LRB-2020-05 – 19/01725/IPL – Erection of a dwellinghouse (in principle), land 70 metres north of Bargate Cottage, Gleneagles

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PAPERS SUBMITTED BY THE APPLICANT

Pullar House 35 Kinnoull Street Perth PH1 5GD Tel: 01738 475300 Fax: 01738 475310 Email: onlineapps@pkc.gov.uk

Applications cannot be validated until all the necessary documentation has been submitted and the required fee has been paid.

Thank you for completing this application form:

ONLINE REFERENCE 100234077-001

The online reference is the unique reference for your online form only. The Planning Authority will allocate an Application Number when your form is validated. Please quote this reference if you need to contact the planning Authority about this application.

Applicant or Agent Details

Are you an applicant or an agent? * (An agent is an architect, consultant or someone else acting on behalf of the applicant in connection with this application) ☐ Applicant ☒ Agent

Agent Details

Please enter Agent details

Company/Organisation:	Bidwells		
Ref. Number:		You must enter a Building Name or Number, or both: *	
First Name: *	Mark	Building Name:	Broxden House
Last Name: *	Myles	Building Number:	
Telephone Number: *	01738 630666	Address 1 (Street): *	Lamberkine Drive
Extension Number:		Address 2:	
Mobile Number:		Town/City: *	Perth
Fax Number:		Country: *	Scotland
		Postcode: *	PH1 1RA
Email Address: *	mark.myles@bidwells.co.uk		

Is the applicant an individual or an organisation/corporate entity? *

☒ Individual ☐ Organisation/Corporate entity

Applicant Details

Please enter Applicant details

Title:	Mr	You must enter a Building Name or Number, or both: *	
Other Title:		Building Name:	Gleneagles
First Name: *	Martin	Building Number:	
Last Name: *	Haldane	Address 1 (Street): *	Gleneagles
Company/Organisation		Address 2:	
Telephone Number: *		Town/City: *	Auchterarder
Extension Number:		Country: *	Scotland
Mobile Number:		Postcode: *	PH3 1PJ
Fax Number:			
Email Address: *	[redacted]		

Site Address Details

Planning Authority: Perth and Kinross Council

Full postal address of the site (including postcode where available):

Address 1:	
Address 2:	
Address 3:	
Address 4:	
Address 5:	
Town/City/Settlement:	
Post Code:	

Please identify/describe the location of the site or sites

Land 70 metres North of Bargate Cottage, Gleneagles

Northing	708955	Easting	292814

Description of Proposal

Please provide a description of your proposal to which your review relates. The description should be the same as given in the application form, or as amended with the agreement of the planning authority: *
(Max 500 characters)

Erection of dwellinghouse (in principle) on Land 70 metres North of Bargate Cottage, Gleneagles

Type of Application

What type of application did you submit to the planning authority? *

☐ Application for planning permission (including householder application but excluding application to work minerals).

☒ Application for planning permission in principle.

☐ Further application.

☐ Application for approval of matters specified in conditions.

What does your review relate to? *

☒ Refusal Notice.

☐ Grant of permission with Conditions imposed.

☐ No decision reached within the prescribed period (two months after validation date or any agreed extension) – deemed refusal.

Statement of reasons for seeking review

You must state in full, why you are a seeking a review of the planning authority's decision (or failure to make a decision). Your statement must set out all matters you consider require to be taken into account in determining your review. If necessary this can be provided as a separate document in the 'Supporting Documents' section: * (Max 500 characters)

Note: you are unlikely to have a further opportunity to add to your statement of appeal at a later date, so it is essential that you produce all of the information you want the decision-maker to take into account.

You should not however raise any new matter which was not before the planning authority at the time it decided your application (or at the time expiry of the period of determination), unless you can demonstrate that the new matter could not have been raised before that time or that it not being raised before that time is a consequence of exceptional circumstances.

Please refer to separate grounds of appeal statement

Have you raised any matters which were not before the appointed officer at the time the Determination on your application was made? * ☐ Yes ☒ No

If yes, you should explain in the box below, why you are raising the new matter, why it was not raised with the appointed officer before your application was determined and why you consider it should be considered in your review: * (Max 500 characters)

Please provide a list of all supporting documents, materials and evidence which you wish to submit with your notice of review and intend to rely on in support of your review. You can attach these documents electronically later in the process: * (Max 500 characters)

Grounds of Appeal Statement, Planning Application forms, Location & Site Plan, Supporting Planning Statement, Design Statement, Flood Risk Assessment and Addendum, Tree Report and associated Plans and Habitat Survey

Application Details

Please provide details of the application and decision.

What is the application reference number? * 19/01725/IPL

What date was the application submitted to the planning authority? * 16/10/2019

What date was the decision issued by the planning authority? * 06/02/2020

Review Procedure

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.

Can this review continue to a conclusion, in your opinion, based on a review of the relevant information provided by yourself and other parties only, without any further procedures? For example, written submission, hearing session, site inspection. *

☐ Yes ☒ No

Please indicate what procedure (or combination of procedures) you think is most appropriate for the handling of your review. You may select more than one option if you wish the review to be a combination of procedures.

Please select a further procedure *

By means of inspection of the land to which the review relates

Please explain in detail in your own words why this further procedure is required and the matters set out in your statement of appeal it will deal with? (Max 500 characters)

To inspect the evidence of the former house that stood on the site, to review the existing boundaries and landscape framework for the site and also to assess the setting within the wider Gleneagles House estate.

In the event that the Local Review Body appointed to consider your application decides to inspect the site, in your opinion:

Can the site be clearly seen from a road or public land? * ☒ Yes ☐ No

Is it possible for the site to be accessed safely and without barriers to entry? * ☒ Yes ☐ No

Checklist – Application for Notice of Review

Please complete the following checklist to make sure you have provided all the necessary information in support of your appeal. Failure to submit all this information may result in your appeal being deemed invalid.

Have you provided the name and address of the applicant?. * ☒ Yes ☐ No

Have you provided the date and reference number of the application which is the subject of this review? * ☒ Yes ☐ No

If you are the agent, acting on behalf of the applicant, have you provided details of your name and address and indicated whether any notice or correspondence required in connection with the review should be sent to you or the applicant? * ☒ Yes ☐ No ☐ N/A

Have you provided a statement setting out your reasons for requiring a review and by what procedure (or combination of procedures) you wish the review to be conducted? * ☒ Yes ☐ No

Note: 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. 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.

Please attach a copy of all documents, material and evidence which you intend to rely on (e.g. plans and Drawings) which are now the subject of this review * ☒ Yes ☐ No

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 (if any) from the earlier consent.

Declare – Notice of Review

I/We the applicant/agent certify that this is an application for review on the grounds stated.

Declaration Name: Mr Mark Myles

Declaration Date: 17/02/2020

BIDWELLS

NOTICE OF REVIEW APPEAL

1.0 Background

The council refused planning permission in principle of application 19/01725/IPL on 6th February 2020, for one reason, namely;

The proposal is contrary to Policy 19 Housing in the Countryside of the PKC Local Development Plan (LDP2) 2019 and the council's housing in the countryside guide 2012 as it failed to comply with any of the categories.

An earlier planning application (19/00733/IPL) for the same proposal had been withdrawn to specifically allow matters relating to potential flood risk, trees and biodiversity to be addressed in full. Additional reports and studies were provided in support of the revised application (19/01725/IPL) to address these points and we are therefore pleased that they did not form reasons for refusal of the application.

A supporting planning policy statement also accompanied the application submission in October 2019, which pre-dated the adoption of the LDP2 on 29 November 2019. The statement also took cognisance of the imminent adoption of LDP2 but in any event the change to Development Plan did not fundamentally alter any of the six categories of the policy where development can be accepted in the countryside.

The supporting statement highlighted that the main focus for assessment of the application was category 3.1 of the policy (Existing Gardens) but also considered the fact that a previous house 'The Kinnaker' stood on this site until around 25-30 years ago, meaning that support could also be gained for a house under categories 4 and 6 of the policy (replacement dwelling and brownfield site).

During email exchanges with the planning officer on the planning application, attempts were made to organise a meeting to discuss and debate interpretation of policy, but the planning officer declined the request as they considered they had enough information to assess the proposal.

2.0 Grounds of Appeal

Our appeal is based, on the fact that, the planning officer did not give proper or full consideration to Category 3.1 Existing Gardens of the policy or to the associated Supplementary Guidance (SG).

The current adopted 2012 (SG) states that proposals located within 'established gardens once associated with a country/estate house, which provides an appropriate landscape setting, but where development would not fundamentally affect the qualities and integrity of the site' can be supported in line with category 3.1a) of Policy 19, and where all of the siting criteria set out in the (SG) can be met. In this case all of the siting criteria are met.

We consider that the (SG) can be interpreted in two different ways and both interpretations would support the approval of a house on this site.

On the one hand this site can be assessed as an identifiable established garden site which was '***once'*** associated with the former estate house 'The Kinnaker' that stood on this site up until 25-30 years ago (and evidence of this is provided in the Design Statement), and where the site clearly benefits from long established site boundaries and a strong landscape framework on all of

its boundaries which separates it from the adjacent farmland and woodland, and where a single house development would not fundamentally affect the qualities and integrity of the site (as also evidenced by the supporting tree survey and biodiversity documentation provided).

The other interpretation would be that this site sits within an identifiable established garden site which was once associated with the main estate house (Gleneagles House) which is located 250m to the south of the site, and where the site similarly also benefits from long established boundaries and a strong landscape framework within the overall estate as set out above. The application site and surrounding land continues to form part of the wider 6,500-acre estate at Gleneagles.

The Report of Handling does not provide any consideration to either of these interpretations whatsoever. The Report of Handling does refer to the fact that the site is located 250m from the Category B listed Gleneagles House and that the distance and intervening vegetation would limit any impact on the listed building. The Report of Handling also highlights that the site will be served by a private estate drive that serves other dwellings in the area but fails to mention that the proposed site is located within and associated with the larger estate property where Policy 3.1a) could be considered favourably.

Instead the Report of Handling focuses solely on the point that as there is no current house on the site, development would be contrary to category 3.1a) but the Report of Handling fails to provide any further detailed assessment despite the responses we had previously submitted. As we had set out to the planning officer the reference to 'once' means that the (SG) can be interpreted as meaning a previous or former house. The planning officer's interpretation is also somewhat illogical because if there was a house still located on the site, then the proposal would clearly be assessed under the terms of the replacement house (category 4) rather than category 3.1a) of the policy anyway.

We are also aware that the council has approved an updated (SG) on Housing in the Countryside in January 2020 and that this has now been issued to Scottish Ministers for review prior to formal adoption by the council.

Within the updated 2020 (SG) category 3.1 a) – existing gardens states;

'Proposals for a new house or houses within the original garden ground associated with an existing country or estate house will be supported provided that there is an appropriate landscape setting and additional development will not fundamentally affect the qualities and integrity of the site, particularly where the house is a listed building or falls within a Historic garden and Design Landscape. A country or estate house is defined as a large house set within its own estate or extensive grounds. This section does not apply to domestic scale gardens or where gardens have been created at a later date, for example, by the change of use of agricultural land to garden ground.'

The site is located on original garden ground that continues to be associated with Gleneagles House estate and clearly benefits from a strong landscape framework and setting that can be enhanced as part of any approval (as set out in the submitted Tree Report and Arboriculture Impact Assessment).

The Report of Handling also confirms that the site is located sufficient distance from Gleneagles House so development on the site would not fundamentally affect the integrity or setting of the principle estate house (category B listed building).

Therefore, even if the updated 2020 (SG) is formally adopted by the council sometime in March 2020, and in advance of when the LRB come to consider this Notice of Review Appeal, then it is evident that the 2020 (SG) also provides strong support towards this proposal.

3.0 Conclusions

The applicant has spent considerable time and expense appointing consultants to provide the further Tree Report and Arboriculture Assessments as well as the extensive flood risk assessment including the necessary hydrological analysis and hydraulic modelling and then responding to further comments received from the council's Flooding and Structures team as part of the application process.

The only issue raised with this proposal is therefore whether or not the application can comply with any of the relevant criteria of the housing in the countryside policy.

Based on the fact that an estate house once stood on this site until around 25-30 years ago there are elements of (category 4 replacement house) and (category 6 brownfield sites) that also have some material weight in support of the approval of this proposal.

For the reasons set out in section 2 above, it is considered that the proposal does comply with category 3.1a) - Existing Gardens, of the housing in the countryside policy and also the detailed guidance set out in the adopted 2012 (SG) as well as the proposed replacement 2020 (SG).

The proposal is also consistent with the policy guidance on promoting rural development in Scottish Planning Policy as set out in our previous supporting planning statement and the Governments stated aim of increasing rural population as set out in the Planning (Scotland) Act 2019.

It is therefore respectfully requested that the LRB allow this appeal subject to any conditions considered necessary, as the proposal complies with category 3.1a) of Policy 19 from LDP2 and the associated (SG) and there are no other policy considerations or material considerations that would indicate otherwise.

BIDWELLS

Pullar House 35 Kinnoull Street Perth PH1 5GD Tel: 01738 475300 Fax: 01738 475310 Email: onlineapps@pkc.gov.uk

Applications cannot be validated until all the necessary documentation has been submitted and the required fee has been paid.

Thank you for completing this application form:

ONLINE REFERENCE 100185323-001

The online reference is the unique reference for your online form only. The Planning Authority will allocate an Application Number when your form is validated. Please quote this reference if you need to contact the planning Authority about this application.

Type of Application

What is this application for? Please select one of the following: *

☐ Application for planning permission (including changes of use and surface mineral working).

☒ Application for planning permission in principle.

☐ Further application, (including renewal of planning permission, modification, variation or removal of a planning condition etc)

☐ Application for Approval of Matters specified in conditions.

Description of Proposal

Please describe the proposal including any change of use: * (Max 500 characters)

Erection of house (in principle) Land 70 metres North of Bargate Cottage, Gleneagles

Is this a temporary permission? * ☐ Yes ☒ No

If a change of use is to be included in the proposal has it already taken place? (Answer 'No' if there is no change of use.) * ☐ Yes ☒ No

Has the work already been started and/or completed? *

☒ No ☐ Yes – Started ☐ Yes - Completed

Applicant or Agent Details

Are you an applicant or an agent? * (An agent is an architect, consultant or someone else acting on behalf of the applicant in connection with this application) ☐ Applicant ☒ Agent

Agent Details

Please enter Agent details

Company/Organisation:	Bidwells		
Ref. Number:		You must enter a Building Name or Number, or both: *	
First Name: *	Mark	Building Name:	Broxden House
Last Name: *	Myles	Building Number:	
Telephone Number: *	01738 630666	Address 1 (Street): *	Lamberkine Drive
Extension Number:		Address 2:	
Mobile Number:		Town/City: *	Perth
Fax Number:		Country: *	Scotland
		Postcode: *	PH1 1RA
Email Address: *	mark.myles@bidwells.co.uk		

Is the applicant an individual or an organisation/corporate entity? *

☒ Individual ☐ Organisation/Corporate entity

Applicant Details

Please enter Applicant details

Title:	Mr	You must enter a Building Name or Number, or both: *	
Other Title:		Building Name:	Gleneagles
First Name: *	Martin	Building Number:	
Last Name: *	Haldane	Address 1 (Street): *	Gleneagles
Company/Organisation		Address 2:	
Telephone Number: *		Town/City: *	Auchterarder
Extension Number:		Country: *	Scotland
Mobile Number:		Postcode: *	PH3 1PJ
Fax Number:			
Email Address: *	haldane@gleneagles.org		

Site Address Details

Planning Authority: Perth and Kinross Council

Full postal address of the site (including postcode where available):

Address 1:

Address 2:

Address 3:

Address 4:

Address 5:

Town/City/Settlement:

Post Code:

Please identify/describe the location of the site or sites

Northing 708955 Easting 292814

Pre-Application Discussion

Have you discussed your proposal with the planning authority? * ☐ Yes ☒ No

Site Area

Please state the site area: 0.70

Please state the measurement type used: ☒ Hectares (ha) ☐ Square Metres (sq.m)

Existing Use

Please describe the current or most recent use: * (Max 500 characters)

Previous long standing site for house and garden as evidenced in the supporting statements, plans and photographs

Access and Parking

Are you proposing a new altered vehicle access to or from a public road? * ☐ Yes ☒ No

If Yes please describe and show on your drawings the position of any existing. Altered or new access points, highlighting the changes you propose to make. You should also show existing footpaths and note if there will be any impact on these.

Are you proposing any change to public paths, public rights of way or affecting any public right of access? * ☐ Yes ☒ No

If Yes please show on your drawings the position of any affected areas highlighting the changes you propose to make, including arrangements for continuing or alternative public access.

Water Supply and Drainage Arrangements

Will your proposal require new or altered water supply or drainage arrangements? * ☒ Yes ☐ No

Are you proposing to connect to the public drainage network (eg. to an existing sewer)? *

☐ Yes – connecting to public drainage network
☒ No – proposing to make private drainage arrangements
☐ Not Applicable – only arrangements for water supply required

As you have indicated that you are proposing to make private drainage arrangements, please provide further details.

What private arrangements are you proposing? *

☒ New/Altered septic tank.
☐ Treatment/Additional treatment (relates to package sewage treatment plants, or passive sewage treatment such as a reed bed).
☐ Other private drainage arrangement (such as chemical toilets or composting toilets).

What private arrangements are you proposing for the New/Altered septic tank? *

☒ Discharge to land via soakaway.
☐ Discharge to watercourse(s) (including partial soakaway).
☐ Discharge to coastal waters.

Please explain your private drainage arrangements briefly here and show more details on your plans and supporting information: *

Septic tank and soakaway would be located within the site boundary

Do your proposals make provision for sustainable drainage of surface water?? * (e.g. SUDS arrangements) * ☒ Yes ☐ No

Note:-

Please include details of SUDS arrangements on your plans

Selecting 'No' to the above question means that you could be in breach of Environmental legislation.

Are you proposing to connect to the public water supply network? *

☐ Yes
☒ No, using a private water supply
☐ No connection required

If No, using a private water supply, please show on plans the supply and all works needed to provide it (on or off site).

Assessment of Flood Risk

Is the site within an area of known risk of flooding? * ☒ Yes ☐ No ☐ Don't Know

If the site is within an area of known risk of flooding you may need to submit a Flood Risk Assessment before your application can be determined. You may wish to contact your Planning Authority or SEPA for advice on what information may be required.

Do you think your proposal may increase the flood risk elsewhere? * ☐ Yes ☒ No ☐ Don't Know

Trees

Are there any trees on or adjacent to the application site? * ☒ Yes ☐ No

If Yes, please mark on your drawings any trees, known protected trees and their canopy spread close to the proposal site and indicate if any are to be cut back or felled.

All Types of Non Housing Development – Proposed New Floorspace

Does your proposal alter or create non-residential floorspace? * ☐ Yes ☒ No

Schedule 3 Development

Does the proposal involve a form of development listed in Schedule 3 of the Town and Country Planning (Development Management Procedure (Scotland) Regulations 2013 * ☐ Yes ☒ No ☐ Don't Know

If yes, your proposal will additionally have to be advertised in a newspaper circulating in the area of the development. Your planning authority will do this on your behalf but will charge you a fee. Please check the planning authority's website for advice on the additional fee and add this to your planning fee.

If you are unsure whether your proposal involves a form of development listed in Schedule 3, please check the Help Text and Guidance notes before contacting your planning authority.

Planning Service Employee/Elected Member Interest

Is the applicant, or the applicant's spouse/partner, either a member of staff within the planning service or an elected member of the planning authority? * ☐ Yes ☒ No

Certificates and Notices

CERTIFICATE AND NOTICE UNDER REGULATION 15 – TOWN AND COUNTRY PLANNING (DEVELOPMENT MANAGEMENT PROCEDURE) (SCOTLAND) REGULATION 2013

One Certificate must be completed and submitted along with the application form. This is most usually Certificate A, Form 1, Certificate B, Certificate C or Certificate E.

Are you/the applicant the sole owner of ALL the land? * ☒ Yes ☐ No

Is any of the land part of an agricultural holding? * ☐ Yes ☒ No

Certificate Required

The following Land Ownership Certificate is required to complete this section of the proposal:

Certificate A

Land Ownership Certificate

Certificate and Notice under Regulation 15 of the Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013

Certificate A

I hereby certify that –

(1) - No person other than myself/the applicant was an owner (Any person who, in respect of any part of the land, is the owner or is the lessee under a lease thereof of which not less than 7 years remain unexpired.) of any part of the land to which the application relates at the beginning of the period of 21 days ending with the date of the accompanying application.

(2) - None of the land to which the application relates constitutes or forms part of an agricultural holding

Signed: Mark Myles

On behalf of: Mr Martin Haldane

Date: 15/10/2019

☒ Please tick here to certify this Certificate. *

Checklist – Application for Planning Permission

Town and Country Planning (Scotland) Act 1997

The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013

Please take a few moments to complete the following checklist in order to ensure that you have provided all the necessary information in support of your application. Failure to submit sufficient information with your application may result in your application being deemed invalid. The planning authority will not start processing your application until it is valid.

a) If this is a further application where there is a variation of conditions attached to a previous consent, have you provided a statement to that effect? *

☐ Yes ☐ No ☒ Not applicable to this application

b) If this is an application for planning permission or planning permission in principal where there is a crown interest in the land, have you provided a statement to that effect? *

☐ Yes ☐ No ☒ Not applicable to this application

c) If this is an application for planning permission, planning permission in principle or a further application and the application is for development belonging to the categories of national or major development (other than one under Section 42 of the planning Act), have you provided a Pre-Application Consultation Report? *

☐ Yes ☐ No ☒ Not applicable to this application

Town and Country Planning (Scotland) Act 1997

The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013

d) If this is an application for planning permission and the application relates to development belonging to the categories of national or major developments and you do not benefit from exemption under Regulation 13 of The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013, have you provided a Design and Access Statement? *

☐ Yes ☐ No ☒ Not applicable to this application

e) If this is an application for planning permission and relates to development belonging to the category of local developments (subject to regulation 13. (2) and (3) of the Development Management Procedure (Scotland) Regulations 2013) have you provided a Design Statement? *

☐ Yes ☐ No ☒ Not applicable to this application

f) If your application relates to installation of an antenna to be employed in an electronic communication network, have you provided an ICNIRP Declaration? *

☐ Yes ☐ No ☒ Not applicable to this application

g) If this is an application for planning permission, planning permission in principle, an application for approval of matters specified in conditions or an application for mineral development, have you provided any other plans or drawings as necessary:

- [x] Site Layout Plan or Block plan.
- [ ] Elevations.
- [ ] Floor plans.
- [ ] Cross sections.
- [ ] Roof plan.
- [ ] Master Plan/Framework Plan.
- [x] Landscape plan.
- [x] Photographs and/or photomontages.
- [ ] Other.

If Other, please specify: * (Max 500 characters)

Provide copies of the following documents if applicable:

A copy of an Environmental Statement. *	☐ Yes	☒ N/A
A Design Statement or Design and Access Statement. *	☒ Yes	☐ N/A
A Flood Risk Assessment. *	☒ Yes	☐ N/A
A Drainage Impact Assessment (including proposals for Sustainable Drainage Systems). *	☐ Yes	☒ N/A
Drainage/SUDS layout. *	☐ Yes	☒ N/A
A Transport Assessment or Travel Plan	☐ Yes	☒ N/A
Contaminated Land Assessment. *	☐ Yes	☒ N/A
Habitat Survey. *	☒ Yes	☐ N/A
A Processing Agreement. *	☐ Yes	☒ N/A

Other Statements (please specify). (Max 500 characters)

Planning Statement & Tree Survey

Declare – For Application to Planning Authority

I, the applicant/agent certify that this is an application to the planning authority as described in this form. The accompanying Plans/drawings and additional information are provided as a part of this application.

Declaration Name: Mr Mark Myles

Declaration Date: 04/10/2019

The Kinnaker, North Mains, Gleneagles
Mr Martin Haldane
Mark Myles
October 2019

BIDWELLS

PROPOSED HOUSE AT THE KINNAKER, NORTH MAINS, GLENEAGLES
PLANNING POLICY STATEMENT

Table of Contents

1.0 Introduction

1.1 This supporting planning statement should be read in conjunction with the planning permission in principle (PPP) application that has been submitted to Perth & Kinross Council on behalf of Mr Martin Haldane.

1.2 The application site is located to the north west of Gleneagles House and to the south of the A9. Access to the site is taken direct from the A823 public road to the east via an existing estate access road that serves a number of existing properties on the estate as well as the previous house that stood on this site.

1.3 This planning application has been submitted as a 'local application' under the Town & Country Planning (Development Management Procedures) (Scotland) Regulations 2013.

2.0 Background to the Proposal & Previous History

2.1 The proposal involves the erection of a dwelling house on a site where the supporting design statement provides historical maps, records and photographs showing that the site had previously accommodated a house and a grouping of steading type outbuildings that dated back to the mid-19th century. The records also refer to the house having been rebuilt during the 1880's at which time the name 'North Mains' was dropped and the name 'The Kinnaker' was adopted and this can still be seen on OS maps today.

2.2 The substantial estate house was demolished around 25-30 years ago and the site has continued to degrade from that time. The material of the former house was spread across a part of the site which had the effect of raising the ground artificially with rubble and debris. The remains of the former walls and foundations remain on the site.

2.3 Although the house was demolished the former property boundaries and curtilage of the former house remain very well defined. Although lacking in basic maintenance, the curtilage and domestic garden of the former house is intact and the site benefits from strong, mature and well-established boundary treatments and a landscape framework that sets it apart from the surrounding estate land. Existing hedging and trees define the southern boundary of the site adjacent to the access road with an established tree belt and fencing to the east. A stone wall, hedging, garden gate and trees define the western boundary and the formal front garden area of the former house is still evident today. A line of yew trees confirming the former domestic nature of the site remain on the site and can be seen in the photograph showing the former house.

2.4 A previous planning application to erect a dwellinghouse in principle (19/00733/IPL) was submitted in May 2019 but subsequently withdrawn as the planning officer had raised some concerns with regards to the principle of the development. Other issues with regards to potential flood risk and the requirement for tree and habitat surveys were also considered to be matters that required to be addressed further. Therefore, as part of this resubmitted planning application additional supporting flood risk, tree survey and phase 1 habitat reports have been prepared to confirm that these are not matters of concern and if need be can be further addressed by means of conditions on any approval.

3.0 Planning Policy Context

National Policy and Guidance

3.1 The Scottish Government expresses its planning policies through The National Planning Frameworks, the Scottish Planning Policy (SPP), Planning Advice Notes (PAN), Creating Places, Designing Streets, National Roads Development Guide and a series of Circulars.

National Planning Framework

3.2 NPF3 is a long-term strategy for Scotland and is a spatial expression of the Government's Economic Strategy and plans for development and investment in infrastructure. Under the Planning etc. (Scotland) Act 2006 this is now a statutory document and material consideration in any planning application. The document provides a national context for development plans and planning decisions as well as informing the on-going programmes of the Scottish Government, public agencies and local authorities.

Scottish Planning Policy 2014

3.3 Scottish Planning Policy (SPP) was published in June 2014 and sets out national planning policies which reflect Scottish Ministers' priorities for operation of the planning system and for the development and use of land. The SPP promotes consistency in the application of policy across Scotland whilst allowing sufficient flexibility to reflect local circumstances.

3.4 The following sections of the SPP are of importance in the assessment of this proposal:

- Sustainability: paragraphs 24 – 35
- Placemaking: paragraphs 36 – 57
- Promoting Rural Development: paragraphs 74-83

3.5 SPP is an important material consideration as its publication postdates adoption of the Local Development plan. Paragraph 75 of SPP confirms that the planning system should encourage rural development that supports prosperous and sustainable communities and businesses whilst protecting and enhancing environmental quality.

3.6 Under the subject heading of Promoting Rural Development, Scottish Planning Policy paragraphs 81 advocates that '*plans and decision making should generally set out the circumstances in which new housing outwith settlements may be appropriate, avoiding the use of occupancy conditions.'*

3.7 Paragraph 83 also highlights that plans and decision making should include provision for small scale housing and other development which supports sustainable economic growth in a range of locations, taking account of environmental protection policies and addressing issues of location, access, siting, design and environmental impact. Where appropriate allowance should also be made for construction of single houses outwith settlements provided they are well sited and designed to fit with local landscape character and there should be no need to impose occupancy restrictions on housing.

4.0 Development Plan

4.1 Section 25 of the Town & Country Planning (Scotland) Act 1997 (as amended) requires proposals to be determined in accordance with the provisions of the development plan unless material considerations indicate otherwise.

4.2 In this case the relevant development plan consists of the Tayplan Strategic Development Plan 2017 (for which there are no directly relevant policies) and the Perth & Kinross Local Development Plan 2014. The council's Local Development 2 is in the process of being adopted (expected by end of October 2019) (see paragraph 5.16 below).

4.3 In terms of other material considerations, the council's Supplementary Guidance on Housing in the Countryside Policy – November 2012 (and formally adopted in October 2014) is the most significant in terms of the detailed criteria it contains for assessing this type of proposal. In addition, Scottish Planning Policy (2014) and Planning Advice Note 72 – Housing in the Countryside are also considered to be of relevance to this application and these are set out in more detail in chapters 3 and 5.

4.4 The principle of erecting a house on this site is required to be considered under the terms of Policy RD3 – Housing in the Countryside in the adopted Perth & Kinross Local Development Plan and Policy 19 in LDP2. The policy allows for the erection of individual houses in the countryside which fall into certain categories i.e. building groups, infill sites, new houses in the countryside, renovation or replacement of houses, conversion or replacement of non-domestic buildings, and rural brownfield land.

4.5 This proposal can be considered under the terms of each of the categories c), d) and f) of Policy RD3 which corresponds to 'new houses in the open countryside' on defined categories of sites as set out in Section 3 of Policy 19 of LDP2 and the Supplementary Guidance, Section 4 on 'replacement of houses' and also Section 6 on 'Development on rural brownfield land.'

4.6 Section 3 in the associated supplementary guidance lists the following subcategories; existing gardens, flood risk, economic activity, houses for local people and pilot projects creating eco-friendly houses. This proposal can be assessed against the first of these subcategories i.e. existing gardens.

4.7 Policy PM1 Placemaking of the Perth & Kinross Local Development Plan also requires all developments to contribute positively to the quality of the surrounding environment and that the design and siting of development should respect the character and amenity of the place.

4.8 In response to the previous planning application, the council's Local Flood Prevention Team advised on the need for a flood risk assessment to be carried out to establish the 0.5% AEP (1:200 year) flood level at this site and establish whether it is suitable for the proposed development. The requirement for the flood risk report (which now accompanies this revised planning application) therefore addresses Policy EP2: New Development and Flooding of LDP and Policy 52 of LDP2.

4.9 As part of the assessment of the previous application a tree survey and an extended Phase 1 Habitat Survey were also requested by the council's Tree and Biodiversity Officer. These are also now provided in support of this revised planning application and address the requirements of Policies NE2B (Forestry, Woodland & Trees) and NE3 (Biodiversity) within the Local Development Plan and Policies 40 and 41 of LDP2.

5.0 Other Material Considerations

5.1 In addition to the policy framework set out in Sections 3 and 4 above, the other material considerations which require to be considered as part of the assessment of this planning application are as follows;

Perth & Kinross Council Housing in the Countryside Supplementary Guidance – November 2012 (Approved October 2014)

5.2 This supplementary guidance contains detailed criteria for assessing this type of proposal. The guidance lists the following categories where housing in the countryside proposals may be considered acceptable (building group, infill sites, new houses in the open countryside, replacement houses, conversion or replacement of non-domestic buildings, rural brownfield land).

5.3 Of these categories the proposal requires to be assessed further under the terms of (c) new houses in the open countryside, (d) replacement houses and (f) development on rural brownfield land.

5.4 In terms of the new houses in the open countryside category (c), the guidance states that 'favourable consideration will be given to proposals for the construction of new houses in the open countryside where they fall into at least one of the following categories; existing gardens, flood risk, economic activity, houses for local people and pilot projects creating eco-friendly houses.

5.5 This proposal can be considered under the existing gardens sub category (3.1 a) of the policy which refers to 'established gardens once associated with a country/estate house, which provide an appropriate landscape setting, but where development would not fundamentally affect the qualities and integrity of the site.'

5.6 In terms of siting criteria, the guidance further adds that;

'Proposals for a new house falling within category 3 above will require to demonstrate that if when viewed from surrounding vantage points, it meets all of the following criteria:

a) it blends sympathetically with landform;

b) it uses existing trees, buildings, slopes or other natural features to provide a backdrop;

c) it uses an identifiable site, (except in the case of proposals for new country estates) with long established boundaries which must separate the site naturally from the surrounding

ground (eg a dry stone dyke, a hedge at minimum height of one metre, a woodland or group of mature trees, or a slope forming an immediate backdrop to the site). The sub-division of a field or other land artificially, for example by post and wire fence or newly planted hedge or tree belt in order to create the site, will not be acceptable;

d) it does not have a detrimental impact on the surrounding landscape.

5.7 Alternatively, a new house site will not be acceptable if when viewed from surrounding vantage points;

a) it occupies a prominent, skyline, top of slope/ridge location;

b) the site lacks existing mature boundaries (for example, dry stone dyke, a hedge at minimum height of one metre, woodland or a group of trees or a slope forming an immediate backdrop to the site) and

c) is unable to provide a suitable degree of enclosure for a new house in the countryside.

5.8 In terms of replacement houses Category 4 e) of the guidance states that 'the replacement of an abandoned or ruinous house will be permitted where:

I. there is substantial visible evidence of the structure of the original building above ground level to enable its size and form to be identified

II. it is located on an established site with a good landscape setting and a good 'fit' in the landscape and on a site acceptable on planning grounds;

III. the site boundaries are capable of providing a suitable enclosure for the new house.

5.9 Category 4 f) further adds that the siting of the new house should be similar to that of the existing building in terms of orientation and distance from the road, unless individual site conditions suggest that another position would create a better landscape fit.'

5.10 Finally Category 6 Rural Brownfield land of the supplementary guidance states that 'Redevelopment for small scale housing of brownfield land which was formerly occupied by buildings may be acceptable where it would remove dereliction or result in a significant environmental improvement and where it can be demonstrated that there are no other pressing requirements for other uses such as business or tourism on the site. A statement of the planning history of the site, including the previous use and condition, must be provided to the planning authority. Proposals should be small scale, up to maximum of five new houses, and must comply with the criteria set out in the For All Proposals section of this policy. All land within the site, including areas not required for housing or private gardens, must be the subject of landscaping and/or other remediation works.'

Planning Advice Notes 72 – Housing in the Countryside

5.11 PAN 72 – Housing in the Countryside was published in February 2005. It predates the publication of SPP but it still highlights the opportunities that exist from the changing circumstances created by the rise in the number of people wishing to live in the countryside.

5.12 The document refers to important criteria such as design, landscape setting, layout and access. The PAN states that the *'overall aim should be to ensure that new housing is carefully located,*

worthy of its setting, and is the result of an imaginative, responsive and sensitive design process.' The PAN concludes by stating that *'there will continue to be a need for new houses in the countryside and this demand will have to be accommodated. This change can be positive, if it is well planned. The location and appearance of each new house must be determined with care and thought, as short term thinking can have a long term impact on the landscape.'*

5.13 The council's supplementary guidance on Housing in the Countryside, acknowledges that the council is keen to assist opportunities for housing in rural areas in accordance with PAN 72.

Advice from Chief Planner (November 2011) and Circular 3/2012

5.14 The letter issued to Local Authorities by the Chief Planner in November 2011 reiterated that the Scottish Government's Planning Policy is to promote a positive approach to rural housing and to support more opportunities for small scale housing development in all rural areas, including housing which is linked to rural businesses. The Scottish Government's approach is not to promote the use of occupancy conditions and the guidance clearly states that 'the Scottish Government believes that occupancy restrictions are rarely appropriate and so should generally be avoided. So where a planning authority is satisfied that an adequate case has been made for a house in a rural area then it should not be necessary to use formal mechanisms to restrict the occupancy.

5.15 This advice was then taken forward and adopted into Scottish Government Circular 3/2012 on Planning Obligations and Good Neighbour Agreements and paragraphs 49 – 51 provide further support to this application. These paragraphs state;

'49. While the most common use of planning obligations is to ensure the provision of infrastructure to make a development acceptable in planning terms, there is a limited role for obligations in restricting the use of land or buildings.

50. Such restrictions have historically been used particularly in respect of housing in rural areas. Imposing restrictions on use are rarely appropriate and so should generally be avoided. They can be intrusive, resource-intensive, difficult to monitor and enforce and can introduce unnecessary burdens or constraints. In determining an application, it may be appropriate for the planning authority to consider the need for the development in that location, especially where there is the potential for adverse impacts. In these circumstances, it is reasonable for decision-makers to weigh the justification against the potential impacts, for example on road safety, landscape quality or natural heritage, and in such circumstances, it may be appropriate for applicants to be asked to make a land management or other business case.

51. Where the authority is satisfied that an adequate case has been made, it should not be necessary to use a planning obligation as a formal mechanism to restrict occupancy or use.'

PKC – LDP2

5.16 The council published their LDP2 for public consultation in December 2017 and the period for representations closed on 2 February 2018. Following an Examination in Public into the unresolved objections, the Reporters Examination Report was received by the council on 11 July

2019. The council agreed to modify the Proposed Plan in line with the Reporters recommendation at a Full Council meeting held on 25 September 2019, with formal adoption of LDP2 then expected to take place by the end of October 2019. Given the timing of the submission of this planning application and the timeline for the adoption of LDP2, then the policies set out in LDP2 are significant as they are expected to form the basis for the assessment of the planning application at its point of determination.

6.0 Planning Assessment & Conclusions

6.1 This planning application seeks PPP for consent to erect a dwelinghouse on the site of the former house at The Kinnaker, North Mains, Gleneagles.

6.2 When assessing the relevant planning policies, the policy that deals with the principle of the development (RD3 from the PKC LDP and Policy 19 of LDP2) allows for new dwellings in the countryside where they fall into certain categories. In this case there are three categories of the policy (RD3 (c), (d) and (f) and the associated Policy 19/Supplementary Guidance (categories 3, 4 and 6) that the proposal can be considered to satisfy.

6.3 In terms of new dwellings (Policy RD3(c) from LDP, Policy 19(3) from LDP2 and category 3 of the supplementary guidance, the council's position is that 'favourable consideration will be given to proposals for the construction of new houses in the open countryside where they fall into at least one of the following categories; existing gardens, flood risk, economic activity, houses for local people and pilot projects creating eco-friendly houses.

6.4 This proposal can be considered favourably under the 'existing gardens' sub category (3.1 a) of the policy which refers to 'established gardens once associated with a country/estate house, which provide an appropriate landscape setting, but where development would not fundamentally affect the qualities and integrity of the site.'

6.5 Given the nature of this identifiable site and the fact that an estate house stood on the site until about 25 years ago, the site clearly benefits from having a well-defined curtilage, with long established site boundaries and a strong landscape framework on all boundaries which separates it from the adjacent farmland and woodland. It also blends sympathetically with landform and a neighbouring cottage (Bargate Cottage) is located to the west. Development on the site would also utilise existing trees, buildings, slopes and other natural features including adjoining roads to provide a backdrop and framework without any detrimental impact on the surrounding landscape. As such the proposal also accords with the detailed siting criteria as set out under Category 3 of the council's supplementary guidance.

6.6 Whilst lacking some basic maintenance, the curtilage of the former house remains intact and the sites identity remains completely independent from the surrounding environment enclosed by the mature long-established boundaries.

6.7 The historical records, maps and photographs provided in the architect's design statement provide evidence of the former use of the site. Although the former estate house was demolished in the late 1980's, substantial evidence of the former stonework remains at ground level to help enable its size and form to be identified. The photographs show that the demolition rubble has lifted the ground levels on areas of the site. As noted above the site is located on an established

site with a good landscape setting and a good fit in the landscape and on a site that is clearly acceptable in planning terms where the existing site boundaries and former curtilage are capable of providing a suitable enclosure for the new house.

6.8 If the council fail to accept that the proposal is also supported by Policy RD3 (d) and Policy 19 (4) of LDP2 and Category 4 of the supplementary guidance, then there can be no debate about the sites ability to comply with RD3 (f), Policy 19 (6) of LDP2 and Category 6 of the supplementary guidance. The evidence submitted in support of the application highlights that the land was formerly occupied by buildings and the proposal would therefore achieve the removal of onsite dereliction which remains on the site. It is possible that some of the former stone can be reused in certain design features or boundary treatments with any new house on this site. The redevelopment of the site would also result in a significant environmental improvement and long-term maintenance. The policy requires landscaping and or remediation works as part of any approval but in this case the quality of the established landscape framework around and on the site would remain very good.

6.9 The proposed residential use would be an appropriate use for this brownfield site and the redevelopment of the site will bring about environmental and biodiversity improvements to the benefit of the wider area. (refer to conclusions of habitat report).

6.10 In terms of the principle of the development the proposal is therefore considered to meet the terms of Policy RD3 (c), (d) and (f), Policy 19 (3), (4), and (6) from LDP2 and also categories, 3.1a, 4 and 6 of the supplementary guidance in that a new house is justified and supported by the detailed criteria set out in the policy and there are no uses in the vicinity of the site that would prevent an adequate standard of amenity for the proposed house.

6.11 When assessing the criteria listed in Policy PM1 from the LDP and Policy 1 of LDP2, in combination with the siting criteria set out in the supplementary guidance, the proposed house is located on a site that is set against and located within a mature landscape framework which is perfectly capable of absorbing the development. As such no additional landscaping and tree planting are considered necessary as the existing boundaries and former garden areas will be able to absorb the proposed single house development into the wider landscape. However if the council consider it necessary then there is scope for additional planting within the site boundaries.

6.12 In response to the previous planning application the council's Local Flood Prevention Team advised on the need for a flood risk assessment to be carried out to establish the 0.5% AEP (1:200 year) flood level at this site and establish whether it is suitable for the proposed development. The requirement for the flood risk report (which now accompanies this revised planning application) therefore addresses Policy EP2 New Development and Flooding and Policy 52 from LDP2. The conclusions of the flood risk study prepared by Atholl Associates confirm that;

- The proposed development will not occupy any existing floodplain, providing the low-lying area of ground to the south of the proposed house (as outlined in Figure 5.2f) is not built on and ground levels in this area are not altered. There should also be no solid barriers to flow such as stone walls in this area (the existing stone wall, if retained, is an exception). This can be addressed through planning condition i.e. removal of permitted development rights.
- A minimum FFL for the proposed house is set at 127.4m AOD and this can be covered by planning condition on any approval.

- The floor level of the house should have a suitable upstand above surrounding ground, say 200mm or more, commensurate with good building practice which again can be covered by planning condition.
- Access roads to the site are unaffected by predicted flood extents, up to and including the flows predicted for a 1-in-200-year flood by the ReFH2 method. For significantly larger flows than this, there will be shallow, slow moving overland flow on parts of the emergency access/egress route for 2 to 3 hours during the peak of the flood event, however vehicular access will be possible at all times.
- In order to avoid any increase in flood risk, surface water runoff generated by the site should be dealt with following the principals of Sustainable Urban Drainage Systems.
- The development of the proposed site will not cause an increase in flood risk to third party property, and that there will be no resultant loss of flood storage.

6.13 As part of the assessment of the previous application a tree survey and an extended Phase 1 Habitat Survey were also requested by the council's Tree and Biodiversity Officer. These are also now provided in support of this revised planning application and address the requirements of Policies NE2B (Forestry, Woodland & Trees) and NE3 (Biodiversity) within the Local Development Plan and Policies 40 and 41 from LDP2.

6.14 There are no issues raised with regards to transportation and no alterations are proposed to the existing long, standing access arrangements for the site. Passing places are also already available along the length of the access road. There is also sufficient space within the site to accommodate the required parking and turning areas for the proposed single house development.

6.15 Based on the above, it is considered that the proposals can be supported as being in accordance with the existing Development Plan subject to any conditions and developer contributions that may be considered necessary and appropriate by the council. As the application seeks permission in principle, the council would be able to fully control the scale, form, height, colour and detailed design of the new house as part of any future matters specified in conditions (MSC) application.

BIDWELLS

PERTH AND KINROSS COUNCIL

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c/o Bidwells
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Perth
PH1 1RA

Pullar House
35 Kinnoull Street
PERTH
PH1 5GD

Date 6th February 2020

TOWN AND COUNTRY PLANNING (SCOTLAND) ACT

Application Number: **19/01725/IPL**

I am directed by the Planning Authority under the Town and Country Planning (Scotland) Acts currently in force, to refuse your application registered on 16th October 2019 for permission for **Erection of a dwellinghouse (in principle) Land 70 Metres North Of Bargate Cottage Gleneagles** for the reasons undernoted.

Head of Planning and Development

Reasons for Refusal

1 The proposal is contrary to Policy 19 Housing in the Countryside of the Perth and Kinross Local Development Plan 2 (2019) and the Council's Housing in the Countryside Guide 2012 as the proposal fails to satisfactorily comply with any of the categories (1) Building Groups, (2) Infill Sites, (3) New Houses in the Open Countryside, (4) Renovation or Replacement of Houses, (5) Conversion or Replacement of Redundant Non Domestic Buildings, or (6) Rural Brownfield Land.

Justification

The proposal is not in accordance with the Development Plan and there are no material reasons which justify departing from the Development Plan

Notes

The plans and documents relating to this decision are listed below and are displayed on Perth and Kinross Council's website at www.pkc.gov.uk "Online Planning Applications" page

Plan Reference

19/01725/1

19/01725/2

19/01725/3

19/01725/4

19/01725/5

19/01725/6

19/01725/7

19/01725/8

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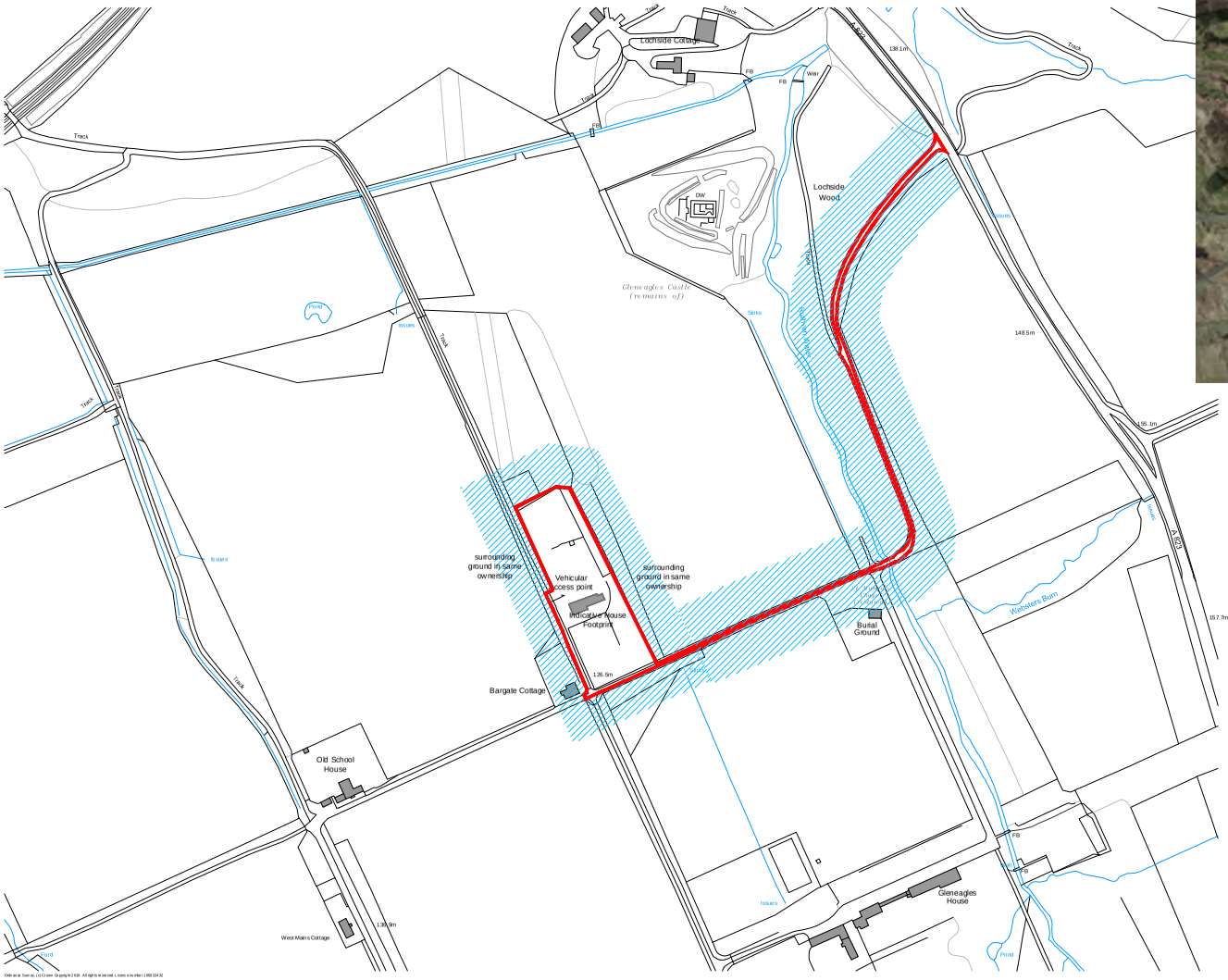
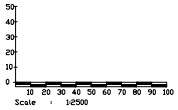
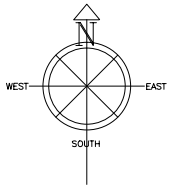
19/01725/14

NOTES







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CLIENT
Mr & Mrs M. Haldane

PROJECT
Proposed New House
The Kinnaker
Gleneagles Estate
Blackford, Perthshire

DRAWING TITLE
Location Plan

SCALE
1:2500 @ A2

DATE
April 2019

CAD FILE
1250

DRAWN BY
PF

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15 West High Street
Forfar, Angus
DD8 1BE
Tel: 01307 466480

DWG N

1250 / LP / 01 Rev A

THE KINNAKER, NORTH MAINS, GLENEAGLES

PROPOSED REPLACEMENT DWELLING

October 2019

PLANNING AND DESIGN STATEMENT

The Kinnaker is situated to the North West of Gleneagles House, East of Blackford and South of the A9. The plot is accessed through the estate of the A823 to the East.

SITE

The aerial photo below shows the site within the immediate landscape of the estate with the existing adjacent access roads to the south and track to the west. Immediately to the West across the track is an adjacent cottage and on the edge of the image to the South is Gleneagles House.

PREVIOUS DEVELOPMENT

Records and historic maps show that the site has accommodated a house and grouping of steading buildings going back to the mid-19th century. From the mapping it is evident that the buildings have gone through what amounts to several stages of alterations, with latterly the partial removal of much of the steadings to the north and an additional extension to the house to the west. Published records also support this with reference to the house being rebuilt during the 1880's, at which time the name 'North Mains' was dropped and the name 'The Kinnaker' was adopted.

Ordinance Survey 1855 -1882

Ordinance Survey 1892 -1949

The house on the site was demolished between 20 to 30 years ago and currently the site remains significantly degraded by this. The demolition material has been spread across the site considerably raising the ground artificially with rubble and debris and due to this is ecologically degraded. This also has a negative impact in terms of the wider landscape of the estate. The remains of the walls and foundations remain in situ but are presently covered by this material and therefore we are able to establish the exact position of the existing property. The definition of brownfield sites are those sites which have previously been developed in some way and as this area of ground has remained unused since this time this can also now be categorised as brownfield land. Whilst lacking basic ongoing maintenance the curtilage of the house remains intact and the sites identity remains independent from the surrounding environment enclosed by hedging to the south. A tree belt and fencing to the east and walls trees/ hedging to the west which is being negatively affected by the extensive build-up of demolition material on the ground. The planted yews and more formal garden to the south, which are clearly evident in the photo and maps included in this statement, remain in situ although considerably overgrown. The site is clearly a house plot and garden missing a house and the reuse of this area of derelict brownfield ground through the proposal to replace the existing property with a new house is the most sustainable viable option available.

PROPOSED REDEVELOPMENT

Previous House

The intention is to erect a single house to replace the existing now predominantly removed property. This will remediate and provide an appropriate use for the brownfield unused ground. This remediation will not only remove the negative impact the site currently has on the wider environment but will enhance biodiversity and bring the ground back under appropriate management.

Moving forward appropriate high-quality detailed proposals for the property will be developed, these will demonstrate a good fit with the landscape character of the area and an appropriate design approach to achieve integration with its setting. The design concept is to create a traditional referenced contemporary house of a style which respects the surrounding rural setting and properties. Additionally the siting, form, scale and massing will reflect and respect the original now predominantly demolished property as well as the surrounding properties and landscape. As part of the development of any proposals the suitable reuse of the remaining materials on site will be investigated.

- **The proposals will blend sympathetically with land form.**
- **Existing trees or other natural features will provide a backdrop to the proposals.**
- **The proposed redevelopment will reuse an established identifiable site with a good setting and a good 'fit' in the landscape**
- **The site has long established boundaries which separate the site naturally from the surrounding ground and remain capable of providing a suitable enclosure for the new house.**
- **The proposals will not have a detrimental impact on the surrounding landscape.**
- **Will result in significant environmental improvement.**

'Rural Brownfield Land' is defined as: Derelict land which was at one time occupied by buildings or structures, but these have now been removed, or land directly linked to former buildings or structures which has been so damaged by a former use that it cannot be left to naturalise or be reused for another purpose without first being improved.

As both an area of rural brownfield ground and replacing an existing dwelling previously removed, we consider this proposal be in keeping and in compliance with Perth & Kinross planning policy and the Housing in the countryside guidance.

Policy & Guidance

Local Development Plan

Policy RD3: Housing in the Countryside

States the Council will support proposals for the erection of single houses in the countryside which include the Renovation or replacement of houses and the Development on rural brownfield land.

Housing in the Countryside – Supplementary Guidance

Again, states the Council will support proposals for the erection of single houses in the countryside which include the Renovation or replacement of houses and the Development on rural brownfield land.

By cleaning up this site it will make a positive contribution to the biodiversity of the site.

The proposal, in terms of scale, layout and design is appropriate to, and has a good fit with, the landscape character of the area in which it is located, and through future submission of detailed proposals we will demonstrate a specific design approach to achieve integration with its setting. The house will also be sympathetic in terms of scale and proportion to other buildings in the locality.

Renovation or Replacement of Houses

Consent will be granted for the restoration or replacement of houses, subject to the following criteria:

The replacement of an abandoned or ruinous house will be permitted where there is substantial visible evidence of the structure of the original building above ground level to enable its size and form to be identified. In this case the existing structure is evident above the original ground level however as the site has been artificially built up with demolition material this is only visible through excavation.

The proposed house it is located on an established site with a good landscape setting and a good 'fit' in the landscape and the site boundaries can provide a suitable enclosure for the new house.

The location of the remains of the previous house can be established and it is proposed that the siting of the new house should be similar to that of the existing building in terms of orientation and distance from the road.

Rural Brownfield Land

As the redevelopment of this site would result in significant environmental improvement Redevelopment in terms of providing a replacement house on this brownfield land should be acceptable especially as there are no other pressing requirements for other uses such as business or tourism on the site. It is intended that all land within the site any land not required for the house itself will be the subject of landscaping and/or other remediation works as part of the garden ground.

View from South corner of existing garden ground (yews along front of previous house evident).

Garden access gate.

Demolition rubble and debris raising site

Overgrown west boundary hedge and walling in poor condition

Partially overgrown demolition rubble covering site.

Demolition rubble and debris lifting ground levels artificially

Tree growing out of demolition rubble / debris

Yews evident in old photo at front of house with demolition debris and rubble behind raising the ground levels.

Front Garden area retained but overgrown

Front garden hedge overgrown

West boundary track, overgrown hedge and walling

North west rear corner boundary

Front garden bounded to west with dry stone wall

View of plot from South West beyond adjacent cottage

View of plot from track to east

Atholl Associates

Flood Risk and Drainage

FLOOD RISK ASSESSMENT: PROPOSED NEW HOUSE, GLENEAGLES ESTATE, AUCHTERARDER, PH3 1PJ

Ref: AAFR/BC/101

September 2019

Client: Mr Martin Haldane
Gleneagles House
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Report Prepared by:

……
Dr Brian Coghlan
BSc (Hons) PhD CEng MCIWEM
Director

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CONTENTS Page

1.0 Introduction

Atholl Associates Ltd have been instructed by Mr Martin Haldane to carry out a Flood Risk Assessment in relation to a proposed house to be situated on ground within Gleneagles Estate, near Blackford by Auchterarder, Perthshire. The house is to be built at the site of a former historic house, some of the ruins of which are still present.

The planning authority have requested a Flood Risk Assessment for the proposed development. It is normal for a development of this type to be assessed for flood risk from a flood with a return period of 1 in 200 years, and to take into account the potential effects of climate change.

1.1 Scope and methodology

The scope of this Flood Risk Assessment is to assess and quantify flood risk to the proposed development. Flood risk to the development will be assessed for a 1-in-200-year flood event.

To assess flood risk to the development, a topographical survey has been undertaken, including surveyed cross sections through watercourses on site and surrounding area as appropriate. This has been done to enable a hydraulic model to be constructed. The survey was preceded by a site walkover to confirm the extent of survey required.

Using several methods, the Q200 flood flows in the vicinity of the site are assessed and applied in the hydraulic model. The results provided by the hydraulic model are then utilised with the topographical survey to assess flood risk to the site.

Once flood risk to the site has been assessed and quantified, recommendations for the site from the perspective of flood risk are then made.

The assessment is prepared using our best engineering judgement but there are levels of uncertainty implicit in the historical data and methods of analysis. Details of the range of possible error in the methods of flood estimation are given in the Flood Estimation Handbook (FEH).

This Flood Risk Assessment is carried out in accordance with the requirements of the Scottish Planning Policy *(SPP) (Scottish Government, 2014)*. This assessment uses a set of procedures originally set out in the Flood Estimation Handbook *(Institute of Hydrology, 1999)* and embodied in the FEH and WINFAP software packages currently used.

2.0 General description of the site

The site of the proposed house is on a raised area of ground within the estates of Gleneagles House, adjacent to an unsurfaced access track which leads north past the site from a crossroads on a tarmacked access road within the estate. The access road leads directly to the main entrance to the estate from the A823, and the route to the main road crosses the Ruthven Water which flows south to north through the estate. Please see location plan, Figure 2.1 below:

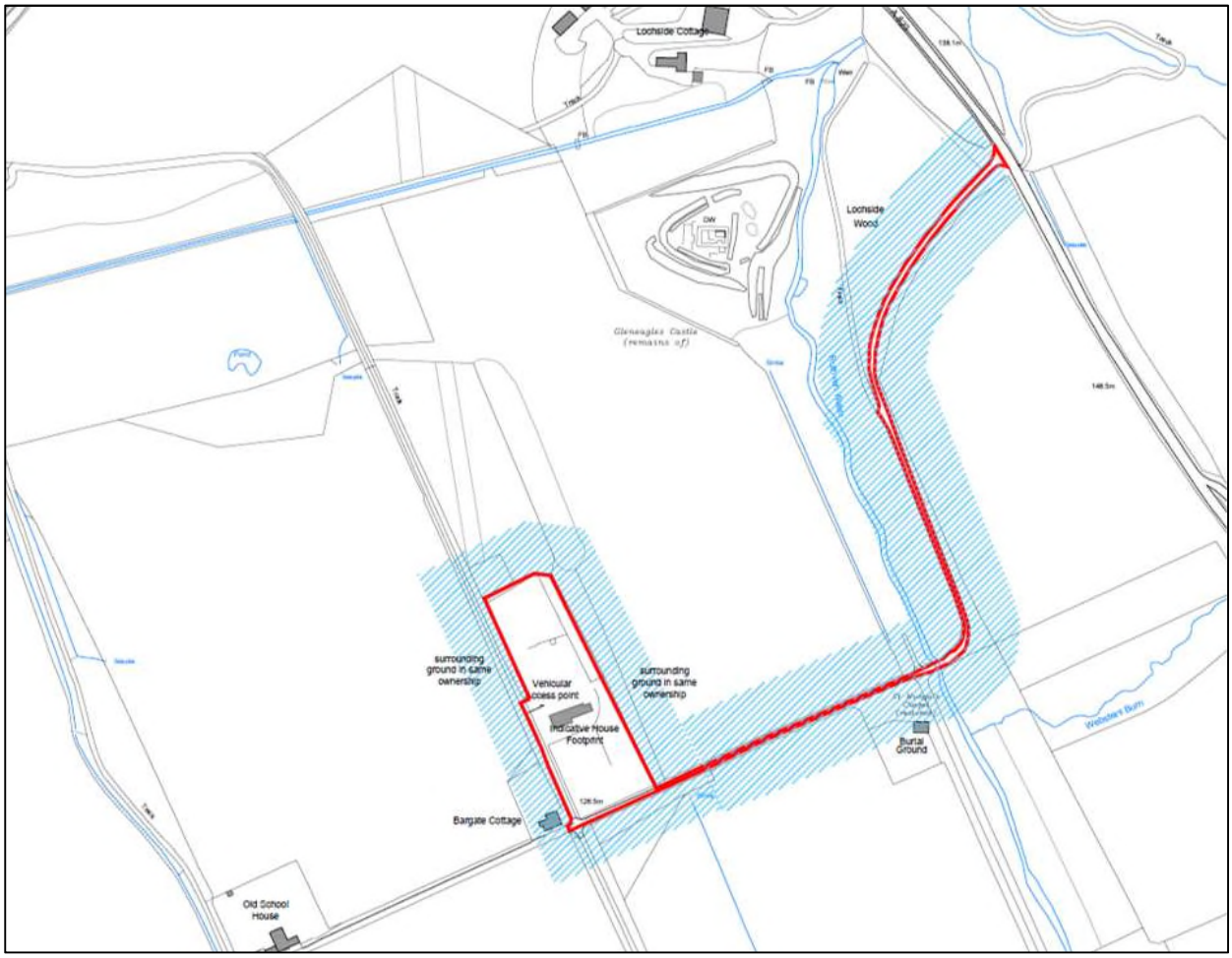


Figure 2.1 - Location Plan

The land in the surrounding area - effectively all of the area to the west of the A823 road shown in Figure 2.1 above - is within the ownership of the client. This is predominantly open farmland, which was at the time the site was visited being kept as pasture, with a smaller proportion of ground under forestry plantation. The latter includes most of the area of the proposed house and garden grounds, apart from an area of rough pasture at the southern end of the grounds. A summary view of the extents of woodland and open ground can be seen in the excerpt from Ordnance Survey included below:

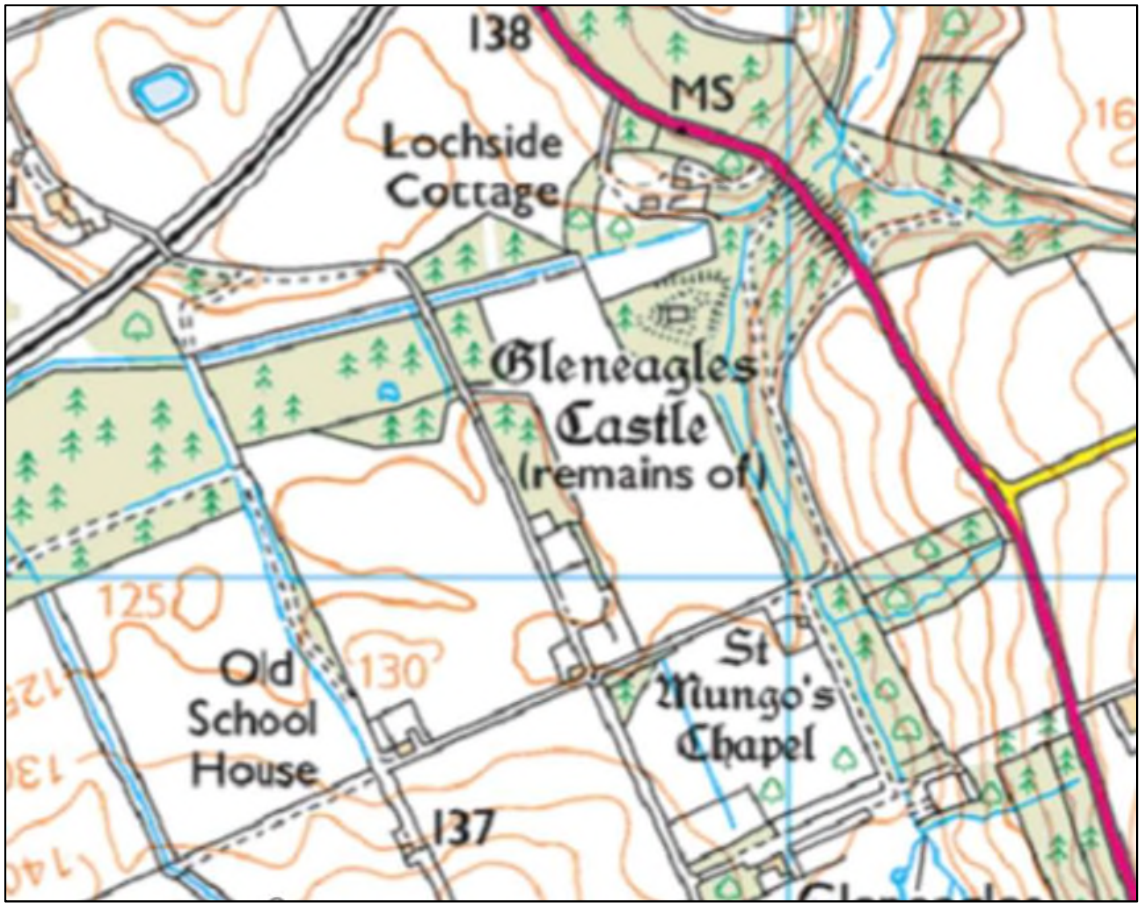


Figure 2.2 - Excerpt from OS mapping

The Ruthven Water is a relatively small watercourse in the reach which passes through the estate, with a catchment area at the upstream end of approximately 6km^2. There is a minor tributary which joins the Ruthven Water just upstream of a bridge carrying the main estate access road across the watercourse, and further downstream (to the north of the development site), a more significant tributary joins just upstream of a large arched culvert which takes the combined flows under the embankment of the A823 carriageway. The combined catchment contributing to flow through the culvert is just over 8km^2.

The access road to the estate starts at the junction with the A823 on relatively higher ground at approximately 155m AOD. The access road drops steadily down to the bridge crossing over the Ruthven Water and immediately on the west side of the bridge the road level is approximately 127.0m AOD. From here the road heads west on a low embankment to the crossroads at Bargate Cottage, dropping gradually from 127.0 to 126.6m at the crossroads. The tarmac road continues to fall gradually as it heads west past the crossroads to a low point just west of Bargate Cottage at a level of 127.4m.

The access track which heads north from the crossroads past the development site falls slightly initially to a low point of 126.3m some 30m north of the crossroads, then rises significantly north of this point. Adjacent to the proposed location of the new house, the track sits above 126.5m and continues to rise at it heads north past the site to a high point of approximately 129m AOD at the northern end of the development site.

The site itself is largely wooded at present, and within the wooded area there are the remains (foundations, some vestiges of walls) of a substantial house which stood on the site until being demolished some 20 to 30 years ago. The ground in the southern part of the site (approximately 1/3 of the total garden grounds) is low-lying and sits below the adjacent roads, while the remainder sits at a higher level and is significantly higher than the adjacent track. The higher ground in the norther part

of the proposed site sits at or above 130.5m. The footprint of the proposed house sits on sloping ground in the transition between these lower and higher areas, at a level of around 127.0 to 128m AOD.

As can be seen in Figure 2, the ground in the area between the site and the Ruthven Water is flat open fields which are relatively low-lying, at or below 125m AOD. The field to the east of the site is more variable in height, with higher areas up to around 130m AOD, and a low-lying hollow around Bargate Cottage which is below 125m AOD.

Generally, the prevailing slopes of the ground in the surrounding areas is south to north towards the main tributary of the Ruthven Water, which flows west to east some 250m north of the site. The tributary is a heavily modified channel in appearance, which looks as if it has been deepened and straightened in the past. The tributary takes flow from a network of drainage ditches in wooded ground to the west and south west and conveys it to the confluence with the Ruthven Water. In the 600m stretch immediately upstream of the confluence, there are two small footbridges, and more significantly at the upstream end of this stretch there is a pipe culvert carrying the embankment of an estate access track over the tributary.

The confluence of the Ruthven Water with the main tributary is just upstream of the culvert taking the main watercourse under the A8923 embankment. In the vicinity of the confluence there are two particularly significant features. The first is a hydraulic structure in the form of a concrete ramp on the Ruthven Water immediately upstream of the confluence. This feature is marked on OS mapping as a “weir”. The second is the culvert which lies a short distance downstream of the confluence. This is a large arched culvert approximately 4.6m wide and 3m high. The length of the culvert, which supports a road embankment almost 20m high, is approximately 50m.

3.0 General Observations

The objectives of this flood risk assessment are to analyse flows in the watercourses, define appropriate flood levels and flood plain extents in the vicinity of the site, and also to establish whether there are safe means of access and egress from the site during flood events.

From an initial walkover of the site, it was apparent that the site itself was likely to sit well above any flood flows, and that the proposed location of the building footprint would not occupy functional floodplain. However, what was less clear was the extent to which flows from the Ruthven Water or its tributary would spread out over surrounding ground including access routes. SEPA mapping of the area suggests extensive flooding, including complete inundation of the development site itself. This is illustrated in the excerpt from SEPA mapping supplied by the client and included below as Figure 3.

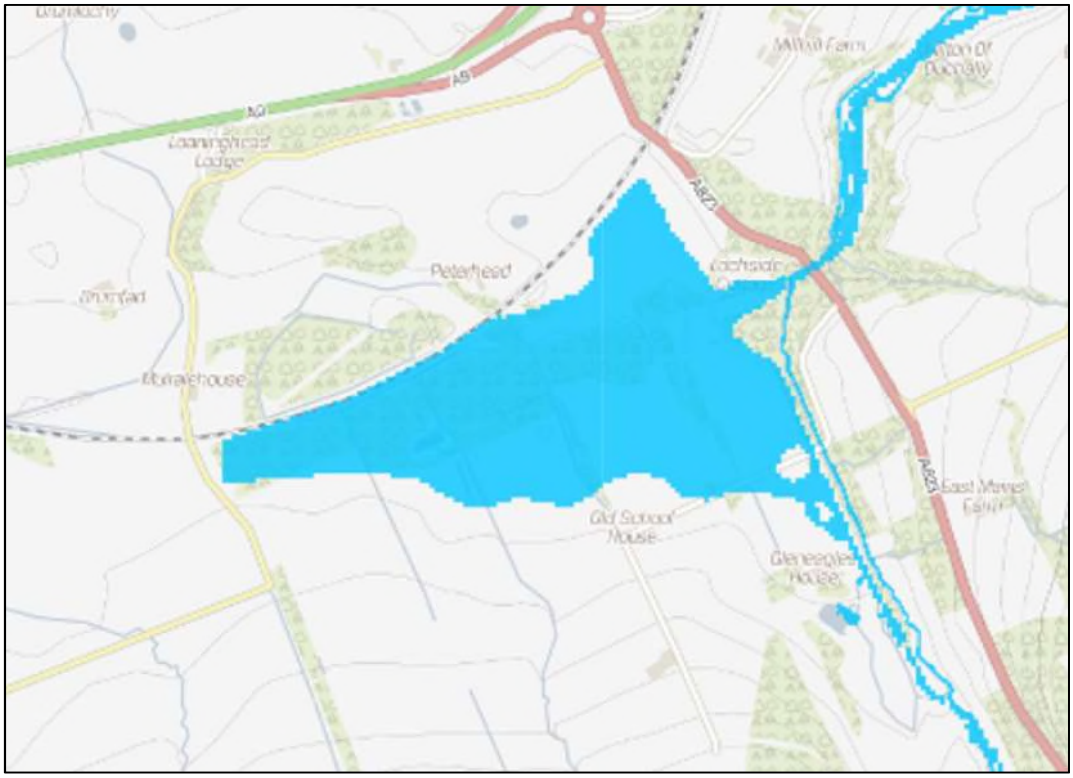


Figure 3.1 - Excerpt from SEPA indicative flood mapping, showing medium flood risk scenario

Given the height of the higher ground within the proposed development site, the above scenario seems unlikely. However, it was clear from this that an evaluation of flood extents associated with both watercourses is warranted.

To gain a clearer understanding of the relative levels of the surrounding ground to the site, the flow capacity of the watercourses, and the levels along the main access route to the development site, a topographical survey, including cross sectional data along the two main watercourses, was commissioned from Benchmark Surveys Ltd. The relevant survey drawings are included in the Plans section of this report as Drawings 545/1 and 545/2.

The course of the Ruthven Water has not likely changed for a very long time, given the mature trees which sit on the banks, and the age of the masonry arch bridge which carries the entrance road to the estate. However, it can be seen from the data on the topographical survey drawings that ground to the west of the watercourse along most of the length within the study area (from just downstream of Gleneagles House down to the confluence with the main tributary) sits at a similar or lower level than the watercourse channel, and the left bank of the channel is therefore effectively a levee. This is unlikely to be a natural feature and suggests the course of the channel may have been altered at

some time in the past. If so, this may be associated with earthworks which at one time formed a lake/moat around high ground on which stands the ruins of Gleneagles Castle (this historic site is on the left bank of the Ruthven Water a short distance upstream of the confluence with the main tributary and is visible in Figures 1 and 2).

As a consequence of this unnatural feature, if the channel capacity of the Ruthven Water is exceeded, water will tend to spill out into ground to the west. As will be discussed in later sections, this is most likely to happen upstream of the bridge carrying the entrance road across the Ruthven Water, and if this happens, there is a road embankment which impedes the resultant overland flow from continuing north to the main tributary. It should be noted that according to the owners of the estate, and also, the resident of Bargate Cottage, there are no records of such an event having happened in the past. This rules out such an event from having happened in the latter half of the twentieth century up to the present date, and potentially would apply to the time preceding that, given the continuous occupation of the site by the Haldane family for many generations. However, if it were to happen, Bargate Cottage could become inundated due to its location and low-lying situation, and there would be a possibility of water flowing over the access route to the proposed development site.

It should be noted that in addition to the two main watercourses discussed above and in preceding sections, there are a number of ditches and minor water features which are visible on the available mapping. Having inspected these, it can be said that these are in the main minor drainage features. The exceptions are:

- there is a larger drainage channel which runs south to north along the west side of an estate access track, starting at the crossroads next to Old School House. This is essentially a large ditch but, in any case, is not relevant to the subject site due to a clear separation distance and higher intervening ground.
- There is a small tributary with limited catchment area which joins the Ruthven Water just upstream of the bridge crossing. This is not significant in the modelling of the stretch upstream of the bridge, although strictly speaking the catchment upstream of the confluence is smaller (we have taken the conservative approach of including the whole catchment area for the whole stretch).

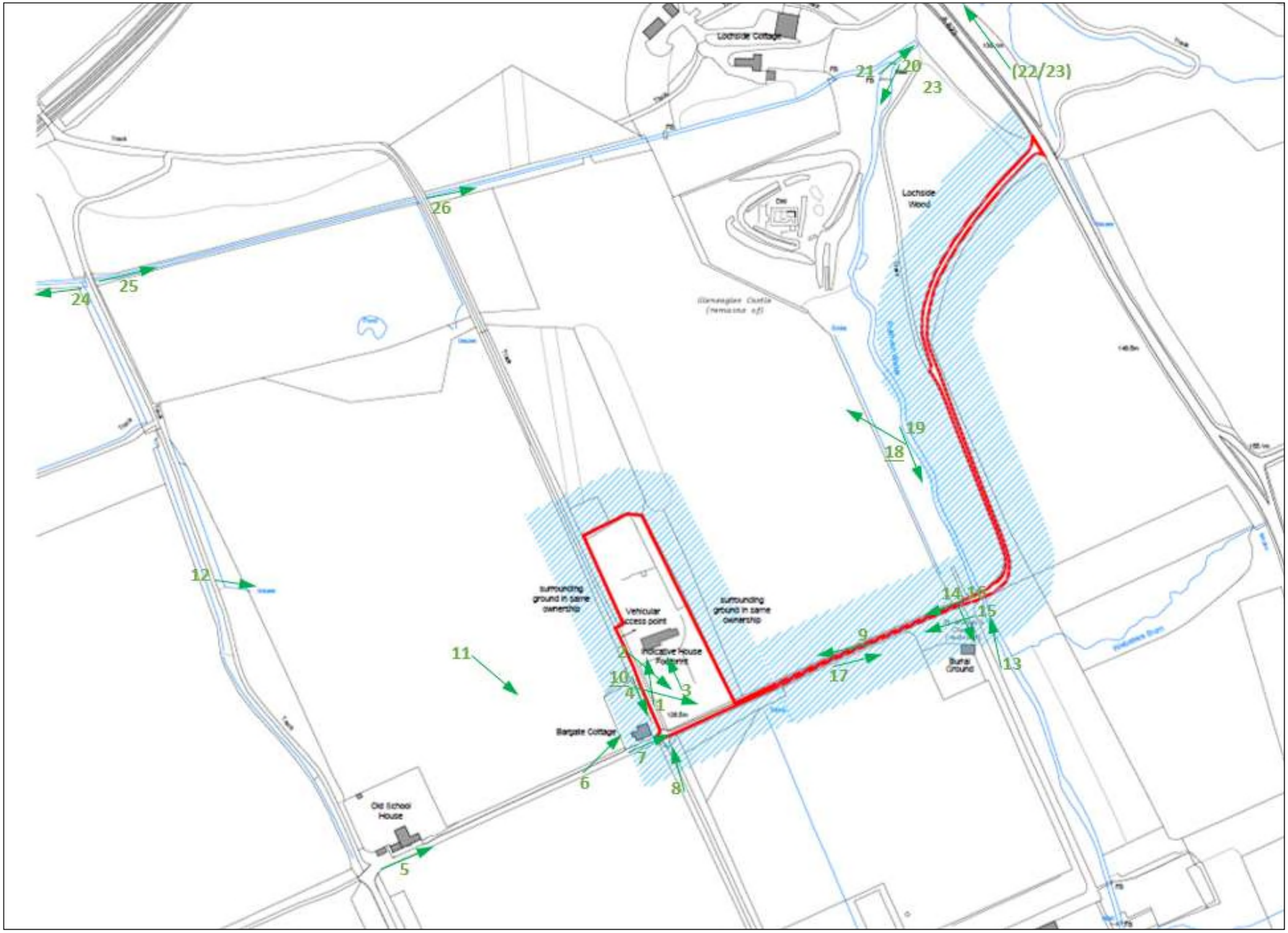


Figure 3.2 - Photograph location plan

Photograph 1 - View north along access track with proposed house site on right, behind line of yew trees. Ground slopes upwards beyond yew trees significantly. In the foreground, ground slopes to the east from the track down to open ground of former garden, and has a masonry wall situated part-way down slope.

Photograph 2 - View south along track from viewpoint adjacent to proposed house location, showing track sloping down to crossroads with main estate road. Overgrown yew trees on left and lower area of old garden beyond.

Photograph 3 - Old photograph of original house, with yew trees in same location as at present.

Photograph 4 - Looking south east over old lower garden towards main estate road at far side. Through the trees on the left of centre, the ground levels fall away to the lower level of a large fields on the north site of the main estate road.

Photograph 5 - Looking east along main estate road from Old School House towards Bargate Cottage and crossroads

Photograph 6 - Bargate Cottage and gardens from main estate road, looking north east. Note lower ground into field in foreground, and line of yew trees at house site in middle distance.

Photograph 7 - View east along main estate road past Bargate Cottage and past crossroads. The vantage point is at approximately the low point of the road, which rises gradually into the distance. Note lower ground visible on south (right-hand) side of the road beyond crossroads, and falling away again on the north side of the road.

Photograph 8 - View north over crossroads towards house site with Bargate Cottage on left. Note lower ground in old gardens on right of track, and pronounced drop to lower levels in garden of Bargate Cottage.

Photograph 9 - View north west from main estate road to Bargate Cottage on left, and old lower garden area beyond trees in middle distance. Note lower levels in field on north of the road, into which any overland flow from the garden area would flow unimpeded. Also, lack of height in grass verge on road, allowing flow direct off road into the field on the north side.

Photograph 10 - View south to Bargate Cottage, showing ditch which runs along the edge of the garden at the foot of the sloping verge. This ditch is a recent addition, intended to convey more flow from the crossroads to the area of lower ground in the field to the north west, hence reducing the tendency for surface water from the road to accumulate in the garden of Bargate Cottage.

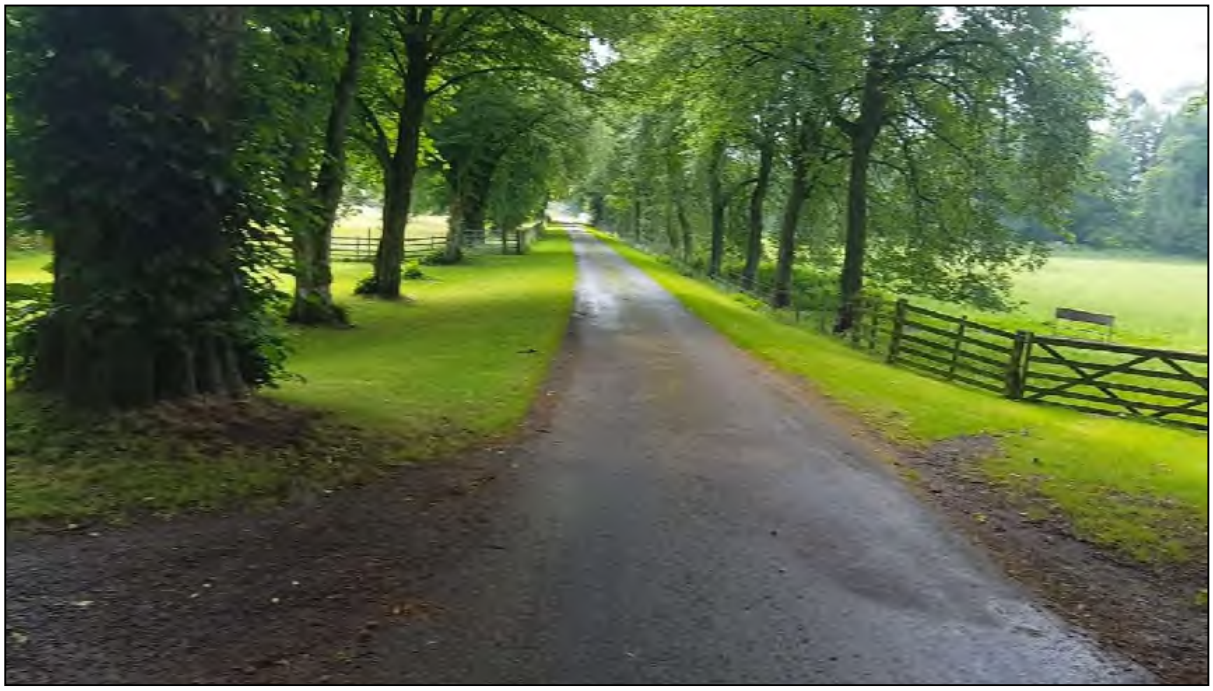
Photograph 11 - View looking towards Bargate Cottage from the relief level in the field where flow would accumulate to before discharging to the north west. The ground level at the viewpoint is 125.5m AOD.

Photograph 12 - Looking east from field boundary towards relief level in the field adjacent to Bargate Cottage. Once water accumulates to the relief level, it would flow towards the ditch in the foreground which emerges at the fence, carrying field drainage.

Photograph 13 - Upstream view of main bridge crossing of Ruthven Water, carrying main estate road across

Photograph 14 - View south (upstream) along track adjacent to the Ruthven Water (which lies to the left of view, beyond line of trees). Track drops to lower level and flatter gradient as it approaches, change of gradient is approximately next to chapel building and cemetery wall. Note grass area in front of chapel which falls away from the watercourse towards the west.

Photograph 15 - Area of grass on the north side of chapel in foreground, which slopes towards field beyond. Estate road on right sits at higher level, and varies only slightly in level, effectively forming a broad crested weir over 200m long.



Photograph 16 - View from the western side of the main bridge looking west along the estate road on its low embankment, with lower ground on both sides.

Photograph 17 - View looking east from the south side of the estate road towards the Ruthven Water. The bridge is visible on left of centre. The walls of the chapel cemetery are visible on the right beyond the wooden fence.

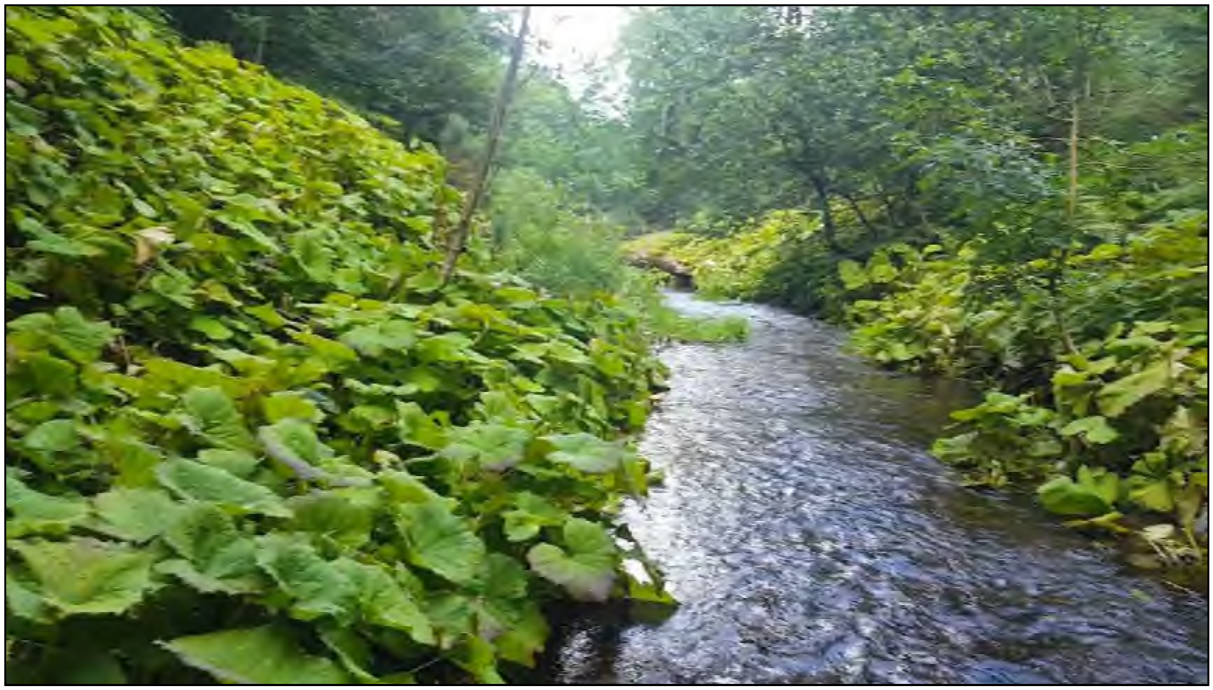
Photograph 18 - View north west from near the left bank of the Ruthven Water downstream of the main bridge, looking over flat marshy field towards the location of the main tributary (flowing left to right in gap between plantations, and in front of distant higher ground)

Photograph 19 - Looking upstream at Ruthven Water. Open fields are visible on the right, and the line of the main estate road embankment is just visible in the distance beyond the trees on the right.

Photograph 20 - Looking upstream at ramp feature on the Ruthven Water (marked as "weir" on OS mapping) from the confluence of the Ruthven Water with the main tributary. The latter is visible on the right. Immediately behind this viewpoint is the entrance to the large arched culvert under the A823 road embankment.

Photograph 21 - Looking east (downstream) to the entrance to the large arched culvert under the A823 road embankment.

Photograph 22 - View west from the downstream end of culvert under the A823 road embankment.



Photograph 23 - View east of the Ruthven Water downstream of the A823 culvert.

Photograph 24 - Looking west (upstream) at the main tributary to the Ruthven Water track crossing point. At this point the watercourse is little more than a ditch.

Photograph 25 - Downstream view from same vantage point as previous photograph

Photograph 26 - Looking east from crossing point on main tributary, towards confluence with Ruthven Water (in distance where lines of trees converge)

4.0 Estimation of flood flows

In order to define the extent and water surface level of the 200 year (0,5% probability) floodplain, we have made an assessment of flood flows and flood levels in the two main watercourses using the FEH Statistical Method, the FEH Rainfall-Runoff Method, and the Revitalised Flood Hydrograph Method (ReFH2). The estimated flood flows have also been factored up by 20% to allow for the potential influence of climate change (following established practice and in line with guidance from the UK Climate Impacts Programme).

4.1 FEH Statistical Method

4.1.1 Estimation of Index Flood Qmed

In order to define the extent and water surface level of the 0.5% annual probability floodplain, we must first estimate the Index Flood, Q_{MED}, using the methods outlined in the Flood Estimation Handbook (FEH).

There are no observed records for the Ruthven Water, hence flows are estimated using Catchment Descriptors, and adjusted using flow records from suitable donor sites.

An initial estimate of the flood flows for the Ruthven Water was made using the Catchment Descriptor Method. This method is described in Volume 3, Chapter 13, of the FEH. The catchment descriptors define various physical and hydrological properties and characteristics of the land that forms the catchment upstream of the point of interest. The formula also includes variables that define the statistical rainfall pattern within the catchment. There is a further adjustment to the formula that accounts for the degree of urbanisation of the catchment.

The method produces the mean annual flood Q_{MED} – the index flood – which is the flood flow along the river or floodplain that is statistically “exceeded on average every other year”. It is roughly equivalent to the two-year flood. The exercise is done using the FEH and WINFAP software.

The final catchment descriptors used for the subject catchment are shown in Figure 5 below.

The WINFAP-FEH estimation of QMED from catchment descriptors is 4.665m^3/s.

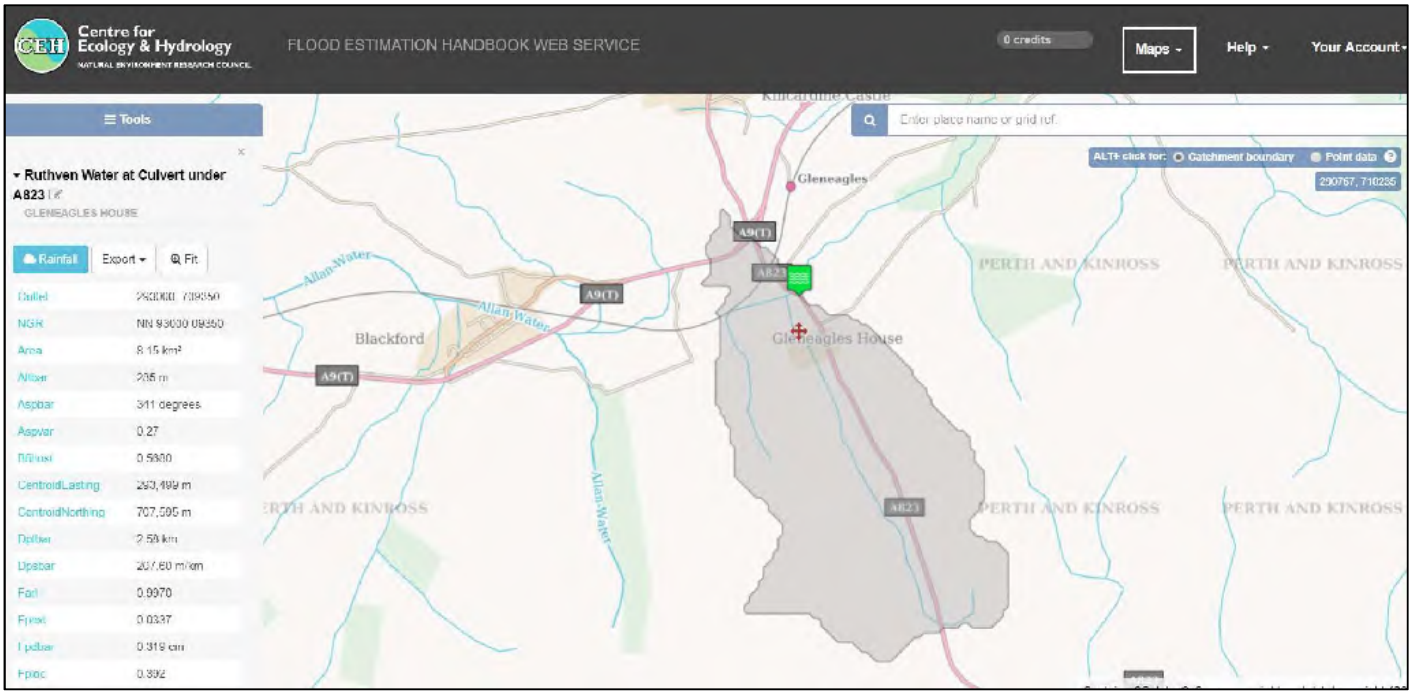


Figure 4 - Ruthven Water Catchment at the culvert under the A823.

VERSION	"FEH CD-F	Version	3	exported a	10:44:34	GMT	Mon	02-Sep-19
CATCHME	GB	293000	709350	NN 93000	09350			
CENTROID	GB	293499	707595	NN 93499	07595			
AREA	8.1525							
ALTBAR	285							
ASPBAR	341							
ASPVAR	0.27							
BFIHOST	0.568							
DPLBAR	2.58							
DPSBAR	207.6							
FARL	0.997							
FPEXT	0.0337							
FPDBAR	0.319							
FPLOC	0.392							
LDP	5.44							
PROPWET	0.59							
RMED-1H	9.5							
RMED-1D	41.7							
RMED-2D	56.7							
SAAR	1379							
SAAR417C	1466							
SPRHOST	33.62							
URBCONC	-999999							
URBEXT19	0.0015							
URBLOC19	-999999							
URBCONC	-999999							
URBEXT2C	0							
URBLOC2(	-999999							
C	-0.0151							
D1	0.47298							
D2	0.41593							
D3	0.37471							
E	0.24043							
F	2.33121							
C(1 km)	-0.015							
D1(1 km)	0.464							
D2(1 km)	0.417							
D3(1 km)	0.359							
E(1 km)	0.24							
F(1 km)	2.289							

FEH_Catchment_Descriptors_29300

Figure 5 - Catchment Descriptors for Ruthven Water at A823 Culvert

4.1.2 Adjustment to Qmed based on selected donor sites

In order to make the estimation of Q_{MED} more accurate, it is necessary to use flow data from donor sites with similar hydrological characteristics, where gauged information does exist for an adequate

number of years. An appropriate local adjustment to the estimate of Q_{MED} at the subject site is then made. The procedure uses several donor sites to estimate an adjusted Q_{MED} value which is then applied to the subject site.

Using WINFAP software, the adjusted Q_{MED} value for the Ruthven Water at the A823 culvert becomes 5.725m^3/s.

4.1.3 Flood Growth Curves

In order to estimate the magnitude of the range of possible statistical flood events which will occur in this catchment, for example the flood that will statistically occur once in 200 years (the flood flow which has a 0.5% chance of occurring in any one year), it is necessary to determine a flood growth curve and a flood frequency curve. This is done by forming a "Pooling Group", i.e. by selecting a group of other catchments across the UK which have very similar characteristics to the subject site and which have existing gauged flow records covering a statistically adequate number of years, and subjecting this group to statistical analysis.

The catchment descriptors from the FEH Web Service are entered as a data file to the WINFAP software, which collates a pooling group of similar catchments, subjects these to a statistical analysis, and calculates a range of flows representing floods of different probabilities at the subject site.

The results can vary slightly, depending upon the chosen weighting of the statistical analysis, but adopting the recommended "Generalised Logistic" (GL) technique, the watercourse flow results are as follows:

Return Period	Flow (m^3/s)
Q200	**19.6**
Q200+20%	**23.5**

Table 4.1 Flow calculation results using FEH Statistical Method

The data and results for the WINFAP growth curve derivations are shown in Appendix A.

4.2 Rainfall Runoff Method

The FEH Rainfall Runoff method was also used to estimate the 1-in-200-year flow rate in the Ruthven Water. The Rainfall Runoff method relies on plentiful rainfall records rather than sometimes scarce river flow records. Hence, if catchment characteristics are known or estimated, the method converts the theoretical design rainfall event of a known return period into a design flood event, with a peak of a known return period.

By selecting the catchment on the FEH Web Service, the catchment descriptors unique to the catchment can be established. Also, by selecting the catchment, the design rainfall for the catchment can be established as the software determines the depth-duration-frequency (DDF) relationships for the catchment.

The catchment descriptors are subsequently entered into the Flood Modeller software to produce a hydrograph showing the peak flow rate during a specified flood return period. A storm duration is also required and involves trial and error to determine the duration of the peak flow.

As the catchment is entirely rural, the winter profile only has been modelled. The largest flood flow estimated using the Rainfall Runoff Method is shown in the table below (see Flood Modeller output, Appendix B):

Return Period	Flow (m^3/s)
Q200	**18.3**
Q200+20%	**22.0**

Table 4.2 Flow calculation results using Rainfall Runoff Method

4.3 Revitalised Flood Hydrograph Method, Version 2 (ReFH2)

The third method utilised for the assessment of flood flows in the Ruthven Water was the ReFH2 Method. This method is the second version of a method which was originally established as an update to the FEH Rainfall Runoff method.

The ReFH2 model is comprised of three components; a loss model, a routing model and a baseflow model. The total rainfall, less the losses is input into the routing model, with results from the routing and baseflow models combined to provide a prediction of flow. The ReFH2 model is used in conjunction with a depth-duration-frequency model, either the FEH99 model or FEH13 model. In this instance, the FEH13 model was used to provide the rainfall input.

Using the ReFH2 software, the flood flow estimate for the Ruthven Water was as follows:

Return Period	Flow (m^3/s)
Q200	**8.7**
Q200+20%	**10.4**

Table 4.3 Flow calculation results using ReFH2 Method Culvert

4.4 Applicable Flowrate

There is a large discrepancy between the three flowrates, with the ReFH2 figure less than half of the other estimates. Although the precautionary principle should be adhered to where possible, in this instance (as will be discussed later in this report) the larger flows imply frequent flooding events would occur, particularly to Bargate Cottage, while none are recorded. On the other hand, ReFH2 is the preferred method for an ungauged rural site in Scotland, and the flows estimated by ReFH2 would cause some flooding for extreme events. Hence a compromise is suggested:

- The ReFH2 flow estimate should be used to establish floodplain extents and hence, where landraising or building should not occur, i.e. $8.7m^3s$ at the A823 culvert.

- Meanwhile, a compromise flow, say RefH2 + 50% of the difference between ReFH2 and RR flows (plus climate change and partial bridge blockage) would be a reasonable compromise for assessing the effects of potential flooding on emergency access, and to establish minimum floor levels. i.e. $16.2m^3s$ at the A823 culvert

For locations upstream of the confluence of the two major watercourses, the flowrate should be reduced by a suitable allowance. For the Ruthven Water upstream of the confluence, therefore the Q200 value should be adjusted in proportion to the reduction in catchment area. This will also be applied to the major tributary for simplicity – although the catchment characteristics of this smaller watercourse may not be as representative of the characteristics of the upstream catchment of the main watercourse, the exact flowrates in this watercourse are not critical, as will be demonstrated later in this report.

In calculating the catchment areas for the watercourses upstream of the confluence, the catchments estimated by the FEH Catchment Database have been used. The catchment areas predicted by FEH were as follows:

Catchment	Catchment area (FEH)	Catchment area (adjusted)
Ruthven Water, Downstream	8.15	8.52
Ruthven Water Upstream of confluence	6.30	6.67
Ruthven Water upstream of Road Bridge	5.93	6.30
Main tributary	1.84	2.21

Table 4.4a – Catchment areas (km^2)

However, it was noted that this underrepresents the catchment of the tributary, as there is a small area to the west which can be seen to drain to the catchment because of a network of ditches. Hence, the catchment areas for both the tributary and the Ruthven Water downstream of the confluence have been increase by 0.37km^2.

Hence the resultant flowrates to be used are as follows:

Catchment	**Q200 (unadjusted catchment area)**	**Q200 (adjusted catchment area)**	**Higher flow (Average of ReFH2/RR, plus 20% + adjusted catchment area)**
Ruthven Water, Downstream	8.7	9.1	16.9
Ruthven Water Upstream of confluence	6.7	7.0	13.0
Ruthven Water upstream of Road Bridge	6.3	6.6	12.3
Main tributary	2.0	2.1	3.9

Table 4.4b – Flowrates for flood estimation (m^3/s)

5.0 Predicted Flood Levels

5.1 Initial model

Having estimated flood flows in the Ruthven water and the main tributary, flood modelling is required to analyse the watercourse channel to see what level the floodwater would reach during the critical 0.5% annual probability flood event.

The watercourse between the sections is analysed using the HEC-RAS river analysis software, which is generally recognised by the relevant authorities as producing verifiable results. The watercourse has been surveyed on site over the length adjacent to the site and for some distance upstream and downstream (see drawings 545/1 and 545/2).

Manning's n coefficients were selected for the site based on inspection of existing conditions, and comparison with tabulated descriptors in tables of Manning's values. Hence the following were selected:

- Main channel: clean, straight, no rifts or deep pools, some weeds and stones (medium value of n = 0.035 applied)

- Banks and flood plains: high grass (normal value of n = 0.035), mature field crops (normal value of n = 0.04), scattered brush, heavy weeds (normal value of n = 0.06),, heavy stand of timber, few down trees, little undergrowth, flow below branches (normal value of n = 0.1)

Once appropriate Manning's values had been selected, boundary conditions at the downstream and upstream ends of the modelled length were modelled based on normal depth commensurate with average channel gradients at each end.

Both 1250mm diameter culverts included in the hydraulic model have been modelled with the bottom 0.1m of the pipe silted up.

Note that cross section numbering in the HECRAS model differs from the numbering used on the survey drawings. To relate the two, please use the table below:

Survey XS Number	1	2	3	4	5	6	7	8	9
HECRAS XS Number	14	13	12	11	10	9	8	7	6
Survey XS Number	10	11	12	13	14	20	21	22	23
HECRAS XS Number	5	4	3	2	1	21	22	23	24
Survey XS Number	24	25							
HECRAS XS Number	25	26							

Table 5.1a - Cross section numbering system, survey versus HECRAS model

Cross sections 9 and 10 on the upstream stretch of the Ruthven Water have a capacity of approximately 6.0 m^3/s before they will overflow into the field on the western side (i.e. beyond the left bank). Hence, flows from this point down to the confluence are limited to this value as the overland flow of the excess floodwater will flow north in a broad shallow sheet flow to eventually flow into the main tributary upstream of the confluence. Hence, a corresponding flow increase is added to sections 23 and downstream.

Results of the analysis are contained in Appendix D.

The initial analysis shows the level of the 0.5% (Q200) flood level using the flood flows derived above:

River	Reach	Section Number	Flood Level (m AOD)
Ruthven Water	Downstream	1	119.47
Ruthven Water	Downstream	2	120.27
Ruthven Water	Downstream	3	120.57
Ruthven Water	Downstream	4	120.76
Ruthven Water	Upstream	5	122.19
Ruthven Water	Upstream	6	122.60
Ruthven Water	Upstream	7	122.86
Ruthven Water	Upstream	8	123.83
Ruthven Water	Upstream	9	124.29
Ruthven Water	Upstream	10	124.85
Ruthven Water	Upstream	11	125.72
Ruthven Water	Upstream	12	126.69
Ruthven Water	Upstream	13	127.02
Ruthven Water	Upstream	14	127.23
Tributary	Upstream	5.8	120.91
Tributary	Upstream	6	120.91
Tributary	Upstream	21	121.00
Tributary	Upstream	21.8	121.03
Tributary	Upstream	22	121.03
Tributary	Upstream	23	121.06
Tributary	Upstream	24	121.10
Tributary	Upstream	24.8	121.12
Tributary	Upstream	25	121.33
Tributary	Upstream	26	121.33

Table 5.1b - Flood levels (0.5% (Q200) flow)

The results show that floodwater should remain within the channel of the Ruthven Water and its major tributary, apart from some overland flow on the left bank. As previously discussed in Section 4.4, this overland flow will be through adjacent fields down to the right bank of the tributary in the reach immediately downstream of Section 10. When modelled with the full flow over the extended cross sections into the adjacent fields, the overland flow depth is indicated to be less than 100mm. In order to assess the flow likely to pass downstream in the main channel, the model was then altered to show the channel running full, with a levee on the crest of the right bank.

The predicted 1-in-200-year (Q200) flood extent is shown in Figure 5.2a and 5.2b below.

Appendix D contains details of the HECRAS analysis, including plots of the watercourse cross-sections and the water surface levels appropriate to the values above.

From the initial results it was immediately clear that the flood levels which would be relevant to the proposed development, and which would have any bearing on the emergence access and egress route from the site, would be dependent on flow capacity and level in the upstream end of the reach on the main watercourse, i.e. at and upstream of the main bridge crossing at Section 12/13. Although subsequent sensitivity analysis confirms this, it was already clear by initial inspection of the results that flows and levels in the tributary and the lower reaches of the Ruthven Water do not affect flows upstream. Also, it was apparent that there is not a viable escape route via the track which crosses the tributary at Section 24/25, as the culvert pipe here is undersized.

5.2 Sensitivity Analysis

Sensitivity analyses were carried out to check the effect of a variation in flow rate, of variation in Manning's 'n' values, and of variation in downstream boundary conditions. As discussed in the preceding section, only levels immediately upstream and around the main bridge crossing of the Ruthven Water are critical to the analysis for the subject site, and hence on sections 11 to 14 are listed below.

The following table compares predicted flood levels for the Q200 and Q200 + 20% (Q200 plus climate change) flood events.

River	Reach	Section Number	Flood Level (m AOD)		Variation in level(m)
			Q200	+20%	
Ruthven Water	Upstream	11	125.70	125.63	-0.07
Ruthven Water	Upstream	12	126.63	125.81	0.18
Ruthven Water	Upstream	13	127.02	127.27	0.25
Ruthven Water	Upstream	14	127.23	127.42	0.19

Table 5.2a – Sensitivity analysis – variation in flowrate

The above results show that an increase in flood flow of 20% would have a limited impact on predicted flood levels, with a maximum level increase of 0.25m predicted.

Sensitivity of the model to changes in Manning's *n* were tested, by increasing the initial (normal) values for watercourse sections by 0.01. This was carried out for all cross sections:

River	Reach	Section Number	Flood Level (m AOD)		Variation in level(m)
			Q200	Manning's n increased by 0.01	
Ruthven Water	Upstream	11	125.70	125.56	-0.14
Ruthven Water	Upstream	12	126.63	126.95	0.32
Ruthven Water	Upstream	13	127.02	127.19	0.17
Ruthven Water	Upstream	14	127.23	127.41	0.18

Table 5.2b – Sensitivity analysis – variation in Manning's n

The above results show that the increase in roughness values results in a maximum predicted Q200 flood level increase of 0.32m in the vicinity of the bridge crossing of the Ruthven Water or upstream. This shows some sensitivity to roughness value chosen, but less so upstream of the bridge.

Sensitivity of the model to changes in the downstream boundary conditions were tested, by increasing the initial gradient determining normal depth by 10%.

River	Reach	Section Number	Flood Level (m AOD)		Variation in level (m)
			Q200	Gradient increased by 10%	
Ruthven Water	Upstream	11	125.70	125.70	0.00
Ruthven Water	Upstream	12	126.63	126.63	0.00
Ruthven Water	Upstream	13	127.02	127.02	0.00
Ruthven Water	Upstream	14	127.23	127.23	0.00

Table 5.2c – Sensitivity analysis – variation in downstream gradient

As can be seen in the results above, the increase in downstream gradient does not affect predicted flood levels near the site.

The predicted flood extents based on the above modelling results is set out in Figures 5.2a and 5.2b below:

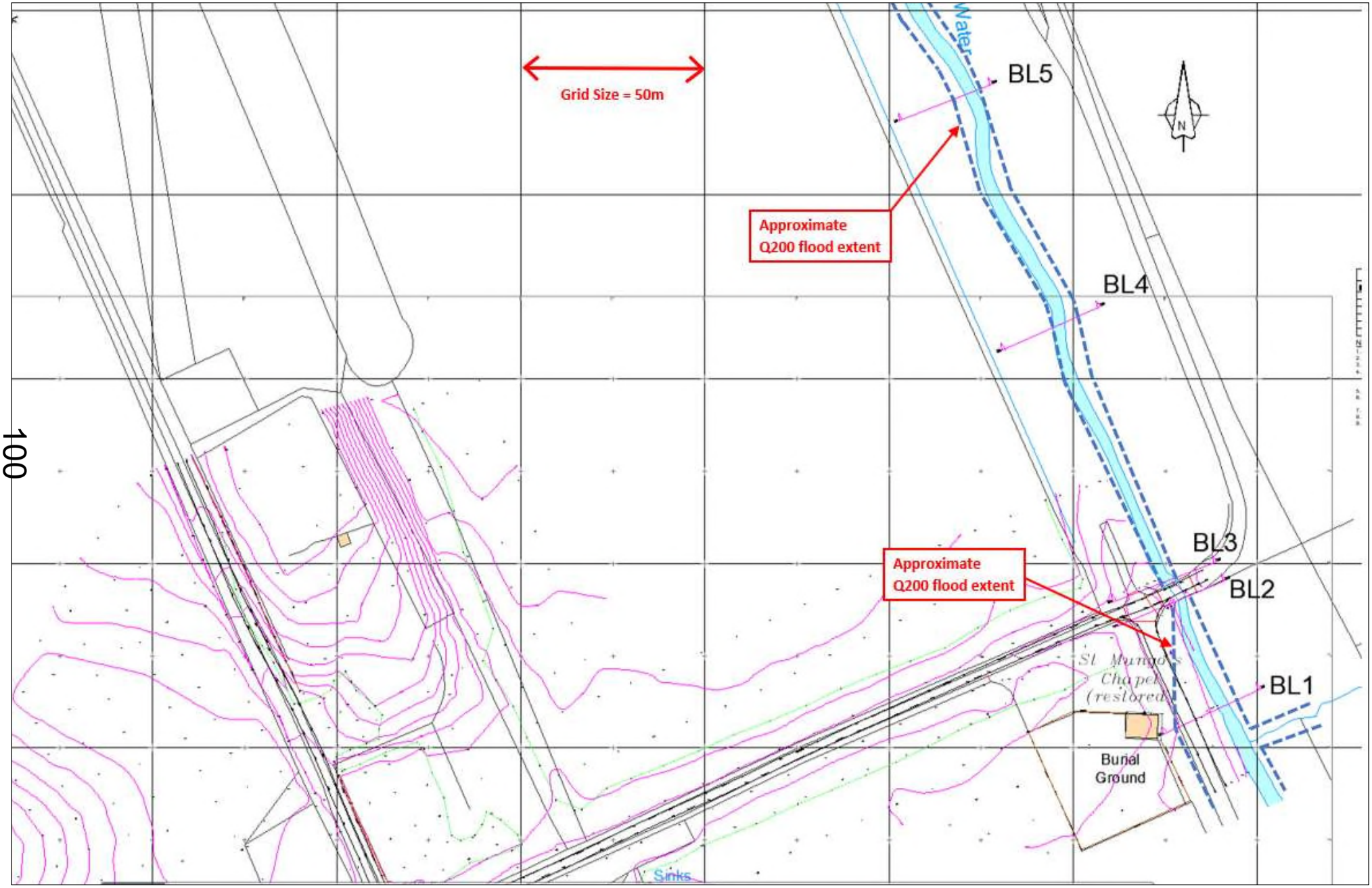


Figure 5.2a - Q200 Flood extents based on ReFH2 flow prediction (south)

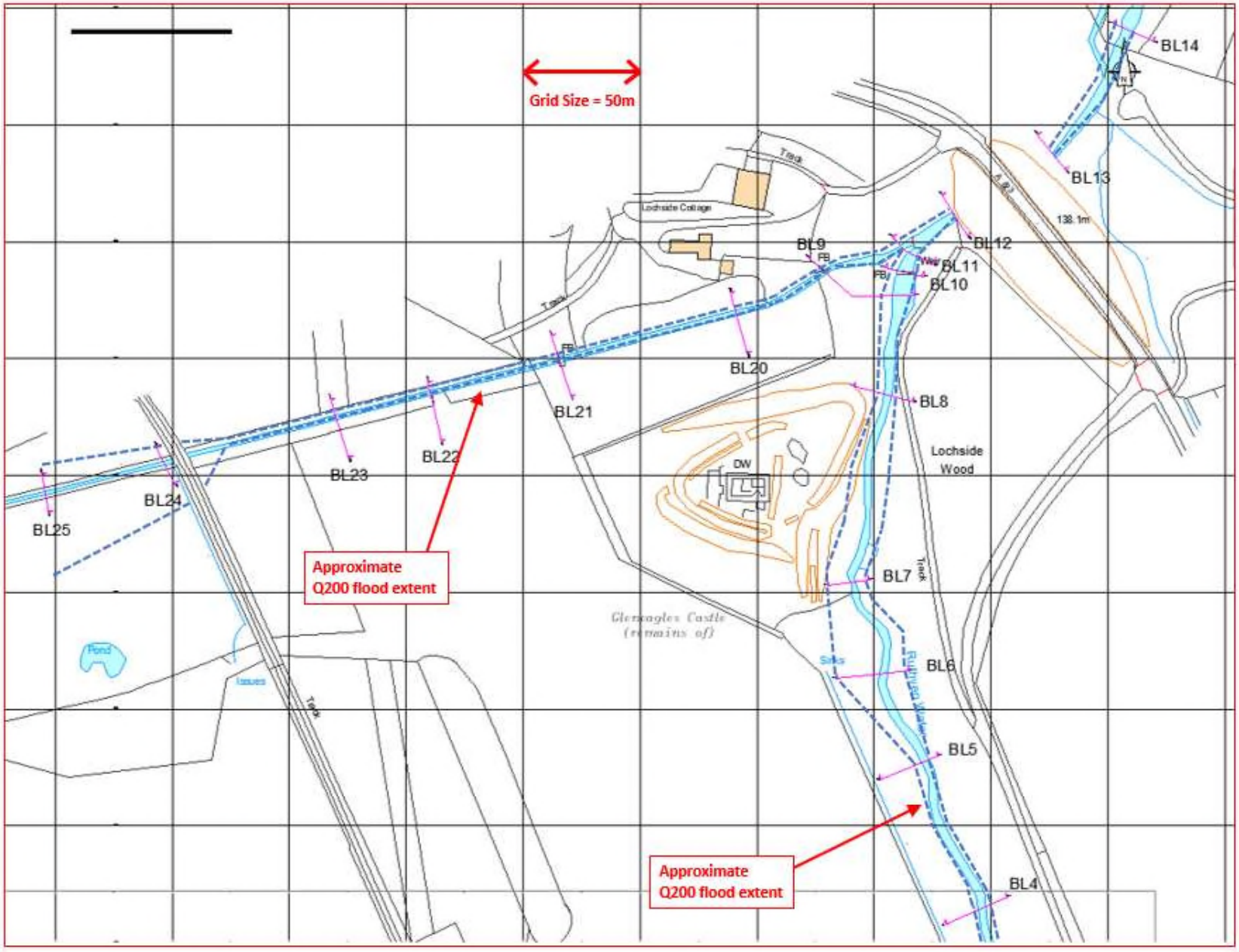


Figure 5.2b - Q200 Flood extents based on ReFH2 flow prediction (north)

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5.2.1 Flood levels including bridge blockage scenario

The potential for blockages of the main road bridge carrying the main access road over the Ruthven Water has been considered in the assessment and therefore the effects of a 25% blockage (i.e. 25% by width) have been modelled are outlined in the table below.

River	Reach	Section Number	Flood Level (m AOD)		Variation in level (m)
			Q200 + 20%	Q200 + 20% with 25% bridge blockage	
Ruthven Water	Upstream	11	125.70	125.63	-0.07
Ruthven Water	Upstream	12	126.63	126.81	0.18
Ruthven Water	Upstream	13	127.02	127.43	0.41
Ruthven Water	Upstream	14	127.23	127.52	0.29

Table 5.2c – Sensitivity analysis – variation in downstream gradient

The above results show that a significant blockage at the bridge has a moderate effect on depth of flow in the vicinity of the bridge, but for Q200 plus 20% flow in combination with a 25% bridge blockage, the upstream flow is predicted to remain in-bank.

As discussed in Section 4.4, the above analyses are based on q200 flows predicted by the ReFH2 method. Higher flows are predicted by the FEH Statistical and Rainfall Runoff methods. Hence, it was proposed that a higher flow based on an average of the REFH2 and Rainfall Runoff methods be used as a check on flood freeboard and regarding the safety of access and egress during flood events. Therefore, the following modelling results are obtained by using the flows as set out in Table 4.4b:

River	Reach	Section Number	Flood Level (m AOD)
Ruthven Water	Upstream	11	125.79
Ruthven Water	Upstream	12	125.87
Ruthven Water	Upstream	13	127.53
Ruthven Water	Upstream	14	127.65

Table 5.2d - Flood levels for Higher flow (average of ReFH2 and RR, + 20%)

In the analysis, it was found that the upstream flow of 12.2m^3/s would flow over the left bank and onto lower ground to the north of the old chapel building and surrounding stone walls. Hence, the above levels are based on limiting the flow to the channel capacity upstream of the bridge, which is 9.3m^3/s approximately. The corresponding HECRAS cross sections for this scenario are as follows:

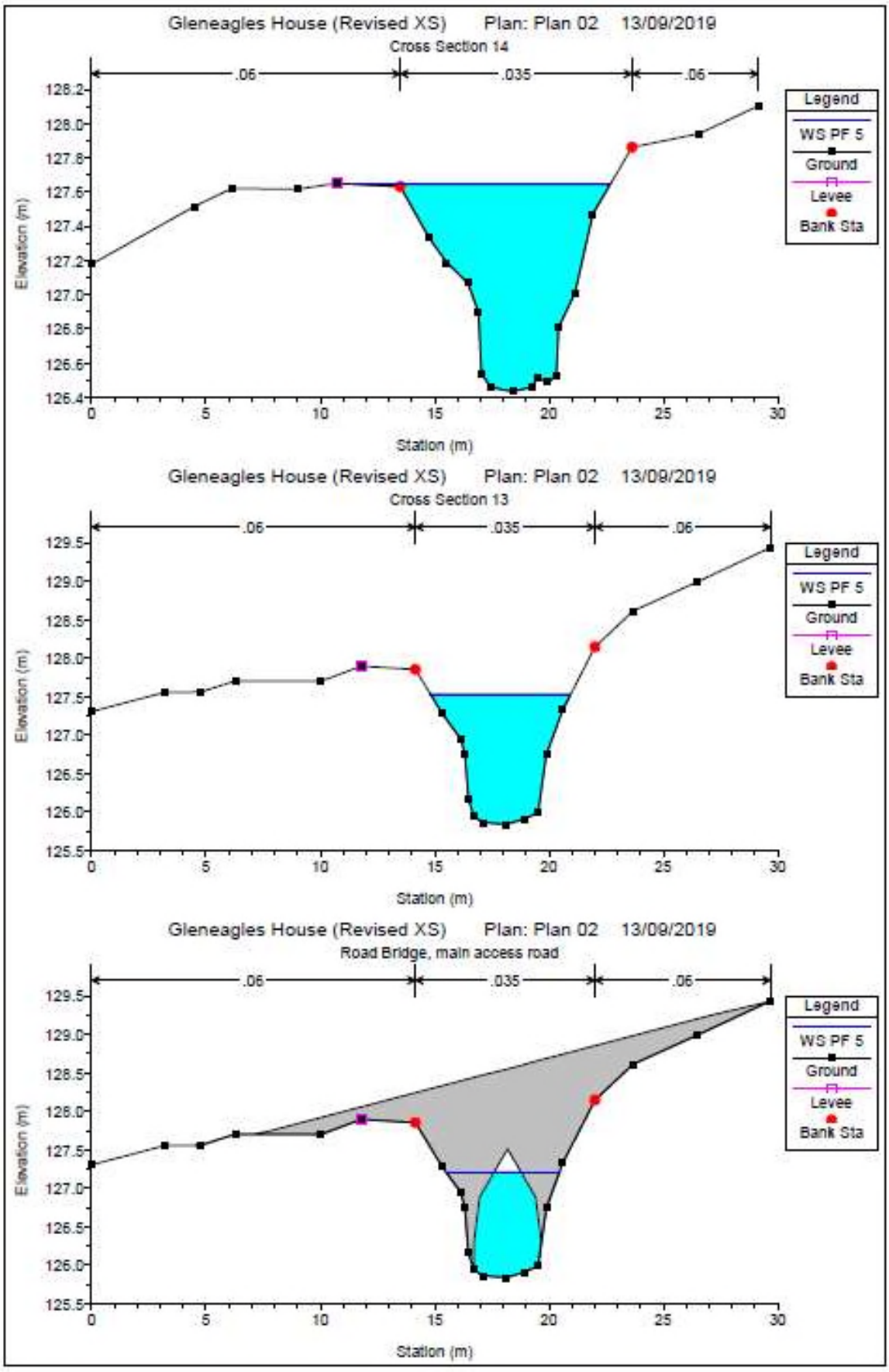

Figure 5.2e - HECRAS output showing flow depths with 9.3m^3/s flowrate in channel upstream of the road bridge on the Ruthven Water

The above result means that 3m^3/s would discharge from the left bank upstream of the bridge onto lower ground to the west. If there was no road embankment for the estate access road, this excess flow would head north parallel with the main watercourse through the fields which lead eventually to the main tributary. On the way, the flow would join further overland flow, which as previously discussed escapes part of the way downstream of the bridge. However, as the embankment forms a solid barrier to flow, this would not occur. Instead the following is anticipated:

- The road embankment is a solid barrier with an erosion-resistant crest due to the tarmac surface of the road. The levels along the road are relatively constant but gradually fall away from 127m AOD at the eastern end near the bridge, to 126.4m at the low point just to the west of Bargate Cottage. From this point the road starts to slope up gradually to a level of around 129m at Old School House.
- Overland flow discharging over the left bank would pass around the north of the chapel and then flow west-southwest down a slope parallel to the road, to collect in lower ground.
- The water would continue in this direction in parallel to the road, until the level of overland flow accumulated to a sufficient depth to flow onto the road. By inspection, this would likely be at a level of around 126.8m. which corresponds to the low point in the stretch of the road between the bridge and the south east corner of the development site
- Whether any water overtopped the mid-point of the stretch of road at 126.8m or not, overland flow would continue west-southwest parallel to the road on lower ground. There would be a tendency for water levels to fall in the direction of flow, and also any flow which was higher than the road crest would spill over onto the road. When this occurs, follow would initially be along the road to the lowest point beyond Bargate Cottage, however if reaching a sufficient depth (i.e. the level of the grass verge of the north side of the road), it would also spill over the north verge to reach lower ground on the north of the road.
- Ultimately, and water which continues to flow along the road through the crossroads, plus any water which flows onto the road at the crossroads from ponded water on the south of the road would tend to flow west to the low point at Bargate cottage and into the field adjacent to the cottage. The field behind the cottage is a hollow with levels as low as 125.2m AOD, and would fill until the relief level of 125.5 is reached, when water will start to flow north west through a gap in low hills and towards the track with adjacent ditch which lies to the west at a lower level

The above scenario in terms of anticipated flow patterns is set out in Figure 5.2f below. By inspection, it is not anticipated that depth of flow on the road would be fast moving, and would be unlikely to exceed o.1m in depth, apart from at the low point west of Bargate Cottage. The Cottage itself would potentially be surrounded by floodwater and would likely suffer some internal flooding.

The maximum flood depth due to adjacent overland flow on the road at the crossroads would therefore be no more than 126.6m (as water can shed off the track to the east and west. It is not anticipated there will be any significant depth on the track itself). With regard to the emergency access/egress route from the proposed house, this would be along the main estate road to the east, over which there would be shallow overland flow in places for just over 100m of the route to the bridge crossing. The road near the bridge crossing itself would be free of overland flow. Along the entire route, the verges on both sides of the road would be visible.

The above scenario would be anticipated to occur for no more than 2 to 3 hours during the peak of a flood event, and would not present any significant hazard to vehicular traffic.

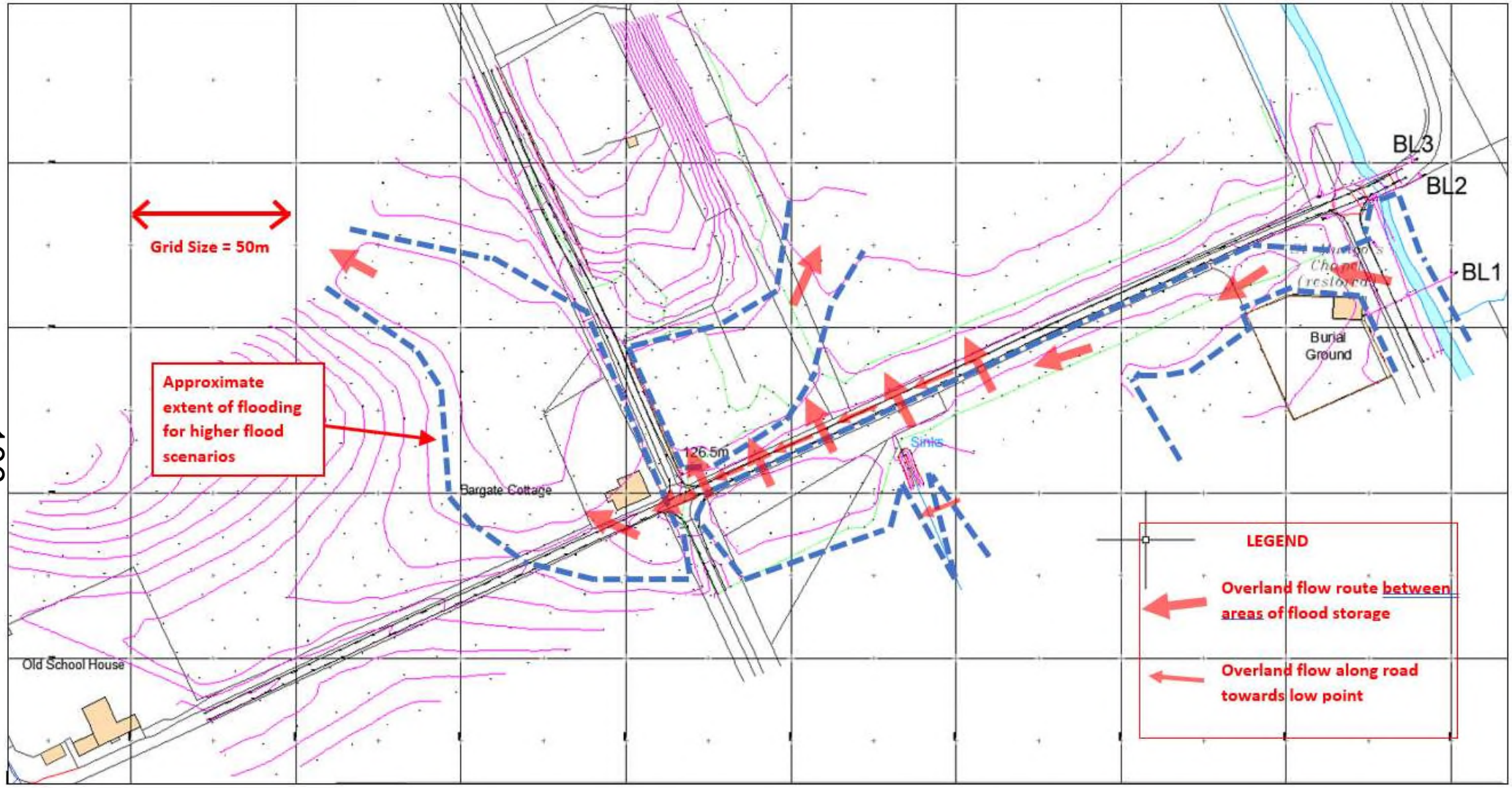

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Figure 5.2f - Water features plan showing estimated flood extents and flow paths based on discussion in Section 5.2.1 above.

6.0 Proposed mitigation and management of flood risk

The results of the flow estimation and flood modelling exercise discussed in Section 5 are summarised in Figures 5.2a, 5.2b, and 5.2f. These indicate that there is no flood risk to the proposed house providing it is built on the footprint shown in the proposed site layout as per Figure 2.1, and it will not occupy functional floodplain. The garden area to the south of the house, however, has the potential for shallow overland flow if a flood event significantly greater that the maximum flow predicted by the ReFH2 method were to occur. Hence, we have indicated the areas which would be affected in Figure 5.2f.

The access track adjacent to the proposed house would remain flood-free in all events, however for the larger flood scenario, it is possible that emergency access and egress during the peak of such an event would cause shallow, slow-moving overland flow on part of the road between the adjacent crossroads and the bridge over the Ruthven Water. This would not impede vehicular access.

The minimum finished floor level (min FFL) for the proposed house should have a suitable freeboard above all adjacent areas of potential flooding. Even though the highest flooding on the access road would be some distance from the house, it is recommended that the Min FFL should be at least 600mm higher than the likely maximum level on the road, which is assumed to be 126.8m, hence the min FFL should be 127.4m AOD.

It is also important to note that the floor level of the house should have a suitable upstand above surrounding ground, say 200mm or more, commensurate with good building practice.

In order to avoid any increase in flood risk to third part property, surface water runoff generated by the site should be dealt with following the principals of Sustainable Urban Drainage Systems.

Based on our findings and the above recommendations, it is possible to say that the development of the proposed site will not cause an increase in flood risk to third party property, and that there will be no resultant loss of flood storage.

7.0 Conclusions

- The proposed development will not occupy any existing floodplain, providing the low-lying area of ground to the south of the proposed house (as outlined in Figure 5.2f) is not built on and ground levels in this area are not altered. There should also be no solid barriers to flow such as stone walls in this area (the existing stone wall, if retained, is an exception).
- A minimum FFL for the proposed house has been set at 127.4m AOD
- The floor level of the house should have a suitable upstand above surrounding ground, say 200mm or more, commensurate with good building practice.
- Access roads to the site are unaffected by predicted flood extents, up to and including the flows predicted for a 1-in-200-year flood by the ReFH2 method. For significantly larger flows than this, there will be shallow, slow moving overland flow on parts of the emergency access/egress route for 2 to 3 hours during the peak of the flood event, however vehicular access will be possible at all times.
- In order to avoid any increase in flood risk, surface water runoff generated by the site should be dealt with following the principals of Sustainable Urban Drainage Systems.
- The development of the proposed site will not cause an increase in flood risk to third party property, and that there will be no resultant loss of flood storage.

We have used our best engineering judgement in this Assessment, and our calculations have been carried out using the Flood Estimation Handbook, WINFAP, HECRAS and other standard hydrological methods. We note that as with all such Flood Risk Assessments the accuracy of the results is only as good as the data and statistical techniques used.

8.0 References

i. Flood Estimation Handbook, Duncan Reed, CEH Institute of Hydrology, Wallingford, 1999.

ii. WINFAP-FEH, Version 4.1, Wallingford Hydrosolutions, 2020

iii. HEC-RAS, Version 5.0.7, March 2019, US Army Corps of Engineers Hydrologic Engineering Center.

iv. Revitalised Flood Hydrograph (ReFH) design package for both catchment and plot scale applications. Version.2.2, Wallingford Hydrosolutions, 2018

v. Flood Modeller Version 4.5, Jacobs 2019

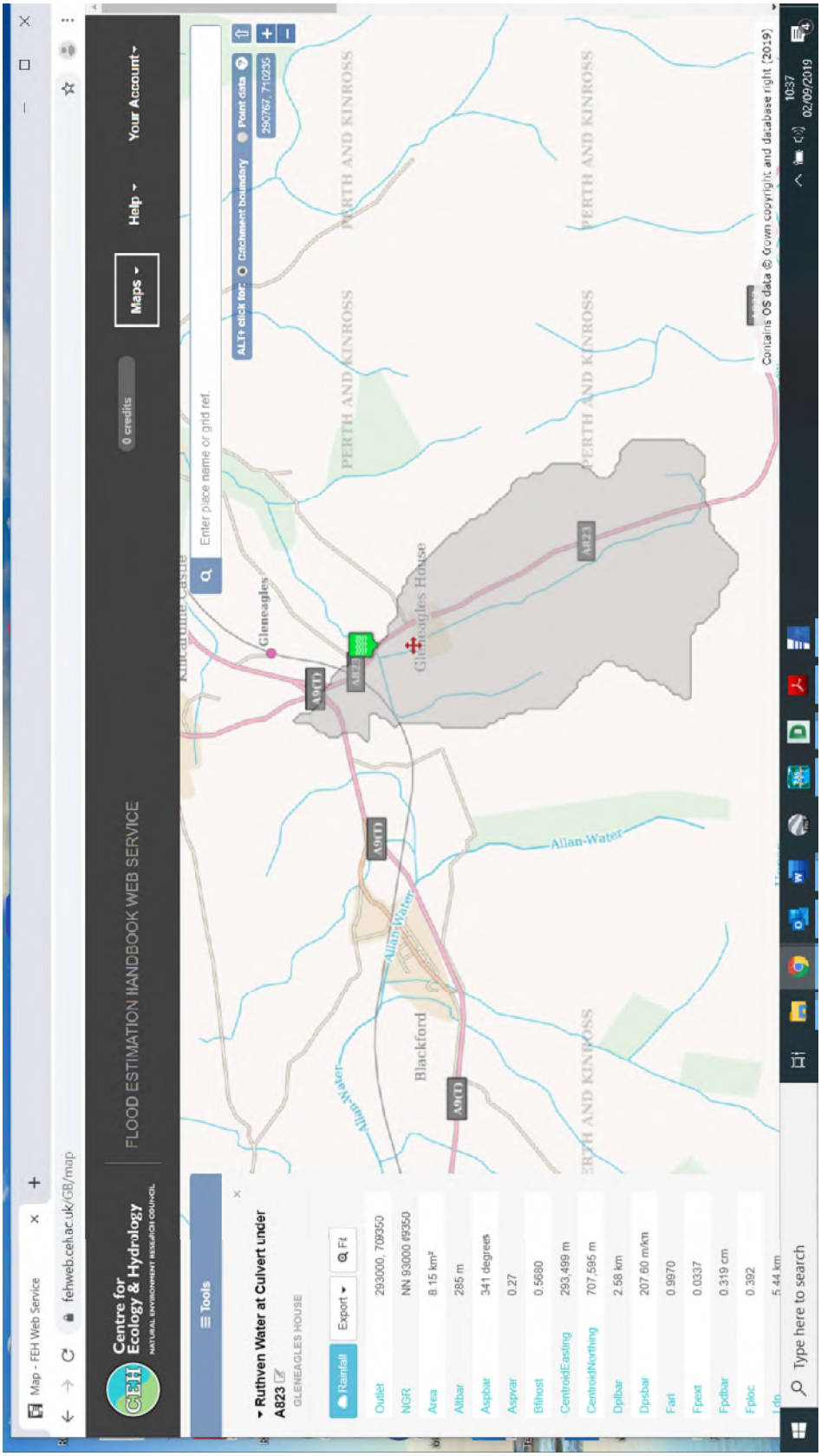
vi. UK Climate Projections for UK Climate Impacts Programme, July 2009.

vii. Scottish Planning Policy, Scottish Government, Crown Copyright, June 2014

APPENDICES

Appendix A

Results of WINFAP flow estimation (FEH Statistical Method)


Map - FEH Web Service
fehweb.ceh.ac.uk/GB/map
Centre for Ecology & Hydrology
FLOOD ESTIMATION HANDBOOK WEB SERVICE
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Maps
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Your Account
Tools
Ruthven Water at Culvert under A823
GLENEAGLES HOUSE
Rainfall
Export
Fit
Outlet 293000, 709350
NGR NN 93000 09350
Area 8.15 km²
Altbar 285 m
Aspbar 341 degrees
Aspvar 0.27
Bfihost 0.5680
CentroidEasting 293,499 m
CentroidNorthing 707,595 m
Dplbar 2.58 km
Dpsbar 207.60 m/km
Farl 0.9970
Fpext 0.0337
Fpdbar 0.319 cm
Fploc 0.392
Ldn 5.44 km
Enter place name or grid ref.
ALT+ click for: Catchment boundary Point data
290767, 710295
Gleneagles
Gleneagles House
Allan-Water
Blackford
PERTH AND KINROSS
A9(T)
A823
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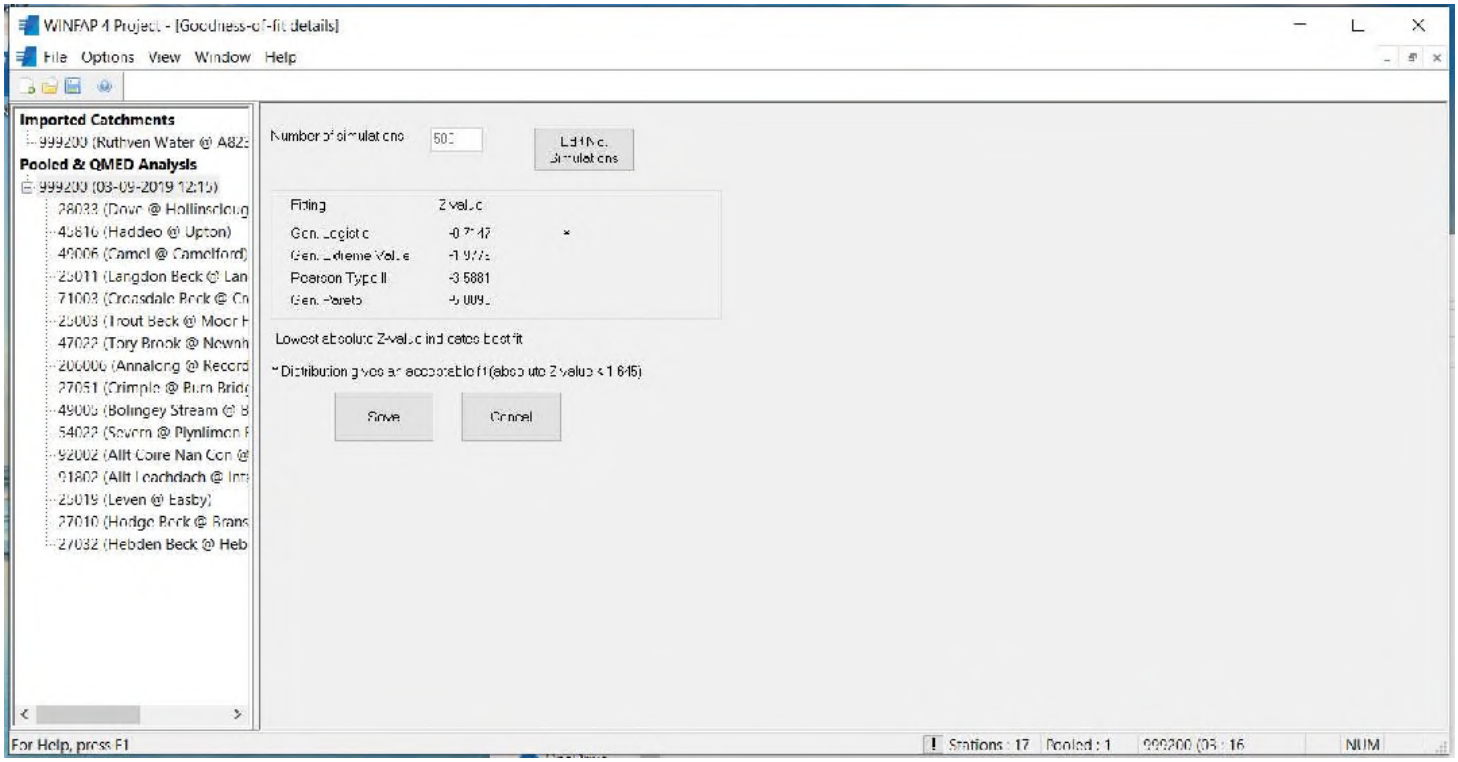
02/09/2019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45816 (Haddeo @ Upton)
49006 (Camel @ Camelford)
25011 (Langdon Beck @ Lan
71003 (Crossdale Beck @ Cr
25003 (Trout Beck @ Moor H
47022 (Tory Brook @ Newnh
206006 (Annalong @ Record
27051 (Crimple @ Burn Bridg
49005 (Bolingey Stream @ B
54022 (Severn @ Plynlimon F
92002 (Allt Coire Nan Con @
91802 (Allt Leachdach @ Int
25019 (Leven @ Easby)
27010 (Hodge Beck @ Brans
27032 (Hebden Beck @ Heb
Number of simulations
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Fitting
Z value
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Gen. Extreme Value
Pearson Type II
Gen. Pareto
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-3.5881
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Lowest absolute Z-value indicates best fit
* Distribution gives an acceptable fit (absolute Z-value < 1.645)
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Pooled : 1
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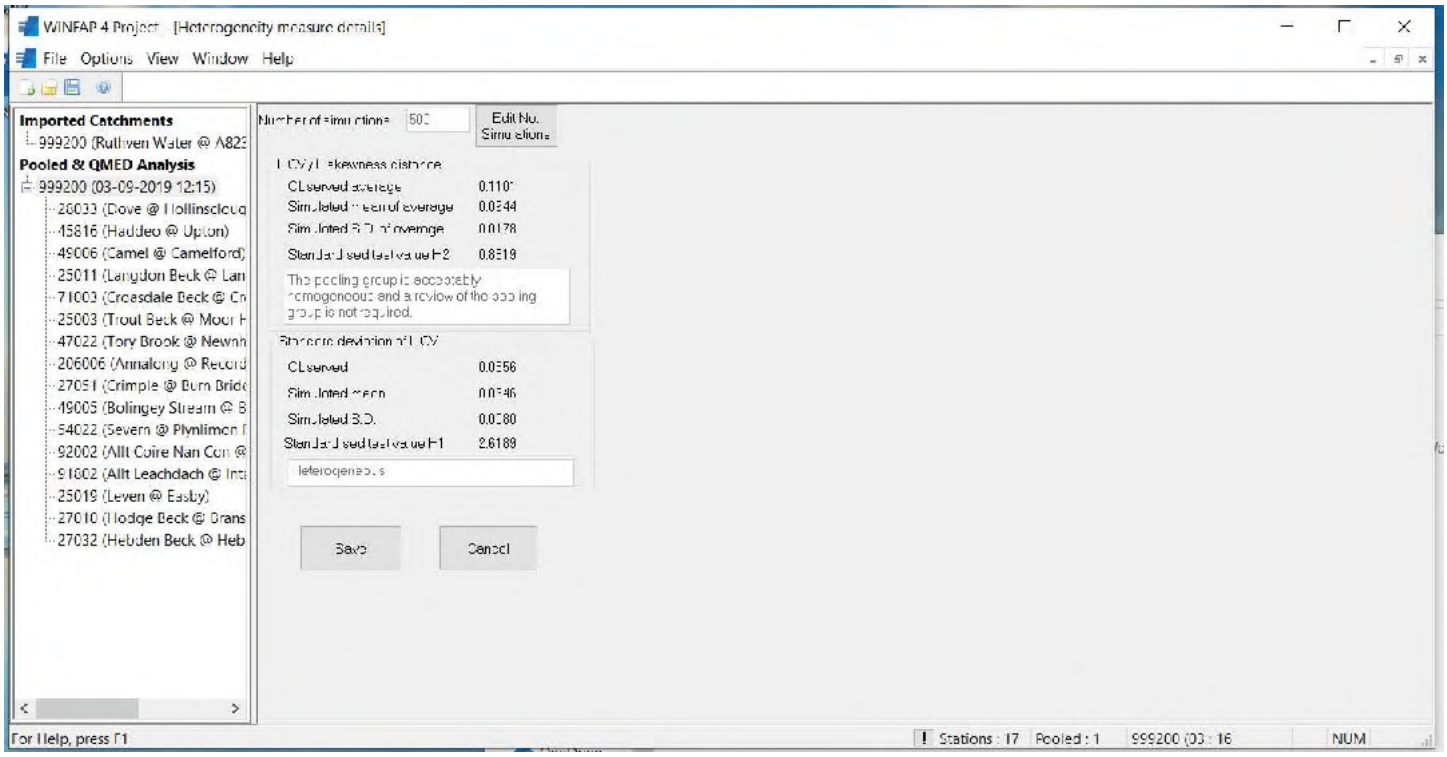
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45816 (Haddeo @ Upton)
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25003 (Trout Beck @ Moor H
47022 (Tory Brook @ Newnh
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27051 (Crimple @ Burn Bridg
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91802 (Allt Leachdach @ Int
25019 (Leven @ Easby)
27010 (Hodge Beck @ Brans
27032 (Hebden Beck @ Heb
Number of simulations
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L-CV / L-skewness distance
CL-served average
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Simulated mean of average
0.0844
Simulated S.D. of average
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Standardised test value H2
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Discordancy deviation of L-CV
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Simulated S.D.
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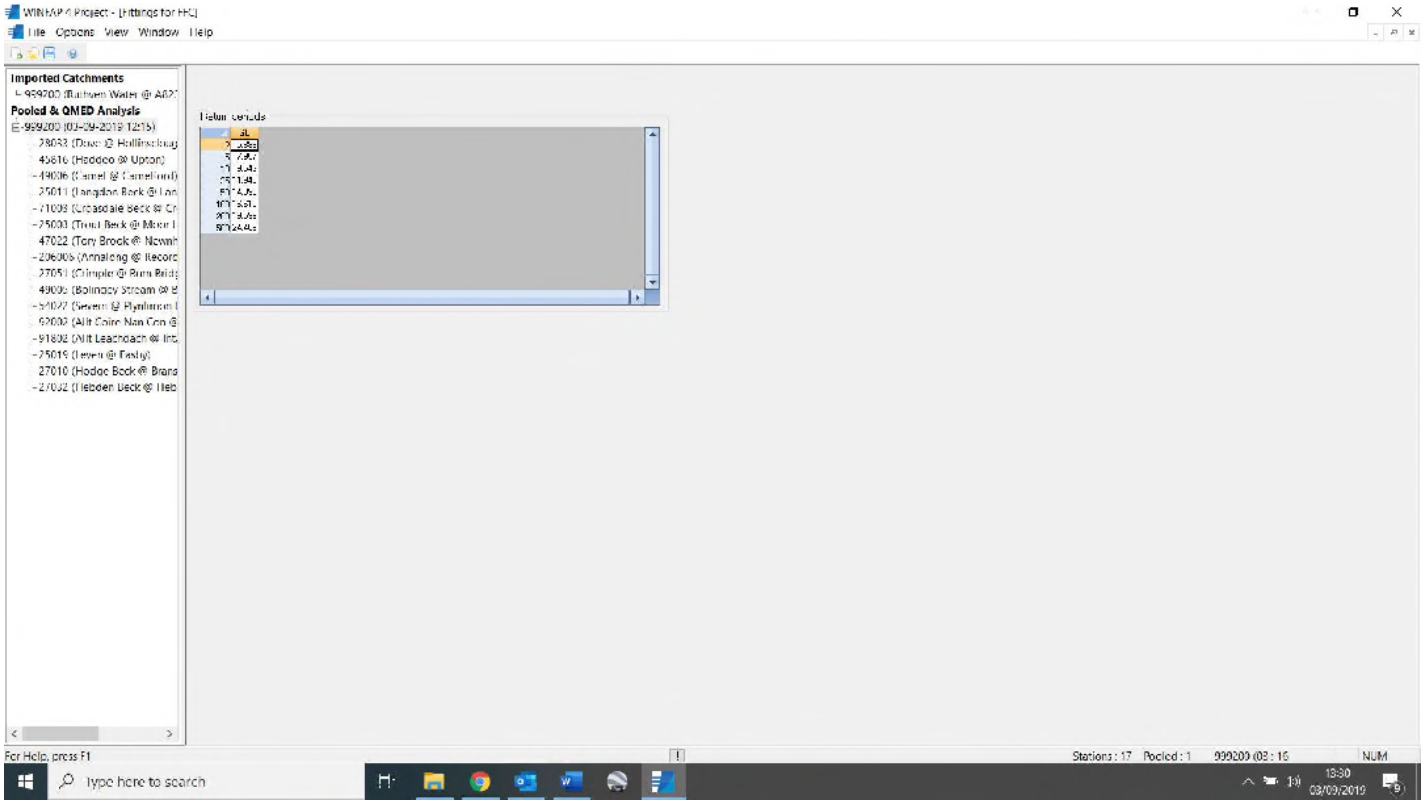

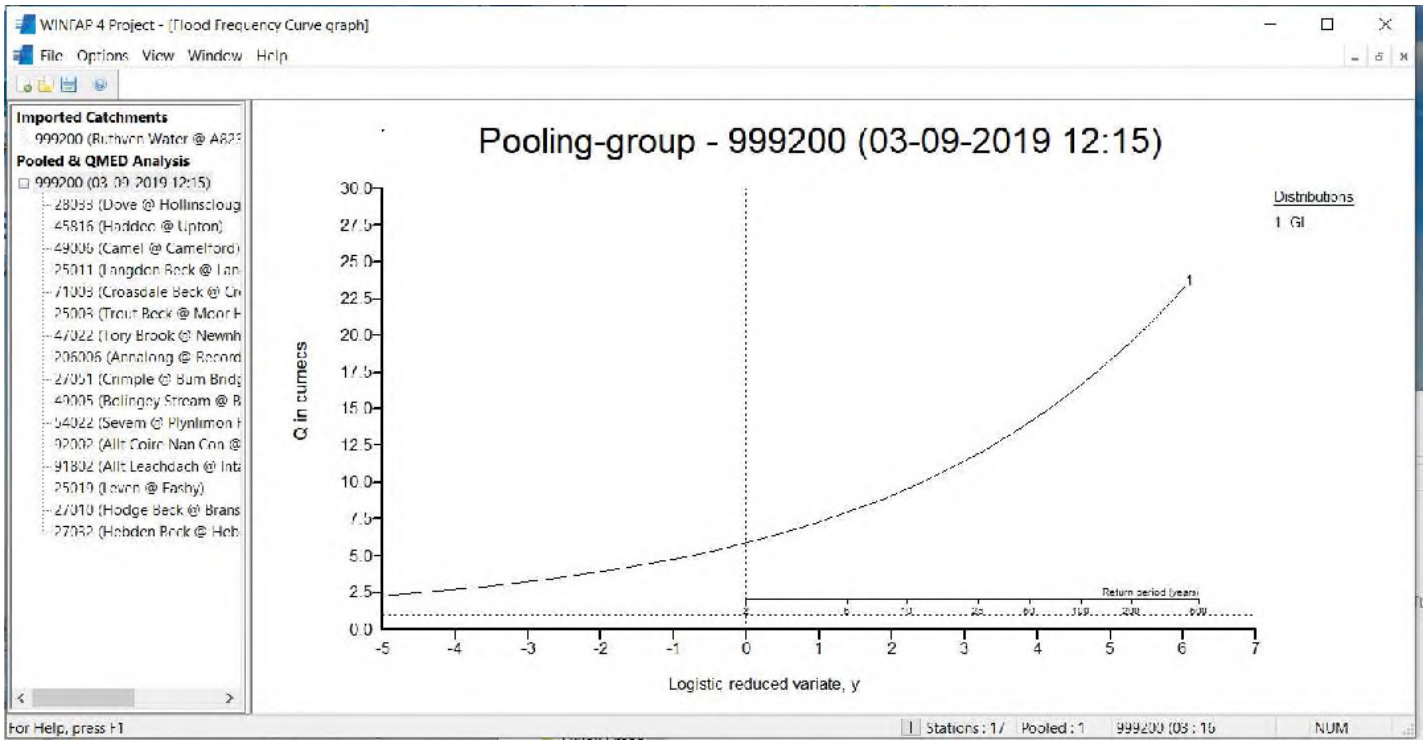

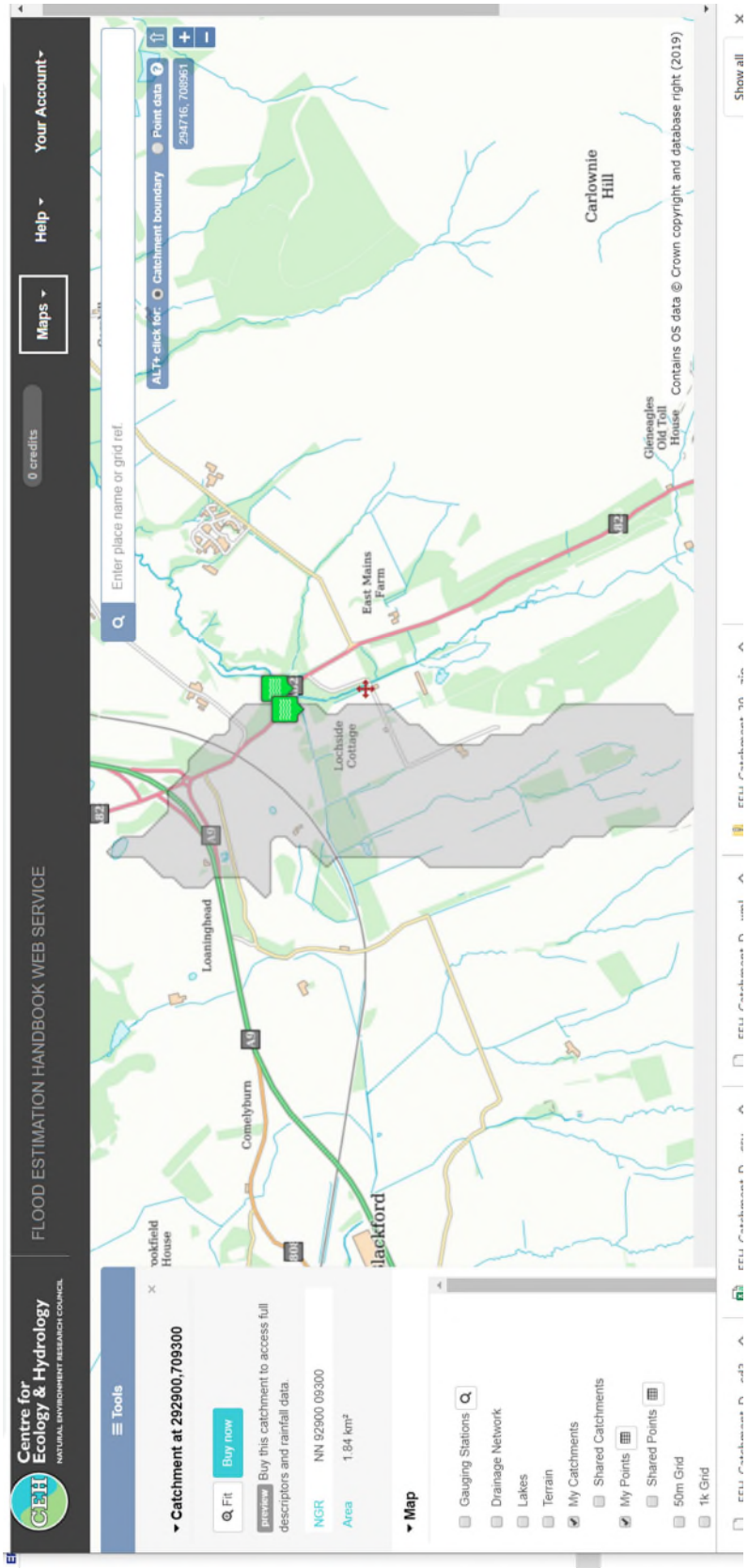
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NATURAL ENVIRONMENT RESEARCH COUNCIL
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Tools
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Fit
Buy now
Buy this catchment to access full descriptors and rainfall data.
NGR NN 92900 09300
Area 1.84 km²
Map
Gauging Stations
Drainage Network
Lakes
Terrain
My Catchments
Shared Catchments
My Points
Shared Points
50m Grid
1k Grid
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ALT+ click for: Catchment boundary Point data
294716, 708961
Carlownie Hill
East Mains Farm
Lochside Cottage
Gleneagles Old Toll House
Contains OS data © Crown copyright and database right (2019)
Loaninghead
Comelyburn
A9
A2
B8
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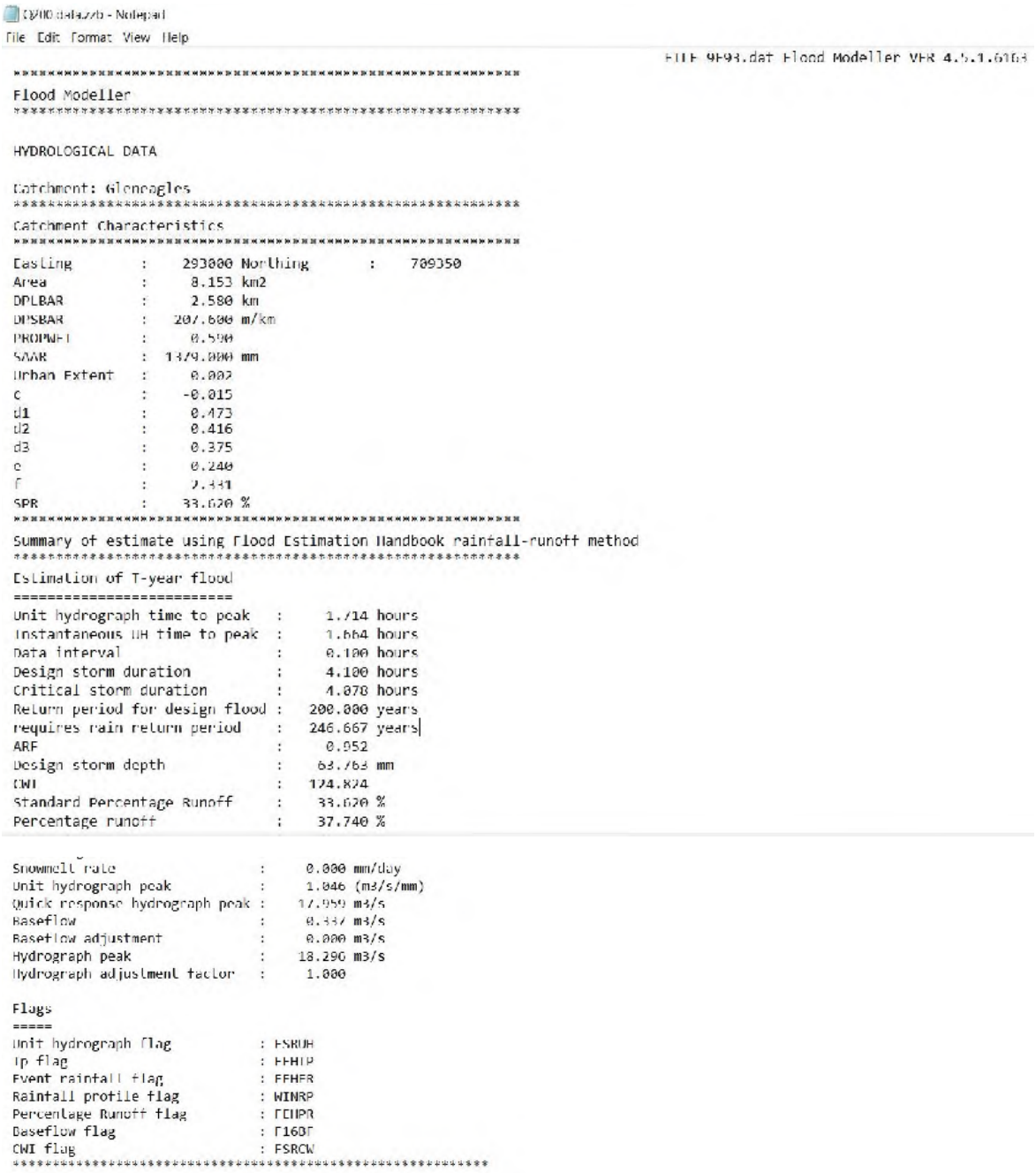
Appendix B

Results of Flood Modeller flow estimation (FEH Rainfall Runoff Method)



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                                                    FILE 9F93.dat Flood Modeller VER 4.5.1.6163
************************************************************
Flood Modeller
************************************************************

HYDROLOGICAL DATA

Catchment: Gleneagles
************************************************************
Catchment Characteristics
************************************************************
Easting         :    293800 Northing       :    709350
Area            :     8.153 km2
DPLBAR          :     2.580 km
DPSBAR          :   207.600 m/km
PROPWET         :     0.590
SAAR            :  1379.000 mm
Urban Extent    :     0.002
C               :    -0.015
d1              :     0.473
d2              :     0.416
d3              :     0.375
e               :     0.240
f               :     2.441
SPR             :    33.020 %
************************************************************
Summary of estimate using Flood Estimation Handbook rainfall-runoff method
************************************************************
Estimation of T-year flood
==========================
Unit hydrograph time to peak   :     1.714 hours
Instantaneous UH time to peak  :     1.664 hours
Data interval                  :     0.100 hours
Design storm duration          :     4.100 hours
Critical storm duration        :     4.078 hours
Return period for design flood :   200.000 years
requires rain return period    :   246.667 years
ARF                            :     0.952
Design storm depth             :    63.763 mm
CWI                            :   124.824
Standard Percentage Runoff     :    33.020 %
Percentage runoff              :    37.740 %

Snowmelt rate                  :     0.000 mm/day
Unit hydrograph peak           :     1.046 (m3/s/mm)
Quick response hydrograph peak :    17.959 m3/s
Baseflow                       :     0.337 m3/s
Baseflow adjustment            :     0.000 m3/s
Hydrograph peak                :    18.296 m3/s
Hydrograph adjustment factor   :     1.000

Flags
=====
Unit hydrograph flag           : FSRUH
Tp flag                        : FFHTP
Event rainfall flag            : FFHFR
Rainfall profile flag          : WINRP
Percentage Runoff flag         : FCUPR
Baseflow flag                  : F160T
CWI flag                       : FSRCW
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Flood Modeller
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Catchment: Gleneagles

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Hydrograph adjustment factor =      1.000
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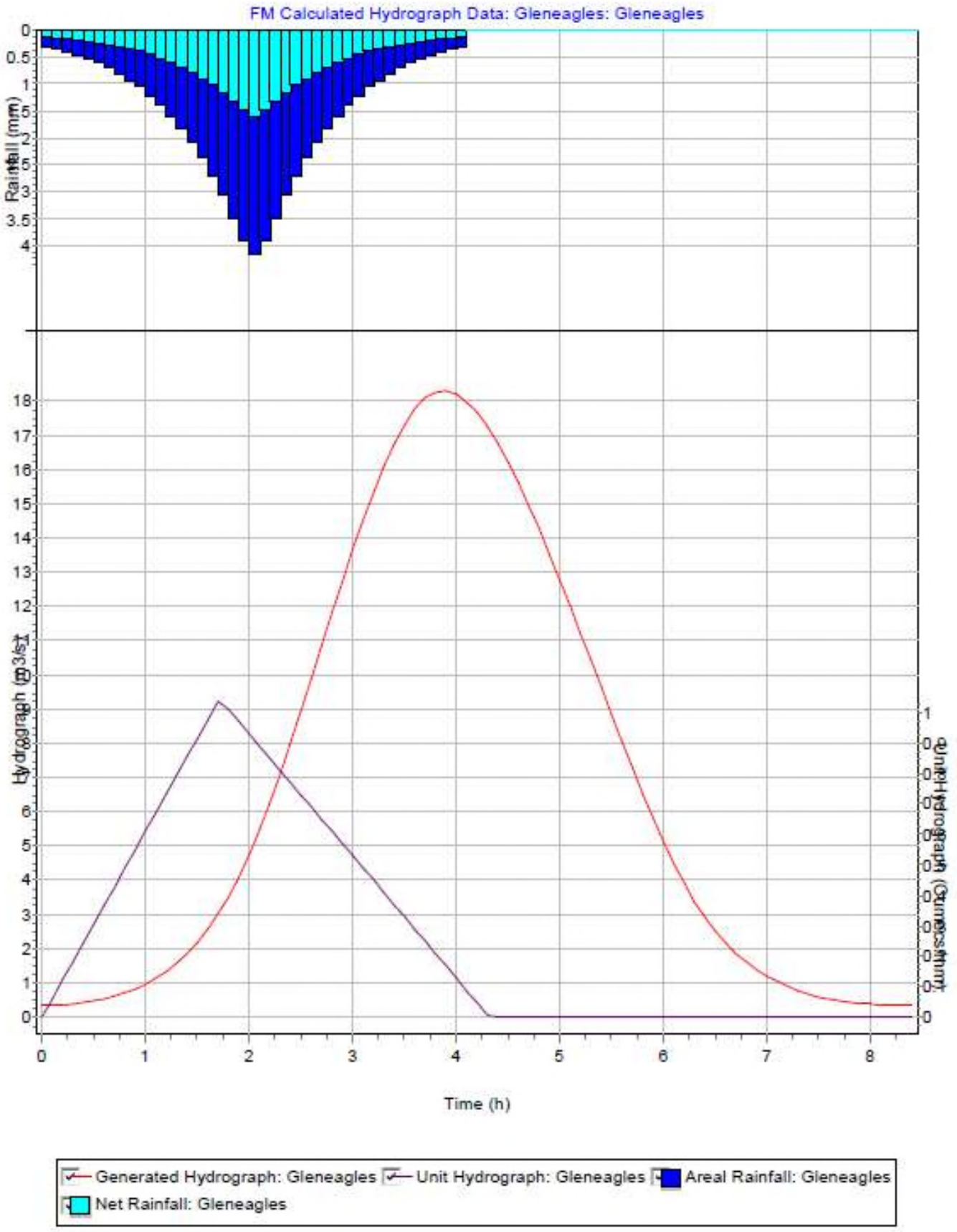
0.100	0.451	0.334	0.061	0.444
0.200	0.405	0.354	0.122	0.459
0.300	0.464	0.175	0.183	0.484
0.400	0.564	0.201	0.244	0.439
0.500	0.613	0.231	0.305	0.467
0.600	0.702	0.265	0.366	0.528
0.700	0.809	0.305	0.427	0.606
0.800	0.923	0.348	0.488	0.702
0.900	1.063	0.401	0.549	0.820
1.000	1.214	0.458	0.610	0.962
1.100	1.393	0.526	0.671	1.132
1.200	1.592	0.601	0.732	1.344
1.300	1.819	0.686	0.793	1.573
1.400	2.082	0.786	0.854	1.854
1.500	2.365	0.894	0.915	2.184
1.600	2.707	1.022	0.976	2.566
1.700	4.064	1.356	1.047	4.011
1.800	4.478	1.432	1.012	4.517
1.900	4.911	1.476	0.972	4.990
2.000	4.175	1.576	0.942	4.748
2.100	4.911	1.476	0.891	5.465
2.200	4.478	1.432	0.851	6.263
2.300	4.064	1.356	0.831	7.135
2.400	2.707	1.022	0.771	8.014
2.600	2.082	0.786	0.691	9.893
2.700	1.819	0.686	0.650	10.851
2.800	1.592	0.601	0.610	11.805
2.900	1.393	0.526	0.570	12.744
3.000	1.214	0.458	0.530	13.656
3.100	1.063	0.401	0.490	14.527
3.200	0.923	0.348	0.450	15.344
3.300	0.809	0.305	0.410	16.094
3.400	0.702	0.265	0.369	16.761
3.500	0.613	0.231	0.329	17.329
3.600	0.534	0.201	0.289	17.781
3.700	0.464	0.175	0.249	18.098
3.800	0.405	0.153	0.209	18.268
3.900	0.351	0.133	0.169	18.296
4.000	0.307	0.116	0.129	18.198
4.100			0.088	17.987
4.200			0.048	17.671
4.300			0.008	17.262
4.400			0.000	16.777
4.500				16.225
4.600				15.618
4.700				14.963
4.800				14.269
4.900				13.542
5.000				12.790
5.100				12.018
5.200				11.232
5.300				10.438
5.400				9.641
5.500				8.847
5.600				8.061
5.700				7.287
5.800				6.533
5.900				5.811
6.000				5.130
6.100				4.494
6.200				3.909
6.300				3.383
6.400				2.919
6.500				2.515
6.600				2.165
6.700				1.862
6.800				1.602
6.900				1.378
7.000				1.187
7.100				1.025
7.200				0.887
7.300				0.771
7.400				0.674
7.500				0.593
7.600				0.527
7.700				0.473
7.800				0.430
7.900				0.397
8.000				0.373
8.100				0.355
8.200				0.344
8.300				0.338
8.400				0.337

```
**********************************************************
umetric analysis of results
**********************************************************
al volume of rainfall      :          519829.5  m3
al volume of net rainfall  :          196181.2  m3
al volume of rain loss     :          323648.3  m3
al volume of baseflow      :           10198.2  m3
al volume of quick runoff  :          195747.3  m3
al volume of runoff        :          205945.5  m3
```

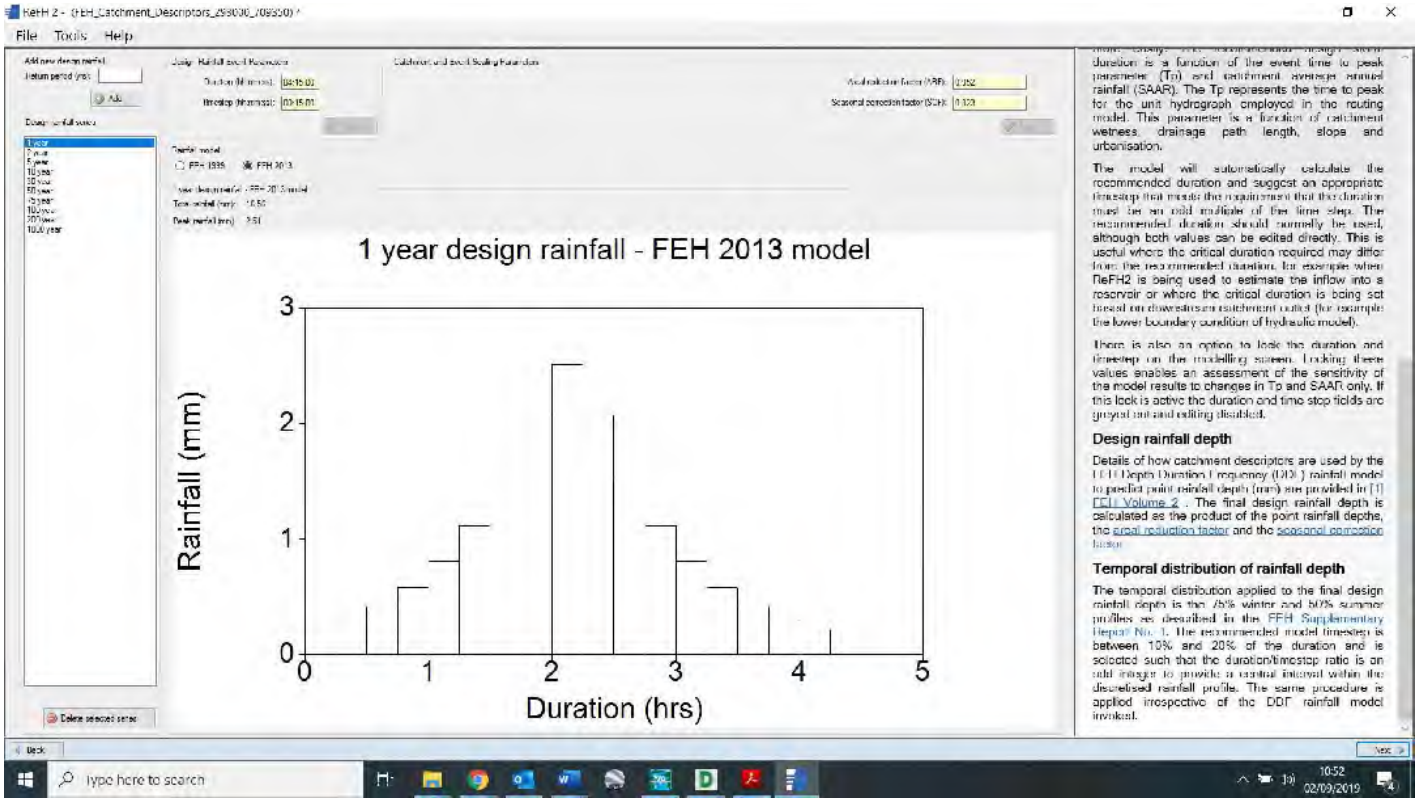
Time (h)	Generated hydrograph (m3/s)
0	0.337
0.1	0.344
0.2	0.359
0.3	0.384
0.4	0.419
0.5	0.467
0.6	0.528
0.7	0.606
0.8	0.702
0.9	0.82
1	0.962
1.1	1.132
1.2	1.334
1.3	1.573
1.4	1.854
1.5	2.183
1.6	2.566
1.7	3.011
1.8	3.517
1.9	4.09
2	4.738
2.1	5.465
2.2	6.261
2.3	7.115
2.4	8.013
2.5	8.943
2.6	9.893
2.7	10.851
2.8	11.805
2.9	12.744
3	13.656
3.1	14.527
3.2	15.344
3.3	16.094
3.4	16.761
3.5	17.329
3.6	17.781
3.7	18.098

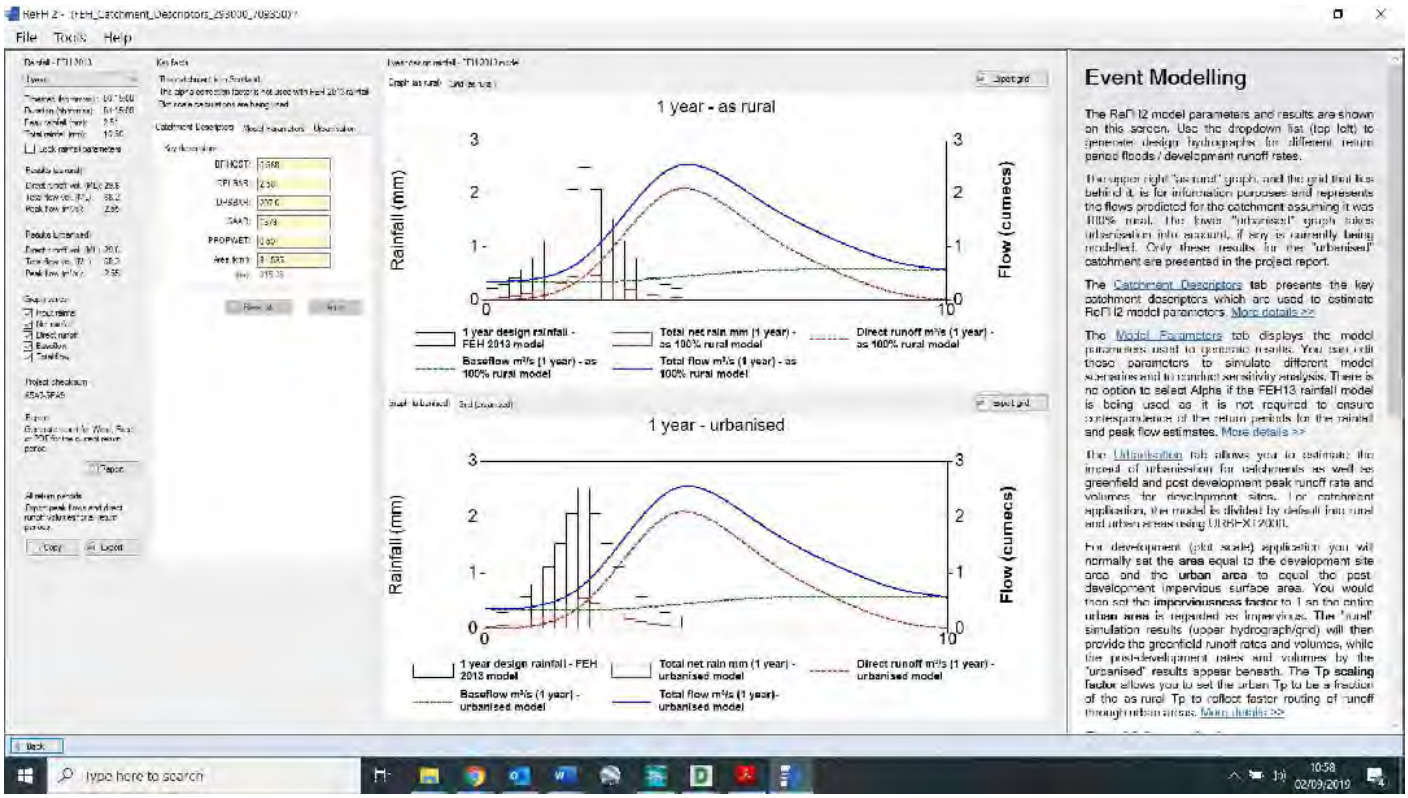
3.8	18.268
3.9	18.296
4	18.198
4.1	17.987
4.2	17.671
4.3	17.262
4.4	16.777
4.5	16.225
4.6	15.618
4.7	14.963
4.8	14.269
4.9	13.542
5	12.79
5.1	12.018
5.2	11.232
5.3	10.438
5.4	9.641
5.5	8.847
5.6	8.061
5.7	7.287
5.8	6.533
5.9	5.811
6	5.13
6.1	4.494
6.2	3.909
6.3	3.383
6.4	2.919
6.5	2.515
6.6	2.165
6.7	1.862
6.8	1.602
6.9	1.378
7	1.187
7.1	1.025
7.2	0.887
7.3	0.771
7.4	0.674
7.5	0.593
7.6	0.527
7.7	0.473
7.8	0.43
7.9	0.397
8	0.373
8.1	0.355
8.2	0.344
8.3	0.338
8.4	0.337

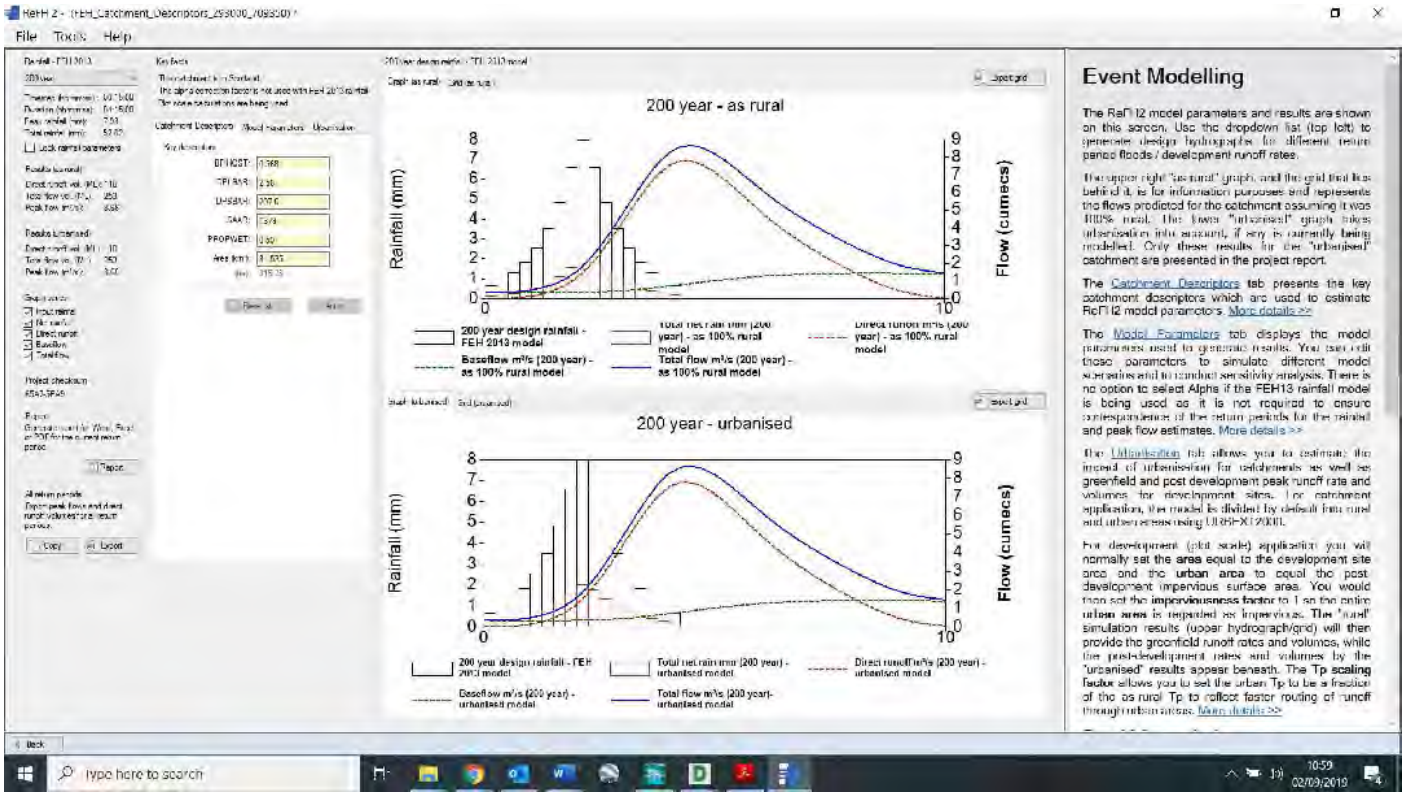

FM Calculated Hydrograph Data: Gleneagles: Gleneagles
Rainfall (mm)
Hydrograph (m3/s)
Unit Hydrograph (m3/s/mm)
Time (h)
Generated Hydrograph: Gleneagles
Unit Hydrograph: Gleneagles
Areal Rainfall: Gleneagles
Net Rainfall: Gleneagles

Appendix C

Results of RefH2 flow estimation (Revitalised Flood Hydrograph Method, Version 2)


File Tools Help
1 year design rainfall - FEH 2013 model
Rainfall (mm)
Duration (hrs)
0
1
2
3
4
5
Design rainfall depth
Temporal distribution of rainfall depth
type here to search


File Tools Help
1 year - as rural
1 year - urbanised
Rainfall (mm)
Flow (cumecs)
Event Modelling
type here to search


File Tools Help
200 year - as rural
Rainfall (mm)
Flow (cumecs)
200 year design rainfall - FEH 2013 model
Baseflow m³/s (200 year) - as 100% rural model
Total flow m³/s (200 year) - as 100% rural model
200 year - urbanised
Rainfall (mm)
Flow (cumecs)
Event Modelling
The ReFH 2 model parameters and results are shown on this screen. Use the dropdown list (top left) to generate design hydrographs for different return period floods / development runoff rates.
The upper right "as rural" graph, and the grid that lies behind it, is for information purposes and represents the flows predicted for the catchment assuming it was 100% rural. The lower "urbanised" graph takes urbanisation into account, if any is currently being modelled. Only these results for the "urbanised" catchment are presented in the project report.
The Catchment Descriptors tab presents the key catchment descriptors which are used to estimate ReFH 2 model parameters. More details >>
The Model Parameters tab displays the model parameters used to generate results. You can edit these parameters to simulate different model scenarios and to conduct sensitivity analysis. There is no option to select Alpha if the FEH13 rainfall model is being used as it is not required to ensure correspondence of the return periods for the rainfall and peak flow estimates. More details >>
The Urbanisation tab allows you to estimate the impact of urbanisation for catchments as well as greenfield and post development peak runoff rate and volumes for development sites. For catchment application, the model is divided by default into rural and urban areas using URBEXT2000.
For development (plot scale) application you will normally set the area equal to the development site area and the urban area to equal the post development impervious surface area. You would then set the imperviousness factor to 1 so the entire urban area is regarded as impervious. The "rural" simulation results (upper hydrograph/grid) will then provide the greenfield runoff rates and volumes, while the post-development rates and volumes by the "urbanised" results appear beneath. The Tp scaling factor allows you to set the urban Tp to be a fraction of the as rural Tp to reflect faster routing of runoff through urban areas. More details >>

UK Design Flood Estimation

Generated on 02 September 2019 10:13:58 by Brian
Printed from the ReFH Flood Modelling software package, version 2.2.6589.25305

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH)

Site details Checksum: 65A7-5EA9

Site name: FEH_Catchment_Descriptors_293000_709350

Easting: 293000

Northing: 709350

Country: Scotland

Catchment Area (km²): 8.15

Using plot scale calculations: Yes

Site description: None

Model run: 200 year

Summary of results

Rainfall - FEH 2013 (mm):	67.13	Total runoff (ML):	109.64
Total Rainfall (mm):	52.62	Total flow (ML):	253.40
Peak Rainfall (mm):	7.98	Peak flow (m³/s):	8.66

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	04:15:00	No
Timestep (hh:mm:ss)	00:15:00	No
SCF (Seasonal correction factor)	0.82	No
ARF (Areal reduction factor)	0.95	No
Seasonality	Winter	n/a

Loss model parameters

Name	Value	User-defined?
Cini (mm)	99.94	No
Cmax (mm)	493.94	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	1.89	No
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BFO (m^3/s)	0.36	No
BL (hr)	29.18	No
BR	1.31	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km^2)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.3	No
Tp scaling factor	0.5	No
Sewered area (km^2)	0.00	Yes
Sewer capacity (m^3/s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
00:00:00	0.6778	0.0000	0.1376	0.0000	0.356	0.356
00:15:00	0.9475	0.0000	0.1939	0.0071	0.353	0.36
00:30:00	1.3221	0.0000	0.2736	0.0312	0.35	0.381
00:45:00	1.8407	0.0000	0.3868	0.0795	0.347	0.427
01:00:00	2.5554	0.0000	0.5484	0.1617	0.346	0.507
01:15:00	3.5337	0.0000	0.7802	0.2920	0.345	0.637
01:30:00	4.8563	0.0000	1.1134	0.4908	0.347	0.838
01:45:00	6.5872	0.0000	1.5866	0.7870	0.351	1.14
02:00:00	7.9771	0.0000	2.0389	1.2201	0.359	1.58
02:15:00	6.5872	0.0000	1.7808	1.8201	0.373	2.19
02:30:00	4.8563	0.0000	1.3691	2.5852	0.395	2.98
02:45:00	3.5337	0.0000	1.0262	3.4681	0.425	3.89
03:00:00	2.5554	0.0000	0.7579	4.4116	0.466	4.88
03:15:00	1.8407	0.0000	0.5541	5.3579	0.516	5.87
03:30:00	1.3221	0.0000	0.4022	6.2453	0.577	6.82
03:45:00	0.9475	0.0000	0.2904	7.0013	0.646	7.65
04:00:00	0.6778	0.0000	0.2089	7.5409	0.722	8.26
04:15:00	0.0000	0.0000	0.0000	7.7945	0.802	8.6
04:30:00	0.0000	0.0000	0.0000	7.7755	0.882	8.66
04:45:00	0.0000	0.0000	0.0000	7.5384	0.96	8.5
05:00:00	0.0000	0.0000	0.0000	7.1441	1.03	8.18
05:15:00	0.0000	0.0000	0.0000	6.6437	1.1	7.75
05:30:00	0.0000	0.0000	0.0000	6.0804	1.16	7.24
05:45:00	0.0000	0.0000	0.0000	5.4925	1.22	6.71
06:00:00	0.0000	0.0000	0.0000	4.9144	1.27	6.18
06:15:00	0.0000	0.0000	0.0000	4.3682	1.31	5.68
06:30:00	0.0000	0.0000	0.0000	3.8711	1.34	5.21
06:45:00	0.0000	0.0000	0.0000	3.4156	1.37	4.79
07:00:00	0.0000	0.0000	0.0000	2.9922	1.4	4.39
07:15:00	0.0000	0.0000	0.0000	2.5958	1.42	4.01
07:30:00	0.0000	0.0000	0.0000	2.2219	1.43	3.65
07:45:00	0.0000	0.0000	0.0000	1.8684	1.44	3.31
08:00:00	0.0000	0.0000	0.0000	1.5352	1.45	2.98
08:15:00	0.0000	0.0000	0.0000	1.2230	1.45	2.67
08:30:00	0.0000	0.0000	0.0000	0.9345	1.45	2.39

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
08:45:00	0.0000	0.0000	0.0000	0.6797	1.45	2.13
09:00:00	0.0000	0.0000	0.0000	0.4711	1.44	1.91
09:15:00	0.0000	0.0000	0.0000	0.3145	1.43	1.75
09:30:00	0.0000	0.0000	0.0000	0.2022	1.42	1.63
09:45:00	0.0000	0.0000	0.0000	0.1237	1.41	1.54
10:00:00	0.0000	0.0000	0.0000	0.0705	1.4	1.47
10:15:00	0.0000	0.0000	0.0000	0.0360	1.39	1.43
10:30:00	0.0000	0.0000	0.0000	0.0151	1.38	1.4
10:45:00	0.0000	0.0000	0.0000	0.0040	1.37	1.37
11:00:00	0.0000	0.0000	0.0000	0.0001	1.36	1.36
11:15:00	0.0000	0.0000	0.0000	0.0000	1.35	1.35
11:30:00	0.0000	0.0000	0.0000	0.0000	1.33	1.33
11:45:00	0.0000	0.0000	0.0000	0.0000	1.32	1.32
12:00:00	0.0000	0.0000	0.0000	0.0000	1.31	1.31
12:15:00	0.0000	0.0000	0.0000	0.0000	1.3	1.3
12:30:00	0.0000	0.0000	0.0000	0.0000	1.29	1.29
12:45:00	0.0000	0.0000	0.0000	0.0000	1.28	1.28
13:00:00	0.0000	0.0000	0.0000	0.0000	1.27	1.27
13:15:00	0.0000	0.0000	0.0000	0.0000	1.26	1.26
13:30:00	0.0000	0.0000	0.0000	0.0000	1.25	1.25
13:45:00	0.0000	0.0000	0.0000	0.0000	1.23	1.23
14:00:00	0.0000	0.0000	0.0000	0.0000	1.22	1.22
14:15:00	0.0000	0.0000	0.0000	0.0000	1.21	1.21
14:30:00	0.0000	0.0000	0.0000	0.0000	1.2	1.2
14:45:00	0.0000	0.0000	0.0000	0.0000	1.19	1.19
15:00:00	0.0000	0.0000	0.0000	0.0000	1.18	1.18
15:15:00	0.0000	0.0000	0.0000	0.0000	1.17	1.17
15:30:00	0.0000	0.0000	0.0000	0.0000	1.16	1.16
15:45:00	0.0000	0.0000	0.0000	0.0000	1.15	1.15
16:00:00	0.0000	0.0000	0.0000	0.0000	1.14	1.14
16:15:00	0.0000	0.0000	0.0000	0.0000	1.13	1.13
16:30:00	0.0000	0.0000	0.0000	0.0000	1.12	1.12
16:45:00	0.0000	0.0000	0.0000	0.0000	1.11	1.11
17:00:00	0.0000	0.0000	0.0000	0.0000	1.1	1.1
17:15:00	0.0000	0.0000	0.0000	0.0000	1.1	1.1
17:30:00	0.0000	0.0000	0.0000	0.0000	1.09	1.09

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
17:45:00	0.0000	0.0000	0.0000	0.0000	1.08	1.08
18:00:00	0.0000	0.0000	0.0000	0.0000	1.07	1.07
18:15:00	0.0000	0.0000	0.0000	0.0000	1.06	1.06
18:30:00	0.0000	0.0000	0.0000	0.0000	1.05	1.05
18:45:00	0.0000	0.0000	0.0000	0.0000	1.04	1.04
19:00:00	0.0000	0.0000	0.0000	0.0000	1.03	1.03
19:15:00	0.0000	0.0000	0.0000	0.0000	1.02	1.02
19:30:00	0.0000	0.0000	0.0000	0.0000	1.01	1.01
19:45:00	0.0000	0.0000	0.0000	0.0000	1.01	1.01
20:00:00	0.0000	0.0000	0.0000	0.0000	0.997	0.997
20:15:00	0.0000	0.0000	0.0000	0.0000	0.988	0.988
20:30:00	0.0000	0.0000	0.0000	0.0000	0.98	0.98
20:45:00	0.0000	0.0000	0.0000	0.0000	0.971	0.971
21:00:00	0.0000	0.0000	0.0000	0.0000	0.963	0.963
21:15:00	0.0000	0.0000	0.0000	0.0000	0.955	0.955
21:30:00	0.0000	0.0000	0.0000	0.0000	0.947	0.947
21:45:00	0.0000	0.0000	0.0000	0.0000	0.939	0.939
22:00:00	0.0000	0.0000	0.0000	0.0000	0.931	0.931
22:15:00	0.0000	0.0000	0.0000	0.0000	0.923	0.923
22:30:00	0.0000	0.0000	0.0000	0.0000	0.915	0.915
22:45:00	0.0000	0.0000	0.0000	0.0000	0.907	0.907
23:00:00	0.0000	0.0000	0.0000	0.0000	0.899	0.899
23:15:00	0.0000	0.0000	0.0000	0.0000	0.892	0.892
23:30:00	0.0000	0.0000	0.0000	0.0000	0.884	0.884
23:45:00	0.0000	0.0000	0.0000	0.0000	0.877	0.877
24:00:00	0.0000	0.0000	0.0000	0.0000	0.869	0.869
24:15:00	0.0000	0.0000	0.0000	0.0000	0.862	0.862
24:30:00	0.0000	0.0000	0.0000	0.0000	0.854	0.854
24:45:00	0.0000	0.0000	0.0000	0.0000	0.847	0.847
25:00:00	0.0000	0.0000	0.0000	0.0000	0.84	0.84
25:15:00	0.0000	0.0000	0.0000	0.0000	0.833	0.833
25:30:00	0.0000	0.0000	0.0000	0.0000	0.826	0.826
25:45:00	0.0000	0.0000	0.0000	0.0000	0.818	0.818
26:00:00	0.0000	0.0000	0.0000	0.0000	0.812	0.812
26:15:00	0.0000	0.0000	0.0000	0.0000	0.805	0.805
26:30:00	0.0000	0.0000	0.0000	0.0000	0.798	0.798

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
26:45:00	0.0000	0.0000	0.0000	0.0000	0.791	0.791
27:00:00	0.0000	0.0000	0.0000	0.0000	0.784	0.784
27:15:00	0.0000	0.0000	0.0000	0.0000	0.777	0.777
27:30:00	0.0000	0.0000	0.0000	0.0000	0.771	0.771
27:45:00	0.0000	0.0000	0.0000	0.0000	0.764	0.764
28:00:00	0.0000	0.0000	0.0000	0.0000	0.758	0.758
28:15:00	0.0000	0.0000	0.0000	0.0000	0.751	0.751
28:30:00	0.0000	0.0000	0.0000	0.0000	0.745	0.745
28:45:00	0.0000	0.0000	0.0000	0.0000	0.739	0.739
29:00:00	0.0000	0.0000	0.0000	0.0000	0.732	0.732
29:15:00	0.0000	0.0000	0.0000	0.0000	0.726	0.726
29:30:00	0.0000	0.0000	0.0000	0.0000	0.72	0.72
29:45:00	0.0000	0.0000	0.0000	0.0000	0.714	0.714
30:00:00	0.0000	0.0000	0.0000	0.0000	0.708	0.708
30:15:00	0.0000	0.0000	0.0000	0.0000	0.702	0.702
30:30:00	0.0000	0.0000	0.0000	0.0000	0.696	0.696
30:45:00	0.0000	0.0000	0.0000	0.0000	0.69	0.69
31:00:00	0.0000	0.0000	0.0000	0.0000	0.684	0.684
31:15:00	0.0000	0.0000	0.0000	0.0000	0.678	0.678
31:30:00	0.0000	0.0000	0.0000	0.0000	0.672	0.672
31:45:00	0.0000	0.0000	0.0000	0.0000	0.666	0.666
32:00:00	0.0000	0.0000	0.0000	0.0000	0.661	0.661
32:15:00	0.0000	0.0000	0.0000	0.0000	0.655	0.655
32:30:00	0.0000	0.0000	0.0000	0.0000	0.649	0.649
32:45:00	0.0000	0.0000	0.0000	0.0000	0.644	0.644
33:00:00	0.0000	0.0000	0.0000	0.0000	0.638	0.638
33:15:00	0.0000	0.0000	0.0000	0.0000	0.633	0.633
33:30:00	0.0000	0.0000	0.0000	0.0000	0.628	0.628
33:45:00	0.0000	0.0000	0.0000	0.0000	0.622	0.622
34:00:00	0.0000	0.0000	0.0000	0.0000	0.617	0.617
34:15:00	0.0000	0.0000	0.0000	0.0000	0.612	0.612
34:30:00	0.0000	0.0000	0.0000	0.0000	0.606	0.606
34:45:00	0.0000	0.0000	0.0000	0.0000	0.601	0.601
35:00:00	0.0000	0.0000	0.0000	0.0000	0.596	0.596
35:15:00	0.0000	0.0000	0.0000	0.0000	0.591	0.591
35:30:00	0.0000	0.0000	0.0000	0.0000	0.586	0.586

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
35:45:00	0.0000	0.0000	0.0000	0.0000	0.581	0.581
36:00:00	0.0000	0.0000	0.0000	0.0000	0.576	0.576
36:15:00	0.0000	0.0000	0.0000	0.0000	0.571	0.571
36:30:00	0.0000	0.0000	0.0000	0.0000	0.566	0.566
36:45:00	0.0000	0.0000	0.0000	0.0000	0.561	0.561
37:00:00	0.0000	0.0000	0.0000	0.0000	0.557	0.557
37:15:00	0.0000	0.0000	0.0000	0.0000	0.552	0.552
37:30:00	0.0000	0.0000	0.0000	0.0000	0.547	0.547
37:45:00	0.0000	0.0000	0.0000	0.0000	0.543	0.543
38:00:00	0.0000	0.0000	0.0000	0.0000	0.538	0.538
38:15:00	0.0000	0.0000	0.0000	0.0000	0.533	0.533
38:30:00	0.0000	0.0000	0.0000	0.0000	0.529	0.529
38:45:00	0.0000	0.0000	0.0000	0.0000	0.524	0.524
39:00:00	0.0000	0.0000	0.0000	0.0000	0.52	0.52
39:15:00	0.0000	0.0000	0.0000	0.0000	0.515	0.515
39:30:00	0.0000	0.0000	0.0000	0.0000	0.511	0.511
39:45:00	0.0000	0.0000	0.0000	0.0000	0.507	0.507
40:00:00	0.0000	0.0000	0.0000	0.0000	0.502	0.502
40:15:00	0.0000	0.0000	0.0000	0.0000	0.498	0.498
40:30:00	0.0000	0.0000	0.0000	0.0000	0.494	0.494
40:45:00	0.0000	0.0000	0.0000	0.0000	0.489	0.489
41:00:00	0.0000	0.0000	0.0000	0.0000	0.485	0.485
41:15:00	0.0000	0.0000	0.0000	0.0000	0.481	0.481
41:30:00	0.0000	0.0000	0.0000	0.0000	0.477	0.477
41:45:00	0.0000	0.0000	0.0000	0.0000	0.473	0.473
42:00:00	0.0000	0.0000	0.0000	0.0000	0.469	0.469
42:15:00	0.0000	0.0000	0.0000	0.0000	0.465	0.465
42:30:00	0.0000	0.0000	0.0000	0.0000	0.461	0.461
42:45:00	0.0000	0.0000	0.0000	0.0000	0.457	0.457
43:00:00	0.0000	0.0000	0.0000	0.0000	0.453	0.453
43:15:00	0.0000	0.0000	0.0000	0.0000	0.449	0.449
43:30:00	0.0000	0.0000	0.0000	0.0000	0.445	0.445
43:45:00	0.0000	0.0000	0.0000	0.0000	0.442	0.442
44:00:00	0.0000	0.0000	0.0000	0.0000	0.438	0.438
44:15:00	0.0000	0.0000	0.0000	0.0000	0.434	0.434
44:30:00	0.0000	0.0000	0.0000	0.0000	0.43	0.43

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
44:45:00	0.0000	0.0000	0.0000	0.0000	0.427	0.427
45:00:00	0.0000	0.0000	0.0000	0.0000	0.423	0.423
45:15:00	0.0000	0.0000	0.0000	0.0000	0.42	0.42
45:30:00	0.0000	0.0000	0.0000	0.0000	0.416	0.416
45:45:00	0.0000	0.0000	0.0000	0.0000	0.412	0.412
46:00:00	0.0000	0.0000	0.0000	0.0000	0.409	0.409
46:15:00	0.0000	0.0000	0.0000	0.0000	0.405	0.405
46:30:00	0.0000	0.0000	0.0000	0.0000	0.402	0.402
46:45:00	0.0000	0.0000	0.0000	0.0000	0.399	0.399
47:00:00	0.0000	0.0000	0.0000	0.0000	0.395	0.395
47:15:00	0.0000	0.0000	0.0000	0.0000	0.392	0.392
47:30:00	0.0000	0.0000	0.0000	0.0000	0.388	0.388
47:45:00	0.0000	0.0000	0.0000	0.0000	0.385	0.385
48:00:00	0.0000	0.0000	0.0000	0.0000	0.382	0.382
48:15:00	0.0000	0.0000	0.0000	0.0000	0.379	0.379
48:30:00	0.0000	0.0000	0.0000	0.0000	0.375	0.375
48:45:00	0.0000	0.0000	0.0000	0.0000	0.372	0.372
49:00:00	0.0000	0.0000	0.0000	0.0000	0.369	0.369
49:15:00	0.0000	0.0000	0.0000	0.0000	0.366	0.366
49:30:00	0.0000	0.0000	0.0000	0.0000	0.363	0.363
49:45:00	0.0000	0.0000	0.0000	0.0000	0.36	0.36

Appendix

Catchment descriptors

Name	Value	User-defined value used?
Area (km²)	8.15	No
ALTBAR	285	No
ASPBAR	341	No
ASPVAR	0.27	No
BFIHOST	0.57	No
DPLBAR (km)	2.58	No
DPSBAR (mkm⁻¹)	207.6	No
FARL	1	No
LDP	5.44	No
PROPWET (mm)	0.59	No
RMED1H	9.5	No
RMED1D	41.7	No
RMED2D	56.7	No
SAAR (mm)	1379	No
SAAR4170 (mm)	1466	No
SPRHOST	33.62	No
Urbext2000	0	No
Urbext1990	0	No
URBCONC	0	No
URBLOC	0	No
Urban Area (km²)	0	No
DDF parameter C	-0.02	No
DDF parameter D1	0.47	No
DDF parameter D2	0.42	No
DDF parameter D3	0.37	No
DDF parameter E	0.24	No
DDF parameter F	2.33	No
DDF parameter C (1km grid value)	-0.02	No
DDF parameter D1 (1km grid value)	0.46	No
DDF parameter D2 (1km grid value)	0.42	No
DDF parameter D3 (1km grid value)	0.36	No
DDF parameter E (1km grid value)	0.24	No
DDF parameter F (1km grid value)	2.29	No

Appendix D

Output from HECRAS model

Steady Flow Data - Flow 05

File Options Help

Description :

Apply Data

Enter/Edit Number of Profiles (32000 max): 1

Reach Boundary Conditions ...

Locations of Flow Data Changes

River: Tributary

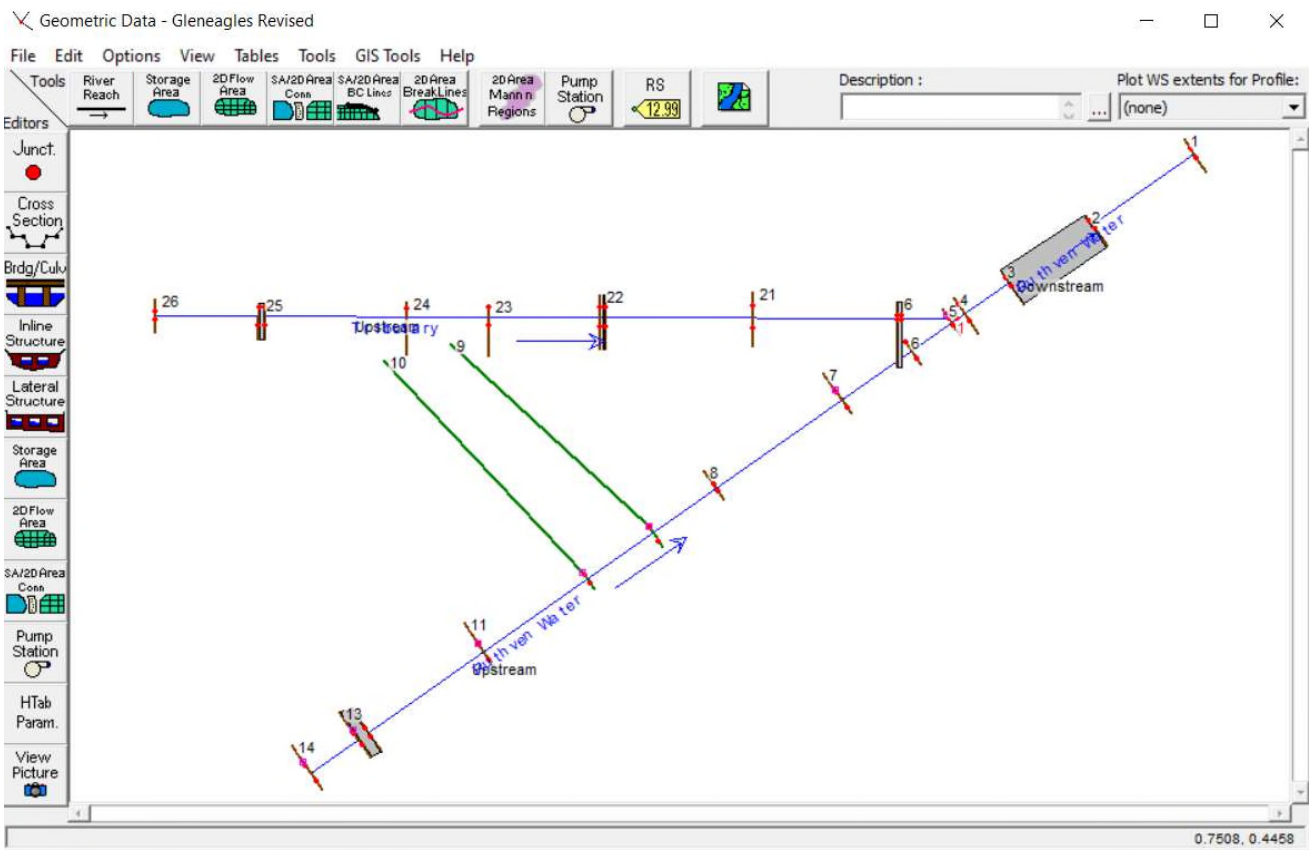
Add Multiple...

Reach: Upstream River Sta.: 26

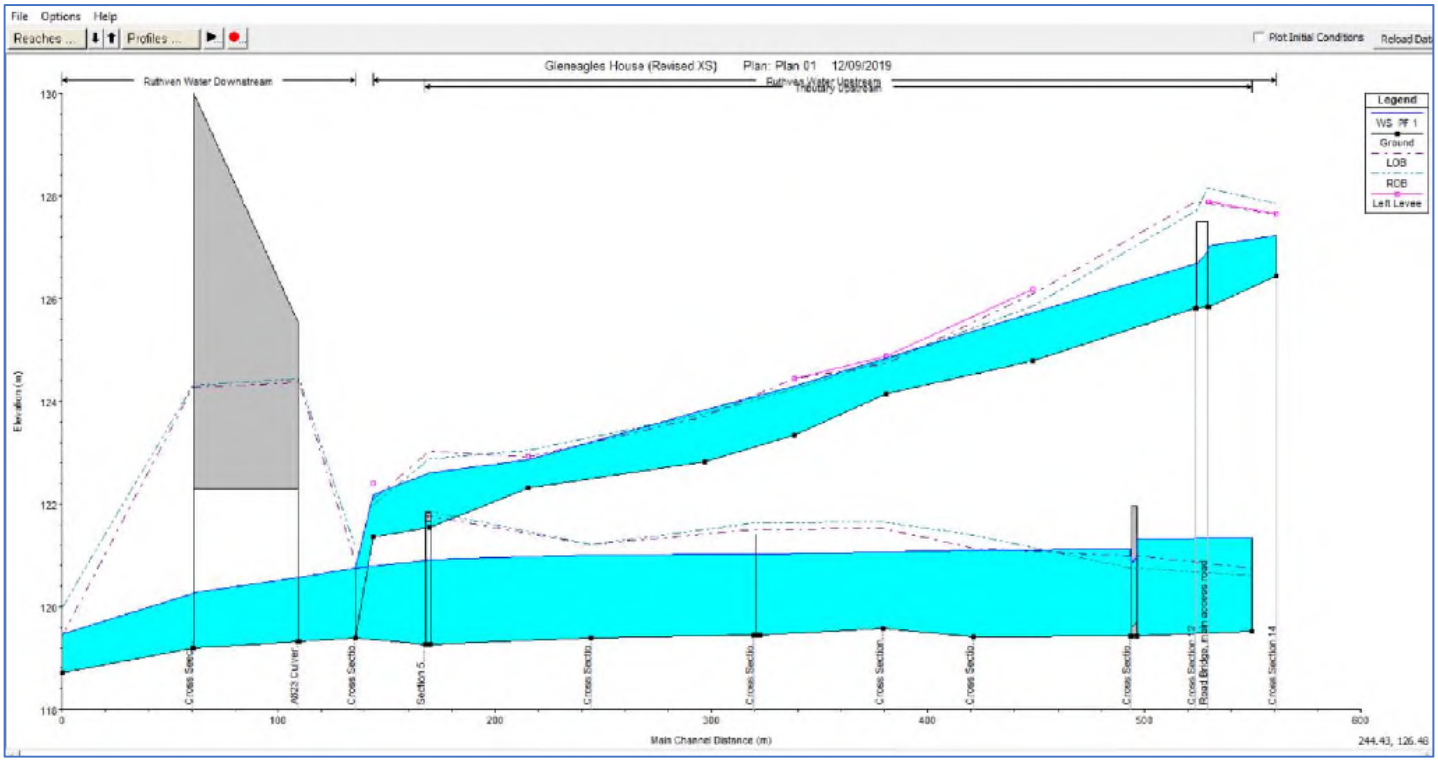
Add A Flow Change Location

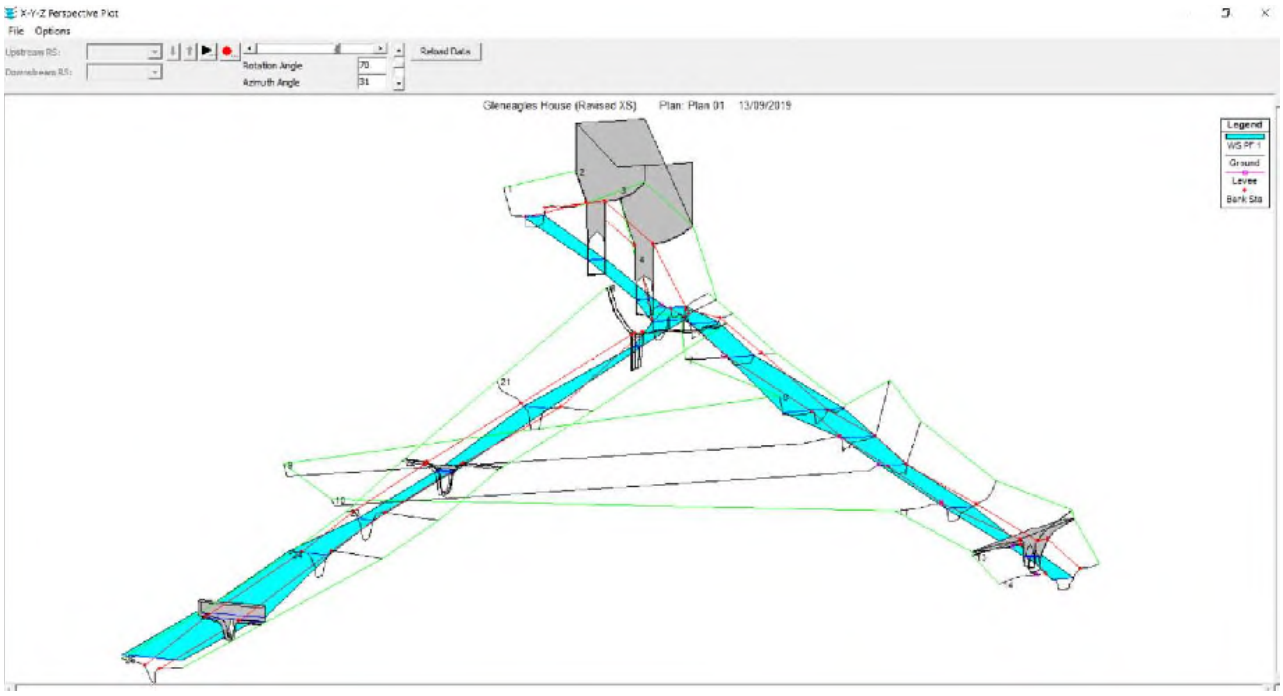
Flow Change Location				Profile Names and Flow Rates
	River	Reach	RS	PF 1
1	Ruthven Water	Upstream	14	6.3
2	Ruthven Water	Upstream	12	6.7
3	Ruthven Water	Upstream	10	6
4	Ruthven Water	Downstream	4	8.7
5	Tributary	Upstream	26	2
6	Tributary	Upstream	23	2.7

Edit Steady flow data for the profiles (m3/s)



River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Tributary	Upstream	26	PF 1	2.00	119.52	121.33		121.34	0.000097	0.27	11.58	17.50	0.08
Tributary	Upstream	25	PF 1	2.00	119.43	121.33	120.00	121.33	0.000071	0.20	12.47	18.51	0.07
Tributary	Upstream	24.9		Culvert									
Tributary	Upstream	24.8	PF 1	2.00	119.43	121.12		121.12	0.000196	0.29	8.61	18.51	0.11
Tributary	Upstream	24	PF 1	2.00	119.41	121.10		121.11	0.000291	0.38	5.52	9.51	0.13
Tributary	Upstream	23	PF 1	2.70	119.59	121.06		121.09	0.000797	0.65	4.15	4.47	0.22
Tributary	Upstream	22	PF 1	2.70	119.44	121.03	119.99	121.05	0.000474	0.53	5.05	4.81	0.17
Tributary	Upstream	21.9		Bridge									
Tributary	Upstream	21.8	PF 1	2.70	119.44	121.03		121.05	0.000476	0.54	5.04	4.80	0.17
Tributary	Upstream	21	PF 1	2.70	119.39	121.00		121.01	0.000425	0.46	5.91	7.32	0.16
Tributary	Upstream	6	PF 1	2.70	119.27	120.91	119.97	120.95	0.001845	0.88	3.07	2.24	0.24
Tributary	Upstream	5.9		Bridge									
Tributary	Upstream	5.8	PF 1	2.70	119.27	120.91		120.95	0.001862	0.88	3.06	2.24	0.24
Ruthven Water	Upstream	14	PF 1	6.30	126.43	127.23	127.20	127.44	0.014472	2.03	3.10	6.21	0.92
Ruthven Water	Upstream	13	PF 1	6.30	125.84	127.02	126.65	127.16	0.005421	1.65	3.82	4.26	0.56
Ruthven Water	Upstream	12.9		Bridge									
Ruthven Water	Upstream	12	PF 1	6.70	125.81	126.69	126.69	127.07	0.020727	2.73	2.46	3.28	1.01
Ruthven Water	Upstream	11	PF 1	6.70	124.78	125.72	125.60	125.86	0.010019	1.69	3.98	7.97	0.76
Ruthven Water	Upstream	10	PF 1	6.00	124.15	124.85	124.83	125.06	0.014230	2.09	3.02	7.60	0.92
Ruthven Water	Upstream	9	PF 1	6.00	123.34	124.29	124.26	124.43	0.014159	1.65	3.64	10.03	0.87
Ruthven Water	Upstream	8	PF 1	6.00	122.82	123.83	123.81	123.95	0.009688	1.74	5.24	17.89	0.74
Ruthven Water	Upstream	7	PF 1	6.00	122.31	122.86	122.82	123.03	0.013174	1.82	3.30	7.76	0.89
Ruthven Water	Upstream	6	PF 1	6.00	121.54	122.60	122.37	122.68	0.004323	1.23	4.87	8.21	0.51
Ruthven Water	Upstream	5	PF 1	6.00	121.36	122.19	122.19	122.46	0.017397	2.31	2.69	6.01	0.96
Ruthven Water	Downstream	4	PF 1	8.70	119.39	120.76		120.84	0.003838	1.30	6.71	8.06	0.45
Ruthven Water	Downstream	3	PF 1	8.70	119.31	120.57	120.17	120.72	0.005112	1.70	5.12	4.61	0.51
Ruthven Water	Downstream	2.8		Bridge									
Ruthven Water	Downstream	2	PF 1	8.70	119.20	120.27	119.94	120.44	0.006503	1.83	4.75	4.56	0.57
Ruthven Water	Downstream	1	PF 1	8.70	118.71	119.47	119.47	119.82	0.017146	2.59	3.37	5.54	1.00




X-Y-Z Perspective Plot
File Options
Rotation Angle
Azimuth Angle
Reload Data
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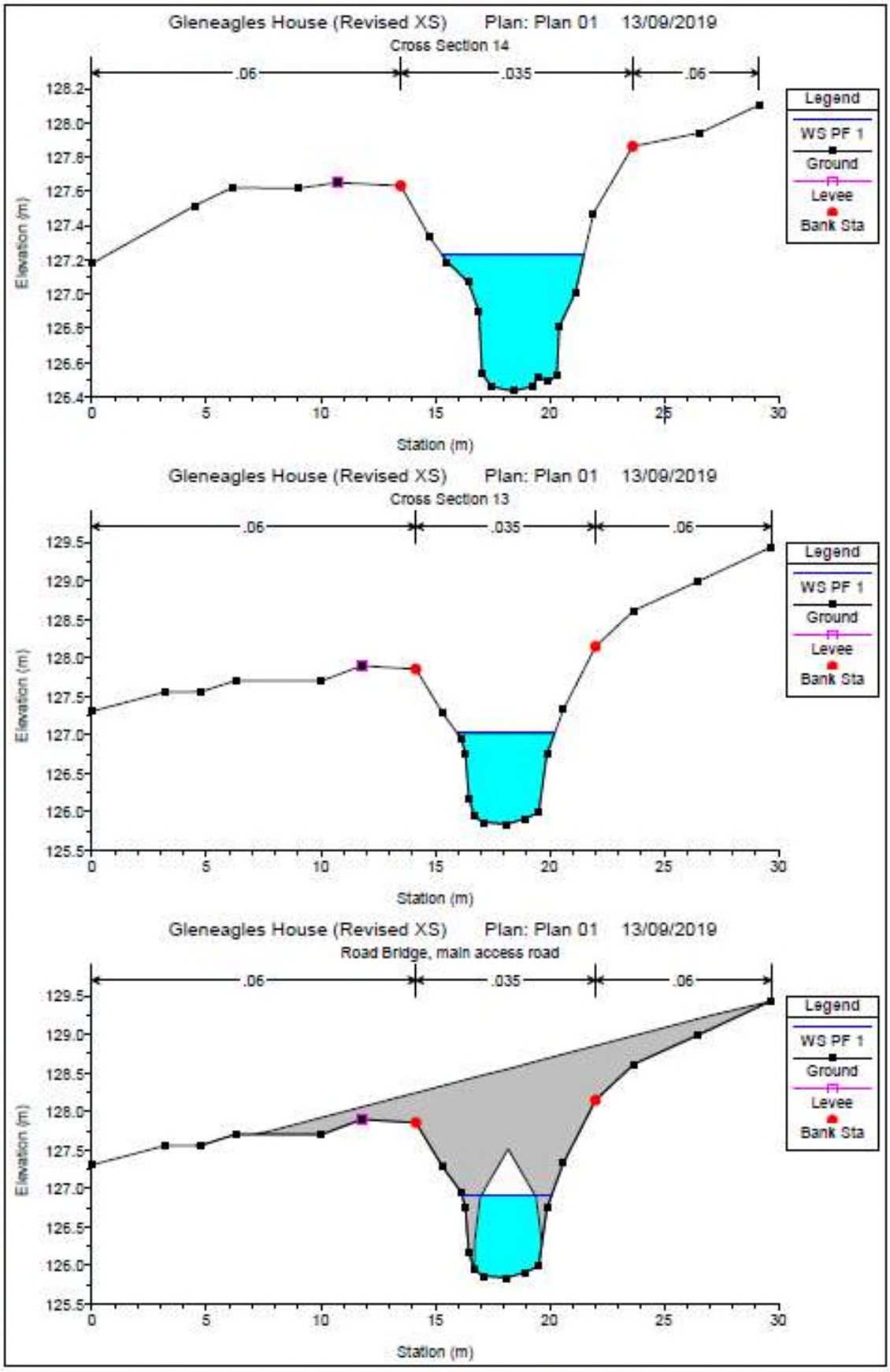
Legend
WS PF 1
Ground
Levee
Bank Sta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Cross Section 14
.06
.035
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Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 13
.06
.035
.06
Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Road Bridge, main access road
.06
.035
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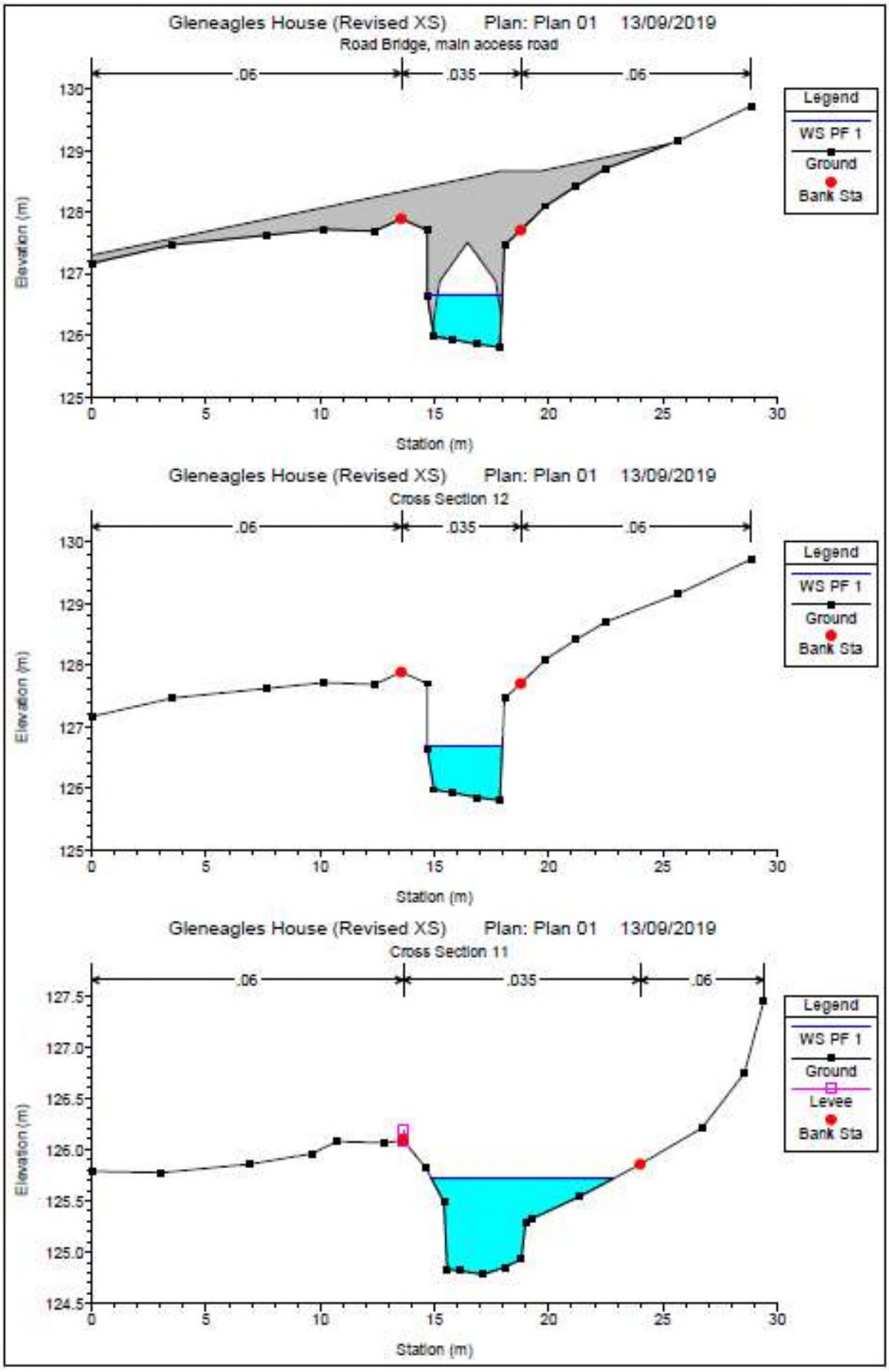
Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)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Road Bridge, main access road
.06
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.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 12
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 11
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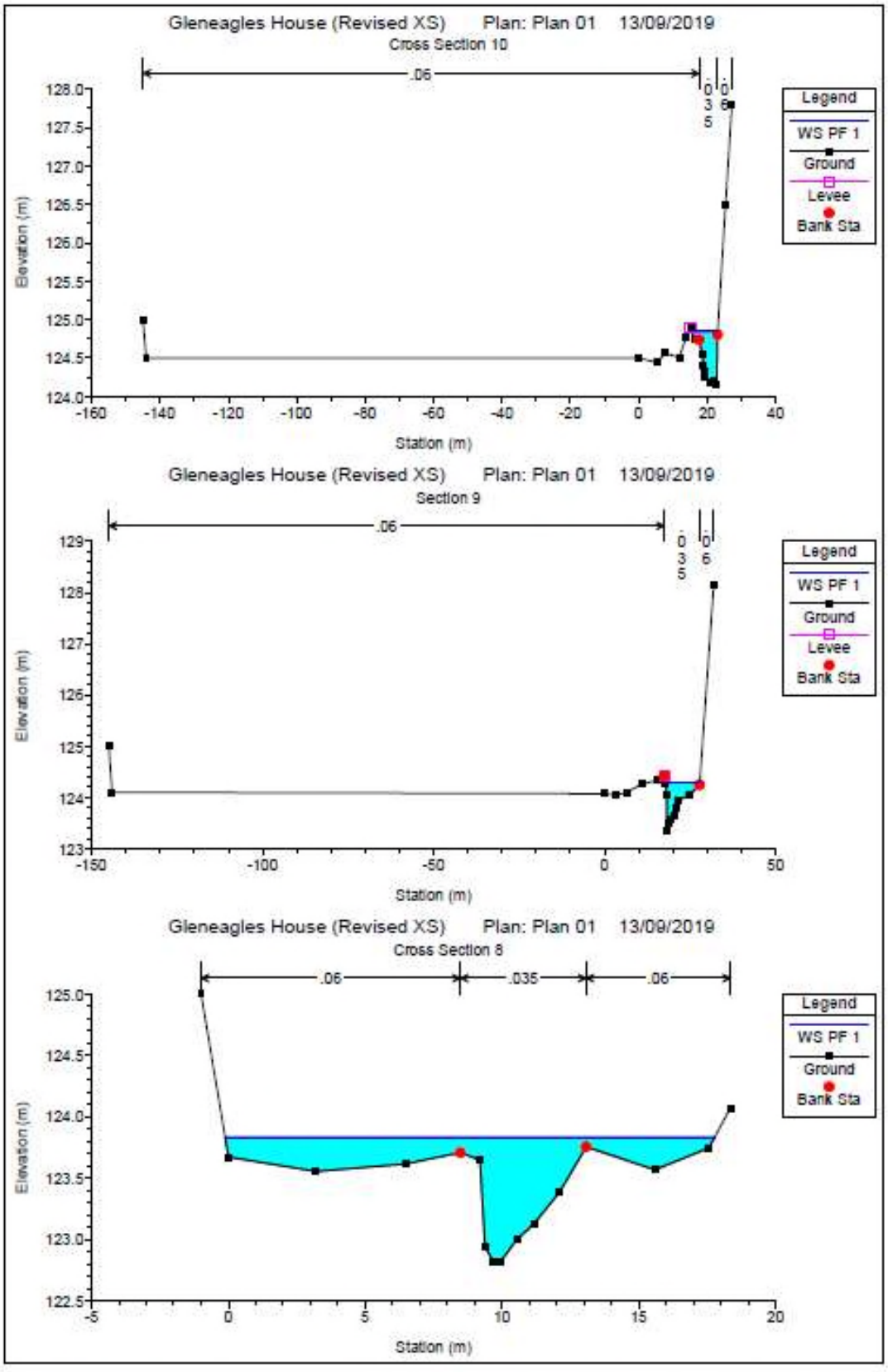
Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)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Cross Section 10
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Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Section 9
.06
.035
.06
Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 8
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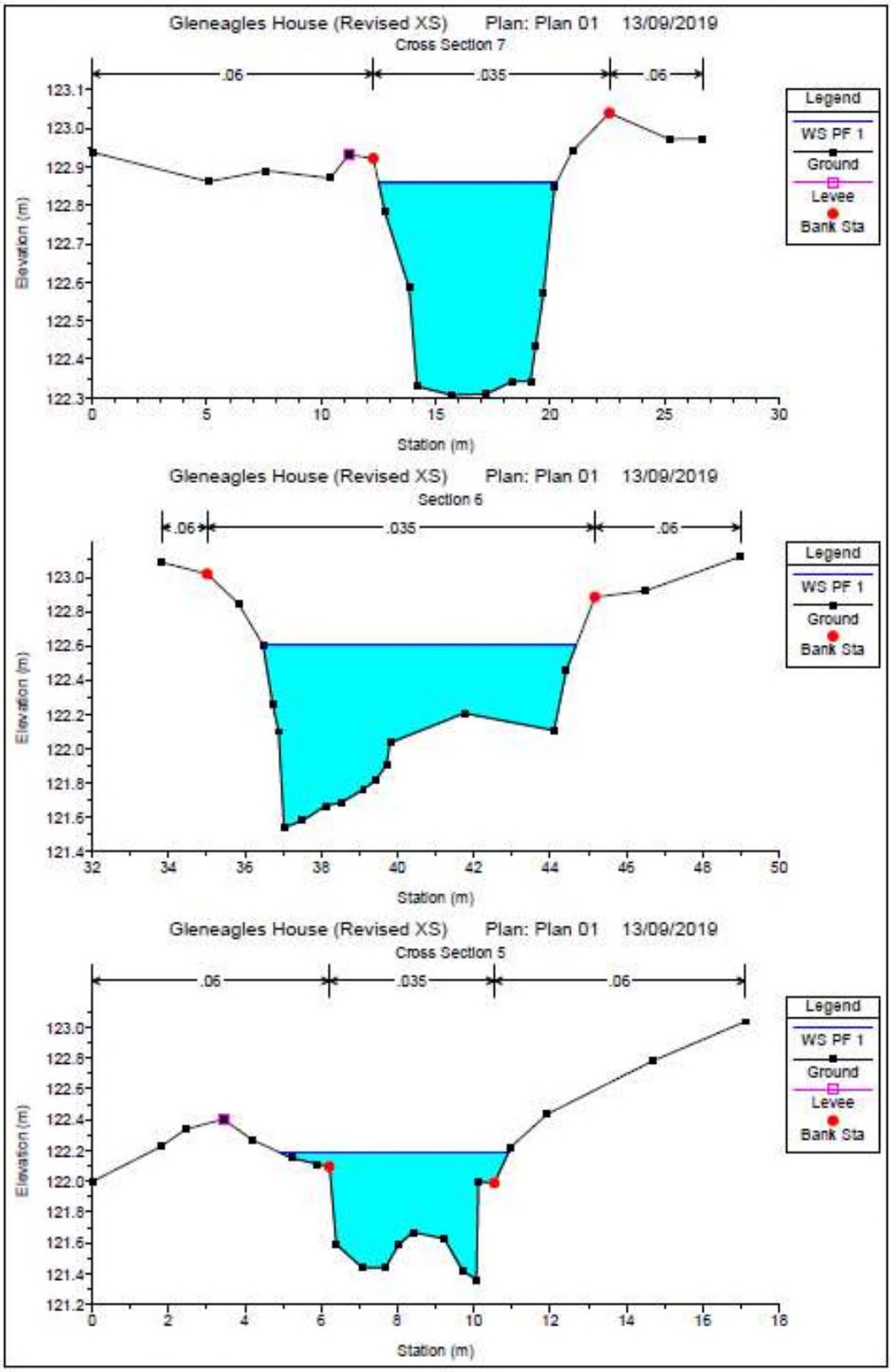
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)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Cross Section 7
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Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Section 6
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 5
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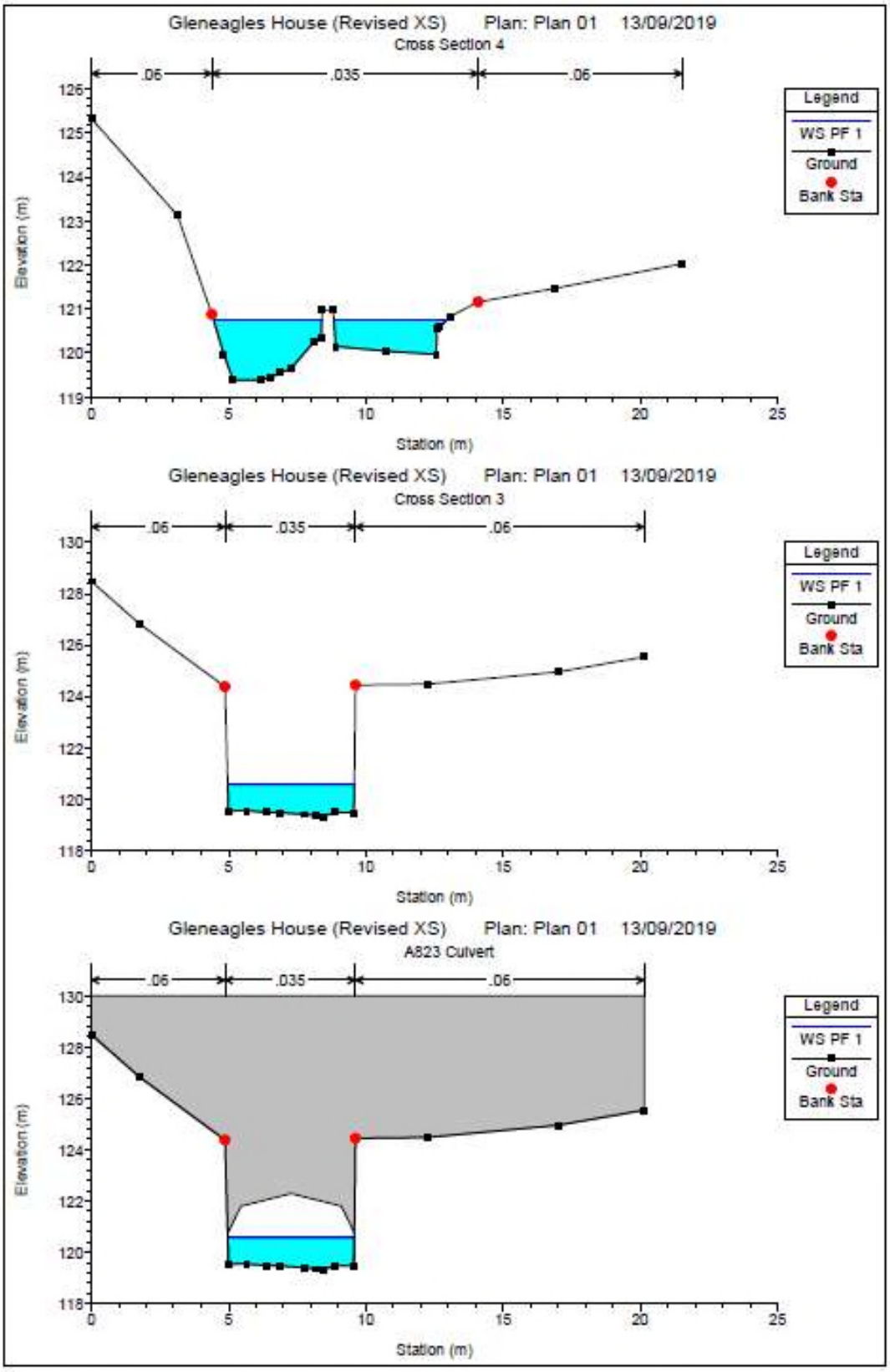
Legend
WS PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)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Cross Section 4
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.035
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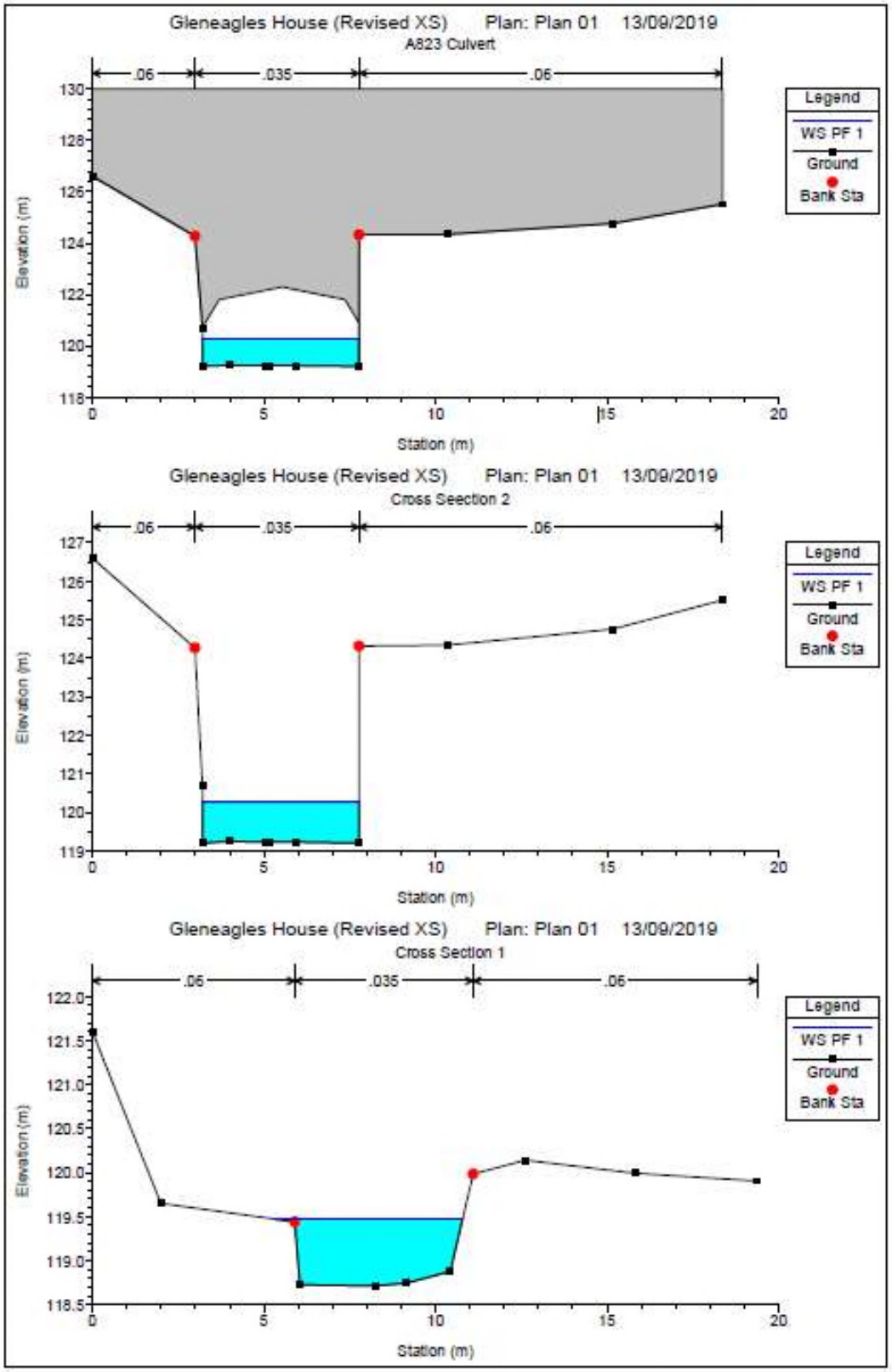
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 3
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
A823 Culvert
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
A823 Culvert
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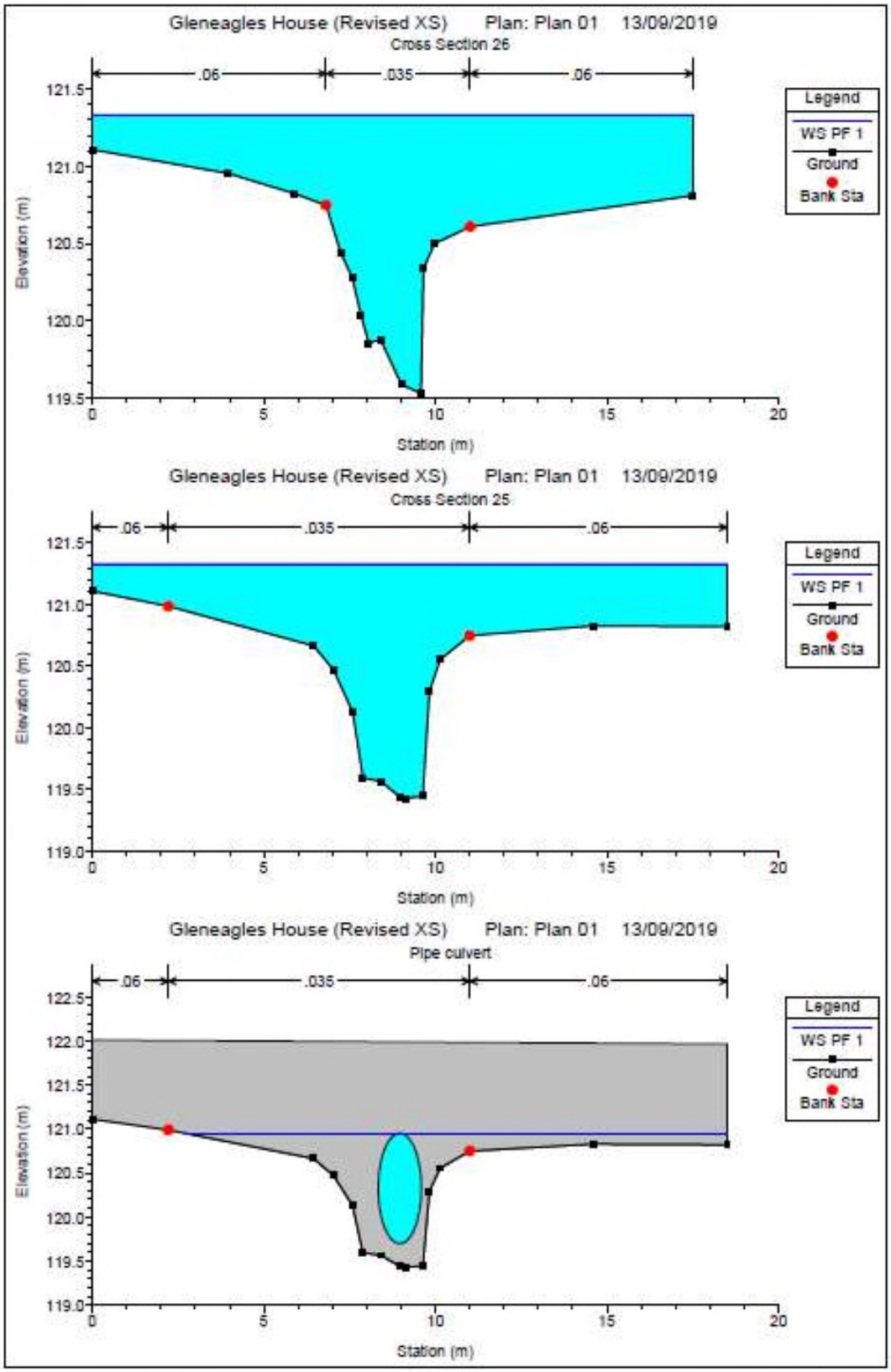
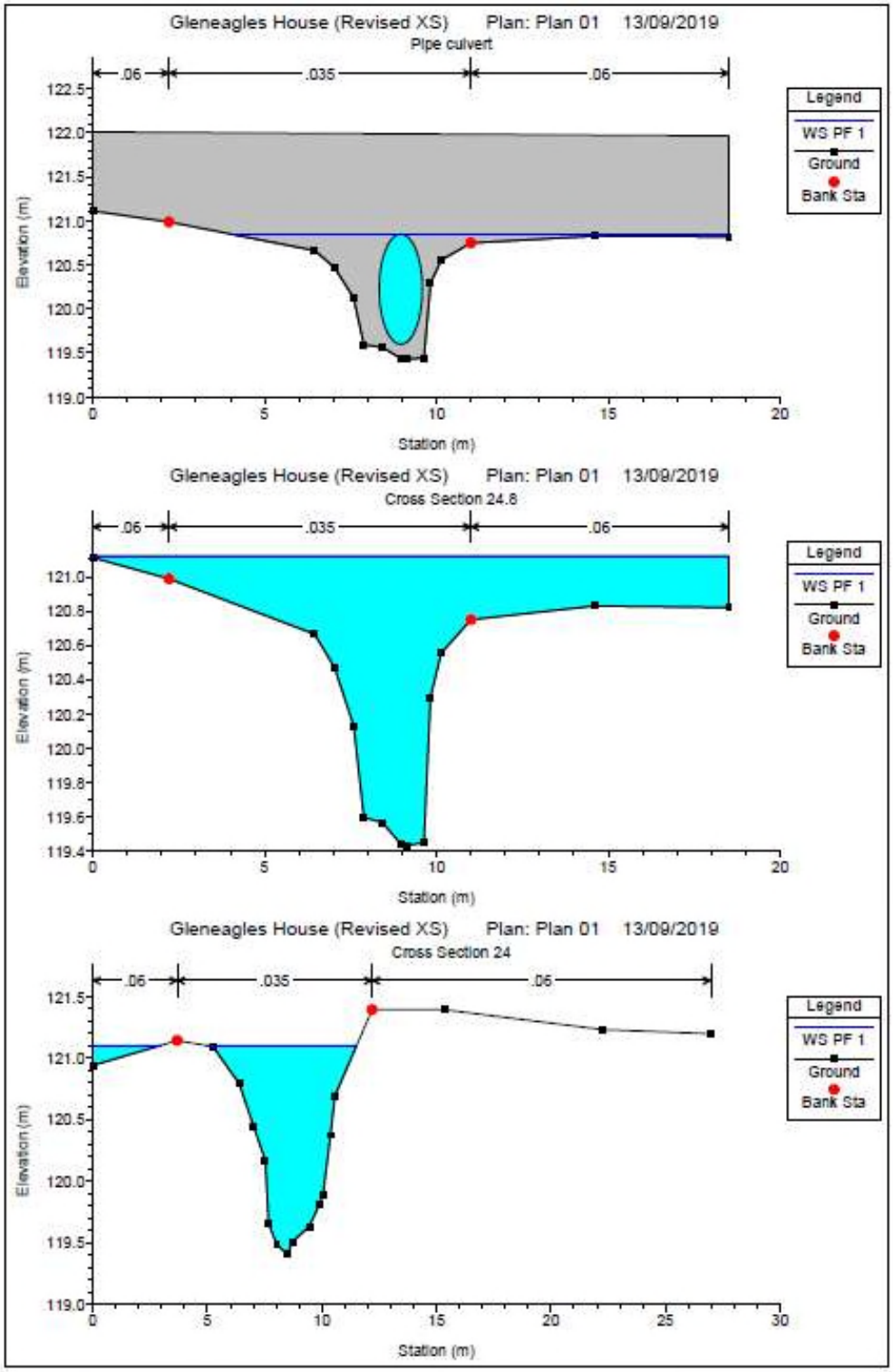
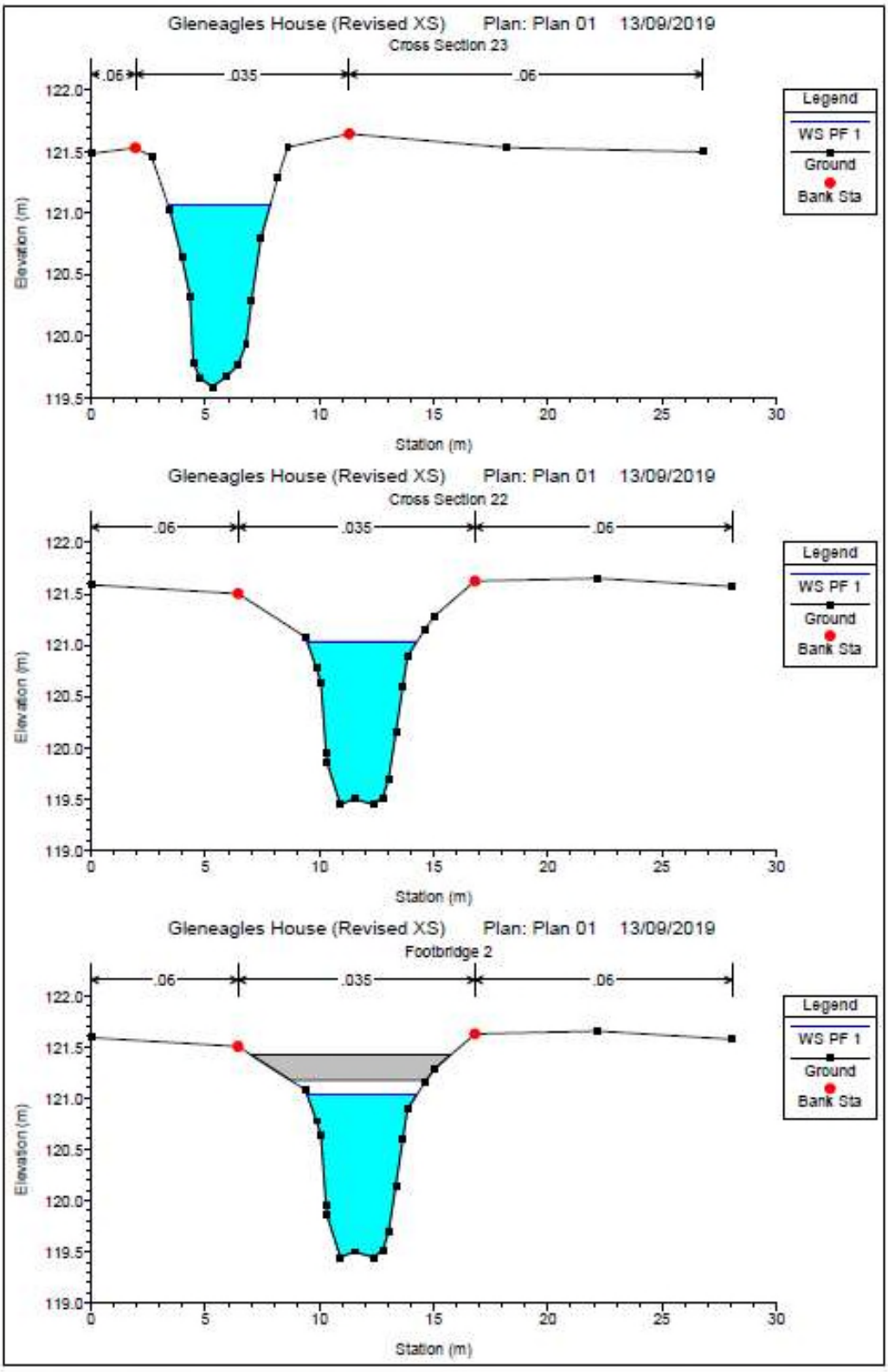
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 2
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 1
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 26
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 25
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Pipe culvert
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Pipe culvert
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 24.8
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 24


Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 23
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.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 22
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Footbridge 2
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.035
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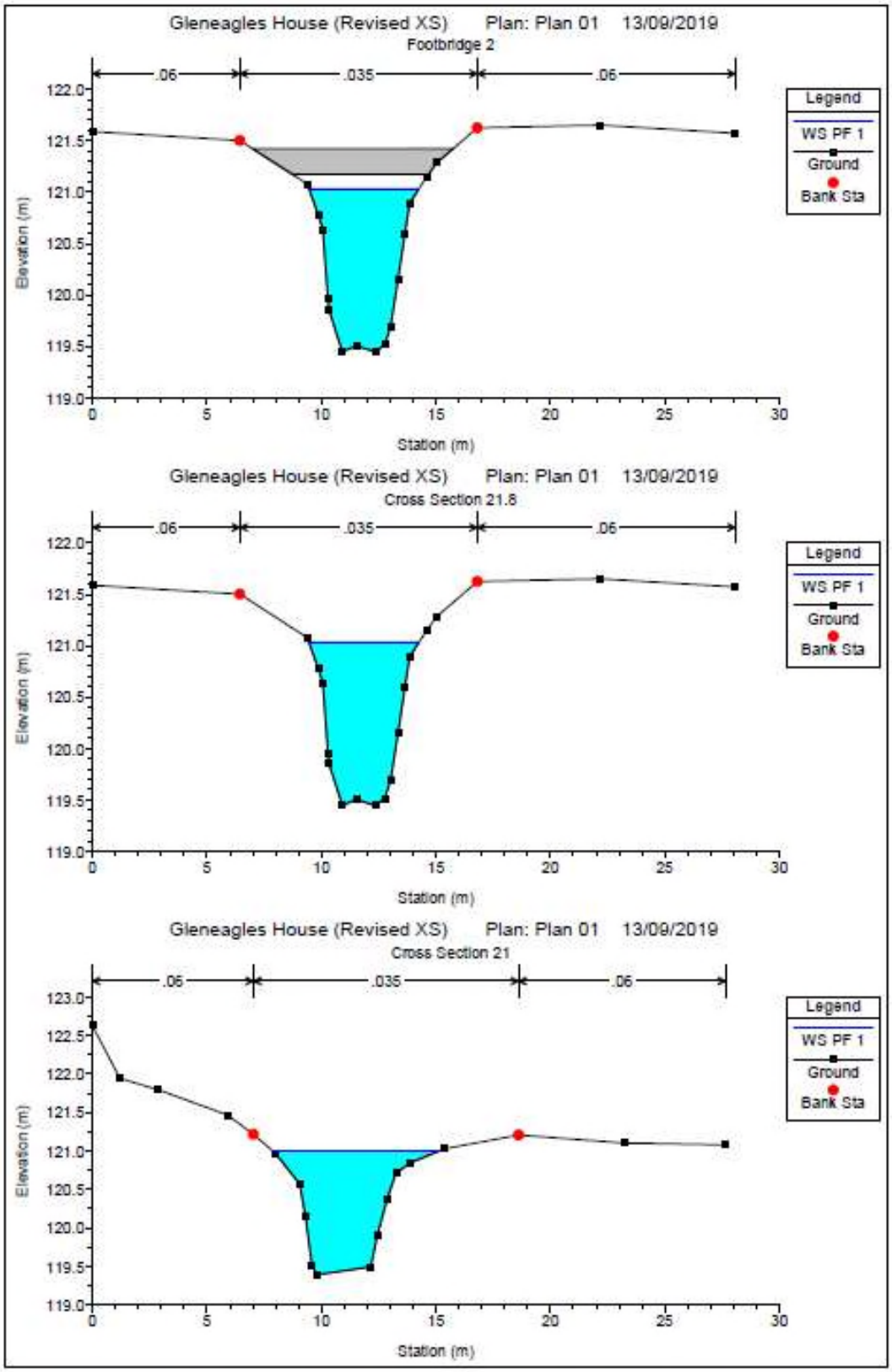
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)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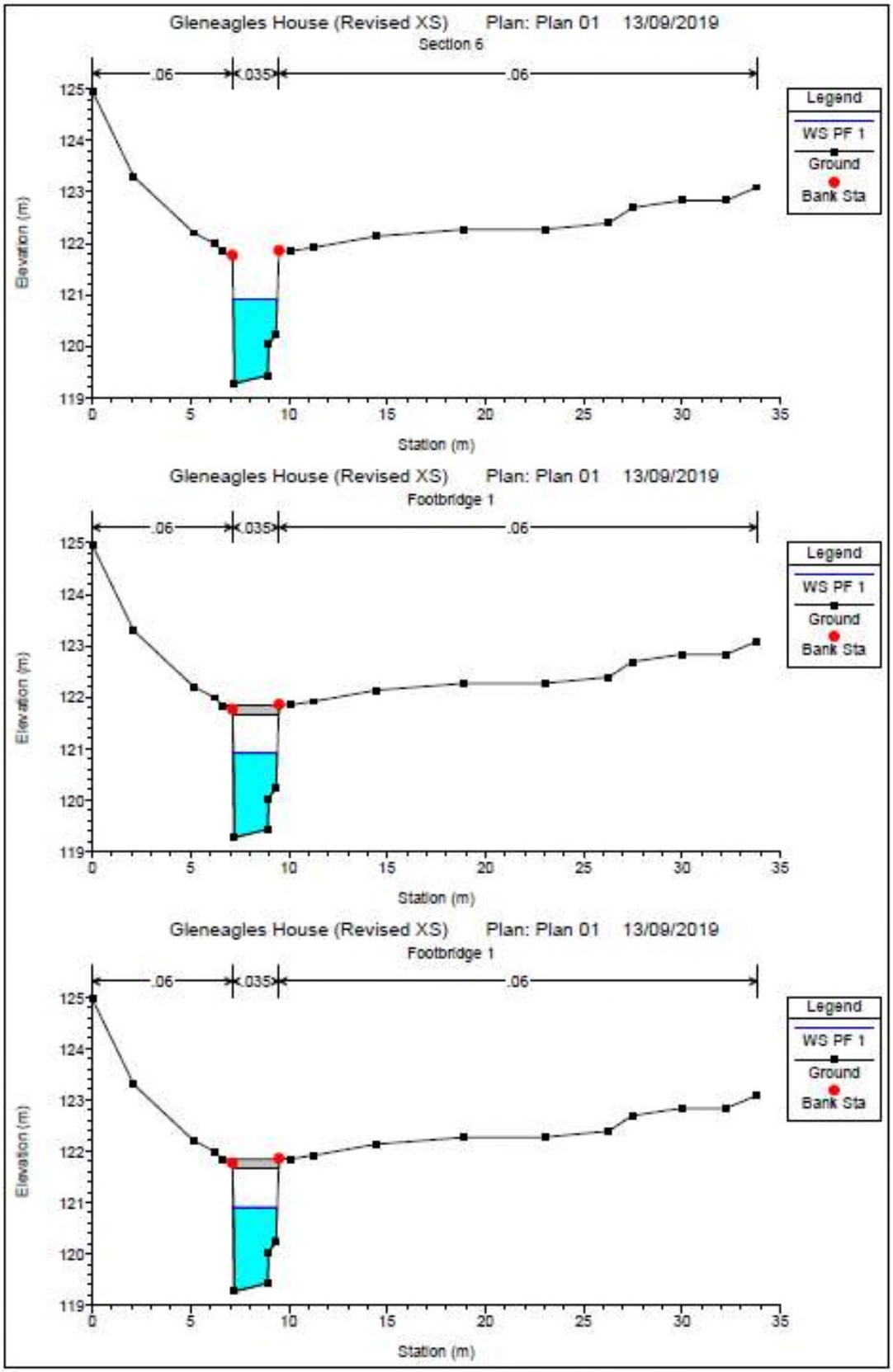
Cross Section 21.8
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Cross Section 21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Elevation (m)
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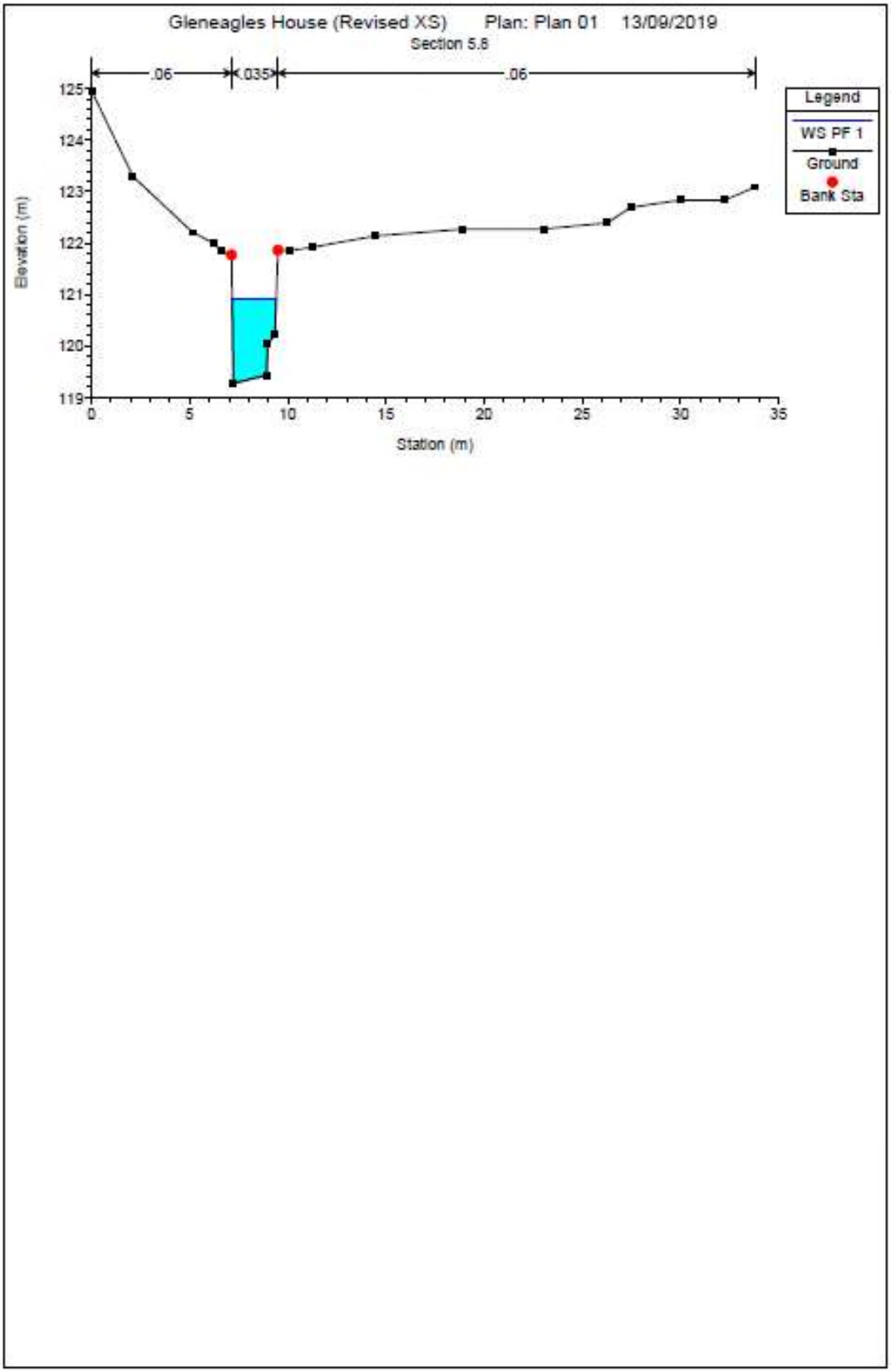
Gleneagles House (Revised XS) Plan: Plan 01 13/09/2019
Section 5.8
.06
.035
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
125
124
123
122
121
120
119
0
5
10
15
20
25
30
35

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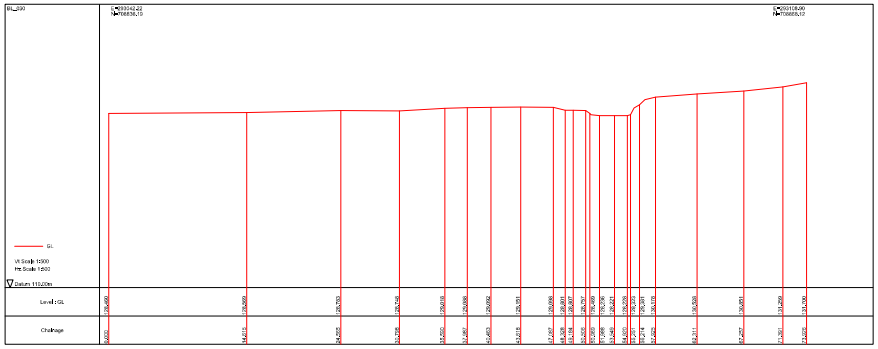

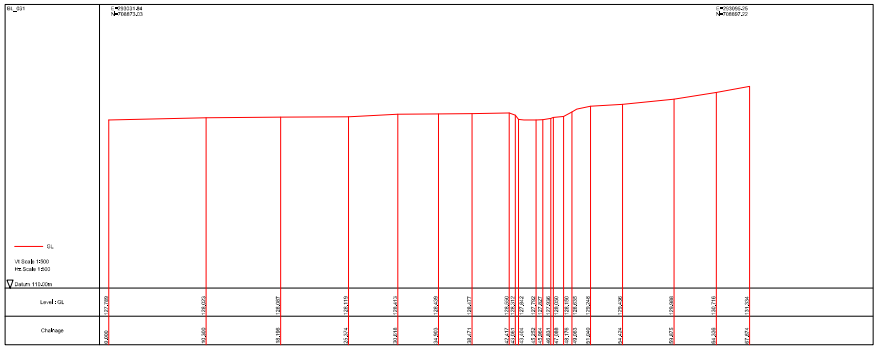

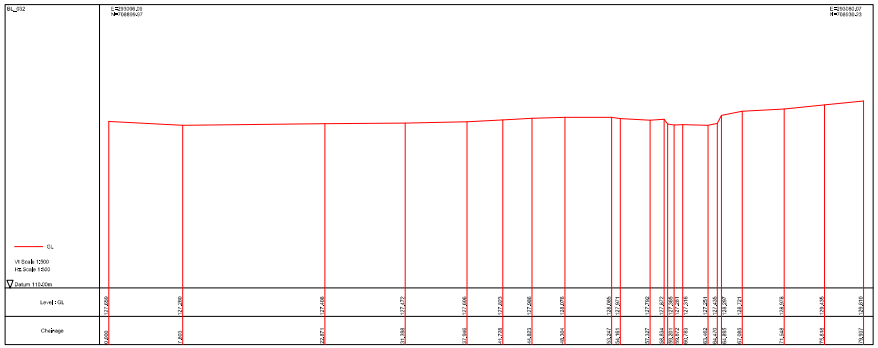

151

Revision	Description	Date

Benchmark Land Surveys

21 Pitcrompton Road
Dundee DD3 9SZ
T: 07427 622650
E: info@benchmarklandsurveys.com
www.benchmarklandsurveys.com

Project: Gleneagles Estate

Title: Cross Sections 1 to 9

Drawn by	Checked	File
MN	MN	A0
Drawing Number	Revision	Scale
545/5		1:200
		Date: 19/8/19

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Our Ref BCFR100

24 December 2019

Rebecca Mack
Flood Team
Perthshire and Kinross Council
Pullar House
35 Kinnoull Street
Perth
PH1 5GD

Dear Rebecca,

ERECTION OF A DWELLINGHOUSE (IN PRINCIPLE), LAND 70 METRES NORTH OF BARGATE COTTAGE, GLENEAGLES (PLANNING REF 19/01725/IPL)

I refer to your "Comments to the Development Quality Manager on a Planning Application" document dated 31/10/19 (copy attached), and our subsequent telephone conversation regarding the details. Hence the following is a response to your comments and can be considered an Addendum to our original FRA report.

Taking each of the issues raised in turn (original comments highlighted in red), my response is as follows:

- *"Figure 2.2 within the FRA shows an excerpt from OS mapping. Within this figure there is a watercourse to the south of the proposed development. No further information on this watercourse has been provided and therefore we request this."*
  The watercourse referred to is a drainage ditch which takes overflow from an ornamental pond which lies to the south of the main house of Gleneagles. The outlet is piped via a culvert under a range of buildings until it issues in an open ditch in a field adjacent to tennis courts. From this point the ditch lies in a straight line through the field to the point where it is culverted just upstream of the main estate road. In this open section, the ditch is likely to collect some field drainage, but flows are small even in wet weather. The culvert under the estate road is a plastic twinwall pipe, 375mm diameter. The watercourse is culverted from this point all the way to the outfall into the main tributary of the Ruthven Water some 400m to the north. The key features are shown below on OS mapping (note that the map shows the watercourse as an open channel, even though this has been culverted for many years)

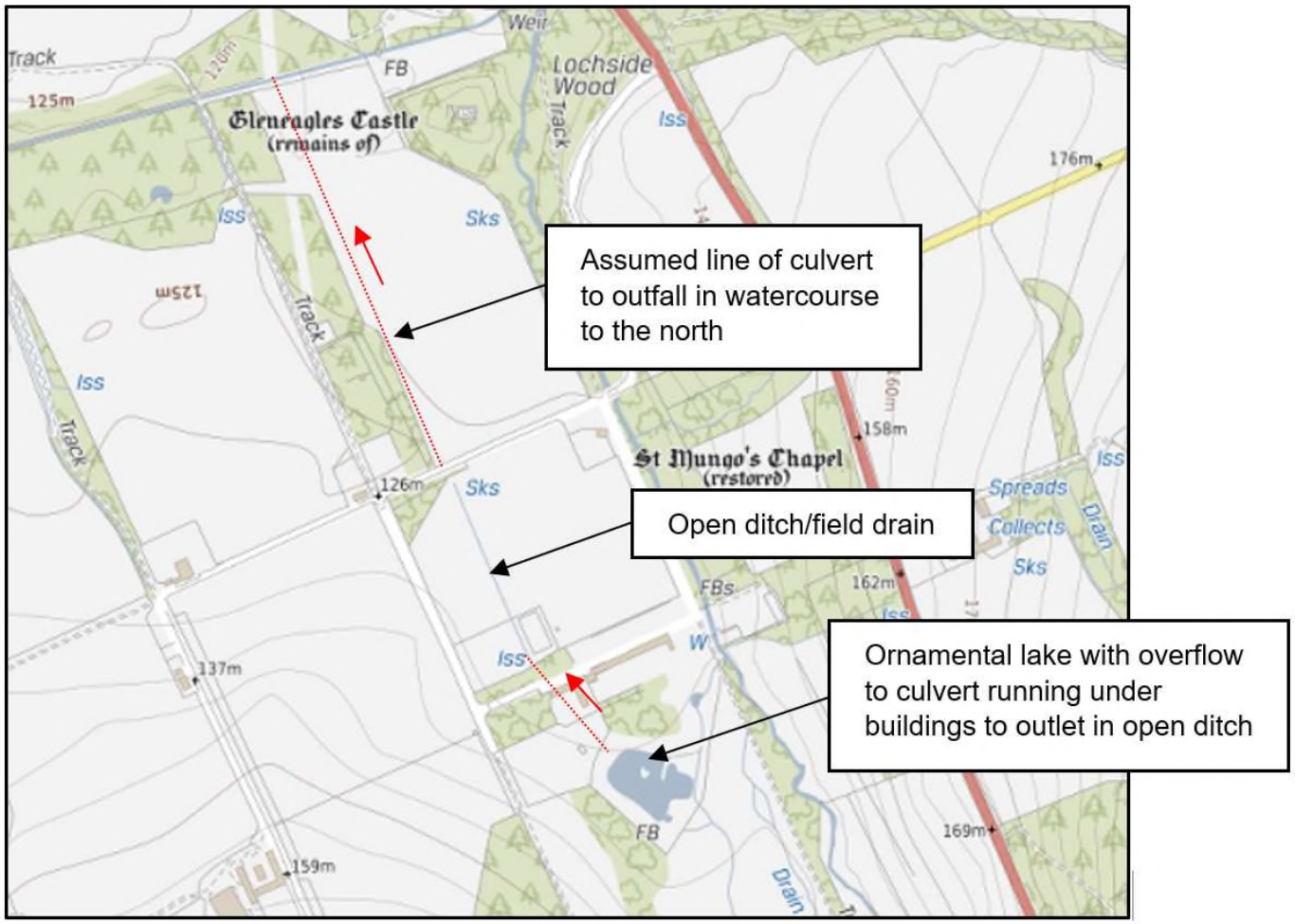


Figure 1 - Route of ditch/culvert

- *"Hydrological analysis has been undertaken for the Ruthven Water using FEH statistical, FEH rainfall runoff and ReFH2 methodology. The results of the FEH Statistical and FEH Rainfall Runoff methodologies gave similar results whereas the ReFH2 methodology was significantly less. The ReFH2 flow was used for the 1 in 200 year flow with a "compromise flow" was used for assessing the effects on access/egress. We disagree with this method and request that the higher flows are used for the 1 in 200 year flow for all assessments of flood risk."*
  I have revised the modelling of the upper reach of the Ruthven Water (I have not included the lower reach of the Ruthven Water or the main tributary in this further modelling exercise as it was demonstrated in the main report that the other reaches do not affect flood risk at the site) to take into account your comments on flowrates. Hence flood flows predicted based on the alternative methods are considered as well as the ReFH2 flow estimates. The results of the modelling exercise are discussed further in the following sections, but it is relevant to say that all predicted flows by the three methods used essentially stay in-bank from Sections 17 to 15 of the extended model, and that the stretch from Section 14 to the bridge has reduced capacity. As the ground on the left bank falls away over this stretch, water which leaves over the left bank does not return. Hence, I have established by trial and error that the flow capacity of the stretch downstream of Section 15 to the bridge has a maximum flow capacity of 14m^3/s at Section 15, and 9m^3/s from Section 14 down to bridge.

The predicted flows for the reach passing through the bridge from upstream are based on an adjustment for the reduced catchment size upstream of the bridge compared with the catchment downstream of the confluence with the main tributary. Hence, they are as follows:

	ReFH2 (m^3/s)	Rainfall Runoff (m^3/s)	FEH Statistical (m^3/s)
Q200	6.0	12.7	13.6
Q200 + 20%	7.2	15.2	16.3

Table 1 -Flowrates estimated by different methods for reach upstream of main bridge, Section 12/13

Hence this means the Q200 + 20% predicted by ReFH2 (the recommended flow estimation method for an ungauged catchment such as this) is contained. However, for either of the other methods, flow would escape over the left bank of the watercourse in a Q200 event. In the worst case, for a Q200 + 20% event based on the FEH Statistical method, up to $7.3m^3/s$ would escape. Of this flow, most would leave at or downstream of Section 14. Hence replicating the overland flow paths shown in Figure 5.2f of the original FRA report. However, for the largest flow, water would also escape over the left bank at around Section 15 (hence upstream of the walled cemetery of the chapel building) although the majority would be released adjacent and downstream of the chapel as previously discussed. Hence, a modified version of the overland flow figure is applicable as shown below in Figure 2:

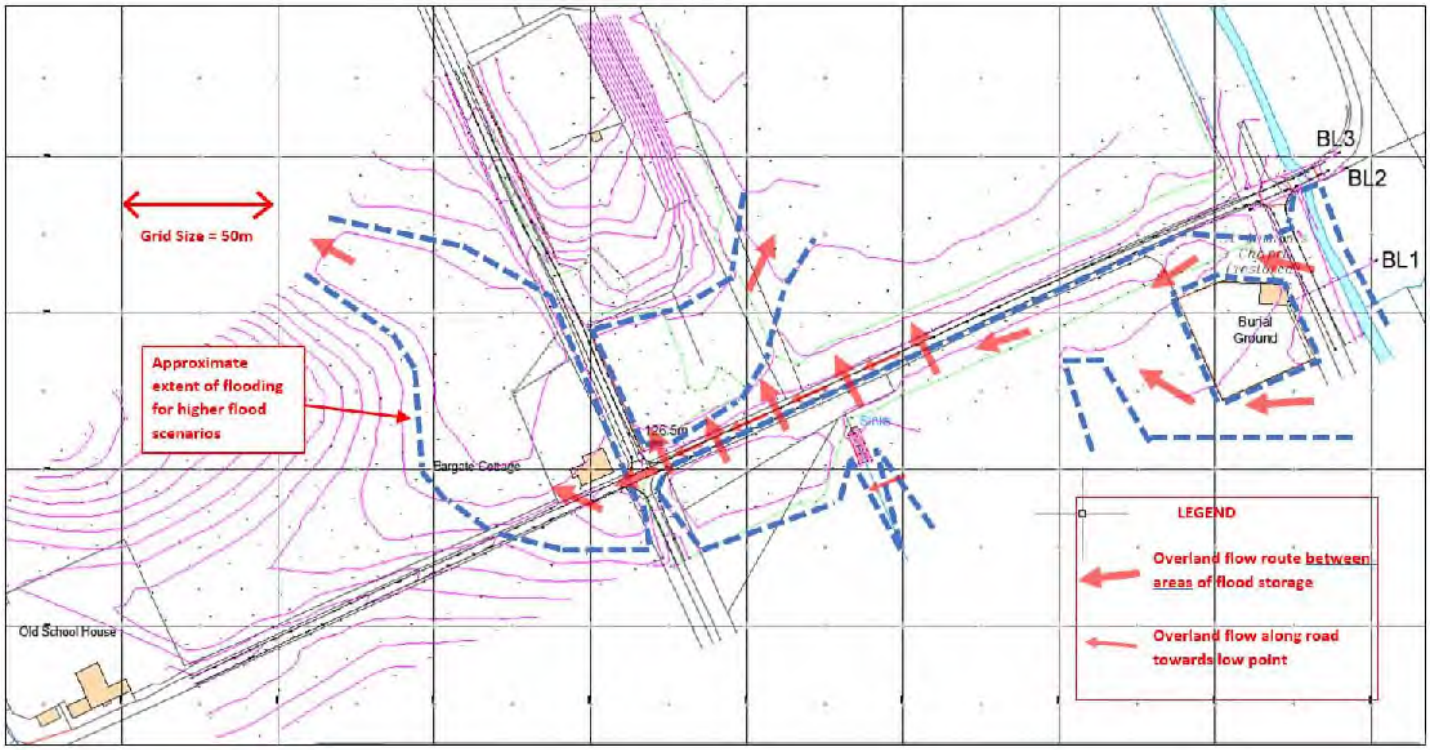


Figure 1 - Water features plan showing estimated flood extents and flow paths based on discussion above

- *"Manning's n roughness values have been provided within section 5.1 of the FRA. Various values have been provided for the floodplains. However, review of the cross sections provided all use a value of 0.06. We request clarification why only one value has been used within the cross-sectional profiles but within the report multiple values have been given. We would have expected the Manning's n value used for the channel would have been a little higher, however based on the photographs provided we accept the use of 0.035 for the channel."*

  A list of the various pre-selected categories is given, however in this instance is was decided in the end to use only one value throughout (on reflection it would have been better to explain this more clearly in the report). The justification for using 0.6 is that it is if anything conservative, but does not significantly affect the results, while maintaining simplicity. Much of the floodplain

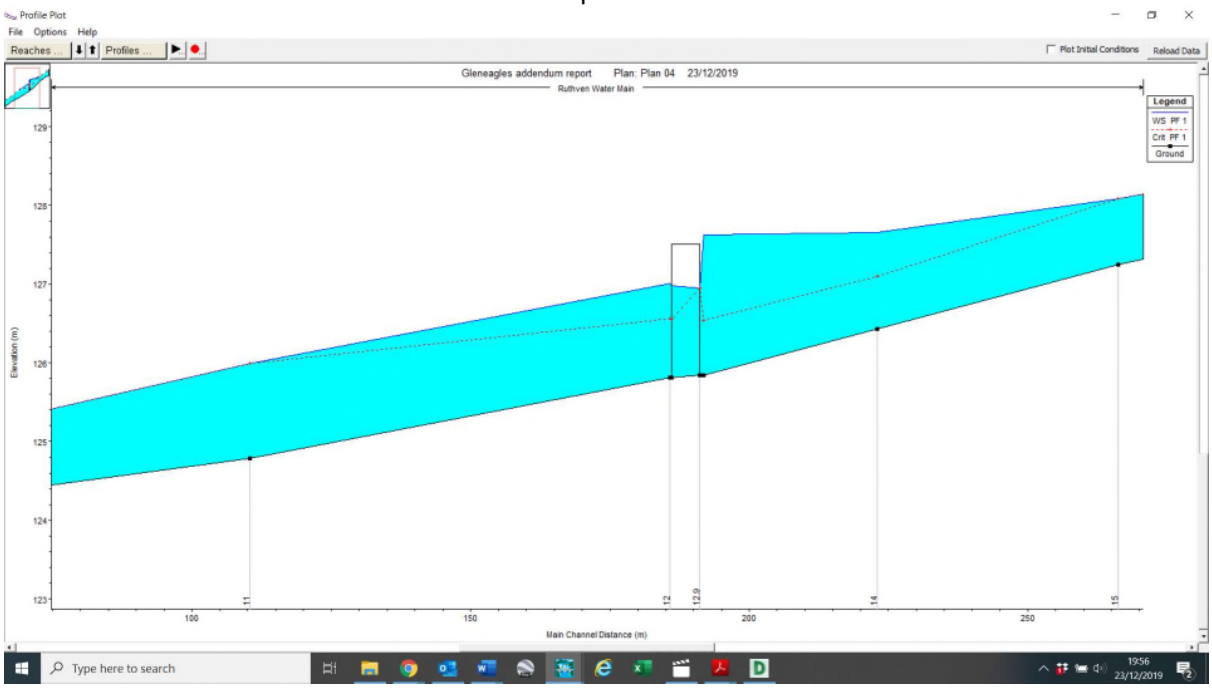
in the reaches modelled is grassland or field crops with a value of 0.03 to 0.04. Apart from these more open fields, there are areas along the banks with strips of woodland. However, these areas of woodland are generally relatively open and in narrow strips, with light brush, and hence corresponds to an n value of 0.06

- *"We would request justification for the location of the upstream boundary. Review of the SEPA Flood Maps indicates that there is a possible out of bank flow pathway further upstream on the Ruthven Water. We would also argue that this upstream cross section is close to the bridge over the Ruthven Water. Therefore, we believe that bridge and upstream cross section location may impact on model results and scenarios with bridge blockage."*

  In response to your above statement we have extended the model upstream by carrying out an additional survey of three further cross sections. As anticipated, this confirms that out of bank flow (for higher flows than those predicted by ReFH2) corresponds with the reach just upstream of the bridge. The additional information derived from the extended model shows a similar amount of out of bank flow, but with some of the overland flow generated originating upstream of the chapel building/cemetery walls, while the majority as previously indicated will emerge adjacent to the chapel building. The outcome is a similar amount of flow which would follow the same overall path as previously indicated in the main report. With regard to the interaction with the bridge structure, the effect of bridge blockages is to increase out of bank flow within the reach modelled in the previous report, i.e. from Section 14 to Section 13. This is discussed in more detail below.

- *Tables 5.2a and 5.2b indicate that with an increase in flows and Manning's n values cross section 11 decreases with an increase in these parameters. We would have expected to see an increase with an increase in these parameters. Therefore, we request further clarification on these values. We would also request further explanation for the increase in flood levels with an increase in Manning's n roughness values as we deem the model to be sensitive to this parameter.*

  The flow regime upstream of Section 11 is subcritical while it is approximately at critical depth at Section 11. The flow therefore in this location affected by whether critical depth moves upstream or downstream of this point and may therefore be greater or less than critical. Hence the relationship between depth, flow and other parameters is inherently unstable in this reach and for certain situations is an inverse relationship.

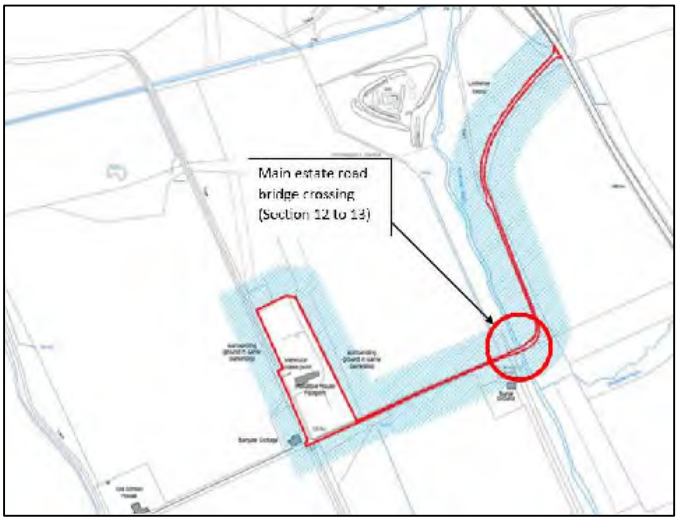


Regarding the sensitivity of flows to Manning's vales, this is I feel reflected in the report, where it is stated that flows show "some sensitivity to roughness value chosen". The report

also makes the differentiation between the higher sensitivity in the stretch immediately downstream of the bridge (i.e. between Sections 11 and 12), "but less so upstream of the bridge". Again, this increased sensitivity between 11 and 12 will be related to the issues discussed above, but importantly, the depth predicted are less sensitive upstream of Section 133, where out of bank flow is predicted.

- *"Section 5.2.1 within the FRA details the bridge blockage scenarios. It is unclear which bridge has a blockage scenario, and therefore, we request confirmation. We would also request justification for applying a 25% blockage scenario to the access track bridge over the Ruthven Water between cross sections 12 and 13."*

  My apologies for any lack of clarity regarding the bridge blockages modelled. In the first paragraph of Section 5.2.1 of the report it is stated "The potential for blockages of the main road bridge carrying the main access road over the Ruthven Water has been considered in the assessment…" This refers to the bridge which sites between Sections 12 and 13 on the main reach of the Ruthven Water, i.e. the location highlighted below:



Regarding the blockage scenario modelled, it was felt that a blockage of more than 25% was unlikely given the relatively high arch compared to the channel size and that the clear span of the arch is slightly greater than the width of the channel. However, in the additional modelling completed for this addendum report, blockages of both 25% and 50% are included. The results in the form of HECRAS output are included in the attachments to this report, but essentially show that for a 25% blockage, 8.2m^3/s passes under the bridge, while for a 50% blockage, 5m^3/s passes under the bridge. This compared with 9m^3/s maximum flow though an unblocked bridge. Hence the flow passing around the bridge by overland flow over the estate road embankment varies (depending on the flowrate estimation method and scenario modelled) from zero up to a maximum of 11.3m^3/s. The range of values are tabulated below:

	ReFH2 (m^3/s)	Rainfall Runoff (m^3/s)	FEH Statistical (m^3/s)
Q200	0.0	4.5	5.4
Q200 + 20%	0.0	7.0	8.1

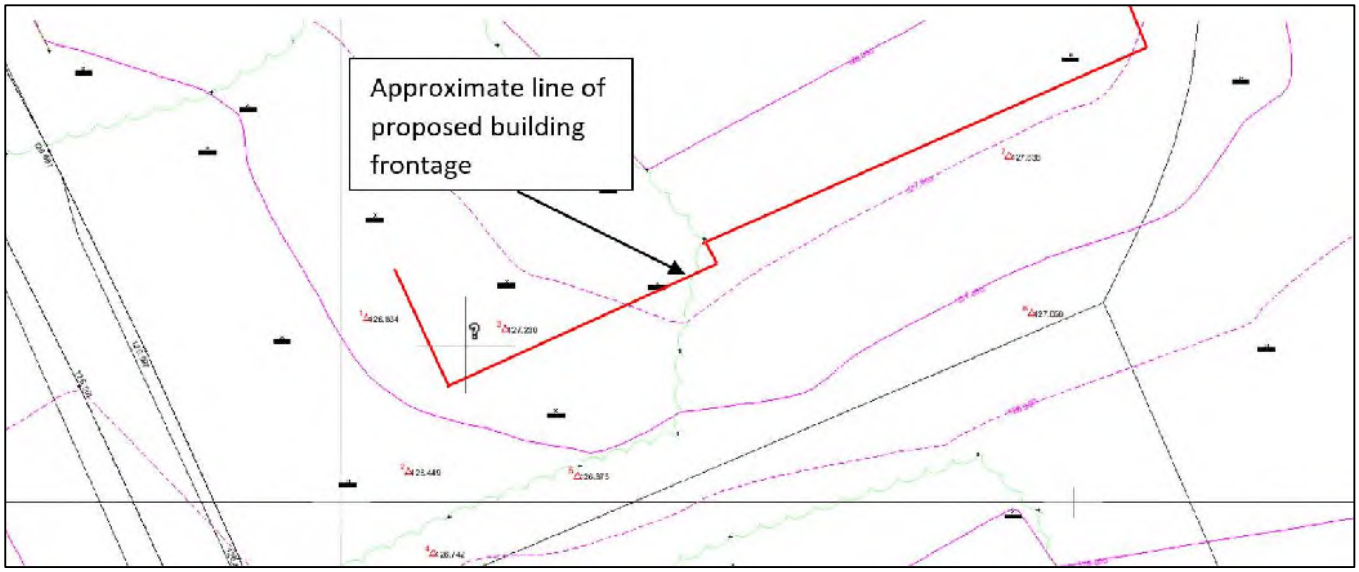
Table 2a - Out of bank flow upstream of bridge at Section 12/13 for a 25% bridge blockage for different flow estimation methods

	ReFH2 (m^3/s)	Rainfall Runoff (m^3/s)	FEH Statistical (m^3/s)
Q200	1.0	7..7	8.6
Q200 + 20%	2.2	10.2	11.3

Table 2b - Out of bank flow upstream of bridge at Section 12/13 for a 50% bridge blockage for different flow estimation methods

- Figure 5.2f shows the overland flow pathways and flood extent. The location of the proposed development is on higher ground indicated by the topography in figure 5.2f. However, this higher ground has been developed by the demolition of the previous dwelling on site. Therefore, we request confirmation that the proposed development will be built on existing ground levels or if the site will be cleared of this demolition material before construction of the proposed development. We would highlight that if the proposal is to remove this demolition material before construction then we would request a pre and post development FRA is undertaken to ensure that the proposed development is not within the functional floodplain. We would be unable to support development within the functional floodplain.

  I can confirm that there is no intention to build any new development on top of demolition rubble, and that the new house will sit on ground which can be demonstrated to sit above the floodplain after removal of demolition rubble. Hence the stated building platform and freeboard can be achieved. To demonstrate this, further ground levels have been surveyed , partly in an area where topsoil and overlying rubble have been cleared to show original foundation stones, and partly in locations where existing features such as old walls, the base of overgrown conifers (those that are visible in the old photograph of the house, Photograph 3 of the FRA report) indicate original ground levels prior to demolition. Based the survey of the original ground levels (number 1 to 6 on Figure 3 below) it can be said that the original ground level at the front (lower side) of the proposed building, the ground levels vary from around 127.0m to 127.5m, i.e. above the assumed flood level on the main estate road of 126.8m. However, for additional reassurance, we would suggest a planning condition is included to the effect that the ground is re-surveyed after site clearance is complete, and if necessary the building footprint should be moved north to higher ground, if any part of the building footprint is found to be below 126.8m AOD.



Photograph 1 - Looking north over location of survey points 1 and 2 (roughly at either end of the surveying staff lying in the excavated area. Note the exposed foundation stones in the stripped back area, original garden ground in foreground to left and right, and mounds of demolition rubble behind.

I hope the above addresses the queries you have raised in your document, and that you can therefore withdraw your objections to the building of the proposed house. However, should you have any further issues you wish to discuss, please do not hesitate to contact me.

Yours sincerely

[redacted]

Dr Brian Coghlan BSc (Hons) PhD CEng MCIWEM
Director
Atholl Associates

Enc: Comments to the Development Quality Manager on a Planning Application dated 31/10/19
HECRAS output of revised modelling
Drawing 545/1 Topographic Survey 2d
Drawing 545//5 Cross sections 1 to 9

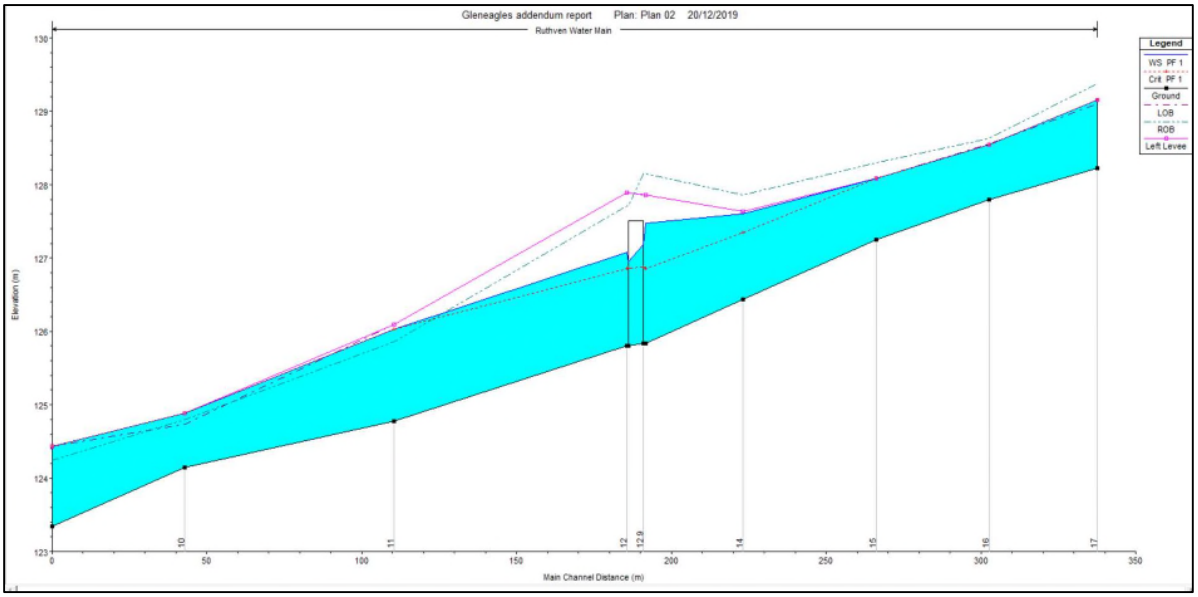
Comments to the Development Quality Manager on a Planning Application

Planning Application ref.	19/01725/IPL	**Comments provided by**	Rebecca Mack
Service/Section	HE/Flooding	**Contact Details**	[redacted]
Description of Proposal	Erection of a dwellinghouse (in principle)		
Address of site	Land 70 metres north of Bargate Cottage, Gleneagles		
Comments on the proposal	We have reviewed the information within the proposed application. We would note that the proposed site lies within the functional floodplain as shown by the SEPA Flood Maps. A Flood Risk Assessment (FRA) has been submitted in support of the application. Hydrological analysis and hydraulic modelling have been undertaken within the FRA. Figure 2.2 within the FRA shows an excerpt from OS mapping. Within this figure there is a watercourse to the south of the proposed development. No further information on this watercourse has been provided and therefore we request this. Hydrological analysis has been undertaken for the Ruthven Water using FEH statistical, FEH rainfall runoff and ReFH2 methodology. The results of the FEH Statistical and FEH Rainfall Runoff methodologies gave similar results whereas the ReFH2 methodology was significantly less. The ReFH2 flow was used for the 1 in 200 year flow with a "compromise flow" was used for assessing the effects on access/egress. We disagree with this method and request that the higher flows are used for the 1 in 200 year flow for all assessments of flood risk. Manning's n roughness values have been provided within section 5.1 of the FRA. Various values have been provided for the floodplains. However, review of the cross sections provided all use a value of 0.06. We request clarification why only one value has been used within the cross-sectional profiles but within the report multiple values have been given. We would have expected the Manning's n value used for the channel would have been a little higher, however based on the photographs provided we accept the use of 0.035 for the channel. We would request justification for the location of the upstream boundary. Review of the SEPA Flood Maps indicates that there is a possible out of bank flow pathway further upstream on the Ruthven Water. We would also argue that this upstream cross section is close to the bridge over the Ruthven Water. Therefore, we believe that bridge and upstream cross section location may impact on model results and scenarios with bridge blockage. Tables 5.2a and 5.2b indicate that with an increase in flows and Manning's n values cross section 11 decreases with an increase in these parameters. We would have expected to see an increase with an increase in these parameters. Therefore, we request further clarification on these values. We would also request further explanation for the increase in flood levels with an increase in		

	Manning's n roughness values as we deem the model to be sensitive to this parameter. Section 5.2.1 within the FRA details the bridge blockage scenarios. It is unclear which bridge has a blockage scenario, and therefore, we request confirmation. We would also request justification for applying a 25% blockage scenario to the access track bridge over the Ruthven Water between cross sections 12 and 13. Figure 5.2f shows the overland flow pathways and flood extent. The location of the proposed development is on higher ground indicated by the topography in figure 5.2f. However, this higher ground has been developed by the demolition of the previous dwelling on site. Therefore, we request confirmation that the proposed development will be built on existing ground levels or if the site will be cleared of this demolition material before construction of the proposed development. We would highlight that if the proposal is to remove this demolition material before construction then we would request a pre and post development FRA is undertaken to ensure that the proposed development is not within the functional floodplain. We would be unable to support development within the functional floodplain.
Recommended planning condition(s)	N/A
Recommended informative(s) for applicant	The applicant is advised to refer to Perth & Kinross Council's Supplementary guidance on Flood Risk and Flood Risk Assessments 2014 as it contains advice relevant to your development.
Date comments returned	31/10/2019

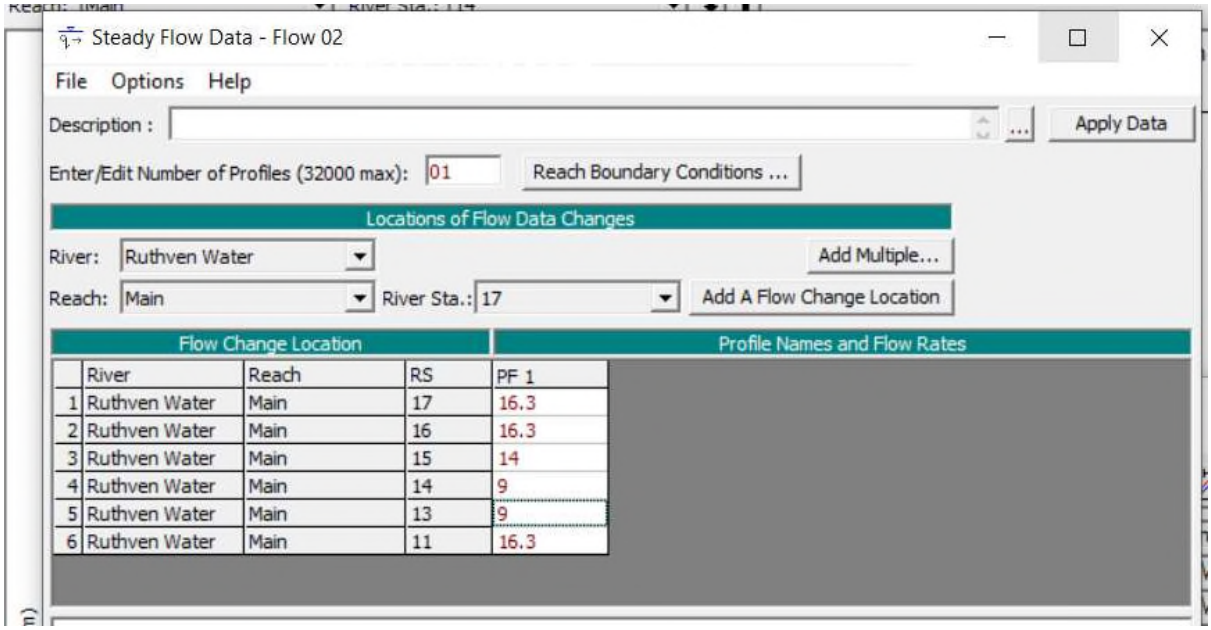
HECRAS OUTPUT

1) No blockage scenario, maximum flow in sections upstream of bridge:

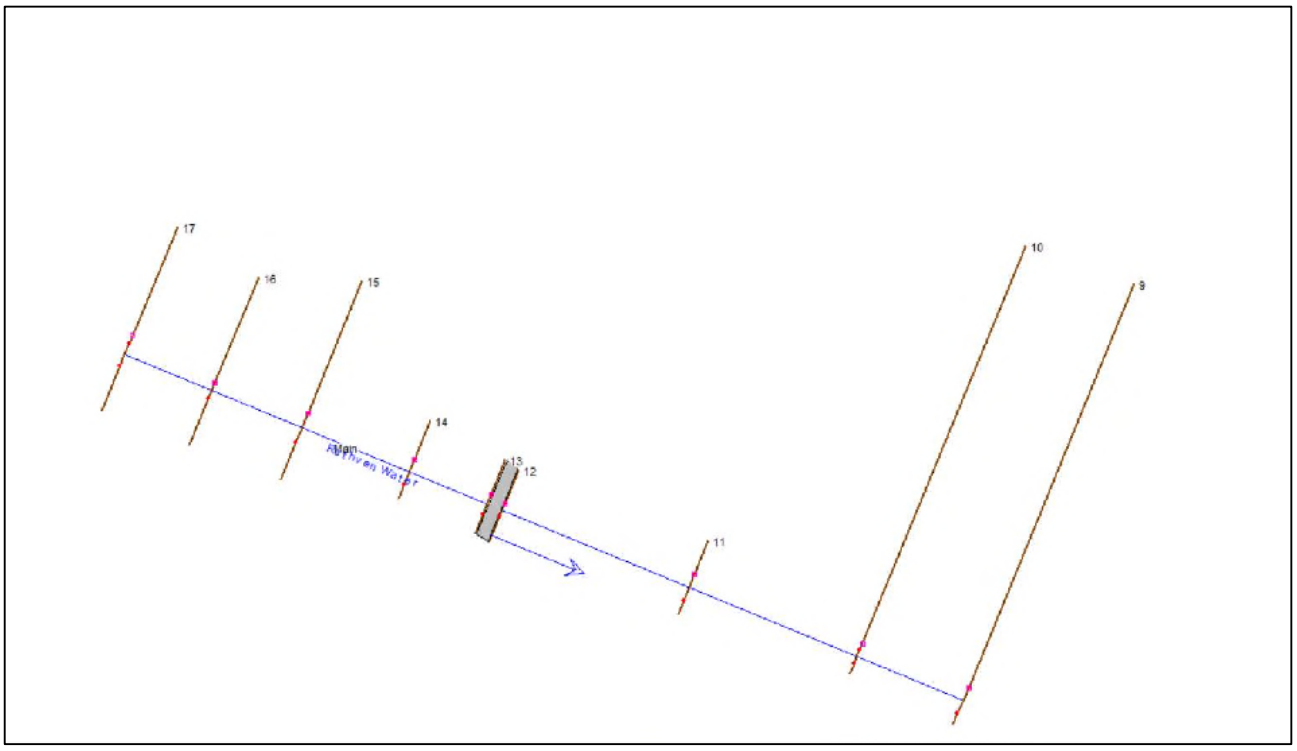


Profile of modelled reach with three additional cross sections upstream of bridge. Flowrates applied are maximum channel capacity with flow change locations at Sections 15, 14 and 11. Hence flowrate at each section as follows:

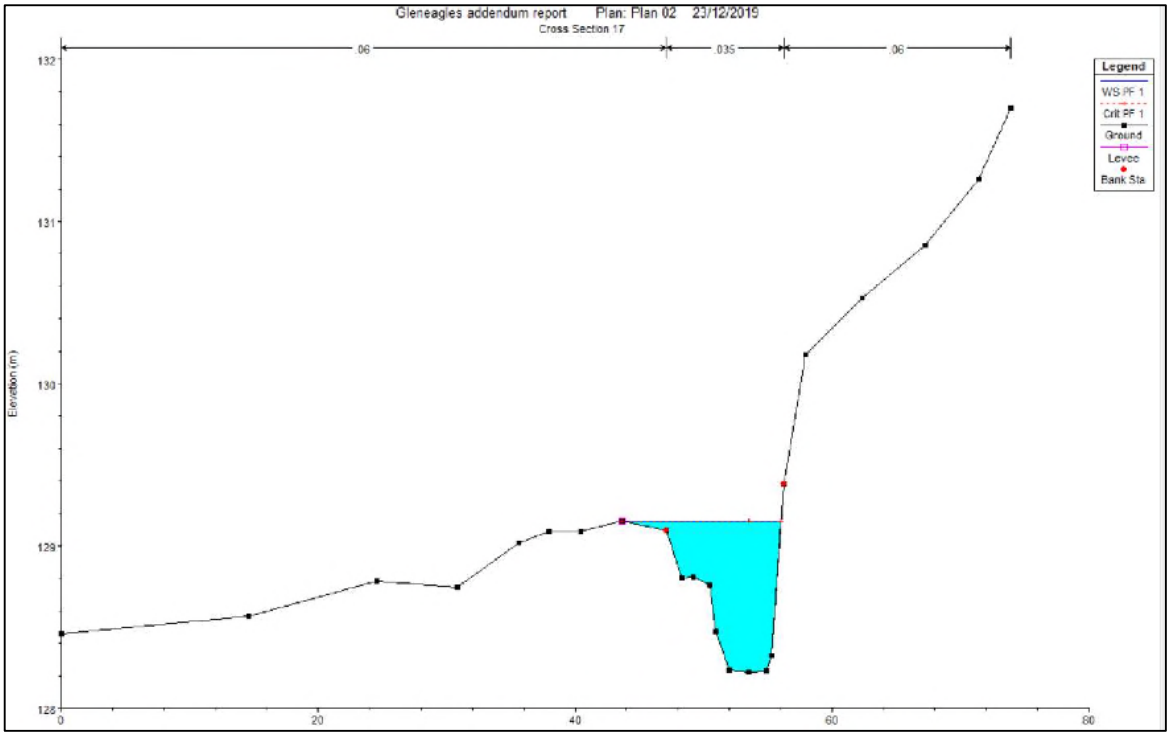
Cross section	Flowrate
17	16.3
16	16.3
15	14
14	9
13	9
12	9
11	16.3 *(Assumes out of bank flow returning after flowing over road – conservative assumption)*
10	16.3
9	16.3



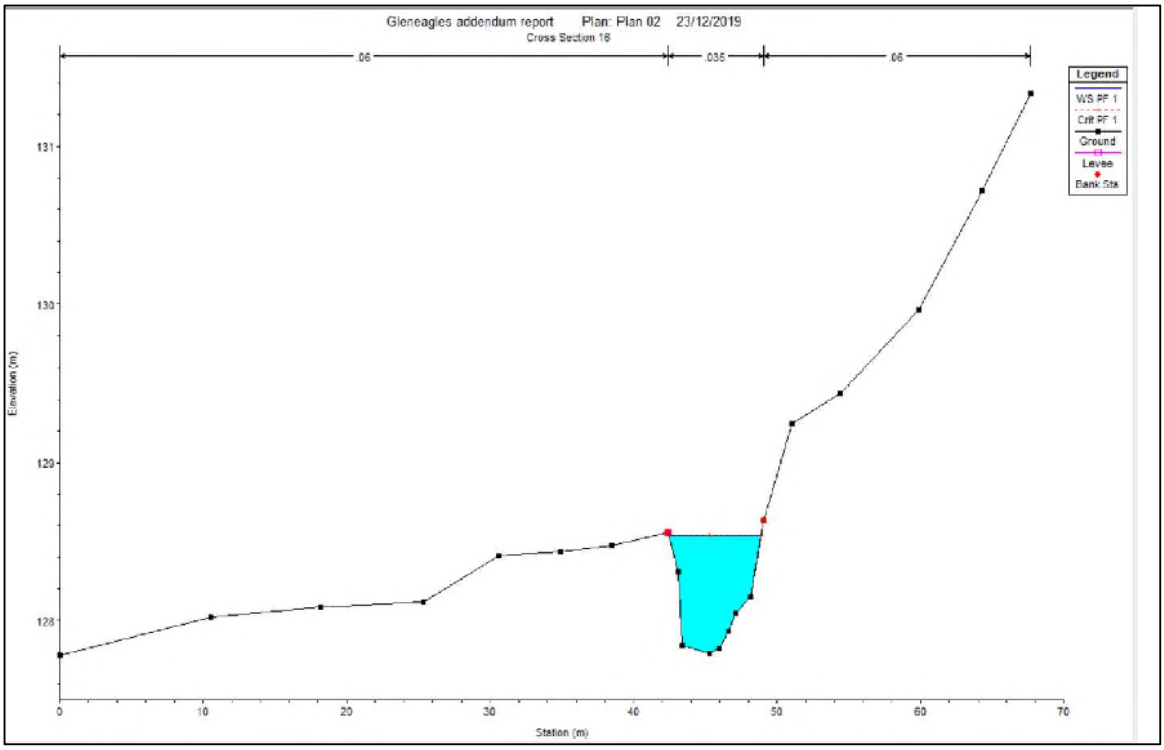
Maximum flows corresponding to bank full capacity. 0% blockage



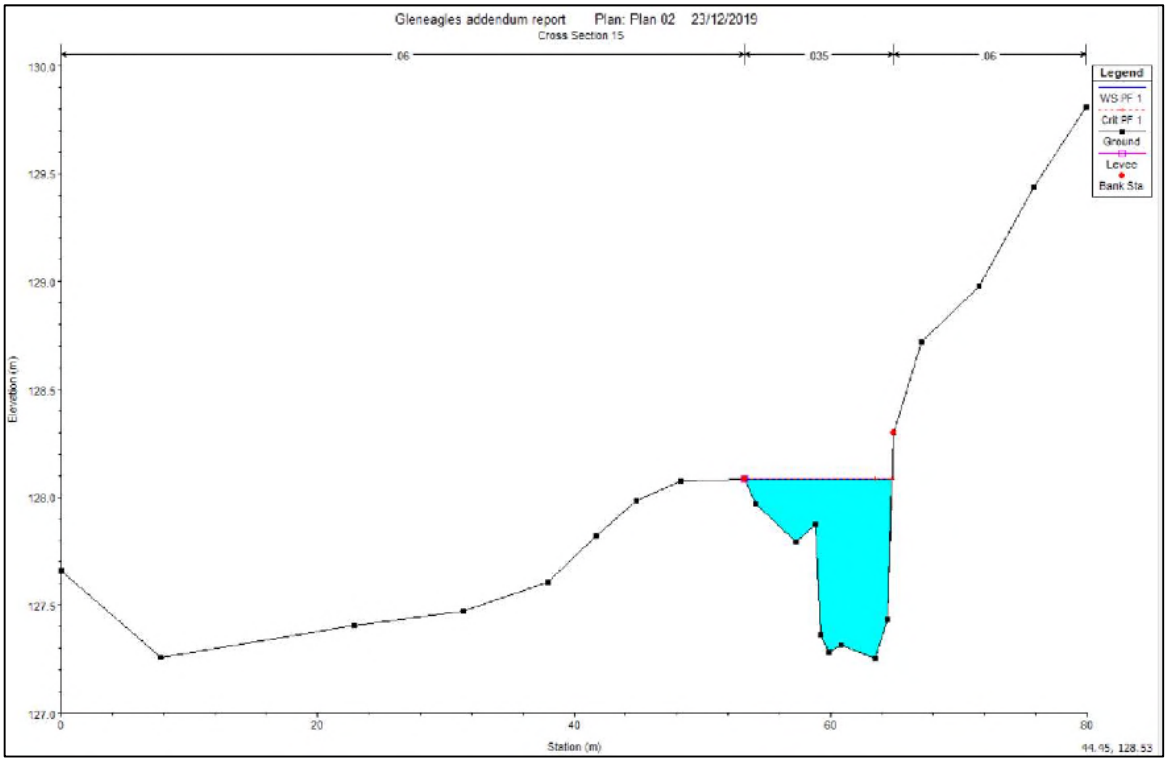
Modelled reach including additional upstream cross sections



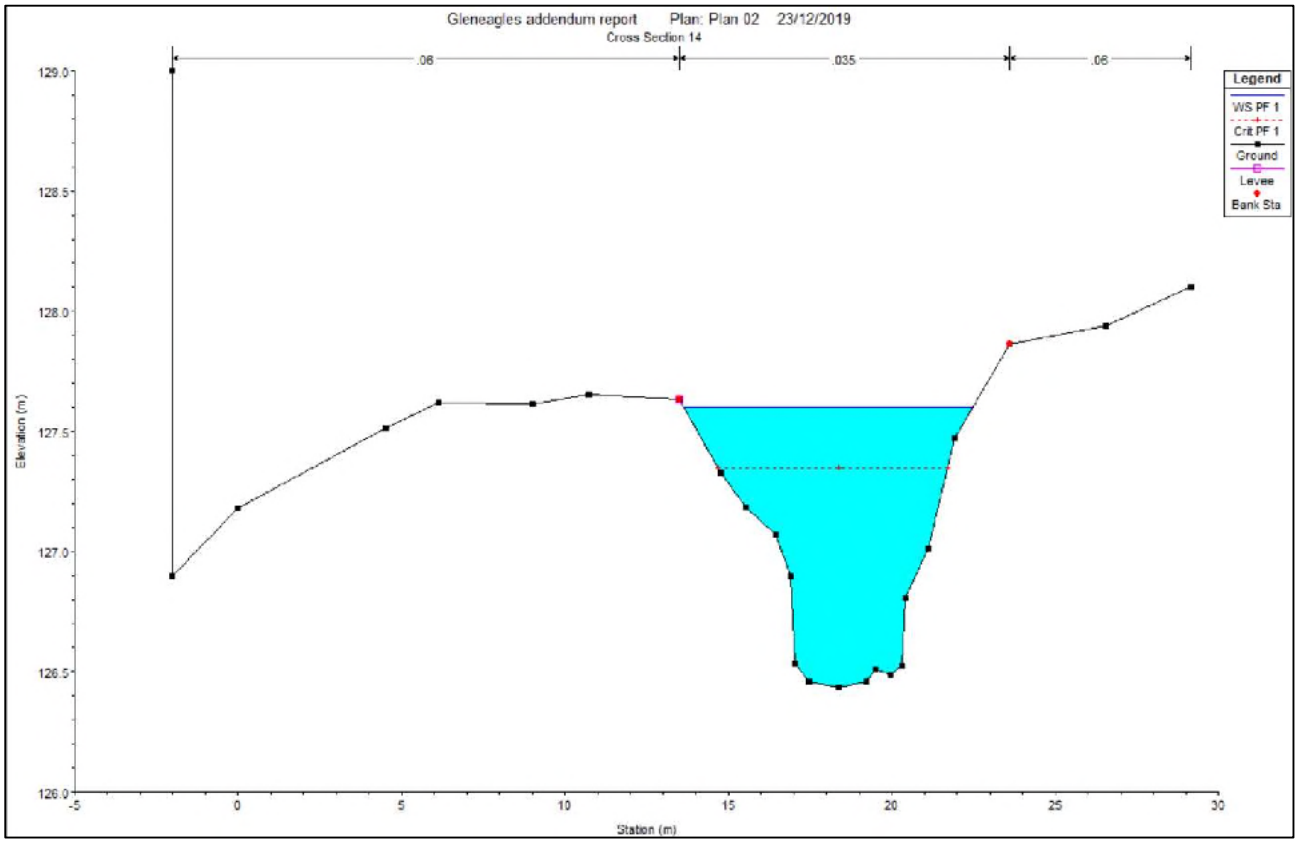
Section 17 with 16.3m^3/s flow, just bank-full on left bank.
Depth does not exceed bank height until a flow of 17.3m^{3-}/s is reached



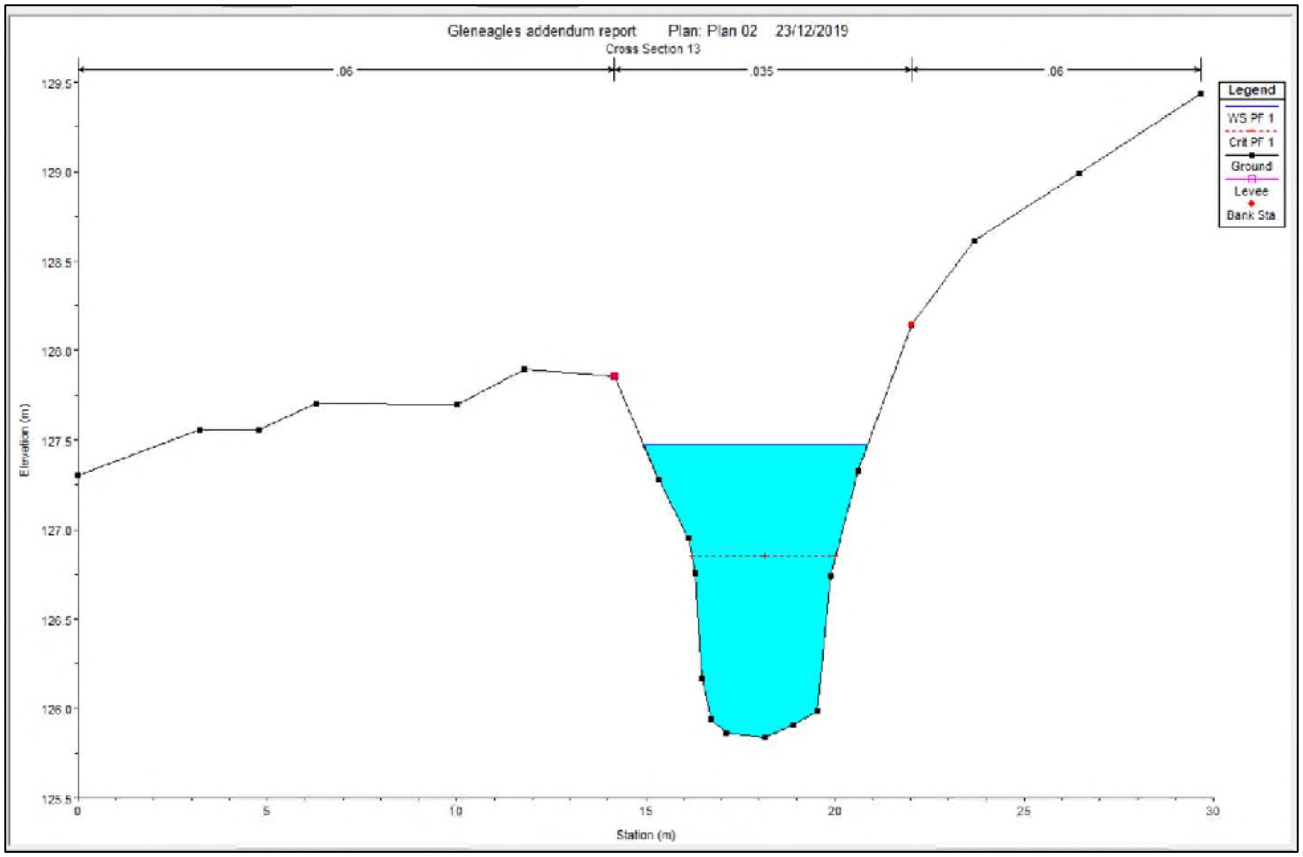
Section 16 with 16.3m^3/s flow, just bank-full on left bank.



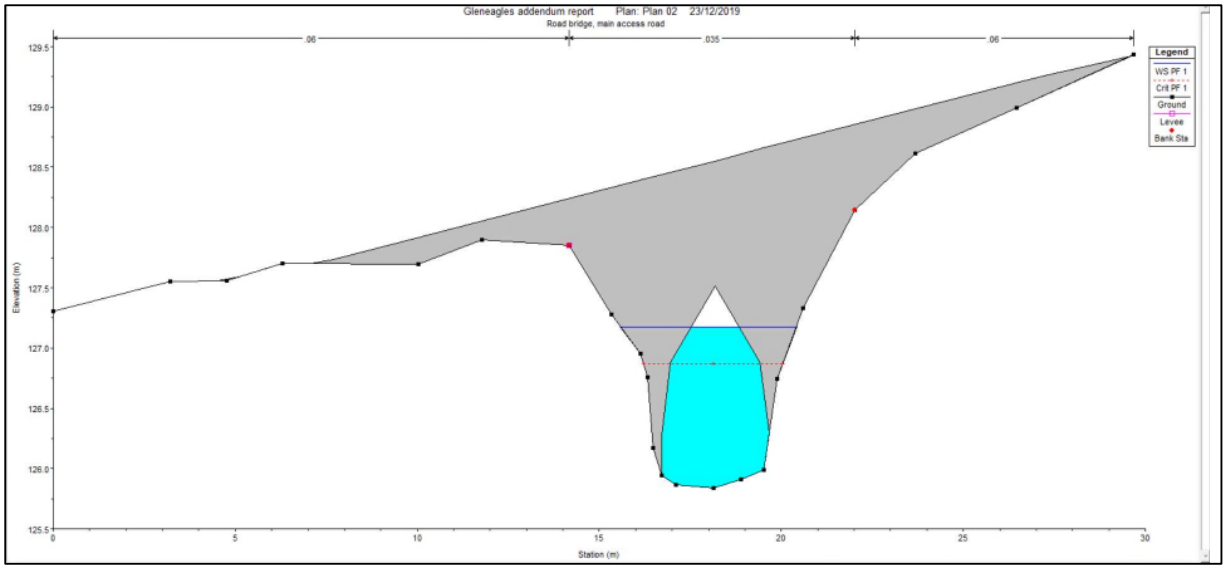
Section 15 with 14m^3/s flow, just bank-full on left bank



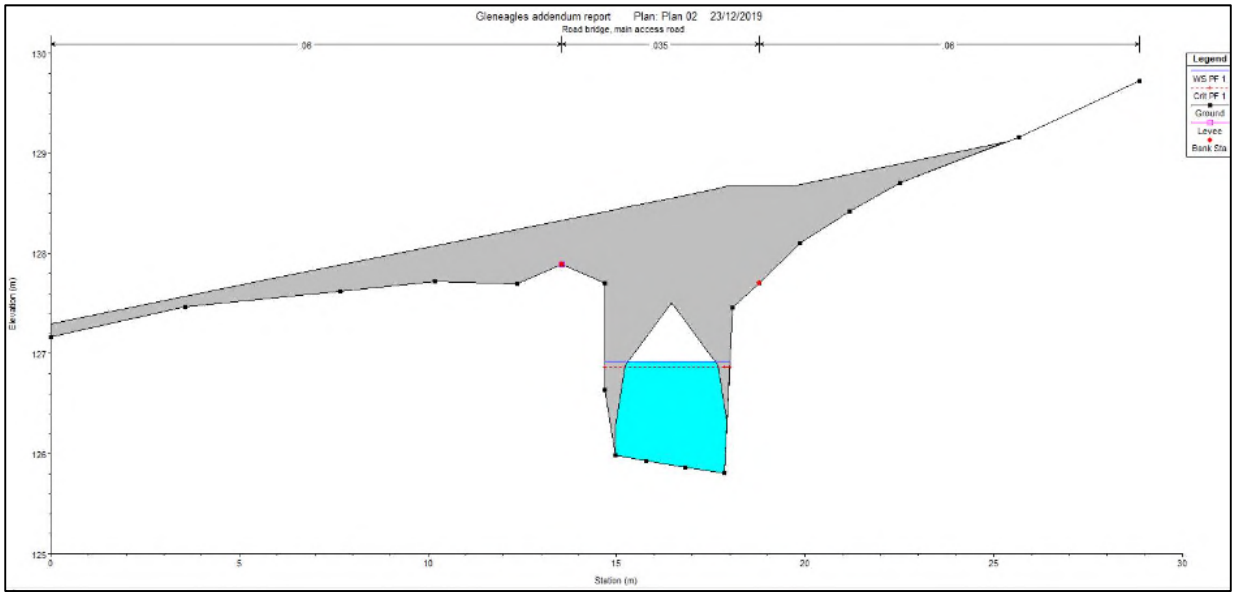
Section 14 with 9m^3/s flow, near bank-full on left bank.



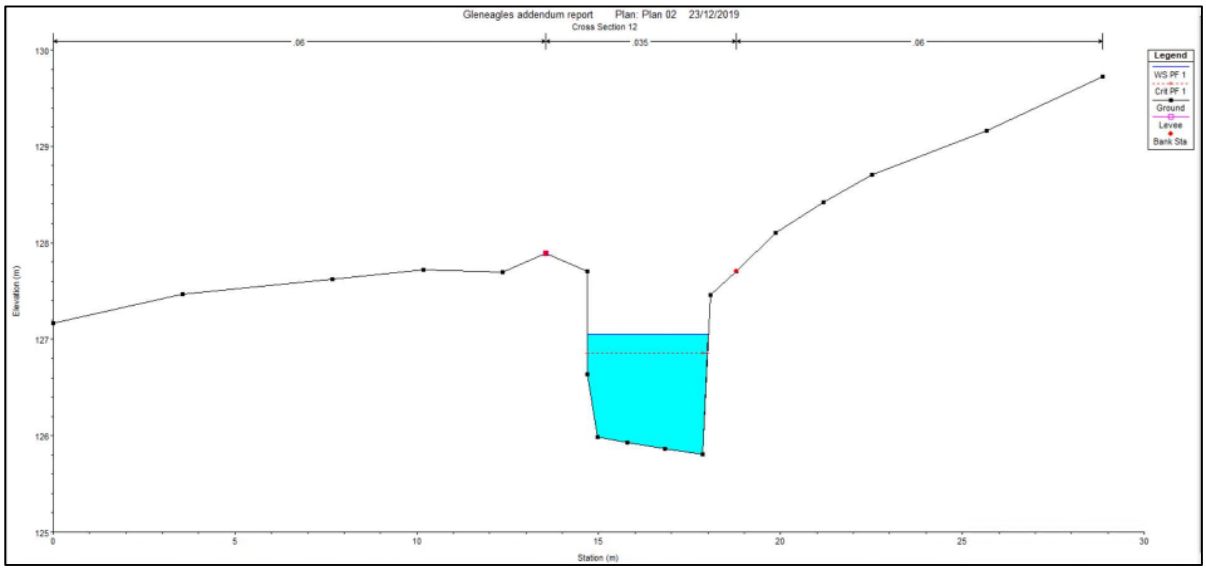
Section 13 with 9m^3/s flow, water level approximately 400mm below left bank.



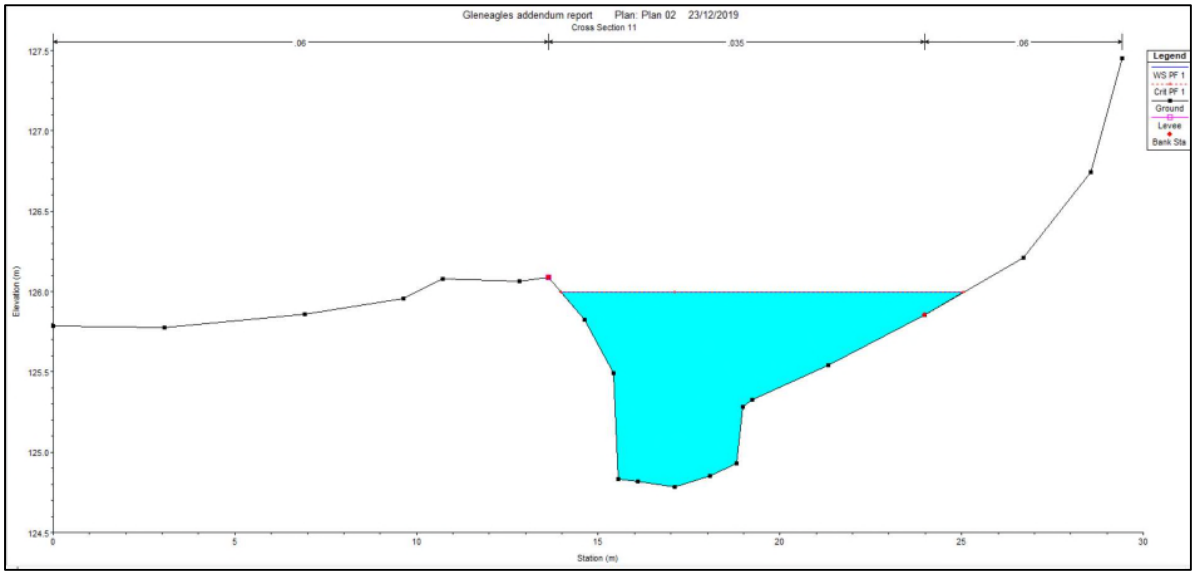
Upstream face of bridge crossing between Sections 13 and 12, no blockage scenario



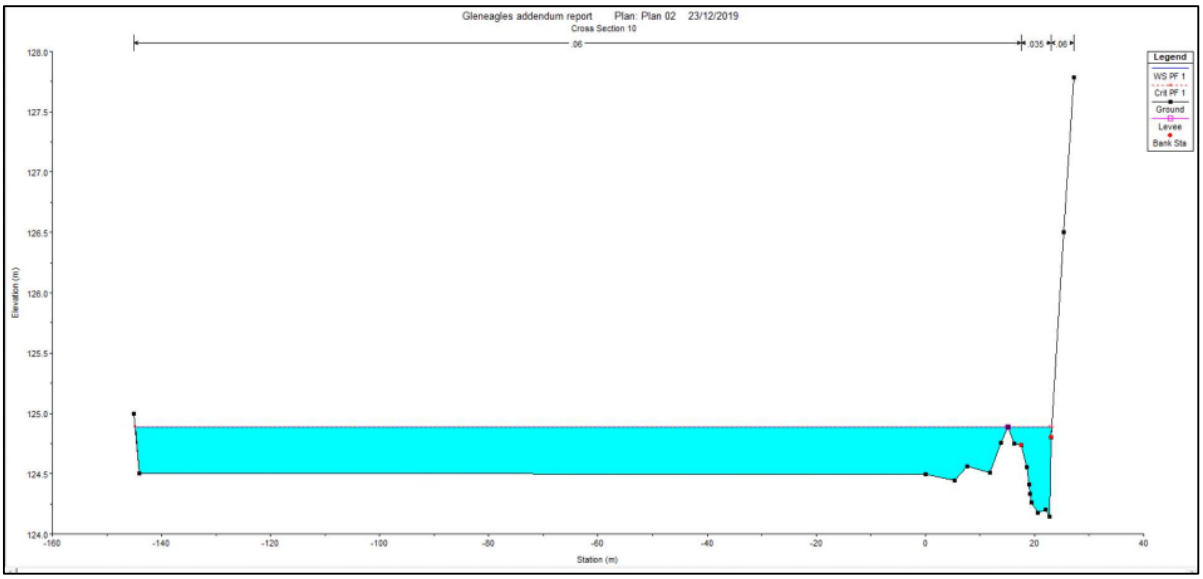
Downstream face of bridge crossing between Sections 13 and 12, no blockage scenario



Section 12 with 9m^3/s flow, water level approximately 800mm below left bank.



Section 11 with 16.3m^3/s flow, near bank-full on left bank.



Section 10 with 16.3m^3/s flow, near bank-full on left bank.

2) 25% blockage scenario, maximum flow capacity in sections upstream of bridge:

File Options Help

Description : ... Apply Data

Enter/Edit Number of Profiles (32000 max): 01 Reach Boundary Conditions ...

Locations of Flow Data Changes

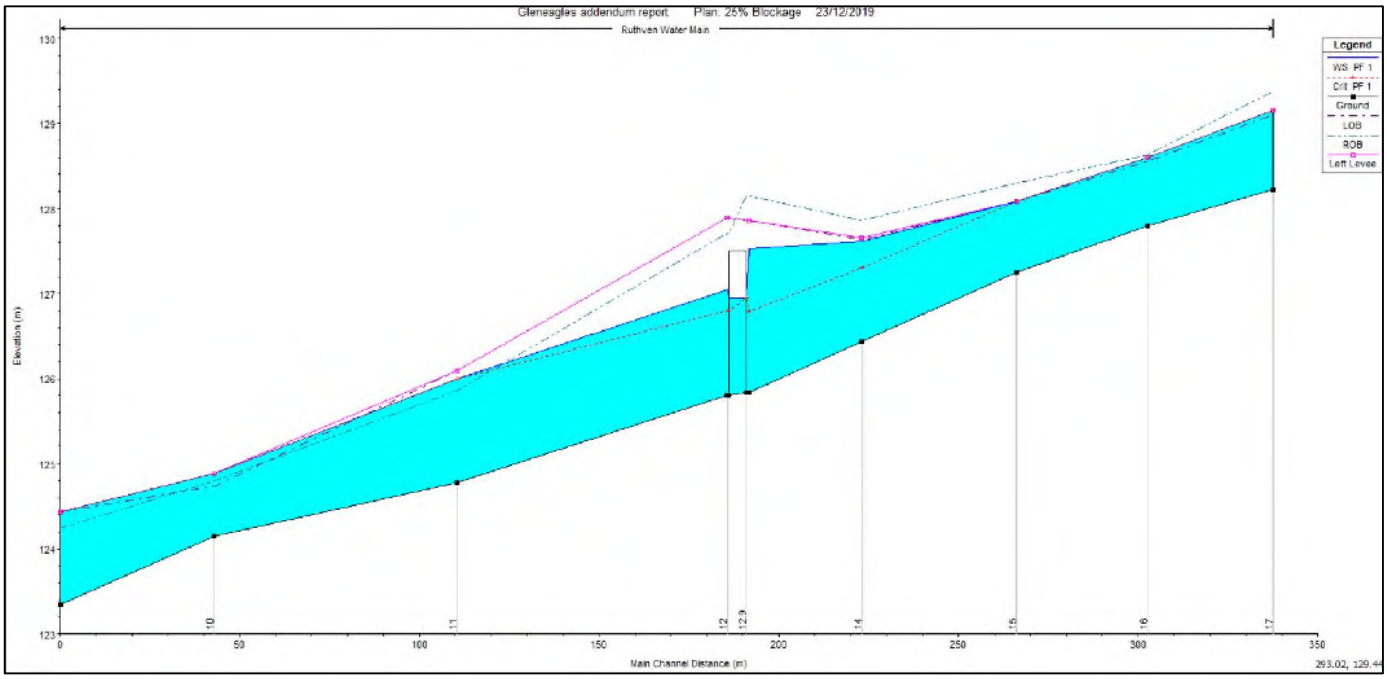
River: Ruthven Water Add Multiple...

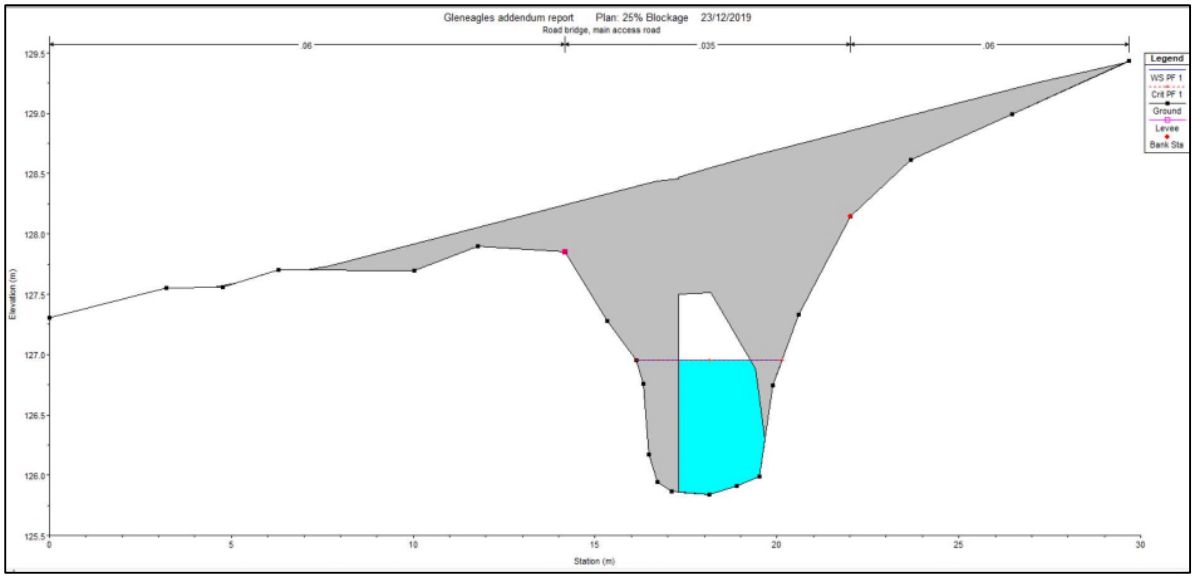
Reach: Main River Sta.: 17 Add A Flow Change Location

Flow Change Location				Profile Names and Flow Rates
	River	Reach	RS	PF 1
1	Ruthven Water	Main	17	16.3
2	Ruthven Water	Main	16	16.3
3	Ruthven Water	Main	15	14
4	Ruthven Water	Main	14	8.2
5	Ruthven Water	Main	13	8.2
6	Ruthven Water	Main	11	16.3

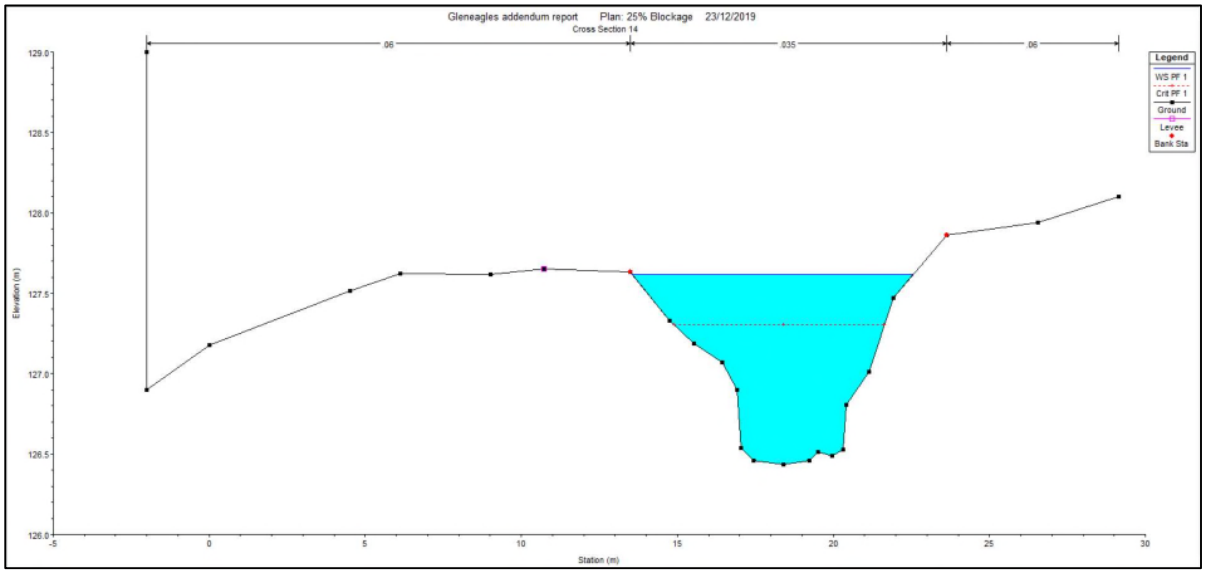
(m)

Maximum flows corresponding to bank full capacity. 25% blockage





Upstream face of bridge, 25% blockage.



Section 14, just bank-full with capacity of flow 8.2m^3/s

3) 50% blockage scenario, maximum flow capacity in sections upstream of bridge:

Steady Flow Data - Flow 02

File Options Help

Description :

Apply Data

Enter/Edit Number of Profiles (32000 max): 1

Reach Boundary Conditions ...

Locations of Flow Data Changes

River: Ruthven Water

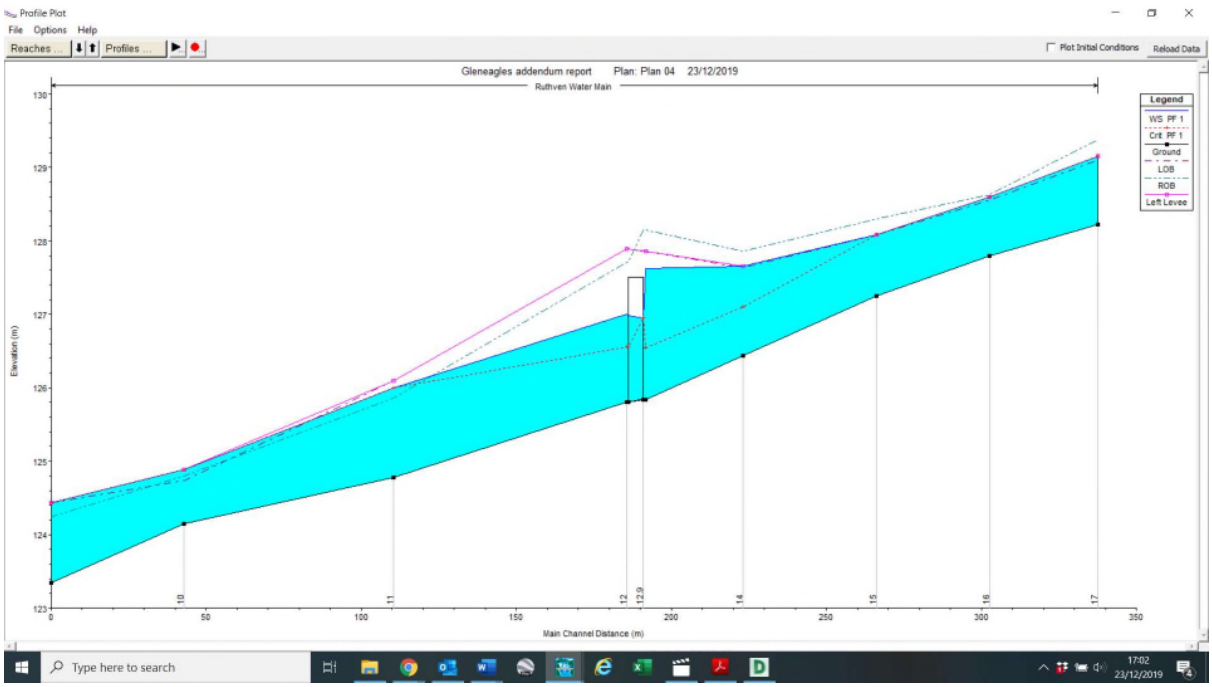
Add Multiple...

Reach: Main River Sta.: 17

Add A Flow Change Location

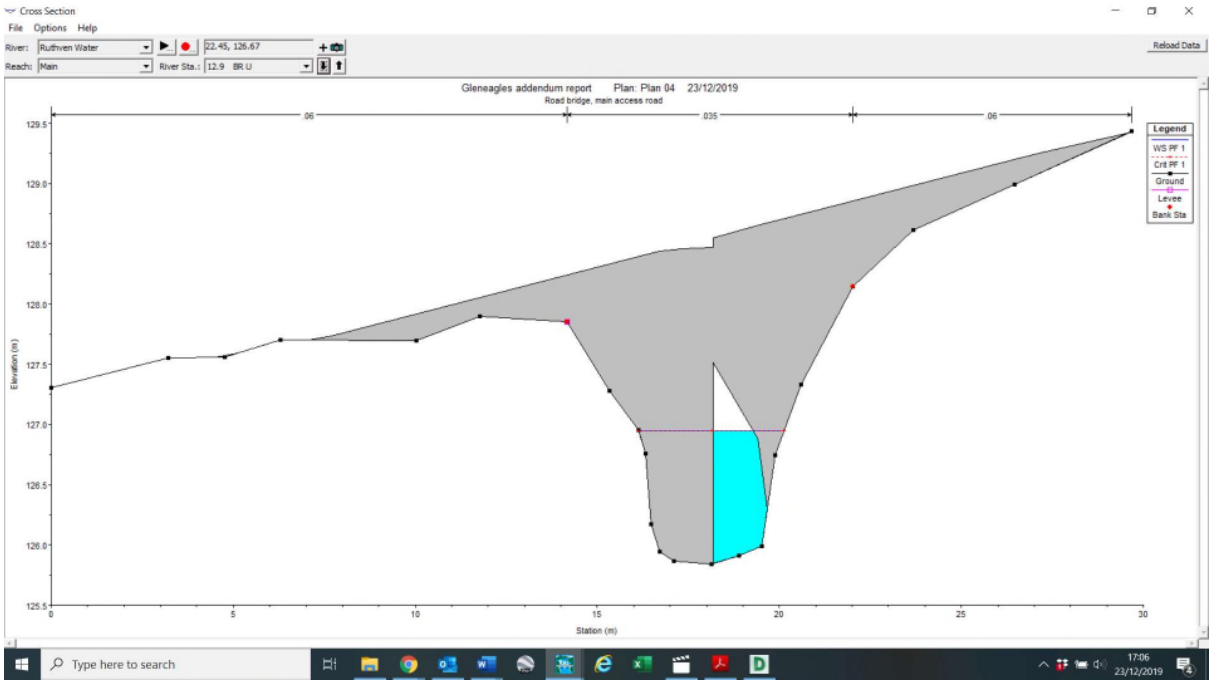
Flow Change Location				Profile Names and Flow Rates
	River	Reach	RS	PF 1
1	Ruthven Water	Main	17	16.3
2	Ruthven Water	Main	16	16.3
3	Ruthven Water	Main	15	14
4	Ruthven Water	Main	14	5
5	Ruthven Water	Main	13	5
6	Ruthven Water	Main	11	16.3

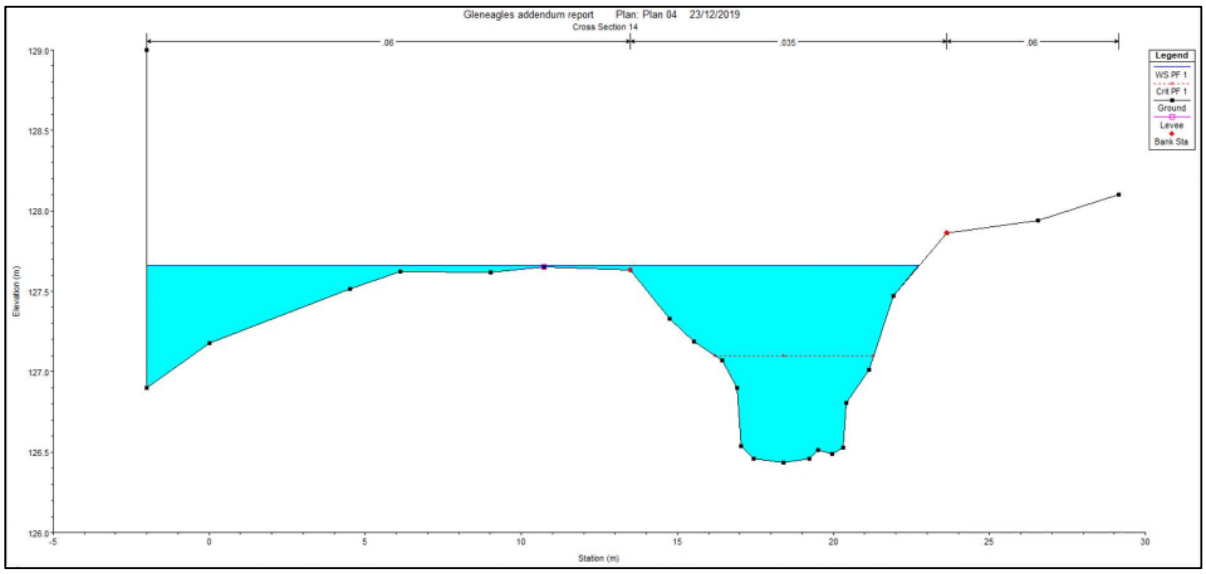
Maximum flows corresponding to bank full capacity. 50% blockage

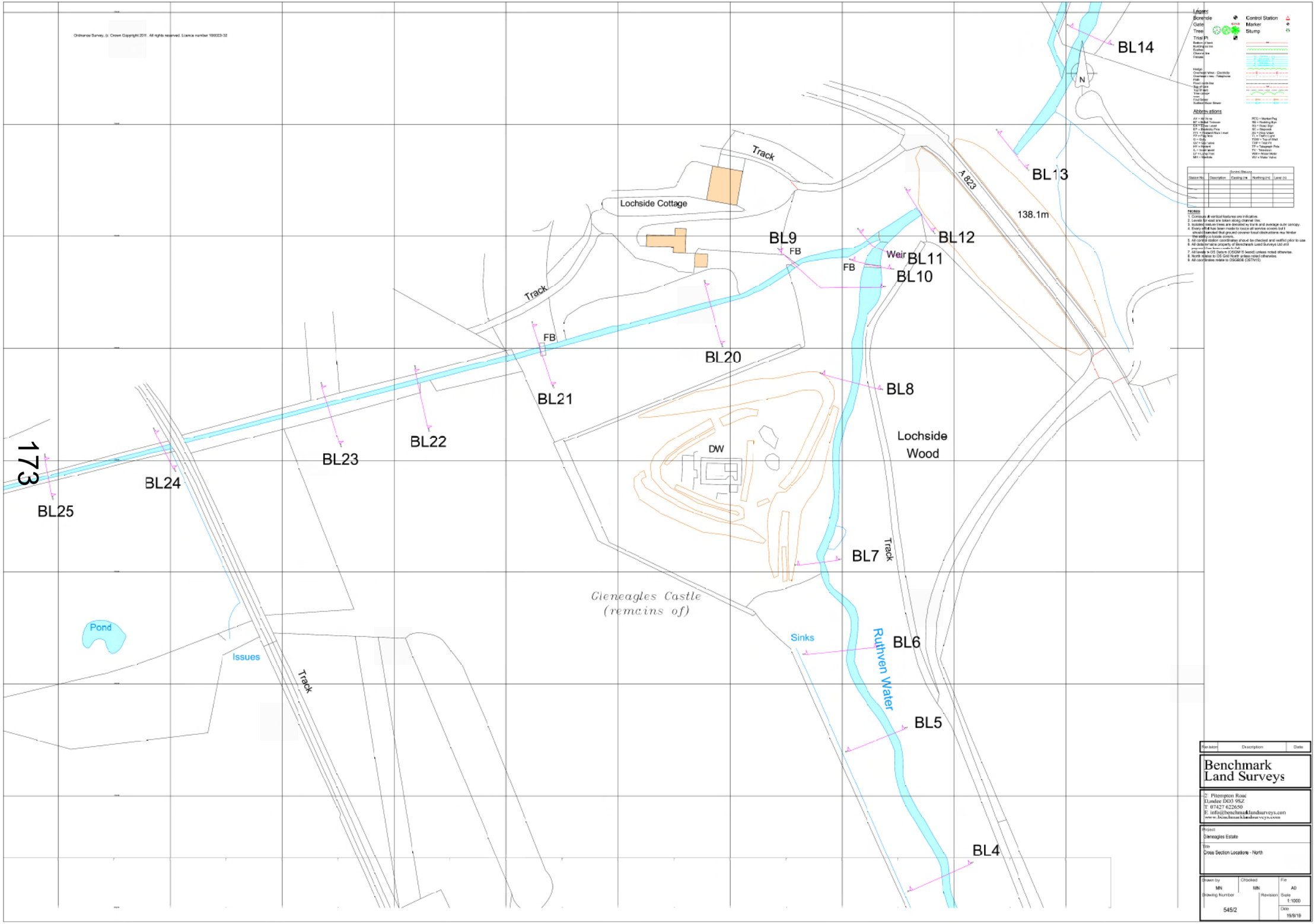


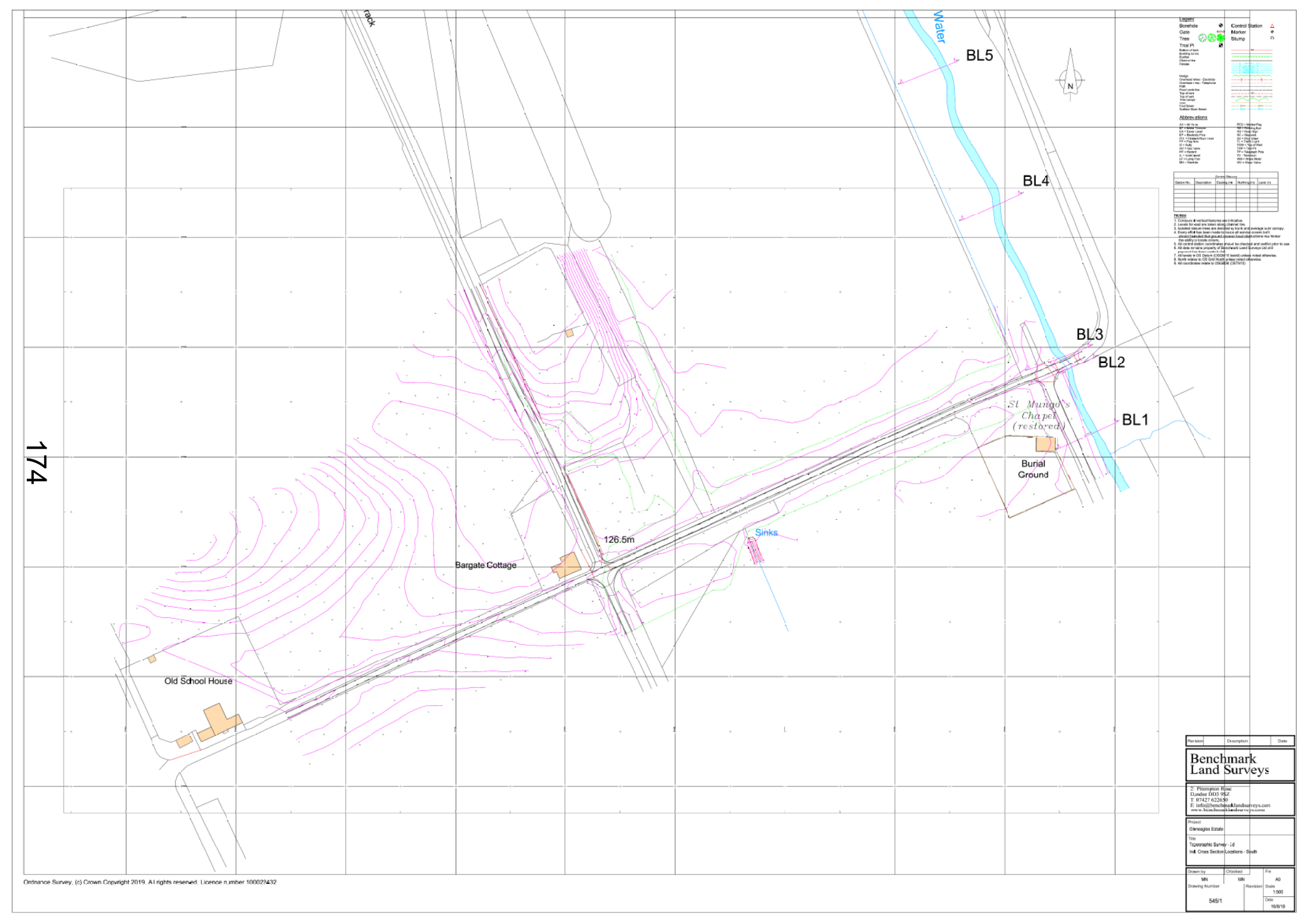
HEC-RAS Plan: Plan 04 River: Ruthven Water Reach: Main Profile: PF 1

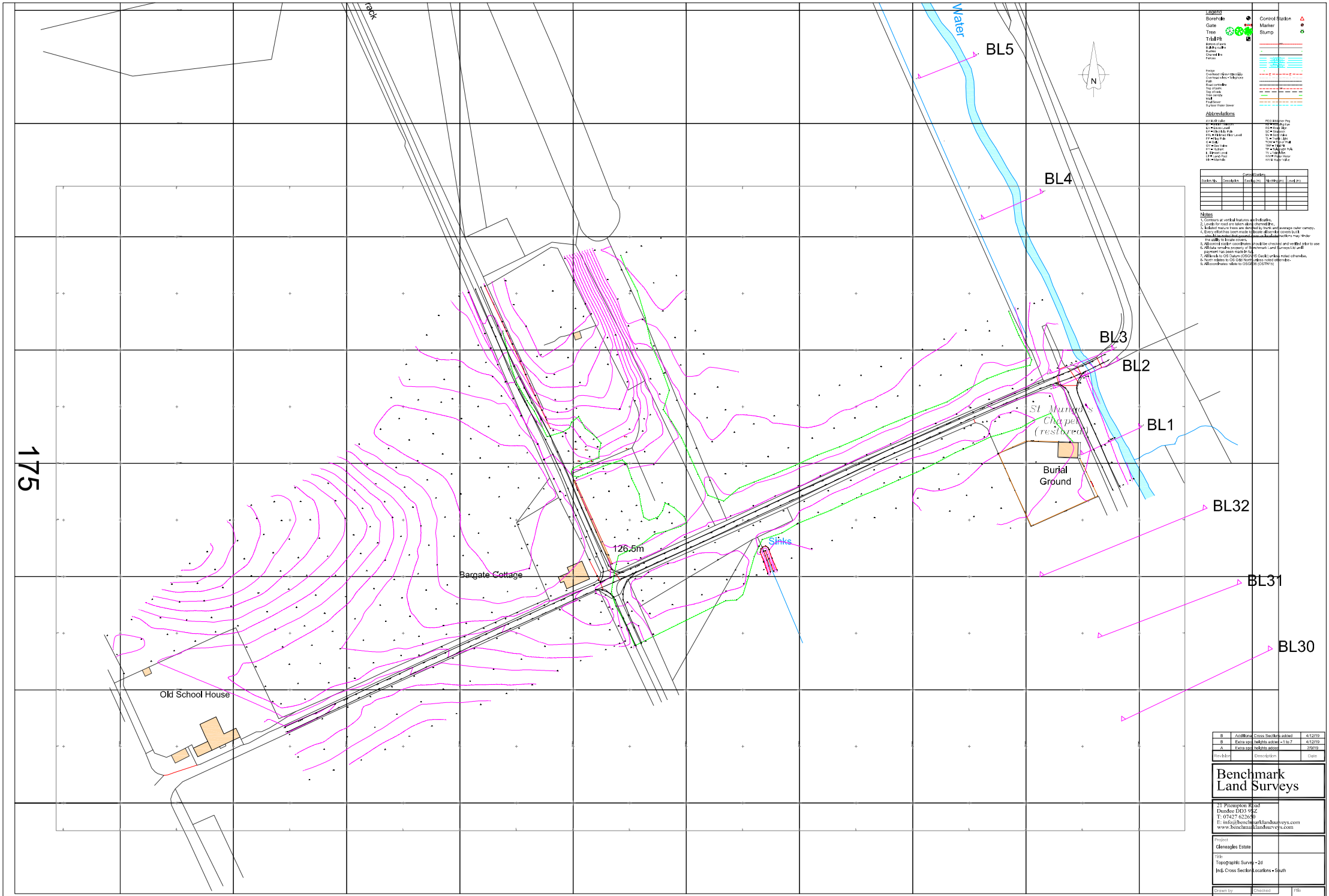
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Main	17	PF 1	16.30	128.22	129.15	129.15	129.19	0.003719	1.20	23.70	56.00	0.49
Main	16	PF 1	16.30	127.79	128.60	128.60	128.64	0.004437	1.25	22.19	49.00	0.53
Main	15	PF 1	14.00	127.25	128.08	128.08	128.10	0.001331	0.61	32.91	64.79	0.28
Main	14	PF 1	5.00	126.43	127.66	127.10	127.68	0.001080	0.70	9.40	24.73	0.27
Main	13	PF 1	5.00	125.84	127.63	126.54	127.65	0.000722	0.71	7.09	6.50	0.22
Main	12.9		Bridge									
Main	12	PF 1	5.00	125.81	127.01	126.55	127.11	0.004194	1.43	3.51	3.32	0.44
Main	11	PF 1	16.30	124.78	125.99	125.99	126.31	0.015098	2.50	6.60	11.07	0.99
Main	10	PF 1	16.30	124.15	124.89	124.89	124.89	0.000744	0.50	64.91	167.90	0.21
Main	9	PF 1	16.30	123.34	124.43	124.43	124.44	0.000996	0.53	58.97	172.33	0.24






Ordnance Survey, (c) Crown Copyright 2011. All rights reserved. Licence number 100022-32
Legend
Borehole
Gate
Tree
Trial Pit
Control Station
Marker
Stump
Abbreviations
Notes
1. Contours & vertical features are indicative.
2. Levels for road are taken along channel line.
3. Isolated roadside trees are denoted by trunk and average outer canopy.
4. Every effort has been made to locate all service covers but it should be noted that ground cover/ road obstructions may hinder accurate location.
5. All control station coordinates should be checked and verified prior to use.
6. All data remains property of Benchmark Land Surveys Ltd and may not be used without permission.
7. All levels to OS Datum (OSGM15 geoid) unless noted otherwise.
8. North relates to OS Grid North unless noted otherwise.
9. All coordinates relate to OSGB36 (OSTM15)
Station No.
Description
Easting (m)
Northing (m)
Level (m)
BL14
BL13
138.1m
A 823
Track
Lochside Cottage
BL9
FB
BL12
Weir
BL11
BL10
FB
Track
FB
BL20
BL21
BL8
Lochside Wood
DW
BL22
BL23
BL24
BL25
173
Gleneagles Castle (remains of)
BL7
Track
Pond
Issues
Track
Sinks
BL6
Ruthven Water
BL5
BL4
N
Benchmark Land Surveys
2 Pitempton Road
Dundee DD3 9SZ
T: 07427 622650
E: info@benchmarklandsurveys.com
www.benchmarklandsurveys.com
Project
Gleneagles Estate
Title
Cross Section Locations - North
Drawn by
MN
Checked
MN
File
A0
Drawing Number
545/2
Revision
Scale
1:1000
Date
19/9/19





EXTENDED PHASE 1 SURVEY REPORT

ECOLOGY SURVEY

GLENEAGLES ESTATE

AUCHTERARDER

14.10.2019 (Version 1)

PREFACE

This document is a report for ecological services to be carried out by the company.

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REVISION AND SIGN OFF

ISSUE DATE	AUTHORS	CHECKED BY	SIGNED OFF	VERSION	CHANGE REFERENCE
14.10.19	Lacey Urquhart Sarah Moore	Beccy Osborn	Beccy Osborn	1	

EXECUTIVE SUMMARY

This report presents the results of an extended Phase 1 ecology survey undertaken in September 2019 at a site located on the Gleneagles Estate, east of Bargate cottage. The survey work was undertaken on behalf of A and R Woodland Consultants Ltd. Planning in principle (19/00733/IPL) has been submitted for a residential dwelling with associated parking and gardens within the site.

The site is largely composed of mixed plantation woodland, with broadleaved semi-natural woodland, scattered broadleaved and coniferous trees, neutral grassland, improved grassland and tall ruderal vegetation. Characters of the habitats on site have been influenced by the previous land use of the site as a residential dwelling and gardens.

The habitat on site offers some suitability for foraging badgers and sett creation. However, no badger signs were identified within the site or 100m buffer. Red squirrels are known to be present within the site boundary. Foraging signs were identified within the site and potential dreys were recorded within the 100m buffer. Trees with bat roost potential were recorded within the site boundary. Bats will use the woodland, tree corridors, hedges and grassland for a commuting and foraging. Nesting birds will use the site, in particular within areas of scrub and trees.

Recommendations:

The report details all recommendations. The following is a summary of key recommendations.

- **Trees:** Semi-mature and mature trees surrounding the site should be retained wherever possible. Any trees on site or overhanging the site, which are not to be affected as a part of any proposed works, should be protected in accordance with British Standard 5837:2012
- **Landscaping**: The site should be subject to landscaping that aims to enhance the biodiversity and ecological value of the site. Species chosen should be native and of known wildlife benefit that benefit species such as red squirrel and bats.
- **Nesting birds:** To ensure compliance with the Wildlife and Countryside Act 1981 (as amended), the clearance of vegetation which may support nests should be undertaken outside the bird nesting season (which is weather dependent but generally extends between March and September inclusive, dependant on species).
- **Bats:** If trees with bat roost potential are to be felled a full bat survey should be undertaken to confirm if any bat roosts are present.
- **Red squirrel:** If works are to take place within the squirrel breeding season (February to September inclusive) a full red squirrel survey should be undertaken to assess for disturbance to red squirrels within dreys up to 50m from the development. A licence for disturbance may be required.
- **Bird and bat boxes:** Provision of artificial boxes is recommended
- **Toolbox Talk:** All workers should receive a 'toolbox' talk during which contractors will be informed of any potential issues with regard to protected species on site (particularly roosting bats and nesting birds). This will ensure that all site workers are inducted in relation to the ecological requirements on the site.
- An **emergency procedure** should be in place should any protected species or their resting site (e.g. otter resting-up site) be encountered during operations. All work should cease in the area immediately, and a suitably experienced ecologist should be consulted to determine any mitigation requirements i.e. suitable set-backs or buffer zones, and consultation with statutory bodies or licence applications if required.

CONTENTS

1 PROJECT INFORMATION

1.1 SCOPE

This report presents the results of an extended Phase 1 Habitat Survey undertaken as part of a proposed development at a site north of Bargate Cottage, Gleneagles Estate, Auchterarder. The proposal comprises the development of a single residential building with associated garden and parking, planning in principle has been received (19/00733/IPL) (Figure 1 and Figure 7, Appendix 2). The survey was undertaken on behalf of A & R Woodland Consultants Ltd. The assessment was undertaken to advise on potential ecological constraints at the proposed development site, as well as to advise on compliance with relevant legislation and planning policy. This included:

- A desk study;
- An assessment of the sites to support roosting and foraging bats;
- A survey for habitats and invasive species; and
- A protected species walkover survey (including badgers, red squirrels and nesting birds).

1.2 SITE LOCATION AND DESCRIPTION

The site is situated approximately 370m to the north-west of Gleneagles House, and approximately 3km to the south of Auchterarder, set within agricultural land. The proposed development site is centred around OSGR (Ordnance survey grid reference) NN 92814 08943. Details of the site location can be found in Figure 1, Appendix 2.

1.3 RELEVANT LEGAL FRAMEWORK AND POLICY

This assessment has taken into account relevant legislation, guidance and policy including:

- EC Habitats (Directive 92/43/EEC);
- EC Birds Directive (Directive 2009/147/EC)
- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- The Conservation (Natural Habitats, &c) Amendment Scotland Regulations 2007;
- Wildlife and Countryside Act 1981 (as amended);
- Nature Conservation Scotland Act 2004 (as amended);
- The Wildlife and Natural Environment (Scotland) Act 2011;
- The Protection of Badgers Act 1992 (as amended);
- Planning for Natural Heritage: Planning Advice Note 60 (2000); and
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017.
- Perth and Kinross Local Development plan (2014)
    - Site H48

Further details where relevant are provided in Appendix 1.

2 SURVEY METHODS

2.1 DESK STUDY

A desk study was undertaken to determine the presence of any ancient woodland inventory, tree preservation orders, statutory and non-statutory designated nature conservation sites, and protected species within the locale. Only records within the last 25 years have been included.

The following were consulted:

- Scottish Natural Heritage (SNH) SiteLink (SNH, 2019);
- Scotland's Environment Web Map; (Scottish Government, 2019)
- National Biodiversity Network (NBN) Atlas (NBN, 2016);
- Tayside Local Biodiversity Action Plan (LBAP) (Tayside Biodiversity Partnership, 2016);
- Perth and Kinross Local Development Plan (Perth and Kinross Council, 2014);
- Perth and Kinross Council Interactive Heritage Map (Perth and Kinross Council, 2019); and
- Scottish Biodiversity List (SBL) (Scottish Government, 2012).

2.2 SURVEY METHODS

The site was visited on the 19th of September 2019. Ten figure grid references were taken to record notable site features as target notes, using a handheld GPS device. Time and weather data for the survey visit is given in Table 3. The area surveyed for habitats was the site boundary (red line boundary, Figure 1,2,3), and a buffer of 100 m (orange line buffer, Figure 1,2.3) was surveyed for protected species (in suitable habitat and where access was available, i.e. not in private gardens).

2.3 EXTENDED PHASE 1 HABITAT SURVEY

Habitats on the sites were classified using the Joint Nature Conservation Committee (JNCC) Phase 1 Habitat Survey method (JNCC, 2010). Target notes and grid references of notable plant species were recorded. Phase 1 Habitat Survey is a standard technique for classifying and mapping British habitats. The aim is to provide a record of habitats that are present on site. During the survey, the presence, or potential presence, of protected species was noted. Plants and their frequency of occurrence were recorded using the subjective DAFOR scale (dominant, abundant, frequent, occasional or rare).

Any invasive plant species present on site covered by the Wildlife and Natural Environments (Scotland) Act 2011 (WANE) were noted, but it was not a specific survey for these species.

2.4 PROTECTED SPECIES WALKOVER

A walkover survey for relevant protected species was undertaken which included a search for signs/sightings of the following:

2.4.1 BADGER

A walkover survey for evidence of badger *Meles meles* activity was undertaken within the site boundary, and in areas of suitable habitat beyond the site boundary, where access was available up to 100m. Any evidence of badger activity (in the form of bedding, scratch marks, paths, prints, guard hairs, latrines, dung and signs of foraging) was recorded.

Badger surveys can be undertaken at any time of year when vegetation growth is not high. Badgers are more active and mark their territories in the spring, but they are still active above ground

throughout the year. Badgers can have territories that are over 2km^2; therefore, seasonal foraging in an area that is within a territory may not be recorded.

2.4.2 OTTER

There are no mapped watercourses within the site boundary, or within 100m of the site. No suitable habitat for otters is thought to be associated with the site, so otter are not considered further in this report.

2.4.3 WATER VOLE

There are no mapped watercourses within the site boundary, or within 100m of the site. No suitable habitat for water vole is thought to be associated with the site, thus they are not considered further in this report.

2.4.4 RED SQUIRREL

Woodland and corridors of tree are present within the site and within 100m of the site boundary. The site and 100m survey area was searched for signs of red squirrel activity, including dreys and feeding signs.

2.4.5 BIRDS

An assessment was made of the suitability of the habitats for birds nesting and foraging, and all birds seen during the surveys were recorded.

A full breeding or wintering bird survey was not undertaken.

2.4.6 BATS

In line with guidance from SNH and the Bat Conservation Trust (BCT) (Collins, 2016), an assessment was made of the suitability of the habitats onsite and close to the site boundary to support roosting or foraging bat species (Table 1). A daytime survey of the trees on site were subject to a visual assessment from ground level to identify features suitable for roosting bats. Potential roost sites were investigated with the aid of binoculars and a powerful torch. Trees were categorised between high and negligible potential, according to Bat Conservation Trust (BCT) guidelines (see Table 1 below).

It is possible to carry out an assessment for bats in trees at any time of the year; but the initial assessment from ground level is best undertaken when the tree is not in full leaf. Trees were in full leaf at the time of the survey.

Table 1: BCT Categories of Roosting Habitats and Commuting and Foraging Habitats.

BCT Categories	Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats	Negligible habitat features on site likely to be used by commuting or foraging bats
Low	A structure with one or more potential roost sites that could be used by the individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roost features (PRFs) but with none seen	Habitat that could be used by small numbers of commuting bats such as fragmented hedgerows or an unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats

	from the ground or features seen with only very limited roosting potential.	such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting, such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

2.4.7 OTHER FAUNA

The presence, or potential presence, of any other species of note (e.g. Scottish Biodiversity List species, Local Biodiversity Action Plan species, reptiles, amphibians, etc.) was recorded.

2.5 EVALUATION

Based on the site survey and desk study an evaluation has been undertaken to identify important ecological features. A detailed assessment is not undertaken of other features that for example are sufficiently widespread, unthreatened and resilient to project impacts. However, recommendations are made to safeguard biodiversity as emphasised in the EU Biodiversity Strategy 2020. Consideration when assessing importance is given to designated sites, Local Biodiversity Action Plan species, red list species and legally protected species. Table 2 is used as a guide when identifying important ecological features.

Table 2: Guidance nature value levels

Level of Value	Examples (not definitive and often dependent on professional judgement)
International	Internationally-designated or proposed sites (such as SACs) meeting the criteria for international designation; or non-designated sites meeting the criteria for international designation. A significant area of a habitat type listed in *Annex I of the Habitats Directive*. Sites supporting populations of internationally-important numbers of species/assemblages.
National	Nationally-designated sites (such as SSSIs, National Nature Reserves, Marine Nature Reserves, Nature Conservation Review Grade 1 sites); or non-designated sites meeting SSSI selection criteria. Sites supporting populations of nationally-important numbers, and/or supplying critical elements of their habitat requirements. A site supporting 1 % or more of a national population.
Regional	Sites containing viable areas of threatened habitats of importance within a regional context. A significant area of habitat type listed on the *Scottish Biodiversity List* (SBL). Sites supporting viable breeding populations of nationally-scarce species on account of their rarity or supplying critical elements of their habitat requirements. Any regularly-occurring population of a nationally-important species that is threatened or rare in the region (e.g. >1 % of the regional population).

Local	Sites meeting the criteria for council area designation (such as Site of Importance for Nature Conservation (SINC)) which may include amenity and educational criteria in urban areas. Designated Local Nature Reserves. Sites containing significant areas of any priority habitat listed on the *LBAP*. Sites supporting significant populations of species known to be council rarities or included on the *LBAP*, and/or supplying critical elements of their habitat requirements. A site supporting 1 % or more of a county population.
Site	Undesignated sites, or features or species considered to appreciably enrich the resource within the context of the local area (i.e. approx. 5 km radius from the site area). Examples include species-rich hedgerows and ponds. Individual or small numbers of protected species common to the area. Small areas of *LBAP* habitat or other habitats of note.
Negligible	Low-grade and widespread habitats or species. A widespread species with minimal use of an area that does not form a significant element of its habitat requirements.

2.6 SURVEY PERSONNEL

All survey work and reporting was overseen by Beccy Osborn, Principal Ecologist and Company Director. She is an experienced ecologist and a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM) with over 19 years' ecological consultancy experience. She has an SNH bat licence and badger development licence. The extended Phase 1 Survey was carried out by Lacey Urquhart (Consultant Ecologist, ACIEEM, SNH licensed bat worker) and Sarah Moore (Senior Ecologist, MCIEEM).

Table 3: Survey details

Date	Surveyor	Survey Type	Start / Finish	Weather
19.09.2019	Lacey Urquhart and Sarah Moore	Extended Phase 1 survey	10:00-12:30	Temp: 15; WS: 1; CC: 0; Rain: 0
Key: Rain = 0-4 (0 = dry); Temp = Temperature (^{o}C); WS = Wind speed - 0 (calm) 12 (hurricane); CC = Cloud cover (in eighths)				

2.6.1 SURVEY LIMITATIONS

The assessment of bat roost potential of the trees was limited to a ground level assessment only; no nocturnal activity surveys or aerial surveys were undertaken.

Some features may have been missed during the ground-based bat roost potential assessment of the trees due to them being in full leaf during the survey.

Dreys may have been missed due to the density of the canopy within some trees. A full red squirrel survey was not undertaken.

A breeding bird survey was not undertaken. Any birds seen during the survey were noted.

Private residential areas within the survey buffer were not accessed.

3 SURVEY RESULTS

3.1 DESK STUDY

3.1.1 DESIGNATED SITES

The proposed development site is not designated for any natural heritage feature. Bogwood and Meadow and Kincardine Castle Wood are the only designated sites noted within 2 km. Bogwood and Meadow and Kincardine Castle Wood are designated as SSSIs (summarized in Table 4). Bogwood and Meadow is located approximately 740m north-west of the proposed development site and Kincardine Castle Wood is 1.8km to the north-east.

There is one Special Protection Areas within 10km. South Tayside Goose Roosts is approximately 4.8km to the west of the site.

3.1.1.1 SSSIs

Bogwood and Meadow is designated as a SSSI for its species rich fen meadow and wet willow scrub woodland. The fen meadow may be the most northerly example in Britain. The wet willow scrub woodland is nationally scarce and contains greater tussock sedge *Carex paniculata* and bay willow *Salix pentandra* both of which are scarce in Perth and Kinross.

Kincardine Castle Wood is a SSSI for its lowland mixed broadleaved woodland. It is one of the most extensive areas of ancient lowland mixed broadleaved woodland remaining in Perth and Kinross.

Given the distance from the development site, the qualifying features of the SSSI are not expected to be directly impacted by the proposed development.

3.1.1.2 SPAs

South Tayside Goose Roosts are protected as a SPA and comprises seven lochs, a number of smaller water bodies and wetland habitats. It is protected for its breeding populations of wigeon *Anas penelope*, non-breeding pink-footed goose *Anser brachyrhynchus* and non-breeding greylag goose Anser answer as well as in excess of 20,000 individual waterfowl.

The conservation objectives of all SPAs are:

- To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
- To ensure for the qualifying species that the following are maintained in the long term:
    - Population of the species as a viable component of the site
    - Distribution of the species within site
    - Distribution and extent of habitats supporting the species
    - Structure, function and supporting processes of habitats supporting the species
    - No significant disturbance of the species

Pink-footed and greylag geese have a winter foraging distance of 15-20 km, placing the proposed site within this distance. Review of literature of the distribution of feeding pink-footed and greylag geese shows that OSGB grid square in which this site is located is a sensitive area for geese, and although no quantitative data exists, geese are known to be present in the area (Mitchell, 2012). However, the site itself does not provide suitable habitat for geese and the development is not expected to directly impact any surrounding habitat, with potential to be used by geese. For these reasons the SPA will not be considered further in this report.

Table 4: Designated sites adjacent to the development.

Protected Area	Designation	Proximity To Survey Area	Statutory Interest Details (SNH Sitelink; Fife LBAP)	Considered further in the assessment
Bogwood and Meadow	SSSI	740m north-west	Designated as a SSSI for its species rich fen meadow and wet willow scrub woodland	No
Kincardine Castle Wood	SSSI	1.8km to the north-east	Designated as a SSSI for its lowland mixed broadleaved woodland	No
South Tayside Goose Roosts	SPA	4.8km west	Designated for its breeding populations of wigeon *Anas penelope*, non-breeding pink-footed goose *Anser brachyrhynchus* and non-breeding greylag goose Anser answer as well as in excess of 20,000 individual waterfowl	No
Key: NNR – National Nature Reserve Ramsar – Designated under the RAMSAR convention SSSI – Site of Special Scientific Interest SPA – Special Protection Area				

3.1.2 ANCIENT WOODLAND INVENTORY

11 areas of ancient woodland were identified within 2km of the site as designated on the Ancient Woodland Inventory (SNH, 2010). 10 of these areas are long-established woodlands of plantation origin. The closest is approximately 150m to the north-east. One section of ancient woodland exists within Broad Wood approximately 1.7km to the north-east along the Kincardine Glen. It is considered that these woodland blocks will not be impacted by the proposed works and therefore they are not considered further in this report.

3.1.3 TREE PRESERVATION ORDERS

No Tree Preservation Orders were listed on the Council website within or adjacent to the proposed development site.

3.1.4 PROTECTED AND NOTABLE SPECIES

Within this area of Scotland, the following bat species are known to be present (Richardson, 2000; Harris and Yalden, 2008; Russ 2014):

- Common pipistrelle *Pipistrellus pipistrellus;*
- Soprano pipistrelle *Pipistrellus pygmaeus;*
- Nathusius' pipistrelle *Pipistrellus nathusii* (rarely);
- Daubenton's bat *Myotis daubentonii;*
- Natterer's bat *Myotis nattereri*;
- Brown long-eared bat *Plecotus auritus;* and
- Leisler's bat *Nyctalus leisleri* (rarely).

Therefore, it is possible that any of the regularly occurring species listed above could be present on site or within the surrounding landscape. All species listed above (with the exception of Leisler's bat) are Scottish Biodiversity list species (Scottish Government, 2012). Bat records for brown long-eared bat were found within 2km of the survey site.

Other species of note highlighted within the search area are listed in Table 5 below.

The absence of records should not be taken as confirmation that a species is absent from the search area.

Table 5: Summary of protected species records within 2km of the site

Species	No. of records	Most recent	Proximity of nearest record to study area	Legislation / conservation status
BATS				
Brown Long-eared *Plecotus auratus*	2	1999	Record to 1km^2, approximately 150m east of the site	HR; ECH 4; SBL; LBAP.
MAMMALS (EXCLUDING BATS)				
Red squirrel *Sciurus vulgaris*	47	2019	Record to 100m^2, approximately 285m east of the site.	WCA; SBL; LBAP.
Beaver *Castor fiber*	6	2017	Records to 10m^2 approximately 1.8km north of the site	HR
BIRDS				
Barn owl Tyto alba	4	2006	Records to 2km^2 approximately 190m to East.	WCA, LBAP,SBL, AMBER
Curlew *Numenius arquata*	3	2006	Records to 2km^2, approximately 114m east of site.	LBAP, SBL, AMBER
Lapwing *Vanellus vanellus*	6	2006	Records to 2km^2, approximately 125m east of site.	LBAP, SBL, RED
Spotted Flycatcher *Muscicapa striata*	6	2006	Records to 2km^2, approximately 133m east of site.	SBL, RED
Tree sparrow *Passer montanus*	4	2011	Records to 2km^2 the approximately 1.7km west of site.	LBAP,SBL,RED
Yellowhammer *Emberiza citrinella*	4	2006	Records to 2km^2, approximately 130m east of site.	LBAP, SBL, RED

Key: ECH 4: Annex IV of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. Animal;
WCA: Wildlife and Countryside Act 1981 as amended.
HR: Conservation Natural Habitats & C Regulations 1994 as amended.
SBL: Scottish Biodiversity List species.
LBAP: Local Biodiversity Action Plan priority species.
NT: IUCN Red List species.

Datasets: Royal Society for the Protection of Birds, Scottish Natural Heritage,Scottish Wildlife Trust, The BCT/MTUK Bats & Roadside Mammals Survey

3.2 PHASE 1 HABITAT SURVEY

3.2.1 HABITAT DESCRIPTIONS

The following habitat categories were recorded within the site boundary during the field survey:

- Broadleaved semi-natural woodland (A1.1.1)
- Mixed plantation woodland (A1.3.2)
- Scattered broadleaved trees (A3.1);

- Scattered coniferous trees (A3.2);
- Neutral grassland (B2.1);
- Improved grassland (B4);
- Tall ruderal vegetation (C3.1);
- Species-poor hedge (J2.1.2)
- Fence (J2.4); and
- Wall (J2.5);

These habitats are described below. They are listed in the order found within the *Handbook for Phase 1 Habitat Survey* (JNCC, 2010), not in order of ecological value.

The dominant habitats present within the site are mixed plantation woodland, broadleaved semi-natural woodland and neutral grassland. The mapped results of the Phase 1 Habitat survey are presented as Figure 6, Appendix 2 and target note photographs in Table 8, Appendix 3.

Broadleaved semi-natural woodland (A1.1.1)

A block of mature woodland runs down the eastern boundary of the site, dominated by a row of mature lime trees *Tilia x europaea* with a patchy understory of sycamore *Acer pseudoplatanus,* and separates the site from adjoining pasture fields*.* The southern end of the woodland incorporates an overgrown and defunct garden hedge, now a line of trees through natural succession (TN 20). Species include sycamore *Acer pseudoplatanus*, hawthorn *Crataegus monogyna*, ash *Fraxinus excelsior* and elder *Sambucus nigra.* The original but rotting fence posts remain in situ within the hedge (TN 21). It is described here as woodland edge.

Between the overgrown garden hedgerow and the woodland boundary of mature lime *Tilia x europaea* is a shady glade dominated by forbs growing tall and sparse in the lower light levels (TNs 22 & 23): frequent ground elder *Aegopodium podagraria*, wood avens *Geum urbanum*, hogweed *Heracleum sphondylium*, creeping buttercup *Ranunculus repens*, raspberry *Rubus idaeus*, dock sp. *Rumex sp*., common nettle *Urtica diocia* and occasional Solomon's seal *Polygonatum multiflorum,* germander speedwell *Veronica chamaedrys* and bush vetch *Vicia sepium*. Most frequent grasses present are tufted hair grass *Deschampsia cespitosa* and Yorkshire fog *Holcus lanatus.* Male fern *Dryopteris felix-mas* is locally frequent.

Growth of the ground flora in the woodland adjacent to the mixed plantation woodland is influenced by the lower levels of available light and grows more sparsely and taller here. Species include cleavers Galium *aparine*, hogweed *Heracleum sphondylium*, raspberry *Rubus idaeus* and common nettle *Urtica diocia.*

Mixed plantation woodland (A1.3.2)

The majority of the site comprises mixed plantation woodland (TNs 24 & 25), ranging in age from young to early mature and planted in loosely differentiated areas of broadleaved species: sycamore *Acer pseudoplatanus*, hazel *Corylus avellana*, hawthorn *Crataegus monogyna*, ash *Fraxinus excelsior*, bird cherry *Prunus padus,* oak *Quercus sp*., rowan *Sorbus aucuparia* and coniferous species: European larch *Larix decidua,* Norway Spruce *Picea abies,* Sitka spruce *Picea sitchensis,* lodgepole pine *Pinus contorta,* Scots pine *Pinus Sylvestris*, Douglas fir *Pseudotsuga menziesii* and western hemlock *Tsuga heterophylla.* Scattered mature trees pre-date the planting and consist mostly of sycamore. A row of coppiced sycamore grows along the western boundary (TN 26); patches of mature box *Buxus sempervirens* grow towards the southern end of the sycamore row (TN 26); a mature gorse *Ulex europeaus* overgrown with raspberry grows in the enhanced light levels

caused by a gap in the canopy; and an overgrown bush of rhododendron is indicative of the previous land use as grounds of a house(TN 27). Rhododendron is a invasive non-native species(INNS).

The ground flora is continuous with the neighbouring semi-natural broadleaved woodland strip to the east; species include cleavers *Galium aparine*, hogweed *Heracleum sphondylium*, raspberry *Rubus idaeus* and common nettle *Urtica diocia.*

Scattered broadleaved trees (A3.1) and coniferous trees (A3.2)

A selection of native broad-leaved trees have been planted along the southern boundary of the site: hawthorn *Crataegus monogyna*, ash *Fraxinus excelsior*, oak *Quercus sp*. and rowan *Sorbus aucuparia* (TN 28). A row of seven mature and cabled but neglected Irish yew *Taxus baccata fastigiata* grow on the well-drained soil of a short slope to the north of the neutral grassland (see below).

Neutral grassland (B2.1)

An enclosed, level and relatively damp area of neutral grassland, dominated by tall specimens of tufted hair grass *Deschampsia cespitosa* and Yorkshire fog *Holcus lanatus*, distinguishes the lawn of the original house (TN 29). The provenance of the grassland is further identified by the occasional introduced shrub species *Rhododendron sp*. The area is bounded on the west by an intact stone wall (**Wall (J2.5)**), and to the south by a wire fence (**Fence (J2.4)**) against which a selection of native broad-leaved trees have been planted: hawthorn *Crataegus monogyna*, ash *Fraxinus excelsior*, oak *Quercus sp*. and rowan *Sorbus aucuparia* (**scattered broadleaved trees (A3.1)**). A row of seven mature and cabled but neglected Irish yew *Taxus baccata fastigiata* grow on the well-drained soil of a short slope (**Scattered coniferous trees (A3.2))**. Substrate here is sandy and the vegetation is dominated by a short, rabbit-grazed mat of rhizomatous yarrow *Achillea millefolium* (TN 30). The eastern boundary of the neutral grassland is delimited by an overgrown and defunct garden hedge of native species, now woodland edge ((**Broadleaved semi-natural woodland (A1.1.1))**.

Tall ruderal (C3.1)

A dense colony of creeping thistle *Cirsium arvense* is established on the previously disturbed site of the original house (TN 31). A mixture of the following species occur occasionally on the thin, poor soil and towards the edge of the *C. arvense* colony: black knapweed *Centaurea nigra*, male fern *Dryopteris filix-mas*, ribwort plantain *Plantago lanceolata*, raspberry *Rubus idaeus* and bush vetch *Vicia sepium*.

Improved grassland (B4)

An area adjacent to the site of the original house and next to the track is managed currently for site access and for car parking and appears subject to regular mowing (TN32). The low vegetation comprises dominant Yorkshire fog *Holcus lanatus*, and abundant white clover *Trifolium repens.* Frequently occurring species include yarrow *Achillea millefolium,* ragwort *Jacobaea vulgaris and* ribwort plantain *Plantago lanceolata*.

Species-poor hedge (J2.1.2)

A beech hedge grows above the retaining wall that runs along the northern section of the western boundary of the site.

Fence (J2.4)

Timber and post fencing divide the site from an estate lane to the south, and pasture fields to the east.

Wall (J2.5)

A stone wall separates the site from the track that runs alongside its western edge. The northern section acts as a retaining wall and is topped by beech (TN 33); the southern section is well maintained (TN 34).

3.2.2 GROUND WATER DEPENDENT TERRESTRIAL ECOSYSTEMS

Groundwater Dependent Terrestrial Ecosystems (GWDTEs) are communities which derive their water supply from a groundwater body, rather than from rain and surface water saturated soils. They can support biodiverse, botanically rich ground-flora, and can be impacted by, for example, pollution, abstraction, or diversion/disruption to groundwater flows. GWDTEs were not recorded on the site.

3.2.3 HABITAT EVALUATION

The habitats recorded on site are considered to be of either site or negligible value. The value of Phase 1 habitats is given in the table below with reference to the LBAP.

Table 6: Areas of Phase 1 habitat types and their assessed value.

Phase 1 Habitat	Geographical and Biodiversity Value (LBAP)	Habitat notes	Potential for other species
Broadleaved semi-natural woodland (A1.1.1)	Site	Extends along the eastern boundary, contributes to habitat connectivity. The mature trees are of high biodiversity value and contribute to landscape character and quality.	Provides suitable habitat for foraging/commuting/roosting bats, badger foraging and sett creation, red squirrel foraging and drey creation, nesting birds.
Mixed plantation woodland (A1.3.2)	Negligible/site	Majority of site is covered by mixed plantation woodland, planted in loosely differentiated blocks of broadleaved and coniferous species. Area includes few mature tree species that pre-date the planting and that are of site value for their high biodiversity value and their contribution to landscape character and quality.	Provides suitable habitat for foraging/commuting/roosting bats, badger foraging and sett creation, red squirrel foraging and drey creation, nesting birds.
Scattered broadleaved trees (A3.1)	Site	Planted along southern boundary of site. Young specimens although, as boundary trees, will already be contributing to habitat connectivity.	Provides suitable habitat for roosting and foraging/commuting bats and nesting birds.
Neutral grassland (B2.2)	Site	Through natural succession the lawn of the original house. Within the farming landscape this uncultivated area of grassland contributes to greater diversity of both plant and animal species.	Foraging habitat for bats and birds.

Improved grassland (B4)	Negligible	An area of grassland improved by mowing and crushing for access and car parking.	May provide foraging opportunities for badger.
Tall ruderal vegetation (C3.1)	Negligible	The site of the original house colonised by creeping thistle.	Foraging habitat for bats and birds.
Species-poor hedge (J2.1.2)	Negligible	Beech hedge above retaining wall. Species-poor and presumably cut on a regular basis, removing nuts that could feed wild birds and mammals over winter.	Foraging habitat for bats and birds.
Fence (J2.4)	Negligible	Separates the site from an estate lane to the south and pasture fields to the east.	No protected species associated.
Wall (J2.5)	Site	Bounds the site to the west from a track. Retaining in nature in the northern section. Small extent of LBAP priority habitat.	No protected species associated. May provide suitable habitat for amphibians such as toads *Bufo bufo* and frogs *Rana temporaria*.

3.3 PROTECTED SPECIES SURVEY

This section summarises the results of the protected species survey. Target notes for the protected species survey can be found in Appendix 3. Figure 2 (Appendix 2) displays the results of the survey.

3.3.1 BADGER

No evidence of badger was noted during the site walkover. The grassland and woodland within the site both offer good foraging potential for badgers, as does the surrounding agricultural land which is favoured due to being rich in earthworms. The habitat within the site is suitable for sett creation, as it contains a sandy, well-drained soil, within the woodland, all of which are characteristics favoured by badger (Harris and Yalden 2008).

3.3.2 RED SQUIRREL

The trees within the site and directly adjacent to the north and south of the site provide suitable habitat for red squirrel foraging and drey creation. Although sightings of red squirrel were not recorded during the survey, surveyors were informed that red squirrels use the bird feeder within the garden directly west of the site (Personal communication September 19th, 2019). Forty-seven red squirrel results were found in the desk study, the closest of which was 285m away. A feeding sign of squirrel was recorded within the site (TN 8) in the form of a chewed cone. Further feeding signs and dreys were recorded within the conifer trees directly to the north of the site (TN 11,13, 15, 16, 18, 19).

3.3.3 BIRDS

The table below outlines all birds recorded on or close to the site during the survey, as well as their conservation status (red, amber or green, as given in Eaton *et al*., 2015).

The, grassland, tree corridors and woodland within the survey area offer good habitat potential for foraging and nesting birds. The trees surrounding the site also provide connectivity to the wider landscape. The agricultural land surrounding the site offers good foraging opportunities for a range of species.

One amber-listed species was recorded using the site and adjacent areas: dunnock *Prunella modularis*. Barn owl records were found during the desk study and the grassland within the site provides suitable foraging habitat.

Table 7: Bird species observed on site.

Species	BTO Code	Notes	Conservation Status (BoCC)/ Legislation/ LBAP
Blue tit *Cyanistes caeruleus*	BT	On feeder off site to the west	Green
Buzzard *Buteo buteo*	BZ	Flying and calling over the north of the site	Green
Carrion crow *Corvus corone*	C.	Calling off site to the south	Green
Chaffinch *Fringilla coelebs*	CH	Calling from trees within the centre of the site	Green
Coal tit *Periparus ater*	CT	Calling from tops of trees on site.	Green
Great tit *Parus major*	GT	On bird feeder outside site to the west	Green
Robin *Erithacus rubecula*	R.	On site at south end	Green
Siskin Carduelis spinus	SK	On site calling from trees	Green
Wood pigeon *Columba palumbus*	WP	In trees east side of site	Green
Sand martin *Riparia riparia*	SM	Flying over the field to the west	Green
Dunnock *Prunella modularis*	D	Within the site	Amber
Great spotted Woodpecker *Dendrocopos major*	GS	On bird feeder in garden to the west	Green
Wren *Troglodytes troglodytes*	WR	Within shrubs in the centre of the site	Green
Jay *Garrulus glandarius*	J	Calling from trees within the site	Green
Key: BoCC: Birds of Conservation Concern, as given in Eaton *et al. (*2015) SBL: Scottish Biodiversity List.			

3.3.4 BATS

3.3.4.1 ROOSTING BATS

Eleven mature trees with bat roost potential are present within the site boundary (Table 9, appendix 23. These were classified following the BCT guidance (Table 1). Seven trees hold low/moderate potential and four hold moderate potential. Full details of the features recorded are available in Table 9. Features included: splits in limbs and main stem, rot and knot holes and delaminated bark.

3.3.4.2 FORAGING BATS

The site offers good foraging potential for bats, over the grassland, tree corridors and woodland.

The habitat suitability of the site and survey buffer is assessed to be of moderate bat foraging and commuting potential.

3.3.5 OTHER SPECIES

Mammal holes that may have previously been used by fox were noted outside of the site to the north; no signs of active fox use were noted.

Field vole signs were recorded within the grassland to the south of the site. Field voles, and the grassland habitat, create a good barn owl foraging.

A dead hedgehog was found within the woodland on the east side of the site. This indicates that the site is used, and is suitable, for hedgehogs. The woodpiles, scrub and tall ruderal all provide suitable nesting areas and foraging potential.

The stonewalls and damp habitat within the woodland provide suitable habitat for amphibians such as toads *Bufo bufo* and frogs *Rana temporaria*.

4 DISCUSSION

4.1 INTRODUCTION

This section of the report makes recommendations that aim to minimise the impact of the proposal on local ecology, fulfil any legal obligations and provide best practice advice based on relevant guidelines. It is understood that a single residential house with associated garden and parking is proposed for the site. Details of the site location can be found in Figure 1, Appendix 2.

4.2 HABITATS

The development of the site would result in the clearance of areas of mixed plantation woodland, neutral grassland, improved grassland, tall ruderal vegetation, and the removal of individual trees. None of the habitats that would be lost are rare within the local area and the effect of the loss of these habitats will be at site level only.

Rhododendron is an invasive non-native species which was identified within the site (TN27) and will potentially be affected by the development. Under the Wildlife and Natural Environment (Scotland) Act 2011 it is an offence for any person to plant or otherwise cause to grow any plant in the wild at a place outwith its native range. As such, any works that will impact upon the non-native plant species, should be undertaken with care, following appropriate guidelines

4.2.1 RECOMMENDATIONS

- If the area of rhododendron will be affected the rhododendron material must be disposed of following appropriate guidelines. Further information on treatment methods and best practices can be found in the Forestry Commission Practice Guide Document: Managing and Controlling Invasive Rhododendron (Edwards, 2006).
- Semi-mature and mature trees surrounding the site should be retained wherever possible. If any are to be removed, appropriate like for like replanting of native species should take place as part of the landscaping of the site. Species chosen for planting should be native, of local provenance, and of known wildlife benefit.
- Any trees on site or overhanging the site, which are not to be affected as a part of any proposed works, should be protected in accordance with British Standard 5837:2012 “Trees in relation to design, demolition and construction – recommendations”. Protective measures should be installed on site prior to the commencement of any works on site. This should include protection from construction traffic and personnel as well as material storage and the trees should be protected by physical barriers (including root protection zones).
- The site should be subject to a comprehensive landscaping plan that aims to enhance the biodiversity and ecological value of the site (see below). Species chosen should be native and of known wildlife benefit.
- As per Policy NE3 of the Local Development Plan, a site Biodiversity Action Plan should be prepared and implemented.

4.2.2 ENHANCEMENT

The development plan should include a detailed landscape plan that aims to maximise the ecological value of the site, with areas of planting to benefit wildlife. Where possible planting should be of native species and other species known to benefit wildlife.

As per Policy NE2 of the Local Development Plan, new tree planting should form part of the landscaping proposals for the site. Additional landscaping plans could include, for example:

- Retention/creation of areas of scrub for ground-nesting bird species and as foraging habitat for terrestrial mammals;
- Planting native plant species which attract night flying insects, which will in turn be of value to foraging bats;
- Planting native seed/fruit bearing tree species which will be of value to wildlife as well as trees specifically for red squirrel;
- The installation of bird and bat boxes;
- Retention of woodpiles and create access to the garden for hedgehogs.
- Planting areas of priority habitat, such as native species-rich hedgerows, wildflower grassland or woodland.

4.3 BADGER

The survey found no evidence of badgers using the site or within the 100m buffer. As such, no effects on this species are predicted as a result of the proposed works. However, badgers are likely to use the wider area. General mitigation recommendations are made.

4.4 BIRDS

Any clearance of trees, scrub, tall ruderal vegetation and tall areas of grassland within the nesting season, could disturb or destroy nesting bird sites.

4.4.1 RECOMMENDATIONS

- To ensure compliance with the Wildlife and Countryside Act 1981 (as amended), the clearance of vegetation which may support nests should be undertaken outside the bird nesting season (which is weather dependent but generally extends between March and September inclusive, dependant on species). This applies to any trees, scrub, or tall grassland.
- If it is not possible to schedule works outside the breeding period, then a nesting bird survey should be carried out by a suitably experienced ecologist immediately prior to works commencing. If birds are found to be nesting, any works which may affect them would have to be delayed until the young have fledged and the nest has been abandoned naturally.

4.4.2 ENHANCEMENT

Planting of trees, shrubs and hedgerows will provide cover, nesting sites and foraging for birds and provide pollinators with habitat through blossoms and flowers.

The inclusion of bird boxes, specifically for species of conservation concern such as swift *Apus apus* (red-listed BoCC) and house martin *Delichon urbica* (amber-listed BoCC), could be installed on the new building. Other species of conservation concern could also be included such as starling *Stunus vulgaris* (red-listed BoCC), and house sparrows *Passer domesticus* (red-listed BoCC).

Examples of possible integral and mounted nest boxes for buildings and/or trees are:

- 17A Schwegler Triple cavity swift nest box
  - https://www.nhbs.com/no-17a-schwegler-swift-nest-box-triple-cavity (mounted).
  - https://www.nhbs.com/ibstock-eco-habitat-for-swifts (integral).
  - https://www.nhbs.com/manthorpe-swift-brick (integral)

- 3S Schwegler Starling Nest Box
    - http://www.nhbs.com/title/177925/3s-schwegler-starling-nest-box
- 9A Schwegler house martin nest
    - https://www.nhbs.com/house-martin-nests (mounted).
- 1SP Schwegler Sparrow Terrace, suitable for house sparrows
    - https://www.nhbs.com/1sp-schwegler-sparrow-terrace (can be mounted or built into wall)

House sparrow and starling nest boxes should be positioned ideally at a minimum of 3 m high and in an area with uncluttered air space. Nest cups for house martins should also ideally be at least 3 m high underneath a horizontal overhang. In both cases, the boxes and cups should be placed away from areas of high footfall, doors and windows, and ideally not facing into the prevailing south-westerly wind. In addition, swift boxes need to be mounted at least 4-5m high with a drop-off for the birds as they enter and exit.

Schwegler (or similar woodcrete boxes) boxes are constructed from a mixture of wood saw-dust, concrete and clay, and have a high rate of occupation due to closely mimicking natural nesting sites. They are breathable and maintain a suitable temperature due to their insulating properties. They are waterproof and rot-proof, with a life expectancy of 25 years without any maintenance requirements.

4.5 RED SQUIRREL

Red squirrels are known to use the site. The footprint of the development does not appear to require felling of any trees that have the potential to contain squirrel dreys. However, the development is within 50m of trees suitable for drey creation and the site boundary is within 50m of a potential drey, thus disturbance of red squirrels within a drey is possible.

- It is an offence to:
    - kill, injure or capture a red squirrel;
    - disturb a red squirrel in a drey;
    - damage, destroy or obstruct access to a red squirrel drey.

During the breeding season, which runs from February to September inclusive, the distane at which works could disturb a drey is 50m. Outside of the breeding season the disturbance distance is 5m.

If clearance of mature trees was required, this would have the potential to destroy squirrel dreys.

The clearance and construction phases of the development may cause disturbance to foraging squirrels due to noise and illumination, although it is not expected to have a significant detrimental effect on the local population.

4.5.1 RECOMMENDATIONS

- If works will take place within the squirrel breeding season a full survey for red squirrel should be undertaken prior to works starting to ensure compliance with the Wildlife and Countryside Act 1981 (as amended).
- If dreys used by red squirrel are confirmed within 50m of the development boundary a licence for disturbance from Scottish Natural Heritage (SNH) may be required, depending on the details of the works.
- If trees containing dreys need to be felled a licence from SNH would be required prior to felling and felling should not take place in the breeding season.

- Measures should be taken to ensure that the woodland areas adjacent to the site are not subject to increased illumination during construction, nor once the development is operational.
- Woodland corridors should be maintained where possible.

4.5.2 ENHANCEMENT

Considerations should be given to planting species that will benefit red squirrel and increase foraging resources. Species that are beneficial to red squirrel are:

- Norway spruce (Picea abies)
- Scots pine (Pinus sylvestris)
- Corsican pine (Pinus nigra)
- Lodgepole pine (Pinus contorta)
- Larch (Larix spp.)
- Willow (Salix spp.)
- Alder (Alnus glutinosa)
- Aspen (Populus tremulus)
- Birch (Betula spp.)
- Rowan (Sorbus aucuparia)
- Ash (Fraxinus excelsior)
- Hawthorn (Crataeugus monogyna)
- Dog rose (Rosa canina)
- Holly (Ilex aquifolium)
- Bramble (Rubus fruticosus)
- Birch (Betula spp.)

Red squirrel boxes could also be erected in the surrounding woodland and feeding stations provided.

4.6 BATS

The development proposal and tree survey indicate that no trees with bat roost potential will be removed. If trees with bat roost potential, as indicated within the Table 8 and Figures 2, will be removed, aerial surveys of the trees for bats should be undertaken prior to works commencing.

4.6.1 RECOMMENDATIONS

If trees with bat roost potential are to be felled a full bat survey should be undertaken. This is likely to involve one or two aerial surveys of the affected trees, and potentially, supervised felling. If a roost was confirmed in any of the trees, a derogation licence from SNH would be required, as well as appropriate mitigation measures.

Recommendations for lighting should follow the ILP guidance note on bats and artificial lighting in the UK (Miles *et al.* 2018). Lighting has been proven to cause disturbance to roosting and foraging bats and can affect the survivability of bats as well as make them vulnerable to predation. Where possible, the development should not illuminate suitable foraging and commuting habitat (in particular hedgerows, scrub, rough grassland and trees).

The following is recommended where lighting is to be installed:

- 'Dark buffers' to separate habitats and lighting by forming a dark perimeter;
- Artificial or natural (trees, hedgerows) screening to reduce light spillage;
- Appropriate luminaire specifications:
    - No use of UV elements, metal halides or fluorescent sources.
    - LED should be used due to its sharp cut-off, dimming capability, good colour rendition and lower intensity.
- A warm white spectrum (<2700 Kelvin) should be used to reduce blue light component;
- Peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats;

- Recessed internal luminaires in buildings to reduce glare and light spill;
- Reduced column height and the use of directional luminaires to reduce light spillage; and
- Luminaires should always be mounted on the horizontal i.e. no upward tilt.

4.6.2 ENHANCEMENT

Bat boxes or bat roost bricks could be integrated into the new building or erected on the trees to provide enhancement to the site. This could positively impact bats in the local area. Where bat boxes are used these should be placed at least 4 or 5 m above ground, as close to the eaves as possible, out of strong winds, and in a location that receives sun for part of the day (south or south-west).

The following are enclosed units could be considered and/or others could be chosen to tie in with the finish on the proposed buildings:

- Schwegler 1FR bat tube: suitable for crevice dwelling bats such as pipistrelle species
  - http://www.nhbs.com/1fr-schwegler-bat-tube
- Habitat bat box: suitable for crevice dwelling bats such as pipistrelle species
  - http://www.nhbs.com/habibat-bat-box-custom-timber-facing
- Ibstock bat box: suitable for crevice dwelling bats such as pipistrelle species
  - http://www.ibstock.com/literature/eco-products (custom brick finish integrated boxes).
- Schwegler 2F double front panel: suitable for erection on trees and crevice dwelling bats such as pipistrelle species
  - https://www.nhbs.com/2f-schwegler-bat-box-with-double-front-panel
- Eco bat box: suitable for erection on trees and crevice dwelling bats such as pipistrelle species
  - https://www.nhbs.com/eco-bat-box

Integrated boxes may also be rendered if required.

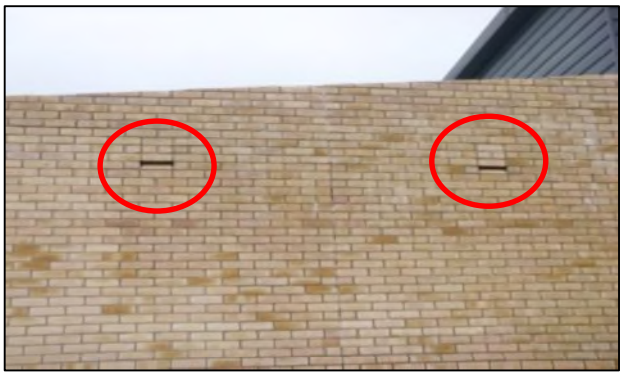

Photo 1: Example of an Ibstock box with matching facing brick.

4.7 GENERAL MITIGATION

- All workers should receive a 'toolbox' talk during which contractors will be informed of any potential issues regarding protected species on site (including nesting birds). This will ensure that all site workers are inducted in relation to the ecological requirements on the site.
- Removal or disturbance of scrub and wood piles should be carried out progressively and with due care to minimise disturbance to any potential hibernating or sheltering animals.

- Any steep-sided excavations that need to be left overnight should be covered or fitted with mammal ramps to ensure that any animals that enter can safely escape. Such excavations should be backfilled as soon as possible to minimise the potential for animals to become trapped.
- An emergency procedure should be in place should any protected species or their resting site be encountered during operations. All work should cease in the area immediately and a suitably experienced ecologist should be consulted to determine any mitigation requirements i.e. suitable set-backs or buffer zones, and consultation with statutory bodies or licence applications if required.
- Should other species of note be encountered during works which do not receive enhanced statutory protection, a suitably experienced ecologist should be consulted.

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APPENDIX 1 – RELEVANT LEGISLATION

EUROPEAN PROTECTED SPECIES

European protected species are those that are protected by the EC Habitats and Species Directive 92/43/EEC. The Conservation (Natural Habitats, &c.) Regulations 1994 translates this European legislation into UK law. This has been amended in Scotland by The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004 and 2007 and the Conservation (Natural Habitats, &c.) Amendment (No. 2) (Scotland) Regulations 2008. EPS includes bats (all species), otter, wildcat and great crested newt. These Regulations make it an offence to deliberately or recklessly:

- capture, injure or kill an EPS
- harass a wild animal or group of wild animals of EPS
- to disturb such an EPS while it is occupying a structure or place it uses for shelter or protection
- to disturb an EPS while it is rearing or otherwise caring for its young
- to obstruct access to a breeding site or resting place of an EPS or to otherwise deny an EPS use of a breeding site or resting place
- to disturb an EPS in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs
- to disturb an EPS in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young
- to disturb such an animal while it is migrating or hibernating

It is also an offence to:

- damage or destroy a breeding site or resting place of such an animal
- keep transport, sell or exchange or offer for sale or exchange any wild animal or plant EPS or any part or derivative of one (from 1st May 2007)

In relation to protected species of animal, licences can be issued under Regulation 44 to permit, for specific purposes, certain actions that would otherwise be against the law. Scottish Natural Heritage (SNH) is responsible for all EPS licensing under the Habitats Regulations (with the exception of some areas of licensing for whales and dolphins).

There is no provision for development licences as such, however, under Regulation 44 (2e) of the Conservation (Natural Habitats, &c.) Regulations 1994 licences may be granted for:

- Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.

However a licence will not be granted unless, importantly under 44 (3), the appropriate licensing authority is satisfied:

- That there is no satisfactory alternative; and

That the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

WILDLIFE AND COUNTRYSIDE ACT 1981

The Wildlife and Countryside Act 1981 provides protection to species and habitats. The Nature Conservation (Scotland) Act 2004 amends the Wildlife and Countryside Act 1981 in Scotland.

BIRDS

All wild birds receive general protection to their nest and eggs under the Wildlife and Countryside Act 1981, as amended by the Wildlife and Natural Environment (Scotland) Act 2011. Some species receive enhanced statutory protection due to their listing in schedule 1 of the Wildlife and Countryside Act 1981. It is an offence to disturb a Schedule 1 species while it is building a nest or is in, on, or near a nest containing eggs or young.

There are obligations within the Birds Directive 1979 relating both to protection of species and maintenance of habitats. Birds on Annex 1 to the Birds Directive, regularly occurring migratory species, and birds on Schedule 1 to the Wildlife & Countryside Act are recognised in statute as requiring special conservation measures.

A number of bird species have been highlighted in non-statutory lists as priorities of Conservation Concern in the United Kingdom. This includes those listed in Birds of Conservation Concern 4: and *Priority Species* listed in the UK *Biodiversity Action Plan*. Eaton *et al*. (2015) assigns all birds according to three categories:

- Red list species - those birds whose populations or range is rapidly declining (recently or historically), and those of global conservation concern;
- Amber list species - those birds whose populations are in moderate decline, rare breeders, internationally important and localised species and those of an unfavourable conservation status in europe; and,
- Green list species - those other birds occurring in the united kingdom not included in the red or amber lists above. Further details of the appraisal can be found in eaton *et al*. (2015).

SCHEDULE 5 ANIMALS

Enhanced protection is provided for species listed on Schedule 5, including red squirrel, water vole, pine marten and freshwater pearl mussel. It is an offence to recklessly kill, injure or take animals listed on Schedule 5, with the exception of water vole. Water voles are protected in respect of Section 9(4) only (in Scotland), meaning that water vole habitat is protected, although the animals themselves are not.

It is also an offence to recklessly damage, destroy or obstruct access to any place used for shelter or breeding. Licences are available for development purposes if certain conditions are met. Licences should be applied for from SNH.

HABITATS AND PLANTS

The protection of habitats and plants of national importance is provided under the provisions of the Wildlife & Countryside Act 1981 (as amended). This designates key sites that fulfil the habitat designation criteria as Sites of Special Scientific Interest (SSSI). Certain plant species receive enhanced statutory protection under Schedule 8 of the Act.

PROTECTION OF BADGERS ACT 1992

The Protection of Badgers Act (1992) provides full legal protection to badgers. In Scotland, this legislation was amended by the Nature Conservation (Scotland) Act 2004 and more recently by the Wildlife and Natural Environment (Scotland) Act 2011. It is an offence to recklessly take, injure or kill a badger (or knowingly cause or permit such an offence), or destroy or cause disturbance to their setts. This includes underground holes and other places of shelter occasionally used by badgers, such as sheds, concrete pipes or culverts etc. *A sett is defined in the Act as any structure or place which displays signs indicating current use by a badger.* Updated guidance has (September 2014) been provided by SNH and can be found on the SNH website at:

http://www.snh.gov.uk/docs/A1391121.pdf. In addition, badgers are afforded protection from cruel ill treatment. As the definition of 'ill treatment' has not been clearly defined; this is likely to include preventing badgers access to their setts as well as causing the loss of significant foraging resources within a badger territory. Licences are available for the disturbance or destruction of setts. SNH must be consulted prior to any works which could cause disturbance to badgers.

INVASIVE NON-NATIVE SPECIES

The Wildlife and Countryside Act 1981 (WCA) (as amended) provides the primary controls on the release of non-native species into the wild in Great Britain. The Wildlife and Natural Environment (Scotland) Act 2011 (WANE Act) made amendments to section 14 of the WCA. It is now an offence to 'plant' or 'otherwise cause to grow in the wild' a number of non-native plant species including species such Japanese knotweed and giant hogweed. In Scotland there is a legal presumption against releasing any animal or plants in the wild out with their natural range.

APPENDIX 2 – FIGURES

Figure 1: Site boundary and 100m buffer

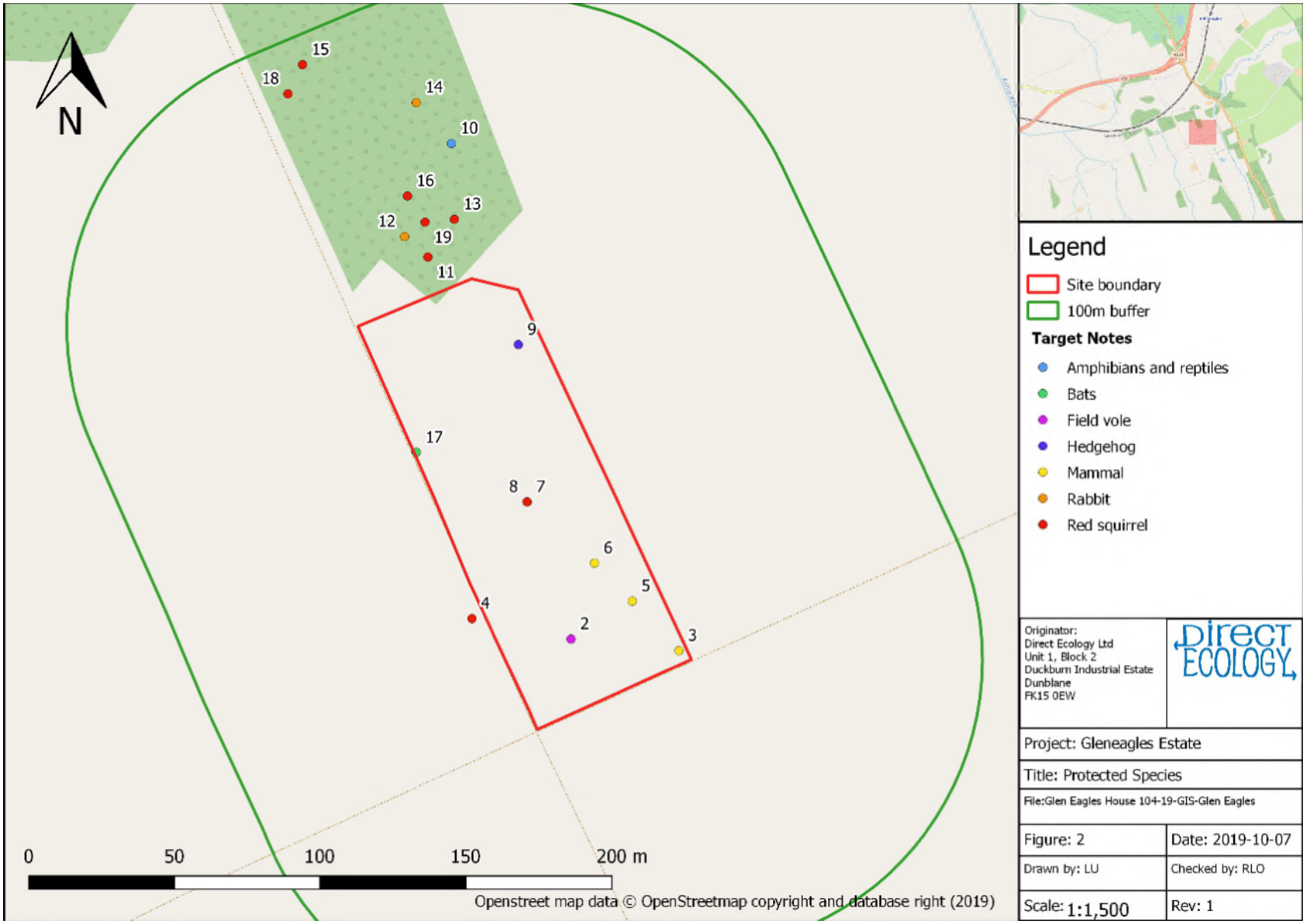

Figure 2:.Protected species results

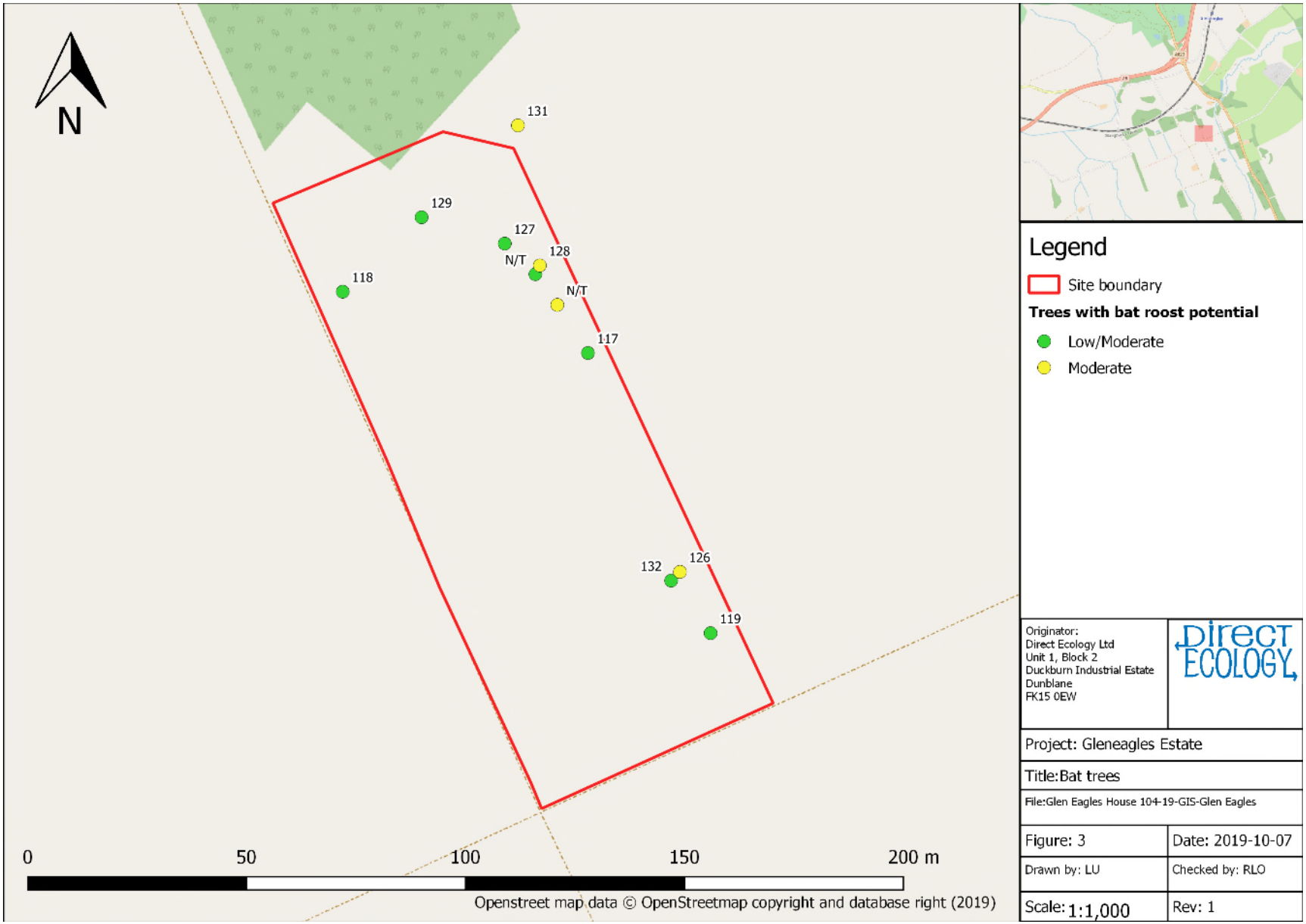

Figure 3: Trees with bat roost potential

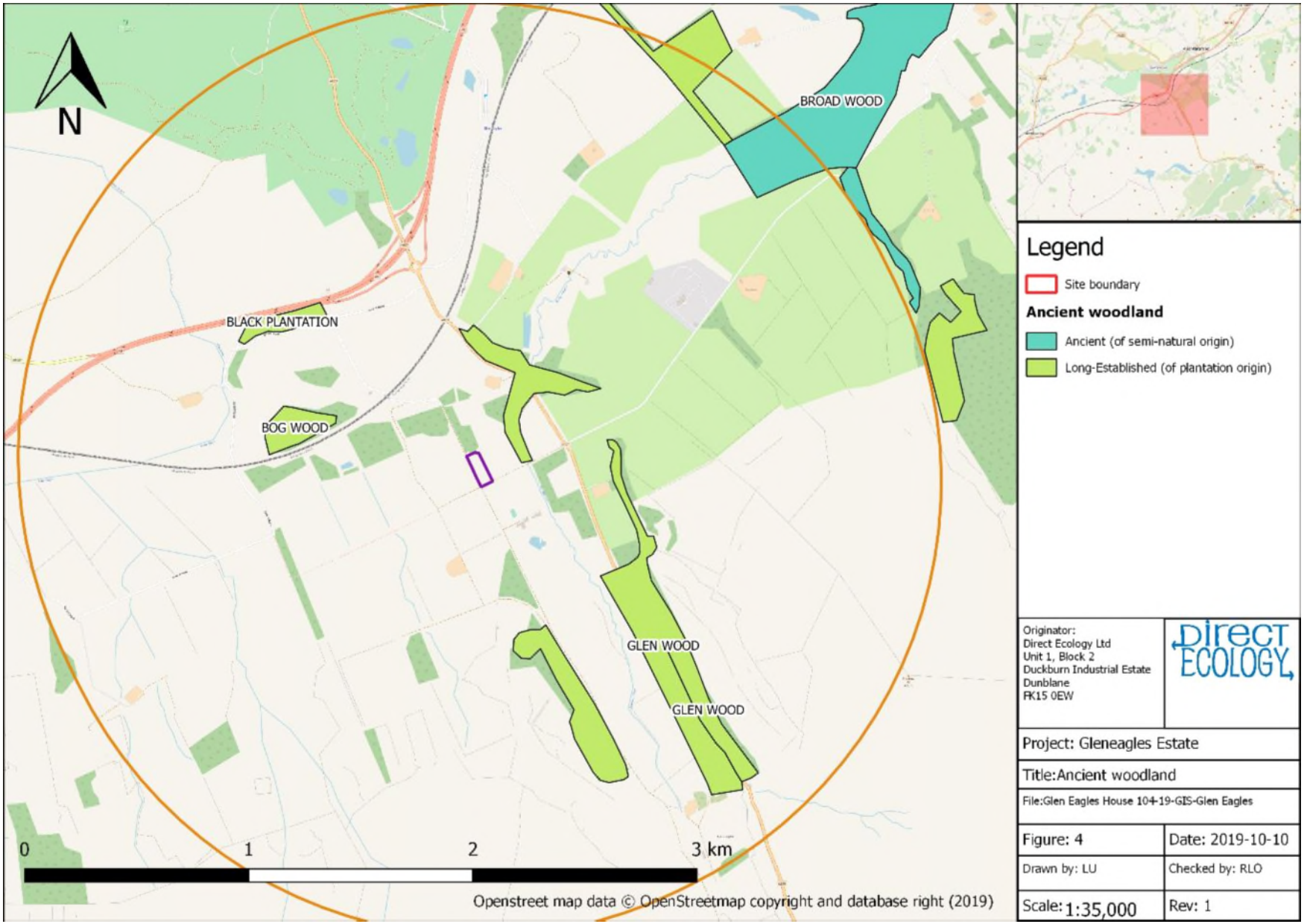

Figure 4: Ancient woodland

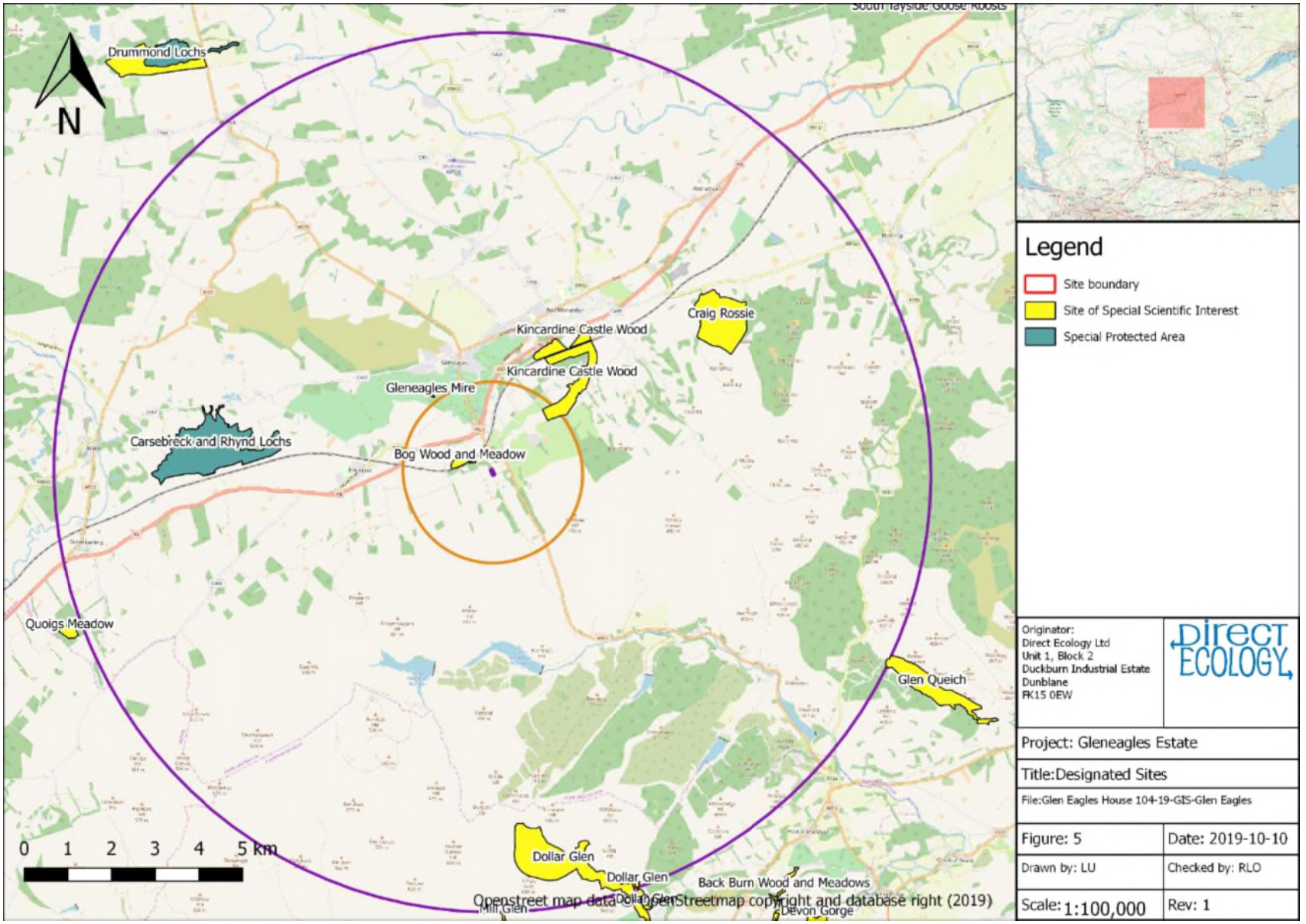

Figure 5: Designated sites

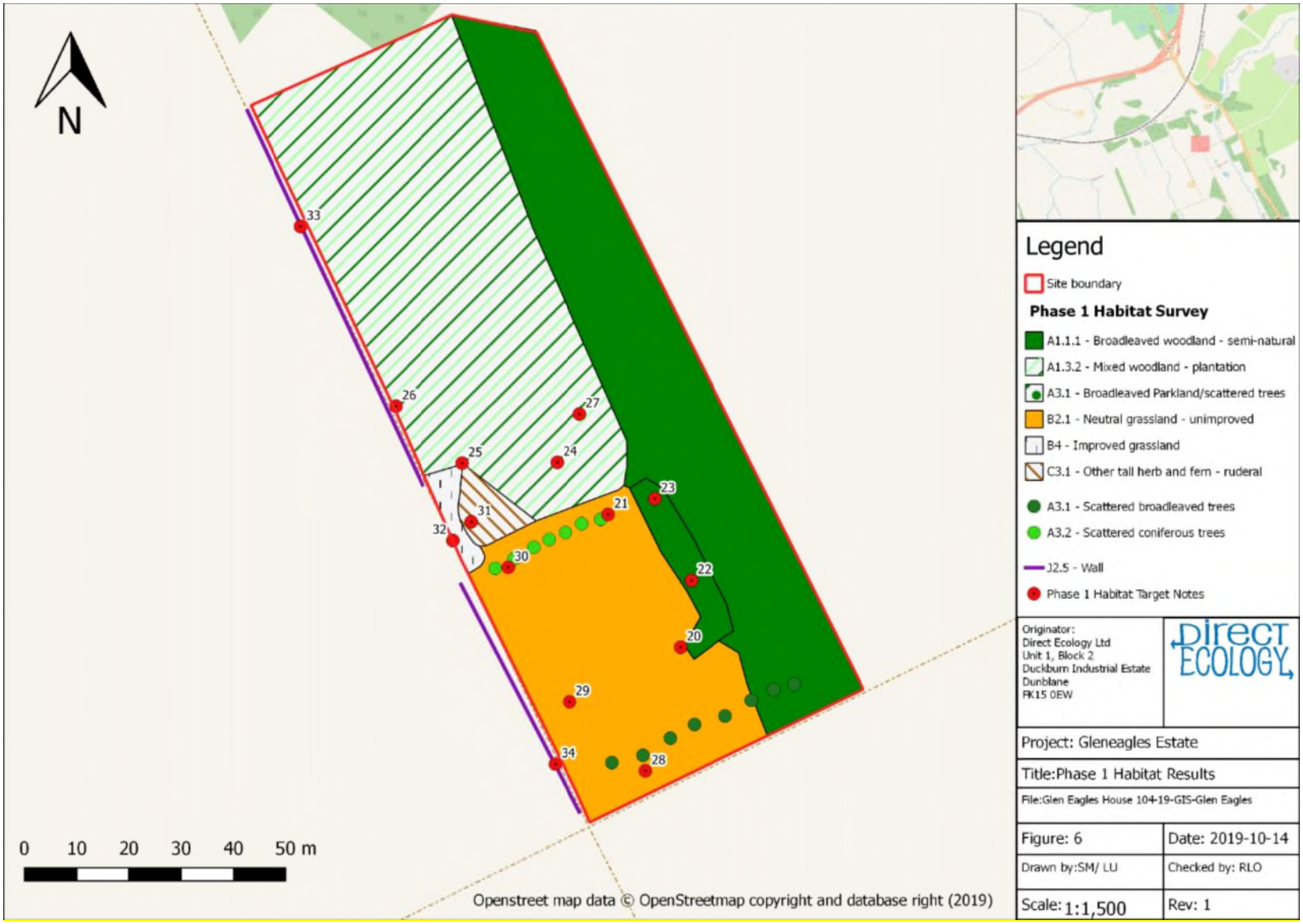

Figure 6 Phase 1 Habitat survey results and location of target notes

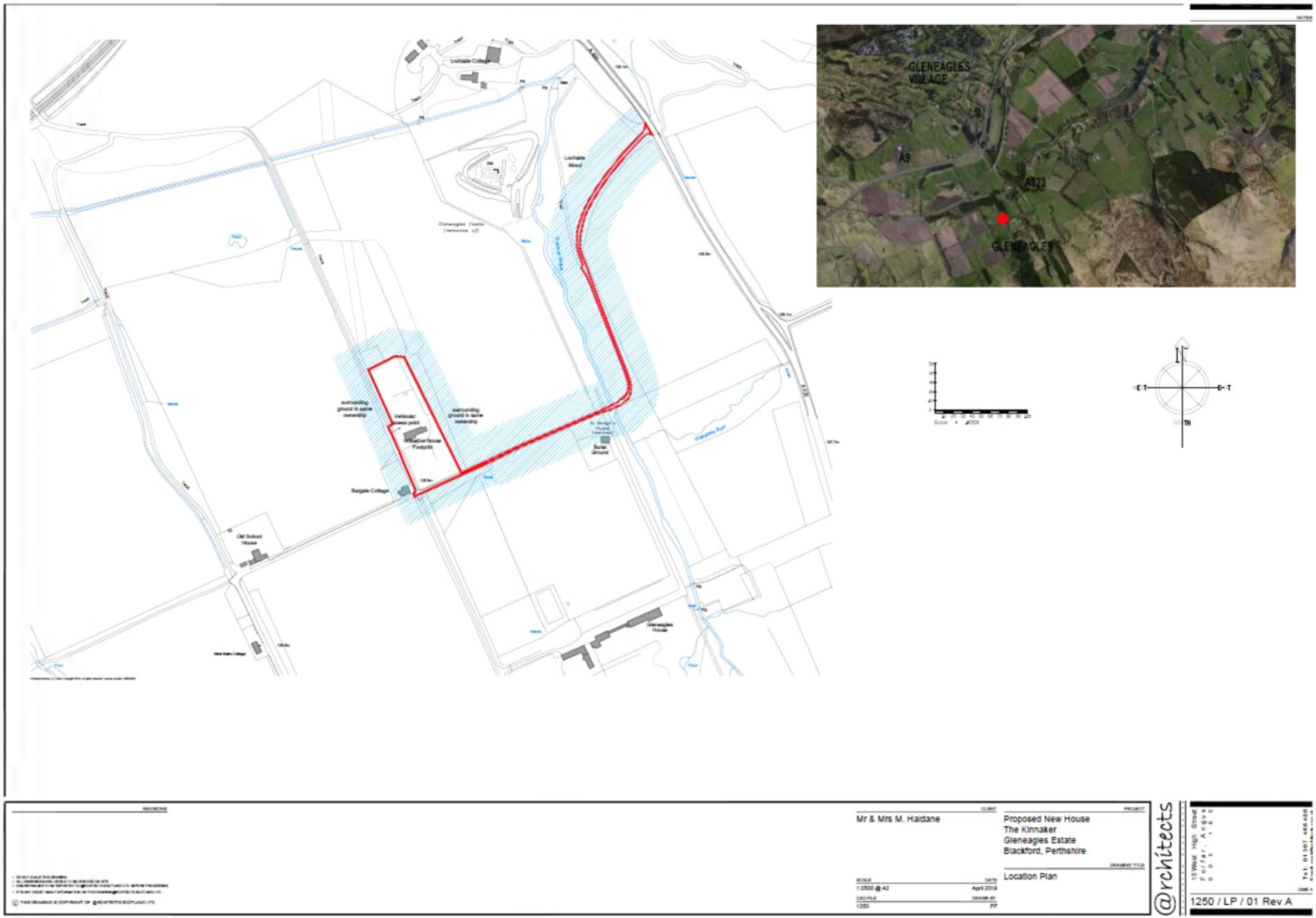

Figure 7: Development plan

APPENDIX 3 – TARGET NOTES

Table 8: Target notes.

TN No.	OSGR	Feature	Species	Notes	Photo
1	NN 92824 08940	Ground scraping	Pheasant	Major ground and vegetation damage throughout the site from pheasant	
2	NN 92828 08927	Droppings	Field vole	Field vole tunnels and droppings throughout the grassland	

TN No.	OSGR	Feature	Species	Notes	Photo
3	NN 92865 08923	Mammal path	Path	Mammal path under the fence	
4	NN 92794 08934	Sighting	Red squirrel	Red squirrel seen by resident on squirrel feeder	
5	NN 92849 08940	Path	Mammal	Mammal path through corridor of trees	
6	NN 92836 08953	Habitat	Mammal	Wood piles within the woodland which would provide suitable habitat for reptiles, amphibians and hedgehogs.	

TN No.	OSGR	Feature	Species	Notes	Photo
7	NN 92813 08974	Mammal hole	Rabbit	Rabbit holes around the base of yew trees. Rabbit hair found within.	
8	NN 92813 08974	Feeding	Red squirrel	Squirrel chewed cone found within rabbit hole	
9	NN 92810 09028	Sighting	Hedgehog	Dead hedgehog at the base of the trees. Appeared to be small/young.	

TN No.	OSGR	Feature	Species	Notes	Photo
10	NN 92787 09097	Habitat	Amphibians and reptiles	Old stone wall with hibernacula potential for amphibians and reptiles	
11	NN 92779 09058	Feeding	Red squirrel	Squirrel eaten cone	

TN No.	OSGR	Feature	Species	Notes	Photo
12	NN 92771 09065	Mammal hole	Rabbit	Hole potentially once used by fox due to size and shape. Now used by rabbit; rabbit droppings on the spoil.	
13	NN 92788 09071	Feeding	Red squirrel	Squirrel eaten cone	

TN No.	OSGR	Feature	Species	Notes	Photo
14	NN 92775 09111	Mammal hole	Rabbit	Rabbit holes. One larger hole with characteristics of fox. No signs of fox.	
15	NN 92736 09124	Feeding	Red squirrel	Squirrel eaten cone	
16	NN 92772 09079	Drey	Red squirrel	Potential red squirrel drey	
17	NN 92775 08991	Commuting	Bats	Mature beech hedge which provides a commuting feature	
18	NN 92731 09114	Drey	Red squirrel	Squirrel drey	
19	NN 92778 09070	Drey	Red squirrel	Potential for red squirrel dreys at top of conifers. Thick canopies restrict views.	

TN No.	OSGR	Feature	Species	Notes	Photo
20	NN 92835 08929	A1.1.1 Broadleaved semi-natural woodland	n/a	Original garden boundary hedgerow, now overgrown to a line of trees, with neutral grassland in foreground.	

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TN No.	OSGR	Feature	Species	Notes	Photo
21	NN 92821 08955	A1.1.1 Broadleaved semi-natural woodland	n/a	Hawthorn in overgrown garden boundary hedgerow.	

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TN No.	OSGR	Feature	Species	Notes	Photo
22	NN 92837 08942	A1.1.1 Broadleaved semi-natural woodland	n/a	Glade within broadleaved semi-natural woodland block, between boundary lime trees and overgrown garden boundary hedgerow.	

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TN No.	OSGR	Feature	Species	Notes	Photo
23	NN 92830 08957	A1.1.1 Broadleaved semi-natural woodland	n/a	Ground flora of glade.	

TN No.	OSGR	Feature	Species	Notes	Photo
24	NN 92812 08965	A1.3.2 Mixed plantation woodland	n/a	Block of broadleaved plantation woodland.	
25	NN 92794 08965	A1.3.2 Mixed plantation woodland	n/a	Photograph looking over improved grassland and tall ruderal to mixed plantation woodland.	

TN No.	OSGR	Feature	Species	Notes	Photo
26	NN 92783 08971	A1.2.2 Mixed plantation woodland	n/a	Coppiced sycamores and box plants in western edge of mixed plantation woodland.	

TN No.	OSGR	Feature	Species	Notes	Photo
27	NN92816 08974	A1.2.2 Mixed plantation woodland	n/a	Large rhododendron bush growing within mixed plantation woodland.	
28	NN 92827 08905	A3.1 Scattered broadleaved trees	n/a	The southern boundary of the site is marked by a post and wire fence (**Fence (J2.4)**), against which a selection of native broad-leaved trees have been planted: hawthorn *Crataegus monogyna*, ash *Fraxinus excelsior*, oak *Quercus sp*. and rowan *Sorbus aucuparia.*	

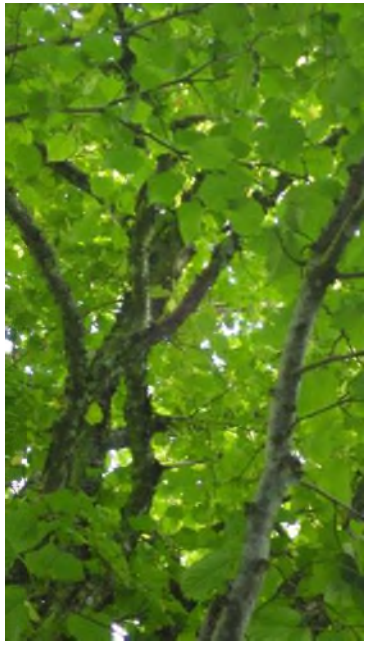
TN No.	OSGR	Feature	Species	Notes	Photo
29	NN 92813 08919	B2.1 Neutral grassland	n/a	Photograph taken from southern boundary of the site, looking towards row of Irish yew. Neutral grassland, dominated by tufted hairgrass and Yorkshire fog, in the foreground.	
30	NN 92802 08945	B2.1 Neutral grassland	n/a	Small area of yarrow-dominated vegetation on slope at base of row of Irish yew, within neutral grassland.	

TN No.	OSGR	Feature	Species	Notes	Photo
31	NN 92795 08954	C.3.1 Tall ruderal	n/a	Tall ruderal vegetation, dominated by creeping thistle, colonising site of original house.	
32	NN 92792 08950	B4 Improved grassland	n/a	Mown parking area, with tall ruderal vegetation colonising site of original house. Eastern end of the row of Irish yew.	

TN No.	OSGR	Feature	Species	Notes	Photo
33	NN 92777 08975	J2.1.2 Species-poor intact hedge; J2.5 Wall	n/a	Retaining wall above beech hedge, northern section of western boundary wall.	
34	NN 92810 08907	J2.5 Wall	n/a	Southern section of western boundary wall.	

Table 9: Bat roost potential trees

Tag No.	Grid Reference	Species	BRP	Notes	Photo
0119	NN 92855 08936	*Tilia x europaea*	Low/Moderate	Mature tree with a possible crevice at 2m on the east side which graduates into two leaders which have grown together. Potentially further features at the site of a split leader.	

Tag No.	Grid Reference	Species	BRP	Notes	Photo
0132	NN 92846 08948	*Tilia x europaea*	Low/Moderate	Potential split or hollow in branch, on the west side of the tree, at approximately 9m	

Tag No.	Grid Reference	Species	BRP	Notes	Photo
0126	NN 92848 08950	*Acer pseudoplatanus*	Moderate	Mature tree with a split up the main stem which may have potential cavities within the split and at the top of the stem. Likely would be unsafe to climb,	
0117	NN	*Pseudotsuga menziesii*	Low/Moderate	Mature tree with split on small branch extending north at approximately 6m. Split at approximately 3m on east side.	

Tag No.	Grid Reference	Species	BRP	Notes	Photo
	NN 92820 09011	*Populus sp.*	Moderate	Mature tree on bank with hollow at base and leaning potentially making it unsuitable to climb. Deadwood at the top of the tree with split which appears to be upward facing. Areas of delaminated bark.	
Not Tagged due to restricted access	NN 92815 09018	*Tilia x europaea*	Low/Moderate	Mature tree on bank with a large amount of epicormic growth which restricts the view of main stem and potential features. No features obvious. Some deadwood which may provide potential	

Tag No.	Grid Reference	Species	BRP	Notes	Photo
0128	NN 92816 09020	*Populus sp.*	Moderate	Mature tree with rot at base and leaning which may make it unsafe to climb. Deadwood at the top of the tree with woodpecker holes.	
0131	NN 92811 09052	*Tilia x europaea*	Moderate	Mature tree with rot holes on branch extending out to the east at approximately 7m. Knot/rot holes throughout the tree	
0127	NN 92808 09025	*Larix decidua*	Low/Moderate	Mature tree with split limb at approximately 8m on the east side	

Tag No.	Grid Reference	Species	BRP	Notes	Photo
0129	NN 92789 09031	*Tilia x europaea*	Low/Moderate	Mature tree with five leaders. The southern two leaders have some split limbs and delaminated bark at approximately 6m.	

0118	NN 92771 09014	*Acer pseudoplatanus*	Low/Moderate	Mature tree with various leaders growing into one another with the potential to form cavities. Cavity on west side at approximately 1.5m which leads downwards.	

Tag No.	Grid Reference	Species	BRP	Notes	Photo
					

BS 5387 Tree Report & Arboricultural Impact Assessment

Gleneagles Estate, Auchterarder, PH3 1PJ

September 2019

Prepared for

Martin Haldane
Gleneagles Estate

Prepared by Andrew Jackman & Rebekah Fraser P.T.I (MArborA) BSc
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Contents

BS 5387 Tree Report

Introduction

This pre-development tree report has been prepared in full support of an application for Planning Permission in Principle under the Town and Country Planning (Scotland) Act 1997.

The proposed domestic dwelling is located within a small block of woodland on the Gleneagles Estate, Land 70 Metres North of Bargate Cottage, Auchterarder, PH3 1PJ.

The information accrued from the tree survey (and specifically where tree loss is proposed) has been used to prepare the arboricultural impact assessment which evaluates the direct and indirect effects of the proposed design, and where appropriate, recommends mitigation.

This survey and report have been completed by Andrew Jackman and Rebekah Fraser, who both hold the LANTRA award in Professional Tree Inspection. Rebekah Fraser also hold a BSc in Arboriculture and Urban Forestry and is also a professional member of the Arboricultural Association. A & R Woodland Consultants Ltd are a team of independent arboriculture consultants and this report presents an impartial and objective assessment of the tree stock on the Gleneagles Estate.

Survey Methodology

The trees have been assessed using the current recommendations, as detailed in British Standard 5837:2012 'Trees in relation to Design, Demolition & Construction – Recommendations', in order to arrive at a Retention Category for each individual tree or group of trees. The tree survey included all trees within and aligning the site boundary that were over 75mm diameter at breast height (DBH). Some areas of denser tree planting have been approximately placed within groups that form cohesive arboricultural features either aerodynamically, visually, culturally or in biodiversity terms.

A Root Protection Area (RPA) has been assigned to each tree, based on its stem diameter and in some cases, crown spread, which has then been used to produce the Tree Constraints Plan – the Tree Constraints Plan is attached with this report as a PDF Document to allow more detailed viewing – 'Gleneagles Tree Constraints Plan'. An overall site view can be found in this document in Appendix 3. For full details of the relevant assessment criteria and retention categories see Table 1 of B.S. 5837 (attached as Appendix 2).

Tree number tags were used to identify trees. All collected survey data and work recommendations for individual trees is presented in the survey schedule which forms Appendix 1 to this report. For the location of all trees see the attached PDF Documents – 'Gleneagles Tree Constraints Plan'.

Site Overview

The development proposal briefly comprises; the erection of a single domestic house within an area of planted young woodland. A house previously stood on this ground until about 25-30 years ago – evidence of this was noted during the tree survey.

Arboricultural Overview

The tree survey and arboricultural implications assessment includes 34 trees – full tree survey schedule included as Appendix 1. Majority of these trees are situated on and around the proposed site of the house which also includes woodland. Other trees that were recorded in this report were located along the access track that leads to the proposed development site from the A823.

Access to the site from the main road is via a Tarmac road up to Bargate Cottage, which is tree lined. The trees found along the track are set back behind fences or hedging in most places. Where a physical barrier does not exist along this road, the trees are set back on a verge with signs present for traffic to keep off all verges. From Bargate Cottage to the development site there is an established estate gravel track that leads up to and runs alongside the west of the proposed development site.

Ten woodland compartments were included in this survey. The proposed development of the main dwelling house is located within woodland group 1. It is estimated that the woodland compartments were planted around the same time in the early 2000s. There has been no maintenance carried out on any of the compartments since planting. The woodlands would have originally been planted as cover for the pheasant shooting on the estate.

The compartments are mostly comprised of:

Woodland Group No.	Maturity	Species	Condition	Retention Category (Sub-category)	Recommendation
G1	Young	Sessile Oak, Sycamore, Ash, Bird Cherry, Hazel, Rowan and Hawthorn.	Planted area for pheasant shelter over old house site and proposed planning area. Trees are planted at 2m spacing, approximately 20 years old and of an even mix of species.	C	Remove
G2	Early Mature	Western Hemlock, Lodgepole Pine and Scots Pine.	Closely spaced tree group in fair condition. Conifer species here beneficial to supporting local red squirrel population.	B	Retain
G3	Young	Norway Spruce and Sitka Spruce.	Good condition. 1.5m planting spacing. Conifer species here beneficial to supporting local red squirrel population.	B	Retain
G4	Young	Norway Spruce, Sitka Spruce and European Larch.	Good condition. 1.5m planting spacing. Conifer species here beneficial to supporting local red squirrel population.	B	Retain

Woodland Group No.	Maturity	Species	Condition	Retention Category (Sub-category)	Recommendation
G5	Mature	Sycamore	Mature Sycamore woodland in poor condition. Understory planting has failed.	C	Retain
G6	Young	Ash, Oak, Bird Cherry and Rowan.	Planted area for pheasant shelter. 2m planting spacing.	B	Retain
G7	Mature	Sycamore, Lime, Sitka Spruce and Douglas Fir.	Woodland group on boundary of development area.	C	Retain
G8	Mature	Beech	Overgrown beech hedging running on top of boundary wall to W of development site. Hedging has been cut back to the north west by SSE due to running under power lines.	C	Retain
G9	Semi Mature	Hawthorn, Sycamore, Ash, Holly and Elder.	Unmanaged historical hedgerow which has now been allowed to grow out as it matures.	B	Retain
G10	Mature	Common Lime and Sycamore.	Mature Lime with younger Sycamore understory.	B	Retain

BS5837 Categories

A breakdown of the numbers of tree in each retention category can be found in the table below.

Retention Category	Individual Trees	Woodland/Groups of Trees	Hedgerows
A – High quality	9	0	n/a
B – Moderate quality	13	6	n/a
C – Low quality	10	4	n/a
U – Cannot realistically be retained	2	0	n/a
Totals	34	10	0

All U Category trees should be removed for reasons of sound arboricultural practice or health and safety, irrespective of any development proposals.

All C Category trees should not be considered as a constraint against development and their removal will be generally accepted.

All A & B Category trees will, under normal circumstances, be retained on development sites, and should influence and inform the design, site layout, and in some cases the specific construction methods to be used. The root protection areas of these trees will generally form a construction exclusion zone, although under certain circumstances, it may be possible to build within these areas providing that appropriate specification have been agreed between the local planning authority, the consulting Arboriculturist and the developer/client.

Conclusion

Given the above, there are no overwhelming arboricultural constraints that can be reasonably cited to alter the proposed construction considerably. The proposed design will be situated on an area where a dwelling once stood and has taken into consideration the constraints of the existing trees where possible. The trees required to be felled to facilitate the development were planted by the estate in the past 20 years over the area where a house once stood. Up to half of woodland block G1 will be required to be felled to construct the house – approximately 36 trees. Gleneagles Estate actively manages their forestry throughout the estate and there are numerous new planting schemes covering the estate, if required they are willing to commit to new planting schemes to offset the loss of trees for this development.

Planning Considerations

Based on the proposed site layout drawings supplied to us we have assessed the arboricultural implications of the development as follows:

- Two category C trees (Common Laurel – T2136 and Sycamore – T2137) are recommended to be removed to facilitate the development. These two trees are of low quality and value and are located close to the development site.
- Two category U trees (Wych Elm – T2138 and T2139) are recommended to be removed due to their current condition. It is expected that they will die completely within the next 10 years due to the suspected presence of Dutch Elm Disease and would therefore pose a health and safety issue if a permanent target was present as a result of the development.
- Woodland group G1 currently stands on the site over the proposed development area. Half of the trees found in this planted woodland area are recommended to be felled - approximately 36 trees from an area covering 172 square meters.
- One category C tree (Sycamore T2156) is recommended to be removed to allow development of the access into the site to the west.
- Access to the site will be from Bargate Cottage to the south, along an existing estate gravel track running alongside and over the RPA of trees T2153, T2157, T2158, T2159 and T2160. It is not anticipated that the existing track will be altered, but if it is to be upgraded with a more permanent hard surfacing, any work within the RPA is required to be carried out following Design recommendations section 7.4.2 of British Standard 5837:2012. Installation of a permanent track should avoid excavation into the soil, be designed to avoid soil compaction, not exceed 20% of any existing unsurfaced ground within the RPA and be constructed of aggregate to allow water penetration.
- Two category C trees (Douglas Fir – T2155 and Sycamore – T2160) have been identified as being of low quality and value due to defects and presence of wood decay fungal fruiting bodies. Their removal was not recommended to facilitate the development, but it is recommended that their removal is considered in the future, on the basis of their condition and safety.
- The row of Irish Yew (T2 – T9) were historically planted in the garden of the original house. Pruning wounds and old cabling are present within the row, indicating they were managed in the past, although it is evident that there has been no recent maintenance. It is recommended the row is pruned back with a suggested crown reduction of 50%. Reduction would encourage new growth and the row can therefore be managed in the future to ensure they have good aesthetics and become a feature for the grounds of the proposed house.

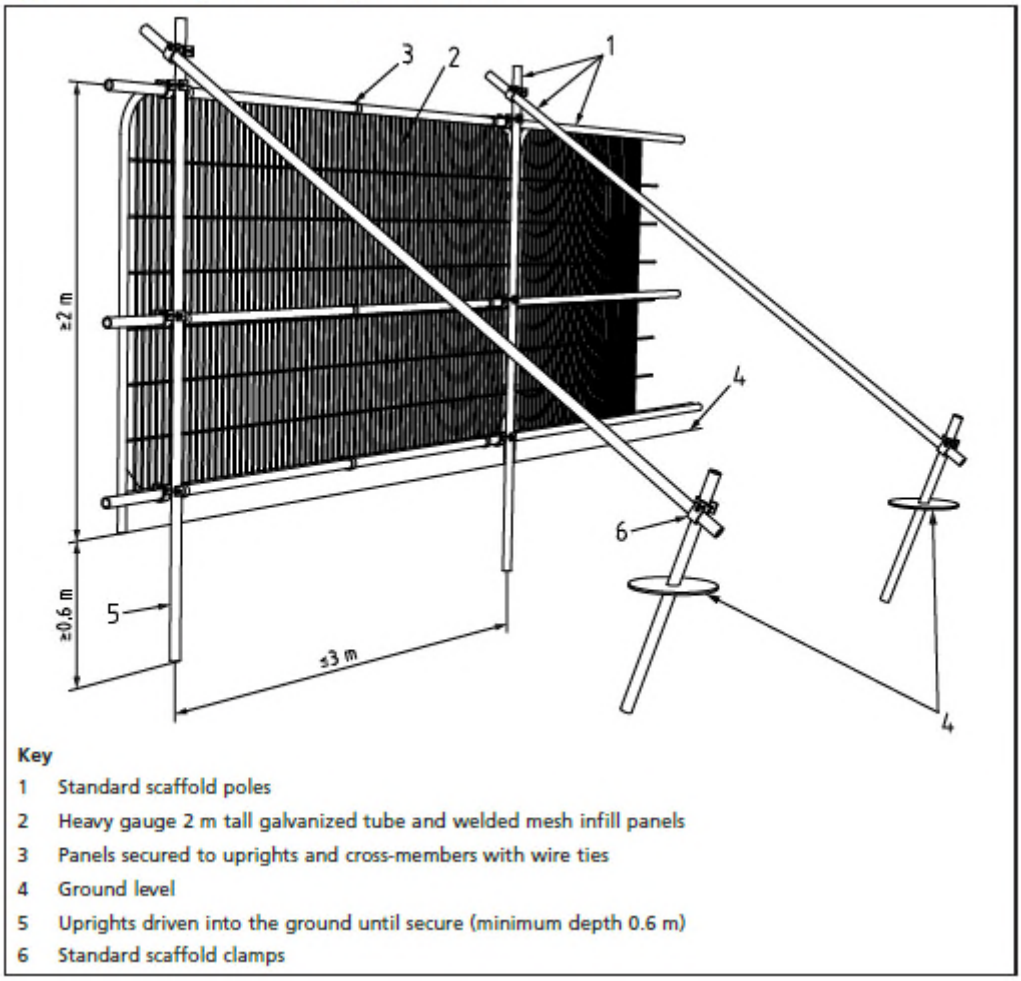
Full schedule of recommended tree works can be found in Appendix 1 of this report, which is supplemented by annotated photographs found in Appendix 4.

Tree Protection Plan

Recommendations

All trees that have been selected for retention should receive such remedial works as recommended in Appendix 1 to this report and furthermore, should be suitably protected with appropriate temporary fencing during the construction phase of the development. This fencing is for the protection of the roots and the location is shown on the attached PDF Document 'Gleneagles Tree Constraints Plan'. Simple Heras fencing or similar is adequate. Fencing protection will be erected prior to commencement of construction work and once set up, should not be moved or altered without prior consultation with the Arboricultural Advisor. The fence must ideally be as per figure 2 in BS 5837:2012 (see below) and be fit for purpose of excluding any construction activity.

Figure 2 **Default specification for protective barrier**



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

The trees found alongside the main access road are set back from the road and are mostly situated behind physical barriers such as hedges and fencing. We believe these trees and their RPA will be adequately protected with the current measures in place. In areas where there are no physical barriers, signage is present instructing road users to keep off verges – evidence of this can be seen in Appendix 4. Sycamore – T1 – located across from Bargate Cottage was

identified as requiring protection from turning construction traffic, which we have been informed will be minimal. It is recommended that when construction traffic is using the road in this area, a banksman is used to ensure that there is adequate clearance from vehicles and this tree.

It is recommended that the track/road, between trees T2153 to T2159, is topped up with porous gravel prior to use by vehicle construction traffic to reduce soil compaction. This material should be a suitable type to allow water and solutes to penetrate through the material to the tree roots below. This should be done by placing material on top of the soil (a raised road) and that excavations for track improvement be avoided.

No excavation digging or other works associated with the track to be installed that would change the current hydrological conditions in which the trees have developed.

Access facilitation pruning of retained trees to be limited to a maximum height of 6 meters and be carried out in accordance with British Standard 3998: 2010 – Tree Work Recommendations.

Protection outside of exclusion zone

Construction works can commence once protective fencing has been installed. Notices should be placed on fences to show that operations are not permitted within the fenced area.

Wide or tall loads should not come into contact with retained trees. A banksman should supervise where vehicles are in close proximity to retained trees.

Oil, cement or other materials that are hazardous to trees should not be stacked or discharged within 10m of a tree stem. Allowance should be made for ground slope to prevent materials running towards trees.

No fires should be lit within proximity of trees, where flames are anticipated to extend within 5m of tree foliage, branches or main stem, taking into consideration wind direction and size of fire.

Notice boards, telephone cables or other services should not be attached to any part of a retained tree.

It is strongly advised that a pre-commencement site meeting be held with contractors who are responsible for operating machinery to highlight the potential for damage occurring to trees or tree crowns and to ensure that extra care is applied when manoeuvring machinery during construction within close proximity to retained trees.

All the above precautionary measures should be applied to minimise the effect of any damage to long term tree health and safety.

Aboricultural Impact Assessment Information

Tree Root Protection

Tree root protection distances have been calculated using BS5837:2012 Recommendations. In circumstances where a tree is required to be removed for the design proposal to progress, trees have been classified as unsuitable for retention.

Below ground constraints to future development are represented by the area surrounding the tree that contains suitable rooting volume to ensure survival of retained trees. This is referred to as the Root Protection Area (RPA) and is shown as a circle in a given radius. The circle may be modified in shape to maintain a similar total area depending on the presence of surrounding obstacles. Where a group of trees have been assessed, the RPA is shown based on the maximum sized tree in any one group and so would exceed the RPA required for many of the individual trees within the group. An RPA is equivalent to a circle with a radius 12x the stem diameter for single stem trees and 10x the basal diameter for trees with more than one stem arising less than 1.5m above ground level.

Installation of Services

It is recommended that underground services to the development are routed in to the site from the west, alongside the access track to the house.

If overhead services are due to be installed, these will aim to avoid trees. Where this is unavoidable, any tree work will be agreed prior to commencement with the Arboricultural Advisor.

Exposure Due to Tree Removal

Windthrow of trees is always a consideration when trees are removed. The proportion of tree removal on site is at a relatively low level and it is anticipated that windthrow as a result of tree removal on site is not of concern. Trees marked for removal are spaced out with wind firm woodland edges that surround the development. The greater problem exists with the current structure of the woodland due to lack of historic thinning works which has resulted in tree stock competing for light. The trees are relatively tall and thin making them more vulnerable to windthrow than trees which have grown with the space to develop adequate girth in relation to height.

Planting

Gleneagles Estate have numerous planting schemes in place throughout the estate and can be considered proactive with their tree management and replanting schemes. The tree cover that is due to be felled to allow for the house to be built are of a young age and on a site that would not have tree cover if it were not for the demolition of the old house. Compensatory plantings are not proposed but, should it be a condition of consent, a landscape plan is attached detailing areas where new planting can be allocated.

Wildlife

A Phase 1 habitat survey has been carried out to classify and map any wildlife habitats on site. In addition to this, in regards to any tree work recommended in this report, it is a criminal offence under normal circumstances to disturb or destroy - whether intentional or unintentional - the nesting sites of wild birds or the roost sites of bats, under the 'Wildlife & Countryside Act 1981 and the 'Countryside and Rights of Way Act 2000'.

Therefore, avoid carrying out significant tree works during the bird nesting season (mid-March to end of July) and ensure that trees are professionally surveyed for signs of bat roosts and/or bat activity before starting any tree work.

Tree Surgery

All the tree work will be agreed with the Local Planning Authority and will be carried out in line with BS3998:2010 Recommendations for Tree Work. Any alterations to the proposed schedule of works will be agreed with the Arboricultural Officer prior to commencement of the works.

Monitoring

In accordance with BS5837:2012 item 6.3 – the site and the associated development should be monitored regularly by a competent Arboriculturist to ensure that arboricultural aspects of the planning permission are complied with.

Post Development Implications

Due to the dynamic nature of trees and their interaction with the environment, their health and structural integrity is liable to change over time. Because of this it is recommended that all trees on or adjacent to the site be inspected on an annual basis.

Tree Survey Schedule: Appendix 1 to report

Tree No	Number relating to identification tag found on tree	
Species	Common name including botanical name, where specifically known	
Maturity	Young – less than 1/3 normal life expectancy	
	Semi-Mature – 1/3 to 2/3 normal life expectancy	
	Mature – over 2/3 normal life expectancy	
	Over-Mature – beyond usually expected life span	
Height	Measured in meters	
First Branch	Measured height between lowest branch and ground level (meters)	
Stem diameter	Trunk diameter (mm) measured at 1.5m above ground level	
Condition	Crown, stem and basal area condition rated good, fair and poor based on the health and structure of this area of the tree	
	Brief description of the health and structural condition of the tree	
Retention Cat.	Retention Category (Sub Category)	
	Based on B.S. 5873:2012 Retention Categories	A: Those of High Quality and Value
		B: Those of Moderate Quality and Value
		C: Those of Low Quality and Value
		U: Remove (or Fell)
Life Expectancy	Predicted useful life expectancy of tree	
Recommendation	Remedial works in order to facilitate retention, or recommend retention or removing	
RPA	Root Protection Area, measured in meters from centre of tree	

Appendix 1 Cont. Tree Survey Schedule

Tree No.	Common Name	Latin Name	Maturity	Height (m)	First Branch (m)	DBH (mm)	Crown Spread N,E,S,W (m)	Crown Condition	Stem Condition	Basal Area Condition	Condition Comments	Retention Category (Sub-category)	Life Expectancy	Physical Condition	Recommendation	RPA Radius (M)
2136	Common Laurel	*Prunus laurocerasus*	Semi Mature	4	5	170	2,4,4,3	Good	Fair	Fair	Multistemmed from base - 6 stems. Stems are crossing in places.	C (1)	40+	Fair	Remove	N/A
2137	Sycamore	*Acer psuedoplatanus*	Semi Mature	10	2	470	3,3,3,4	Fair	Fair	Fair	Growing out of old stone dyke. Tight branch unions.	C (1)	40+	Fair	Remove	N/A
2138	Wych Elm	*Ulmus glabra*	Early Mature	10	1	340	7,7,4,6	Fair	Fair	Fair	Rooting into old stone area. Leaning heavily to SW. Slight dieback present in crown - potential Dutch Elm Disease present. Neighbouring young elm in poor condition suggesting Dutch Elm Disease.	U	<10	Fair	Remove	N/A
2139	Wych Elm	*Ulmus glabra*	Early Mature	11	2	270	2,3,4,4	Poor	Poor	Fair	Severe dieback in crown - suspected Dutch Elm Disease.	U	<10	Poor	Remove	N/A
2140	Common Lime	*Tilia x europaea*	Mature	19	3	870	5,5,4,5	Good	Good	Good	Epicormic growth to base of stem. Co-dominant at approximately 5m - wide, tension union - appears stable. Lower branching in crown pruned back to W.	B (2)	40+	Good	Retain	10.4
2141	Common Lime	*Tilia x europaea*	Mature	20	2	650	3,6,4,6	Good	Good	Good	Good condition specimen. Part of woodland providing screening for house development.	B (2)	40+	Good	Retain	7.8
2142	European Larch	*Larix decidua*	Early Mature	18	2	390	1,2,3,1	Fair	Fair	Fair	Average specimen. Part of woodland providing screening for house development.	B (2)	40+	Fair	Retain	N/A
2143	Common Lime	*Tilia x europaea*	Mature	21	2	790	4,3,6,7	Good	Good	Good	Good condition tree. Part of woodland providing screening for house development.	B (2)	40+	Good	Retain	N/A

Appendix 1 Cont. Tree Survey Schedule

Tree No.	Common Name	Latin Name	Maturity	Height (m)	First Branch (m)	DBH (mm)	Crown Spread N,E,S,W (m)	Crown Condition	Stem Condition	Basal Area Condition	Condition Comments	Retention Category (Sub-category)	Life Expectancy	Physical Condition	Recommendation	RPA Radius (M)
2144	European Larch	*Larix decidua*	Early Mature	18	2	380	1,1,2,6	Fair	Fair	Fair	Average specimen. Part of woodland providing screening for house development.	B (2)	40+	Fair	Retain	N/A
2145	European Larch	*Larix decidua*	Semi Mature	21	2	550	2,3,4,4	Good	Good	Good	Better example of larch specimen in this woodland group. Part of woodland providing screening for house development.	B (2)	40+	Good	Retain	N/A
2146	Common Lime	*Tilia x europaea*	Mature	22	2	750	5,4,3,8	Good	Good	Good	Good condition tree part of woodland group. Part of woodland providing screening for house development.	B (2)	40+	Good	Retain	N/A
2147	European Larch	*Larix decidua*	Semi Mature	22	10	490	2,2,2,2	Good	Good	Good	Tall straight specimen in woodland group. Part of woodland providing screening for house development.	B (2)	40+	Good	Retain	N/A
2148	Common Lime	*Tilia x europaea*	Semi Mature	18	5	460	1,8,3,1	Good	Fair	Good	Upper stem lean NE towards field. Part of woodland providing screening for house development.	B (2)	40+	Good	Retain	N/A
2149	European Larch	*Larix decidua*	Semi Mature	19	6	520	2,4,2,1	Good	Good	Good	Tall straight specimen. Slight lean towards field. Part of woodland providing screening for house development.	B (2)	40+	Good	Retain	N/A
2150	Douglas Fir	*Pseudotsuga menziesii*	Semi Mature	17	8	500	3,6,3,1	Good	Fair	Good	Fair specimen. Tree has slight lean towards field. Part of woodland providing screening for house development.	B (2)	40+	Good	Retain	N/A
2151	Common Lime	*Tilia x europaea*	Semi Mature	20	5	410	3,9,2,1	Fair	Fair	Good	Crown one sided to NE. Slight lean towards field. Part of woodland providing screening for house development.	B (2)	40+	Fair	Retain	N/A

Appendix 1 Cont. Tree Survey Schedule

Tree No.	Common Name	Latin Name	Maturity	Height (m)	First Branch (m)	DBH (mm)	Crown Spread N,E,S,W (m)	Crown Condition	Stem Condition	Basal Area Condition	Condition Comments	Retention Category (Sub-category)	Life Expectancy	Physical Condition	Recommendation	RPA Radius (M)
2152	European Larch	*Larix decidua*	Early Mature	16	6	280	3,6,0,0	Fair	Poor	Fair	Upper crown lean N. Poor specimen tree. Part of woodland providing screening for house development - situated far enough away from house development therefore health and safety will not be a concern.	B (3)	40+	Poor	Retain	N/A
2153	Sycamore	*Acer psuedoplatanus*	Young	8	3	170	2,2,2,2	Fair	Fair	Fair	Co dominant at base - tight compression union. Canopy appears thin.	C (1)	40+	Fair	Retain	2
2154	Sycamore	*Acer psuedoplatanus*	Young	9	2	260	2,2,2,2	Fair	Fair	Fair	Fair condition tree. Canopy appears thin.	C (1)	40+	Fair	Retain	3.1
2155	Douglas Fir	*Pseudotsuga menziesii*	Early Mature	18	3	730	6,6,6,6	Fair	Poor	Poor	*Phaeolus schweinitzii* present at base of stem to N - base of stem sounding solid with compensatory growth evident at stem base. Internal decay predicted however in roots and stem base. Recommend for removal in <10 years if planning permission granted. A permanent target will be present if planning permission is granted.	C (2)	<10	Poor	Retain	8.8
2156	Sycamore	*Acer psuedoplatanus*	Young	10	2	230	2,4,3,3	Fair	Fair	Fair	Growing out of old drystone wall. Multistemmed from base - 3 main leaders. Fair condition.	C (2)	40+	Fair	Remove	N/A
2157	Douglas Fir	*Pseudotsuga menziesii*	Semi Mature	18	1	660	2,3,3,4	Good	Fair	Fair	Large branch with tight union to NE trackside - no sign of splitting/growing upright.	C (2)	40+	Fair	Retain	7.9
2158	Douglas Fir	*Pseudotsuga menziesii*	Semi Mature	18	3	540	2,5,1,6	Good	Good	Good	Good condition. Straight growing tree.	C (2)	40+	Good	Retain	6.5

Appendix 1 Cont. Tree Survey Schedule

Tree No.	Common Name	Latin Name	Maturity	Height (m)	First Branch (m)	DBH (mm)	Crown Spread N,E,S,W (m)	Crown Condition	Stem Condition	Basal Area Condition	Condition Comments	Retention Category (Sub-category)	Life Expectancy	Physical Condition	Recommendation	RPA Radius (M)
2159	Douglas Fir	*Pseudotsuga menziesii*	Semi Mature	19	2	520	8,6,3,6	Good.	Fair	Fair	Group of 2 Douglas Fir. South tree has co-dominant at 1.5m - tight compression union. North tree has lower stem lean N over track - corrected and growing upwards in upper stem.	C (2)	40+	Fair	Retain	6.2
2160	Sycamore	*Acer psuedoplatanus*	Semi Mature	14	6	350	3,6,3,3	Good	Fair	Poor	Growing out of old drystone wall. Co-dominant from base - tight compression union. Poor formed tree potentially unstable. Look to remove in future - if planning permission is granted targets will be constantly present.	C (3)	10+	Poor	Retain	4.2
T1	Sycamore	*Acer psuedoplatanus*	Over Mature	20	5	1260	8,9,8,6	Good	Good	Fair	Tarmac road over rooting zone to N and W. Over mature tree and prominent on the landscape. Good specimen.	A (2)	40+	Good	Retain	15
T2	Irish Yew	*Taxus baccata 'Fastigiata'*	Mature	5	0	80	2,2,2,2	Good	Fair	Good	Average of 10 larger stems. Historically planted. This row of Irish Yew has been unkept for a number of years and would benefit from maintenance tree work. Overall crown reduction would benefit these specimens and rewiring to control and shape splaying ends.	A (2)	40+	Good	Retain	2.5

Appendix 1 Cont. Tree Survey Schedule

Tree No.	Common Name	Latin Name	Maturity	Height (m)	First Branch (m)	DBH (mm)	Crown Spread N,E,S,W (m)	Crown Condition	Stem Condition	Basal Area Condition	Condition Comments	Retention Category (Sub-category)	Life Expectancy	Physical Condition	Recommendation	RPA Radius (M)
T3	Irish Yew	*Taxus baccata 'Fastigiata'*	Mature	5	0	80	2,2,2,2	Good	Fair	Good	Average of 10 larger stems. Historically planted. This row of Irish Yew has been unkept for a number of years and would benefit from maintenance tree work. Overall crown reduction would benefit these specimens and rewiring to control and shape splaying ends.	A (2)	40+	Good	Retain	2.5
T4	Irish Yew	*Taxus baccata 'Fastigiata'*	Mature	5	0	80	2,2,2,2	Good	Fair	Good	Average of 10 larger stems. Historically planted. This row of Irish Yew has been unkept for a number of years and would benefit from maintenance tree work. Overall crown reduction would benefit these specimens and rewiring to control and shape splaying ends.	A (2)	40+	Good	Retain	2.5
T5	Irish Yew	*Taxus baccata 'Fastigiata'*	Mature	5	0	80	2,2,2,2	Good	Fair	Good	Average of 10 larger stems. Historically planted. This row of Irish Yew has been unkept for a number of years and would benefit from maintenance tree work. Overall crown reduction would benefit these specimens and rewiring to control and shape splaying ends.	A (2)	40+	Good	Retain	2.5

Appendix 1 Cont. Tree Survey Schedule

Tree No.	Common Name	Latin Name	Maturity	Height (m)	First Branch (m)	DBH (mm)	Crown Spread N,E,S,W (m)	Crown Condition	Stem Condition	Basal Area Condition	Condition Comments	Retention Category (Sub-category)	Life Expectancy	Physical Condition	Recommendation	RPA Radius (M)
T6	Irish Yew	*Taxus baccata 'Fastigiata'*	Mature	5	0	80	2,2,2,2	Good	Fair	Good	Average of 10 larger stems. Historically planted. This row of Irish Yew has been unkept for a number of years and would benefit from maintenance tree work. Overall crown reduction would benefit these specimens and rewiring to control and shape splaying ends.	A (2)	40+	Good	Retain	2.5
T7	Irish Yew	*Taxus baccata 'Fastigiata'*	Mature	5	0	80	2,2,2,2	Good	Fair	Good	Average of 10 larger stems. Historically planted. This row of Irish Yew has been unkept for a number of years and would benefit from maintenance tree work. Overall crown reduction would benefit these specimens and rewiring to control and shape splaying ends.	A (2)	40+	Good	Retain	2.5
T8	Irish Yew	*Taxus baccata 'Fastigiata'*	Mature	5	0	80	2,2,2,2	Good	Fair	Good	Average of 10 larger stems. Historically planted. This row of Irish Yew has been unkept for a number of years and would benefit from maintenance tree work. Overall crown reduction would benefit these specimens and rewiring to control and shape splaying ends.	A (2)	40+	Good	Retain	2.5
T9	Irish Yew	*Taxus baccata 'Fastigiata'*	Mature	5	0	80	2,2,2,2	Good	Fair	Good	Average of 10 larger stems. Historically planted. This row of Irish Yew has been unkept for a number of years and would benefit from maintenance tree work. Overall crown reduction would benefit these specimens	A (2)	40+	Good	Retain	2.5

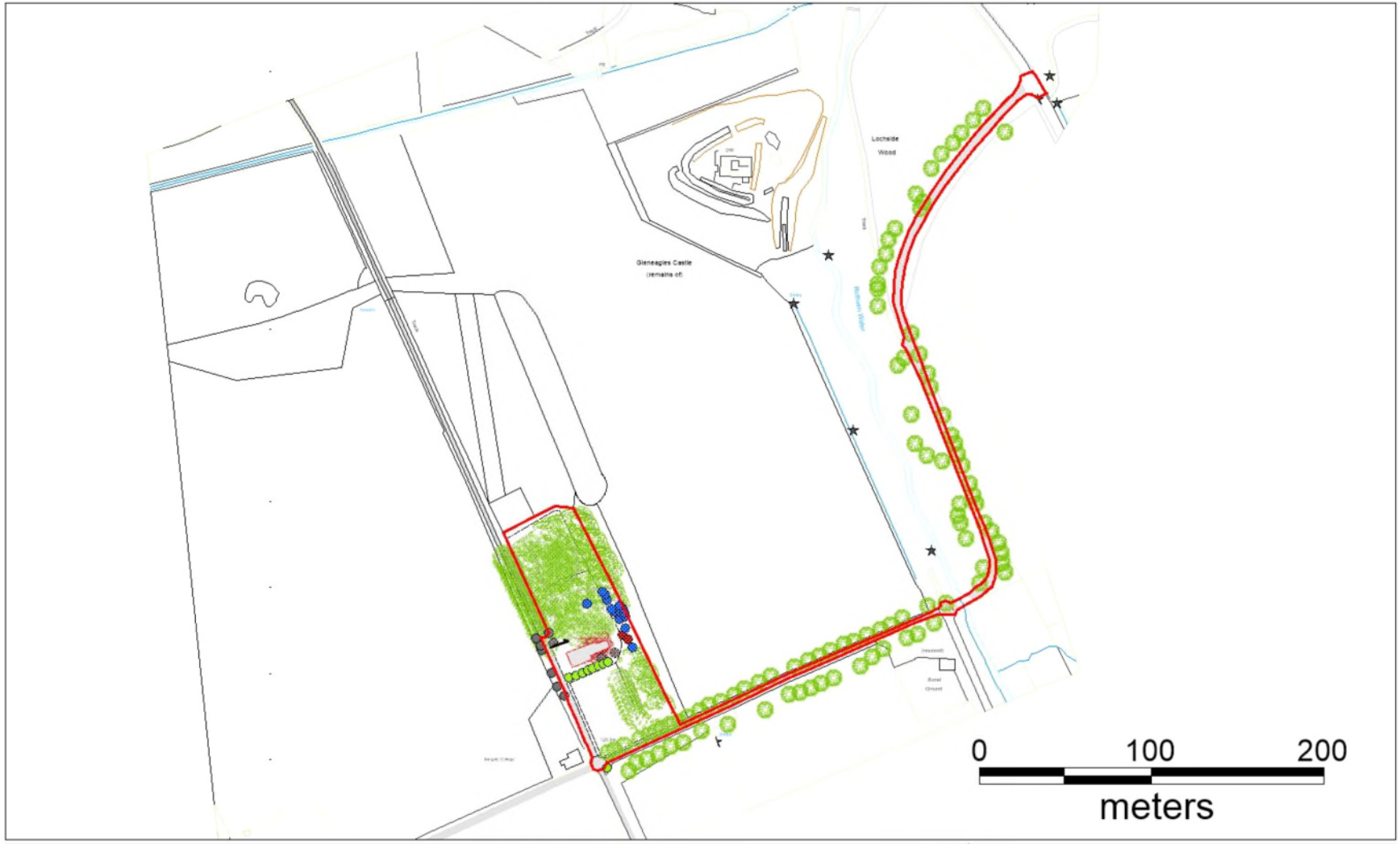
Appendix 2: BS: 5837 Table 1

BS 5837 TABLE 1 - CASCADE CHART FOR TREE QUALITY ASSESSMENT

TREES FOR REMOVAL		
Category and definition	**Criteria**	**Identification on plan**
Category U Those in such a condition that any existing value would be lost within 10 years and which should in the current context be removed for reasons of sound arboricultural management	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other R category trees (i.e. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby (e.g. Dutch elm disease), or very low quality trees suppressing adjacent trees of better quality NOTE Habitat reinstatement may be appropriate (e.g. R category tree used as a bat roost: installation of bat box in nearby tree).	DARK RED

TREES TO BE CONSIDERED FOR RETENTION				
Category and definition	**Criteria — Subcategories**			**Identification on plan**
	1 Mainly arboricultural values	2 Mainly landscape values	3 Mainly cultural values, including conservation	
Category A Those of high quality and value: in such a condition as to be able to make a substantial contribution (a minimum of 40 years is suggested)	Trees that are particularly good examples of their species, especially if rare or unusual, or essential components of groups, or of formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands which provide a definite screening or softening effect to the locality in relation to views into or out of the site, or those of particular visual importance (e.g. avenues or other arboricultural features assessed as groups)	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	LIGHT GREEN
Category B Those of moderate quality and value: those in such a condition as to make a significant contribution (a minimum of 20 years is suggested)	Trees that might be included in the high category, but are downgraded because of impaired condition (e.g. presence of remediable defects including unsympathetic past management and minor storm damage)	Trees present in numbers, usually as groups or woodlands, such that they form distinct landscape features, thereby attracting a higher collective rating than they might as individuals but which are not, individually, essential components of formal or semi-formal arboricultural features (e.g. trees of moderate quality within an avenue that includes better, A category specimens), or trees situated mainly internally to the site, therefore individually having little visual impact on the wider locality	Trees with clearly identifiable conservation or other cultural benefits	MID BLUE
Category C Those of low quality and value: currently in adequate condition to remain until new planting could be established (a minimum of 10 years 15 suggested), or young trees with a stem diameter below 150 mm	Trees not qualifying in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater landscape value, and/or trees offering low or only temporary screening benefit	Trees with very limited conservation or other cultural benefits	GREY
	NOTE Whilst C category trees will usually not be retained where they would impose a significant constraint on development, young trees with a stem diameter of less than 150 mm should be considered for relocation.			

Appendix 3: Tree Constraints Map Overview



A & R Woodland Consultants Ltd Kinneskie House, Munlochy, IV8 8PF arwoodlands@gmail.com 07549 352792 / 07446 080463	**Title:** Tree Constraints Plan **Property:** Gleneagles Estate, Land North of Bargate Cottage, Auchterarder, PH3 1PJ **Drawing Title:** Location Plan 1	Legend: Site Boundary Legend Site Boundary	Date Produced :- 24-09-2019 Scale @ A3: 1:2,000 @ A3	N	Contains OS data © Crown copyright and database right 2019. Also contains data provided by A & R Woodland Consultants Ltd.

Appendix 4: Site Photographs

General view of proposed development area – evidence of historical hard standing visible.

View of row of Irish Yew to south of development area.

Sycamore T2160 – Recommended to be considered for removal in future. Tree is poorly rooted in to old drystone dyke

Douglas Fir T2155 – P. schweinitzii visible at base of main stem.

View of trees present throughout access driveway for construction traffic.

'Please keep off all verges' signs found at numerous points throughout the access driveway for construction traffic.

Attachments

‘Gleneagles Tree Constraints Map Layered’ – PDF Document

‘Gleneagles Tree Constraints Map’ – PDF Document

‘Landscape Plan’ – PDF Document

‘Tree Constraints Map Location’ – PDF Document

A & R Woodland Consultants Ltd

Kinneskie House, Munlochy, IV8 8PF

arwoodlands@gmail.com

07549 352792 / 07446 080463

Title: Tree Constraints Plan

Property:

Gleneagles Estate,
Land North of Bargate Cottage,
Auchterarder,
PH3 1PJ

Legend:

- Proposed Vehicle Acces Point
- Fence Root Protection
- Root Protection Area
- Canopy Spread
- Tag Number
- Development Site Boundary

BS 5837 Tree Category

- A-High Quality
- B-Moderate Quality
- C-Low Quality
- U-Remove
- Remove
- Woodland

263

Date: 24-09-2019

Scale @ A3: 1:600 @ A3

Drawing Title: Site Plan 1

A & R Woodland Consultants Ltd

Kinneskie House, Munlochy, IV8 8PF

arwoodlands@gmail.com

07549 352792 / 07446 080463

Title: Tree Constraints Plan

Property:
Gleneagles Estate,
Land North of Bargate Cottage,
Auchterarder,
PH3 1PJ

Legend:

- Proposed Vehicle Acces Point
- Fence Root Protection
- Root Protection Area
- 21 — Canopy Spread / Tag Number
- Development Site Boundary
- Woodland

BS 5837 Tree Category

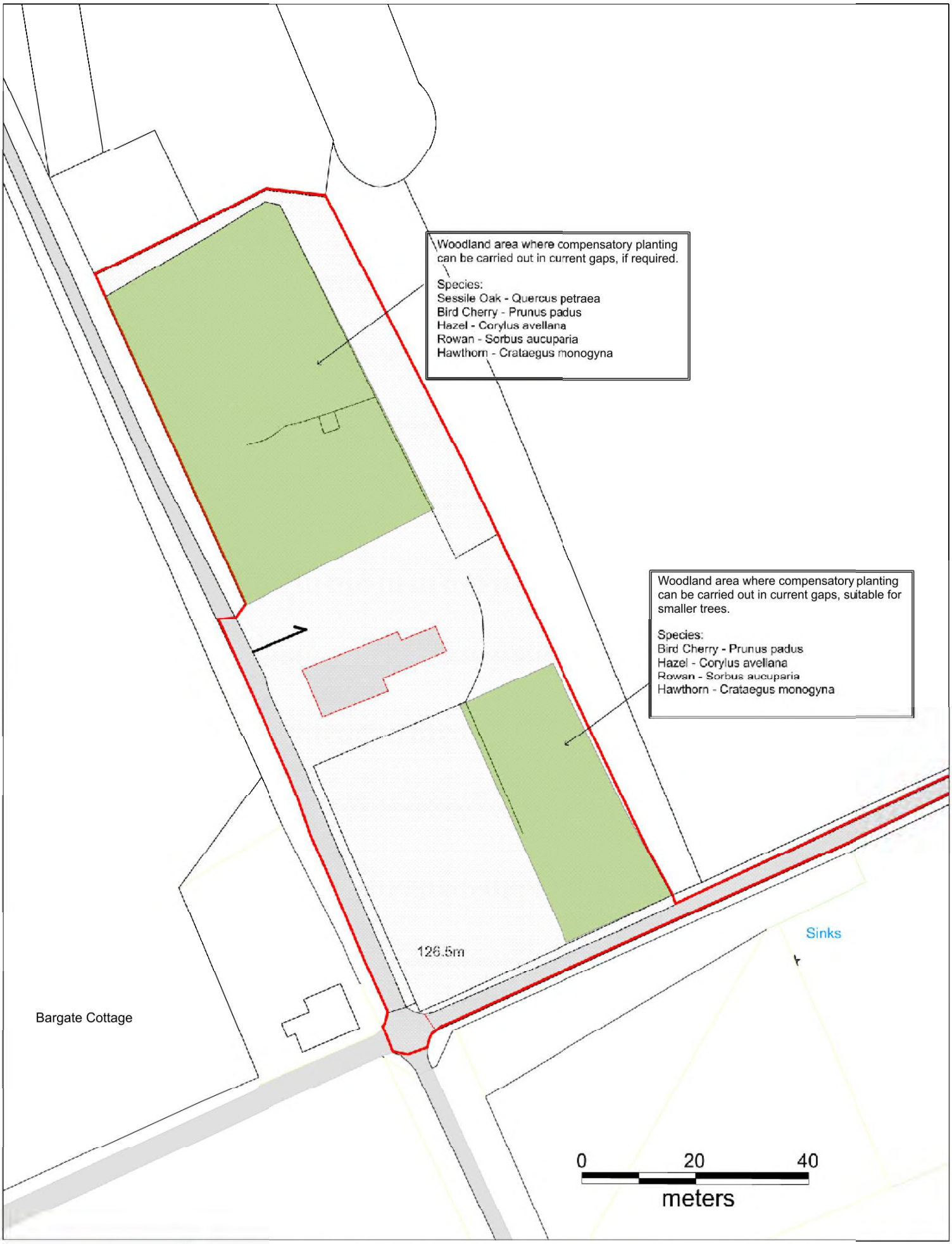
- A-High Quality
- B-Moderate Quality
- C-Low Quality
- U-Remove
- Remove

264

Date: 24-09-2019

Scale @ A3: 1:600 @ A3

Drawing Title: Site Plan 1



A & R Woodland Consultants Ltd
Kinneskie House, Munlochy, IV8 8PF
arwoodlands@gmail.com
07549 352792 / 07446 080463

Title: Landscape Plan

Property: Gleneagles Estate, Land North of Bargate Cottage, Auchterarder, PH3 1PJ

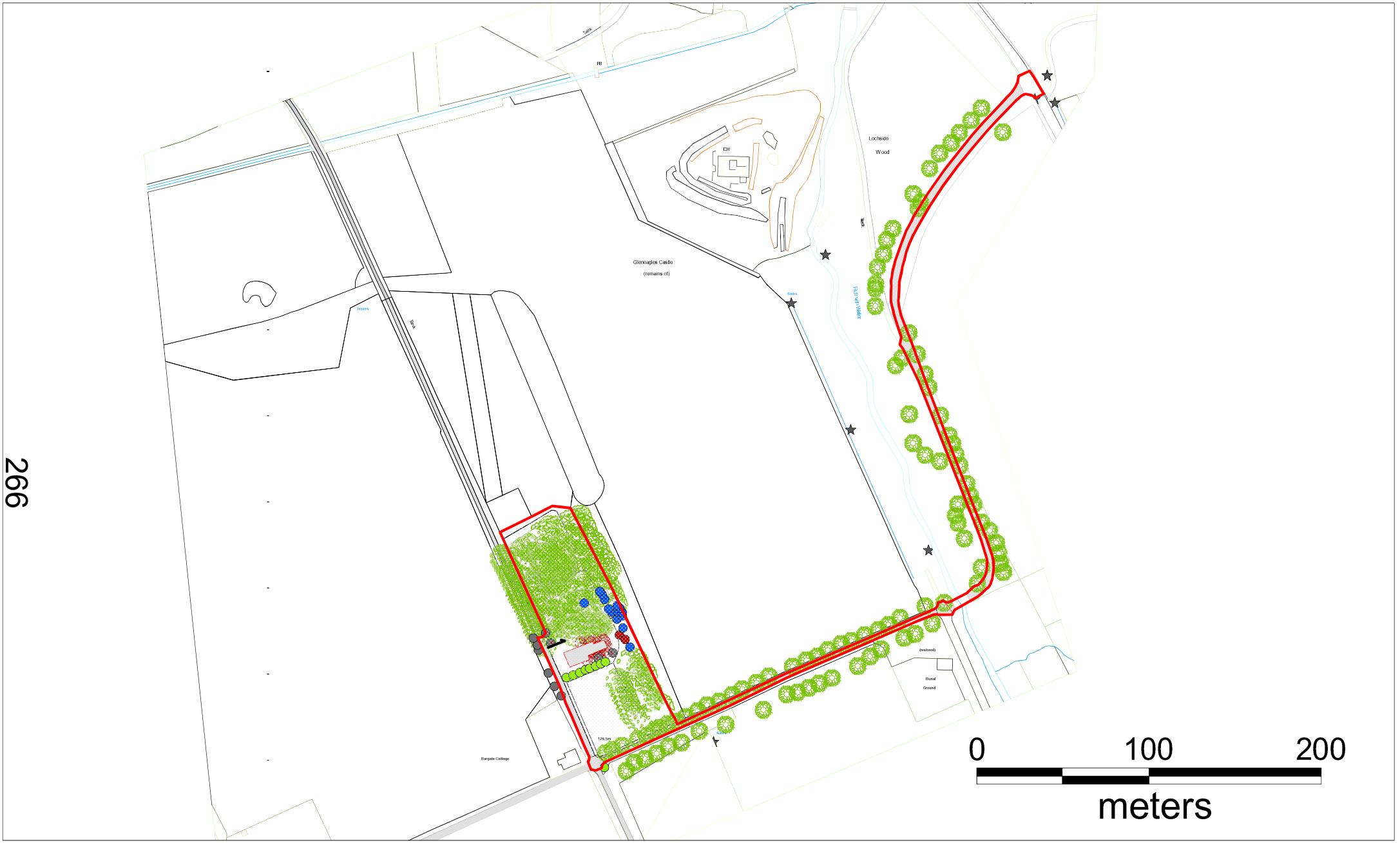
Legend:
Landscape Plan
Area for proposed compensatory planting
Site Boundary

265

Date: 26-09-2019

Scale @ A3: 1:600 @ A3

Drawing Title: Landscape Plan 1



266

A & R Woodland Consultants Ltd
Kinneskie House, Munlochy, IV8 8PF
arwoodlands@gmail.com
07549 352792 / 07446 080463

Title: Tree Constraints Plan

Property: Gleneagles Estate,
Land North of Bargate Cottage,
Auchterarder,
PH3 1PJ

Drawing Title: Location Plan 1

Legend: Site Boundary Legend
Site Boundary

Date Produced :-
24-09-2019

Scale @ A3:
1:2,000 @ A3

N

LRB-2020-05 – 19/01725/IPL – Erection of a dwellinghouse (in principle), land 70 metres north of Bargate Cottage, Gleneagles

PLANNING DECISION NOTICE *(included in applicant's submission, pages)*

REPORT OF HANDLING *(included in applicant's submission, pages)*

REFERENCE DOCUMENTS *(included in applicant's submission, pages)*

REPORT OF HANDLING

DELEGATED REPORT

Ref No	**19/01725/IPL**	
Ward No	**P7- Strathallan**	
Due Determination Date	**15.12.2019**	
Report Issued by		**Date**
Countersigned by		**Date**

PROPOSAL: Erection of a dwellinghouse (in principle)

LOCATION: Land 70 Metres North Of Bargate Cottage Gleneagles

SUMMARY:

This report recommends **refusal** of the application as the development is considered to be contrary to the relevant provisions of the Development Plan and there are no material considerations apparent which justify setting aside the Development Plan.

DATE OF SITE VISIT: 22 May 2019

SITE PHOTOGRAPHS

BACKGROUND AND DESCRIPTION OF PROPOSAL

Planning permission is sought for the erection of a dwellinghouse (in principle) at a site to the north of Bargate Cottage, Gleneagles. The site is around 250 metres from Gleneagles House, a Category B listed building. A single storey property, Bargate Cottage, is adjacent to the site. The site extends to around 145 m by 50 m and is partly bounded to the west by a stone wall. The other boundaries are largely bounded with post and wire fencing. The southern part of the site comprises an area of grass with woodland belt to the east. A line of Irish yew trees runs to the north of this grassed area around 45 metres from the estate road to the south. There is an area to the north of the yew trees that was the site of a demolished house. This area has recently been excavated to reveal some demolition material but is largely overgrown and has re-vegetated. There is existing woodland including to the east and north of this area of the site the latter wooded area extending around 75 metres to the northern site boundary.

A track runs between the site and Bargate Cottage. The main access is from the A823 public road along an estate driveway that serves a number of other properties. This driveway is a Core Path.

A similar application (19/00733/IPL) was withdrawn and the proposal re-submitted with additional supporting information with regard to flooding, trees and biodiversity.

SITE HISTORY

19/00733/IPL Erection of a dwellinghouse (in principle) 26 June 2019 Application Withdrawn

PRE-APPLICATION CONSULTATION

Pre application Reference: 19/00060/PREAPP

NATIONAL POLICY AND GUIDANCE

The Scottish Government expresses its planning policies through The National Planning Framework, the Scottish Planning Policy (SPP), Planning Advice Notes (PAN), Creating Places, Designing Streets, National Roads Development Guide and a series of Circulars.

DEVELOPMENT PLAN

The Development Plan for the area comprises the TAYplan Strategic Development Plan 2016-2036 and the Perth and Kinross Local Development Plan 2019.

TAYplan Strategic Development Plan 2016 – 2036 - Approved October 2017

Whilst there are no specific policies or strategies directly relevant to this proposal the overall vision of the TAYplan should be noted. The vision states *"By 2036 the TAYplan area will be sustainable, more attractive, competitive and vibrant without creating an unacceptable burden on our planet. The quality of life will make it a place of first choice where more people choose to live, work, study and visit, and where businesses choose to invest and create jobs."*

Perth and Kinross Local Development Plan 2 (2019) – Adopted November 2019

The Local Development Plan 2 is the most recent statement of Council policy and is augmented by Supplementary Guidance.

The principal policies are, in summary:

Policy 1A: Placemaking
Policy 1B: Placemaking
Policy 2: Design Statements
Policy 5: Infrastructure Contributions
Policy 6: Settlement Boundaries
Policy 15: Public Access
Policy 19: Housing in the Countryside
Policy 27A: Listed Buildings
Policy 31: Other Historic Environment Assets
Policy 32: Embedding Low & Zero Carbon Generating Technologies in New Development
Policy 39: Landscape
Policy 40B: Forestry, Woodland and Trees: Trees, Woodland and Development
Policy 41: Biodiversity
Policy 53B: Water Environment and Drainage: Foul Drainage
Policy 53C: Water Environment and Drainage: Surface Water Drainage
Policy 53E: Water Environment and Drainage: Water Supply
Policy 60B: Transport Standards and Accessibility Requirements: New Development Proposals

OTHER POLICIES

Housing in the Countryside Guide 2012
Developer Contributions Supplementary Guidance 2016

CONSULTATION RESPONSES

Environmental Health (Private Water)
Condition and informative note with regard to private water.

Environmental Health (Contaminated Land)
No adverse comments. A search of the historic records did not raise any concerns regarding ground contamination.

Structures And Flooding
No objection following submission of further information with regard to flood risk. Condition requested.

Transport Planning
No objection subject to condition.

Development Negotiations Officer
Condition required with regard to potential contributions for Primary Education and Auchterarder A9 Junction.

Biodiversity/Tree Officer
No objection subject to conditions.

REPRESENTATIONS

There have not been any representations received with regard to this application.

ADDITIONAL INFORMATION RECEIVED:

Environmental Impact Assessment (EIA)	Not Required
Screening Opinion	Not Required
EIA Report	Not Required
Appropriate Assessment	Not Required
Design Statement or Design and Access Statement	Submitted
Report on Impact or Potential Impact eg Flood Risk Assessment	Submitted – Tree Survey, Habitat Survey and Flood Risk Assessment

APPRAISAL

Sections 25 and 37 (2) of the Town and Country Planning (Scotland) Act 1997 require that planning decisions be made in accordance with the development plan unless material considerations indicate otherwise. The Development Plan for the area comprises the approved TAYplan 2016 and the adopted Perth and Kinross Local Development Plan 2 (2019).

The determining issues in this case are whether; the proposal complies with development plan policy; or if there are any other material considerations which justify a departure from policy.

Policy Appraisal

Policy 19, housing in the countryside, of the adopted Local Development Plan supports proposals for the erection, or creation through conversion, of single houses and small groups of houses in the countryside which fall into at least one of the following categories:

(1) Building Groups.
(2) Infill sites.
(3) New houses in the open countryside on defined categories of sites as set out in section 3 of the Supplementary Guidance.
(4) Renovation or replacement of houses.
(5) Conversion or replacement of redundant non-domestic buildings.
(6) Development on rural brownfield land.

In this case the proposal does not meet the requirements of any of the categories.

It is not within a building group (1). It is not an infill site (2).

Section 3 of the policy which is detailed in the associated Guide includes section 3.1 Existing Gardens. This supports development in an established garden once associated with a country/estate house. This part of the policy requires an existing house to be in place and any new house to be developed on a part of garden that was once associated with it. In this case there is no house on the site so development as proposed would be contrary to this policy.

Section 4 supports the renovation or replacement of houses subject to criteria. The policy set out in the Housing in the Countryside Guide 2012 specifically requires in 4e) that the replacement of an abandoned or ruinous house will be permitted where:

i) There is substantial visible evidence of the structure of the original building above ground level to enable its size and form to be identified
ii) It is located on an established site with a good landscape setting and a good “fit” in the landscape on a site acceptable on planning grounds;

iii) The site boundaries are capable of providing a suitable enclosure.

In this case whilst it is accepted that there was previously a house on this site the proposal fails to meet criteria i) above as there is no visible evidence of the structure above ground level to enable its size and form to be identified.

Section 6 of the policy supports development on rural brownfield land where the site has been formerly occupied by buildings and where development would remove dereliction or result in a significant environmental improvement. In this case the site has largely re-vegetated and is surrounded by trees and woodland. Development would not result in a significant environmental improvement.

In conclusion the proposal does not fit in to any of the categories in the Policy 19 Housing in the Countryside policy and associated Housing in the Countryside Guide 2012 and as such is contrary to this policy and Guidance.

Design and Layout

The proposal is in principle and as such no detailed plans of any proposed house have been submitted. An indicative landscaping layout has been submitted. This shows an indicative house position based on the outline of the previous house on the site that was demolished in the 1980s.

Landscape

The site is within the Ochil Hills area of special landscape quality. The site is partially set within a wooded area. There is a stone wall along much of the western boundary.

Policy 40B Forestry, Woodland and Trees states that any application with trees on the site should be accompanied by a tree survey. There is a presumption in favour of protecting woodland resources. Following withdrawal of the previous application a Tree Report and Arboricultural Assessment were submitted.

The submitted Tree Report & Arboricultural Impact Assessment indicates a total of 43 trees must be felled to allow this development to take place. In line with the Scottish Government's Woodland Removal Policy, compensatory planting of at least 43 trees would be required.

Natural Heritage and Biodiversity

Policy 41 Biodiversity sets out the Council's legislative obligation to further the conservation of biodiversity when carrying out its duties. The Council will seek to protect and enhance all wildlife and wildlife habitats whether formally designated/protected or not taking into account national and international legislation and the Tayside Local Biodiversity Action Plan, and associated guidance. Proposals that have a detrimental impact on the ability to achieve

these guidelines and documents will not be supported unless clear evidence can be provided that the ecological impacts can be satisfactorily mitigated.

An Extended Phase 1 Survey Report has been submitted that considers the impact on protected species such as bats, red squirrel and breeding birds. Further surveys would be required prior to any development being approved on the site. The submitted Extended Phase 1 Survey Report presents a range of options to enhance the biodiversity value of this development including integrated bat roosting boxes, bird nesting boxes and landscaping. Should permission be approved on the site conditions with regard to carrying out the recommendations in the Phase 1 Survey would be required.

Residential Amenity

There is one residential property situated to the west of the site. As this application is only in principle no detailed plans of any proposed house have been submitted. However, considering the size of the site and its location in relation to the neighbouring property it is likely that a house could be designed for the site that would not impact detrimentally on the neighbouring property. Residential amenity, including that of future occupiers, would be fully addressed should a detailed application be submitted however as outlined above the principle of erecting a dwelling on this site is not considered acceptable and is not in accordance with LDP policy.

Visual Amenity

The Housing in the Countryside Guide 2012 includes siting criteria which require to be considered in any proposal. Policy PM1A and B also require developments to be compatible with their surroundings and to contribute to the quality of the built and natural environment. As this is an application in principle no detailed design or scale of dwelling has been submitted. The visual impact of the proposal would be further considered at the detailed submission stage should any permission be given.

Roads and Access

The site will be served by a private estate drive that serves other dwellings in the area. There are not any concerns with this access and it is considered that it could accommodate an additional residential property. Transport Planning has been consulted and do not object subject to a condition requiring that access details meet Council specifications.

Drainage

The application is being refused on matters of principle however details of surface water and foul drainage would be required should the application be approved. The site will be required to connect to a Sustainable Urban Drainage System (SUDS). A private foul drainage system would be required for the site.

Flooding

The proposed site lies within the functional floodplain as shown by the SEPA Flood Maps. A Flood Risk Assessment (FRA) has been submitted in support of the application. Hydrological analysis and hydraulic modelling have been undertaken within the FRA. Flooding and Structures were consulted and requested further information on a watercourse that exists to the south of the site.

An addendum dated 24th of December 2019 was submitted in support of the application in response to concerns expressed particularly with regard to the location of a culvert in the vicinity of the site. This addendum satisfies concerns of Flooding and Structures. However, it has been highlighted that if during removal of demolition material, a culvert is found, then no built development should be on top of or adjacent to the culvert. A condition would be required with regard to this should the application be approved.

Private Water

The development is for a dwelling house in a rural area with private water supplies believed to serve properties in the vicinity.

Informative notes with regard to ensuring that the new development has an adequate and consistently wholesome supply of water and to ensure the private water supply or septic drainage systems of neighbours of the development remain accessible for future maintenance should be attached if planning permission is given.

Conservation Considerations

The site is around 250 metres from the Category B listed Gleneagles House. The distance and intervening vegetation would limit any impact on the listed building. The site is not within a conservation area.

Archaeology

Perth and Kinross Heritage Trust was consulted. The proposal does not raise any significant issues in terms of archaeology and no archaeological mitigation would be required.

Developer Contributions

Primary Education

The Council Developer Contributions Supplementary Guidance requires a financial contribution towards increased primary school capacity in areas where a primary school capacity constraint has been identified. A capacity constraint is defined as where a primary school is operating at over 80% and is likely to be operating following completion of the proposed development,

extant planning permissions and Local Development Plan allocations, at or above 100% of total capacity.

This proposal is within the catchment of Community School of Auchterarder Primary School. A condition to ensure compliance with policy 5 (Infrastructure Contributions) should be attached to any planning application given.

Auchterarder A9 Junction

The Council Developer Contributions Supplementary Guidance requires contributions from developments within the Auchterarder and wider Strathearn housing market area towards meeting the cost of delivering the A9 junction improvements which are required in the interests of safety.

The application falls within the identified A9 Junction Supplementary Guidance boundary and a condition to reflect this should be attached to any planning application given.

Contaminated Land

No issues have been identified with regard to contaminated land.

Economic Impact

The economic impact of the proposal is likely to be minimal and limited to the construction phase of the development.

Conclusion

In conclusion, the application must be determined in accordance with the adopted Development Plan unless material considerations indicate otherwise. In this respect, the proposal is not considered to comply with the approved TAYplan 2016 and the adopted Local Development Plan (2) 2019. I have taken account of material considerations and find none that would justify overriding the adopted Development Plan. On that basis the application is recommended for refusal.

APPLICATION PROCESSING TIME

The recommendation for this application has not been made within the statutory determination period due to further information being required with regard to flood risk.

LEGAL AGREEMENTS

None required.

DIRECTION BY SCOTTISH MINISTERS

None applicable to this proposal.

RECOMMENDATION

Refuse the application

1 The proposal is contrary to Policy 19 Housing in the Countryside of the Perth and Kinross Local Development Plan 2 (2019) and the Council's Housing in the Countryside Guide 2012 as the proposal fails to satisfactorily comply with any of the categories (1) Building Groups, (2) Infill Sites, (3) New Houses in the Open Countryside, (4) Renovation or Replacement of Houses, (5) Conversion or Replacement of Redundant Non Domestic Buildings, or (6) Rural Brownfield Land.

Justification

The proposal is not in accordance with the Development Plan and there are no material reasons which justify departing from the Development Plan

Informatives

None.

Procedural Notes

Not Applicable.

PLANS AND DOCUMENTS RELATING TO THIS DECISION

19/01725/1
19/01725/2
19/01725/3
19/01725/4
19/01725/5
19/01725/6
19/01725/7
19/01725/8
19/01725/9
19/01725/10
19/01725/11
19/01725/12
19/01725/13
19/01725/14

Date of Report

6 February 2020

LRB-2020-05 – 19/01725/IPL – Erection of a dwellinghouse (in principle), land 70 metres north of Bargate Cottage, Gleneagles

REPRESENTATIONS

M e m o r a n d u m

To	Head of Development Management	From	Regulatory Services Manager
Your ref	19/01725/IPL	Our ref	RM
Date	21 October 2019	Tel No	[redacted]

The Environment Service **Pullar House, 35 Kinnoull Street, Perth PH1 5GD**

The Town and Country Planning (Scotland) Act 1997 as amended by Planning etc (Scotland) Act 2006

Consultation on an application.

RE: Erection of a dwellinghouse (in principle) Land 70 Metres North Of Bargate Cottage Gleneagles for Mr Martin Haldane

I refer to your letter dated 18 October 2019 in connection with the above application and have the following comments to make.

Contaminated Land (assessment date – 31 October 2019)

This redevelopment site has not been consulted prior to this consultation:

Comments

Although searches of historical mapping has not identified and there is no further information held by the Authority to inform and to indicate that the application area has not been affected by contamination that may cause a constraint to the proposed development, It shall be the responsibility of the applicant to satisfy themselves that the ground conditions are as such that the development will be suitable for which planning consent has been granted.

Recommendation

A search of the historic records did not raise any concerns regarding ground contamination and therefore I have no adverse comments to make on the application.

[redacted]

M e m o r a n d u m

To	Development Quality Manager	From	Regulatory Service Manager
Your ref	19/01725/IPL	Our ref	MA
Date	24 October 2019	Tel No	[redacted]

The Environment Service **Pullar House, 35 Kinnoull Street, Perth PH1 5GD**

Consultation on an Application for Planning Permission

RE: Erection of a dwellinghouse (in principle) Land 70 Metres North Of Bargate Cottage Gleneagles for Mr Martin Haldane

I refer to your letter dated 18 October 2019 in connection with the above application and have the following comments to make.

Water (assessment date – 24/10/19)

Recommendation
I have no objections to the application but recommend the undernoted condition and informatives be included in any given consent.

Comments

The development is for a dwelling house in a rural area with private water supplies (including St Mungo's Farm supply) believed to serve properties in the vicinity. To ensure the new development has an adequate and consistently wholesome supply of water and to maintain water quality and supply in the interests of residential amenity and ensure the private water supply or septic drainage systems of neighbours of the development remain accessible for future maintenance please note the following condition and informatives. It should be noted that once the development is operational this Service may have statutory duties detailed in the Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017 to monitor the water quality. No public objections relating to the water supply were noted at the date above.

WS00 Condition

Prior to the commencement of the development hereby approved, details of the location and measures proposed for the safeguarding and continued operation, or replacement, of any septic tanks and soakaways, private water sources, private water supply storage facilities and/or private water supply pipes serving properties in the vicinity, sited within and running through the application site, shall be submitted to and approved in writing by the Council as Planning Authority. The subsequently agreed protective or replacement measures shall be put in place prior to the development being brought into use and shall thereafter be so maintained insofar as it relates to the development hereby approved.

WAYL - Informative 1

The applicant should ensure that any existing wayleaves for maintenance or repair to existing private water supply or septic drainage infrastructure in the development area are honoured throughout and after completion of the development.

PWS - Informative 2

The applicant shall ensure the private water supply for the dwellinghouse/ development complies with the Water Scotland Act 1980 (Section 63), The Private Water Supplies (Scotland) Regulations 2006 and The Water Intended for Human Consumption (Private Supplies) (Scotland) Regulations 2017. Detailed information regarding the private water supply, including the nature, location and adequacy of the source, any storage tanks/ pipework and the filtration and disinfection treatment proposed to ensure provision of an adequate and consistently wholesome water supply shall be submitted to Perth and Kinross Council Environmental Health in line with the above Act and Regulations.

Comments to the Development Quality Manager on a Planning Application

Planning Application ref.	19/01725/IPL	**Comments provided by**	Rebecca Mack
Service/Section	HE/Flooding	**Contact Details**	[redacted]
Description of Proposal	Erection of a dwellinghouse (in principle)		
Address of site	Land 70 metres north of Bargate Cottage, Gleneagles		
Comments on the proposal	We have reviewed the information within the proposed application. We would note that the proposed site lies within the functional floodplain as shown by the SEPA Flood Maps. A Flood Risk Assessment (FRA) has been submitted in support of the application. Hydrological analysis and hydraulic modelling have been undertaken within the FRA. Figure 2.2 within the FRA shows an excerpt from OS mapping. Within this figure there is a watercourse to the south of the proposed development. No further information on this watercourse has been provided and therefore we request this. Hydrological analysis has been undertaken for the Ruthven Water using FEH statistical, FEH rainfall runoff and ReFH2 methodology. The results of the FEH Statistical and FEH Rainfall Runoff methodologies gave similar results whereas the ReFH2 methodology was significantly less. The ReFH2 flow was used for the 1 in 200 year flow with a "compromise flow" was used for assessing the effects on access/egress. We disagree with this method and request that the higher flows are used for the 1 in 200 year flow for all assessments of flood risk. Manning's n roughness values have been provided within section 5.1 of the FRA. Various values have been provided for the floodplains. However, review of the cross sections provided all use a value of 0.06. We request clarification why only one value has been used within the cross-sectional profiles but within the report multiple values have been given. We would have expected the Manning's n value used for the channel would have been a little higher, however based on the photographs provided we accept the use of 0.035 for the channel. We would request justification for the location of the upstream boundary. Review of the SEPA Flood Maps indicates that there is a possible out of bank flow pathway further upstream on the Ruthven Water. We would also argue that this upstream cross section is close to the bridge over the Ruthven Water. Therefore, we believe that bridge and upstream cross section location may impact on model results and scenarios with bridge blockage. Tables 5.2a and 5.2b indicate that with an increase in flows and Manning's n values cross section 11 decreases with an increase in these parameters. We would have expected to see an increase with an increase in these parameters. Therefore, we request further clarification on these values. We would also request further explanation for the increase in flood levels with an increase in		

	Manning's n roughness values as we deem the model to be sensitive to this parameter. Section 5.2.1 within the FRA details the bridge blockage scenarios. It is unclear which bridge has a blockage scenario, and therefore, we request confirmation. We would also request justification for applying a 25% blockage scenario to the access track bridge over the Ruthven Water between cross sections 12 and 13. Figure 5.2f shows the overland flow pathways and flood extent. The location of the proposed development is on higher ground indicated by the topography in figure 5.2f. However, this higher ground has been developed by the demolition of the previous dwelling on site. Therefore, we request confirmation that the proposed development will be built on existing ground levels or if the site will be cleared of this demolition material before construction of the proposed development. We would highlight that if the proposal is to remove this demolition material before construction then we would request a pre and post development FRA is undertaken to ensure that the proposed development is not within the functional floodplain. We would be unable to support development within the functional floodplain.
Recommended planning condition(s)	N/A
Recommended informative(s) for applicant	The applicant is advised to refer to Perth & Kinross Council's Supplementary guidance on Flood Risk and Flood Risk Assessments 2014 as it contains advice relevant to your development.
Date comments returned	31/10/2019

Comments to the Development Quality Manager on a Planning Application

Planning Application ref.	19/01725/IPL	**Comments provided by**	Euan McLaughlin
Service/Section	Strategy & Policy	**Contact Details**	**Development Negotiations Officer:** Euan McLaughlin [redacted]
Description of Proposal	Erection of a dwellinghouse (in principle)		
Address of site	Land 70 Metres North of Bargate Cottage, Gleneagles		
Comments on the proposal	**Primary Education** With reference to the above planning application the Council Developer Contributions Supplementary Guidance requires a financial contribution towards increased primary school capacity in areas where a primary school capacity constraint has been identified. A capacity constraint is defined as where a primary school is operating at over 80% and is likely to be operating following completion of the proposed development, extant planning permissions and Local Development Plan allocations, at or above 100% of total capacity. This proposal is within the catchment of Community School of Auchterarder Primary School. **Auchterarder A9 Junction** With reference to the above planning application the Council Developer Contributions Supplementary Guidance requires contributions from developments within the Auchterarder and wider Strathearn housing market area towards meeting the cost of delivering the A9 junction improvements which are required in the interests of safety. The application falls within the identified A9 Junction Supplementary Guidance boundary and a condition to reflect this should be attached to any planning application granted.		
Recommended planning condition(s)	**Primary Education** **CO01** The development shall be in accordance with the requirements of Perth & Kinross Council's Developer Contributions and Affordable Housing Supplementary Guidance 2016 in line with Policy PM3: Infrastructure Contributions of the Perth & Kinross Local Development Plan 2014 with particular regard to primary education infrastructure or such replacement Guidance and Policy which may replace these. **RCO00** Reason – To ensure that the development approved makes a contribution towards increasing primary school provision, in accordance with Development Plan Policy and Supplementary		

	Guidance. **Auchterarder A9 Junction** **CO03** The development shall be in accordance with the requirements of Perth & Kinross Council's Developer Contributions and Affordable Housing Supplementary Guidance 2016 in line with Policy PM3: Infrastructure Contributions of the Perth & Kinross Local Development Plan 2014 with particular regard to Auchterarder A9 Junction Improvements or such replacement Guidance and Policy which may replace these. **RCO00** Reason – To ensure that the development approved makes a contribution towards the Auchterarder A9 Junction Improvements, in accordance with Development Plan Policy and Supplementary Guidance.
Recommended informative(s) for applicant	N/A
Date comments returned	04 November 2019

Comments to the Development Quality Manager on a Planning Application

Planning Application ref.	19/01725/IPL	**Comments provided by**	Andrew de Jongh Technician – Transport Planning
Service/Section	Transport Planning	**Contact Details**	TransportPlanning@pkc.gov.uk
Description of Proposal	Erection of a dwellinghouse (in principle)		
Address of site	Land 70 Metres North Of Bargate Cottage, Gleneagles		
Comments on the proposal	Insofar as the Roads matters are concerned, I have no objections to this proposal on the following condition.		
Recommended planning condition(s)	The development shall not commence until the following specified matters have been the subject of a formal planning application for the approval of the Council as Planning Authority: regarding access, car parking, public transport facilities, walking and cycling facilities, the road layout, design and specification (including the disposal of surface water) shall be in accordance with the standards required by the Council as Roads Authority (as detailed in the National Roads Development Guide) and to the satisfaction of the Planning Authority.		
Recommended informative(s) for applicant			
Date comments returned	04/11/2019		

Comments to the Development Quality Manager on a Planning Application

Planning Application ref.	**19/01725/IPL**	**Comments provided by**	Joanna Dick Tree and Biodiversity Officer
Service/Section	Strategy and Policy	**Contact Details**	[redacted] Email biodiversity@pkc.gov.uk
Description of Proposal	Erection of a dwelling house (in principle).		
Address of site	Land 70 Metres North Of Bargate Cottage, Gleneagles.		
Comments on the proposal	**Policy NE2B: Forestry, Woodland and Trees** Where there are existing trees on a development site, any application should be accompanied by a tree survey. There is a presumption in favour of protecting woodland resources. In exceptional circumstances where the loss of individual trees or woodland cover is unavoidable, mitigation measures will be required. The submitted Tree Report & Arboricultural Impact Assessment indicates a total of 43 trees must be felled to allow this development to take place. In line with the Scottish Government's Woodland Removal Policy, compensatory planting of at least 43 trees is required. To maximise the biodiversity value of new planting, the following recommendations in the submitted Extended Phase 1 Survey Report should be incorporated into landscaping plans: • Retention/creation of areas of scrub for ground-nesting bird species and as foraging habitat for terrestrial mammals; • Planting native plant species which attract night flying insects, which will in turn be of value to foraging bats; • Planting native seed/fruit bearing tree species which will be of value to wildlife as well as trees specifically for red squirrel (listed in section 4.5.2). • Planting areas of priority habitat, such as native species-rich hedgerows, wildflower grassland or woodland. **Policy NE3: Biodiversity** Policy NE3 sets out the Council's legislative obligation to further the conservation of biodiversity when carrying out its duties. The Council will seek to protect and enhance all wildlife and wildlife habitats whether formally designated/protected or not taking into account national and international legislation and the Tayside Local Biodiversity Action Plan, and associated guidance. Proposals that have a detrimental impact on the ability to achieve these guidelines and documents will not be supported unless clear evidence can be provided that the ecological impacts can be satisfactorily mitigated. <u>Bats</u> Eleven trees with bat roost potential were recorded within the site boundary.		

	Bats use the woodland, tree corridors, hedges and grassland for a commuting and foraging. In accordance with the recommendations in the submitted Extended Phase 1 Survey Report, if trees with bat roost potential are to be felled a full bat survey should be undertaken to confirm if any bat roosts are present. This survey should be submitted to the planning authority. <u>Red Squirrel</u> Red squirrels are known to be present within the site boundary. Foraging signs were identified within the site and potential dreys were recorded within the 100m buffer. In accordance with the recommendations in the submitted Extended Phase 1 Survey Report, if works are to take place within the squirrel breeding season (February to September inclusive) a full red squirrel survey should be undertaken to assess for disturbance to red squirrels within dreys up to 50m from the development. This survey should be submitted to the planning authority. <u>Breeding Birds</u> One amber-listed species was recorded using the site and adjacent areas: dunnock. Barn owl records were found during the desk study and the grassland within the site provides suitable foraging habitat. For all wild bird species in Great Britain, it is an offence to intentionally or recklessly kill, injure or take a bird; take, damage, destroy or interfere with a nest of any bird while it is in use or being built; or obstruct or prevent any bird from using its nest. <u>Biodiversity Enhancement</u> The submitted Extended Phase 1 Survey Report is an exemplar of best practice and presents a range of options to enhance the biodiversity value of this development including integrated bat roosting boxes, bird nesting boxes and landscaping. The applicant is encouraged to confirm which biodiversity enhancement measures will be integrated into the development into one document entitled a Site Biodiversity Action Plan. This should be submitted to the planning authority. Enhancement measures are listed in Section 4 of the Extended Phase 1 Survey Report.
Recommended planning condition(s)	If you are minded to approve the application then I recommend the following conditions be included in any approval: • **NE00** The conclusions and recommended action points within the supporting biodiversity survey submitted and hereby approved shall be fully adhered to, respected and undertaken as part of the construction phase of development.
Recommended informative(s) for applicant	
Date comments returned	21 November 2019

Comments to the Development Quality Manager on a Planning Application

Planning Application ref.	19/01725/IPL	**Comments provided by**	Rebecca Mack
Service/Section	HE/Flooding	**Contact Details**	[redacted]
Description of Proposal	Erection of a dwellinghouse (in principle)		
Address of site	Land 70 metres north of Bargate Cottage, Gleneagles		
Comments on the proposal	We previously responded to this application on the 31st of October 2019. We made comments on the submitted Flood Risk Assessment including: • Further information on the watercourse to the south • Hydrological method taken forward into the hydraulic modelling • Justification for the Manning's n roughness values for the floodplain • Justification for the upstream boundary • Clarification on the sensitivity to changes to Manning's n parameters • Justification for applying a 25% bridge blockage scenario • Confirmation that the proposed development will be built on existing ground levels Since our previous comments made in October 2019 an addendum, dated the 24th of December 2019 has been submitted in support of the application, in response to the above points. We are satisfied that the watercourse to the south that was identified on OS maps is culverted outwith the red line boundary. However, we would highlight that if during removal of demolition material, a culvert is found, then no built development should be on top of or adjacent to this culvert. FEH Rainfall Runoff and FEH Statistical estimated flow rates have been used in the updated hydraulic model, which we support. Justification has been given for the Manning's n roughness values used for the floodplains, which we support The upstream boundary has been extended upstream by a further 3 cross sections, which we also support. We accept the information provided within the addendum on the sensitivity analysis on Manning's n roughness values. A 25% and 50% blockage scenarios have been undertaken and presented within the addendum, which we accept. It has been confirmed that the proposed development will not be built on existing demolition material. This material will be removed before the erection of the proposed development. Therefore, we remove our objection but, we request that once this demolition material is removed the finished ground levels is re-surveyed and it must be demonstrated that the proposed development will be located above the 126.8mAOD contour.		

Recommended planning condition(s)	Once the proposed site is cleared of all demolition rubble, the ground is re-surveyed to ensure that the proposed development will lie above 126.8mAOD. The development must be located on ground above 126.8mAOD.
Recommended informative(s) for applicant	The applicant is advised to refer to Perth & Kinross Council's Supplementary guidance on Flood Risk and Flood Risk Assessments 2014 as it contains advice relevant to your development.
Date comments returned	06/01/20