324	0.0	7.4	284
600 min Winter	8.850	0.0	8.0	346
720 min Winter	7.800	0.0	8.4	406
960 min Winter	6.386	0.0	9.2	528
1440 min Winter	4.811	0.0	10.4	752
2160 min Winter	3.624	0.0	11.7	1104
2880 min Winter	2.964	0.0	12.8	1452
4320 min Winter	2.228	0.0	14.4	2132
5760 min Winter	1.817	0.0	15.6	2896
7200 min Winter	1.550	0.0	16.5	3552
8640 min Winter	1.361	0.0	17.4	4376
10080 min Winter	1.219	0.0	18.1	5048


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Date 06/03/2024 File 210321 - Plot 4 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.011		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.011		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 4 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 4 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.600		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 13.0
Max Percolation (l/s)	9.0	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.800	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.800		
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Date 06/03/2024 File 210321 - Plot 5 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 1 year Return Period</u>							
Half Drain Time : 6 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.943	0.043	0.0	0.2	0.2	0.1	O K
30 min Summer	8.951	0.051	0.0	0.3	0.3	0.1	O K
60 min Summer	8.956	0.056	0.0	0.3	0.3	0.2	O K
120 min Summer	8.953	0.053	0.0	0.3	0.3	0.2	O K
180 min Summer	8.947	0.047	0.0	0.2	0.2	0.1	O K
240 min Summer	8.943	0.043	0.0	0.2	0.2	0.1	O K
360 min Summer	8.936	0.036	0.0	0.2	0.2	0.1	O K
480 min Summer	8.933	0.033	0.0	0.2	0.2	0.1	O K
600 min Summer	8.931	0.031	0.0	0.2	0.2	0.1	O K
720 min Summer	8.929	0.029	0.0	0.1	0.1	0.0	O K
960 min Summer	8.926	0.026	0.0	0.1	0.1	0.0	O K
1440 min Summer	8.922	0.022	0.0	0.1	0.1	0.0	O K
2160 min Summer	8.919	0.019	0.0	0.1	0.1	0.0	O K
2880 min Summer	8.917	0.017	0.0	0.1	0.1	0.0	O K
4320 min Summer	8.914	0.014	0.0	0.0	0.0	0.0	O K
5760 min Summer	8.913	0.013	0.0	0.0	0.0	0.0	O K
7200 min Summer	8.913	0.013	0.0	0.0	0.0	0.0	O K
8640 min Summer	8.912	0.012	0.0	0.0	0.0	0.0	O K
10080 min Summer	8.911	0.011	0.0	0.0	0.0	0.0	O K
15 min Winter	8.948	0.048	0.0	0.2	0.2	0.1	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	0.2	13			
30 min Summer	13.218	0.0	0.3	22			
60 min Summer	8.918	0.0	0.5	38			
120 min Summer	5.920	0.0	0.7	70			
180 min Summer	4.641	0.0	0.8	100			
240 min Summer	3.903	0.0	0.9	130			
360 min Summer	3.055	0.0	1.1	188			
480 min Summer	2.569	0.0	1.2	248			
600 min Summer	2.246	0.0	1.3	308			
720 min Summer	2.013	0.0	1.5	368			
960 min Summer	1.694	0.0	1.6	490			
1440 min Summer	1.326	0.0	1.9	734			
2160 min Summer	1.034	0.0	2.3	1100			
2880 min Summer	0.866	0.0	2.5	1424			
4320 min Summer	0.675	0.0	2.9	2128			
5760 min Summer	0.566	0.0	3.2	2896			
7200 min Summer	0.494	0.0	3.5	3552			
8640 min Summer	0.441	0.0	3.7	4312			
10080 min Summer	0.401	0.0	3.8	5136			
15 min Winter	19.000	0.0	0.2	14			
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Date 06/03/2024 File 210321 - Plot 5 Perviou...		Designed by JMA Checked by JMA					
CADS		Source Control 2017.1.2					
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (1/s)</b>	<b>Max Control (1/s)</b>	<b>Max Σ Outflow (1/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	8.955	0.055	0.0	0.3	0.3	0.2	O K
60 min Winter	8.956	0.056	0.0	0.3	0.3	0.2	O K
120 min Winter	8.949	0.049	0.0	0.2	0.2	0.1	O K
180 min Winter	8.941	0.041	0.0	0.2	0.2	0.1	O K
240 min Winter	8.936	0.036	0.0	0.2	0.2	0.1	O K
360 min Winter	8.931	0.031	0.0	0.2	0.2	0.1	O K
480 min Winter	8.927	0.027	0.0	0.1	0.1	0.0	O K
600 min Winter	8.925	0.025	0.0	0.1	0.1	0.0	O K
720 min Winter	8.924	0.024	0.0	0.1	0.1	0.0	O K
960 min Winter	8.921	0.021	0.0	0.1	0.1	0.0	O K
1440 min Winter	8.918	0.018	0.0	0.1	0.1	0.0	O K
2160 min Winter	8.915	0.015	0.0	0.1	0.1	0.0	O K
2880 min Winter	8.914	0.014	0.0	0.0	0.0	0.0	O K
4320 min Winter	8.913	0.013	0.0	0.0	0.0	0.0	O K
5760 min Winter	8.912	0.012	0.0	0.0	0.0	0.0	O K
7200 min Winter	8.911	0.011	0.0	0.0	0.0	0.0	O K
8640 min Winter	8.910	0.010	0.0	0.0	0.0	0.0	O K
10080 min Winter	8.910	0.010	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	0.4	23			
60 min Winter	8.918	0.0	0.5	40			
120 min Winter	5.920	0.0	0.8	72			
180 min Winter	4.641	0.0	0.9	102			
240 min Winter	3.903	0.0	1.0	128			
360 min Winter	3.055	0.0	1.2	188			
480 min Winter	2.569	0.0	1.4	248			
600 min Winter	2.246	0.0	1.5	306			
720 min Winter	2.013	0.0	1.6	374			
960 min Winter	1.694	0.0	1.9	478			
1440 min Winter	1.326	0.0	2.2	722			
2160 min Winter	1.034	0.0	2.6	1096			
2880 min Winter	0.866	0.0	2.8	1468			
4320 min Winter	0.675	0.0	3.3	2168			
5760 min Winter	0.566	0.0	3.6	2800			
7200 min Winter	0.494	0.0	3.9	3504			
8640 min Winter	0.441	0.0	4.2	4408			
10080 min Winter	0.401	0.0	4.4	5056			
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Date 06/03/2024 File 210321 - Plot 5 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.009		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.009		
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CADS		Source Control 2017.1.2

Model Details


Storage is Online Cover Level (m) 9.700

Porous Car Park Structure


Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	11.0
Max Percolation (l/s)	7.6	Slope (1:X)	150.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	8.900	Membrane Depth (m)	0


Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.900

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Date 06/03/2024 File 210321 - Plot 5 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 10 year Return Period</u>							
Half Drain Time : 12 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.971	0.071	0.0	0.3	0.3	0.3	O K
30 min Summer	8.982	0.082	0.0	0.3	0.3	0.4	O K
60 min Summer	8.987	0.087	0.0	0.4	0.4	0.4	O K
120 min Summer	8.983	0.083	0.0	0.3	0.3	0.4	O K
180 min Summer	8.976	0.076	0.0	0.3	0.3	0.3	O K
240 min Summer	8.970	0.070	0.0	0.3	0.3	0.3	O K
360 min Summer	8.960	0.060	0.0	0.3	0.3	0.2	O K
480 min Summer	8.952	0.052	0.0	0.3	0.3	0.2	O K
600 min Summer	8.946	0.046	0.0	0.2	0.2	0.1	O K
720 min Summer	8.941	0.041	0.0	0.2	0.2	0.1	O K
960 min Summer	8.935	0.035	0.0	0.2	0.2	0.1	O K
1440 min Summer	8.929	0.029	0.0	0.1	0.1	0.0	O K
2160 min Summer	8.925	0.025	0.0	0.1	0.1	0.0	O K
2880 min Summer	8.922	0.022	0.0	0.1	0.1	0.0	O K
4320 min Summer	8.919	0.019	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.917	0.017	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.915	0.015	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.914	0.014	0.0	0.0	0.0	0.0	O K
10080 min Summer	8.914	0.014	0.0	0.0	0.0	0.0	O K
15 min Winter	8.977	0.077	0.0	0.3	0.3	0.3	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	0.4	14			
30 min Summer	23.154	0.0	0.6	23			
60 min Summer	15.530	0.0	0.9	40			
120 min Summer	10.149	0.0	1.2	72			
180 min Summer	7.867	0.0	1.4	104			
240 min Summer	6.555	0.0	1.6	134			
360 min Summer	5.058	0.0	1.9	194			
480 min Summer	4.204	0.0	2.1	254			
600 min Summer	3.641	0.0	2.3	314			
720 min Summer	3.236	0.0	2.4	370			
960 min Summer	2.686	0.0	2.7	490			
1440 min Summer	2.065	0.0	3.1	734			
2160 min Summer	1.587	0.0	3.6	1100			
2880 min Summer	1.317	0.0	4.0	1444			
4320 min Summer	1.011	0.0	4.5	2164			
5760 min Summer	0.838	0.0	5.0	2864			
7200 min Summer	0.725	0.0	5.3	3576			
8640 min Summer	0.643	0.0	5.6	4368			
10080 min Summer	0.582	0.0	5.9	4992			
15 min Winter	33.317	0.0	0.5	15			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 5 Pervious Paving						
Date 06/03/2024 File 210321 - Plot 5 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 10 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	8.988	0.088	0.0	0.4	0.4	0.4	O K
60 min Winter	8.991	0.091	0.0	0.4	0.4	0.4	O K
120 min Winter	8.981	0.081	0.0	0.3	0.3	0.4	O K
180 min Winter	8.971	0.071	0.0	0.3	0.3	0.3	O K
240 min Winter	8.962	0.062	0.0	0.3	0.3	0.2	O K
360 min Winter	8.949	0.049	0.0	0.2	0.2	0.1	O K
480 min Winter	8.940	0.040	0.0	0.2	0.2	0.1	O K
600 min Winter	8.935	0.035	0.0	0.2	0.2	0.1	O K
720 min Winter	8.932	0.032	0.0	0.2	0.2	0.1	O K
960 min Winter	8.928	0.028	0.0	0.1	0.1	0.0	O K
1440 min Winter	8.924	0.024	0.0	0.1	0.1	0.0	O K
2160 min Winter	8.921	0.021	0.0	0.1	0.1	0.0	O K
2880 min Winter	8.918	0.018	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.915	0.015	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.914	0.014	0.0	0.0	0.0	0.0	O K
7200 min Winter	8.913	0.013	0.0	0.0	0.0	0.0	O K
8640 min Winter	8.912	0.012	0.0	0.0	0.0	0.0	O K
10080 min Winter	8.912	0.012	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	23.154	0.0	0.7	24			
60 min Winter	15.530	0.0	1.0	42			
120 min Winter	10.149	0.0	1.4	76			
180 min Winter	7.867	0.0	1.6	108			
240 min Winter	6.555	0.0	1.8	138			
360 min Winter	5.058	0.0	2.1	196			
480 min Winter	4.204	0.0	2.4	254			
600 min Winter	3.641	0.0	2.6	308			
720 min Winter	3.236	0.0	2.8	368			
960 min Winter	2.686	0.0	3.1	488			
1440 min Winter	2.065	0.0	3.5	730			
2160 min Winter	1.587	0.0	4.1	1108			
2880 min Winter	1.317	0.0	4.5	1460			
4320 min Winter	1.011	0.0	5.1	2188			
5760 min Winter	0.838	0.0	5.6	2856			
7200 min Winter	0.725	0.0	6.0	3608			
8640 min Winter	0.643	0.0	6.4	4256			
10080 min Winter	0.582	0.0	6.7	5056			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 5 Pervious Paving	
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Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0


Time Area Diagram

Total Area (ha) 0.009

Time (mins)		Area
From:	To:	(ha)
0	4	0.009

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 5 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 5 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.700		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 11.0
Max Percolation (l/s)	7.6	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.900	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.900		
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 5 Pervious Paving				
Date 06/03/2024 File 210321 - Plot 5 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<p>Summary of Results for 30 year Return Period (+35%)</p> <p>Half Drain Time : 19 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max <math>\Sigma</math> Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.010	0.110	0.0	0.4	0.4	0.6	O K
30 min Summer	9.031	0.131	0.0	0.4	0.4	0.8	O K
60 min Summer	9.043	0.143	0.0	0.5	0.5	0.9	O K
120 min Summer	9.041	0.141	0.0	0.5	0.5	0.9	O K
180 min Summer	9.032	0.132	0.0	0.5	0.5	0.8	O K
240 min Summer	9.022	0.122	0.0	0.4	0.4	0.7	O K
360 min Summer	9.006	0.106	0.0	0.4	0.4	0.6	O K
480 min Summer	8.992	0.092	0.0	0.4	0.4	0.5	O K
600 min Summer	8.982	0.082	0.0	0.3	0.3	0.4	O K
720 min Summer	8.974	0.074	0.0	0.3	0.3	0.3	O K
960 min Summer	8.962	0.062	0.0	0.3	0.3	0.2	O K
1440 min Summer	8.946	0.046	0.0	0.2	0.2	0.1	O K
2160 min Summer	8.935	0.035	0.0	0.2	0.2	0.1	O K
2880 min Summer	8.930	0.030	0.0	0.2	0.2	0.1	O K
4320 min Summer	8.925	0.025	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.923	0.023	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.921	0.021	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.919	0.019	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.918	0.018	0.0	0.1	0.1	0.0	O K
15 min Winter	9.021	0.121	0.0	0.4	0.4	0.7	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	0.8	15			
30 min Summer	39.673	0.0	1.2	24			
60 min Summer	26.745	0.0	1.7	42			
120 min Summer	17.385	0.0	2.2	76			
180 min Summer	13.417	0.0	2.6	108			
240 min Summer	11.137	0.0	2.9	140			
360 min Summer	8.542	0.0	3.3	202			
480 min Summer	7.068	0.0	3.7	262			
600 min Summer	6.098	0.0	3.9	322			
720 min Summer	5.403	0.0	4.2	382			
960 min Summer	4.463	0.0	4.6	500			
1440 min Summer	3.406	0.0	5.3	736			
2160 min Summer	2.598	0.0	6.1	1088			
2880 min Summer	2.144	0.0	6.6	1452			
4320 min Summer	1.634	0.0	7.6	2200			
5760 min Summer	1.346	0.0	8.3	2920			
7200 min Summer	1.158	0.0	8.8	3552			
8640 min Summer	1.024	0.0	9.3	4392			
10080 min Summer	0.923	0.0	9.8	4968			
15 min Winter	56.548	0.0	0.9	15			
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CADS		Source Control 2017.1.2

Summary of Results for 30 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.044	0.144	0.0	0.5	0.5	0.9	O K
60 min Winter	9.056	0.156	0.0	0.5	0.5	1.0	O K
120 min Winter	9.046	0.146	0.0	0.5	0.5	0.9	O K
180 min Winter	9.030	0.130	0.0	0.4	0.4	0.8	O K
240 min Winter	9.015	0.115	0.0	0.4	0.4	0.6	O K
360 min Winter	8.993	0.093	0.0	0.4	0.4	0.5	O K
480 min Winter	8.977	0.077	0.0	0.3	0.3	0.3	O K
600 min Winter	8.965	0.065	0.0	0.3	0.3	0.2	O K
720 min Winter	8.956	0.056	0.0	0.3	0.3	0.2	O K
960 min Winter	8.944	0.044	0.0	0.2	0.2	0.1	O K
1440 min Winter	8.933	0.033	0.0	0.2	0.2	0.1	O K
2160 min Winter	8.928	0.028	0.0	0.1	0.1	0.0	O K
2880 min Winter	8.925	0.025	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.921	0.021	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.918	0.018	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.917	0.017	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.915	0.015	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.914	0.014	0.0	0.0	0.0	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	39.673	0.0	1.4	25
60 min Winter	26.745	0.0	1.9	44
120 min Winter	17.385	0.0	2.5	80
180 min Winter	13.417	0.0	2.9	114
240 min Winter	11.137	0.0	3.2	146
360 min Winter	8.542	0.0	3.7	210
480 min Winter	7.068	0.0	4.1	268
600 min Winter	6.098	0.0	4.4	326
720 min Winter	5.403	0.0	4.7	384
960 min Winter	4.463	0.0	5.2	498
1440 min Winter	3.406	0.0	6.0	712
2160 min Winter	2.598	0.0	6.8	1084
2880 min Winter	2.144	0.0	7.5	1452
4320 min Winter	1.634	0.0	8.5	2184
5760 min Winter	1.346	0.0	9.3	2872
7200 min Winter	1.158	0.0	10.0	3632
8640 min Winter	1.024	0.0	10.5	4496
10080 min Winter	0.923	0.0	11.0	5120

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CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+35

Time Area Diagram


Total Area (ha) 0.009

Time (mins)		Area
From:	To:	(ha)
0	4	0.009

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 5 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 5 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.700		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 11.0
Max Percolation (l/s)	7.6	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.900	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.900		
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Date 06/03/2024 File 210321 - Plot 5 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 100 year Return Period (+35%)</u>							
Half Drain Time : 24 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.037	0.137	0.0	0.5	0.5	0.8	O K
30 min Summer	9.067	0.167	0.0	0.5	0.5	1.1	O K
60 min Summer	9.087	0.187	0.0	0.5	0.5	1.2	O K
120 min Summer	9.086	0.186	0.0	0.5	0.5	1.2	O K
180 min Summer	9.076	0.176	0.0	0.5	0.5	1.1	O K
240 min Summer	9.064	0.164	0.0	0.5	0.5	1.0	O K
360 min Summer	9.042	0.142	0.0	0.5	0.5	0.9	O K
480 min Summer	9.025	0.125	0.0	0.4	0.4	0.7	O K
600 min Summer	9.011	0.111	0.0	0.4	0.4	0.6	O K
720 min Summer	8.999	0.099	0.0	0.4	0.4	0.5	O K
960 min Summer	8.982	0.082	0.0	0.3	0.3	0.4	O K
1440 min Summer	8.961	0.061	0.0	0.3	0.3	0.2	O K
2160 min Summer	8.944	0.044	0.0	0.2	0.2	0.1	O K
2880 min Summer	8.935	0.035	0.0	0.2	0.2	0.1	O K
4320 min Summer	8.929	0.029	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.925	0.025	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.923	0.023	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.921	0.021	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.920	0.020	0.0	0.1	0.1	0.0	O K
15 min Winter	9.053	0.153	0.0	0.5	0.5	1.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	1.1	16			
30 min Summer	51.518	0.0	1.6	25			
60 min Summer	34.923	0.0	2.2	42			
120 min Summer	22.569	0.0	2.9	76			
180 min Summer	17.334	0.0	3.4	110			
240 min Summer	14.329	0.0	3.7	142			
360 min Summer	10.919	0.0	4.3	206			
480 min Summer	8.989	0.0	4.7	266			
600 min Summer	7.724	0.0	5.0	326			
720 min Summer	6.821	0.0	5.3	386			
960 min Summer	5.602	0.0	5.9	508			
1440 min Summer	4.241	0.0	6.7	738			
2160 min Summer	3.209	0.0	7.5	1100			
2880 min Summer	2.633	0.0	8.2	1460			
4320 min Summer	1.989	0.0	9.3	2156			
5760 min Summer	1.628	0.0	10.1	2880			
7200 min Summer	1.394	0.0	10.7	3608			
8640 min Summer	1.227	0.0	11.3	4400			
10080 min Summer	1.101	0.0	11.8	5112			
15 min Winter	72.673	0.0	1.2	16			
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Summary of Results for 100 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.086	0.186	0.0	0.5	0.5	1.2	O K
60 min Winter	9.106	0.206	0.0	0.6	0.6	1.4	O K
120 min Winter	9.097	0.197	0.0	0.6	0.6	1.3	O K
180 min Winter	9.078	0.178	0.0	0.5	0.5	1.2	O K
240 min Winter	9.060	0.160	0.0	0.5	0.5	1.0	O K
360 min Winter	9.029	0.129	0.0	0.4	0.4	0.8	O K
480 min Winter	9.007	0.107	0.0	0.4	0.4	0.6	O K
600 min Winter	8.990	0.090	0.0	0.4	0.4	0.4	O K
720 min Winter	8.977	0.077	0.0	0.3	0.3	0.3	O K
960 min Winter	8.960	0.060	0.0	0.3	0.3	0.2	O K
1440 min Winter	8.942	0.042	0.0	0.2	0.2	0.1	O K
2160 min Winter	8.932	0.032	0.0	0.2	0.2	0.1	O K
2880 min Winter	8.928	0.028	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.924	0.024	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.921	0.021	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.919	0.019	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.917	0.017	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.916	0.016	0.0	0.1	0.1	0.0	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	51.518	0.0	1.8	26
60 min Winter	34.923	0.0	2.5	46
120 min Winter	22.569	0.0	3.3	82
180 min Winter	17.334	0.0	3.8	116
240 min Winter	14.329	0.0	4.2	150
360 min Winter	10.919	0.0	4.8	214
480 min Winter	8.989	0.0	5.3	276
600 min Winter	7.724	0.0	5.7	336
720 min Winter	6.821	0.0	6.0	394
960 min Winter	5.602	0.0	6.6	510
1440 min Winter	4.241	0.0	7.5	736
2160 min Winter	3.209	0.0	8.5	1088
2880 min Winter	2.633	0.0	9.3	1460
4320 min Winter	1.989	0.0	10.4	2164
5760 min Winter	1.628	0.0	11.4	2888
7200 min Winter	1.394	0.0	12.1	3640
8640 min Winter	1.227	0.0	12.7	4200
10080 min Winter	1.101	0.0	13.3	5136


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CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.009		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.009		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 5 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 5 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.700		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 11.0
Max Percolation (l/s)	7.6	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.900	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.900		
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 5 Pervious Paving				
Date 06/03/2024 File 210321 - Plot 5 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 200 year Return Period (+35%)</u>							
Half Drain Time : 27 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.058	0.158	0.0	0.5	0.5	1.0	O K
30 min Summer	9.094	0.194	0.0	0.6	0.6	1.3	O K
60 min Summer	9.120	0.220	0.0	0.6	0.6	1.5	O K
120 min Summer	9.120	0.220	0.0	0.6	0.6	1.5	O K
180 min Summer	9.108	0.208	0.0	0.6	0.6	1.4	O K
240 min Summer	9.095	0.195	0.0	0.6	0.6	1.3	O K
360 min Summer	9.070	0.170	0.0	0.5	0.5	1.1	O K
480 min Summer	9.050	0.150	0.0	0.5	0.5	0.9	O K
600 min Summer	9.033	0.133	0.0	0.5	0.5	0.8	O K
720 min Summer	9.019	0.119	0.0	0.4	0.4	0.7	O K
960 min Summer	8.998	0.098	0.0	0.4	0.4	0.5	O K
1440 min Summer	8.972	0.072	0.0	0.3	0.3	0.3	O K
2160 min Summer	8.952	0.052	0.0	0.3	0.3	0.2	O K
2880 min Summer	8.940	0.040	0.0	0.2	0.2	0.1	O K
4320 min Summer	8.931	0.031	0.0	0.2	0.2	0.1	O K
5760 min Summer	8.927	0.027	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.925	0.025	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.923	0.023	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.921	0.021	0.0	0.1	0.1	0.0	O K
15 min Winter	9.076	0.176	0.0	0.5	0.5	1.1	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	1.3	16			
30 min Summer	59.880	0.0	1.9	25			
60 min Summer	40.721	0.0	2.6	42			
120 min Summer	26.227	0.0	3.4	78			
180 min Summer	20.088	0.0	3.9	110			
240 min Summer	16.566	0.0	4.3	144			
360 min Summer	12.577	0.0	4.9	206			
480 min Summer	10.324	0.0	5.4	268			
600 min Summer	8.850	0.0	5.8	330			
720 min Summer	7.800	0.0	6.1	390			
960 min Summer	6.386	0.0	6.7	510			
1440 min Summer	4.811	0.0	7.6	748			
2160 min Summer	3.624	0.0	8.5	1104			
2880 min Summer	2.964	0.0	9.3	1468			
4320 min Summer	2.228	0.0	10.4	2164			
5760 min Summer	1.817	0.0	11.3	2856			
7200 min Summer	1.550	0.0	12.0	3656			
8640 min Summer	1.361	0.0	12.6	4400			
10080 min Summer	1.219	0.0	13.1	5032			
15 min Winter	83.965	0.0	1.4	16			
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15 Victoria Street Aberdeen AB10 1XB		210321 - Cairston Road North Plot 5 Pervious Paving					
Date 06/03/2024 File 210321 - Plot 5 Perviou...		Designed by JMA Checked by JMA					
CADS		Source Control 2017.1.2					
<u>Summary of Results for 200 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	9.117	0.217	0.0	0.6	0.6	1.5	O K
60 min Winter	9.143	0.243	0.0	0.6	0.6	1.7	O K
120 min Winter	9.135	0.235	0.0	0.6	0.6	1.6	O K
180 min Winter	9.114	0.214	0.0	0.6	0.6	1.5	O K
240 min Winter	9.093	0.193	0.0	0.6	0.6	1.3	O K
360 min Winter	9.057	0.157	0.0	0.5	0.5	1.0	O K
480 min Winter	9.030	0.130	0.0	0.4	0.4	0.8	O K
600 min Winter	9.010	0.110	0.0	0.4	0.4	0.6	O K
720 min Winter	8.994	0.094	0.0	0.4	0.4	0.5	O K
960 min Winter	8.973	0.073	0.0	0.3	0.3	0.3	O K
1440 min Winter	8.950	0.050	0.0	0.3	0.3	0.1	O K
2160 min Winter	8.935	0.035	0.0	0.2	0.2	0.1	O K
2880 min Winter	8.930	0.030	0.0	0.2	0.2	0.1	O K
4320 min Winter	8.925	0.025	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.922	0.022	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.920	0.020	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.919	0.019	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.917	0.017	0.0	0.1	0.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	59.880	0.0	2.1	27			
60 min Winter	40.721	0.0	2.9	46			
120 min Winter	26.227	0.0	3.8	82			
180 min Winter	20.088	0.0	4.4	118			
240 min Winter	16.566	0.0	4.9	152			
360 min Winter	12.577	0.0	5.5	216			
480 min Winter	10.324	0.0	6.1	278			
600 min Winter	8.850	0.0	6.5	338			
720 min Winter	7.800	0.0	6.9	398			
960 min Winter	6.386	0.0	7.5	512			
1440 min Winter	4.811	0.0	8.5	738			
2160 min Winter	3.624	0.0	9.6	1100			
2880 min Winter	2.964	0.0	10.5	1440			
4320 min Winter	2.228	0.0	11.7	2164			
5760 min Winter	1.817	0.0	12.7	2848			
7200 min Winter	1.550	0.0	13.5	3560			
8640 min Winter	1.361	0.0	14.2	4376			
10080 min Winter	1.219	0.0	14.8	5000			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 5 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 5 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.009		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.009		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 5 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 5 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 9.700		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 11.0
Max Percolation (l/s)	7.6	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	8.900	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 8.900		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
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CADS		Source Control 2017.1.2

Summary of Results for 1 year Return Period


Half Drain Time : 8 minutes.


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	9.543	0.043	0.0	0.2	0.2	0.1	O K
30 min Summer	9.552	0.052	0.0	0.3	0.3	0.2	O K
60 min Summer	9.556	0.056	0.0	0.3	0.3	0.2	O K
120 min Summer	9.553	0.053	0.0	0.3	0.3	0.2	O K
180 min Summer	9.548	0.048	0.0	0.2	0.2	0.1	O K
240 min Summer	9.543	0.043	0.0	0.2	0.2	0.1	O K
360 min Summer	9.536	0.036	0.0	0.2	0.2	0.1	O K
480 min Summer	9.533	0.033	0.0	0.2	0.2	0.1	O K
600 min Summer	9.531	0.031	0.0	0.2	0.2	0.1	O K
720 min Summer	9.529	0.029	0.0	0.1	0.1	0.0	O K
960 min Summer	9.526	0.026	0.0	0.1	0.1	0.0	O K
1440 min Summer	9.522	0.022	0.0	0.1	0.1	0.0	O K
2160 min Summer	9.519	0.019	0.0	0.1	0.1	0.0	O K
2880 min Summer	9.517	0.017	0.0	0.1	0.1	0.0	O K
4320 min Summer	9.514	0.014	0.0	0.0	0.0	0.0	O K
5760 min Summer	9.513	0.013	0.0	0.0	0.0	0.0	O K
7200 min Summer	9.513	0.013	0.0	0.0	0.0	0.0	O K
8640 min Summer	9.512	0.012	0.0	0.0	0.0	0.0	O K
10080 min Summer	9.512	0.012	0.0	0.0	0.0	0.0	O K
15 min Winter	9.549	0.049	0.0	0.2	0.2	0.1	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	19.000	0.0	0.2	13
30 min Summer	13.218	0.0	0.3	22
60 min Summer	8.918	0.0	0.5	38
120 min Summer	5.920	0.0	0.7	70
180 min Summer	4.641	0.0	0.8	100
240 min Summer	3.903	0.0	0.9	130
360 min Summer	3.055	0.0	1.1	188
480 min Summer	2.569	0.0	1.2	248
600 min Summer	2.246	0.0	1.4	308
720 min Summer	2.013	0.0	1.5	368
960 min Summer	1.694	0.0	1.6	490
1440 min Summer	1.326	0.0	1.9	718
2160 min Summer	1.034	0.0	2.3	1084
2880 min Summer	0.866	0.0	2.5	1432
4320 min Summer	0.675	0.0	2.9	2204
5760 min Summer	0.566	0.0	3.2	2904
7200 min Summer	0.494	0.0	3.5	3544
8640 min Summer	0.441	0.0	3.7	4408
10080 min Summer	0.401	0.0	3.9	5080
15 min Winter	19.000	0.0	0.2	14





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15 Victoria Street Aberdeen AB10 1XB		210321 - Cairston Road North Plot 6 Pervious Paving					
Date 06/03/2024 File 210321 - Plot 6 Perviou...		Designed by JMA Checked by JMA					
CADS		Source Control 2017.1.2					
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (1/s)</b>	<b>Max Control (1/s)</b>	<b>Max Σ Outflow (1/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	9.556	0.056	0.0	0.3	0.3	0.2	O K
60 min Winter	9.557	0.057	0.0	0.3	0.3	0.2	O K
120 min Winter	9.549	0.049	0.0	0.2	0.2	0.1	O K
180 min Winter	9.541	0.041	0.0	0.2	0.2	0.1	O K
240 min Winter	9.536	0.036	0.0	0.2	0.2	0.1	O K
360 min Winter	9.531	0.031	0.0	0.2	0.2	0.1	O K
480 min Winter	9.527	0.027	0.0	0.1	0.1	0.0	O K
600 min Winter	9.525	0.025	0.0	0.1	0.1	0.0	O K
720 min Winter	9.524	0.024	0.0	0.1	0.1	0.0	O K
960 min Winter	9.521	0.021	0.0	0.1	0.1	0.0	O K
1440 min Winter	9.518	0.018	0.0	0.1	0.1	0.0	O K
2160 min Winter	9.515	0.015	0.0	0.1	0.1	0.0	O K
2880 min Winter	9.514	0.014	0.0	0.0	0.0	0.0	O K
4320 min Winter	9.513	0.013	0.0	0.0	0.0	0.0	O K
5760 min Winter	9.512	0.012	0.0	0.0	0.0	0.0	O K
7200 min Winter	9.511	0.011	0.0	0.0	0.0	0.0	O K
8640 min Winter	9.510	0.010	0.0	0.0	0.0	0.0	O K
10080 min Winter	9.510	0.010	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	0.4	23			
60 min Winter	8.918	0.0	0.5	40			
120 min Winter	5.920	0.0	0.8	72			
180 min Winter	4.641	0.0	0.9	102			
240 min Winter	3.903	0.0	1.0	128			
360 min Winter	3.055	0.0	1.2	188			
480 min Winter	2.569	0.0	1.4	248			
600 min Winter	2.246	0.0	1.5	308			
720 min Winter	2.013	0.0	1.7	376			
960 min Winter	1.694	0.0	1.9	484			
1440 min Winter	1.326	0.0	2.2	744			
2160 min Winter	1.034	0.0	2.6	1092			
2880 min Winter	0.866	0.0	2.9	1472			
4320 min Winter	0.675	0.0	3.3	2176			
5760 min Winter	0.566	0.0	3.7	2840			
7200 min Winter	0.494	0.0	4.0	3480			
8640 min Winter	0.441	0.0	4.2	4352			
10080 min Winter	0.401	0.0	4.4	5040			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 6 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.009		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.009		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 10.300		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 10.5
Max Percolation (l/s)	7.3	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	9.500	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.500		
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Date 06/03/2024 File 210321 - Plot 6 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<u>Summary of Results for 10 year Return Period</u>							
Half Drain Time : 11 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.571	0.071	0.0	0.3	0.3	0.3	O K
30 min Summer	9.583	0.083	0.0	0.3	0.3	0.4	O K
60 min Summer	9.588	0.088	0.0	0.4	0.4	0.4	O K
120 min Summer	9.584	0.084	0.0	0.3	0.3	0.4	O K
180 min Summer	9.576	0.076	0.0	0.3	0.3	0.3	O K
240 min Summer	9.570	0.070	0.0	0.3	0.3	0.3	O K
360 min Summer	9.560	0.060	0.0	0.3	0.3	0.2	O K
480 min Summer	9.552	0.052	0.0	0.3	0.3	0.2	O K
600 min Summer	9.546	0.046	0.0	0.2	0.2	0.1	O K
720 min Summer	9.541	0.041	0.0	0.2	0.2	0.1	O K
960 min Summer	9.535	0.035	0.0	0.2	0.2	0.1	O K
1440 min Summer	9.529	0.029	0.0	0.1	0.1	0.0	O K
2160 min Summer	9.525	0.025	0.0	0.1	0.1	0.0	O K
2880 min Summer	9.522	0.022	0.0	0.1	0.1	0.0	O K
4320 min Summer	9.519	0.019	0.0	0.1	0.1	0.0	O K
5760 min Summer	9.517	0.017	0.0	0.1	0.1	0.0	O K
7200 min Summer	9.515	0.015	0.0	0.1	0.1	0.0	O K
8640 min Summer	9.514	0.014	0.0	0.0	0.0	0.0	O K
10080 min Summer	9.514	0.014	0.0	0.0	0.0	0.0	O K
15 min Winter	9.578	0.078	0.0	0.3	0.3	0.3	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	0.4	14			
30 min Summer	23.154	0.0	0.6	23			
60 min Summer	15.530	0.0	0.9	40			
120 min Summer	10.149	0.0	1.2	72			
180 min Summer	7.867	0.0	1.5	104			
240 min Summer	6.555	0.0	1.6	134			
360 min Summer	5.058	0.0	1.9	194			
480 min Summer	4.204	0.0	2.1	254			
600 min Summer	3.641	0.0	2.3	314			
720 min Summer	3.236	0.0	2.5	370			
960 min Summer	2.686	0.0	2.7	490			
1440 min Summer	2.065	0.0	3.1	734			
2160 min Summer	1.587	0.0	3.6	1100			
2880 min Summer	1.317	0.0	4.0	1440			
4320 min Summer	1.011	0.0	4.5	2132			
5760 min Summer	0.838	0.0	5.0	2912			
7200 min Summer	0.725	0.0	5.3	3664			
8640 min Summer	0.643	0.0	5.7	4408			
10080 min Summer	0.582	0.0	5.9	5112			
15 min Winter	33.317	0.0	0.5	15			
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Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 10 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	9.589	0.089	0.0	0.4	0.4	0.4	O K
60 min Winter	9.592	0.092	0.0	0.4	0.4	0.4	O K
120 min Winter	9.582	0.082	0.0	0.3	0.3	0.4	O K
180 min Winter	9.571	0.071	0.0	0.3	0.3	0.3	O K
240 min Winter	9.562	0.062	0.0	0.3	0.3	0.2	O K
360 min Winter	9.549	0.049	0.0	0.2	0.2	0.1	O K
480 min Winter	9.540	0.040	0.0	0.2	0.2	0.1	O K
600 min Winter	9.535	0.035	0.0	0.2	0.2	0.1	O K
720 min Winter	9.532	0.032	0.0	0.2	0.2	0.1	O K
960 min Winter	9.528	0.028	0.0	0.1	0.1	0.0	O K
1440 min Winter	9.524	0.024	0.0	0.1	0.1	0.0	O K
2160 min Winter	9.521	0.021	0.0	0.1	0.1	0.0	O K
2880 min Winter	9.518	0.018	0.0	0.1	0.1	0.0	O K
4320 min Winter	9.515	0.015	0.0	0.1	0.1	0.0	O K
5760 min Winter	9.514	0.014	0.0	0.0	0.0	0.0	O K
7200 min Winter	9.513	0.013	0.0	0.0	0.0	0.0	O K
8640 min Winter	9.512	0.012	0.0	0.0	0.0	0.0	O K
10080 min Winter	9.512	0.012	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	23.154	0.0	0.7	24			
60 min Winter	15.530	0.0	1.0	42			
120 min Winter	10.149	0.0	1.4	76			
180 min Winter	7.867	0.0	1.6	108			
240 min Winter	6.555	0.0	1.8	138			
360 min Winter	5.058	0.0	2.1	196			
480 min Winter	4.204	0.0	2.4	254			
600 min Winter	3.641	0.0	2.6	308			
720 min Winter	3.236	0.0	2.8	374			
960 min Winter	2.686	0.0	3.1	488			
1440 min Winter	2.065	0.0	3.5	730			
2160 min Winter	1.587	0.0	4.1	1076			
2880 min Winter	1.317	0.0	4.5	1460			
4320 min Winter	1.011	0.0	5.1	2140			
5760 min Winter	0.838	0.0	5.6	2896			
7200 min Winter	0.725	0.0	6.1	3672			
8640 min Winter	0.643	0.0	6.4	4352			
10080 min Winter	0.582	0.0	6.7	5000			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	10	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.009		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.009		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 10.300		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 10.5
Max Percolation (l/s)	7.3	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	9.500	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.500		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving						
Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA						
CADS	Source Control 2017.1.2						
<u>Summary of Results for 30 year Return Period (+35%)</u>							
Half Drain Time : 19 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.612	0.112	0.0	0.4	0.4	0.6	O K
30 min Summer	9.634	0.134	0.0	0.5	0.5	0.8	O K
60 min Summer	9.647	0.147	0.0	0.5	0.5	0.9	O K
120 min Summer	9.643	0.143	0.0	0.5	0.5	0.9	O K
180 min Summer	9.634	0.134	0.0	0.5	0.5	0.8	O K
240 min Summer	9.624	0.124	0.0	0.4	0.4	0.7	O K
360 min Summer	9.607	0.107	0.0	0.4	0.4	0.6	O K
480 min Summer	9.593	0.093	0.0	0.4	0.4	0.5	O K
600 min Summer	9.583	0.083	0.0	0.3	0.3	0.4	O K
720 min Summer	9.574	0.074	0.0	0.3	0.3	0.3	O K
960 min Summer	9.562	0.062	0.0	0.3	0.3	0.2	O K
1440 min Summer	9.546	0.046	0.0	0.2	0.2	0.1	O K
2160 min Summer	9.535	0.035	0.0	0.2	0.2	0.1	O K
2880 min Summer	9.530	0.030	0.0	0.2	0.2	0.1	O K
4320 min Summer	9.525	0.025	0.0	0.1	0.1	0.0	O K
5760 min Summer	9.523	0.023	0.0	0.1	0.1	0.0	O K
7200 min Summer	9.521	0.021	0.0	0.1	0.1	0.0	O K
8640 min Summer	9.519	0.019	0.0	0.1	0.1	0.0	O K
10080 min Summer	9.518	0.018	0.0	0.1	0.1	0.0	O K
15 min Winter	9.624	0.124	0.0	0.4	0.4	0.7	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	0.8	15			
30 min Summer	39.673	0.0	1.2	24			
60 min Summer	26.745	0.0	1.7	42			
120 min Summer	17.385	0.0	2.2	76			
180 min Summer	13.417	0.0	2.6	108			
240 min Summer	11.137	0.0	2.9	140			
360 min Summer	8.542	0.0	3.3	202			
480 min Summer	7.068	0.0	3.7	262			
600 min Summer	6.098	0.0	4.0	322			
720 min Summer	5.403	0.0	4.2	382			
960 min Summer	4.463	0.0	4.6	500			
1440 min Summer	3.406	0.0	5.3	736			
2160 min Summer	2.598	0.0	6.1	1092			
2880 min Summer	2.144	0.0	6.7	1436			
4320 min Summer	1.634	0.0	7.6	2200			
5760 min Summer	1.346	0.0	8.3	2936			
7200 min Summer	1.158	0.0	8.9	3608			
8640 min Summer	1.024	0.0	9.4	4280			
10080 min Summer	0.923	0.0	9.8	4992			
15 min Winter	56.548	0.0	0.9	15			
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 6 Pervious Paving				
Date 06/03/2024 File 210321 - Plot 6 Perviou...			Designed by JMA Checked by JMA				
CADS			Source Control 2017.1.2				
<u>Summary of Results for 30 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	9.648	0.148	0.0	0.5	0.5	0.9	O K
60 min Winter	9.659	0.159	0.0	0.5	0.5	1.0	O K
120 min Winter	9.648	0.148	0.0	0.5	0.5	0.9	O K
180 min Winter	9.632	0.132	0.0	0.5	0.5	0.8	O K
240 min Winter	9.617	0.117	0.0	0.4	0.4	0.6	O K
360 min Winter	9.593	0.093	0.0	0.4	0.4	0.5	O K
480 min Winter	9.577	0.077	0.0	0.3	0.3	0.3	O K
600 min Winter	9.565	0.065	0.0	0.3	0.3	0.2	O K
720 min Winter	9.556	0.056	0.0	0.3	0.3	0.2	O K
960 min Winter	9.544	0.044	0.0	0.2	0.2	0.1	O K
1440 min Winter	9.533	0.033	0.0	0.2	0.2	0.1	O K
2160 min Winter	9.528	0.028	0.0	0.1	0.1	0.0	O K
2880 min Winter	9.525	0.025	0.0	0.1	0.1	0.0	O K
4320 min Winter	9.521	0.021	0.0	0.1	0.1	0.0	O K
5760 min Winter	9.518	0.018	0.0	0.1	0.1	0.0	O K
7200 min Winter	9.517	0.017	0.0	0.1	0.1	0.0	O K
8640 min Winter	9.515	0.015	0.0	0.1	0.1	0.0	O K
10080 min Winter	9.514	0.014	0.0	0.0	0.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	39.673	0.0	1.4	25			
60 min Winter	26.745	0.0	1.9	44			
120 min Winter	17.385	0.0	2.5	80			
180 min Winter	13.417	0.0	2.9	114			
240 min Winter	11.137	0.0	3.2	146			
360 min Winter	8.542	0.0	3.7	208			
480 min Winter	7.068	0.0	4.1	268			
600 min Winter	6.098	0.0	4.4	326			
720 min Winter	5.403	0.0	4.7	384			
960 min Winter	4.463	0.0	5.2	498			
1440 min Winter	3.406	0.0	6.0	734			
2160 min Winter	2.598	0.0	6.8	1080			
2880 min Winter	2.144	0.0	7.5	1440			
4320 min Winter	1.634	0.0	8.5	2236			
5760 min Winter	1.346	0.0	9.3	2896			
7200 min Winter	1.158	0.0	10.0	3632			
8640 min Winter	1.024	0.0	10.5	4192			
10080 min Winter	0.923	0.0	11.0	4976			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 6 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	30	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.009		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.009		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 10.300		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 10.5
Max Percolation (l/s)	7.3	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	9.500	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.500		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving						
Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 100 year Return Period (+35%)</u>							
Half Drain Time : 24 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.641	0.141	0.0	0.5	0.5	0.8	O K
30 min Summer	9.672	0.172	0.0	0.5	0.5	1.1	O K
60 min Summer	9.693	0.193	0.0	0.6	0.6	1.2	O K
120 min Summer	9.691	0.191	0.0	0.6	0.6	1.2	O K
180 min Summer	9.680	0.180	0.0	0.5	0.5	1.1	O K
240 min Summer	9.667	0.167	0.0	0.5	0.5	1.0	O K
360 min Summer	9.645	0.145	0.0	0.5	0.5	0.9	O K
480 min Summer	9.627	0.127	0.0	0.4	0.4	0.7	O K
600 min Summer	9.612	0.112	0.0	0.4	0.4	0.6	O K
720 min Summer	9.600	0.100	0.0	0.4	0.4	0.5	O K
960 min Summer	9.582	0.082	0.0	0.3	0.3	0.4	O K
1440 min Summer	9.561	0.061	0.0	0.3	0.3	0.2	O K
2160 min Summer	9.544	0.044	0.0	0.2	0.2	0.1	O K
2880 min Summer	9.535	0.035	0.0	0.2	0.2	0.1	O K
4320 min Summer	9.529	0.029	0.0	0.1	0.1	0.0	O K
5760 min Summer	9.525	0.025	0.0	0.1	0.1	0.0	O K
7200 min Summer	9.523	0.023	0.0	0.1	0.1	0.0	O K
8640 min Summer	9.521	0.021	0.0	0.1	0.1	0.0	O K
10080 min Summer	9.520	0.020	0.0	0.1	0.1	0.0	O K
15 min Winter	9.657	0.157	0.0	0.5	0.5	1.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	1.1	16			
30 min Summer	51.518	0.0	1.6	25			
60 min Summer	34.923	0.0	2.2	42			
120 min Summer	22.569	0.0	2.9	76			
180 min Summer	17.334	0.0	3.4	110			
240 min Summer	14.329	0.0	3.7	142			
360 min Summer	10.919	0.0	4.3	204			
480 min Summer	8.989	0.0	4.7	266			
600 min Summer	7.724	0.0	5.0	326			
720 min Summer	6.821	0.0	5.4	386			
960 min Summer	5.602	0.0	5.9	504			
1440 min Summer	4.241	0.0	6.7	738			
2160 min Summer	3.209	0.0	7.5	1100			
2880 min Summer	2.633	0.0	8.2	1456			
4320 min Summer	1.989	0.0	9.3	2152			
5760 min Summer	1.628	0.0	10.1	2840			
7200 min Summer	1.394	0.0	10.8	3664			
8640 min Summer	1.227	0.0	11.3	4304			
10080 min Summer	1.101	0.0	11.8	4984			
15 min Winter	72.673	0.0	1.2	16			
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Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Summary of Results for 100 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.692	0.192	0.0	0.6	0.6	1.2	O K
60 min Winter	9.712	0.212	0.0	0.6	0.6	1.4	O K
120 min Winter	9.702	0.202	0.0	0.6	0.6	1.3	O K
180 min Winter	9.682	0.182	0.0	0.5	0.5	1.2	O K
240 min Winter	9.662	0.162	0.0	0.5	0.5	1.0	O K
360 min Winter	9.631	0.131	0.0	0.4	0.4	0.8	O K
480 min Winter	9.607	0.107	0.0	0.4	0.4	0.6	O K
600 min Winter	9.590	0.090	0.0	0.4	0.4	0.4	O K
720 min Winter	9.578	0.078	0.0	0.3	0.3	0.3	O K
960 min Winter	9.560	0.060	0.0	0.3	0.3	0.2	O K
1440 min Winter	9.542	0.042	0.0	0.2	0.2	0.1	O K
2160 min Winter	9.532	0.032	0.0	0.2	0.2	0.1	O K
2880 min Winter	9.528	0.028	0.0	0.1	0.1	0.0	O K
4320 min Winter	9.524	0.024	0.0	0.1	0.1	0.0	O K
5760 min Winter	9.521	0.021	0.0	0.1	0.1	0.0	O K
7200 min Winter	9.519	0.019	0.0	0.1	0.1	0.0	O K
8640 min Winter	9.517	0.017	0.0	0.1	0.1	0.0	O K
10080 min Winter	9.516	0.016	0.0	0.1	0.1	0.0	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	51.518	0.0	1.8	26
60 min Winter	34.923	0.0	2.5	46
120 min Winter	22.569	0.0	3.3	82
180 min Winter	17.334	0.0	3.8	116
240 min Winter	14.329	0.0	4.2	150
360 min Winter	10.919	0.0	4.8	214
480 min Winter	8.989	0.0	5.3	274
600 min Winter	7.724	0.0	5.7	334
720 min Winter	6.821	0.0	6.0	392
960 min Winter	5.602	0.0	6.6	510
1440 min Winter	4.241	0.0	7.5	736
2160 min Winter	3.209	0.0	8.5	1088
2880 min Winter	2.633	0.0	9.3	1444
4320 min Winter	1.989	0.0	10.5	2184
5760 min Winter	1.628	0.0	11.4	2864
7200 min Winter	1.394	0.0	12.1	3624
8640 min Winter	1.227	0.0	12.8	4288
10080 min Winter	1.101	0.0	13.3	5136

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 6 Pervi...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.009		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.009		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 10.300		
<u>Porous Car Park Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Width (m) 2.5
Membrane Percolation (mm/hr)	1000	Length (m) 10.5
Max Percolation (l/s)	7.3	Slope (1:X) 150.0
Safety Factor	2.0	Depression Storage (mm) 5
Porosity	0.30	Evaporation (mm/day) 3
Invert Level (m)	9.500	Membrane Depth (m) 0
<u>Orifice Outflow Control</u>		
Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.500		
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Plot 6 Pervious Paving				
Date 06/03/2024 File 210321 - Plot 6 Perviou...			Designed by JMA Checked by JMA				
CADS				Source Control 2017.1.2			
<p><u>Summary of Results for 200 year Return Period (+35%)</u></p> <p>Half Drain Time : 27 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.662	0.162	0.0	0.5	0.5	1.0	O K
30 min Summer	9.700	0.200	0.0	0.6	0.6	1.3	O K
60 min Summer	9.726	0.226	0.0	0.6	0.6	1.5	O K
120 min Summer	9.726	0.226	0.0	0.6	0.6	1.5	O K
180 min Summer	9.713	0.213	0.0	0.6	0.6	1.4	O K
240 min Summer	9.700	0.200	0.0	0.6	0.6	1.3	O K
360 min Summer	9.674	0.174	0.0	0.5	0.5	1.1	O K
480 min Summer	9.652	0.152	0.0	0.5	0.5	0.9	O K
600 min Summer	9.635	0.135	0.0	0.5	0.5	0.8	O K
720 min Summer	9.620	0.120	0.0	0.4	0.4	0.7	O K
960 min Summer	9.599	0.099	0.0	0.4	0.4	0.5	O K
1440 min Summer	9.572	0.072	0.0	0.3	0.3	0.3	O K
2160 min Summer	9.552	0.052	0.0	0.3	0.3	0.2	O K
2880 min Summer	9.540	0.040	0.0	0.2	0.2	0.1	O K
4320 min Summer	9.531	0.031	0.0	0.2	0.2	0.1	O K
5760 min Summer	9.527	0.027	0.0	0.1	0.1	0.0	O K
7200 min Summer	9.525	0.025	0.0	0.1	0.1	0.0	O K
8640 min Summer	9.523	0.023	0.0	0.1	0.1	0.0	O K
10080 min Summer	9.521	0.021	0.0	0.1	0.1	0.0	O K
15 min Winter	9.681	0.181	0.0	0.5	0.5	1.1	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	1.3	16			
30 min Summer	59.880	0.0	1.9	25			
60 min Summer	40.721	0.0	2.6	42			
120 min Summer	26.227	0.0	3.4	78			
180 min Summer	20.088	0.0	3.9	110			
240 min Summer	16.566	0.0	4.3	144			
360 min Summer	12.577	0.0	4.9	206			
480 min Summer	10.324	0.0	5.4	268			
600 min Summer	8.850	0.0	5.8	328			
720 min Summer	7.800	0.0	6.1	390			
960 min Summer	6.386	0.0	6.7	510			
1440 min Summer	4.811	0.0	7.6	748			
2160 min Summer	3.624	0.0	8.6	1104			
2880 min Summer	2.964	0.0	9.3	1468			
4320 min Summer	2.228	0.0	10.5	2144			
5760 min Summer	1.817	0.0	11.3	2872			
7200 min Summer	1.550	0.0	12.0	3648			
8640 min Summer	1.361	0.0	12.6	4376			
10080 min Summer	1.219	0.0	13.1	5048			
15 min Winter	83.965	0.0	1.5	16			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Plot 6 Pervious Paving	
Date 06/03/2024 File 210321 - Plot 6 Perviou...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2

Summary of Results for 200 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.723	0.223	0.0	0.6	0.6	1.5	O K
60 min Winter	9.750	0.250	0.0	0.6	0.6	1.7	O K
120 min Winter	9.741	0.241	0.0	0.6	0.6	1.6	O K
180 min Winter	9.719	0.219	0.0	0.6	0.6	1.4	O K
240 min Winter	9.697	0.197	0.0	0.6	0.6	1.3	O K
360 min Winter	9.660	0.160	0.0	0.5	0.5	1.0	O K
480 min Winter	9.632	0.132	0.0	0.5	0.5	0.8	O K
600 min Winter	9.611	0.111	0.0	0.4	0.4	0.6	O K
720 min Winter	9.595	0.095	0.0	0.4	0.4	0.5	O K
960 min Winter	9.573	0.073	0.0	0.3	0.3	0.3	O K
1440 min Winter	9.550	0.050	0.0	0.3	0.3	0.1	O K
2160 min Winter	9.535	0.035	0.0	0.2	0.2	0.1	O K
2880 min Winter	9.530	0.030	0.0	0.2	0.2	0.1	O K
4320 min Winter	9.525	0.025	0.0	0.1	0.1	0.0	O K
5760 min Winter	9.522	0.022	0.0	0.1	0.1	0.0	O K
7200 min Winter	9.520	0.020	0.0	0.1	0.1	0.0	O K
8640 min Winter	9.519	0.019	0.0	0.1	0.1	0.0	O K
10080 min Winter	9.517	0.017	0.0	0.1	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	59.880	0.0	2.1	27
60 min Winter	40.721	0.0	2.9	46
120 min Winter	26.227	0.0	3.8	82
180 min Winter	20.088	0.0	4.4	118
240 min Winter	16.566	0.0	4.9	152
360 min Winter	12.577	0.0	5.6	216
480 min Winter	10.324	0.0	6.1	278
600 min Winter	8.850	0.0	6.5	338
720 min Winter	7.800	0.0	6.9	398
960 min Winter	6.386	0.0	7.5	512
1440 min Winter	4.811	0.0	8.5	738
2160 min Winter	3.624	0.0	9.6	1100
2880 min Winter	2.964	0.0	10.5	1420
4320 min Winter	2.228	0.0	11.8	2148
5760 min Winter	1.817	0.0	12.7	2840
7200 min Winter	1.550	0.0	13.5	3672
8640 min Winter	1.361	0.0	14.2	4400
10080 min Winter	1.219	0.0	14.8	5096

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	200	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+35

Time Area Diagram

Total Area (ha) 0.009

Time (mins)		Area
From:	To:	(ha)
0	4	0.009

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Model Details


Storage is Online Cover Level (m) 10.300

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	10.5
Max Percolation (l/s)	7.3	Slope (1:X)	150.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	9.500	Membrane Depth (m)	0

Orifice Outflow Control

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 9.500


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CADS		Source Control 2017.1.2


Summary of Results for 1 year Return Period


Half Drain Time : 0 minutes.


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	8.749	0.249	0.0	6.1	6.1	0.2	O K
30 min Summer	8.730	0.230	0.0	5.8	5.8	0.2	O K
60 min Summer	8.659	0.159	0.0	4.6	4.6	0.1	O K
120 min Summer	8.609	0.109	0.0	3.4	3.4	0.0	O K
180 min Summer	8.595	0.095	0.0	2.8	2.8	0.0	O K
240 min Summer	8.585	0.085	0.0	2.4	2.4	0.0	O K
360 min Summer	8.573	0.073	0.0	1.8	1.8	0.0	O K
480 min Summer	8.566	0.066	0.0	1.6	1.6	0.0	O K
600 min Summer	8.561	0.061	0.0	1.4	1.4	0.0	O K
720 min Summer	8.556	0.056	0.0	1.2	1.2	0.0	O K
960 min Summer	8.550	0.050	0.0	1.0	1.0	0.0	O K
1440 min Summer	8.544	0.044	0.0	0.8	0.8	0.0	O K
2160 min Summer	8.540	0.040	0.0	0.7	0.7	0.0	O K
2880 min Summer	8.537	0.037	0.0	0.5	0.5	0.0	O K
4320 min Summer	8.532	0.032	0.0	0.4	0.4	0.0	O K
5760 min Summer	8.529	0.029	0.0	0.4	0.4	0.0	O K
7200 min Summer	8.528	0.028	0.0	0.3	0.3	0.0	O K
8640 min Summer	8.526	0.026	0.0	0.3	0.3	0.0	O K
10080 min Summer	8.525	0.025	0.0	0.3	0.3	0.0	O K
15 min Winter	8.754	0.254	0.0	6.2	6.2	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	19.000	0.0	2.6	11
30 min Summer	13.218	0.0	3.7	18
60 min Summer	8.918	0.0	4.9	32
120 min Summer	5.920	0.0	6.6	62
180 min Summer	4.641	0.0	7.7	92
240 min Summer	3.903	0.0	8.7	122
360 min Summer	3.055	0.0	10.2	184
480 min Summer	2.569	0.0	11.4	240
600 min Summer	2.246	0.0	12.5	306
720 min Summer	2.013	0.0	13.4	358
960 min Summer	1.694	0.0	15.0	482
1440 min Summer	1.326	0.0	17.7	710
2160 min Summer	1.034	0.0	20.7	1068
2880 min Summer	0.866	0.0	23.1	1460
4320 min Summer	0.675	0.0	27.0	2160
5760 min Summer	0.566	0.0	30.1	2720
7200 min Summer	0.494	0.0	32.8	3616
8640 min Summer	0.441	0.0	35.2	4352
10080 min Summer	0.401	0.0	37.3	4968
15 min Winter	19.000	0.0	3.0	11


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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Road-side Filter Drain 1			
Date 07/03/2024 File 210321 - Roadside Filte...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	8.694	0.194	0.0	5.2	5.2	0.1	O K
60 min Winter	8.620	0.120	0.0	3.8	3.8	0.0	O K
120 min Winter	8.590	0.090	0.0	2.6	2.6	0.0	O K
180 min Winter	8.577	0.077	0.0	2.0	2.0	0.0	O K
240 min Winter	8.570	0.070	0.0	1.7	1.7	0.0	O K
360 min Winter	8.560	0.060	0.0	1.3	1.3	0.0	O K
480 min Winter	8.553	0.053	0.0	1.1	1.1	0.0	O K
600 min Winter	8.548	0.048	0.0	1.0	1.0	0.0	O K
720 min Winter	8.545	0.045	0.0	0.9	0.9	0.0	O K
960 min Winter	8.542	0.042	0.0	0.8	0.8	0.0	O K
1440 min Winter	8.538	0.038	0.0	0.6	0.6	0.0	O K
2160 min Winter	8.534	0.034	0.0	0.5	0.5	0.0	O K
2880 min Winter	8.531	0.031	0.0	0.4	0.4	0.0	O K
4320 min Winter	8.527	0.027	0.0	0.3	0.3	0.0	O K
5760 min Winter	8.525	0.025	0.0	0.3	0.3	0.0	O K
7200 min Winter	8.523	0.023	0.0	0.2	0.2	0.0	O K
8640 min Winter	8.524	0.024	0.0	0.2	0.2	0.0	O K
10080 min Winter	8.522	0.022	0.0	0.2	0.2	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	4.1	18			
60 min Winter	8.918	0.0	5.5	32			
120 min Winter	5.920	0.0	7.4	62			
180 min Winter	4.641	0.0	8.7	94			
240 min Winter	3.903	0.0	9.7	120			
360 min Winter	3.055	0.0	11.4	184			
480 min Winter	2.569	0.0	12.8	244			
600 min Winter	2.246	0.0	14.0	322			
720 min Winter	2.013	0.0	15.0	356			
960 min Winter	1.694	0.0	16.8	466			
1440 min Winter	1.326	0.0	19.8	702			
2160 min Winter	1.034	0.0	23.1	1120			
2880 min Winter	0.866	0.0	25.8	1452			
4320 min Winter	0.675	0.0	30.2	2124			
5760 min Winter	0.566	0.0	33.8	2848			
7200 min Winter	0.494	0.0	36.8	3592			
8640 min Winter	0.441	0.0	39.4	4384			
10080 min Winter	0.401	0.0	41.8	5200			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.074		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.074		
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CADS		Source Control 2017.1.2	
<u>Model Details</u>			
Storage is Online Cover Level (m) 10.000			
<u>Filter Drain Structure</u>			
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Slope (1:X)	15.0
Porosity	0.35	Cap Volume Depth (m)	0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m)	0.000
Trench Width (m)	1.0	Number of Pipes	1
Trench Length (m)	12.0		
<u>Orifice Outflow Control</u>			
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500			
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Date 07/03/2024 File 210321 - Roadside Filte...			Designed by JMA Checked by JMA				
CADS						Source Control 2017.1.2	
<u>Summary of Results for 10 year Return Period</u>							
Half Drain Time : 1 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.999	0.499	0.0	9.1	9.1	0.8	O K
30 min Summer	8.975	0.475	0.0	8.8	8.8	0.7	O K
60 min Summer	8.859	0.359	0.0	7.5	7.5	0.4	O K
120 min Summer	8.722	0.222	0.0	5.7	5.7	0.2	O K
180 min Summer	8.660	0.160	0.0	4.6	4.6	0.1	O K
240 min Summer	8.626	0.126	0.0	3.9	3.9	0.1	O K
360 min Summer	8.601	0.101	0.0	3.1	3.1	0.0	O K
480 min Summer	8.589	0.089	0.0	2.5	2.5	0.0	O K
600 min Summer	8.582	0.082	0.0	2.2	2.2	0.0	O K
720 min Summer	8.576	0.076	0.0	2.0	2.0	0.0	O K
960 min Summer	8.568	0.068	0.0	1.7	1.7	0.0	O K
1440 min Summer	8.557	0.057	0.0	1.3	1.3	0.0	O K
2160 min Summer	8.548	0.048	0.0	1.0	1.0	0.0	O K
2880 min Summer	8.544	0.044	0.0	0.8	0.8	0.0	O K
4320 min Summer	8.539	0.039	0.0	0.6	0.6	0.0	O K
5760 min Summer	8.537	0.037	0.0	0.6	0.6	0.0	O K
7200 min Summer	8.533	0.033	0.0	0.4	0.4	0.0	O K
8640 min Summer	8.532	0.032	0.0	0.4	0.4	0.0	O K
10080 min Summer	8.529	0.029	0.0	0.4	0.4	0.0	O K
15 min Winter	9.015	0.515	0.0	9.2	9.2	0.9	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	4.6	11			
30 min Summer	23.154	0.0	6.4	19			
60 min Summer	15.530	0.0	8.6	34			
120 min Summer	10.149	0.0	11.3	64			
180 min Summer	7.867	0.0	13.1	92			
240 min Summer	6.555	0.0	14.6	122			
360 min Summer	5.058	0.0	16.8	182			
480 min Summer	4.204	0.0	18.7	244			
600 min Summer	3.641	0.0	20.2	298			
720 min Summer	3.236	0.0	21.6	360			
960 min Summer	2.686	0.0	23.9	480			
1440 min Summer	2.065	0.0	27.5	710			
2160 min Summer	1.587	0.0	31.7	1084			
2880 min Summer	1.317	0.0	35.1	1436			
4320 min Summer	1.011	0.0	40.4	2136			
5760 min Summer	0.838	0.0	44.7	2776			
7200 min Summer	0.725	0.0	48.2	3568			
8640 min Summer	0.643	0.0	51.3	4272			
10080 min Summer	0.582	0.0	54.2	4976			
15 min Winter	33.317	0.0	5.2	11			
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Date 07/03/2024 File 210321 - Roadside Filte...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Summary of Results for 10 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	8.931	0.431	0.0	8.4	8.4	0.6	O K
60 min Winter	8.773	0.273	0.0	6.4	6.4	0.3	O K
120 min Winter	8.648	0.148	0.0	4.4	4.4	0.1	O K
180 min Winter	8.610	0.110	0.0	3.4	3.4	0.0	O K
240 min Winter	8.597	0.097	0.0	2.9	2.9	0.0	O K
360 min Winter	8.582	0.082	0.0	2.2	2.2	0.0	O K
480 min Winter	8.573	0.073	0.0	1.9	1.9	0.0	O K
600 min Winter	8.568	0.068	0.0	1.6	1.6	0.0	O K
720 min Winter	8.563	0.063	0.0	1.4	1.4	0.0	O K
960 min Winter	8.555	0.055	0.0	1.2	1.2	0.0	O K
1440 min Winter	8.546	0.046	0.0	0.9	0.9	0.0	O K
2160 min Winter	8.541	0.041	0.0	0.7	0.7	0.0	O K
2880 min Winter	8.539	0.039	0.0	0.6	0.6	0.0	O K
4320 min Winter	8.534	0.034	0.0	0.5	0.5	0.0	O K
5760 min Winter	8.531	0.031	0.0	0.4	0.4	0.0	O K
7200 min Winter	8.529	0.029	0.0	0.4	0.4	0.0	O K
8640 min Winter	8.527	0.027	0.0	0.3	0.3	0.0	O K
10080 min Winter	8.525	0.025	0.0	0.3	0.3	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	23.154	0.0	7.2	19			
60 min Winter	15.530	0.0	9.7	34			
120 min Winter	10.149	0.0	12.6	62			
180 min Winter	7.867	0.0	14.7	92			
240 min Winter	6.555	0.0	16.3	122			
360 min Winter	5.058	0.0	18.9	178			
480 min Winter	4.204	0.0	20.9	236			
600 min Winter	3.641	0.0	22.6	306			
720 min Winter	3.236	0.0	24.1	368			
960 min Winter	2.686	0.0	26.7	476			
1440 min Winter	2.065	0.0	30.8	732			
2160 min Winter	1.587	0.0	35.5	1036			
2880 min Winter	1.317	0.0	39.3	1424			
4320 min Winter	1.011	0.0	45.3	2196			
5760 min Winter	0.838	0.0	50.0	2872			
7200 min Winter	0.725	0.0	54.0	3544			
8640 min Winter	0.643	0.0	57.6	4264			
10080 min Winter	0.582	0.0	60.7	4976			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	10	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.074		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.074		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1		
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA		
CADS		Source Control 2017.1.2	
<u>Model Details</u>			
Storage is Online Cover Level (m) 10.000			
<u>Filter Drain Structure</u>			
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Slope (1:X)	15.0
Porosity	0.35	Cap Volume Depth (m)	0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m)	0.000
Trench Width (m)	1.0	Number of Pipes	1
Trench Length (m)	12.0		
<u>Orifice Outflow Control</u>			
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500			
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Road-side Filter Drain 1				
Date 07/03/2024 File 210321 - Roadside Filte...			Designed by JMA Checked by JMA				
CADS						Source Control 2017.1.2	
<p>Summary of Results for 30 year Return Period (+35%)</p> <p>Half Drain Time : 3 minutes.</p>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	9.358	0.858	0.0	12.1	12.1	2.2	O K
30 min Summer	9.361	0.861	0.0	12.1	12.1	2.2	O K
60 min Summer	9.219	0.719	0.0	11.0	11.0	1.6	O K
120 min Summer	9.000	0.500	0.0	9.1	9.1	0.8	O K
180 min Summer	8.865	0.365	0.0	7.6	7.6	0.4	O K
240 min Summer	8.780	0.280	0.0	6.5	6.5	0.3	O K
360 min Summer	8.688	0.188	0.0	5.1	5.1	0.1	O K
480 min Summer	8.642	0.142	0.0	4.3	4.3	0.1	O K
600 min Summer	8.616	0.116	0.0	3.7	3.7	0.0	O K
720 min Summer	8.606	0.106	0.0	3.3	3.3	0.0	O K
960 min Summer	8.593	0.093	0.0	2.7	2.7	0.0	O K
1440 min Summer	8.578	0.078	0.0	2.1	2.1	0.0	O K
2160 min Summer	8.567	0.067	0.0	1.6	1.6	0.0	O K
2880 min Summer	8.559	0.059	0.0	1.3	1.3	0.0	O K
4320 min Summer	8.548	0.048	0.0	1.0	1.0	0.0	O K
5760 min Summer	8.547	0.047	0.0	0.9	0.9	0.0	O K
7200 min Summer	8.542	0.042	0.0	0.7	0.7	0.0	O K
8640 min Summer	8.541	0.041	0.0	0.7	0.7	0.0	O K
10080 min Summer	8.538	0.038	0.0	0.6	0.6	0.0	O K
15 min Winter	9.412	0.912	0.0	12.5	12.5	2.5	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	7.9	12			
30 min Summer	39.673	0.0	11.0	20			
60 min Summer	26.745	0.0	14.8	36			
120 min Summer	17.385	0.0	19.3	64			
180 min Summer	13.417	0.0	22.3	94			
240 min Summer	11.137	0.0	24.7	124			
360 min Summer	8.542	0.0	28.4	184			
480 min Summer	7.068	0.0	31.4	242			
600 min Summer	6.098	0.0	33.8	306			
720 min Summer	5.403	0.0	36.0	360			
960 min Summer	4.463	0.0	39.6	476			
1440 min Summer	3.406	0.0	45.4	734			
2160 min Summer	2.598	0.0	51.9	1088			
2880 min Summer	2.144	0.0	57.1	1436			
4320 min Summer	1.634	0.0	65.3	2108			
5760 min Summer	1.346	0.0	71.7	2824			
7200 min Summer	1.158	0.0	77.1	3600			
8640 min Summer	1.024	0.0	81.8	4280			
10080 min Summer	0.923	0.0	86.0	4968			
15 min Winter	56.548	0.0	8.9	12			
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Road-side Filter Drain 1				
Date 07/03/2024 File 210321 - Roadside Filte...			Designed by JMA Checked by JMA				
CADS			Source Control 2017.1.2				
<u>Summary of Results for 30 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	9.340	0.840	0.0	12.0	12.0	2.1	O K
60 min Winter	9.119	0.619	0.0	10.2	10.2	1.2	O K
120 min Winter	8.847	0.347	0.0	7.4	7.4	0.4	O K
180 min Winter	8.730	0.230	0.0	5.8	5.8	0.2	O K
240 min Winter	8.672	0.172	0.0	4.8	4.8	0.1	O K
360 min Winter	8.618	0.118	0.0	3.7	3.7	0.0	O K
480 min Winter	8.602	0.102	0.0	3.1	3.1	0.0	O K
600 min Winter	8.592	0.092	0.0	2.7	2.7	0.0	O K
720 min Winter	8.585	0.085	0.0	2.4	2.4	0.0	O K
960 min Winter	8.576	0.076	0.0	2.0	2.0	0.0	O K
1440 min Winter	8.565	0.065	0.0	1.5	1.5	0.0	O K
2160 min Winter	8.554	0.054	0.0	1.2	1.2	0.0	O K
2880 min Winter	8.548	0.048	0.0	1.0	1.0	0.0	O K
4320 min Winter	8.542	0.042	0.0	0.8	0.8	0.0	O K
5760 min Winter	8.539	0.039	0.0	0.6	0.6	0.0	O K
7200 min Winter	8.536	0.036	0.0	0.5	0.5	0.0	O K
8640 min Winter	8.534	0.034	0.0	0.5	0.5	0.0	O K
10080 min Winter	8.532	0.032	0.0	0.4	0.4	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	39.673	0.0	12.3	20			
60 min Winter	26.745	0.0	16.6	36			
120 min Winter	17.385	0.0	21.6	64			
180 min Winter	13.417	0.0	25.0	94			
240 min Winter	11.137	0.0	27.7	124			
360 min Winter	8.542	0.0	31.9	182			
480 min Winter	7.068	0.0	35.1	242			
600 min Winter	6.098	0.0	37.9	300			
720 min Winter	5.403	0.0	40.3	362			
960 min Winter	4.463	0.0	44.4	500			
1440 min Winter	3.406	0.0	50.8	722			
2160 min Winter	2.598	0.0	58.1	1112			
2880 min Winter	2.144	0.0	64.0	1480			
4320 min Winter	1.634	0.0	73.1	2212			
5760 min Winter	1.346	0.0	80.3	2880			
7200 min Winter	1.158	0.0	86.4	3600			
8640 min Winter	1.024	0.0	91.7	4304			
10080 min Winter	0.923	0.0	96.3	5432			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+35

Time Area Diagram


Total Area (ha) 0.074

Time (mins)		Area
From:	To:	(ha)
0	4	0.074

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1		
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA		
CADS		Source Control 2017.1.2	
<u>Model Details</u>			
Storage is Online Cover Level (m) 10.000			
<u>Filter Drain Structure</u>			
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Slope (1:X)	15.0
Porosity	0.35	Cap Volume Depth (m)	0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m)	0.000
Trench Width (m)	1.0	Number of Pipes	1
Trench Length (m)	12.0		
<u>Orifice Outflow Control</u>			
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1						
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 100 year Return Period (+35%)</u>							
Half Drain Time : 3 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	9.633	1.133	0.0	14.0	14.0	3.4	O K
30 min Summer	9.675	1.175	0.0	14.2	14.2	3.6	O K
60 min Summer	9.513	1.013	0.0	13.2	13.2	2.9	O K
120 min Summer	9.222	0.722	0.0	11.0	11.0	1.6	O K
180 min Summer	9.037	0.537	0.0	9.4	9.4	0.9	O K
240 min Summer	8.918	0.418	0.0	8.2	8.2	0.6	O K
360 min Summer	8.779	0.279	0.0	6.5	6.5	0.3	O K
480 min Summer	8.705	0.205	0.0	5.4	5.4	0.1	O K
600 min Summer	8.662	0.162	0.0	4.7	4.7	0.1	O K
720 min Summer	8.635	0.135	0.0	4.1	4.1	0.1	O K
960 min Summer	8.609	0.109	0.0	3.4	3.4	0.0	O K
1440 min Summer	8.590	0.090	0.0	2.6	2.6	0.0	O K
2160 min Summer	8.576	0.076	0.0	2.0	2.0	0.0	O K
2880 min Summer	8.567	0.067	0.0	1.6	1.6	0.0	O K
4320 min Summer	8.556	0.056	0.0	1.2	1.2	0.0	O K
5760 min Summer	8.550	0.050	0.0	1.0	1.0	0.0	O K
7200 min Summer	8.545	0.045	0.0	0.9	0.9	0.0	O K
8640 min Summer	8.543	0.043	0.0	0.8	0.8	0.0	O K
10080 min Summer	8.541	0.041	0.0	0.7	0.7	0.0	O K
15 min Winter	9.719	1.219	0.0	14.5	14.5	3.7	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	10.1	12			
30 min Summer	51.518	0.0	14.3	20			
60 min Summer	34.923	0.0	19.4	36			
120 min Summer	22.569	0.0	25.1	66			
180 min Summer	17.334	0.0	28.9	96			
240 min Summer	14.329	0.0	31.8	124			
360 min Summer	10.919	0.0	36.4	184			
480 min Summer	8.989	0.0	39.9	244			
600 min Summer	7.724	0.0	42.9	306			
720 min Summer	6.821	0.0	45.4	360			
960 min Summer	5.602	0.0	49.7	478			
1440 min Summer	4.241	0.0	56.5	730			
2160 min Summer	3.209	0.0	64.1	1064			
2880 min Summer	2.633	0.0	70.1	1416			
4320 min Summer	1.989	0.0	79.5	2192			
5760 min Summer	1.628	0.0	86.8	2928			
7200 min Summer	1.394	0.0	92.8	3744			
8640 min Summer	1.227	0.0	98.0	4280			
10080 min Summer	1.101	0.0	102.6	5016			
15 min Winter	72.673	0.0	11.3	12			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2

Summary of Results for 100 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.672	1.172	0.0	14.2	14.2	3.6	O K
60 min Winter	9.391	0.891	0.0	12.3	12.3	2.4	O K
120 min Winter	9.033	0.533	0.0	9.4	9.4	0.9	O K
180 min Winter	8.852	0.352	0.0	7.5	7.5	0.4	O K
240 min Winter	8.758	0.258	0.0	6.2	6.2	0.2	O K
360 min Winter	8.667	0.167	0.0	4.8	4.8	0.1	O K
480 min Winter	8.627	0.127	0.0	3.9	3.9	0.1	O K
600 min Winter	8.609	0.109	0.0	3.4	3.4	0.0	O K
720 min Winter	8.600	0.100	0.0	3.0	3.0	0.0	O K
960 min Winter	8.587	0.087	0.0	2.5	2.5	0.0	O K
1440 min Winter	8.574	0.074	0.0	1.9	1.9	0.0	O K
2160 min Winter	8.562	0.062	0.0	1.4	1.4	0.0	O K
2880 min Winter	8.554	0.054	0.0	1.2	1.2	0.0	O K
4320 min Winter	8.546	0.046	0.0	0.9	0.9	0.0	O K
5760 min Winter	8.542	0.042	0.0	0.8	0.8	0.0	O K
7200 min Winter	8.540	0.040	0.0	0.7	0.7	0.0	O K
8640 min Winter	8.538	0.038	0.0	0.6	0.6	0.0	O K
10080 min Winter	8.535	0.035	0.0	0.5	0.5	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	51.518	0.0	16.0	21
60 min Winter	34.923	0.0	21.7	36
120 min Winter	22.569	0.0	28.1	66
180 min Winter	17.334	0.0	32.3	94
240 min Winter	14.329	0.0	35.6	124
360 min Winter	10.919	0.0	40.7	182
480 min Winter	8.989	0.0	44.7	242
600 min Winter	7.724	0.0	48.0	300
720 min Winter	6.821	0.0	50.9	358
960 min Winter	5.602	0.0	55.7	486
1440 min Winter	4.241	0.0	63.3	722
2160 min Winter	3.209	0.0	71.8	1092
2880 min Winter	2.633	0.0	78.6	1476
4320 min Winter	1.989	0.0	89.0	2196
5760 min Winter	1.628	0.0	97.2	3088
7200 min Winter	1.394	0.0	103.9	3272
8640 min Winter	1.227	0.0	109.8	4152
10080 min Winter	1.101	0.0	114.9	5072

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.074		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.074		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2

Model Details


Storage is Online Cover Level (m) 10.000


Filter Drain Structure

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Slope (1:X)	15.0
Porosity	0.35	Cap Volume Depth (m)	0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m)	0.000
Trench Width (m)	1.0	Number of Pipes	1
Trench Length (m)	12.0		

Orifice Outflow Control

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500


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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Road-side Filter Drain 1				
Date 07/03/2024 File 210321 - Roadside Filte...			Designed by JMA Checked by JMA				
CADS						Source Control 2017.1.2	
<u>Summary of Results for 200 year Return Period (+35%)</u>							
Half Drain Time : 4 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	9.837	1.337	0.0	15.2	15.2	4.2	O K
30 min Summer	9.913	1.413	0.0	15.7	15.7	4.6	O K
60 min Summer	9.748	1.248	0.0	14.7	14.7	3.9	O K
120 min Summer	9.384	0.884	0.0	12.3	12.3	2.3	O K
180 min Summer	9.171	0.671	0.0	10.6	10.6	1.4	O K
240 min Summer	9.024	0.524	0.0	9.3	9.3	0.9	O K
360 min Summer	8.852	0.352	0.0	7.5	7.5	0.4	O K
480 min Summer	8.757	0.257	0.0	6.2	6.2	0.2	O K
600 min Summer	8.700	0.200	0.0	5.3	5.3	0.1	O K
720 min Summer	8.665	0.165	0.0	4.7	4.7	0.1	O K
960 min Summer	8.624	0.124	0.0	3.9	3.9	0.1	O K
1440 min Summer	8.598	0.098	0.0	2.9	2.9	0.0	O K
2160 min Summer	8.582	0.082	0.0	2.2	2.2	0.0	O K
2880 min Summer	8.573	0.073	0.0	1.8	1.8	0.0	O K
4320 min Summer	8.561	0.061	0.0	1.4	1.4	0.0	O K
5760 min Summer	8.553	0.053	0.0	1.1	1.1	0.0	O K
7200 min Summer	8.547	0.047	0.0	1.0	1.0	0.0	O K
8640 min Summer	8.545	0.045	0.0	0.9	0.9	0.0	O K
10080 min Summer	8.543	0.043	0.0	0.8	0.8	0.0	O K
15 min Winter	9.945	1.445	0.0	15.8	15.8	4.7	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	11.7	12			
30 min Summer	59.880	0.0	16.6	20			
60 min Summer	40.721	0.0	22.6	36			
120 min Summer	26.227	0.0	29.1	66			
180 min Summer	20.088	0.0	33.4	96			
240 min Summer	16.566	0.0	36.8	126			
360 min Summer	12.577	0.0	41.9	184			
480 min Summer	10.324	0.0	45.8	244			
600 min Summer	8.850	0.0	49.1	306			
720 min Summer	7.800	0.0	51.9	366			
960 min Summer	6.386	0.0	56.7	482			
1440 min Summer	4.811	0.0	64.1	726			
2160 min Summer	3.624	0.0	72.4	1076			
2880 min Summer	2.964	0.0	79.0	1424			
4320 min Summer	2.228	0.0	89.0	2204			
5760 min Summer	1.817	0.0	96.8	2912			
7200 min Summer	1.550	0.0	103.2	3664			
8640 min Summer	1.361	0.0	108.8	4296			
10080 min Summer	1.219	0.0	113.6	5024			
15 min Winter	83.965	0.0	13.1	12			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Summary of Results for 200 year Return Period (+35%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.933	1.433	0.0	15.8	15.8	4.7	O K
60 min Winter	9.615	1.115	0.0	13.8	13.8	3.3	O K
120 min Winter	9.176	0.676	0.0	10.7	10.7	1.4	O K
180 min Winter	8.952	0.452	0.0	8.6	8.6	0.7	O K
240 min Winter	8.829	0.329	0.0	7.2	7.2	0.4	O K
360 min Winter	8.709	0.209	0.0	5.5	5.5	0.2	O K
480 min Winter	8.654	0.154	0.0	4.5	4.5	0.1	O K
600 min Winter	8.624	0.124	0.0	3.9	3.9	0.1	O K
720 min Winter	8.609	0.109	0.0	3.4	3.4	0.0	O K
960 min Winter	8.595	0.095	0.0	2.8	2.8	0.0	O K
1440 min Winter	8.579	0.079	0.0	2.1	2.1	0.0	O K
2160 min Winter	8.568	0.068	0.0	1.6	1.6	0.0	O K
2880 min Winter	8.559	0.059	0.0	1.3	1.3	0.0	O K
4320 min Winter	8.549	0.049	0.0	1.0	1.0	0.0	O K
5760 min Winter	8.544	0.044	0.0	0.8	0.8	0.0	O K
7200 min Winter	8.541	0.041	0.0	0.7	0.7	0.0	O K
8640 min Winter	8.539	0.039	0.0	0.6	0.6	0.0	O K
10080 min Winter	8.537	0.037	0.0	0.6	0.6	0.0	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	59.880	0.0	18.6	21
60 min Winter	40.721	0.0	25.3	38
120 min Winter	26.227	0.0	32.6	66
180 min Winter	20.088	0.0	37.5	96
240 min Winter	16.566	0.0	41.2	124
360 min Winter	12.577	0.0	46.9	184
480 min Winter	10.324	0.0	51.3	242
600 min Winter	8.850	0.0	55.0	300
720 min Winter	7.800	0.0	58.2	362
960 min Winter	6.386	0.0	63.5	486
1440 min Winter	4.811	0.0	71.8	732
2160 min Winter	3.624	0.0	81.1	1080
2880 min Winter	2.964	0.0	88.4	1452
4320 min Winter	2.228	0.0	99.7	2128
5760 min Winter	1.817	0.0	108.4	2976
7200 min Winter	1.550	0.0	115.6	3408
8640 min Winter	1.361	0.0	121.8	4560
10080 min Winter	1.219	0.0	127.3	5096


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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.074		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.074		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 1		
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA		
CADS		Source Control 2017.1.2	
<u>Model Details</u>			
Storage is Online Cover Level (m) 10.000			
<u>Filter Drain Structure</u>			
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Slope (1:X)	15.0
Porosity	0.35	Cap Volume Depth (m)	0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m)	0.000
Trench Width (m)	1.0	Number of Pipes	1
Trench Length (m)	12.0		
<u>Orifice Outflow Control</u>			
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 1 year Return Period</u>							
Half Drain Time : 0 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.581	0.081	0.0	2.2	2.2	0.0	O K
30 min Summer	8.577	0.077	0.0	2.0	2.0	0.0	O K
60 min Summer	8.567	0.067	0.0	1.6	1.6	0.0	O K
120 min Summer	8.553	0.053	0.0	1.1	1.1	0.0	O K
180 min Summer	8.546	0.046	0.0	0.9	0.9	0.0	O K
240 min Summer	8.543	0.043	0.0	0.8	0.8	0.0	O K
360 min Summer	8.538	0.038	0.0	0.6	0.6	0.0	O K
480 min Summer	8.536	0.036	0.0	0.5	0.5	0.0	O K
600 min Summer	8.533	0.033	0.0	0.4	0.4	0.0	O K
720 min Summer	8.531	0.031	0.0	0.4	0.4	0.0	O K
960 min Summer	8.528	0.028	0.0	0.3	0.3	0.0	O K
1440 min Summer	8.526	0.026	0.0	0.3	0.3	0.0	O K
2160 min Summer	8.522	0.022	0.0	0.2	0.2	0.0	O K
2880 min Summer	8.521	0.021	0.0	0.2	0.2	0.0	O K
4320 min Summer	8.518	0.018	0.0	0.1	0.1	0.0	O K
5760 min Summer	8.517	0.017	0.0	0.1	0.1	0.0	O K
7200 min Summer	8.517	0.017	0.0	0.1	0.1	0.0	O K
8640 min Summer	8.514	0.014	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.514	0.014	0.0	0.1	0.1	0.0	O K
15 min Winter	8.581	0.081	0.0	2.2	2.2	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	0.9	10			
30 min Summer	13.218	0.0	1.2	17			
60 min Summer	8.918	0.0	1.6	32			
120 min Summer	5.920	0.0	2.1	62			
180 min Summer	4.641	0.0	2.5	94			
240 min Summer	3.903	0.0	2.8	120			
360 min Summer	3.055	0.0	3.3	184			
480 min Summer	2.569	0.0	3.7	238			
600 min Summer	2.246	0.0	4.0	306			
720 min Summer	2.013	0.0	4.3	366			
960 min Summer	1.694	0.0	4.9	476			
1440 min Summer	1.326	0.0	5.7	724			
2160 min Summer	1.034	0.0	6.7	1120			
2880 min Summer	0.866	0.0	7.5	1464			
4320 min Summer	0.675	0.0	8.7	2120			
5760 min Summer	0.566	0.0	9.8	2896			
7200 min Summer	0.494	0.0	10.6	3544			
8640 min Summer	0.441	0.0	11.4	4344			
10080 min Summer	0.401	0.0	12.0	4960			
15 min Winter	19.000	0.0	1.0	10			
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15 Victoria Street Aberdeen AB10 1XB			210321 - Cairston Road North Road-side Filter Drain 2				
Date 07/03/2024 File 210321 - Roadside Filte...			Designed by JMA Checked by JMA				
CADS			Source Control 2017.1.2				
<u>Summary of Results for 1 year Return Period</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
30 min Winter	8.571	0.071	0.0	1.8	1.8	0.0	O K
60 min Winter	8.557	0.057	0.0	1.2	1.2	0.0	O K
120 min Winter	8.544	0.044	0.0	0.8	0.8	0.0	O K
180 min Winter	8.540	0.040	0.0	0.7	0.7	0.0	O K
240 min Winter	8.537	0.037	0.0	0.6	0.6	0.0	O K
360 min Winter	8.533	0.033	0.0	0.4	0.4	0.0	O K
480 min Winter	8.530	0.030	0.0	0.4	0.4	0.0	O K
600 min Winter	8.528	0.028	0.0	0.3	0.3	0.0	O K
720 min Winter	8.526	0.026	0.0	0.3	0.3	0.0	O K
960 min Winter	8.525	0.025	0.0	0.3	0.3	0.0	O K
1440 min Winter	8.521	0.021	0.0	0.2	0.2	0.0	O K
2160 min Winter	8.519	0.019	0.0	0.2	0.2	0.0	O K
2880 min Winter	8.518	0.018	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.516	0.016	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.515	0.015	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.513	0.013	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.512	0.012	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.512	0.012	0.0	0.1	0.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	13.218	0.0	1.3	17			
60 min Winter	8.918	0.0	1.8	32			
120 min Winter	5.920	0.0	2.4	58			
180 min Winter	4.641	0.0	2.8	94			
240 min Winter	3.903	0.0	3.1	120			
360 min Winter	3.055	0.0	3.7	176			
480 min Winter	2.569	0.0	4.1	234			
600 min Winter	2.246	0.0	4.5	292			
720 min Winter	2.013	0.0	4.9	372			
960 min Winter	1.694	0.0	5.5	486			
1440 min Winter	1.326	0.0	6.4	728			
2160 min Winter	1.034	0.0	7.5	1140			
2880 min Winter	0.866	0.0	8.4	1508			
4320 min Winter	0.675	0.0	9.8	1980			
5760 min Winter	0.566	0.0	10.9	3040			
7200 min Winter	0.494	0.0	11.9	3600			
8640 min Winter	0.441	0.0	12.8	4528			
10080 min Winter	0.401	0.0	13.5	4896			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 10.000		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 15.0
Porosity	0.35	Cap Volume Depth (m) 0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	1.0	Number of Pipes 1
Trench Length (m)	21.0	
<u>Orifice Outflow Control</u>		
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 10 year Return Period</u>							
Half Drain Time : 0 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.622	0.122	0.0	3.8	3.8	0.1	O K
30 min Summer	8.612	0.112	0.0	3.5	3.5	0.0	O K
60 min Summer	8.593	0.093	0.0	2.7	2.7	0.0	O K
120 min Summer	8.575	0.075	0.0	1.9	1.9	0.0	O K
180 min Summer	8.565	0.065	0.0	1.5	1.5	0.0	O K
240 min Summer	8.558	0.058	0.0	1.3	1.3	0.0	O K
360 min Summer	8.548	0.048	0.0	1.0	1.0	0.0	O K
480 min Summer	8.545	0.045	0.0	0.9	0.9	0.0	O K
600 min Summer	8.542	0.042	0.0	0.7	0.7	0.0	O K
720 min Summer	8.540	0.040	0.0	0.7	0.7	0.0	O K
960 min Summer	8.537	0.037	0.0	0.5	0.5	0.0	O K
1440 min Summer	8.532	0.032	0.0	0.4	0.4	0.0	O K
2160 min Summer	8.528	0.028	0.0	0.3	0.3	0.0	O K
2880 min Summer	8.525	0.025	0.0	0.3	0.3	0.0	O K
4320 min Summer	8.522	0.022	0.0	0.2	0.2	0.0	O K
5760 min Summer	8.521	0.021	0.0	0.2	0.2	0.0	O K
7200 min Summer	8.519	0.019	0.0	0.2	0.2	0.0	O K
8640 min Summer	8.518	0.018	0.0	0.1	0.1	0.0	O K
10080 min Summer	8.517	0.017	0.0	0.1	0.1	0.0	O K
15 min Winter	8.622	0.122	0.0	3.8	3.8	0.1	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	1.5	10			
30 min Summer	23.154	0.0	2.1	17			
60 min Summer	15.530	0.0	2.8	32			
120 min Summer	10.149	0.0	3.7	62			
180 min Summer	7.867	0.0	4.2	92			
240 min Summer	6.555	0.0	4.7	124			
360 min Summer	5.058	0.0	5.5	182			
480 min Summer	4.204	0.0	6.1	242			
600 min Summer	3.641	0.0	6.6	302			
720 min Summer	3.236	0.0	7.0	368			
960 min Summer	2.686	0.0	7.7	478			
1440 min Summer	2.065	0.0	8.9	712			
2160 min Summer	1.587	0.0	10.3	1080			
2880 min Summer	1.317	0.0	11.4	1460			
4320 min Summer	1.011	0.0	13.1	2132			
5760 min Summer	0.838	0.0	14.4	2872			
7200 min Summer	0.725	0.0	15.6	3480			
8640 min Summer	0.643	0.0	16.6	4208			
10080 min Summer	0.582	0.0	17.5	5096			
15 min Winter	33.317	0.0	1.7	10			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2

Summary of Results for 10 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.602	0.102	0.0	3.1	3.1	0.0	O K
60 min Winter	8.581	0.081	0.0	2.2	2.2	0.0	O K
120 min Winter	8.563	0.063	0.0	1.4	1.4	0.0	O K
180 min Winter	8.553	0.053	0.0	1.1	1.1	0.0	O K
240 min Winter	8.547	0.047	0.0	0.9	0.9	0.0	O K
360 min Winter	8.542	0.042	0.0	0.7	0.7	0.0	O K
480 min Winter	8.539	0.039	0.0	0.6	0.6	0.0	O K
600 min Winter	8.536	0.036	0.0	0.5	0.5	0.0	O K
720 min Winter	8.534	0.034	0.0	0.5	0.5	0.0	O K
960 min Winter	8.530	0.030	0.0	0.4	0.4	0.0	O K
1440 min Winter	8.527	0.027	0.0	0.3	0.3	0.0	O K
2160 min Winter	8.524	0.024	0.0	0.2	0.2	0.0	O K
2880 min Winter	8.521	0.021	0.0	0.2	0.2	0.0	O K
4320 min Winter	8.519	0.019	0.0	0.2	0.2	0.0	O K
5760 min Winter	8.518	0.018	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.517	0.017	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.516	0.016	0.0	0.1	0.1	0.0	O K
10080 min Winter	8.515	0.015	0.0	0.1	0.1	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	23.154	0.0	2.3	17
60 min Winter	15.530	0.0	3.1	32
120 min Winter	10.149	0.0	4.1	60
180 min Winter	7.867	0.0	4.8	88
240 min Winter	6.555	0.0	5.3	126
360 min Winter	5.058	0.0	6.1	180
480 min Winter	4.204	0.0	6.8	260
600 min Winter	3.641	0.0	7.3	310
720 min Winter	3.236	0.0	7.8	360
960 min Winter	2.686	0.0	8.7	472
1440 min Winter	2.065	0.0	10.0	718
2160 min Winter	1.587	0.0	11.5	1104
2880 min Winter	1.317	0.0	12.7	1452
4320 min Winter	1.011	0.0	14.7	2140
5760 min Winter	0.838	0.0	16.2	2848
7200 min Winter	0.725	0.0	17.5	3976
8640 min Winter	0.643	0.0	18.6	3840
10080 min Winter	0.582	0.0	19.6	5168

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	13.000	Shortest Storm (mins)	15
Ratio R	0.250	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.024

<b>Time (mins)</b>	<b>Area</b>
<b>From: To:</b>	<b>(ha)</b>
0	4 0.024

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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2		
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA		
CADS		Source Control 2017.1.2	
<u>Model Details</u>			
Storage is Online Cover Level (m) 10.000			
<u>Filter Drain Structure</u>			
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Slope (1:X)	15.0
Porosity	0.35	Cap Volume Depth (m)	0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m)	0.000
Trench Width (m)	1.0	Number of Pipes	1
Trench Length (m)	21.0		
<u>Orifice Outflow Control</u>			
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Summary of Results for 30 year Return Period (+35%)

Half Drain Time : 0 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	8.737	0.237	0.0	5.9	5.9	0.2	O K
30 min Summer	8.722	0.222	0.0	5.7	5.7	0.2	O K
60 min Summer	8.653	0.153	0.0	4.5	4.5	0.1	O K
120 min Summer	8.606	0.106	0.0	3.3	3.3	0.0	O K
180 min Summer	8.591	0.091	0.0	2.6	2.6	0.0	O K
240 min Summer	8.581	0.081	0.0	2.2	2.2	0.0	O K
360 min Summer	8.569	0.069	0.0	1.7	1.7	0.0	O K
480 min Summer	8.561	0.061	0.0	1.4	1.4	0.0	O K
600 min Summer	8.555	0.055	0.0	1.2	1.2	0.0	O K
720 min Summer	8.551	0.051	0.0	1.1	1.1	0.0	O K
960 min Summer	8.546	0.046	0.0	0.9	0.9	0.0	O K
1440 min Summer	8.541	0.041	0.0	0.7	0.7	0.0	O K
2160 min Summer	8.536	0.036	0.0	0.5	0.5	0.0	O K
2880 min Summer	8.532	0.032	0.0	0.4	0.4	0.0	O K
4320 min Summer	8.528	0.028	0.0	0.3	0.3	0.0	O K
5760 min Summer	8.526	0.026	0.0	0.3	0.3	0.0	O K
7200 min Summer	8.525	0.025	0.0	0.3	0.3	0.0	O K
8640 min Summer	8.522	0.022	0.0	0.2	0.2	0.0	O K
10080 min Summer	8.521	0.021	0.0	0.2	0.2	0.0	O K
15 min Winter	8.741	0.241	0.0	6.0	6.0	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	56.548	0.0	2.5	11
30 min Summer	39.673	0.0	3.6	18
60 min Summer	26.745	0.0	4.8	32
120 min Summer	17.385	0.0	6.3	62
180 min Summer	13.417	0.0	7.2	92
240 min Summer	11.137	0.0	8.0	124
360 min Summer	8.542	0.0	9.2	182
480 min Summer	7.068	0.0	10.2	244
600 min Summer	6.098	0.0	11.0	298
720 min Summer	5.403	0.0	11.7	366
960 min Summer	4.463	0.0	12.9	480
1440 min Summer	3.406	0.0	14.7	712
2160 min Summer	2.598	0.0	16.8	1064
2880 min Summer	2.144	0.0	18.5	1460
4320 min Summer	1.634	0.0	21.2	2164
5760 min Summer	1.346	0.0	23.2	2832
7200 min Summer	1.158	0.0	25.0	3656
8640 min Summer	1.024	0.0	26.4	4264
10080 min Summer	0.923	0.0	27.8	5176
15 min Winter	56.548	0.0	2.9	11





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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Summary of Results for 30 year Return Period (+35%)


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.687	0.187	0.0	5.1	5.1	0.1	O K
60 min Winter	8.617	0.117	0.0	3.7	3.7	0.0	O K
120 min Winter	8.587	0.087	0.0	2.4	2.4	0.0	O K
180 min Winter	8.574	0.074	0.0	1.9	1.9	0.0	O K
240 min Winter	8.567	0.067	0.0	1.6	1.6	0.0	O K
360 min Winter	8.556	0.056	0.0	1.2	1.2	0.0	O K
480 min Winter	8.549	0.049	0.0	1.0	1.0	0.0	O K
600 min Winter	8.546	0.046	0.0	0.9	0.9	0.0	O K
720 min Winter	8.543	0.043	0.0	0.8	0.8	0.0	O K
960 min Winter	8.540	0.040	0.0	0.7	0.7	0.0	O K
1440 min Winter	8.535	0.035	0.0	0.5	0.5	0.0	O K
2160 min Winter	8.530	0.030	0.0	0.4	0.4	0.0	O K
2880 min Winter	8.528	0.028	0.0	0.3	0.3	0.0	O K
4320 min Winter	8.524	0.024	0.0	0.2	0.2	0.0	O K
5760 min Winter	8.522	0.022	0.0	0.2	0.2	0.0	O K
7200 min Winter	8.522	0.022	0.0	0.2	0.2	0.0	O K
8640 min Winter	8.520	0.020	0.0	0.2	0.2	0.0	O K
10080 min Winter	8.518	0.018	0.0	0.1	0.1	0.0	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	39.673	0.0	4.0	18
60 min Winter	26.745	0.0	5.4	32
120 min Winter	17.385	0.0	7.0	64
180 min Winter	13.417	0.0	8.1	92
240 min Winter	11.137	0.0	9.0	116
360 min Winter	8.542	0.0	10.3	180
480 min Winter	7.068	0.0	11.4	240
600 min Winter	6.098	0.0	12.3	310
720 min Winter	5.403	0.0	13.1	346
960 min Winter	4.463	0.0	14.4	460
1440 min Winter	3.406	0.0	16.5	724
2160 min Winter	2.598	0.0	18.9	1124
2880 min Winter	2.144	0.0	20.7	1492
4320 min Winter	1.634	0.0	23.7	2084
5760 min Winter	1.346	0.0	26.0	2576
7200 min Winter	1.158	0.0	28.0	3720
8640 min Winter	1.024	0.0	29.7	4552
10080 min Winter	0.923	0.0	31.2	4560


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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	30	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 10.000		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 15.0
Porosity	0.35	Cap Volume Depth (m) 0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	1.0	Number of Pipes 1
Trench Length (m)	21.0	
<u>Orifice Outflow Control</u>		
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 100 year Return Period (+35%)</u>							
Half Drain Time : 1 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	8.832	0.332	0.0	7.2	7.2	0.4	O K
30 min Summer	8.812	0.312	0.0	7.0	7.0	0.3	O K
60 min Summer	8.725	0.225	0.0	5.7	5.7	0.2	O K
120 min Summer	8.638	0.138	0.0	4.2	4.2	0.1	O K
180 min Summer	8.608	0.108	0.0	3.4	3.4	0.0	O K
240 min Summer	8.596	0.096	0.0	2.8	2.8	0.0	O K
360 min Summer	8.580	0.080	0.0	2.1	2.1	0.0	O K
480 min Summer	8.571	0.071	0.0	1.8	1.8	0.0	O K
600 min Summer	8.565	0.065	0.0	1.5	1.5	0.0	O K
720 min Summer	8.560	0.060	0.0	1.4	1.4	0.0	O K
960 min Summer	8.552	0.052	0.0	1.1	1.1	0.0	O K
1440 min Summer	8.545	0.045	0.0	0.9	0.9	0.0	O K
2160 min Summer	8.540	0.040	0.0	0.7	0.7	0.0	O K
2880 min Summer	8.537	0.037	0.0	0.6	0.6	0.0	O K
4320 min Summer	8.531	0.031	0.0	0.4	0.4	0.0	O K
5760 min Summer	8.528	0.028	0.0	0.3	0.3	0.0	O K
7200 min Summer	8.526	0.026	0.0	0.3	0.3	0.0	O K
8640 min Summer	8.524	0.024	0.0	0.2	0.2	0.0	O K
10080 min Summer	8.523	0.023	0.0	0.2	0.2	0.0	O K
15 min Winter	8.839	0.339	0.0	7.3	7.3	0.4	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	3.3	11			
30 min Summer	51.518	0.0	4.6	18			
60 min Summer	34.923	0.0	6.3	34			
120 min Summer	22.569	0.0	8.1	62			
180 min Summer	17.334	0.0	9.4	92			
240 min Summer	14.329	0.0	10.3	122			
360 min Summer	10.919	0.0	11.8	184			
480 min Summer	8.989	0.0	12.9	240			
600 min Summer	7.724	0.0	13.9	298			
720 min Summer	6.821	0.0	14.7	364			
960 min Summer	5.602	0.0	16.1	480			
1440 min Summer	4.241	0.0	18.3	730			
2160 min Summer	3.209	0.0	20.8	1076			
2880 min Summer	2.633	0.0	22.8	1424			
4320 min Summer	1.989	0.0	25.8	2176			
5760 min Summer	1.628	0.0	28.1	2840			
7200 min Summer	1.394	0.0	30.0	3544			
8640 min Summer	1.227	0.0	31.7	4408			
10080 min Summer	1.101	0.0	33.2	5000			
15 min Winter	72.673	0.0	3.7	11			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 100 year Return Period (+35%)</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
30 min Winter	8.771	0.271	0.0	6.4	6.4	0.3	O K
60 min Winter	8.667	0.167	0.0	4.8	4.8	0.1	O K
120 min Winter	8.604	0.104	0.0	3.2	3.2	0.0	O K
180 min Winter	8.587	0.087	0.0	2.5	2.5	0.0	O K
240 min Winter	8.577	0.077	0.0	2.0	2.0	0.0	O K
360 min Winter	8.566	0.066	0.0	1.5	1.5	0.0	O K
480 min Winter	8.558	0.058	0.0	1.3	1.3	0.0	O K
600 min Winter	8.552	0.052	0.0	1.1	1.1	0.0	O K
720 min Winter	8.549	0.049	0.0	1.0	1.0	0.0	O K
960 min Winter	8.544	0.044	0.0	0.8	0.8	0.0	O K
1440 min Winter	8.539	0.039	0.0	0.6	0.6	0.0	O K
2160 min Winter	8.534	0.034	0.0	0.5	0.5	0.0	O K
2880 min Winter	8.530	0.030	0.0	0.4	0.4	0.0	O K
4320 min Winter	8.527	0.027	0.0	0.3	0.3	0.0	O K
5760 min Winter	8.525	0.025	0.0	0.3	0.3	0.0	O K
7200 min Winter	8.522	0.022	0.0	0.2	0.2	0.0	O K
8640 min Winter	8.523	0.023	0.0	0.2	0.2	0.0	O K
10080 min Winter	8.521	0.021	0.0	0.2	0.2	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
30 min Winter	51.518	0.0	5.2	18			
60 min Winter	34.923	0.0	7.0	32			
120 min Winter	22.569	0.0	9.1	62			
180 min Winter	17.334	0.0	10.5	90			
240 min Winter	14.329	0.0	11.6	122			
360 min Winter	10.919	0.0	13.2	178			
480 min Winter	8.989	0.0	14.5	242			
600 min Winter	7.724	0.0	15.6	298			
720 min Winter	6.821	0.0	16.5	360			
960 min Winter	5.602	0.0	18.1	498			
1440 min Winter	4.241	0.0	20.5	730			
2160 min Winter	3.209	0.0	23.3	1020			
2880 min Winter	2.633	0.0	25.5	1476			
4320 min Winter	1.989	0.0	28.9	2004			
5760 min Winter	1.628	0.0	31.5	3112			
7200 min Winter	1.394	0.0	33.7	3584			
8640 min Winter	1.227	0.0	35.6	4608			
10080 min Winter	1.101	0.0	37.3	5216			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 10.000		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 15.0
Porosity	0.35	Cap Volume Depth (m) 0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	1.0	Number of Pipes 1
Trench Length (m)	21.0	
<u>Orifice Outflow Control</u>		
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Summary of Results for 200 year Return Period (+35%)</u>							
Half Drain Time : 1 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	8.897	0.397	0.0	8.0	8.0	0.5	O K
30 min Summer	8.879	0.379	0.0	7.8	7.8	0.5	O K
60 min Summer	8.784	0.284	0.0	6.6	6.6	0.3	O K
120 min Summer	8.669	0.169	0.0	4.8	4.8	0.1	O K
180 min Summer	8.623	0.123	0.0	3.9	3.9	0.1	O K
240 min Summer	8.605	0.105	0.0	3.2	3.2	0.0	O K
360 min Summer	8.587	0.087	0.0	2.5	2.5	0.0	O K
480 min Summer	8.578	0.078	0.0	2.0	2.0	0.0	O K
600 min Summer	8.570	0.070	0.0	1.7	1.7	0.0	O K
720 min Summer	8.566	0.066	0.0	1.5	1.5	0.0	O K
960 min Summer	8.558	0.058	0.0	1.3	1.3	0.0	O K
1440 min Summer	8.548	0.048	0.0	1.0	1.0	0.0	O K
2160 min Summer	8.542	0.042	0.0	0.7	0.7	0.0	O K
2880 min Summer	8.539	0.039	0.0	0.6	0.6	0.0	O K
4320 min Summer	8.533	0.033	0.0	0.5	0.5	0.0	O K
5760 min Summer	8.530	0.030	0.0	0.4	0.4	0.0	O K
7200 min Summer	8.528	0.028	0.0	0.3	0.3	0.0	O K
8640 min Summer	8.527	0.027	0.0	0.3	0.3	0.0	O K
10080 min Summer	8.525	0.025	0.0	0.3	0.3	0.0	O K
15 min Winter	8.907	0.407	0.0	8.1	8.1	0.5	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	3.8	11			
30 min Summer	59.880	0.0	5.4	19			
60 min Summer	40.721	0.0	7.3	34			
120 min Summer	26.227	0.0	9.4	64			
180 min Summer	20.088	0.0	10.8	92			
240 min Summer	16.566	0.0	11.9	122			
360 min Summer	12.577	0.0	13.6	182			
480 min Summer	10.324	0.0	14.9	242			
600 min Summer	8.850	0.0	15.9	306			
720 min Summer	7.800	0.0	16.8	362			
960 min Summer	6.386	0.0	18.4	478			
1440 min Summer	4.811	0.0	20.8	716			
2160 min Summer	3.624	0.0	23.5	1076			
2880 min Summer	2.964	0.0	25.6	1448			
4320 min Summer	2.228	0.0	28.9	2132			
5760 min Summer	1.817	0.0	31.4	2840			
7200 min Summer	1.550	0.0	33.4	3536			
8640 min Summer	1.361	0.0	35.2	4440			
10080 min Summer	1.219	0.0	36.7	4984			
15 min Winter	83.965	0.0	4.2	11			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Summary of Results for 200 year Return Period (+35%)


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.837	0.337	0.0	7.3	7.3	0.4	O K
60 min Winter	8.711	0.211	0.0	5.5	5.5	0.2	O K
120 min Winter	8.616	0.116	0.0	3.7	3.7	0.0	O K
180 min Winter	8.596	0.096	0.0	2.8	2.8	0.0	O K
240 min Winter	8.585	0.085	0.0	2.4	2.4	0.0	O K
360 min Winter	8.572	0.072	0.0	1.8	1.8	0.0	O K
480 min Winter	8.564	0.064	0.0	1.5	1.5	0.0	O K
600 min Winter	8.557	0.057	0.0	1.3	1.3	0.0	O K
720 min Winter	8.553	0.053	0.0	1.1	1.1	0.0	O K
960 min Winter	8.547	0.047	0.0	0.9	0.9	0.0	O K
1440 min Winter	8.541	0.041	0.0	0.7	0.7	0.0	O K
2160 min Winter	8.537	0.037	0.0	0.5	0.5	0.0	O K
2880 min Winter	8.532	0.032	0.0	0.4	0.4	0.0	O K
4320 min Winter	8.528	0.028	0.0	0.3	0.3	0.0	O K
5760 min Winter	8.526	0.026	0.0	0.3	0.3	0.0	O K
7200 min Winter	8.524	0.024	0.0	0.2	0.2	0.0	O K
8640 min Winter	8.522	0.022	0.0	0.2	0.2	0.0	O K
10080 min Winter	8.522	0.022	0.0	0.2	0.2	0.0	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	59.880	0.0	6.0	19
60 min Winter	40.721	0.0	8.2	34
120 min Winter	26.227	0.0	10.6	62
180 min Winter	20.088	0.0	12.2	94
240 min Winter	16.566	0.0	13.4	128
360 min Winter	12.577	0.0	15.2	182
480 min Winter	10.324	0.0	16.7	244
600 min Winter	8.850	0.0	17.8	304
720 min Winter	7.800	0.0	18.9	366
960 min Winter	6.386	0.0	20.6	482
1440 min Winter	4.811	0.0	23.3	726
2160 min Winter	3.624	0.0	26.3	1052
2880 min Winter	2.964	0.0	28.7	1520
4320 min Winter	2.228	0.0	32.3	2204
5760 min Winter	1.817	0.0	35.2	2808
7200 min Winter	1.550	0.0	37.5	3648
8640 min Winter	1.361	0.0	39.4	4016
10080 min Winter	1.219	0.0	41.2	4584


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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Rainfall Details</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - Roadside Filte...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Model Details</u>		
Storage is Online Cover Level (m) 10.000		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 15.0
Porosity	0.35	Cap Volume Depth (m) 0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	1.0	Number of Pipes 1
Trench Length (m)	21.0	
<u>Orifice Outflow Control</u>		
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX</u>							
<b>Upstream Structures</b>		<b>Outflow To Overflow To</b>					
210321 - Roadside Filter Drain 1.SRCX		(None) (None)					
Half Drain Time : 1 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	8.828	0.328	0.0	7.2	7.2	0.4	O K
30 min Summer	8.816	0.316	0.0	7.0	7.0	0.3	O K
60 min Summer	8.738	0.238	0.0	5.9	5.9	0.2	O K
120 min Summer	8.650	0.150	0.0	4.4	4.4	0.1	O K
180 min Summer	8.615	0.115	0.0	3.7	3.7	0.0	O K
240 min Summer	8.602	0.102	0.0	3.1	3.1	0.0	O K
360 min Summer	8.587	0.087	0.0	2.4	2.4	0.0	O K
480 min Summer	8.578	0.078	0.0	2.1	2.1	0.0	O K
600 min Summer	8.572	0.072	0.0	1.8	1.8	0.0	O K
720 min Summer	8.568	0.068	0.0	1.6	1.6	0.0	O K
960 min Summer	8.561	0.061	0.0	1.4	1.4	0.0	O K
1440 min Summer	8.551	0.051	0.0	1.1	1.1	0.0	O K
2160 min Summer	8.546	0.046	0.0	0.9	0.9	0.0	O K
2880 min Summer	8.542	0.042	0.0	0.7	0.7	0.0	O K
4320 min Summer	8.538	0.038	0.0	0.6	0.6	0.0	O K
5760 min Summer	8.535	0.035	0.0	0.5	0.5	0.0	O K
7200 min Summer	8.532	0.032	0.0	0.4	0.4	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	3.5	12			
30 min Summer	13.218	0.0	4.9	19			
60 min Summer	8.918	0.0	6.6	34			
120 min Summer	5.920	0.0	8.7	64			
180 min Summer	4.641	0.0	10.2	92			
240 min Summer	3.903	0.0	11.5	122			
360 min Summer	3.055	0.0	13.5	182			
480 min Summer	2.569	0.0	15.1	242			
600 min Summer	2.246	0.0	16.5	302			
720 min Summer	2.013	0.0	17.8	358			
960 min Summer	1.694	0.0	19.9	488			
1440 min Summer	1.326	0.0	23.4	718			
2160 min Summer	1.034	0.0	27.4	1104			
2880 min Summer	0.866	0.0	30.6	1464			
4320 min Summer	0.675	0.0	35.7	2240			
5760 min Summer	0.566	0.0	39.9	2864			
7200 min Summer	0.494	0.0	43.4	3560			
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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Road-side Filter Drain 2			
Date 07/03/2024 File 210321 - SuDS Component...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
8640 min Summer	8.531	0.031	0.0	0.4	0.4	0.0	O K
10080 min Summer	8.528	0.028	0.0	0.3	0.3	0.0	O K
15 min Winter	8.842	0.342	0.0	7.3	7.3	0.4	O K
30 min Winter	8.783	0.283	0.0	6.6	6.6	0.3	O K
60 min Winter	8.679	0.179	0.0	5.0	5.0	0.1	O K
120 min Winter	8.609	0.109	0.0	3.4	3.4	0.0	O K
180 min Winter	8.593	0.093	0.0	2.7	2.7	0.0	O K
240 min Winter	8.584	0.084	0.0	2.3	2.3	0.0	O K
360 min Winter	8.571	0.071	0.0	1.8	1.8	0.0	O K
480 min Winter	8.565	0.065	0.0	1.5	1.5	0.0	O K
600 min Winter	8.559	0.059	0.0	1.3	1.3	0.0	O K
720 min Winter	8.554	0.054	0.0	1.2	1.2	0.0	O K
960 min Winter	8.548	0.048	0.0	1.0	1.0	0.0	O K
1440 min Winter	8.544	0.044	0.0	0.8	0.8	0.0	O K
2160 min Winter	8.539	0.039	0.0	0.6	0.6	0.0	O K
2880 min Winter	8.536	0.036	0.0	0.5	0.5	0.0	O K
4320 min Winter	8.531	0.031	0.0	0.4	0.4	0.0	O K
5760 min Winter	8.529	0.029	0.0	0.4	0.4	0.0	O K
7200 min Winter	8.527	0.027	0.0	0.3	0.3	0.0	O K
8640 min Winter	8.526	0.026	0.0	0.3	0.3	0.0	O K
10080 min Winter	8.526	0.026	0.0	0.3	0.3	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
8640 min Summer	0.441	0.0	46.5	4352			
10080 min Summer	0.401	0.0	49.3	5128			
15 min Winter	19.000	0.0	3.9	12			
30 min Winter	13.218	0.0	5.4	19			
60 min Winter	8.918	0.0	7.3	34			
120 min Winter	5.920	0.0	9.7	62			
180 min Winter	4.641	0.0	11.5	92			
240 min Winter	3.903	0.0	12.9	122			
360 min Winter	3.055	0.0	15.1	178			
480 min Winter	2.569	0.0	16.9	236			
600 min Winter	2.246	0.0	18.5	306			
720 min Winter	2.013	0.0	19.9	356			
960 min Winter	1.694	0.0	22.3	488			
1440 min Winter	1.326	0.0	26.2	706			
2160 min Winter	1.034	0.0	30.6	1140			
2880 min Winter	0.866	0.0	34.2	1392			
4320 min Winter	0.675	0.0	40.0	2096			
5760 min Winter	0.566	0.0	44.7	3000			
7200 min Winter	0.494	0.0	48.7	3488			
8640 min Winter	0.441	0.0	52.2	4144			
10080 min Winter	0.401	0.0	55.3	5040			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Cascade Rainfall Details for 210321 - Roadside Filter Drain 2.SRCX</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2

Cascade Model Details for 210321 - Roadside Filter Drain 2.SRCX


Storage is Online Cover Level (m) 10.000

Filter Drain Structure


Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Slope (1:X)	15.0
Porosity	0.35	Cap Volume Depth (m)	0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m)	0.000
Trench Width (m)	1.0	Number of Pipes	1
Trench Length (m)	21.0		


Orifice Outflow Control


Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500


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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX</u>							
<b>Upstream Structures</b>		<b>Outflow To</b>					
210321 - Roadside Filter Drain 1.SRCX		(None)					
		(None)					
Half Drain Time : 1 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	9.068	0.568	0.0	9.7	9.7	1.0	O K
30 min Summer	9.074	0.574	0.0	9.8	9.8	1.0	O K
60 min Summer	8.989	0.489	0.0	9.0	9.0	0.8	O K
120 min Summer	8.831	0.331	0.0	7.2	7.2	0.4	O K
180 min Summer	8.743	0.243	0.0	6.0	6.0	0.2	O K
240 min Summer	8.689	0.189	0.0	5.2	5.2	0.1	O K
360 min Summer	8.632	0.132	0.0	4.0	4.0	0.1	O K
480 min Summer	8.608	0.108	0.0	3.4	3.4	0.0	O K
600 min Summer	8.598	0.098	0.0	2.9	2.9	0.0	O K
720 min Summer	8.591	0.091	0.0	2.6	2.6	0.0	O K
960 min Summer	8.580	0.080	0.0	2.2	2.2	0.0	O K
1440 min Summer	8.569	0.069	0.0	1.7	1.7	0.0	O K
2160 min Summer	8.559	0.059	0.0	1.3	1.3	0.0	O K
2880 min Summer	8.552	0.052	0.0	1.1	1.1	0.0	O K
4320 min Summer	8.545	0.045	0.0	0.9	0.9	0.0	O K
5760 min Summer	8.541	0.041	0.0	0.7	0.7	0.0	O K
7200 min Summer	8.539	0.039	0.0	0.6	0.6	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	6.1	13			
30 min Summer	23.154	0.0	8.5	21			
60 min Summer	15.530	0.0	11.4	36			
120 min Summer	10.149	0.0	14.9	64			
180 min Summer	7.867	0.0	17.3	94			
240 min Summer	6.555	0.0	19.3	124			
360 min Summer	5.058	0.0	22.3	182			
480 min Summer	4.204	0.0	24.7	244			
600 min Summer	3.641	0.0	26.8	304			
720 min Summer	3.236	0.0	28.5	366			
960 min Summer	2.686	0.0	31.6	482			
1440 min Summer	2.065	0.0	36.4	732			
2160 min Summer	1.587	0.0	42.0	1096			
2880 min Summer	1.317	0.0	46.5	1432			
4320 min Summer	1.011	0.0	53.5	2196			
5760 min Summer	0.838	0.0	59.1	2936			
7200 min Summer	0.725	0.0	63.9	3696			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA						
CADS	Source Control 2017.1.2						
<u>Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (1/s)</b>	<b>Max Control (1/s)</b>	<b>Max Σ Outflow (1/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
8640 min Summer	8.539	0.039	0.0	0.6	0.6	0.0	O K
10080 min Summer	8.535	0.035	0.0	0.5	0.5	0.0	O K
15 min Winter	9.106	0.606	0.0	10.1	10.1	1.2	O K
30 min Winter	9.068	0.568	0.0	9.7	9.7	1.0	O K
60 min Winter	8.910	0.410	0.0	8.1	8.1	0.6	O K
120 min Winter	8.727	0.227	0.0	5.8	5.8	0.2	O K
180 min Winter	8.655	0.155	0.0	4.5	4.5	0.1	O K
240 min Winter	8.621	0.121	0.0	3.8	3.8	0.0	O K
360 min Winter	8.598	0.098	0.0	2.9	2.9	0.0	O K
480 min Winter	8.587	0.087	0.0	2.4	2.4	0.0	O K
600 min Winter	8.579	0.079	0.0	2.1	2.1	0.0	O K
720 min Winter	8.574	0.074	0.0	1.9	1.9	0.0	O K
960 min Winter	8.566	0.066	0.0	1.6	1.6	0.0	O K
1440 min Winter	8.556	0.056	0.0	1.2	1.2	0.0	O K
2160 min Winter	8.547	0.047	0.0	1.0	1.0	0.0	O K
2880 min Winter	8.544	0.044	0.0	0.8	0.8	0.0	O K
4320 min Winter	8.539	0.039	0.0	0.6	0.6	0.0	O K
5760 min Winter	8.536	0.036	0.0	0.5	0.5	0.0	O K
7200 min Winter	8.533	0.033	0.0	0.4	0.4	0.0	O K
8640 min Winter	8.531	0.031	0.0	0.4	0.4	0.0	O K
10080 min Winter	8.529	0.029	0.0	0.4	0.4	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
8640 min Summer	0.643	0.0	68.0	4360			
10080 min Summer	0.582	0.0	71.7	5128			
15 min Winter	33.317	0.0	6.9	13			
30 min Winter	23.154	0.0	9.5	21			
60 min Winter	15.530	0.0	12.8	36			
120 min Winter	10.149	0.0	16.7	64			
180 min Winter	7.867	0.0	19.4	94			
240 min Winter	6.555	0.0	21.6	122			
360 min Winter	5.058	0.0	25.0	180			
480 min Winter	4.204	0.0	27.7	238			
600 min Winter	3.641	0.0	30.0	304			
720 min Winter	3.236	0.0	32.0	362			
960 min Winter	2.686	0.0	35.4	476			
1440 min Winter	2.065	0.0	40.8	694			
2160 min Winter	1.587	0.0	47.0	1104			
2880 min Winter	1.317	0.0	52.0	1444			
4320 min Winter	1.011	0.0	59.9	2268			
5760 min Winter	0.838	0.0	66.2	2816			
7200 min Winter	0.725	0.0	71.5	3344			
8640 min Winter	0.643	0.0	76.2	4320			
10080 min Winter	0.582	0.0	80.3	5080			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Cascade Rainfall Details for 210321 - Roadside Filter Drain 2.SRCX</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	10	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Cascade Model Details for 210321 - Roadside Filter Drain 2.SRCX</u>		
Storage is Online Cover Level (m) 10.000		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 15.0
Porosity	0.35	Cap Volume Depth (m) 0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	1.0	Number of Pipes 1
Trench Length (m)	21.0	
<u>Orifice Outflow Control</u>		
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX</u>							
<b>Upstream Structures</b>		<b>Outflow To</b>					
210321 - Roadside Filter Drain 1.SRCX		(None)					
		(None)					
Half Drain Time : 2 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	9.365	0.865	0.0	12.1	12.1	2.3	O K
30 min Summer	9.417	0.917	0.0	12.5	12.5	2.5	O K
60 min Summer	9.377	0.877	0.0	12.2	12.2	2.3	O K
120 min Summer	9.195	0.695	0.0	10.8	10.8	1.5	O K
180 min Summer	9.039	0.539	0.0	9.4	9.4	0.9	O K
240 min Summer	8.930	0.430	0.0	8.3	8.3	0.6	O K
360 min Summer	8.793	0.293	0.0	6.7	6.7	0.3	O K
480 min Summer	8.719	0.219	0.0	5.6	5.6	0.2	O K
600 min Summer	8.674	0.174	0.0	4.9	4.9	0.1	O K
720 min Summer	8.645	0.145	0.0	4.3	4.3	0.1	O K
960 min Summer	8.613	0.113	0.0	3.6	3.6	0.0	O K
1440 min Summer	8.594	0.094	0.0	2.7	2.7	0.0	O K
2160 min Summer	8.579	0.079	0.0	2.1	2.1	0.0	O K
2880 min Summer	8.571	0.071	0.0	1.8	1.8	0.0	O K
4320 min Summer	8.559	0.059	0.0	1.3	1.3	0.0	O K
5760 min Summer	8.553	0.053	0.0	1.1	1.1	0.0	O K
7200 min Summer	8.549	0.049	0.0	1.0	1.0	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	10.4	14			
30 min Summer	39.673	0.0	14.6	23			
60 min Summer	26.745	0.0	19.7	38			
120 min Summer	17.385	0.0	25.6	68			
180 min Summer	13.417	0.0	29.6	96			
240 min Summer	11.137	0.0	32.7	126			
360 min Summer	8.542	0.0	37.7	184			
480 min Summer	7.068	0.0	41.6	244			
600 min Summer	6.098	0.0	44.8	302			
720 min Summer	5.403	0.0	47.7	364			
960 min Summer	4.463	0.0	52.5	484			
1440 min Summer	3.406	0.0	60.1	726			
2160 min Summer	2.598	0.0	68.8	1068			
2880 min Summer	2.144	0.0	75.6	1436			
4320 min Summer	1.634	0.0	86.5	2156			
5760 min Summer	1.346	0.0	95.0	2920			
7200 min Summer	1.158	0.0	102.1	3464			
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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Road-side Filter Drain 2			
Date 07/03/2024 File 210321 - SuDS Component...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
8640 min Summer	8.545	0.045	0.0	0.9	0.9	0.0	O K
10080 min Summer	8.544	0.044	0.0	0.8	0.8	0.0	O K
15 min Winter	9.435	0.935	0.0	12.6	12.6	2.6	O K
30 min Winter	9.461	0.961	0.0	12.8	12.8	2.8	O K
60 min Winter	9.336	0.836	0.0	11.9	11.9	2.1	O K
120 min Winter	9.040	0.540	0.0	9.4	9.4	0.9	O K
180 min Winter	8.865	0.365	0.0	7.6	7.6	0.4	O K
240 min Winter	8.769	0.269	0.0	6.4	6.4	0.3	O K
360 min Winter	8.677	0.177	0.0	4.9	4.9	0.1	O K
480 min Winter	8.634	0.134	0.0	4.1	4.1	0.1	O K
600 min Winter	8.612	0.112	0.0	3.6	3.6	0.0	O K
720 min Winter	8.603	0.103	0.0	3.2	3.2	0.0	O K
960 min Winter	8.590	0.090	0.0	2.6	2.6	0.0	O K
1440 min Winter	8.576	0.076	0.0	2.0	2.0	0.0	O K
2160 min Winter	8.566	0.066	0.0	1.5	1.5	0.0	O K
2880 min Winter	8.557	0.057	0.0	1.3	1.3	0.0	O K
4320 min Winter	8.548	0.048	0.0	1.0	1.0	0.0	O K
5760 min Winter	8.544	0.044	0.0	0.8	0.8	0.0	O K
7200 min Winter	8.542	0.042	0.0	0.7	0.7	0.0	O K
8640 min Winter	8.540	0.040	0.0	0.7	0.7	0.0	O K
10080 min Winter	8.538	0.038	0.0	0.6	0.6	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
8640 min Summer	1.024	0.0	108.3	4368			
10080 min Summer	0.923	0.0	113.9	4968			
15 min Winter	56.548	0.0	11.7	15			
30 min Winter	39.673	0.0	16.3	24			
60 min Winter	26.745	0.0	22.0	40			
120 min Winter	17.385	0.0	28.6	68			
180 min Winter	13.417	0.0	33.1	96			
240 min Winter	11.137	0.0	36.7	124			
360 min Winter	8.542	0.0	42.2	184			
480 min Winter	7.068	0.0	46.5	244			
600 min Winter	6.098	0.0	50.2	306			
720 min Winter	5.403	0.0	53.4	358			
960 min Winter	4.463	0.0	58.8	488			
1440 min Winter	3.406	0.0	67.3	724			
2160 min Winter	2.598	0.0	77.0	1056			
2880 min Winter	2.144	0.0	84.7	1396			
4320 min Winter	1.634	0.0	96.8	2124			
5760 min Winter	1.346	0.0	106.4	3016			
7200 min Winter	1.158	0.0	114.4	3624			
8640 min Winter	1.024	0.0	121.4	4456			
10080 min Winter	0.923	0.0	127.6	4864			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX</u>							
<b>Upstream Structures</b>		<b>Outflow To Overflow To</b>					
210321 - Roadside Filter Drain 1.SRCX		(None) (None)					
Half Drain Time : 3 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	9.543	1.043	0.0	13.4	13.4	3.2	O K
30 min Summer	9.630	1.130	0.0	13.9	13.9	3.7	O K
60 min Summer	9.621	1.121	0.0	13.9	13.9	3.7	O K
120 min Summer	9.445	0.945	0.0	12.7	12.7	2.7	O K
180 min Summer	9.266	0.766	0.0	11.4	11.4	1.8	O K
240 min Summer	9.127	0.627	0.0	10.2	10.2	1.2	O K
360 min Summer	8.937	0.437	0.0	8.4	8.4	0.6	O K
480 min Summer	8.824	0.324	0.0	7.1	7.1	0.4	O K
600 min Summer	8.754	0.254	0.0	6.2	6.2	0.2	O K
720 min Summer	8.707	0.207	0.0	5.5	5.5	0.1	O K
960 min Summer	8.653	0.153	0.0	4.5	4.5	0.1	O K
1440 min Summer	8.609	0.109	0.0	3.4	3.4	0.0	O K
2160 min Summer	8.591	0.091	0.0	2.6	2.6	0.0	O K
2880 min Summer	8.580	0.080	0.0	2.2	2.2	0.0	O K
4320 min Summer	8.569	0.069	0.0	1.7	1.7	0.0	O K
5760 min Summer	8.560	0.060	0.0	1.4	1.4	0.0	O K
7200 min Summer	8.553	0.053	0.0	1.1	1.1	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	13.5	15			
30 min Summer	51.518	0.0	18.9	24			
60 min Summer	34.923	0.0	25.7	40			
120 min Summer	22.569	0.0	33.2	70			
180 min Summer	17.334	0.0	38.2	100			
240 min Summer	14.329	0.0	42.1	128			
360 min Summer	10.919	0.0	48.2	186			
480 min Summer	8.989	0.0	52.9	246			
600 min Summer	7.724	0.0	56.8	306			
720 min Summer	6.821	0.0	60.2	366			
960 min Summer	5.602	0.0	65.9	486			
1440 min Summer	4.241	0.0	74.8	730			
2160 min Summer	3.209	0.0	84.9	1084			
2880 min Summer	2.633	0.0	92.9	1420			
4320 min Summer	1.989	0.0	105.3	2156			
5760 min Summer	1.628	0.0	114.9	2864			
7200 min Summer	1.394	0.0	122.9	3552			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2						
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA						
CADS		Source Control 2017.1.2					
<u>Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
8640 min Summer	8.550	0.050	0.0	1.0	1.0	0.0	O K
10080 min Summer	8.548	0.048	0.0	1.0	1.0	0.0	O K
15 min Winter	9.632	1.132	0.0	14.0	14.0	3.8	O K
30 min Winter	9.705	1.205	0.0	14.4	14.4	4.2	O K
60 min Winter	9.618	1.118	0.0	13.9	13.9	3.7	O K
120 min Winter	9.299	0.799	0.0	11.6	11.6	1.9	O K
180 min Winter	9.061	0.561	0.0	9.6	9.6	1.0	O K
240 min Winter	8.914	0.414	0.0	8.2	8.2	0.6	O K
360 min Winter	8.762	0.262	0.0	6.3	6.3	0.2	O K
480 min Winter	8.692	0.192	0.0	5.2	5.2	0.1	O K
600 min Winter	8.652	0.152	0.0	4.5	4.5	0.1	O K
720 min Winter	8.628	0.128	0.0	4.0	4.0	0.1	O K
960 min Winter	8.606	0.106	0.0	3.3	3.3	0.0	O K
1440 min Winter	8.588	0.088	0.0	2.5	2.5	0.0	O K
2160 min Winter	8.574	0.074	0.0	1.9	1.9	0.0	O K
2880 min Winter	8.566	0.066	0.0	1.6	1.6	0.0	O K
4320 min Winter	8.555	0.055	0.0	1.2	1.2	0.0	O K
5760 min Winter	8.548	0.048	0.0	1.0	1.0	0.0	O K
7200 min Winter	8.545	0.045	0.0	0.9	0.9	0.0	O K
8640 min Winter	8.542	0.042	0.0	0.7	0.7	0.0	O K
10080 min Winter	8.541	0.041	0.0	0.7	0.7	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
8640 min Summer	1.227	0.0	129.8	4448			
10080 min Summer	1.101	0.0	135.9	5040			
15 min Winter	72.673	0.0	15.0	16			
30 min Winter	51.518	0.0	21.3	25			
60 min Winter	34.923	0.0	28.8	42			
120 min Winter	22.569	0.0	37.2	70			
180 min Winter	17.334	0.0	42.8	98			
240 min Winter	14.329	0.0	47.2	126			
360 min Winter	10.919	0.0	53.9	184			
480 min Winter	8.989	0.0	59.2	244			
600 min Winter	7.724	0.0	63.6	302			
720 min Winter	6.821	0.0	67.4	362			
960 min Winter	5.602	0.0	73.8	474			
1440 min Winter	4.241	0.0	83.8	724			
2160 min Winter	3.209	0.0	95.1	1076			
2880 min Winter	2.633	0.0	104.0	1396			
4320 min Winter	1.989	0.0	117.9	2132			
5760 min Winter	1.628	0.0	128.7	3024			
7200 min Winter	1.394	0.0	137.7	3472			
8640 min Winter	1.227	0.0	145.4	4480			
10080 min Winter	1.101	0.0	152.2	5344			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Cascade Rainfall Details for 210321 - Roadside Filter Drain 2.SRCX</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Cascade Model Details for 210321 - Roadside Filter Drain 2.SRCX</u>		
Storage is Online Cover Level (m) 10.000		
<u>Filter Drain Structure</u>		
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m) 0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m) 0.000
Safety Factor	2.0	Slope (1:X) 15.0
Porosity	0.35	Cap Volume Depth (m) 0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m) 0.000
Trench Width (m)	1.0	Number of Pipes 1
Trench Length (m)	21.0	
<u>Orifice Outflow Control</u>		
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500		
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2


Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX


		<b>Upstream Structures</b>		<b>Outflow To</b>			<b>Overflow To</b>	
		210321 - Roadside Filter Drain 1.SRCX		(None)	(None)		(None)	
Half Drain Time : 3 minutes.								
<b>Storm Event</b>		<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer		9.663	1.163	0.0	14.2	14.2	4.0	O K
30 min Summer		9.774	1.274	0.0	14.8	14.8	4.7	O K
60 min Summer		9.784	1.284	0.0	14.9	14.9	4.8	O K
120 min Summer		9.611	1.111	0.0	13.8	13.8	3.6	O K
180 min Summer		9.426	0.926	0.0	12.6	12.6	2.6	O K
240 min Summer		9.270	0.770	0.0	11.4	11.4	1.8	O K
360 min Summer		9.047	0.547	0.0	9.5	9.5	1.0	O K
480 min Summer		8.908	0.408	0.0	8.1	8.1	0.6	O K
600 min Summer		8.819	0.319	0.0	7.1	7.1	0.3	O K
720 min Summer		8.758	0.258	0.0	6.2	6.2	0.2	O K
960 min Summer		8.687	0.187	0.0	5.1	5.1	0.1	O K
1440 min Summer		8.624	0.124	0.0	3.9	3.9	0.1	O K
2160 min Summer		8.598	0.098	0.0	2.9	2.9	0.0	O K
2880 min Summer		8.586	0.086	0.0	2.4	2.4	0.0	O K
4320 min Summer		8.572	0.072	0.0	1.8	1.8	0.0	O K
5760 min Summer		8.564	0.064	0.0	1.5	1.5	0.0	O K
7200 min Summer		8.558	0.058	0.0	1.3	1.3	0.0	O K


<b>Storm Event</b>		<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>
15 min Summer		83.965	0.0	15.6	16
30 min Summer		59.880	0.0	22.0	25
60 min Summer		40.721	0.0	29.9	40
120 min Summer		26.227	0.0	38.6	72
180 min Summer		20.088	0.0	44.3	100
240 min Summer		16.566	0.0	48.7	130
360 min Summer		12.577	0.0	55.5	188
480 min Summer		10.324	0.0	60.7	246
600 min Summer		8.850	0.0	65.0	306
720 min Summer		7.800	0.0	68.8	366
960 min Summer		6.386	0.0	75.1	484
1440 min Summer		4.811	0.0	84.9	712
2160 min Summer		3.624	0.0	95.9	1076
2880 min Summer		2.964	0.0	104.6	1468
4320 min Summer		2.228	0.0	117.9	2124
5760 min Summer		1.817	0.0	128.2	2920
7200 min Summer		1.550	0.0	136.7	3592

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15 Victoria Street Aberdeen AB10 1XB				210321 - Cairston Road North Road-side Filter Drain 2			
Date 07/03/2024 File 210321 - SuDS Component...				Designed by JMA Checked by JMA			
CADS				Source Control 2017.1.2			
<u>Cascade Summary of Results for 210321 - Roadside Filter Drain 2.SRCX</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
8640 min Summer	8.553	0.053	0.0	1.1	1.1	0.0	O K
10080 min Summer	8.549	0.049	0.0	1.0	1.0	0.0	O K
15 min Winter	9.761	1.261	0.0	14.8	14.8	4.6	O K
30 min Winter	9.869	1.369	0.0	15.4	15.4	5.4	O K
60 min Winter	9.808	1.308	0.0	15.0	15.0	5.0	O K
120 min Winter	9.483	0.983	0.0	13.0	13.0	2.9	O K
180 min Winter	9.212	0.712	0.0	11.0	11.0	1.6	O K
240 min Winter	9.031	0.531	0.0	9.4	9.4	0.9	O K
360 min Winter	8.834	0.334	0.0	7.2	7.2	0.4	O K
480 min Winter	8.740	0.240	0.0	6.0	6.0	0.2	O K
600 min Winter	8.687	0.187	0.0	5.1	5.1	0.1	O K
720 min Winter	8.654	0.154	0.0	4.5	4.5	0.1	O K
960 min Winter	8.617	0.117	0.0	3.7	3.7	0.0	O K
1440 min Winter	8.595	0.095	0.0	2.8	2.8	0.0	O K
2160 min Winter	8.580	0.080	0.0	2.1	2.1	0.0	O K
2880 min Winter	8.570	0.070	0.0	1.7	1.7	0.0	O K
4320 min Winter	8.559	0.059	0.0	1.3	1.3	0.0	O K
5760 min Winter	8.552	0.052	0.0	1.1	1.1	0.0	O K
7200 min Winter	8.547	0.047	0.0	1.0	1.0	0.0	O K
8640 min Winter	8.545	0.045	0.0	0.9	0.9	0.0	O K
10080 min Winter	8.543	0.043	0.0	0.8	0.8	0.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
8640 min Summer	1.361	0.0	144.1	4256			
10080 min Summer	1.219	0.0	150.4	5072			
15 min Winter	83.965	0.0	17.4	16			
30 min Winter	59.880	0.0	24.7	26			
60 min Winter	40.721	0.0	33.6	42			
120 min Winter	26.227	0.0	43.2	72			
180 min Winter	20.088	0.0	49.6	100			
240 min Winter	16.566	0.0	54.6	128			
360 min Winter	12.577	0.0	62.1	186			
480 min Winter	10.324	0.0	68.0	244			
600 min Winter	8.850	0.0	72.9	302			
720 min Winter	7.800	0.0	77.1	358			
960 min Winter	6.386	0.0	84.1	482			
1440 min Winter	4.811	0.0	95.1	734			
2160 min Winter	3.624	0.0	107.4	1036			
2880 min Winter	2.964	0.0	117.1	1448			
4320 min Winter	2.228	0.0	132.0	2140			
5760 min Winter	1.817	0.0	143.6	2960			
7200 min Winter	1.550	0.0	153.1	3616			
8640 min Winter	1.361	0.0	161.3	4400			
10080 min Winter	1.219	0.0	168.6	5120			
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15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2	
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA	
CADS		Source Control 2017.1.2
<u>Cascade Rainfall Details for 210321 - Roadside Filter Drain 2.SRCX</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.024		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.024		
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Cameron & Ross		Page 4	
15 Victoria Street Aberdeen AB10 1XB	210321 - Cairston Road North Road-side Filter Drain 2		
Date 07/03/2024 File 210321 - SuDS Component...	Designed by JMA Checked by JMA		
CADS	Source Control 2017.1.2		
<u>Cascade Model Details for 210321 - Roadside Filter Drain 2.SRCX</u>			
Storage is Online Cover Level (m) 10.000			
<u>Filter Drain Structure</u>			
Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.225
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Slope (1:X)	15.0
Porosity	0.35	Cap Volume Depth (m)	0.000
Invert Level (m)	8.500	Cap Infiltration Depth (m)	0.000
Trench Width (m)	1.0	Number of Pipes	1
Trench Length (m)	21.0		
<u>Orifice Outflow Control</u>			
Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 8.500			
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15 Victoria Street Aberdeen AB10 1XB							
Date 07/03/2024 11:52			Designed by JMA				
File 210321 - SuDS Component...			Checked by				
CADS						Source Control 2017.1.2	
<u>Cascade Summary of Results for 210321 - Main site Attenuation.SRCX</u>							
<b>Upstream Structures</b>				<b>Outflow To Overflow To</b>			
210321 - Plot 1 Pervious Paving.SRCX				(None)		(None)	
210321 - Plot 2 Pervious Paving.SRCX							
210321 - Plot 3 Pervious Paving.SRCX							
210321 - Plot 4 Pervious Paving.SRCX							
210321 - Plot 5 Pervious Paving.SRCX							
210321 - Plot 6 Pervious Paving.SRCX							
210321 - Roadside Filter Drain 2.SRCX							
210321 - Roadside Filter Drain 1.SRCX							
Half Drain Time : 36 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	4.883	0.083	0.0	1.7	1.7	4.7	O K
30 min Summer	4.911	0.111	0.0	2.1	2.1	6.3	O K
60 min Summer	4.936	0.136	0.0	2.4	2.4	7.7	O K
120 min Summer	4.957	0.157	0.0	2.7	2.7	8.9	O K
180 min Summer	4.964	0.164	0.0	2.8	2.8	9.4	O K
240 min Summer	4.965	0.165	0.0	2.8	2.8	9.4	O K
360 min Summer	4.959	0.159	0.0	2.7	2.7	9.0	O K
480 min Summer	4.949	0.149	0.0	2.6	2.6	8.5	O K
600 min Summer	4.940	0.140	0.0	2.5	2.5	8.0	O K
720 min Summer	4.932	0.132	0.0	2.4	2.4	7.5	O K
960 min Summer	4.918	0.118	0.0	2.2	2.2	6.7	O K
1440 min Summer	4.898	0.098	0.0	2.0	2.0	5.6	O K
2160 min Summer	4.882	0.082	0.0	1.7	1.7	4.7	O K
2880 min Summer	4.874	0.074	0.0	1.4	1.4	4.2	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	19.000	0.0	6.5	19			
30 min Summer	13.218	0.0	9.4	32			
60 min Summer	8.918	0.0	13.1	54			
120 min Summer	5.920	0.0	17.7	86			
180 min Summer	4.641	0.0	20.9	118			
240 min Summer	3.903	0.0	23.5	150			
360 min Summer	3.055	0.0	27.8	214			
480 min Summer	2.569	0.0	31.2	276			
600 min Summer	2.246	0.0	34.1	338			
720 min Summer	2.013	0.0	36.8	398			
960 min Summer	1.694	0.0	41.3	520			
1440 min Summer	1.326	0.0	48.5	754			
2160 min Summer	1.034	0.0	56.8	1108			
2880 min Summer	0.866	0.0	63.3	1472			
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15 Victoria Street Aberdeen AB10 1XB		
Date 07/03/2024 11:52 File 210321 - SuDS Component...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2


Cascade Summary of Results for 210321 - Main site Attenuation.SRCX


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
4320 min Summer	4.863	0.063	0.0	1.1	1.1	3.6	O K
5760 min Summer	4.857	0.057	0.0	1.0	1.0	3.2	O K
7200 min Summer	4.852	0.052	0.0	0.8	0.8	3.0	O K
8640 min Summer	4.849	0.049	0.0	0.8	0.8	2.8	O K
10080 min Summer	4.846	0.046	0.0	0.7	0.7	2.6	O K
15 min Winter	4.893	0.093	0.0	1.9	1.9	5.3	O K
30 min Winter	4.924	0.124	0.0	2.3	2.3	7.1	O K
60 min Winter	4.953	0.153	0.0	2.6	2.6	8.7	O K
120 min Winter	4.972	0.172	0.0	2.8	2.8	9.8	O K
180 min Winter	4.974	0.174	0.0	2.9	2.9	9.9	O K
240 min Winter	4.969	0.169	0.0	2.8	2.8	9.7	O K
360 min Winter	4.954	0.154	0.0	2.6	2.6	8.8	O K
480 min Winter	4.938	0.138	0.0	2.5	2.5	7.9	O K
600 min Winter	4.925	0.125	0.0	2.3	2.3	7.1	O K
720 min Winter	4.913	0.113	0.0	2.2	2.2	6.5	O K
960 min Winter	4.896	0.096	0.0	1.9	1.9	5.5	O K
1440 min Winter	4.879	0.079	0.0	1.6	1.6	4.5	O K
2160 min Winter	4.868	0.068	0.0	1.3	1.3	3.8	O K
2880 min Winter	4.860	0.060	0.0	1.1	1.1	3.4	O K
4320 min Winter	4.852	0.052	0.0	0.8	0.8	3.0	O K
5760 min Winter	4.847	0.047	0.0	0.7	0.7	2.7	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
4320 min Summer	0.675	0.0	73.8	2204
5760 min Summer	0.566	0.0	82.4	2936
7200 min Summer	0.494	0.0	89.5	3672
8640 min Summer	0.441	0.0	95.6	4360
10080 min Summer	0.401	0.0	101.0	5096
15 min Winter	19.000	0.0	7.4	18
30 min Winter	13.218	0.0	10.7	32
60 min Winter	8.918	0.0	14.8	58
120 min Winter	5.920	0.0	19.9	90
180 min Winter	4.641	0.0	23.5	126
240 min Winter	3.903	0.0	26.5	158
360 min Winter	3.055	0.0	31.2	224
480 min Winter	2.569	0.0	35.1	286
600 min Winter	2.246	0.0	38.4	348
720 min Winter	2.013	0.0	41.3	406
960 min Winter	1.694	0.0	46.4	522
1440 min Winter	1.326	0.0	54.5	752
2160 min Winter	1.034	0.0	63.8	1124
2880 min Winter	0.866	0.0	71.2	1480
4320 min Winter	0.675	0.0	83.0	2196
5760 min Winter	0.566	0.0	92.6	2944


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15 Victoria Street Aberdeen AB10 1XB							
Date 07/03/2024 11:52 File 210321 - SuDS Component...	Designed by JMA Checked by						
CADS		Source Control 2017.1.2					
<u>Cascade Summary of Results for 210321 - Main site Attenuation.SRCX</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
7200 min Winter	4.842	0.042	0.0	0.6	0.6	2.4	O K
8640 min Winter	4.839	0.039	0.0	0.5	0.5	2.2	O K
10080 min Winter	4.837	0.037	0.0	0.5	0.5	2.1	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
7200 min Winter	0.494	0.0	100.7	3680			
8640 min Winter	0.441	0.0	107.7	4344			
10080 min Winter	0.401	0.0	113.8	5096			
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15 Victoria Street Aberdeen AB10 1XB		
Date 07/03/2024 11:52 File 210321 - SuDS Component...	Designed by JMA Checked by	
CADS		Source Control 2017.1.2
<u>Cascade Rainfall Details for 210321 - Main site Attenuation.SRCX</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	1	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +0
<u>Time Area Diagram</u>		
Total Area (ha) 0.031		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.031		
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15 Victoria Street Aberdeen AB10 1XB																				
Date 07/03/2024 11:52 File 210321 - SuDS Component...	Designed by JMA Checked by																			
CADS		Source Control 2017.1.2																		
<u>Cascade Model Details for 210321 - Main site Attenuation.SRCX</u>																				
Storage is Online Cover Level (m) 6.000																				
<u>Cellular Storage Structure</u>																				
Invert Level (m) 4.800 Safety Factor 2.0																				
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95																				
Infiltration Coefficient Side (m/hr) 0.00000																				
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Depth (m)</th> <th style="text-align: left;">Area (m<sup>2</sup>)</th> <th style="text-align: left;">Inf. Area (m<sup>2</sup>)</th> <th style="text-align: left;">Depth (m)</th> <th style="text-align: left;">Area (m<sup>2</sup>)</th> <th style="text-align: left;">Inf. Area (m<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>60.0</td> <td>60.0</td> <td>1.300</td> <td>0.0</td> <td>97.2</td> </tr> <tr> <td>1.200</td> <td>60.0</td> <td>97.2</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	0.000	60.0	60.0	1.300	0.0	97.2	1.200	60.0	97.2			
Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )															
0.000	60.0	60.0	1.300	0.0	97.2															
1.200	60.0	97.2																		
<u>Orifice Outflow Control</u>																				
Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 4.800																				
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15 Victoria Street Aberdeen AB10 1XB							
Date 07/03/2024 12:04		Designed by JMA					
File		Checked by					
CADS				Source Control 2017.1.2			
<u>Cascade Summary of Results for 210321 - Main site Attenuation.SRCX</u>							
<b>Upstream Structures</b>				<b>Outflow To Overflow To</b>			
210321 - Plot 1 Pervious Paving.SRCX				(None)		(None)	
210321 - Plot 2 Pervious Paving.SRCX							
210321 - Plot 3 Pervious Paving.SRCX							
210321 - Plot 4 Pervious Paving.SRCX							
210321 - Plot 5 Pervious Paving.SRCX							
210321 - Plot 6 Pervious Paving.SRCX							
210321 - Roadside Filter Drain 2.SRCX							
210321 - Roadside Filter Drain 1.SRCX							
Half Drain Time : 47 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max <math>\Sigma</math> Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	4.944	0.144	0.0	2.5	2.5	8.2	O K
30 min Summer	4.994	0.194	0.0	3.0	3.0	11.0	O K
60 min Summer	5.041	0.241	0.0	3.4	3.4	13.7	O K
120 min Summer	5.073	0.273	0.0	3.7	3.7	15.5	O K
180 min Summer	5.085	0.285	0.0	3.8	3.8	16.2	O K
240 min Summer	5.087	0.287	0.0	3.8	3.8	16.4	O K
360 min Summer	5.079	0.279	0.0	3.8	3.8	15.9	O K
480 min Summer	5.065	0.265	0.0	3.6	3.6	15.1	O K
600 min Summer	5.049	0.249	0.0	3.5	3.5	14.2	O K
720 min Summer	5.034	0.234	0.0	3.4	3.4	13.3	O K
960 min Summer	5.007	0.207	0.0	3.2	3.2	11.8	O K
1440 min Summer	4.967	0.167	0.0	2.8	2.8	9.5	O K
2160 min Summer	4.929	0.129	0.0	2.4	2.4	7.4	O K
2880 min Summer	4.906	0.106	0.0	2.1	2.1	6.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	33.317	0.0	12.2	19			
30 min Summer	23.154	0.0	17.2	33			
60 min Summer	15.530	0.0	23.5	60			
120 min Summer	10.149	0.0	30.9	92			
180 min Summer	7.867	0.0	36.1	124			
240 min Summer	6.555	0.0	40.2	158			
360 min Summer	5.058	0.0	46.6	224			
480 min Summer	4.204	0.0	51.7	288			
600 min Summer	3.641	0.0	56.0	350			
720 min Summer	3.236	0.0	59.8	412			
960 min Summer	2.686	0.0	66.2	532			
1440 min Summer	2.065	0.0	76.3	772			
2160 min Summer	1.587	0.0	88.0	1128			
2880 min Summer	1.317	0.0	97.3	1484			
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15 Victoria Street Aberdeen AB10 1XB		
Date 07/03/2024 12:04 File	Designed by JMA Checked by	
CADS		Source Control 2017.1.2


Cascade Summary of Results for 210321 - Main site Attenuation.SRCX


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
4320 min Summer	4.883	0.083	0.0	1.7	1.7	4.7	O K
5760 min Summer	4.873	0.073	0.0	1.4	1.4	4.2	O K
7200 min Summer	4.867	0.067	0.0	1.2	1.2	3.8	O K
8640 min Summer	4.862	0.062	0.0	1.1	1.1	3.5	O K
10080 min Summer	4.858	0.058	0.0	1.0	1.0	3.3	O K
15 min Winter	4.962	0.162	0.0	2.7	2.7	9.2	O K
30 min Winter	5.017	0.217	0.0	3.2	3.2	12.4	O K
60 min Winter	5.071	0.271	0.0	3.7	3.7	15.4	O K
120 min Winter	5.104	0.304	0.0	3.9	3.9	17.3	O K
180 min Winter	5.112	0.312	0.0	4.0	4.0	17.8	O K
240 min Winter	5.108	0.308	0.0	4.0	4.0	17.6	O K
360 min Winter	5.085	0.285	0.0	3.8	3.8	16.3	O K
480 min Winter	5.058	0.258	0.0	3.6	3.6	14.7	O K
600 min Winter	5.033	0.233	0.0	3.4	3.4	13.3	O K
720 min Winter	5.010	0.210	0.0	3.2	3.2	12.0	O K
960 min Winter	4.975	0.175	0.0	2.9	2.9	10.0	O K
1440 min Winter	4.930	0.130	0.0	2.4	2.4	7.4	O K
2160 min Winter	4.894	0.094	0.0	1.9	1.9	5.4	O K
2880 min Winter	4.880	0.080	0.0	1.6	1.6	4.6	O K
4320 min Winter	4.867	0.067	0.0	1.2	1.2	3.8	O K
5760 min Winter	4.859	0.059	0.0	1.0	1.0	3.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
4320 min Summer	1.011	0.0	111.8	2204
5760 min Summer	0.838	0.0	123.4	2936
7200 min Summer	0.725	0.0	133.0	3672
8640 min Summer	0.643	0.0	141.4	4344
10080 min Summer	0.582	0.0	148.8	5104
15 min Winter	33.317	0.0	13.7	19
30 min Winter	23.154	0.0	19.4	32
60 min Winter	15.530	0.0	26.4	60
120 min Winter	10.149	0.0	34.7	96
180 min Winter	7.867	0.0	40.5	132
240 min Winter	6.555	0.0	45.1	168
360 min Winter	5.058	0.0	52.3	236
480 min Winter	4.204	0.0	58.0	300
600 min Winter	3.641	0.0	62.8	362
720 min Winter	3.236	0.0	67.1	424
960 min Winter	2.686	0.0	74.3	548
1440 min Winter	2.065	0.0	85.6	780
2160 min Winter	1.587	0.0	98.8	1132
2880 min Winter	1.317	0.0	109.1	1472
4320 min Winter	1.011	0.0	125.5	2204
5760 min Winter	0.838	0.0	138.5	2944


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15 Victoria Street Aberdeen AB10 1XB							
Date 07/03/2024 12:04 File	Designed by JMA Checked by						
CADS		Source Control 2017.1.2					
<u>Cascade Summary of Results for 210321 - Main site Attenuation.SRCX</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
7200 min Winter	4.854	0.054	0.0	0.9	0.9	3.1	O K
8640 min Winter	4.851	0.051	0.0	0.8	0.8	2.9	O K
10080 min Winter	4.848	0.048	0.0	0.7	0.7	2.7	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
7200 min Winter	0.725	0.0	149.4	3664			
8640 min Winter	0.643	0.0	158.8	4376			
10080 min Winter	0.582	0.0	167.2	5128			
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15 Victoria Street Aberdeen AB10 1XB								
Date 07/03/2024 12:04 File	Designed by JMA Checked by							
CADS		Source Control 2017.1.2						
<u>Cascade Rainfall Details for 210321 - Main site Attenuation.SRCX</u>								
Rainfall Model	FSR	Winter Storms Yes						
Return Period (years)	10	Cv (Summer) 0.750						
Region	Scotland and Ireland	Cv (Winter) 0.840						
M5-60 (mm)	13.000	Shortest Storm (mins) 15						
Ratio R	0.250	Longest Storm (mins) 10080						
Summer Storms	Yes	Climate Change % +0						
<u>Time Area Diagram</u>								
Total Area (ha) 0.031								
<table border="0"> <tr> <td><b>Time (mins)</b></td> <td><b>Area</b></td> </tr> <tr> <td><b>From: To:</b></td> <td><b>(ha)</b></td> </tr> <tr> <td>0</td> <td>4 0.031</td> </tr> </table>			<b>Time (mins)</b>	<b>Area</b>	<b>From: To:</b>	<b>(ha)</b>	0	4 0.031
<b>Time (mins)</b>	<b>Area</b>							
<b>From: To:</b>	<b>(ha)</b>							
0	4 0.031							
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<u>Cascade Model Details for 210321 - Main site Attenuation.SRCX</u>																				
Storage is Online Cover Level (m) 6.000																				
<u>Cellular Storage Structure</u>																				
Invert Level (m) 4.800 Safety Factor 2.0																				
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95																				
Infiltration Coefficient Side (m/hr) 0.00000																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Depth (m)</th> <th style="text-align: left;">Area (m<sup>2</sup>)</th> <th style="text-align: left;">Inf. Area (m<sup>2</sup>)</th> <th style="text-align: left;">Depth (m)</th> <th style="text-align: left;">Area (m<sup>2</sup>)</th> <th style="text-align: left;">Inf. Area (m<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>60.0</td> <td>60.0</td> <td>1.300</td> <td>0.0</td> <td>97.2</td> </tr> <tr> <td>1.200</td> <td>60.0</td> <td>97.2</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	0.000	60.0	60.0	1.300	0.0	97.2	1.200	60.0	97.2			
Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )															
0.000	60.0	60.0	1.300	0.0	97.2															
1.200	60.0	97.2																		
<u>Orifice Outflow Control</u>																				
Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 4.800																				
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<u>Cascade Summary of Results for 210321 - Main site Attenuation.SRCX</u>							
<b>Upstream Structures</b>				<b>Outflow To Overflow To</b>			
210321 - Plot 1 Pervious Paving.SRCX				(None)	(None)		
210321 - Plot 2 Pervious Paving.SRCX							
210321 - Plot 3 Pervious Paving.SRCX							
210321 - Plot 4 Pervious Paving.SRCX							
210321 - Plot 5 Pervious Paving.SRCX							
210321 - Plot 6 Pervious Paving.SRCX							
210321 - Roadside Filter Drain 2.SRCX							
210321 - Roadside Filter Drain 1.SRCX							
Half Drain Time : 59 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max E Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
15 min Summer	5.043	0.243	0.0	3.5	3.5	13.8	O K
30 min Summer	5.134	0.334	0.0	4.1	4.1	19.1	O K
60 min Summer	5.224	0.424	0.0	4.7	4.7	24.2	O K
120 min Summer	5.283	0.483	0.0	5.1	5.1	27.5	O K
180 min Summer	5.305	0.505	0.0	5.2	5.2	28.8	O K
240 min Summer	5.312	0.512	0.0	5.2	5.2	29.2	O K
360 min Summer	5.307	0.507	0.0	5.2	5.2	28.9	O K
480 min Summer	5.290	0.490	0.0	5.1	5.1	28.0	O K
600 min Summer	5.270	0.470	0.0	5.0	5.0	26.8	O K
720 min Summer	5.248	0.448	0.0	4.9	4.9	25.6	O K
960 min Summer	5.206	0.406	0.0	4.6	4.6	23.1	O K
1440 min Summer	5.134	0.334	0.0	4.1	4.1	19.0	O K
2160 min Summer	5.058	0.258	0.0	3.6	3.6	14.7	O K
2880 min Summer	5.008	0.208	0.0	3.2	3.2	11.9	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	56.548	0.0	21.3	22			
30 min Summer	39.673	0.0	30.2	33			
60 min Summer	26.745	0.0	41.1	62			
120 min Summer	17.385	0.0	53.6	102			
180 min Summer	13.417	0.0	62.2	132			
240 min Summer	11.137	0.0	68.9	166			
360 min Summer	8.542	0.0	79.4	234			
480 min Summer	7.068	0.0	87.6	300			
600 min Summer	6.098	0.0	94.5	364			
720 min Summer	5.403	0.0	100.5	428			
960 min Summer	4.463	0.0	110.7	550			
1440 min Summer	3.406	0.0	126.7	794			
2160 min Summer	2.598	0.0	145.1	1148			
2880 min Summer	2.144	0.0	159.5	1504			
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Cascade Summary of Results for 210321 - Main site Attenuation.SRCX


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
4320 min Summer	4.949	0.149	0.0	2.6	2.6	8.5	O K
5760 min Summer	4.917	0.117	0.0	2.2	2.2	6.7	O K
7200 min Summer	4.897	0.097	0.0	1.9	1.9	5.5	O K
8640 min Summer	4.885	0.085	0.0	1.7	1.7	4.8	O K
10080 min Summer	4.879	0.079	0.0	1.6	1.6	4.5	O K
15 min Winter	5.072	0.272	0.0	3.7	3.7	15.5	O K
30 min Winter	5.174	0.374	0.0	4.4	4.4	21.3	O K
60 min Winter	5.277	0.477	0.0	5.0	5.0	27.2	O K
120 min Winter	5.345	0.545	0.0	5.4	5.4	31.0	O K
180 min Winter	5.365	0.565	0.0	5.5	5.5	32.2	O K
240 min Winter	5.367	0.567	0.0	5.5	5.5	32.3	O K
360 min Winter	5.344	0.544	0.0	5.4	5.4	31.0	O K
480 min Winter	5.308	0.508	0.0	5.2	5.2	28.9	O K
600 min Winter	5.269	0.469	0.0	5.0	5.0	26.7	O K
720 min Winter	5.232	0.432	0.0	4.8	4.8	24.6	O K
960 min Winter	5.167	0.367	0.0	4.4	4.4	20.9	O K
1440 min Winter	5.073	0.273	0.0	3.7	3.7	15.5	O K
2160 min Winter	4.991	0.191	0.0	3.0	3.0	10.9	O K
2880 min Winter	4.946	0.146	0.0	2.6	2.6	8.3	O K
4320 min Winter	4.900	0.100	0.0	2.0	2.0	5.7	O K
5760 min Winter	4.882	0.082	0.0	1.7	1.7	4.6	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
4320 min Summer	1.634	0.0	182.0	2212
5760 min Summer	1.346	0.0	199.8	2944
7200 min Summer	1.158	0.0	214.6	3672
8640 min Summer	1.024	0.0	227.4	4376
10080 min Summer	0.923	0.0	238.7	5088
15 min Winter	56.548	0.0	24.0	24
30 min Winter	39.673	0.0	33.9	34
60 min Winter	26.745	0.0	46.1	60
120 min Winter	17.385	0.0	60.2	112
180 min Winter	13.417	0.0	69.8	140
240 min Winter	11.137	0.0	77.3	176
360 min Winter	8.542	0.0	89.0	248
480 min Winter	7.068	0.0	98.2	316
600 min Winter	6.098	0.0	106.0	382
720 min Winter	5.403	0.0	112.7	446
960 min Winter	4.463	0.0	124.2	568
1440 min Winter	3.406	0.0	142.1	810
2160 min Winter	2.598	0.0	162.7	1168
2880 min Winter	2.144	0.0	178.9	1524
4320 min Winter	1.634	0.0	204.2	2232
5760 min Winter	1.346	0.0	224.1	2936

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<u>Cascade Summary of Results for 210321 - Main site Attenuation.SRCX</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
7200 min Winter	4.873	0.073	0.0	1.4	1.4	4.2	O K
8640 min Winter	4.868	0.068	0.0	1.3	1.3	3.9	O K
10080 min Winter	4.863	0.063	0.0	1.1	1.1	3.6	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
7200 min Winter	1.158	0.0	240.8	3672			
8640 min Winter	1.024	0.0	255.2	4360			
10080 min Winter	0.923	0.0	267.9	5000			
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CADS	Source Control 2017.1.2	
<u>Cascade Rainfall Details for 210321 - Main site Attenuation.SRCX</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	30	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.031		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.031		
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Date 07/03/2024 12:06 File	Designed by JMA Checked by																			
CADS		Source Control 2017.1.2																		
<u>Cascade Model Details for 210321 - Main site Attenuation.SRCX</u>																				
Storage is Online Cover Level (m) 6.000																				
<u>Cellular Storage Structure</u>																				
Invert Level (m) 4.800 Safety Factor 2.0																				
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95																				
Infiltration Coefficient Side (m/hr) 0.00000																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Depth (m)</th> <th style="text-align: left;">Area (m<sup>2</sup>)</th> <th style="text-align: left;">Inf. Area (m<sup>2</sup>)</th> <th style="text-align: left;">Depth (m)</th> <th style="text-align: left;">Area (m<sup>2</sup>)</th> <th style="text-align: left;">Inf. Area (m<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>60.0</td> <td>60.0</td> <td>1.300</td> <td>0.0</td> <td>97.2</td> </tr> <tr> <td>1.200</td> <td>60.0</td> <td>97.2</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	0.000	60.0	60.0	1.300	0.0	97.2	1.200	60.0	97.2			
Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )															
0.000	60.0	60.0	1.300	0.0	97.2															
1.200	60.0	97.2																		
<u>Orifice Outflow Control</u>																				
Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 4.800																				
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<u>Cascade Summary of Results for 210321 - Main site Attenuation.SRCX</u>							
<b>Upstream Structures</b>		<b>Outflow To Overflow To</b>					
210321 - Plot 1 Pervious Paving.SRCX		(None) (None)					
210321 - Plot 2 Pervious Paving.SRCX							
210321 - Plot 3 Pervious Paving.SRCX							
210321 - Plot 4 Pervious Paving.SRCX							
210321 - Plot 5 Pervious Paving.SRCX							
210321 - Plot 6 Pervious Paving.SRCX							
210321 - Roadside Filter Drain 2.SRCX							
210321 - Roadside Filter Drain 1.SRCX							
Half Drain Time : 67 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max E Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	5.112	0.312	0.0	4.0	4.0	17.8	O K
30 min Summer	5.234	0.434	0.0	4.8	4.8	24.7	O K
60 min Summer	5.361	0.561	0.0	5.5	5.5	32.0	O K
120 min Summer	5.441	0.641	0.0	5.9	5.9	36.5	O K
180 min Summer	5.469	0.669	0.0	6.0	6.0	38.1	O K
240 min Summer	5.479	0.679	0.0	6.1	6.1	38.7	O K
360 min Summer	5.474	0.674	0.0	6.0	6.0	38.4	O K
480 min Summer	5.454	0.654	0.0	5.9	5.9	37.3	O K
600 min Summer	5.429	0.629	0.0	5.8	5.8	35.9	O K
720 min Summer	5.402	0.602	0.0	5.7	5.7	34.3	O K
960 min Summer	5.349	0.549	0.0	5.4	5.4	31.3	O K
1440 min Summer	5.255	0.455	0.0	4.9	4.9	26.0	O K
2160 min Summer	5.153	0.353	0.0	4.3	4.3	20.1	O K
2880 min Summer	5.084	0.284	0.0	3.8	3.8	16.2	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	72.673	0.0	27.7	25			
30 min Summer	51.518	0.0	39.5	36			
60 min Summer	34.923	0.0	53.9	62			
120 min Summer	22.569	0.0	69.9	108			
180 min Summer	17.334	0.0	80.6	138			
240 min Summer	14.329	0.0	88.9	170			
360 min Summer	10.919	0.0	101.7	238			
480 min Summer	8.989	0.0	111.7	304			
600 min Summer	7.724	0.0	120.0	370			
720 min Summer	6.821	0.0	127.2	434			
960 min Summer	5.602	0.0	139.3	560			
1440 min Summer	4.241	0.0	158.2	808			
2160 min Summer	3.209	0.0	179.5	1164			
2880 min Summer	2.633	0.0	196.3	1524			
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Cascade Summary of Results for 210321 - Main site Attenuation.SRCX


Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
4320 min Summer	5.001	0.201	0.0	3.1	3.1	11.4	O K
5760 min Summer	4.954	0.154	0.0	2.6	2.6	8.8	O K
7200 min Summer	4.925	0.125	0.0	2.3	2.3	7.2	O K
8640 min Summer	4.906	0.106	0.0	2.1	2.1	6.0	O K
10080 min Summer	4.892	0.092	0.0	1.9	1.9	5.2	O K
15 min Winter	5.148	0.348	0.0	4.2	4.2	19.8	O K
30 min Winter	5.286	0.486	0.0	5.1	5.1	27.7	O K
60 min Winter	5.432	0.632	0.0	5.8	5.8	36.0	O K
120 min Winter	5.528	0.728	0.0	6.3	6.3	41.5	O K
180 min Winter	5.553	0.753	0.0	6.4	6.4	42.9	O K
240 min Winter	5.559	0.759	0.0	6.4	6.4	43.3	O K
360 min Winter	5.535	0.735	0.0	6.3	6.3	41.9	O K
480 min Winter	5.492	0.692	0.0	6.1	6.1	39.4	O K
600 min Winter	5.444	0.644	0.0	5.9	5.9	36.7	O K
720 min Winter	5.398	0.598	0.0	5.7	5.7	34.1	O K
960 min Winter	5.313	0.513	0.0	5.2	5.2	29.2	O K
1440 min Winter	5.184	0.384	0.0	4.5	4.5	21.9	O K
2160 min Winter	5.068	0.268	0.0	3.7	3.7	15.2	O K
2880 min Winter	5.001	0.201	0.0	3.1	3.1	11.5	O K
4320 min Winter	4.933	0.133	0.0	2.4	2.4	7.6	O K
5760 min Winter	4.900	0.100	0.0	2.0	2.0	5.7	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
4320 min Summer	1.989	0.0	222.1	2244
5760 min Summer	1.628	0.0	242.2	2944
7200 min Summer	1.394	0.0	258.8	3672
8640 min Summer	1.227	0.0	273.1	4408
10080 min Summer	1.101	0.0	285.6	5128
15 min Winter	72.673	0.0	31.0	26
30 min Winter	51.518	0.0	44.4	38
60 min Winter	34.923	0.0	60.4	62
120 min Winter	22.569	0.0	78.3	114
180 min Winter	17.334	0.0	90.4	144
240 min Winter	14.329	0.0	99.7	180
360 min Winter	10.919	0.0	114.0	254
480 min Winter	8.989	0.0	125.2	324
600 min Winter	7.724	0.0	134.5	392
720 min Winter	6.821	0.0	142.6	456
960 min Winter	5.602	0.0	156.2	580
1440 min Winter	4.241	0.0	177.3	824
2160 min Winter	3.209	0.0	201.3	1176
2880 min Winter	2.633	0.0	220.1	1532
4320 min Winter	1.989	0.0	249.1	2244
5760 min Winter	1.628	0.0	271.6	2944


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<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
7200 min Winter	4.884	0.084	0.0	1.7	1.7	4.8	O K
8640 min Winter	4.876	0.076	0.0	1.5	1.5	4.4	O K
10080 min Winter	4.871	0.071	0.0	1.4	1.4	4.0	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
7200 min Winter	1.394	0.0	290.3	3624			
8640 min Winter	1.227	0.0	306.4	4400			
10080 min Winter	1.101	0.0	320.4	5080			
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<u>Cascade Rainfall Details for 210321 - Main site Attenuation.SRCX</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	100	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.031		
<b>Time (mins) Area</b> <b>From: To: (ha)</b>		
0            4    0.031		
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Date 07/03/2024 12:08 File	Designed by JMA Checked by																			
CADS		Source Control 2017.1.2																		
<u>Cascade Model Details for 210321 - Main site Attenuation.SRCX</u>																				
Storage is Online Cover Level (m) 6.000																				
<u>Cellular Storage Structure</u>																				
Invert Level (m) 4.800 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Depth (m)</th> <th style="text-align: left;">Area (m<sup>2</sup>)</th> <th style="text-align: left;">Inf. Area (m<sup>2</sup>)</th> <th style="text-align: left;">Depth (m)</th> <th style="text-align: left;">Area (m<sup>2</sup>)</th> <th style="text-align: left;">Inf. Area (m<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>60.0</td> <td>60.0</td> <td>1.300</td> <td>0.0</td> <td>97.2</td> </tr> <tr> <td>1.200</td> <td>60.0</td> <td>97.2</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	0.000	60.0	60.0	1.300	0.0	97.2	1.200	60.0	97.2			
Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )															
0.000	60.0	60.0	1.300	0.0	97.2															
1.200	60.0	97.2																		
<u>Orifice Outflow Control</u>																				
Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 4.800																				
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15 Victoria Street Aberdeen AB10 1XB							
Date 07/03/2024 12:10		Designed by JMA					
File		Checked by					
CADS				Source Control 2017.1.2			
<u>Cascade Summary of Results for 210321 - Main site Attenuation.SRCX</u>							
<b>Upstream Structures</b>				<b>Outflow To Overflow To</b>			
210321 - Plot 1 Pervious Paving.SRCX				(None)		(None)	
210321 - Plot 2 Pervious Paving.SRCX							
210321 - Plot 3 Pervious Paving.SRCX							
210321 - Plot 4 Pervious Paving.SRCX							
210321 - Plot 5 Pervious Paving.SRCX							
210321 - Plot 6 Pervious Paving.SRCX							
210321 - Roadside Filter Drain 2.SRCX							
210321 - Roadside Filter Drain 1.SRCX							
Half Drain Time : 74 minutes.							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max E Outflow (l/s)</b>	<b>Max Volume (m³)</b>	<b>Status</b>
15 min Summer	5.160	0.360	0.0	4.3	4.3	20.5	O K
30 min Summer	5.304	0.504	0.0	5.2	5.2	28.7	O K
60 min Summer	5.460	0.660	0.0	6.0	6.0	37.6	O K
120 min Summer	5.557	0.757	0.0	6.4	6.4	43.1	O K
180 min Summer	5.588	0.788	0.0	6.5	6.5	44.9	O K
240 min Summer	5.600	0.800	0.0	6.6	6.6	45.6	O K
360 min Summer	5.595	0.795	0.0	6.6	6.6	45.3	O K
480 min Summer	5.573	0.773	0.0	6.5	6.5	44.1	O K
600 min Summer	5.544	0.744	0.0	6.4	6.4	42.4	O K
720 min Summer	5.514	0.714	0.0	6.2	6.2	40.7	O K
960 min Summer	5.452	0.652	0.0	5.9	5.9	37.2	O K
1440 min Summer	5.344	0.544	0.0	5.4	5.4	31.0	O K
2160 min Summer	5.224	0.424	0.0	4.7	4.7	24.2	O K
2880 min Summer	5.142	0.342	0.0	4.2	4.2	19.5	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m³)</b>	<b>Discharge Volume (m³)</b>	<b>Time-Peak (mins)</b>			
15 min Summer	83.965	0.0	32.1	27			
30 min Summer	59.880	0.0	46.0	38			
60 min Summer	40.721	0.0	63.0	62			
120 min Summer	26.227	0.0	81.3	112			
180 min Summer	20.088	0.0	93.5	142			
240 min Summer	16.566	0.0	102.9	174			
360 min Summer	12.577	0.0	117.3	240			
480 min Summer	10.324	0.0	128.4	308			
600 min Summer	8.850	0.0	137.7	374			
720 min Summer	7.800	0.0	145.6	438			
960 min Summer	6.386	0.0	158.9	568			
1440 min Summer	4.811	0.0	179.6	810			
2160 min Summer	3.624	0.0	202.9	1168			
2880 min Summer	2.964	0.0	221.2	1528			
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Cascade Summary of Results for 210321 - Main site Attenuation.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
4320 min Summer	5.039	0.239	0.0	3.4	3.4	13.7	O K
5760 min Summer	4.982	0.182	0.0	2.9	2.9	10.4	O K
7200 min Summer	4.947	0.147	0.0	2.6	2.6	8.4	O K
8640 min Summer	4.922	0.122	0.0	2.3	2.3	7.0	O K
10080 min Summer	4.905	0.105	0.0	2.1	2.1	6.0	O K
15 min Winter	5.202	0.402	0.0	4.6	4.6	22.9	O K
30 min Winter	5.364	0.564	0.0	5.5	5.5	32.1	O K
60 min Winter	5.544	0.744	0.0	6.3	6.3	42.4	O K
120 min Winter	5.660	0.860	0.0	6.8	6.8	49.0	O K
180 min Winter	5.689	0.889	0.0	7.0	7.0	50.7	O K
240 min Winter	5.698	0.898	0.0	7.0	7.0	51.2	O K
360 min Winter	5.674	0.874	0.0	6.9	6.9	49.8	O K
480 min Winter	5.627	0.827	0.0	6.7	6.7	47.1	O K
600 min Winter	5.573	0.773	0.0	6.5	6.5	44.0	O K
720 min Winter	5.519	0.719	0.0	6.2	6.2	41.0	O K
960 min Winter	5.421	0.621	0.0	5.8	5.8	35.4	O K
1440 min Winter	5.268	0.468	0.0	5.0	5.0	26.7	O K
2160 min Winter	5.126	0.326	0.0	4.1	4.1	18.6	O K
2880 min Winter	5.044	0.244	0.0	3.5	3.5	13.9	O K
4320 min Winter	4.958	0.158	0.0	2.7	2.7	9.0	O K
5760 min Winter	4.917	0.117	0.0	2.2	2.2	6.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
4320 min Summer	2.228	0.0	249.0	2248
5760 min Summer	1.817	0.0	270.6	2944
7200 min Summer	1.550	0.0	288.2	3672
8640 min Summer	1.361	0.0	303.5	4408
10080 min Summer	1.219	0.0	316.6	5136
15 min Winter	83.965	0.0	36.0	28
30 min Winter	59.880	0.0	51.7	40
60 min Winter	40.721	0.0	70.7	62
120 min Winter	26.227	0.0	91.2	116
180 min Winter	20.088	0.0	104.9	148
240 min Winter	16.566	0.0	115.4	184
360 min Winter	12.577	0.0	131.5	256
480 min Winter	10.324	0.0	144.0	328
600 min Winter	8.850	0.0	154.3	396
720 min Winter	7.800	0.0	163.2	462
960 min Winter	6.386	0.0	178.2	588
1440 min Winter	4.811	0.0	201.3	834
2160 min Winter	3.624	0.0	227.5	1192
2880 min Winter	2.964	0.0	247.9	1532
4320 min Winter	2.228	0.0	279.2	2248
5760 min Winter	1.817	0.0	303.4	2944

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CADS		Source Control 2017.1.2					
<u>Cascade Summary of Results for 210321 - Main site Attenuation.SRCX</u>							
<b>Storm Event</b>	<b>Max Level (m)</b>	<b>Max Depth (m)</b>	<b>Max Infiltration (l/s)</b>	<b>Max Control (l/s)</b>	<b>Max Σ Outflow (l/s)</b>	<b>Max Volume (m<sup>3</sup>)</b>	<b>Status</b>
7200 min Winter	4.894	0.094	0.0	1.9	1.9	5.4	O K
8640 min Winter	4.882	0.082	0.0	1.7	1.7	4.7	O K
10080 min Winter	4.876	0.076	0.0	1.5	1.5	4.3	O K
<b>Storm Event</b>	<b>Rain (mm/hr)</b>	<b>Flooded Volume (m<sup>3</sup>)</b>	<b>Discharge Volume (m<sup>3</sup>)</b>	<b>Time-Peak (mins)</b>			
7200 min Winter	1.550	0.0	323.3	3672			
8640 min Winter	1.361	0.0	340.3	4408			
10080 min Winter	1.219	0.0	355.2	5056			
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CADS	Source Control 2017.1.2	
<u>Cascade Rainfall Details for 210321 - Main site Attenuation.SRCX</u>		
Rainfall Model	FSR	Winter Storms Yes
Return Period (years)	200	Cv (Summer) 0.750
Region	Scotland and Ireland	Cv (Winter) 0.840
M5-60 (mm)	13.000	Shortest Storm (mins) 15
Ratio R	0.250	Longest Storm (mins) 10080
Summer Storms	Yes	Climate Change % +35
<u>Time Area Diagram</u>		
Total Area (ha) 0.031		
<b>Time (mins) Area</b>		
<b>From: To: (ha)</b>		
0 4 0.031		
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15 Victoria Street Aberdeen AB10 1XB																				
Date 07/03/2024 12:10 File	Designed by JMA Checked by																			
CADS		Source Control 2017.1.2																		
<u>Cascade Model Details for 210321 - Main site Attenuation.SRCX</u>																				
Storage is Online Cover Level (m) 6.000																				
<u>Cellular Storage Structure</u>																				
Invert Level (m) 4.800 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000																				
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Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )															
0.000	60.0	60.0	1.300	0.0	97.2															
1.200	60.0	97.2																		
<u>Orifice Outflow Control</u>																				
Diameter (m) 0.060 Discharge Coefficient 0.600 Invert Level (m) 4.800																				
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## **APPENDIX H**

### SuDS Operation and Maintenance Guidance

**TABLE 20.15** Operation and maintenance requirements for pervious pavements

Maintenance schedule	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 surface 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	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Many of the specific maintenance activities for pervious pavements can be undertaken as part of a general site cleaning contract (many car parks or roads are swept to remove litter and for visual reasons to keep them tidy) and therefore, if litter management is already required at site, this should have marginal cost implications.

Generally, pervious pavements require less frequent gritting in winter to prevent ice formation. There is also less risk of ice formation after snow melt, as the melt water drains directly into the underlying sub-base and does not have chance to refreeze. A slight frost may occur more frequently on the surface of pervious pavements compared to adjacent impermeable surfaces, but this is only likely to last for a few hours. It does not happen in all installations and, if necessary, this can be dealt with by application of salt. It is not likely to pose a hazard to vehicle movements.



**TABLE 16.1** Operation and maintenance requirements for filter drains

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	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	Six monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	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	As required

Sediments excavated from upstream pre-treatment devices that receive runoff from residential or standard road and roof areas are generally not toxic or hazardous material and can therefore be safely disposed of by either land application or landfilling. However, consultation should take place with the environmental regulator to confirm appropriate waste management protocols and compliance with legislation. Sediment testing may be required before sediment excavation to determine its classification and appropriate disposal methods. For industrial site runoff, sediment testing will be essential. In the majority of cases, it will be acceptable to distribute the sediment on site, if there is an appropriate safe and acceptable location to do so. Any damage due to sediment removal or erosion should be repaired and immediately reseeded or planted.

**TABLE 21.3** Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required



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## Re-Consultation Request Notification - Engineering Services

Planning Authority Name	<b>Orkney Islands Council</b>
Date of Consultation	<b>16th January 2024</b>
Response required by	<b>6th February 2024</b>
Planning Authority Reference	<b>22/382/PP</b>
Nature of Proposal (Description)	<b>Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure</b>
Site	<b>Cairston Road (Land Near), Stromness, Orkney, KW16 3JS</b>
Site Postcode	<b>N/A</b>
Site Gazetteer UPRN	
Proposal Location Easting	<b>326018</b>
Proposal Location Northing	<b>1010016</b>
Area of application site (Metres)	<b>4962</b>
Clarification of Specific Reasons for Consultation	
Development Hierarchy Level	<b>N/A</b>
Supporting Documentation URL	<a href="http://planningandwarrant.orkney.gov.uk/online-applications/">http://planningandwarrant.orkney.gov.uk/online-applications/</a> <b>Please enter - 22/382/PP</b>
List of Available Supporting Documentation	<b>As above URL</b>
Offline Documents available?	<b>N/A</b>
Date of Validation by Planning Authority	<b>23rd November 2022</b>
Governing Legislation	TOWN AND COUNTRY PLANNING (SCOTLAND) ACTS DEVELOPMENT MANAGEMENT PROCEDURE (SCOTLAND) REGULATIONS 2013
Consultation Type	<b>Planning Permission</b>
Consultation Stage	<b>N/A</b>
Is this a re-consultation of an existing application?	<b>YES</b>
EIA Required	<b>No</b>
EIA Regulations	<b>N/A</b>
Use Class (Current)	
Use Class (Proposed)	
Does the application conform with the Structure Plan / Local Plan Land Use	
Additional Comments relating to Structure Plan / Local Plan Use	<b>N/A</b>
Transport Assessment or Travel Plan	<b>N/A</b>
Applicant Name	<b>Orkney Builders Ltd</b>
Applicant Organisation Name	
Applicant Address	<b>Orkney Builders Ltd Hatston Road Crowness</b>

	<b>Kirkwall Orkney KW15 1RG</b>
Agent Name	<b>Bracewell Stirling</b>
Agent Organisation Name	
Agent Address	<b>C/o Lisa Balnave 5 Ness Bank Inverness United Kingdom IV2 4SF</b>
Agent Phone Number	<b>N/A</b>
Agent Email Address	<b>N/A</b>
PA Office	<b>Development Management</b>
Case Officer	<b>Mr Jamie Macvie</b>
Case Officer Phone number	<b>01856 873535 EXT 2529</b>
Case Officer email address	<b>jamie.macvie@orkney.gov.uk</b>
PA Response To	<b>planningconsultation@orkney.gov.uk</b>

### **Flood Risk**

Satisfactory responses have been provided to all of the queries raised regarding the surface water system proposed for this development.

We do not object to the proposal.

PW



**ORKNEY**  
ISLANDS COUNCIL

**GRANT PLANNING PERMISSION**

**DELEGATED DECISION**

**TOWN AND COUNTRY PLANNING (SCOTLAND) ACT, 1997 (as amended) ("The Act")**

**Ref: 22/382/PP**

Orkney Builders Ltd  
c/o Bracewell Stirling  
C/o Lisa Balnave  
5 Ness Bank  
Inverness  
United Kingdom  
IV2 4SF

With reference to your application registered on 23rd November 2022 for planning permission for the following development:-

**PROPOSAL:** Erect 10 houses with air source heat pumps, construct a road and associated landscaping and infrastructure

**LOCATION:** Cairston Road (Land Near), Stromness, Orkney, KW16 3JS

Orkney Islands Council in exercise of its powers under the above Act, hereby **Grants Planning Permission subject to the attached terms and conditions.**

**The Council's reasoning for this decision is:** The development is acceptable in principle, as development of an allocated site within the settlement boundary of Stromness. Management of surface water has been adequately addressed. Roads Services has no objections. Representations have been received. The development is considered to accord with Policies 1, 2, 5A, 9G and 14C of the Orkney Local Development Plan 2017, and the relevant provisions of National Planning Framework 4.

(For further detail you may view the Planning Handling Report for this case by following the Application Search and Submission link on the Council's web page and entering the reference number for this application).

**Please read carefully the Terms and Conditions on the following pages as failure to comply may result in enforcement action.**

Decision date: 28th June 2024

Jamie Macvie MRTPI, Service Manager, Development Management, Orkney Islands Council, Council Offices, Kirkwall, Orkney, KW15 1NY

Ref: 22/382/PP

## TERMS AND CONDITIONS

### TERMS

- A. The development hereby approved must be carried out in accordance with the terms and conditions attached to this planning permission and with the approved plans and details identified in Schedule 1.
- B. Failure to implement the permission in accordance with the approved details and attached planning conditions may render the development unauthorised and may result in enforcement action.
- C. No development shall commence on the development hereby approved until the developer has formally advised the Planning Authority in writing of the intended start date. This should be done as soon as practicable. Take note that **failure to submit such a Notice would be a breach of planning control** under section 123(1) of the Act and could result in enforcement action.
- D. To accord with the provisions of Section 27B of the Act, once the development hereby approved is completed, and prior to the development being brought into use, the developer shall submit a completion notice to the Planning Authority.

(To comply with C & D above please use and submit the attached forms to ensure compliance with all of the statutory requirements in this regard. These forms are also available from the planning page on the Council's web site.)

- E. If, at any stage, it becomes necessary to vary any of the approved plans or details you should contact the Planning Authority in advance of implementing any changes to establish whether the proposed changes require any further planning approval.
- F. It should be understood that this permission does not carry with it or supersede the need for any necessary consent or approval for the proposed development under any other statutory enactments, for example the Building (Scotland) Act, the Roads (Scotland) Act 1984, the Water (Scotland) Act 1980, and the Environmental Protection Act 1990.
- G. It is the responsibility of the developer to ensure that services including telephone and electricity lines, water mains and sewers are protected. You should contact the relevant service providers to check whether such services would be affected.



## CONDITIONS

01. The development hereby approved to which this planning permission relates must be begun not later than the expiration of three years, beginning with the date on which the permission is granted, which is the date of this decision notice. If development has not commenced within this period, this planning permission shall lapse.

Reason: In accordance with Section 58 of the Town and Country Planning (Scotland) Act 1997, as amended, which limits the duration of planning permission.

02. No development, including any site clearance works, shall commence until a Construction Method Statement has been submitted to, and approved in writing by, the Planning Authority. The statement shall provide for:

- The means of access to and from the site for plant, machinery and all construction traffic.
- Parking of vehicles of site operatives and visitors.
- Loading and unloading of plant and materials.
- Construction compound.
- Welfare facilities.
- Storage of plant and materials used in constructing the development.
- Stockpiling of soils.
- The erection and maintenance of security hoarding.
- Construction lighting.
- Measures to control the emission of dust and dirt during construction.
- A scheme for recycling/disposing of waste resulting from demolition and construction works.
- Where relevant in terms of occupation, the phasing of the development.

For the avoidance of doubt there shall be no burning or burying of waste within the site.

Thereafter, and throughout all construction phases, the site and development shall be undertaken wholly in accordance with the approved Construction Method Statement.

Reason: To safeguard the amenity of neighbouring properties and occupants.

03. Notwithstanding the details included within the site plan hereby approved, no development shall commence until a Scheme of Landscaping for all hard and soft landscaping is submitted to, and approved in writing by, the Planning Authority, including substantial tree planting surrounding the amenity space to the south of the site. The Scheme of Landscaping shall include:

- The location of all proposed tree, shrub, hedging and grass planting.
- A planting schedule comprising layout, number, density, species, height of all trees and shrubs and seed mix of all grass areas.
- The location, design (including height where applicable) and materials of all

- hard landscaping works, including walls, retaining walls, fences and gates.
- A timescale for implementation and completion of all soft and hard landscaping contained in the Scheme of Landscaping, including all tree and shrub planting in the first planting season following commencement of development. All roads, footpaths, parking, bin storage and all other hard landscaping shall be completed wholly in accordance with approved details prior to first occupation of any residential unit within the development.

All soft and hard landscaping shall be carried out wholly in accordance with the approved Scheme of Landscaping, unless otherwise agreed, in writing, with the Planning Authority.

Any tree or shrub planting which, within a period of five years from planting, in the opinion of the Planning Authority, is dead, dying, diseased or severely damaged, shall be replaced by a tree or shrub of similar size and species to that originally planted, unless otherwise agreed, in writing, with the Planning Authority.

Thereafter, the development shall be maintained in accordance with the details included in the Scheme of Landscaping throughout the lifetime of the development.

Reason: To protect the character and appearance of the area and residential amenity.

04. In conjunction with landscaping details submitted in pursuance of condition 03, no development shall commence until full details of not less than four electric vehicle chargers within the application site, and infrastructure for future installation of further chargers at each parking bay, are submitted to and agreed, in writing, by the Planning Authority. Thereafter, the electric vehicle chargers and infrastructure shall be provided in accordance with the approved details prior to first occupation of any part of the development.

Reason: To ensure adequate provision of electric vehicle charging infrastructure.

05. The development shall not be brought into use until the junction of the access hereby approved with the public road has been constructed to the Council's Roads Services standard 'Carriageway Construction', attached to and forming part of this decision notice, and in accordance with the dimensions included in the site plan hereby approved.

Any damage caused to the existing road infrastructure during construction of the development shall be repaired prior to first occupation of the development, to the satisfaction of the Planning Authority, in conjunction with Roads Services.

Reason: In the interests of road safety.

06. No house within the development hereby approved shall be occupied until the full extent of approved road and footpath surface has been completed to full construction including the final wearing surface, unless an alternative phased approach to occupation is approved under the terms of condition 02.

Reason: To ensure that an adequate level of access is timeously provided for the development; in the interests of road safety and amenity.

07. No development shall commence until full details of a footway across the Cairston Road frontage of the site have been submitted to and approved, in writing, by the Planning Authority. These details shall include:

- The extent of the footway from the south corner of the site adjoining the third-party access, to the east corner of the site adjacent to Karlea, comprising the whole frontage of the application site with Cairston Road, other than the approved access.
- Full construction details of the footway, which shall be not less than 1.8 metres wide, to a standard Roads Services footway construction.
- Location and full construction details of pedestrian crossing points.
- Associated street lighting, including any alterations to existing street lighting columns.
- Any drainage included within the footway construction.
- Construction (including replacement of the existing wall where relevant) of a dry stone wall along the length of the back edge of the footway.

Thereafter, the development shall be completed wholly in accordance with approved details prior to first occupation of any house, unless otherwise approved, in writing, under the provisions of condition 06.

Reason: In the interests of road safety, and as the development of an allocated housing site within the settlement boundary.

08. No development shall commence until full details of the 'Potential Future Connection' at the north-west boundary of the application site have been submitted to and approved, in writing, by the Planning Authority. Notwithstanding details included in the site plan, the submitted details shall include construction of the road and footway to the property boundary, including service ducting and future foul and surface water drainage connections where relevant, so that development of the adjoining land can include continuation of the road and footway with no further works required within the current application site area. No construction detail shall inhibit future free access from the application site to the adjoining land. Thereafter, the 'Potential Future Connection' shall be constructed wholly in accordance with approved details prior to first occupation of any house, unless otherwise approved, in writing, under the provisions of condition 06.

Reason: To ensure access to other allocated land, to ensure connectivity within the settlement.

09. Prior to occupation of any part of the development hereby approved, all surface water drainage works hereby approved, shall be constructed wholly in accordance with the approved drawings and submitted documents, including the 'Drainage Report' dated March 2024. Thereafter, and throughout the lifetime of the development, the drainage shall be maintained in accordance with the approved details, and in accordance with the principles of Sustainable Drainage Systems (SuDS) and be compliant with the guidance set out in the CIRIA SuDS Manual C753.

Reason: To ensure the provision of an adequate surface water drainage system and to accord with Policy 13B - Sustainable Drainage Systems (SuDS) of Orkney Local Development Plan 2017.

10. No development shall commence until a Maintenance and Management Schedule is submitted to, and approved in writing by, the Planning Authority. This Schedule shall include:

- Confirmation of maintenance responsibilities and arrangements for all surface water devices, roads, footways and landscaping.
- Full maintenance details, including a maintenance schedule, of all roads and footways.
- Full maintenance details, including a maintenance schedule, of all surface water devices, including permeable paving.
- A maintenance schedule for all surface water devices.

The approved Maintenance and Management Schedule shall be applied and complied with throughout the lifetime of the development.

Reason: To ensure the proper maintenance and management of surface water devices, roads and footways and landscaping in perpetuity.

11. No development shall commence until details of affordable housing provision have been submitted to, and agreed in writing by, the Planning Authority, in conjunction with Housing Services. These details shall include consideration and incorporation of housing types and tenures which meet local housing requirements and phasing of the development, and/or a viability assessment. Thereafter, the development shall be delivered wholly in accordance with all agreed details.

Reason: To ensure the development meets local housing requirements in accordance with Policy 5B of the Orkney Local Development Plan 2017.

12. Total noise from each of the Air Source Heat Pumps installed shall not exceed NR25 within any residential property outwith the development, where NR25 is the Noise Rating Curve at 25, (noise measurements to be made with a window of any residential property outwith the development open no more than 50 mm).

Reason: To protect any nearby residents from excessive noise disturbance from the air source heat pumps.

13. Prior to the dwellings hereby approved being occupied and brought into first use, they shall be connected to Scottish Water's public waste water system.

Reason: In the interests of environmental protection and to accord with Policy 13C - Waste Water Drainage of Orkney Local Development Plan 2017.

14. Notwithstanding details included in the elevations hereby approved, all fascias, soffits, windows, and weatherboard cladding shall be dark/anthracite grey.

Reason: To ensure continuity of design through the development, to match the colours specified in the two houses at the entrance to the development, as indicated in the submitted visualisation.

15. Hours of construction work on site involving the use of machinery and powered tools, or any other operation, for example hammering, that would generate noise audible beyond the boundary of the site, shall only take place between the hours of 07:30 and 19:00 Mondays to Fridays, 09:00 to 17:00 Saturdays, and not at

all on Sundays or the Christmas or New Year Public Holidays, unless otherwise agreed, in writing, with the Planning Authority.

Reason: To safeguard the amenity of nearby residents.

### *Informatives*

01. This application was subject to consultations with agencies and other interested parties. It would be helpful for you to look at the full terms of their response(s) as they include advice and contact details that are relevant to you. You can access these details by following the Online Planning link on the Council's website and then entering either the application address or the planning application number.
02. It is an offence under Section 56 of the Roads (Scotland) Act 1984 to carry out any excavations within the boundary of the public road without written permission of the roads authority. Therefore, one or more separate consents will be required from the Council's Roads Services to carry out any works within the road boundary, prior to any works commencing. These consents may require additional work and/or introduce additional specifications. You are therefore advised to contact Roads Services for further advice as early as possible.

Any damage caused to the existing road infrastructure during construction of the development shall be repaired prior to the development being brought into use, to the satisfaction of the Planning Authority, in conjunction with Roads Services.

It is an offence under Section 95 of the Roads (Scotland) Act 1984 to allow mud or any other material to be deposited, and thereafter remain beyond the working day, on a public road from any vehicle or development site.

Ref: 22/382/PP

**SCHEDULE 1 – PLANS, VARIATIONS AND ANY OBLIGATION****1. Plans and Drawings**

The plans and drawings to which this decision relates are those identified below:

Location Plan	OIC-01	1
Floor & Elevation Plans	OIC-04	1
Floor & Elevation Plans	OIC-07	1
Floor & Elevation Plans	OIC-08	1
Drainage Layout	OIC-10	4
Floor & Elevation Plans	OIC-06	2
Site Plan	OIC-03	3
Floor & Elevation Plans	OIC-05	2
Other	OIC-15	2
Other	OIC-13	3
Other	OIC-16	2
Other	OIC-11	3

**2. Variations**

If there have been any variations made to the application in accordance with section 32A of the Act these are specified below:

Date of Amendment:  
Reasons

**3. Legal Obligation**

Has any obligation been entered into under section 75 of the Act? – N

If such an obligation has been entered into, the terms of such obligation or a summary of such terms may be inspected by contacting Legal Services.

## RIGHT TO SEEK A REVIEW

If you are unhappy with the terms of this decision you have a right to ask for a review of your planning decision by following the procedure specified below.

### PROCEDURE FOR REQUESTING A REVIEW BY THE LOCAL REVIEW BODY

1. If the applicant is aggrieved by the decision of the Appointed Officer to:
  - a. Refuse any application, or
  - b. Grant permission subject to conditions.

In accordance with the Town and Country Planning (Scheme of Delegation and Local Review Procedure) (Scotland) Regulations, the applicant may apply to the Local Review Body within three months from the date of this notice for a review of that decision.

2. Forms to request a review are available from either address below, or from <http://www.orkney.gov.uk/Service-Directory/D/appeal-a-decision.htm>.

Completed forms to request a review should be submitted to the address below:

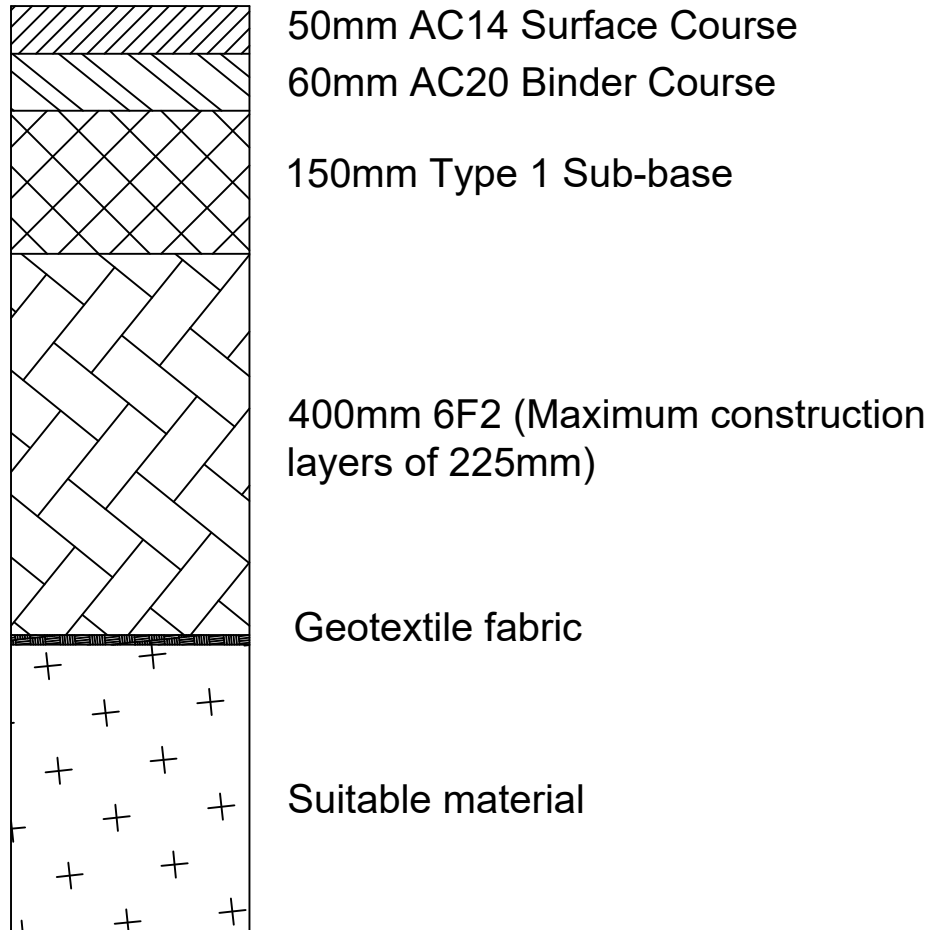
Committee Services  
Orkney Islands Council  
Council Offices  
School Place  
KIRKWALL  
Orkney  
KW15 1NY

and at the same time a copy of the notice for a review should be sent to:

Service Manager (Development Management)  
Orkney Islands Council  
Council Offices  
School Place  
KIRKWALL  
Orkney  
KW15 1NY

Email: [planning@orkney.gov.uk](mailto:planning@orkney.gov.uk)

3. If permission to develop land is refused or granted subject to conditions, whether by the planning authority or by the Scottish Ministers, and the owner of the land claims that the land has become incapable of reasonably beneficial use in its existing state and cannot be rendered capable of reasonably beneficial use by the carrying out of any development which has been or would be permitted, the owner of the land may serve on the planning authority a purchase notice requiring the purchase of the owner of the land's interest in the land in accordance with Part 5 of the Act.



## Typical Section Carriageway Construction

REV 0 14/12/20 DW  
For use

File Ref. <b>R3.40.01</b>	Drg. No. <b>CC-01</b>	<b>ROADS SERVICES</b>	<b>NEIGHBOURHOOD SERVICES &amp; INFRASTRUCTURE</b> Council Offices, Kirkwall Orkney, KW15 1NY tel (01856) 873535 fax (01856) 876094  Corporate Director :- Hayley Green MBA (Public Service)	 <b>ORKNEY</b> ISLANDS COUNCIL
Revision				
Date <b>14 Dec 2020</b>	Drawn <i>DRW</i>			
Scale <b>N.T.S.</b>	Checked <i>KDR</i>			



To:  
 Development Management  
 Orkney Islands Council  
 Council Offices  
 School Place  
 Kirkwall  
 KW15 1NY

Or by email to [planning@orkney.gov.uk](mailto:planning@orkney.gov.uk)

## Notification of Completion of Development

It is important that the planning authority is informed as soon as possible following completion of works.

Planning Application Reference: \_\_\_\_\_

In accordance with Section 27B of The Town and Country Planning (Scotland) Act 1997, as amended, the planning authority is hereby advised of the completion of the above development.

- (a) Provide the date of completion of development. \_\_\_\_\_
- (b) Provide full name and address, and email address if available, of the person submitting Notification of Completion. (Note that any correspondence relating to the Notification of Completion will be addressed to this person.)

\_\_\_\_\_  
 \_\_\_\_\_

Signed: \_\_\_\_\_ Applicant / Agent (delete as appropriate)

Print name: \_\_\_\_\_

Dated: \_\_\_\_\_

To:  
 Development Management  
 Orkney Islands Council  
 Council Offices  
 School Place  
 Kirkwall  
 KW15 1NY

Or by email to [planning@orkney.gov.uk](mailto:planning@orkney.gov.uk)

## Notification of Initiation of Development

**IMPORTANT:** Failure to notify the planning authority of initiation of development would constitute a breach of planning control under Section 123(1) of The Town and Country Planning (Scotland) Act 1997, as amended.

Planning Application Reference: \_\_\_\_\_

Date of planning permission: \_\_\_\_\_

In accordance with Section 27A of The Town and Country Planning (Scotland) Act 1997, as amended, the planning authority is hereby advised that it is intended to initiate the above development as follows:

(a) Provide the date of initiation. \_\_\_\_\_

(b) Provide full name and address, and email address if available, of the person(s) intending to carry out the development. (Note that in the first instance, any correspondence relating to the Notification of Initiation of Development will be addressed to this person.)

\_\_\_\_\_  
 \_\_\_\_\_

(c) If the person included at (b) above is the owner of the land to which the development relates, state 'OWNER'. If that person is not the owner, provide the full name and address of the owner.

\_\_\_\_\_  
 \_\_\_\_\_

(d) If a person is, or is to be, appointed to oversee the carrying out of the development on site, provide the name of that person and details of how that person to be contacted.

\_\_\_\_\_  
 \_\_\_\_\_

Signed: \_\_\_\_\_ Applicant / Agent (delete as appropriate)

Print name: \_\_\_\_\_

Dated: \_\_\_\_\_

**NOTE:** Planning conditions may be attached to a grant of planning permission. These form part of the permission, and limit and control the way in which the permission must be implemented and may include mitigation or a requirement for further information. **If pre-commencement conditions are attached to the decision, development cannot proceed until these conditions have been discharged.**

When development commences, the planning authority may check for compliance with all conditions. If implemented or carried out contrary to planning conditions, the development would be unauthorised and may be subject to formal enforcement action.

**22/382/PP****Erect 10 houses with air source pumps, construct a road and associated landscaping and infrastructure at Cairston Road, Stromness****Regulation 10(b) Representation by Interested Party – Development Management**

Development Management reaches a different conclusion than those stated in the Notice of Review.

The terms of planning conditions are not bound by or limited to comments made by consultation bodies. I.e. whilst Roads Services did not specify the full extent of the footway required by the planning condition, that does not prevent the footway upgrade forming part of the permission.

The Notice of Review highlights the width of the existing verge. That is noted, and formed part of the consideration of the application and basis of attaching the condition. Clearly not every instance where a footway is required by a developer, is in a road verge that is already 1.8 metres in width.

It is reasonable to expect the boundary wall to be upgraded in any case, as the edge of the development of the public realm, and given its currently poor condition. Provision for altering the lighting column and line of the boundary wall are both included in the condition requirements.

Development Management does not agree with the assessment of the tests of planning conditions, as set out in the Notice of Review. For example, it is argued that a footway across the frontage of a development site is not relevant to that development. In planning terms, it is linked and entirely relevant.

The Notice of Review also argues that the condition is not enforceable, on the basis it includes works to road verge, as land in control of the roads authority. This does not make the condition unenforceable, and it is common practice for developers to be required to carry out works within the road boundary, including footways, street lighting, installation of passing places, road widening, and other works required by planning condition.

It is common practice for a developer to complete a footway and appropriate boundary across the frontage of a development site in a settlement, where that fronts a public road. The Notice of Review is correct that not all that side of Cairston Road has footway currently, but as the town expands in that direction, it is appropriate that developers of any individual site be responsible for footway within the road verge across that site frontage.

It is entirely appropriate that any such necessary infrastructure upgrades are required by a developer where linked to a development, rather than at local authority cost at a later date. The outcome of the planning permission should be for the long-term public good and development of a urban street in an appropriate way, not to suit stated financial implications of a developer.

This is consistent with other relatively recent developments in Stromness, including decisions taken by Planning Committee where a developer was required to provide a footway within the public road verge.

**Development Management****24 October 2024**