

Sharon Phipps

From: [REDACTED]
Sent: 22 February 2021 11:28
To: [REDACTED]@lochlomond-trossachs.org)
Cc: [REDACTED]
Subject: 20200260DET - Rhoderick Dhu path and watchtower -
Attachments: Rhoderick Dhu Path and Watchtower at Trossachs Woods SAC - natura proforma - 03 December 2020 (A3353650).pdf; 20200260 DET - Rhoderick Dhu - Footpath and lookout - near Trossachs Pier - Trossachs woods SAC - Naturescot response - February 2021(A3389392).pdf

Dear [REDACTED]

Please find attached our response to 20200260DET watchtower and path planning case with the supporting Natura appraisal.

Kind regards

[REDACTED]
Area Officer

NatureScot | Silvan House, 231 Corstorphine Road, Edinburgh (Stirling team)

[nature.scot](https://www.nature.scot) | [@nature_scot](https://twitter.com/nature_scot) | *Scotland's Nature Agency* | *Buidheann Nàdair na h-Alba*

Natura Appraisal Form

Casework Recording Ref	
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1a. Name of the Natura Site affected & current status

Trossachs Woods SAC (Current)

1b. Name of component SSSI if relevant

Ben A'an and Brenacoile Woods SSSI

1c. European qualifying interest(s) & whether priority/non-priority:

Trossachs Woods SAC

Western acidic oak woodland

1d. Conservation objectives for qualifying interests:

Trossachs Woods SAC

To avoid deterioration of the qualifying habitats (listed below), thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and to ensure for the qualifying habitats that the following are maintained in the long term:
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- | |
|--|
| <ul style="list-style-type: none">• Extent of the habitat on site• Distribution of the habitat within site• Structure and function of the habitat• Processes supporting the habitat• Distribution of typical species of the habitat• Viability of typical species as components of the habitat• No significant disturbance of typical species of the habitat |
|--|

Western acidic oak woodland

2a. Proposal Title

Rhoderick Dhu Path and Watchtower at Trossachs Woods SAC
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2b. Date consultation sent	12-NOV-2020
2c. Date consultation received	12-NOV-2020
2d. Name of consultee	
2e. Name of competent authority	Loch Lomond and Trossachs National Park
2f. Type of case	Planning application

2g. Details of proposed operation

Installing a path to a viewpoint and a watchtower at the viewpoint near Trossachs Pier.

APPRAISAL IN RELATION TO REGULATION 48

3a. Is the operation directly connected with or necessary to conservation management of the site? YES/NO If YES give details:

No.

If yes and it can be demonstrated that the elements in 3b have been applied to all the interest features in a fully assessed and agreed management plan then consent can be issued but rationale must be provided, including reference to management objectives. If no, or if site has several European qualifying interests and operation is not directly connected with or necessary to the management of all of these then proceed to 3b.

3b. Is the operation likely to have significant effect on the qualifying interest? Consider each qualifying interest in relation to the conservation objectives.

- i) indicate which feature of interest could be affected by the proposed operation and briefly in what way; if none provide a brief justification and then proceed to v), otherwise continue;*
- ii) refer to other plans/projects with similar effects/other relevant evidence;*
- iii) consider scale, longevity, and reversibility of effects;*
- iv) consider whether proposal contributes to cumulative or incremental impacts with other projects completed, underway or proposed;*
- v) give Yes/No conclusion for each interest.*

Yes. The proposal is in Trossachs Woods SAC and will destroy qualifying habitat.

If yes, or in cases of doubt, proceed to 3c. If potential significant effects can easily be avoided, go straight to 4 and record modifications required. If no for all features, a consent or non-objection response can be given and recorded under 6 (although if there are other features of national interest only, the effect on these should be considered separately).

Mitigation or modifications required to avoid a likely significant effect & reasons for these:

3c. Appraisal of the implications for the site in view of the site's conservation objectives.

- i) Describe for each European qualifying interest the potential impacts of the proposed operation detailing which aspects of the proposal could impact upon them and their conservation objectives*
- ii) Evaluate the significance of the potential impacts, e.g. whether short/long term, reversible or irreversible, and in relation to the proportion/importance of the interest affected, and the overall effect on the site's conservation objectives. Record if any information or specialist advice has been obtained.*
- iii) In the light of the appraisal, ascertain whether the proposal will not adversely affect the integrity of the site for the qualifying interests. If SAC and/or SPA and/or Ramsar site give separate conclusions. If conditions or modifications are required, proceed to 4.*

Ensuring for the qualifying habitats that the following are maintained in the long term:

- Extent of the habitat on site
- Distribution of the habitat within site
- Structure and function of the habitat
- Processes supporting the habitat
- Distribution of typical species of the habitat
- Viability of typical species as components of the habitat
- No significant disturbance of typical species of the habitat

Extent of the habitat on site

- The extent of ground flora of the qualifying habitat will be permanently reduced by the footprint of path and watchtower.
- Extent of existing canopy cover will be retained, but trees may be lost as a result of root damage and accidental damage by visitors.

Watchtower footprint

The tower has been designed to minimise impacts on the protected site, with much of the platform and walkway area being suspended above the ground. However, the lower level viewing platform appears to sit on the ground and the visualisations also show a broad gravel area at the entrance and exit from the building, which would lead to additional loss of habitat, not fully included in the calculations below.

Path footprint

0.016%* of the qualifying habitat will be destroyed by the footprint of the main path line (1.5m wide path) and watchtower; however, taking into account plans for side ditches, stone revetments, slope stabilisation, passing places and the watchtower entry area, the final loss of qualifying habitat is likely to be considerably greater than that.

- On popular, established routes the installation of a path/path repairs can reduce impacts by reducing path braiding and erosion. This justification cannot be used here, as the path is infrequently used, narrow and barely visible in some parts.
- This loss should be considered as part of a cumulative total, in addition to other recent local developments (see below).

*Calculation: 282m² under main path line and 85m² under watchtower footprint (NP calculations from plans) or 0.0367ha/232.5ha qualifying habitat on the SAC = **0.016%**

Distribution of the habitat within the site

- In addition to the direct loss under the path, the ground flora around the path and watchtower entry area is likely to suffer damage to its structure, species composition and

vegetation cover from human trampling and dog urine/faeces. There may also be an increase in weedy species encouraged by disturbance and brought in by visitors.

Structure and function of the habitat

- The habitat is already unfavourable declining, due to high herbivore impacts (main negative pressure) and rhododendron. In particular, the site requires the restoration of the shrub layer and age structure of the woodland, through reduction in herbivore impacts and increased regeneration of woody species.
- The increased disturbance may reduce the number of browsing deer in the area and the proposal contains plans to remove nearby rhododendron; however, these potential positive impacts cannot be used to cancel out negative impacts in a Natura appraisal.
- Overall, the proposals will result in further decline in site condition in this area. Path maintenance and trampling around the path will also prevent natural succession and tree regeneration in the immediate area.

Processes supporting the habitat.

- As well as impacts on tree regeneration (discussed above) there may be localised impacts on the hydrology of the site, due to the interruption/re-direction of water flows by the path, watchtower foundations and associated structures. This is likely to affect the ground flora, groundwater dependant habitats and surrounding trees. A section broad walk is proposed over a flush, which would minimise impacts in that area.

Distribution of typical species and viability of typical species as components of the habitat

- The distribution of typical birds and mammals in the area are likely to be locally affected by the presence of many more people and dogs in the area of the proposal. The pier car park and campsite are very busy with day trippers and tourists through spring, summer and autumn. An increase in parking spaces is planned. As it would be one of the main attractions on site, the path and watchtower are likely to be heavily used and for long hours in the summer, as people can stay overnight on the site. This could deter woodland mammals and birds from breeding and foraging in the area around the proposal, reducing their numbers. The disturbance effects could extend for a few hundred metres around the area of the proposal, depending on the sensitivity of the receptor species (also see section on significant disturbance below).
- The line of the path and location of the watchtower could represent a barrier to species that are sensitive to human disturbance, reducing their use of the area between the path and the pier. This could lead to localised changes to the distribution of typical species on site, effectively causing partial fragmentation of the site.
- All existing, healthy native trees will be retained, although the tree survey recommends that one Scots pine is pruned and 4 diseased or dead trees are removed.

- The categorisation of trees used in the assessment gives trees that have low life expectancy, or that are older, defective, damaged or diseased a lower overall value. It is important to note that these trees often can have high biodiversity value, and that just because they are not of high timber or amenity value that they are therefore less valuable. This logic is flawed in terms of conservation assessment, and assumptions based on this logic in the report are also therefore flawed.
- Standing dead wood is also of value; the report identifies some dead trees that it recommends are felled and stacked.
- The proposed route of the path and the foundations of the watchtower would cut through the RPAs (Root Protection Areas) of a large number of the trees. Therefore we can expect that there may be longer term impacts on tree health and stability as a result of the path construction work. It is NatureScot's view that the construction of the path will likely result in indirect loss of existing trees.

No significant disturbance of typical species of the habitat

- A significant, permanent increase in disturbance, in what is currently a relatively undisturbed area, is expected to result from this development. The path from the car park to the watchtower area is infrequently used, narrow and informal at present. The topography means that most of the proposed path and watchtower area are buffered from activity at the pier at present.
- The hours of use for this area are likely to be long in the summer, as people stay on site in mobile homes or on the campsite.
- The watchtower is designed to discourage people from dispersing into the wider area, but walkers are frequently accompanied by off-lead dogs, which will disturb wildlife over a much larger area.
- The disturbance effects could extend for a few hundred metres around the area of the proposal, depending on the sensitivity of the receptor species.

Cumulative impacts

A nearby camping development by the same applicants, has resulted in a 0.12% loss of qualifying habitat on the same protected site. AESI was ruled out for that development, on the grounds that it was a degraded, disturbed area with low restoration potential on the edge of the SAC. 0.05ha of the site has also been lost at the edge of the car park, due to works by a third party and a further car park extension of 0.04ha is proposed. The potential loss of qualifying habitat from the path and watchtower proposal should be considered as part of a cumulative total loss since designation.

Conclusion

In the context of wider natura case law, it has not been possible to rule out adverse effect on site integrity for proposals with similar levels of cumulative permanent loss of qualifying habitat, significant additional impacts and an increase in disturbance.

On the basis of current information, and for the reasons given above, it is unlikely that Loch Lomond and Trossachs National Park Authority will be able to conclude that there will be no adverse effect on the integrity of the site.

4. Conditions or modifications required.

Indicate conditions/modifications required to ensure adverse effects are avoided, & reasons for these.

N/A

5. Advice sought.

Include here details of or clear reference to, advice sought from AS, colleagues etc. If no advice sought give brief reasons/justification

[Advice](#) sought from [REDACTED] woodland advisor and [REDACTED] regarding natura sites. Also referred to natura case law and similar cases on other woodland SACs

6. RESPONSE

a) Natura comments (for additional guidance see Development Management and Natural Heritage, section 8, or the Natura Model Responses (in the Natura Casework Guidance) for all other Natura casework)

On the basis of current information, and for the reasons given above, it is unlikely that Loch Lomond and Trossachs National Park Authority will be able to conclude that there will be no adverse effect on the integrity of the site."

b) SNH Comments (for additional guidance see Development Management and Natural Heritage, section 8)

For SNH advice to other authorities:

Outright objection 7b.
Likely significant effect and probable adverse effect on integrity and we have carried out a scientific appraisal to enable us to respond to the consultation

For SNH response to request for opinion on effects of permitted development:

For SNH response to application for consent/licence:

Appraised by	
Date	15-FEB-2020
Checked by	
Date	16 FEB 2021

[REDACTED]
Loch Lomond and the Trossachs National Park
Carrochan
Carrochan Road
Balloch
G83 8EG

22 February 2021

Our ref: CDM161260
Your ref: 2020/0260/DET

[REDACTED]
Town and Country planning (Scotland) Act 1997
Formation of new footpath and installation of lookout structures near to Trossachs
Pier in Trossachs Woods Special Area of Conservation (SAC)/ Ben A'an and
Brenachoile Site of Special Scientific Interest (SSSI).

Thank you for your consultation on this planning application, received on 3rd December 2020 and the Habitats Regulations Appraisal (HRA), received on the 13th February 2021. We previously advised that a proposal of this nature within the Special Area of Conservation would be challenging. In particular, that loss of habitat and damage to the structure and function of the woodland and its supporting species would be difficult to fully mitigate.

NatureScot Position

We support the conclusions of the HRA undertaken by the National Park Planning Authority, that it cannot be shown that there will be no adverse effect on the integrity of the European site. **We therefore object to this proposal.**

NatureScot comments

The proposal lies within the Trossachs Woods Special Area of Conservation (SAC), designated for its western acidic oak woodland.

The site's status means that the requirements of the **Conservation (Natural Habitats, &c.) Regulations 1994 as amended, (the "Habitats Regulations")** apply.

We agree with the conclusion of the HRA, in particular we consider the key potential effects of the proposal on site integrity to be:

- a) Direct qualifying habitat loss under the path and watchtower. Case law has established that small losses of habitat can affect adversely site integrity (see Annex One for more detail on *Peter Sweetman v An Bord Pleanala* (Case C-258/11)). In addition, the ground flora around the path and watchtower is likely to suffer damage to its structure, species composition and vegetation cover from human trampling.

- b) The proposed route of the path and the foundations of the watchtower would cut through the RPAs (Root Protection Areas) of a large number of the trees. Therefore we can expect that there may be longer term impacts on tree health and stability.
- c) A significant and permanent increase in disturbance to deer and other woodland mammals and birds, in what is currently a relatively undisturbed area. The disturbance effects could extend for a few hundred metres around the area of the proposal, depending on the sensitivity of the receptor species. This disturbance effect may also affect the distribution of species.

Conclusion

On the basis of current information, and for the reasons given above, it is unlikely that Loch Lomond and The Trossachs National Park will be able to conclude that there will be no adverse effect on the integrity of the site and therefore we object to this proposal.

If the planning authority intends to grant planning permission against this advice you must notify Scottish Ministers.

If you have any questions about this response, please contact [REDACTED] nature.scot). This advice is provided by Scottish Natural Heritage, acting under its operating name NatureScot.

Yours sincerely,

[by email]

Ian Bray
Area Manager Forth
ian.bray@nature.scot

Annex One - *Peter Sweetman v An Bord Pleanala* (Case C-258/11)

A decision of the Court of Justice of the European Union in *Peter Sweetman v An Bord Pleanala* (Case C-258/11) discussed what is meant by an adverse effect on site integrity in relation to a priority habitat (although there was no firm ruling in relation to non-priority habitat). It states in paragraph 46 “**Consequently, if, after an appropriate assessment of a plan or project’s implications for a site, carried out on the basis of the first sentence of Article 6(3) of the Habitats Directive, the competent national authority concludes that that plan or project will lead to the lasting and irreparable loss of the whole or part of a priority natural habitat type whose conservation was the objective that justified the designation of the site concerned as an SCI, the view should be taken that such a plan or project will adversely affect the integrity of that site**”. Paragraph 48 further states that a plan or project “*will adversely affect the integrity of that site if it is liable to prevent the lasting preservation of the constitutive characteristics of the site that are connected to the presence of a priority natural habitat whose conservation was the objective justifying the designation of the site in the list of SCIs, in accordance with the directive. The precautionary principle should be applied for the purposes of that appraisal*”.

In case C-258/11 the Court of Justice of the European Union (CJEU) addressed the issue of how small a percentage of loss of a priority qualifying habitat could constitute an adverse effect on site integrity (AESI). It ruled that a permanent loss of c.0.5% of a priority qualifying habitat (1.47ha out of 270ha of the total habitat, in a SAC of c.25,247ha) did constitute an AESI, and that the same logic would apply to any other long-lasting loss. This has more recently backed-up in EU guidance on the subject which extends the same interpretation to non-priority habitats.

Sharon Phipps

From: [REDACTED]
Sent: 02 March 2021 14:22
To: [REDACTED]@scotland.gsi.gov.uk'
Cc: [REDACTED]@scotland.gsi.gov.uk'; Peter Hutchinson; GOVERNMENT_RELATIONS;
[REDACTED]
Subject: Notification of a NatureScot objection - construct a footpath and watchtower near to Trossachs Pier
Attachments: NatureScot response - Rhoderick Dhu - Footpath and lookout - near Trossachs Pier -.pdf

Dear [REDACTED]

Please find attached a copy of a recent NatureScot objection to a proposal to construct a footpath and watchtower near to Trossachs Pier.

We have objected on the grounds that the proposed likely to have a significant effect on the Western acidic oak woodland qualifying interest of the Trossachs Woods Special Area of Conservation (SAC) and it is not possible to demonstrate that there would be no adverse effect on the integrity of the SAC.

Kind regards

[REDACTED]
Development Casework Manager

NatureScot | Alexander Fleming House | Southfield Drive | Elgin | IV30 6GR | m: [REDACTED]
[nature.scot](https://www.nature.scot) | [@nature_scot](https://twitter.com/nature_scot) | Scotland's Nature Agency | Buidheann Nàdair na h-Alba

██████████
Loch Lomond and the Trossachs National Park
Carrochan
Carrochan Road
Balloch
G83 8EG

22 February 2021

Our ref: CDM161260
Your ref: 2020/0260/DET

Dear ██████████

**Town and Country planning (Scotland) Act 1997
Formation of new footpath and installation of lookout structures near to Trossachs
Pier in Trossachs Woods Special Area of Conservation (SAC)/ Ben A'an and
Brenachoile Site of Special Scientific Interest (SSSI).**

Thank you for your consultation on this planning application, received on 3rd December 2020 and the Habitats Regulations Appraisal (HRA), received on the 13th February 2021. We previously advised that a proposal of this nature within the Special Area of Conservation would be challenging. In particular, that loss of habitat and damage to the structure and function of the woodland and its supporting species would be difficult to fully mitigate.

NatureScot Position

We support the conclusions of the HRA undertaken by the National Park Planning Authority, that it cannot be shown that there will be no adverse effect on the integrity of the European site. **We therefore object to this proposal.**

NatureScot comments

The proposal lies within the Trossachs Woods Special Area of Conservation (SAC), designated for its western acidic oak woodland.

The site's status means that the requirements of the **Conservation (Natural Habitats, &c.) Regulations 1994 as amended, (the "Habitats Regulations")** apply.

We agree with the conclusion of the HRA, in particular we consider the key potential effects of the proposal on site integrity to be:

- a) Direct qualifying habitat loss under the path and watchtower. Case law has established that small losses of habitat can affect adversely site integrity (see Annex One for more detail on *Peter Sweetman v An Bord Pleanala* (Case C-258/11)). In addition, the ground flora around the path and watchtower is likely to suffer damage to its structure, species composition and vegetation cover from human trampling.

- b) The proposed route of the path and the foundations of the watchtower would cut through the RPAs (Root Protection Areas) of a large number of the trees. Therefore we can expect that there may be longer term impacts on tree health and stability.
- c) A significant and permanent increase in disturbance to deer and other woodland mammals and birds, in what is currently a relatively undisturbed area. The disturbance effects could extend for a few hundred metres around the area of the proposal, depending on the sensitivity of the receptor species. This disturbance effect may also affect the distribution of species.

Conclusion

On the basis of current information, and for the reasons given above, it is unlikely that Loch Lomond and The Trossachs National Park will be able to conclude that there will be no adverse effect on the integrity of the site and therefore we object to this proposal.

If the planning authority intends to grant planning permission against this advice you must notify Scottish Ministers.

If you have any questions about this response, please contact [REDACTED] [\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)). This advice is provided by Scottish Natural Heritage, acting under its operating name NatureScot.

Yours sincerely,

[by email]

Ian Bray
Area Manager Forth
ian.bray@nature.scot

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Sharon Phipps

From: [REDACTED]@lochlomond-trossachs.org>
Sent: 03 March 2021 14:36
To: [REDACTED]
Subject: FW: 2020/0260/DET
Attachments: Consultation response to [REDACTED].pdf

Good Afternoon [REDACTED]

I had a call with [REDACTED] and his agent yesterday regarding the new path at Trossachs Pier. They advised that they wish to respond to the HRA and NatureScot response. This has been received today and I attach it above. The letter raises 3 main issues:

1. Path Description
2. Mitigation Measures
3. NatureScot response.

Regarding point 1. I can confirm there will be no change to the description of the development. The proposal relates to engineering works along the "path" route as well as widening of the path. It is not accepted that the proposal relates to path reinstatement.

Regarding points 2. and 3, I would be grateful if you could confirm if you wish to update your response following the submission of this additional information. I have also sent this to [REDACTED] and asked if she wishes to update the HRA. If it would help I would be happy to arrange a call early next week for the three of us to discuss. As you know their funding deadline is at the end of the month so if you could get back to me next week (even if just to confirm if you want to make any further comment) that would be really appreciated.

Thanks very much
[REDACTED]

From: MW Consultants [<mailto:murraygwatt@yahoo.co.uk>]
Sent: 03 March 2021 11:05
To: [REDACTED]@lochlomond-trossachs.org>
Subject: Fw: 2020/0260/DET

[REDACTED]

Apologies. Missed a couple of typos. Corrected letter attached for upload/ sharing with colleagues.

Regards,

[REDACTED]
Partner
MW Consultants
m: [REDACTED]

The content of this email and any attachments is confidential and is subject to the terms of the National Park Authority's email disclaimer at <https://www.lochlomond-trossachs.org/disclaimer> and is intended only for the use of the individual or entity to which it is addressed.



MW CONSULTANTS
ARCHITECTURE & DESIGN

[REDACTED]
Loch Lomond & The Trossachs National Park Authority
Planning
NP HQ
Carrochan
Carrochan Road
BALLOCH
G83 8EG

2nd March 2021

Dear [REDACTED]

PLANNING APPLICATIONS

2020 /0250/ DET, /0251/ DET and /0260/DET

**RHODERICK DHU REINSTATED PATH & NEW WATCHTOWER
TROSSACHS PIER and STRONACHLACHAR PIER SITES**

Thanks very much for the Skype meeting with [REDACTED] and myself on Monday afternoon. It was a useful session and reassuring to hear of the progress you have made particularly with the applications for the Trossachs Pier and Stronachlachar Pier sites. It was also good to hear you will be able complete the reports on these two applications along with the F&LS one for Ben A'an for sign off within the next couple of weeks.

However, we clearly still have further to go with the application for the reinstatement of the historic Roderick Dhu footpath and the replacement watchtower and scenic lookouts. We are keen to explore the scope for introducing mitigation measures that would address the concerns of NatureScot and your internal natural heritage adviser and this is the primary purpose of this follow up letter.

As mentioned we are also concerned that the Habitat Assessment and the NatureScot response of 22nd February seem to be at odds with the surveys and conclusions of our professional team who undertook detailed ground surveys of the reinstated path and scenic lookouts corridor and the surrounding hinterland and concluded the impact of the proposals would be small and linear in a confined area with habitat in the surrounding area not being directly impacted and with minimal impact on roots of trees which are predominantly birch due to the sensitive construction techniques being used.

As you acknowledged the quality of the survey work, path construction and scenic lookout design proposals are of a high standard which reflects my client's desire to introduce a well-designed and sensitively constructed project which is based on the principles of 'light touch' with no construction vehicles on the ground and robust visitor management to minimise environmental impacts. This has increased the overall cost of the project significantly but this is a cost the client is willing to bear to enable more visitors to enjoy the historic Roderick Dhu viewpoint safely.

1. Path Description

On several occasions in correspondence both my client and I have expressed concern that the planning application has been registered as a 'new path' when it was clearly stated in the application form that this was the reinstatement of a historic Victorian path. We believe there is an important distinction as the principle of a path being in existence in this area as part of a more extensive historic path network, and along with a watchtower, over a considerably long period of time has been established and is well illustrated in old postcards and the John Knox painting of circa 1820. In any assessment report or description of this proposal we would be grateful if it is referred to as 'reinstatement of the historic Roderick Dhu path and construction of scenic lookouts' as the current title on the planning web portal is very misleading.

There is only a short stretch of the former path that has been realigned at the bottom to avoid rockfall and fallen trees and this decision was taken on health and safety grounds.

It is unfortunate the path fell into a state of disrepair in the 1980s but there are still a significant number of visitors who find their way up to the viewpoint despite the path not being signed any more though the Watchtower viewpoint does continue to be featured on many websites. There is notable ground damage in several areas and more localised damage in other areas with poor vegetation cover from trampling of feet despite this not being as bad as normal due to extensive lockdowns over the past year due to COVID 19. I am mindful when you and others were on site late last year the level of damage from trampling was less pronounced as the lockdowns have allowed some ground recovery to take place. There is of course substantial ground cover damage over a wide area due to animal grazing, predominantly by wild goats and deer.

2. Possible Mitigation Measures

As part of any mitigation plan agreed my client would be prepared to erect a post and rail fence on either side of the path to contain visitors and to prevent them spreading out and causing further damage. A two spar and handrail design would keep visitors to the path and when they reach the tower and scenic lookouts they are in a well contained area anyway for health and safety reasons as well as to minimise environmental impact.

This type of arrangement has worked well in other sensitive areas including other National Parks and areas with special nature designations. This is a well tried and tested visitor management technique used extensively on sensitive sites across the globe. The style of fencing proposed would enable wildlife to path through the different zones of the SAC easily and safely.

There would also be clear signing at the bottom of the path to advise visitors to keep dogs on a lead and to observe other site management rules. The path and scenic lookouts would also be closely monitored with regular patrols plus it is planned to install CCTV in the tower and scenic lookout area. The lower part of the path is already covered by CCTV located in the car park as part of a site wide visitor safety and management regime. Interpretive panels would be installed at the bottom of the path beside the car park to showcase the natural and cultural heritage of the site and conservation messages. Some low key interpretation is also planned at the tower and scenic lookout.

My client is also willing to consider any other mitigation measures deemed appropriate and has a strong commitment to ensure this short path and scenic lookout corridor is managed to a high standard with daily litter picks and regular interactions with visitors.

3. Feedback on NatureScot Consultation Response

As agreed when we spoke the other day, below I set out a brief summary of the feedback from our professional team on NatureScot's consultation response of the 22nd February 2021 to the Habitat Appraisal undertaken by one of your colleagues and I add some further comments on each of the three grounds of objection cited.

It is important to emphasise how our clients instructed the Project Team to approach this project from the start, understanding and respecting how sensitive the existing path route and viewpoint areas are within the Trossachs Woods SAC and ensuring not just qualified consultants on the team, but consultants with experience working throughout Scotland, to deliver environmentally responsible projects in the most sensitive areas of our environment. For example, the path construction team A.C.T. Heritage were chosen because they have delivered over 320 path projects of the highest quality in sensitive hill and mountain environments including a number which were part of the HLF and NPA funded Mountains and People Project spanning both the Loch Lomond and The Trossachs and Cairngorms National Parks.

Our Professional Team have all reviewed the Habitat Appraisal and the NatureScot Natura form and letter and I trust the comments below are considered in the constructive way they are meant as part of trying to find a way forward to secure a positive outcome for this application.

NatureScot Consultation letter of 22/02/21 (response to NPA Habitats Regulations Appraisal of 13/02/21)

A) *“Direct qualifying habitat loss under the path and watchtower. Small losses of habitat can affect adversely site integrity (see Annex One for more detail on Peter Sweetman v An Bord Pleanala (Case C-258/11)). In addition, the ground flora around the path and watchtower is likely to suffer damage to its structure, species composition and vegetation cover from human trampling.”*

Response from - TAY ECOLOGY/ A.C.T HERITAGE / ALAN MOTION TREE CONSULTING/ MW CONSULTANTS

In terms of the habitat loss we appreciate that it is impossible for the proposed reinstatement of the footpath and erection of the watchtower to have zero impact on the vegetation but this is largely on the largely existing 188m route of the path to the viewpoint. It is overgrown in parts and generally poorly defined apart from on the drier contour ledge on the last third of the path approaching the scenic viewpoint where the heather cover has been worn down by walkers. In some areas there are disproportionately large areas of trodden and muddy ground including over the first 30m approximately from the edge of the carpark.

The area is also being reviewed and assessed during a period that travel restrictions have been in place for lengthy periods due to COVID 19 resulting in less walkers using this area and having an impact on ground cover. There is clearly some existing damage to existing ground cover and this is likely to continue over a wide area and is unlikely to be managed effectively if the path reinstatement proposals and related mitigation measures are not implemented.

Across the range of habitat, vegetation, bat and tree surveys undertaken on site last year all the consultants concluded the impact of the proposals would be small and linear in a confined area with habitat in the surrounding area not being directly impacted and minimal impact on roots of trees near the path route and scenic lookouts which are predominantly birch (85%).

We would suggest that the mitigation measures proposed by our consultants could be made even more robust - For example, this could include the addition of post and rail fencing along either side of the route of the path referred to earlier, effectively preventing people and dogs from leaving the surfaced path. This, combined with signage explaining the value of respecting the defined route and keeping dogs on leads, would alleviate some of the concerns being raised.

We appreciate that it is the vegetation for which the SAC is designated and it is the impact across a small linear area which is the issue, even though the actual area is a very small percentage of the SAC overall. The potentially affected area of the qualifying habitat of the SAC, as identified in the NPA Heritage Appraisal, is 0.016%, or 1/6250th. Also it is important to note some of this area and a wider area is already damaged and degraded through a combination of trampling by walkers and grazing by animals. This is unlikely to change for the better if the path improvements do not proceed. The reinstatement of the path with the appropriate mitigation measures could therefore have a very positive impact in this area.

The legal precedent, Peter Sweetman v An Bord Pleanala, referred to in Nature.Scot's Consultation Annex one concludes that "...a permanent loss of circa 0.5% of a priority qualifying habitat did constitute an Adverse Effect on Site Integrity, and that the same logic would apply to any other long lasting loss." Our area of potentially affected qualifying habitat equates to a percentage of less than 1/30th of that referred to above in the legal precedent and a more extensive area is already adversely affected by walkers and grazing animals as referred to earlier and this doesn't appear to have been taken account of in the calculations.

B) *"The proposed route of the path and the foundations of the watchtower would cut through the RPAs (Root Protection Areas) of a large number of the trees. Therefore we can expect that there may be longer term impacts on tree health and stability."*

Response from - ALAN MOTION TREE CONSULTING/ A.C.T HERITAGE/ MW CONSULTANTS

Although the path does indeed pass over the Root Protection Area of trees (predominantly birch), it does not 'cut through' roots as stated by NatureScot. The path construction methods planned and set out are non-invasive nature and such that no tree roots or trees, with the exception of one dead rowan adjacent to tree number 9669, need to be removed to allow the path construction works.

Two ash trees heavily infected with Ash Dieback Disease are recommended for removal, purely due to disease presence and the fact that they will both die. Neither are particularly large, so the safety of retaining them as standing dead wood is not overly concerning. They could be retained if the authorities wanted. Similarly, one silver birch is standing dead, and recommended to be reduced in height from 9m to 4m purely from a safety perspective.

The top bullet point in the Natura appraisal form page 5 of 7 makes reference to the categorisation of trees. The categorisation method used is set out in British Standard 5837:2012, which is industry best practice, and a requirement for all planning submissions made to the NPA, set out in their Natural Environment Policy 9 of the adopted local plan. This categorisation is based on nationally agreed criteria, designed to allow reasoned planning decisions to be made. Only dead/dying trees as noted above are affected by the proposal, so the categorisation is correct.

The Watchtower is proposed as a lightly-loaded timber structure on a steel frame, sitting on small pad foundations. Excavations for foundation pads can be hand-dug in accordance with BS5837 recommendations to minimise any intrusion into the soil and potential conflict with tree roots. We have specified these construction methods as they are well established and routinely used, and present negligible risk of harm to existing trees. The tower base can also be slightly raised off the ground too to alleviate concerns but it should be noted the ground cover here is already badly damaged due to foot trampling.

There are no proposals to remove any trees from the vicinity of the Watchtower. However, this area contains specimens of Norway spruce which have self-seeded and established naturally within the native woodland. Removal of these non-native species as part of the project would be beneficial and this is in line with comments from the NPA's own tree adviser.

Some minor pruning of one Scots pine to improve the views is proposed which will have a negligible impact on overall site quality.

Many of trees in this area are thin birch trees and are down the bank. Distances to most of the birch trees, apart from one vary, between 4m and 7m which means the likelihood of damaging tree roots is minimal.

As far as our proposed construction methods are concerned, as stated earlier, we are reinstating a path that has been used by visitors since the 1800s to see and appreciate the views so vividly described by Sir Walter Scott in his famous Lady of the Lake poem. The site therefore has great historical and natural heritage significance and our path and scenic lookout specialists have taken this into account in their design and construction method proposals to minimise impact.

A.C.T. have carried out a Wetland Typology survey, metre by metre, then designed the path proposal accordingly and applied the appropriate construction method and specification, generally Hand Built construction to respect Root Protection Areas, as well as applying specially designed 20 m boardwalk section and a variety of drainage features, where appropriate, raising the path above the 'Natural flush' to mitigate against any changes to the existing site hydrology.

As already noted in the response to point A) above, a post and rail fence could be erected to clearly define the path area and to minimise the impact on the protected wetland area.

C) *“A significant and permanent increase in disturbance to deer and other woodland mammals and birds, in what is currently a relatively undisturbed area. The disturbance effects could extend for a few hundred metres around the area of the proposal, depending on the sensitivity of the receptor species. This disturbance effect may also affect the distribution of species.”*

Response from - TAY ECOLOGY/ A.C.T HERITAGE/ MW CONSULTANTS

As stated in points above, making our proposed mitigation more robust would act in support of the project. For example, this could include fencing along the path to discourage people from leaving the surfaced path and signage to explain why people should stay on the path. This would reduce the impact over the wider area.

Whilst there would be disturbance to other species from the footpath during construction this is mitigated by following the specific recommendations of the Tay Ecology Appraisal and A.C.T. Heritage's Method statements and disturbance through usage will be minimised by the proposed erection of a post & rail fence as suggested above.

Disturbance beyond the construction phase from usage by people and dogs can be substantially reduced with the introduction of a mix of mitigation measures such as confining visitor movements with the installation of fencing in the path corridor and the other proposals highlighted earlier.

I would question the scale of increase in disturbance to deer and other woodland mammals such as birds on two grounds.

Firstly, the path and scenic lookouts are within 200 metres of a very large and busy car park and bustling pierhead area with over 100,000 people annually coming here for scenic boat trips and outdoor recreational activity. There is already significant 'sound spill' within the area where the reinstated path and scenic lookouts will be due to the close proximity of the car park and pierhead, the associated toing and froing of cars and coaches and the regular loud tannoy announcements and commentaries on the 4 passenger boats with passengers embarking and disembarking. There is significant noise disturbance in this area due to the popularity of the car park and pierhead visitor hub.

Secondly, in the Habitat Survey and Protected Species Assessment Report prepared by Tay Ecology the specialist consultant refers to undertaking a survey over a 500 metre area from the path and concluded 'the wider surrounding area will not be directly impacted' and the potential impact on any breeding birds is expected to be low'. The consultant confirmed the survey demonstrates that the proposed reinstated path is unlikely to have a detrimental impact on any wildlife already using the site and the surrounding area.

In terms of deer disturbance the existing levels of activity on the site already deter deer during operational hours from the areas immediately adjacent to the site, which would include the existing access path and viewpoint. The presence of deer (and wild goats) over the wider area is an ongoing problem that Scottish Water and Forestry & Land Scotland is grappling with due to the extent of damage in the SAC caused by deer and wild goat grazing and deer culling actively takes place on annual basis.

CONCLUSIONS

This site, incorporating the historical Roderick Dhu path and viewpoint, is already accessible to the public causing potentially unquantifiable damage to the habitat and is a small confined area within 200m of the existing tourism related activities associated with the long established Trossachs Pier site.

Also, the principle of development within the Trossachs Woodland SAC is not precluded, subject to mitigating against adverse effects on the site integrity, otherwise we would have been advised of such at the pre-application stage and not commissioned a series of specialist surveys and reports.

Whilst we appreciate that no loss of qualifying habitat, however small, could be defined as negligible, if weighed against the potential gains of a more clearly defined, and signed, access path, constructed along this existing path, using hand dig methods and boardwalk sections etc all as specified in A.C.T.' Heritage's and Tay Ecology's method statements, mitigating against impacts, however minimal, to the habitat, wildlife and hydrology of the site plus no trees requiring removal due to our proposals, no Tree Protection Areas being cut through, that there is an overall gain to be achieved offering improved protection to the existing overall area of qualifying habitat.

Sharon Phipps

From: [REDACTED]
Sent: 04 March 2021 16:23
To: [REDACTED]
Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED],
Could you send me the appraisal you did and the response that is mentioned please?
Many thanks
[REDACTED]

From: [REDACTED]
Sent: 04 March 2021 16:05
To: [REDACTED] ; Ian Bray ; [REDACTED]
Cc: [REDACTED] ; [REDACTED]
Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

Hi all,
Thanks for your comments. Ian, do you think they should produce their own natura/scientific appraisal if they do not agree with the park's appraisal or our position?
The developer/consultant seem to be saying that the benefits of the scheme outweigh the potential damage, but I don't agree with this and natura doesn't work that way anyway (unless it is a IROPI case). The development can't be justified by a reduction in damage e.g. pathworks on a busy, damaged SAC munro and it is not a IROPI case. People can walk up to the viewpoint if they wish, without the path and watchtower.
In answer to the questions:
Yes, cumulative losses were considered, as there is the current car park extension, the unconsented Scottish Water work and the huts case x 2, that all contribute small losses and/or increased disturbance.
The site is in unfavourable condition from rhody and herbivores, so this means that further loss/damage further undermines condition – mentioned in our natura appraisal.
The fence would reduce or prevent potential loss of habitat around the path (but not reduce the minimum calculated loss figure). I don't think it would reduce disturbance very much.
I mentioned that disturbance of deer/goats might reduce browsing for balance in our appraisal, but other mammals and birds might be deterred from foraging and breeding in that area of the woods (possibly quite a large area for sensitive species). The possible small positive benefit can't be weighed against the negatives to other woodland species.
The watchtower is still part of this planning application.
Thanks everyone, I look forward to our discussion on Monday.

[REDACTED]
[REDACTED]
NatureScot | Silvan House, 231 Corstorphine Road, Edinburgh (Stirling team)

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From: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>
Sent: 04 March 2021 15:32
To: Ian Bray <Ian.Bray@nature.scot>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>
Cc: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>
Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED],
Thanks for flagging this up. I've not seen any recent documentation on this case, so I don't recall our HRA details or whatever the consultants have responded with.

Happy to have a look before Monday and join you then. I had planned Monday as AL, but I had also planned tomorrow off, and that doesn't look possible now either, so I'm viewing it as days saved for when the weather is warmer!

A few HRA-focused points from me for now:

Cumulative / in combination issues may well play a part in any assessment. Has this been fully considered along with the condition of the feature and site condition? I think we did consider this but don't remember.

Fencing would need to be maintained – different fences provide different levels of certainty re people staying within them.

Sweetman case – but it sounds like you are familiar with the legal ruling in it.

Cheers

From: Ian Bray <Ian.Bray@nature.scot>

Sent: 04 March 2021 15:03

To: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>

Cc: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>

Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

I agree with [REDACTED] but I think the applicant is failing to address the impacts as described in the HRA and in particular linking this back to the conservation objectives of the site. It would be helpful if their consultant can produce an appraisal to inform an HRA that show how the conservation objectives won't be undermined.

Ian

Ian Bray | Area Manager – Forth

NatureScot | Strathallan House | Castle Business Park | Stirling | FK9 4TZ | [REDACTED]

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From: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>

Sent: 04 March 2021 14:57

To: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>

Cc: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; Ian Bray <Ian.Bray@nature.scot>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>

Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

Thanks for this. Some thoughts from me:

- A fence would reduce damage and disturbance. The question is does this reduction achieve a level we can accept.
- I agree that the current path is barely visible – certainly the lower section from the car park. However there is a desire line there so some damage and disturbance is taking place.
- I'm concerned about the issue of disturbance to mammals – could disturbing deer and goats have positive benefits?
- Finally, I'm confused about the watchtower and scenic lookout? The consultants letter focuses on the path but the implies the watchtower is still the destination. Is a watchtower still planned or 'just' a scenic lookout (with a fence)?

Happy to discuss – [REDACTED] are you able to join our team meeting on Monday at 10

NatureScot | Strathallan House | Castle Business Park | Stirling | FK9 4TZ | t: 01738 [REDACTED]
[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot) | [\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot) | Scotland's Nature Agency | Buidheann Nàdair na h-Alba

Pronouns: he/him/his

From: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>

Sent: 04 March 2021 11:45

To: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>

Cc: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; Ian Bray <Ian.Bray@nature.scot>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>

Subject: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED]
[REDACTED] I hope you don't mind being roped into this case again?)

The consultants for the developers have come back offering to fence in the path and disputing some points in our/the parks assessment and response. I'd like to some advice about how we should respond to this please. I'm not sure where this proposal sits in comparison with other cases we have objected to, post sweetman case?

My initial thoughts are that

- Fencing the path would reduce some of the potential habitat damage and disturbance impacts.
- The main impacts that led to the objection would still remain.
- It was [REDACTED] professional opinion that the roots of many trees would be damaged. By 'cut through', I think we meant 'go through, as we didn't literally mean that all the roots would be cut, but they could be damaged, compacted, disturbed.
- I disagree that there are high existing impacts along the path. The pathline is barely visible over most of its length (as per my site visit photos). A member of staff told me that a large dead tree was removed (unconsented) to clear the pathline. So this indicates that it was partially blocked off before.
- As in our appraisal, I think there will be a large increase in disturbance, as the rising ground between the proposal and the pier means that the area is current quiet and not in view of the pier.

Thanks,
[REDACTED]

Sharon Phipps

From: [REDACTED]
Sent: 04 March 2021 17:28
To: [REDACTED]
Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED]
It's fine, I have a few things all needing sorting out quite promptly, so happy to help.
Cheers

From: [REDACTED]
Sent: 04 March 2021 16:27
To: [REDACTED]
Subject: FW: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED]
Its attached here. Thanks for offering to help, but if you are due a day off, please don't work through on my account!

[REDACTED]
NatureScot | Silvan House, 231 Corstorphine Road, Edinburgh (Stirling team)
nature.scot | [@nature_scot](https://twitter.com/nature_scot) | Scotland's Nature Agency | Buidheann Nàdair na h-Alba

From: [REDACTED]
Sent: 04 March 2021 11:45
To: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>
Cc: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; Ian Bray <Ian.Bray@nature.scot>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>
Subject: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED],
[REDACTED] hope you don't mind being roped into this case again?)

The consultants for the developers have come back offering to fence in the path and disputing some points in our/the parks assessment and response. I'd like to some advice about how we should respond to this please. I'm not sure where this proposal sits in comparison with other cases we have objected to, post sweetman case?

My initial thoughts are that

- Fencing the path would reduce some of the potential habitat damage and disturbance impacts.
- The main impacts that led to the objection would still remain.
- It was [REDACTED] professional opinion that the roots of many trees would be damaged. By 'cut through', I think we meant 'go through, as we didn't literally mean that all the roots would be cut, but they could be damaged, compacted, disturbed.
- I disagree that there are high existing impacts along the path. The pathline is barely visible over most of its length (as per my site visit photos). A member of staff told me that a large dead tree was removed (unconsented) to clear the pathline. So this indicates that it was partially blocked off before.
- As in our appraisal, I think there will be a large increase in disturbance, as the rising ground between the proposal and the pier means that the area is current quiet and not in view of the pier.

Thanks,



Sharon Phipps

From: [REDACTED]
Sent: 08 March 2021 13:55
To: [REDACTED]
Subject: RE: path and watchtower case advice - points from our meeting

Thanks for the note [REDACTED] and yours and [REDACTED] time this morning. Happy with what you've written below. Let me know how the meeting with the Park goes.

Operations Manager

NatureScot | Strathallan House | Castle Business Park | Stirling | FK9 4TZ | t: 01738 [REDACTED]
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Pronouns: he/him/his

From: [REDACTED]
Sent: 08 March 2021 13:04
To: [REDACTED]
Subject: path and watchtower case advice - points from our meeting

[REDACTED],
I've summarised the points from our meeting below, please add or correct if you need to. [REDACTED] if you could get back to me by Wednesday, that would be really helpful, as the park staff are keen to resolve this. If that's not possible, please let me know.

Note of meeting

Summary

The proposal is for a path and watchtower in Trossachs Woods SAC. The National Park HRA was unable to conclude no AESI and Naturescot have objected. Naturescot also carried out their own scientific appraisal to inform the response. The developer are disputing the HRA and Naturescot response and offering additional mitigation, including a fence to reduce straying from the path, signage and information.

The HRA is park led and we should let them lead the response to the developer comments. Overall it would be difficult to conclude no adverse effect for this development and it is difficult to imagine mitigation which would significantly reduce impacts. We have the option of standing by our original response if we don't think the new proposal significantly changes the impacts in relation to the conservation objectives.

Consideration of suggested mitigation

- Fencing could reduce (but not necessarily totally prevent) people leaving the path, but it would also increase impacts on tree roots.
- Signage to keep dogs on leads would not be effective enough mitigation to rule out impacts from off-lead dogs.

The developer needs to provide detail on how the development will not compromise site integrity and how mitigation can reduce impacts from original proposal. This needs to be considered with reference to the conservation objectives.

Comments on scientific appraisal

Cumulative loss of habitat and increase in disturbance from the developments in the area add up and are a key part factor triggering an objection – this could have been emphasised more in our appraisal. Some of the conditions to reduce impacts from the huts development were not carried out (would need to check with NP for details), so the cumulative impacts are greater than they might have been.

The increase in disturbance and the area that it would affect is a major element of the case. This has some similarities with the slipway case, in the Natura guidance, which refers to a very small loss of habitat, but considers the increased disturbance a major issue, that led to planning refusal. There are no figures on predicted number of visitors have been provided by the developer. Judging by other attractions in the area, we imagine that this will be a popular walk. In terms of quantifying impacts, there is data from other studies about % of walkers with dogs/off lead dogs that could be referred to. There are also studies on disturbance distances of characteristic woodland species during foraging or breeding are available for some species.

The consequences of unfavourable condition were not discussed in our appraisal and should be more detail to make clear that the conservation objectives are already undermined. The proposal could push the site further away from achieving favourable condition/make it harder to achieve favourable condition.

Thanks,



NatureScot | Silvan House, 231 Corstorphine Road, Edinburgh (Stirling team)

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Sharon Phipps

From: [REDACTED]
Sent: 08 March 2021 17:04
To: Ian Bray; [REDACTED]; [REDACTED]; [REDACTED]
Cc: [REDACTED]
Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

Hello everyone!

Just catching up with the email discussion over the developer response to NatureScot's objection to the Rhoderick Dhu path, and wanted to add a couple more points about the path.

The consultation response, as I have read it, does not address the potential direct impacts of the path on the qualifying habitat. There is very little discussion in fact of this in their response apart from the reference that "The path construction methods planned and set out are non-invasive nature and such that no tree roots or trees, with the exception of one dead rowan adjacent to tree number 9669, need to be removed to allow the path construction works."

My earlier advice, based on their consultation documents found that:

- The ground as the path leaves the car park is really soft and poorly drained and it is not clear to me how this will be protected from being damaged both during the construction of the path and afterwards once it is being used. There is real potential for trampling damage to vegetation on either side of the path, leading to erosion and loss of vegetation habitat.
- Passing places/chicanes on the path are planned in order to allow visitors to pass at a 2m spacing for Covid reasons. These passing places will extend the width of the path which otherwise is 1.5m to 3m and will involve the siting of prefabricated metal hoops in concrete foundations. I could not find, however, any information on how many passing places there will be or where they will be sited, apart from some near the start of the path. I am presuming they will be spaced along the length of the whole path? And if so this greatly increases the amount of habitat lost as a result of ground taken for the path construction, and makes it hard to get an idea of what the total loss of habitat will be
- The path will be constructed with foundations and drains. This will interfere with the normal drainage pattern of the hillside, that may lead to changes in the vegetation and potential impacts on the trees

Given all of this, I find it hard to accept their conclusion "that there is an overall gain to be achieved offering improved protection to the existing overall area of qualifying habitat" from the development proposals.

While it is possible that the route to the lookout was more used in the 1980s than it is now, the issue is surely about what the current use is. SNH actually used the exact area in question as a "plot" within which to run an HIA training event several years ago, so we clearly thought at that time that the habitat there represented typical qualifying habitat. I remember at the time realising how fragile the vegetation there was though, and becoming concerned that with a group of people moving about assessing herbivore impacts that we were starting to cause some damage with our footfall. I also am fairly sure that herbivore impacts there were not low, [REDACTED] may still have the results, most likely the deer visit the area at night once visitors have departed and in any case, most herbivore impact damage occurs in the winter months when visitor numbers anyway are very low.

Kind regards

[REDACTED]
t: 0131 316 [REDACTED] m: [REDACTED]

NatureScot | Silvan House, 231 Corstorphine Road, Edinburgh EH12 7AT

[nature.scot](https://www.nature.scot) | [@nature_scot](https://twitter.com/nature_scot) | *Scotland's Nature Agency – Connecting People and Nature in Scotland* - |
Buidheann Nàdair na h-Alba

From: Ian Bray
Sent: 04 March 2021 16:57
To: [REDACTED]; [REDACTED]; [REDACTED]
Cc: [REDACTED]; [REDACTED]
Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED]

Re the HRA, I would say it's the contractors and their consultants job to discuss the mitigation or change in plan in the context of the conservation objectives, not just suggest mitigation. They need to put this in the context of the HRA... so how will they address loss of qualifying habitat? Or disturbance to supporting species (not just large mammals)?

Ian

Ian Bray | Area Manager – Forth

NatureScot | Strathallan House | Castle Business Park | Stirling | FK9 4TZ | [REDACTED]
[REDACTED]
nature.scot | [@nature_scot](https://twitter.com/nature_scot) | Scotland's Nature Agency | Buidheann Nàdair na h-Alba

From: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>
Sent: 04 March 2021 16:05
To: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; Ian Bray <Ian.Bray@nature.scot>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>
Cc: [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] <[\[REDACTED\]@nature.scot](mailto:[REDACTED]@nature.scot)>
Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

Hi all,

Thanks for your comments. [REDACTED] do you think they should produce their own natura/scientific appraisal if they do not agree with the park's appraisal or our position?

The developer/consultant seem to be saying that the benefits of the scheme outweigh the potential damage, but I don't agree with this and natura doesn't work that way anyway (unless it is a IROPI case). The development can't be justified by a reduction in damage e.g. pathworks on a busy, damaged SAC munro and it is not a IROPI case. People can walk up to the viewpoint if they wish, without the path and watchtower.

In answer to the questions:

Yes, cumulative losses were considered, as there is the current car park extension, the unconsented Scottish Water work and the huts case x 2, that all contribute small losses and/or increased disturbance.

The site is in unfavourable condition from rhody and herbivores, so this means that further loss/damage further undermines condition – mentioned in our natura appraisal.

The fence would reduce or prevent potential loss of habitat around the path (but not reduce the minimum calculated loss figure). I don't think it would reduce disturbance very much.

I mentioned that disturbance of deer/goats might reduce browsing for balance in our appraisal, but other mammals and birds might be deterred from foraging and breeding in that area of the woods (possibly quite a large area for sensitive species). The possible small positive benefit can't be weighed against the negatives to other woodland species.

The watchtower is still part of this planning application.

Thanks everyone, I look forward to our discussion on Monday.

Area Officer

NatureScot | Silvan House, 231 Corstorphine Road, Edinburgh (Stirling team)

[nature.scot](https://www.nature.scot) | [@nature_scot](https://twitter.com/nature_scot) | Scotland's Nature Agency | Buidheann Nàdair na h-Alba

From: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Sent: 04 March 2021 15:32

To: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED]

[REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Cc: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED]

Thanks for flagging this up. I've not seen any recent documentation on this case, so I don't recall our HRA details or whatever the consultants have responded with.

Happy to have a look before Monday and join you then. [REDACTED]

A few HRA-focused points from me for now:

Cumulative / in combination issues may well play a part in any assessment. Has this been fully considered along with the condition of the feature and site condition? I think we did consider this but don't remember.

Fencing would need to be maintained – different fences provide different levels of certainty re people staying within them.

Sweetman case – but it sounds like you are familiar with the legal ruling in it.

Cheers

From: Ian Bray <Ian.Bray@nature.scot>

Sent: 04 March 2021 15:03

To: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED]

[REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Cc: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED]

I agree with [REDACTED], but I think the applicant is failing to address the impacts as described in the HRA and in particular linking this back to the conservation objectives of the site. It would be helpful if their consultant can produce an appraisal to inform an HRA that show how the conservation objectives won't be undermined.

Ian

Ian Bray | Area Manager – Forth

From: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Sent: 04 March 2021 14:57

To: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Cc: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; Ian Bray <Ian.Bray@nature.scot>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Subject: RE: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED]

Thanks for this. Some thoughts from me:

- A fence would reduce damage and disturbance. The question is does this reduction achieve a level we can accept.
- I agree that the current path is barely visible – certainly the lower section from the car park. However there is a desire line there so some damage and disturbance is taking place.
- I'm concerned about the issue of disturbance to mammals – could disturbing deer and goats have positive benefits?
- Finally, I'm confused about the watchtower and scenic lookout? The consultants letter focuses on the path but the implies the watchtower is still the destination. Is a watchtower still planned or 'just' a scenic lookout (with a fence)?

Happy to discuss – [REDACTED] are you able to join our team meeting on Monday at 10

[REDACTED]

[REDACTED]

NatureScot | Strathallan House | Castle Business Park | Stirling | FK9 4TZ | t: [REDACTED]

nature.scot | [@nature_scot](https://twitter.com/nature_scot) | Scotland's Nature Agency | Buidheann Nadair na h-Alba

Pronouns: he/him/his

From: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Sent: 04 March 2021 11:45

To: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Cc: [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>; Ian Bray <Ian.Bray@nature.scot>; [REDACTED] [@nature.scot](mailto:[REDACTED]@nature.scot)>

Subject: Rhoderick Dhu path - Developer/consultant response to NatureScot objection

[REDACTED]

([REDACTED], I hope you don't mind being roped into this case again?)

The consultants for the developers have come back offering to fence in the path and disputing some points in our/the parks assessment and response. I'd like to some advice about how we should respond to this please. I'm not sure where this proposal sits in comparison with other cases we have objected to, post sweetman case?

My initial thoughts are that

- Fencing the path would reduce some of the potential habitat damage and disturbance impacts.
- The main impacts that led to the objection would still remain.

- It was [REDACTED] professional opinion that the roots of many trees would be damaged. By 'cut through', I think we meant 'go through, as we didn't literally mean that all the roots would be cut, but they could be damaged, compacted, disturbed.
- I disagree that there are high existing impacts along the path. The pathline is barely visible over most of its length (as per my site visit photos). A member of staff told me that a large dead tree was removed (unconsented) to clear the pathline. So this indicates that it was partially blocked off before.
- As in our appraisal, I think there will be a large increase in disturbance, as the rising ground between the proposal and the pier means that the area is current quiet and not in view of the pier.

Thanks,

[REDACTED]

Additional gains are also to be had in removing all the rhododendron and non-native conifers which have self-seeded in the area around the path and the wider SAC. The introduction of mitigation measures such as post and rail fencing either side of the path would help protect ground cover over a wider area and assist regeneration efforts.

As recommended in the NPA Pre-Application appraisal we commissioned a professional team of Ecologists, Tree Consultants, Landscape Architects, Architects and Specialist Construction Teams.

We hope the above information, combined with our already submitted professional Reports and Appraisals and the mitigation proposals, evidence our client's commitment and ambition to create an exemplar quality project in an environmentally sensitive yet busy tourist destination which will be well managed on an ongoing basis and gives the relevant Consultees sufficient comfort to be able to support this application.

I look forward to discussing this further with you after you have received further feedback from NatureScot and your internal Natural Heritage Adviser

Yours sincerely



Partner
MW Consultancy

Sharon Phipps

From: [REDACTED]
Sent: 10 March 2021 23:29
To: [REDACTED]
Subject: Fwd: Roderick Dhu Path Reinstatement and Scenic Lookouts
Attachments: 2020_0260_DET-Watchtower_-_Plans__elevations_and_visualisations-100364511.pdf; 2020_0260_DET-Roderick_Dhu_Viewpoint_path_reinstatement_proposal_report-100364889.pdf; 2020_0260_DET-Response_from_NatureScot-100370851 (1).pdf; Consultation response to [REDACTED] [REDACTED] (6).pdf

[REDACTED] More background including our letter which is seriously unimpressive! Disturbing deerreally!!

Begin forwarded message:

From: [REDACTED]
Date: 10 March 2021 at 22:42:14 GMT
To: [REDACTED]
Subject: Re: Roderick Dhu Path Reinstatement and Scenic Lookouts

[REDACTED]
For information I am forwarding some background information on the Sir Walter Scott Steamship Trust's proposals to reinstate 188m of the historic Roderick Dhu path and the installation of a tower and scenic lookouts to replace the former historic Roderick Dhu Watchtower. The path spurs off the busy Trossachs Pier car and coach park and the tower/scenic lookouts are due to be located on the knoll area immediately above Trossachs Pierhead.

In the 1980s the path fell into a state of disrepair and the management at Loch Katrine decided to remove the signs directing visitors to the Roderick Dhu viewpoint which is where Sir Walter Scott got much of his inspiration from to write the famous Lady of the Lake poem that played such a major part in the birth of Scottish tourism. There is a famous John Knox painting (circa 1820) showing visitors at Lochend with the watch tower sitting on the knoll above where the pier now is. Roderick Dhu Watchtower and the scenic viewpoint also featured regularly in the first Valentines postcards of the Trossachs and is a well documented historical and heritage site.

In the planned path route where the remnants of the former path and a wider area is already damaged in several stretches from people finding their way up to the Roderick Dhu scenic lookout and our proposal with mitigation measures, including post and rail fencing either side of the path, would channel people up to the contained tower and scenic lookout to minimise visitor spill and wider damage. At the scenic lookout we plan to install a telescope so that visitors can have a long distance view of an [REDACTED] this would provide a great opportunity for people to connect with nature as well as to appreciate the special scenic and landscape qualities of Loch Katrine.

NatureScot's objection is threefold:

- habitat loss due to the path and tower base* (0.016% of the SAC area-1/6000th). Parts of path route already damaged by pressure of footprints and 20m of 188m route will be on a raised walkway so area of habitat loss likely to be reduced further when mitigation measures taken account of.
- path and foundation of watchtower will cut through root protection area of a large number of trees.* Not likely to be the case as path being hand dug by traditional methods and materials for path and tower being flown in by helicopter. Predominantly birch trees nearby (over 85% of all trees) and many of those in the vicinity of tower base 4-7 metres away.
- a significant increase in disturbance to deer and other woodland mammals and habitat in what is a relatively undisturbed area.* Surprising objection given the proximity of a busy large car and coach park and the noise spill associated with cars/coaches/boats toing and froing and 100,000 plus people in the immediate area. The noise spill from regular tannoy announcements and on boat

commentaries below the scenic lookouts is also already significant. Reference to deer disturbance surprising too given they have been responsible for considerable damage to habitat in the SAC according to the habitat assessment. Our ecology and habitat consultant who undertook a major survey advised wildlife disturbance would not be significant.

Copies of the following are attached:

- (i) Visualisations of scenic tower and lookouts (Capco are one of the UK top timber tower designers and are regularly used by NTS to develop imaginative timber adventure play areas at their historic properties and country parks)
- (ii) Path reinstatement report (Prepared by ACT Heritage whose lead project designer in this case was the individual who designed many of the path upgrades in sensitive mountain environments as part of the Mountains and the People project across both Scotland's National Parks including nearby Ben Venue and Ben A'an)
- (iii) Letter of objection from NatureScot
- (iv) Our letter of response to the grounds for objection including proposals for mitigation measures that we thought might lead to NatureScot modifying its position.

This truly is a high quality project at the birthplace of Scottish tourism where Sir Walter Scott and other writers inspired people to appreciate the special natural heritage/landscape qualities of Scotland and our plans have caught the imagination of many locals and visitors who have registered their support on the NPA planning portal. It would be a great pity if after such a long tradition of the former Roderick Dhu path and scenic lookouts playing such an important role in introducing Scotland's natural heritage to so many visitors this was undermined by the national heritage organisation and the National Park Authority coming together to block improvements designed to enable a wider range of people of all ages with different levels of fitness and mobility from enjoying this magical spot and connecting with nature.

I hope this information is helpful.

Regards





RODERICK DHU VIEWPOINT

Path Reinstatement Proposal



A.C.T Heritage Ltd.

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1. Introduction

A.C.T Heritage have been invited to survey and construct a viable path proposal, on behalf of the Steamship Sir Walter Scott Trust, for the reinstatement of a historic path from the Trossachs Pier main car park to the 'Roderick Dhu' viewpoint, situated around a rock outcrop to the west of the pier facility. This document is designed to give an informed proposal of design and construction of the renewed and upgraded visitor experience access path.

2. Background

Located in the heart of Loch Lomond and Trossachs National Park, Loch Katrine is approximately 10 miles west of Callander and 7 miles north of Aberfoyle. Loch Katrine has been the primary drinking water reservoir for much of the City of Glasgow since the late 1800's.

Loch Katrine has been operating as a visitor attraction and destination since Victorian times. Queen Victoria famously visited in 1859 to open the newly completed water works and as a result, has been a popular tourist destination ever since.

Home to the steamship Sir Walter Scott, the Trossachs Pier complex located at the eastern end of Loch Katrine and provides a focal point with café, walks, cycle hire and car parking facilities for a range of events and recreational experiences all year round.

As part of the Trossachs Visitor Management Project being coordinated by the Steamship Sir Walter Scott Trust, an opportunity has been identified to reinstate the path to the historic Roderick Dhu viewpoint and site of the former watchtower. This scheme includes the design and installation of a new timber viewing tower and associated board walks which are an integral part of the path and viewpoint proposals (see separate report). This will add to the range of walks available for visitors to the heart of the Trossachs and the busy Trossachs Pier visitor destination as well as helping to relieve some visitor pressure on the loch shore walk and nearby hill climbs.

Walking directly from the car park for a short distance to a prominent rocky outcrop above the pier, the Roderick Dhu' viewpoint is believed to have been popular dating back to Victorian times. The viewpoint affords stunning views along the length of Loch Katrine. The path itself is known to have existed as recently as the 1980's but has however fallen into disrepair. The below painting is by John Knox circa 1820 and depicts the rocky outcrop and viewpoint above the pier with a watch tower. The name 'Roderick Dhu' which is attributed to the watchtower, comes from Sir Walter Scott's narrative poem 'Lady of the Lake' as supposedly Roderick Dhu being one of the antagonists vying to win the love of Lady Ellen Douglas.

The area in which the path and viewpoint are situated are designated under the *BEN A'AN AND BRENACHOILE WOODS SITE OF SPECIAL SCIENTIFIC INTEREST* which is a statutory designation made by NatureScot (formerly Scottish Natural Heritage – SNH) under the [Nature Conservation \(Scotland\) Act 2004](#).

Additional to the SSSI citation, the area is also designated as part of Trossachs Woods Special Area of Conservation (SAC) for the European habitats listed as Western Acidic Oak Woodland.



Landscape with Tourists at Loch Katrine by John Knox circa 1815-20
Photograph by Antonia Reeve

Photo credit: National Galleries of Scotland

3. Path Survey

The survey has been undertaken using various items of equipment including ranging pole and clinometer to measure slope, wheel to measure distance; a tape measure to measure path width and a digital camera to show specific items of works and the path line. For simplicity, the survey has been hand drawn on the attached survey sheets with relevant identification references and item symbols. Reference photos are included within survey attachments.

The path condition survey is designed to provide an overall assessment of the current condition of the path line and to give a design and specification of what techniques will be used to construct the upgraded path. A 'Bill of Quantities' is also included within the appendix, itemising all aspects of the work required to deliver the proposed path.

4. Path construction – Rationale and techniques

Modern Hand Build Upland Path Construction Techniques have been developed over the last 30 years. Many of the techniques have been adopted through 'rediscovering' the techniques used during construction of 'Stalkers Paths' in the mid to late 1800s. Many of these paths were generally built with hand dug aggregate material for surfacing and protected with stone-built drainage features.

Due to the sensitivities of the site to be developed, a fully 'Hand Built' path construction permissions would be sought. Given that the area is within designated sites for woodland habitat, the least disturbance to any ground will be favourable. All hand build techniques are tried and tested and fully specified within the Upland Path Advisory Group (UPAG) guidelines (revised 2015) and any contractor will be expected to be fully conversant with these techniques.

The path can be split into 4 discernible sections; all of which are fully detailed within the specification sheets included within the appendix. The path will run for approximately 188m from start at carpark OS GR NN 4594 0717 to termination at viewpoint at OS GR NN 4945 0725. There follows a brief synopsis.

- Section 1 – circa 35m. From car park to flat terrace before rockfall area will, due to slope, require a comprehensive stone pitching solution. This will address the sensitivities of the slope where mature trees are most populous and will also minimise any ground disturbance through excavation thus keeping root disturbance to a minimum.
- Section 2 – circa 72m from terrace to Boardwalk section. This section will be a mix of aggregate surfaced path and stone pitching to address gradient fluctuations. The aggregate surface will 'float' on a geotextile material which will allow drainage and prevent path slippage and muddying. Additional drainage features i.e. water bars and X-drains and/or culverts will be installed to manage water run off and reduce maintenance requirements.
- Section 3 – circa 20m from end of section 2 to final accent, it is proposed to install a section of boardwalk to raise the path above the natural flush thus preventing and changes to the hydrology of the flush by way of installing drainage channels or blockages from a 'raised bench style' path.
- Section 4 – circa 61m. As section 2. From boardwalk to viewpoint. A mix of aggregate and pitching to reach final destination at the Roderick Dhu viewpoint.

In addition to the above path construction, it is also envisaged to install an interpretation panel at the start of the walk to provide historical background and general area information. Also, for user safety, to prevent accidental egress directly into the carpark, a 'Half Barrier' will be installed at the bottom/start of the path. Examples of both are illustrated below.



Example: Half Barrier as installed at entrance to nearby Ben A'an footpath



Example: Information panel as installed at nearby Ben A'an car park

Appendices

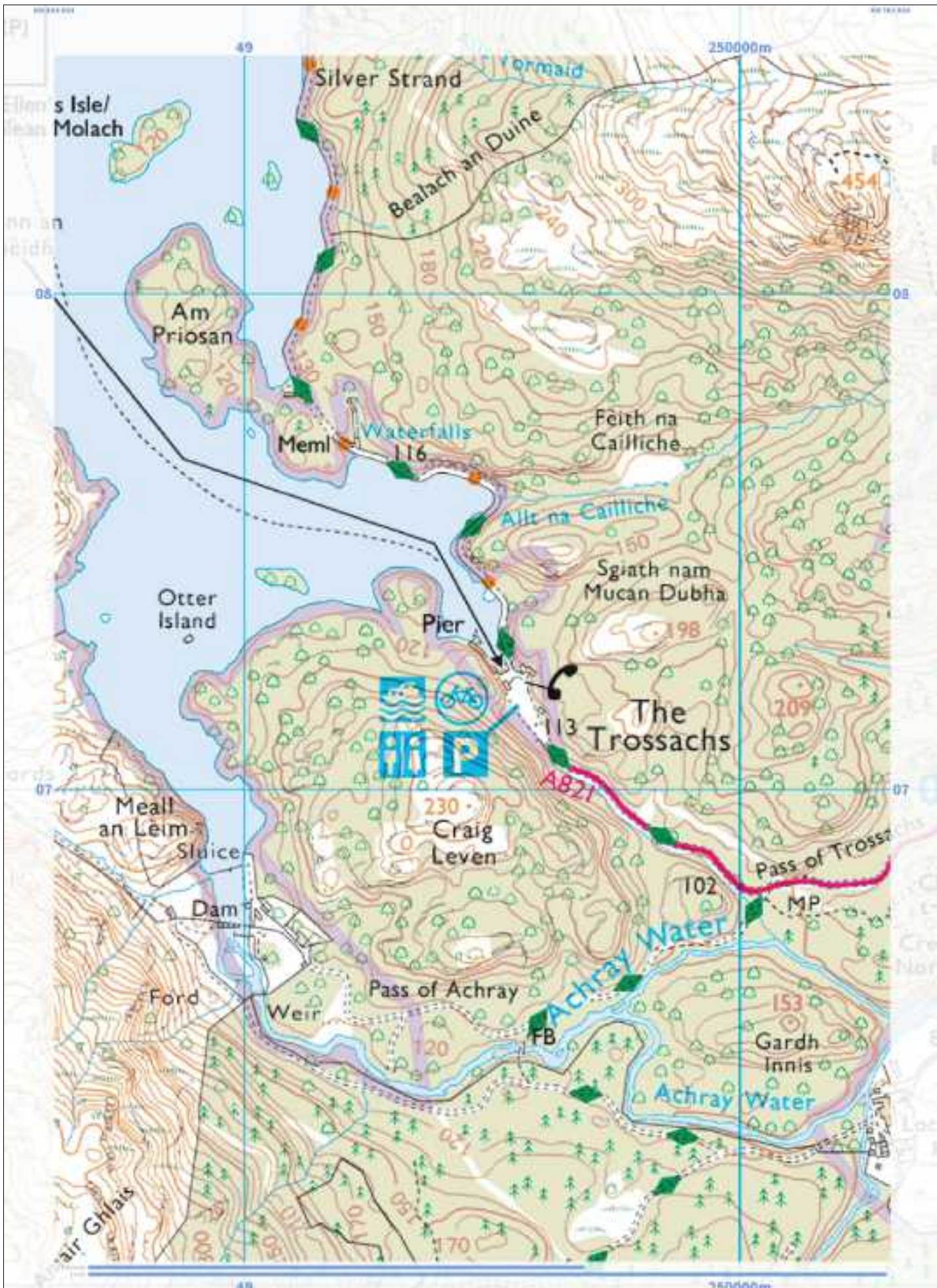
- a. Location Maps
- b. Path survey and specification sheets
- c. Bill of Quantities
- d. CMS (Construction Method Statement)
- e. Wetland Typology – Field Survey
- f. Half Barrier example technical sheet – *Courtesy of Outdoor Access Design Guide*

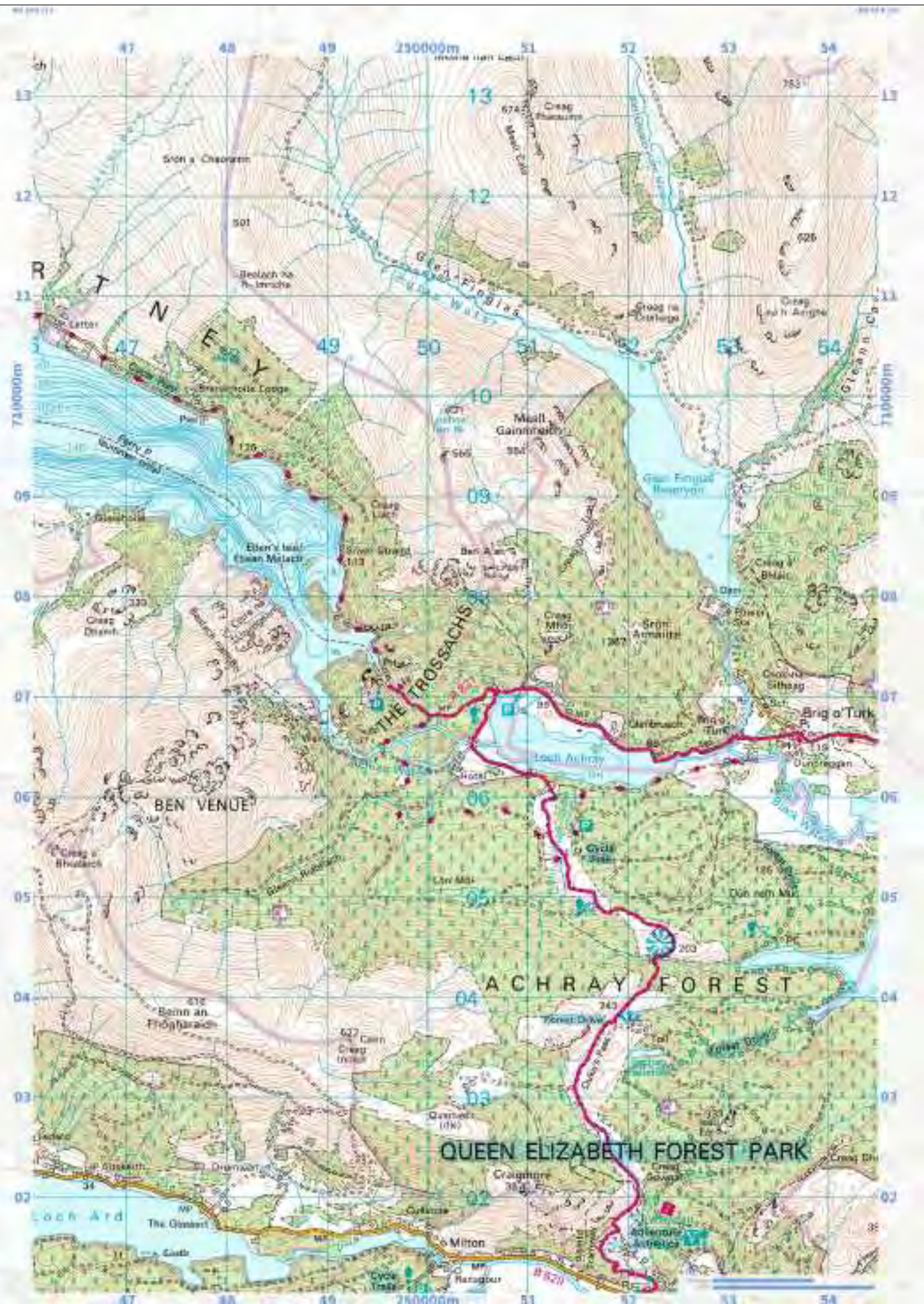




Slipways

Pier

Car
Park





PATH NAME/LOCATION: RODERICK DHU PATH REINSTATEMENT						Sheet	5	ACT HERITAGE
Date 15 SEPT 20		Weather: RAIN Surveyor: GRJ		G.R. Start: NN 4954 0717 (corner)				
				G.R. End: NN 4945 0725 (main)		Section	4.2	
158	ENDS					<p>8m ANCHOR GRASS (FLUSH)</p> <p>3m LAYER GRASS</p> <p>7m REINFORCEMENT</p> <p>2m BLOCK STONE PITCHING</p> <p>28m AGGREGATE PATH</p> <p>NOTES: FULL LENGTH SECTION WIDE ENOUGH TO DEMO & 15m FULL LENGTH.</p>		
159								
Dist (m)	Grad (x°)	Path width (m)	Existing Path Features	Grad (x°)	Path width (m)	Work Required		Description

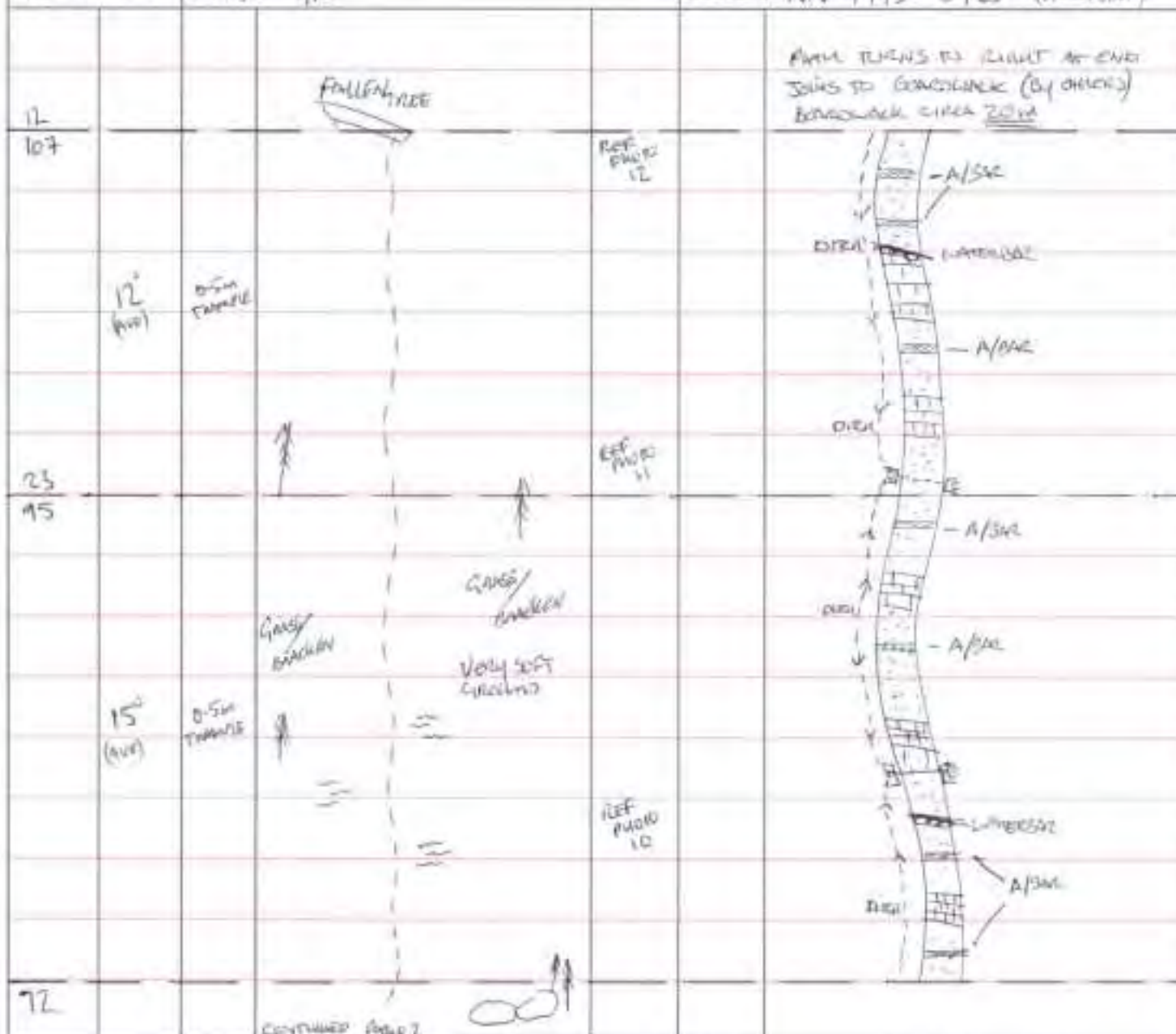
PATH NAME/LOCATION ROEBUCK DMU PATH REINSTATEMENT

Sheet 3


 Date: 15 SEPT '20
 Weather: RAIN
 Surveyor: GAJ

 G.R. Start: NN 4954 0717 (CALPICK)
 G.R. End: NN 4945 0725 (WALFORD)

Section: 2.2


 PATH SECTION 3.5m. mix 40/60 PITCHING
 & AGGREGATES TO FIT/ADJUSTMENT
 CHANGES IN GRADIENT

16m BLOCK STONE PITCHING

19m AGGREGATE PATH

 2nos 300mm TWIS WALL CURBET
 W/ HEAD W/ML STONES

2nos WATERBAIL

 7nos ANCHOR ONE — ANCHOR ONE
 STONE TO BE FLUSH WITH SURFACE
 IF STEP REQUIRED, ADDITIONAL STONE
 TO BE INSTALLED LOWER STEP

NOTES:

 From 104m to 127m (STRAIN LINE)
 BORDOWALK THROUGH FLUSH TO
 BE INSTALLED BY OTHER.

Dist (m)	Grad (x%)	Path width (m)	Existing Path Features	Grad (x%)	Path width (m)	Work Required	Description
----------	-----------	----------------	------------------------	-----------	----------------	---------------	-------------



Photo 1: start of path at car park



Photo 2: Soft wet grasses/mosses with surface breakage



Photo 3: Fallen tree / mound



Photo 4: Top of pitching section / change in gradient



Photo 5: entrance to pinch point; ground hard underfoot.



Photo 6: pinch point entrance; rock on RHS can be trimmed/removed



Photo 7: Coming out of pinch point.



Photo 8: Coming out of pinch point; note tree on RHS, spring shows after rain.



Photo 9: double rock formation at 72m. Soft ground trample zone.



Photo 10: General trod line; ground quite soft, heavy grasses



Photo 11: slight increase in gradient; pitching solution required



Photo 12: end section 3 – approximate section/line of sight for boardwalk



Photo 13: end of boardwalk; steeper section with mineral soils visible



Photo 14: pitching section after flat terrace. Note bedrock to RHS at tree



Photo 15: easy gradient; predominantly peat and heather/blaeberry



Photo 16: area of path edge subsidence



Photo 17: 2m pitching area at dead birch.



Photo 18: prominent dead birch as focal point



Photo 19: path termination area (expected watch tower)

ITEM	WORKS DESCRIPTION	UNIT	QTY
1	Aggregate Path: Construct aggregate path, 1500mm average width / 150mm Type1/2 sub-base / 25mm (1:50 camber or cross shed where landscape allows) fines top coat. Compact to refusal. Landscape spoil and form edges.	m	93.00
2	Anchor Bars: Construct stone built anchor bars across the full path width. To extend 150mm each path edge, and be flush with the path surface. The stone will form an independent structure to reinforce the aggregate of the path and pressure of use. Only weathered tops are to be visible.	each	15.00
3	Water Bars: Construct water/detritus shedding bars;. between 30°- 45° to the path line. Bar depth should be a minimum of 100mm rising to approximately 150mm but not be obstructive. Liner should provide a draining fall of 5° minimum. Extend by 300mm on each path side. No gaps between bar stones.	each	15.00
4	Open Side Drain: Excavate drainage ditch 300mm deep and 300mm wide at base, chamfered to 500mm wide at top. Ensure that water drains freely along the ditch and away from path. The base of the drain should be turf lined to prevent scour and reduce visual impact.	m	45.00
5	Pitching: Construct rock / boulder pitched path to a variable width 1500mm +/- 200mm. Irregular, random treads must be comfortable to use over an even gradient. <u>Maximum riser height to be 150mm (6 inches)</u> . The construction must be solid with stones fitting tightly, well packed, with overlapping joints. Use excavated turfs, spoil and boulders to define and contain the path edge. Rock to be well set into the ground at least 300mm with a level treading surface.	m	75.00
6	Revetment: Construct retaining revetment wall to stabilise the slope below path. The construction must be solid and stable, with large foundation stones, off-set joints, pinned and backfilled firmly. Pack gaps between the courses with turf and fully landscape.	m ²	41.00
7	Half Barrier: Supply and install Half barrier. Use 100mm x 100mm posts; chamfered tops into metal sockets cemented into ground. Post height should be 950mm from ground level. 3no. 100mm x 38mm x 1000mm bars across. Barrier to be set approx. 2m apart. All timber to be FCS certified.	each	1.00
8	Pipe Culverts: Supply and Install 300mm dia. Twin wall culvert pipes bedded on 100mm depth of gravel material. Compact the backfill material to 300mm minimum depth. Weathered stone built headwalls and landscape exposed pipe ends.	each	2.00
9	Imported Materials - Provision of working Materials. Estimates of 60 tonnes aggregates and 75 tonnes block building stone. Costs to include all logistics including sourcing, collection and helicopter transport to site of all required materials.	each	1

Construction Method Statement

Roderick Dhu Path Proposal

1. TIMINGS AND DURATIONS

The works shall take place (proposed) between August 2021 and October 2021. Exact scheduling is subject to funding and planning approval.

The project shall last for an approximate 6-week period (continuous) weather permitting.

❖ Phasing of works:

- Pre-contract start up site visit between Project Manager/Principle Designer and Principle Contractor.
- Organising Helicopter Lift operation (if using), stone and aggregates collection/delivery and setting out drop sites.
- Following instructions on survey sheets completing works to the standards required in 'Appendix C – Path Survey and Specification sheets'.
- The path works shall be completed from Bottom to Top.
- Final Measure and instructions for snagging; if required.

2. CONTRACTORS & PROJECT MANAGEMENT

CLIENT:

Steamship Sir Walter Scott Trust
Trossachs Pier
Loch Katrine
Callander
FK17 8HZ

CONTRACTOR:

To Be Confirmed following competitive tender process

PROJECT MANAGEMENT:

Steamship Sir Walter Scott Trust or their designated person(s)
To Be Confirmed.

3. HOURS OF OPERATION

Work will be carried-out during any day of the week, unless specifically specified, during daylight hours only. As a guide, 0800hrs to 1800hrs. No 'lone working' will be permitted at any time.

4. ACCESS AND EGRESS

Access will be from the main visitor car park area. A compound by means of Heras fencing or similar will be cordoned off and appropriate signage will be installed to inform public and other users of the works and safety requirements.

5. COVID-19

Due to the current pandemic affecting all aspects of work and personal life and lifestyles, project management will be required to put in place requirements and safeguards to ensure works and public safety. The contractor, during the tendering process, will be required to submit a full risk assessment and statement outlining all policies and procedures required to ensure a safe working environment. All statements should consider the current conditions and best practice as set out by Government or other statutory body.

6. RISK ASSESSMENT

Risk assessments will consider the whole site, the work activities and the safety of the worker and any other persons that may come into contact with the site whilst works are being carried out. In the case of path work of this nature, this will predominantly walkers, but may also be mountain bikers or horse riders. All risks arising from hazards associated with the work that may endanger the staff or the public will be identified and assessed in advance of any work taking place. The assessment considers the severity and likelihood of accidents and injuries occurring and what action or controls should be taken to remove or reduce any significant risks to an acceptable level. This is will be recorded on a Risk Assessment Form. Risk assessments will help inform the arrangements for managing safety that are set out in the construction phase plan.

Risk assessments will be carried out at all stages of the project by designers and contractors (and principal designers and principal contractors) and should be discussed and reviewed with all parties whose safety might be affected by the risks identified within them. If significant risks are identified that have no controls in place, action must be taken to rectify the situation, prior to work starting. Risk assessments will be held by the works Project Management and available on site at all times within the Site File.

7. PUBLIC SAFETY

Following on from the Risk Assessment above, the safety of the public must be considered at all times, particularly when accessing the site, working on the path or gathering materials in the surrounding area. It is the responsibility of all staff to ensure that any possible risk to the public from the works are controlled. 'Suitable and sufficient' controls may be signing the works, cordoning off the work site and re-routing the path.

Clearly worded signs will be erected at all access points to the work site to advise the public of:

- When and where works are taking place
- Alternative route if available
- Diversions around the work site
- Hazards and procedures should walkers or mountain bikers need to walk or ride through the site.

As the route in question is designed as a circular route with only one access point, an information panel shall be placed in the car park. This will alert people to the fact that works are taking place on the route, enabling them to choose to go elsewhere if they prefer.

To manage public access when required, Banksman shall be assigned and used to facilitate safe passage of public or visitors through the working corridor.

8. PATH CONSTRUCTION - *Rationale, Guidance and Method*

8.1 – Rationale (Tools and Equipment)

The work type involved within this proposal can be viewed upon as 'Upland Path Work' as described within the UPAG Upland Path Management manual (2016) second edition. Upland Path Work uses a variety of hand tools for manual construction techniques, often with the assistance of small mechanical equipment to move materials around or to the site. Hand build work is as robust as standard construction and may use distinctive techniques and/or variations in standard construction including:

- Braid blocking to help close down multiple path lines.
- Turf lined ditches.
- Stone water bars/cross- drains and culver pipes.
- Pitching with an informal appearance utilising natural features.
- Mixed sections with pitching and stretches of aggregate surfaced path.

These works will incorporate a mix of Block stone Pitching, Aggregate surfaced path and appropriate water management/surface protection and drainage. Refer to specification sheets for further detail.

❖ Tools

A variety of tools will be used; the basic hand tools required are:

Hand tools:

- Pinch-bar
- Mattock
- Spade
- Shovel
- Mash hammer
- Sledge hammer
- Rake
- Hack (hooked three-pronged fork, for moving turf)
- Rutter (very heavy, big ditching spade)
- Pick axe
- Tamper
- Buckets
- Wheelbarrows

The hand-tools and type selected for use will depend largely on the particular task being carried out, but will also vary with the individual preference of the worker. There is also a wide variety of types of mattock, spade, shovel, pinch bar, rake and hammer to choose from.

❖ Safety and Care

Hand tools will be checked daily and regularly maintained to ensure that they are safe to use, as well as prolonging their life.

- Steel edges and heads should be kept free of burrs.
- Cutting edges should be kept sharp.
- Heads should be checked to ensure that they are firmly fixed to the shaft, wedges should be undamaged and secure
- Shafts should be checked for damage, such as cracks and splits in the wood, and replaced when necessary.

Tools will be safely transported to site. When carrying tools to the work site, overloading should be avoided and tools should always be carried at the side rather than over the shoulder.

❖ Small Mechanical Equipment

Three types of mechanical equipment will be utilised within these works:

- Power barrows
- Manually operated winches
- Vibrating plate (whacker plate)

Before using any of the aforementioned equipment, it is essential that the operator has received training in use and safety and is familiar with the manufacturer's guidelines. Mechanical equipment should only be used after maintenance checks have been made by a competent person.

• Power Barrows

Used for gathering and moving materials, they reduce the need for manual handling and lifting of materials. These are small tracked "wheel-barrows", powered by a small four stroke engine. Running on rubber tracks they spread the load over a larger area and minimise damage to vegetation. Depending on the size and make they can carry approximately 400kgs on level ground, and 250kg on a gradient, e.g. the Honda HP400. Some models have a hand operated tipping mechanism. They can be used to carry boulders, stone, aggregate, turf and soil to and from the path, as well as equipment to the work site. Users will vary the route taken to and from the path to reduce tracking and the likelihood of environmental damage.

• Winches

Tirfor™ Cable Winches will be used during these works. These are capable of pulling loads up to 1600kgs. The winch has a shear pin that will break if the load maximum is exceeded. The main part of the winch is the gear box, where a rope is pulled using gripping jaws and a lever mechanism. The winch is used in conjunction with a wire rope, nylon strops, shackles and anchor points. Anchor points will normally be in-

situ boulders, or bedrock, which must be larger than the stone being winched. They need to be secure, with no possibility of moving once the winch is attached and operating and combined with steel pins if necessary. They must also be a suitable shape to secure a nylon strop, to which the winch is attached. If none can be found in the location, purpose made anchor points can be set up using steel pins and chains. Anchor points must withstand the force of the winch and wire rope when the load is being moved. Once a stable anchor point has been set up it should be used for winching as many loads as possible. A separate Risk Assessment should be made available from the contractor prior to use.

- **Vibrating Plate**

Compaction machinery such as vibrating plates may be brought in to aid aggregate path construction. Suitable for use within the flat aggregate sections within the path, the vibrating plate will assist in gaining the correct compaction rate for the aggregate material ensuring water deflection and surface longevity. The provision and use of all compaction machinery is subject to Health and Safety Regulations.

- **Safety and Care**

All types of mechanical equipment have restrictions and should never be used beyond their specification. They should be serviced according to the manufacturer's instructions. Safe working procedures should be followed at all times, particularly with regard to public and worker safety.

All equipment is subject to Health and Safety Regulations and require regular maintenance with daily and weekly checks. Testing must be undertaken by a competent person at six month intervals. It is a legal requirement that the correct certificates are held. Strops, ropes and shackles used with the winch should be more than capable of withstanding the maximum weights to be lifted and marked with their safe working load. They should also be routinely tested by a competent person and checked daily for wear and damage prior to use.

- ❖ **OTHER MECHANICAL EQUIPMENT**

- **Helicopters**

It may be prudent to utilise helicopter operations during these works (subject to contractor). Although subject to more demanding work planning, working practice and safety management, they minimise time required, manual handling and environmental impact. Helicopters are generally contracted from specialist companies: loads lifted up to 1000kg.

Path materials throughout this site are in short supply so it will be required to import all materials to facilitate the path build. Depending on cost and client/contractor preference, helicopter operations may be required. Operational specific Risk Assessments will be made available prior to any use of helicopters and the required logistical operations.

Helicopter operations will adhere to SNH guideline 'The use of helicopters and aircraft in relation to disturbance risks to Schedule 1 & 1A raptors and wider Schedule 1 species' document and helicopter operatives will follow any further constraints as laid down following SNH consultation.

8.2 Guidance

The work site shall be split into 4 working sections:

- Section 1 – from car park to flat terrace before rockfall area. Approximately 55m of comprehensive stone block pitching solution. This will address the sensitivities of the slope where mature trees are most prevalent and will also minimise any ground disturbance through excavation thus keeping root disturbance to a minimum. The pitching should be up to 1.5m in width to accommodate expected user numbers with additional 'passing places' to provide breakout areas for passing users (Covid-19 2m distancing). Pitching will be built in adherence to UPAG guidelines and should be as user friendly as possible.
- Section 2 – from terrace to Boardwalk section. This section will be a mix of aggregate surfaced path and stone pitching to address gradient fluctuations. The aggregate surface will 'float' on a geotextile

material which will allow drainage and prevent path slippage and muddying. Additional drainage features i.e. water bars and X-drains and/or culverts will be installed to manage water run-off and reduce maintenance requirements. Again, this path should be average 1.5m in width with additional passing places.

- Section 3 – from end of section 2 to final accent, it is proposed to install a section of boardwalk; these works will be separate to the path work proposed within this construction method statement.
- Section 4 – as section 2. From boardwalk to viewpoint. A mix of aggregate and pitching to reach final destination at the Roderick Dhu viewpoint.

8.3 Method of Works

❖ PATH DESIGN AND CONSTRUCTION

All sections of hand built aggregate path will require imported materials to facilitate construction. Aggregates used for the path will be of 'Type 2' base material with a 'Fines' (dust) topcoat. The path will be graded and compacted to leave an even surface with a slightly raised camber to shed surface water. Path edges and side ditches will be carefully landscaped using turfs and topsoil removed during construction.

- Micro-siting: paths are designed to follow a sinuous alignment, contouring and utilising desirable natural landscape features e.g. large boulders, topographical features. Wherever possible, linear alignment will be avoided to provide a more 'natural' appearance.
- Micro-siting: scale and position of built features e.g. water bars, anchor bars, bends etc. will be sited and designed to accommodate walkers. For example, step height within pitched sections will be a maximum of 100mm and avoid large built drainage features.

➤ Sequence of Operations

- i. Install compound and safety signage.
- ii. Ensure site is safe to access to transport all plant /tools to start of site.
- iii. Erect site signage and barriers.
- iv. Lift turf from path line and place to one side.
- v. Strip turf from ditch line and place to one side (where applicable).
- vi. Excavate path tray and prepare suitable sub-base including fitment of Geotextile where using.
- vii. Surplus turf is used to landscape path margins and line ditch where practicable.
- viii. After a reasonable length of path has been prepared, imported materials are used to fill path line (by way of power-carrier or if previously imported by helicopter) and spread manually to give finished path surface.
- ix. Drainage features to be installed where specified.
- x. Work to progress along path.
- xi. On completion of works signage to be removed and tools to be taken off site.

The sequence of operation is true for both aggregate path and block stone pitching. Only manageable sections will be worked on, to completion, before moving on. Typically, a 4-person team will work in 2 teams, overlapping sections as they complete each section providing a continuous evolution of path.

❖ PATH MATERIALS

It is recommended, due to the lack of useable on-site materials, that all materials intended for use within the path should be imported. Block stone should be sought from a suitable quarry; rock type to match the type found on site. Aggregate materials should be made up from Type 2 base material to a minimum depth of 150mm with a 25mm dust or fines topcoat; compacted to refusal to provide a weather resistant finish.

Turf and vegetation, whether heather or grass, shall be removed for as brief a period as possible. This shall be part of a contiguous process of removing the turfs and laying to one side, turf side up.

Substantial peat and spoil attached to the turf to protect the root mass will contribute substantially to the vegetation's recovery and survival. The process metre by metre of laying the path will ensure that any turf is not left exposed for any prolonged period of time. Nevertheless, should there be any unforeseen delay,

to help retain moisture, the turf will be covered with synthetic material or matting. Turfs will be carefully managed by type and care will be taken not to mix habitats. Turfs shall be removed and replanted as near to their original position as possible. Turf type, i.e. wet or dry, shall not be mixed or transplanted into unsuitable areas where the vegetation will die off. For example, wet, peat heavy, moss rich turf is unsuitable for transplant to a dry, free draining grassland area. Transplanted turf will aim to recreate a pattern sympathetic to the vegetation found in the location prior to the works being undertaken.

It is expected that the level of exposure to drying out is negligible, the quick re-use of the turfs in the side ditches and the edges of the path is key to their survival ensuring limited or no loss of habitat. To prevent the leading edge of the root system drying out, and vegetation dying, turfs will be fitted tightly together, with overlapping joins. This practice, learned from upland turf lined ditches, has been carried out for many years; within months of construction the turfs show signs of bedding in, and due to the low lying and damp area being developed, a single growing season should return exceptional establishment.

❖ **REINFORCED SURFACING: Aggregate Path on Peat/ground water protection.**

➤ Floating the path

Where the 'Wetland Typology Field Survey's' identified any sections as having characteristics of wetland typology and therefore a potential impact on groundwater dependant terrestrial ecosystems (GWDTE), to mitigate against any risk to the GWDTE the path will be floated by using geotextiles. A semi-permeable membrane will be laid under the path at a depth of 300mm separating the path material from the peat; it will prevent aggregate loss and the path subsequently disappearing. This technique also reduces the amount of excavation and aggregate required compared to excavating to a hard base and infilling with stone.

The use of synthetic geotextiles to provide the foundation, and 'float' the path over deep peat, has been copied from developed from road engineering and construction methods. 'Terram' 2000 to be used on full length where gradient is <6°; 'Tensar' TS20 to be used on sections where the gradient exceeds 6°, and/or on very soft ground and on benched crossfalls. Whilst the geotextile has a material or fabric structure the Terram has an open grid structure holding the aggregate material in place, reducing the likelihood of slippage. Aggregate base and surface will be a minimum depth of 300mm. No geotextile will be left exposed above the path surface.

This measure will protect the GWDTE allowing groundwater to permeate the path and move through the peat below the path surface, allowing the continual movement of water under the path. If the peat has no structure or is very wet, the formed tray should be increased to 300mm wider than the required path width, on each side. This allows for a greater geotextile width, which will give added strength to the path base, and allow better water drainage from the path base. Good size turf sections will be required to place over the excess width of geotextile, and to create the tray edges and secure the geotextile.

Matting (Geotextile)

The matting, of tightly woven synthetic fibres, is the separation material used to 'float' the path. Geotextile main properties are:

- Separates the path material from underlying soils.
- Semi-permeable allowing water to seep through and drain away from the path structure.
- Spreads the load across the path width and length and prevents subsidence or sinking into soft areas.

Matting comes in several grades, the highest provide greater load bearing strength, which will be required over areas of very deep or wet peat. Lower grades are suitable where the peat layer is thin or has a higher mineral content. The one most widely used in Scotland is "Terram" 2000.

Geogrid

Geogrid is a thick plastic mesh, which is used in addition to matting where extra support is required, particularly on very soft ground. It also helps to hold the aggregate in position.

The main properties are:

- Provides a strong path foundation.
- Spreads the weight of path use over the full path length and width.
- Grid structure prevents path material from moving along, or across the matting and migrating from the path sides.

Geogrids may be used with lower grade matting for additional strength over deep wet peat area if required. Geogrid is particularly useful to prevent movement of the base aggregate where there is a cross-slope or a downhill gradient. The type predominantly used in Scotland is 'Tensar' TS20.

Geotextiles are normally supplied in rolls, of variable width and length. Whole rolls of matting may be cut, off-site, to a suitable width using a chain saw or hack saw. The lengths required can be cut on-site using a sharp knife or heavy-duty scissors.

❖ **METHOD OF CONSTRUCTION**

Stage 1

Form the path tray.

- Excavate the tray as for an aggregate path, with the exception that the depth does not need to reach a solid base.
- Form a base that is level and even for laying the geotextile.
- Remove any sharp or protruding items to prevent distortion or puncturing of the matting.
- If the ground/peat is very wet, or has no vegetative content, form the tray depth andrevet/support sides with good size, heavy turf, with rock reinforcement if required (revetment), after laying matting.

Stage 2

Lay the geotextile matting.

- Line the path tray with the geotextile matting, cutting it to the required width allowing for up to one metre on either side of the path line.
- To take up curves and bends in the path either fold the matting or cut it to suitable lengths, allowing an overlap of at least 300mm.
- Secure folds or overlaps with larger aggregate stone to prevent them protruding up through the path material.
- If a tray is not being dug or required, a raised tray should be formed with large turf and boulders creating a reinforced edge. The matting should extend at least 1m either side to prevent migration or slippage.

Stage 3 (if required)

Lay the geogrid.

- Where required, lay the geogrid over the matting, cut to the required path width. For bends in the path alignment; as with the matting, joins should overlap by 300mm.
- Where there is an excess on either side, due to the variable path width, it should be dug into the tray edges, or, if the matting is folded up, cut to the exact size.
- The geogrid should not curve up the tray sides; it is important that no geogrid edges are left exposed after the surface has been laid and compacted.

Stage 4

Incorporate drainage features.

- Construct drainage features as for an aggregate path, with the exception that geotextile should be laid to continue into construction trenches.
- For ease of laying, and to provide additional strength, cut the geotextile to allow a full overlap across the drainage trench width.

Stage 5

Construct the aggregate path.

- Take care to prevent any puncturing of the matting when laying and compacting the lower layer of base, or sub-base material.

Stage 6

Edge finishing.

- Make sure that any turf already laid are effective in covering the geotextile and containing the aggregate. Adjust landscaping where necessary.
- The path edges may require further turfing and landscaping, to define the line and 'soften' the appearance.

9. DRAINAGE

There are no known water courses within the site boundary. Drains and culverts will not introduce water directly into burns and water courses. Any discharge will be allowed to run off and disperse naturally.

10. SEDIMENT

A key aspect to considerably reducing sediment flow for upland path drainage is the use of turf lined ditches. Unlike an open-faced ditch of bare soil increasing flow rate and sediment run-off/movement, the turf lined ditch contains the sediment, protecting the drain from flash flood and scour by a process of seepage or reducing the flow rate. As such, any drainage channels required within these works will be turf lined as a prevention method.

❖ Pollution Prevention – Dealing with Surface Run-Off During Construction

No muddy surface waters or discoloured ground water is to be admitted to burns, surface water drain or other watercourse. Any water bars, X-drains or culverts built in the vicinity of open water courses, will be constructed with Silt Traps at the discharge point to act as sumps to prevent silt from entering any close proximity water course.

11. EXCAVATIONS

No extensive excavations are planned during these works however should there be the requirement for any excavations, the following must be adhered to. Excavations must be clearly protected to prevent any persons, materials or equipment falling into them. Light weight protective portable barriers will be used to protect sites identified as a hazard after risk assessment. Barriers and signage will be checked regularly to ensure they are in place; if necessary signs will be installed again should any go missing, this procedure will continue throughout the duration of the contract. This is essential before the site is left unattended, particularly at weekends and when work is over for the day.

12. EMERGENCY EQUIPMENT

Contingency procedures are to be available for use in the event of a spillage. Spill kits, complete with absorbent material are to be provided and instruction of use known by the contractor. Any spilled material is to be contained and reported to the environmental protection authority immediately.

13. THE CONTROL OF FUEL AND LUBRICATING FLUIDS

Power carrier (power barrow) to be refuelled from a double banded container prior to going to site. Ground spill protection shall be used in the form of Plant Nappy containment system during fuelling and any machinery while idle, shall be placed upon the containment system.

14. SITE PRECAUTIONS

All vehicles, plant (power barrows, vibrating plate etc) and equipment shall be strictly maintained and operated in accordance with authorised guidelines, instructions and directives. The site working area shall be signposted, taped off and warning notices posted to warn the public. Banksmen shall be on site during any operations and should any persons come through the site, they will be safely escorted around any active works.

15. SITE DEMOBILISATION

All equipment, plant, temporary works etc. and other traces of occupation of the site will be removed from the site within one week of the path-works finishing. All ground vegetation surface wear and tear will be repaired to its former natural state using the appropriate reinstatement technique such as spot turfing or blanket turfing. This repair work will be immediately carried out by the contractor once the site infrastructure has been vacated and to the satisfaction of the works Project Manager, The Park Authority and Landowner.

16. PROTECTED SPECIES

Prior to any works taking place, a habitat survey should be undertaken to provide information on any protected species that may be present within the works area. This survey should include but not be limited to, Bats, Otter, Badger and raptors.

Should any protected species be found whilst works are ongoing, works shall stop immediately and the works supervisor shall inform the client. SNH will be consulted on how best to proceed and notification shall also be given to the planning authority.

If there is potential for protected avian species to be present, SNH guidance on 'The use of helicopters and aircraft in relation to disturbance risks to Schedule 1 & 1A raptors and wider Schedule 1 species' will be strictly adhered to.

RSPB/Local Raptor Study Groups will be consulted regarding birds of prey for all works and mitigation. If more extensive than general raptor good practice guidance from SNH is advised, then this will be followed.

There will be clear mitigation in place to protect badgers and otters (there is a possibility that badgers could be in the surrounding area at the foot of Ben Venue).

The works sites could have, or be close to, black grouse leks. Works will start after sunrise and will not continue after sunset so there should be no disturbance of a lek. No further work is required for this species on this basis.

Toolbox Talks, in general, will cover specific issues that have been identified from walking around the site, issues raised during site briefings or those which cause the most accidents or near misses on site. The issues can include but are not exclusive to:

- Manual handling.
- Slips and trips.
- Noise induced hearing loss.
- Bad backs.
- Hand arm Vibration Syndrome.

Toolbox talks will also be made available to convey information to the contractor in the event of a protected species being discovered during vegetation clearance works. Additionally, for the contractor's awareness, toolbox talks will discuss protected species associated with the locality and the importance to mitigate against disturbance.

Any protected species discovered, flora or fauna, not previously identified as part of a habitat survey, will be notified to the works Project Manager who in turn will notify the Loch Lomond and Trossachs National Park Natural Heritage Planning Officer and SNH.

For flora/nesting sites if found during the works, works will stop in the localised area and the item(s) cordoned off until further advice is given from the Natural Heritage Planning Officer and SNH as to how to proceed.

Appendix 2 Specifications

Path Construction Design Specifications

Specification 1 – Raised Aggregate Path Construction (850 to 1050mm variable path width)



Function

The aggregate path provides a hard wearing, durable surface to withstand the expected pressure of use. It should be comfortable to use so that walkers will keep to it and not walk on surrounding vegetation or take alternative routes. Path edge definition with turfs and boulders, and site restoration, will help to control this. The path should be free draining, with drainage features incorporated, to withstand the expected weather and waterflow.

Use locally won aggregate to re-construct existing path to a width varying between 850 - 1050mm, and a minimum depth of 250mm. Grade base material depth to allow 50mm of graded surface material, with a binding of fine material. Compact to form draining cambers or cross-falls. Use excavated material with turves and boulders to define and contain the path edge.

DIMENSION GUIDELINES

- the width should be naturally varied along the length of construction; the average width will be determined by the path assessment - this may be as little as 850mm, or up to 1050mm;

- the average tray depth should be no less than 250mm; the path tray base should be a solid, natural mineral soil foundation; where path tray excavation reaches 300mm and the ground is still soft, or wet, geotextile will be required the depth of construction, or path tray, will depend on the nature of the ground and depth of erosion; softer ground, and heavier use will require a deeper tray and a sub base;
- the depth of surface, base and sub-base will depend on the tray depth, and material available; minimum depths should be:
 - 50mm of compacted surface material.
 - 100mm of compacted base material.
 - 150mm of sub-base material.
- the surface layer should always be at least 50mm to prevent exposure of the rougher base course through pressure of use; combined base and sub-base depths can be varied, depending on material source and stone size available (see below);
- the surface camber or crossfall should be between 2° to 5°, to effectively shed surface water;
- the finished path surface should be no lower than the ground at the path edge to avoid water collecting here.

MATERIALS

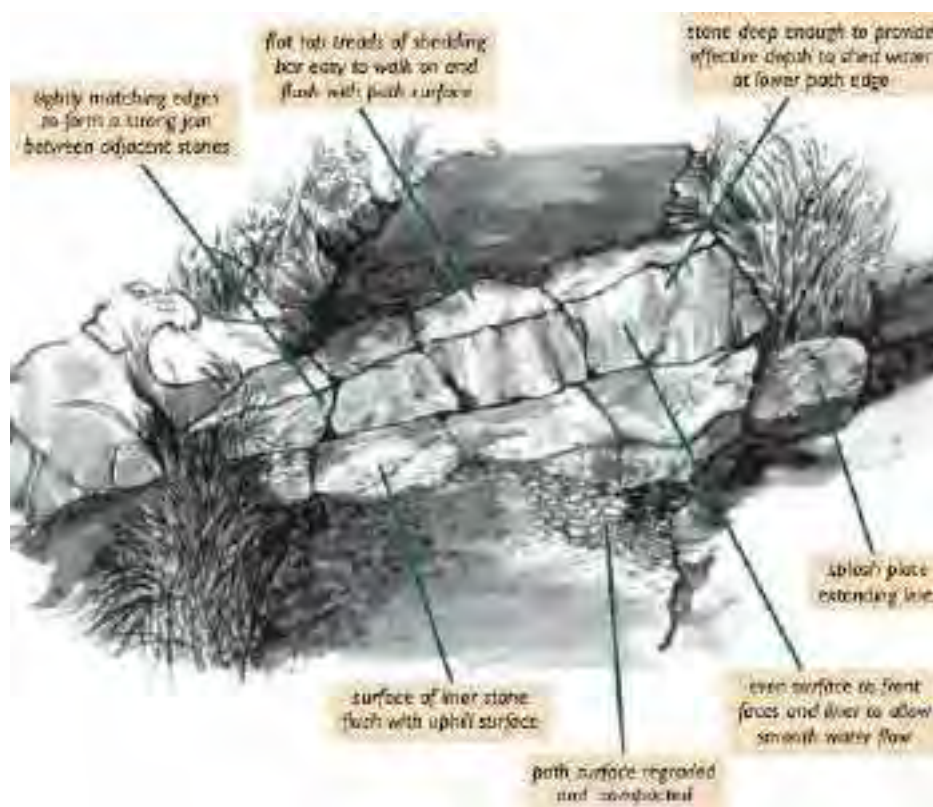
On-site aggregate will be won from the surrounding area from borrow pits. Material should not be used 'as dug' but graded for each path layer. Where feasible this may be done using purpose built screens with different size wire mesh.

The source available may dictate the grading but, as a rough guide, the largest size stone for each layer should be at least 50% of the layer depth. For minimum depths:

- sub-base stone would be between 75 - 150mm, graded down to approximately 10mm.
- base stone would be between 50 - 100mm, graded down to 5mm, with some fine particles.
- surface stone would be 25 - 50mm, graded down to fine particles.
- binding stone should always be no more than 5mm graded down to very fine particles.

Stone should be angular for good interlocking. Binding material should have a high mineral content and be free draining, i.e. with not too much peat or soil. In some places the binding layer may be clay.

Specification 2 – Stone Waterbar



Function

The key function of a waterbar is to divert running surface water off a sloping path. Without them the path surface scours and gradually becomes so rough, gullied and wet that walkers will not use it. Waterbars can also help to stabilise the path surface, by providing a solid anchor. A waterbar does a different job from crossdrains, which are generally used to take water from uphill ground, across the path.

Use local, weathered stone to construct a waterbar, between 30°- 45° to the path line. Bar depth should be a minimum 100mm rising to approximately 150mm. Liner should provide a draining fall of 5° minimum. Extend by 300mm on each path side. Include splash plate if ground drops steeply. Re-construct path at least 2 metres above and below the waterbar.

DIMENSION GUIDLINES

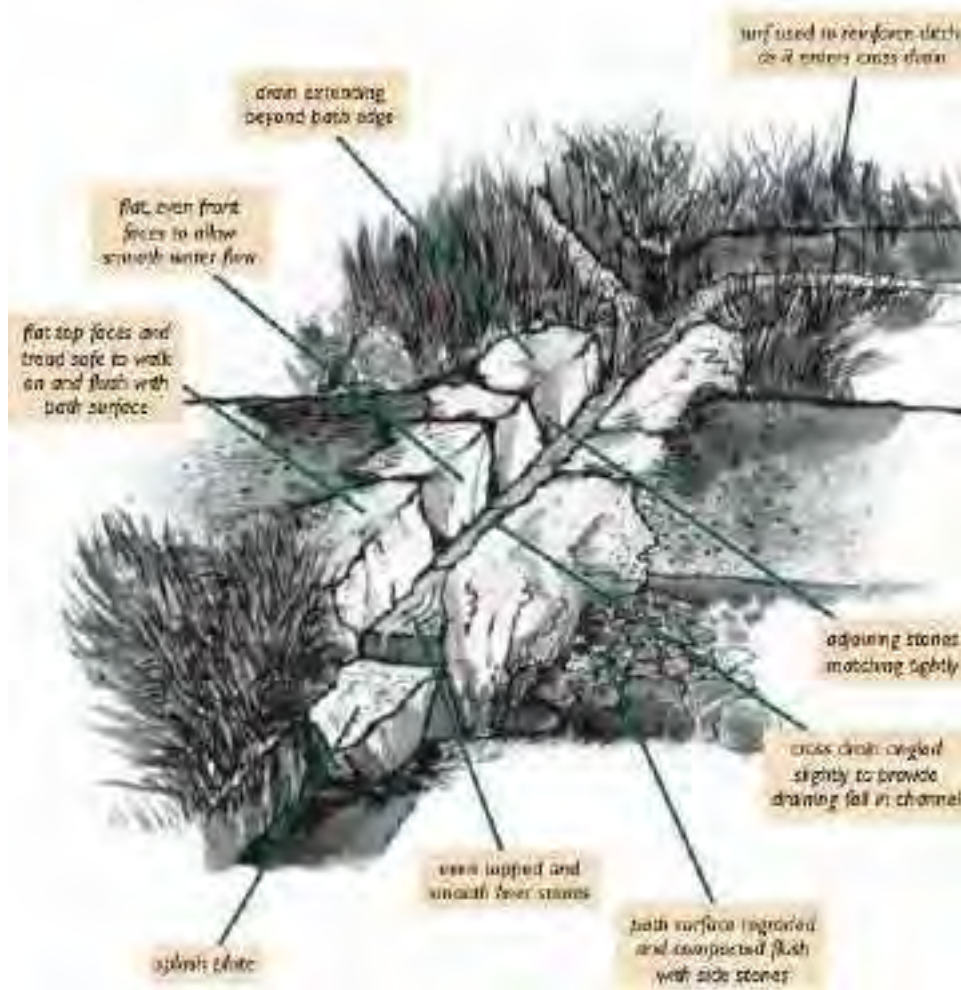
- the angle of the waterbar across the path should provide an adequate fall and be between 30°- 45° to the path;
- the draining fall in the liner across the path should be no less than 5°, and up to 15°;
- the bar upstand above the liner should effectively catch and disperse the water and be a minimum of 100mm depth at the upper path edge rising to approximately 150mm at the lower edge, but not present a barrier to path user top surface of the bar stone should be flush with the downhill surface;
- the surface of the liner stones should be flush with the uphill surface and slightly angled down to the bar stone;
- the bar should extend approximately 300mm either side of the path, as the site allows, to prevent water flowing back onto the path, and walkers from walking around and damaging the path edges.

MATERIALS

Local stone selected should be in its natural form, preferably weathered. The amount of stone needed will depend on the path width. The following points should be noted when selecting stone.

- block stone for the bar should be large enough to withstand the pressure of path use, the greatest waterflow, and frost heave - if it can be moved and lifted easily it will be too small;
- bar stones should be deep enough for half the depth to be below the liner level, and to provide the required upstand depth;
- the front face of the bar stone should have no protrusions and provide an even surface with adjacent bar stones;
- the top face, or tread, of bar stone should be large enough and suitable for walkers to step onto;
- liner stones can be smaller, but must be at least 200mm deep to prevent undermining and movement by heavy water flow;
- the upper surface of liner stones should have no protrusions and provide an even surface with adjoining liners.

Specification 3 – Stone Cross Drain



The stone cross-drain is a traditional, and versatile, drainage feature, sometimes referred to as an open culvert, or a stone lined ditch. The elements of the design used today remain relatively unchanged from those used on stalkers paths and hill tracks.

FUNCTION

The main purpose of the cross-drain is to channel water from above the path to the lower side. The source of the water may be from small streams, springs, mossy flushes, areas of uphill surface water or seepage. Cross-drains are also used to collect and disperse path surface water at low points on the path, or on sloping paths where water bars are not suitable for the path use

Use local weathered stone to construct a stone cross-drain with a

minimum channel depth and width of 300mm. Extend by 300mm on each path side. Stone line the full length of the drain base, with a gradient of 5° minimum. Allow for an outflow splash plate and approximately 10 metres of in and out flow side ditch. Construct path at least 2 metres either side of the drain

CONSTRUCTION

The cross-drain has two main components - side walls and a lined channel base. They provide a solid channel across the path which is easy to clear of silt and debris, and is relatively self-cleansing.

- side walls provide the channel width and depth, and are comprised of two lines of block stone across the path, placed with faces to channel the water flow - essential 'stone extensions' of drainage ditch or water course sides;
- lined channel base is comprised of a row of liner stones, between the side walls, which helps to stabilise the side stones and prevents undermining by water.

A splash plate stone extending the liner stones at the outflow may be required to prevent erosion, especially where there is a steep drop, or soft ground is present.

Inflow ditches collect the water flow to be taken across the path from the water source. The ditch for the outflow may connect with the drainage system, or lower water courses, and will ensure that water is dispersed away from the path edge.

DIMENSION GUIDELINES

These will vary according to the nature, source and volume of water to be channelled, and the direction and dispersal of waterflow.

- the cross-drain is normally at a shallow angle across the path, depending on the nature and direction of flow; the angle may need to be increased in order to provide an adequate fall in the channel;
- the draining fall in the channel should be no less than 5°, and up to 10°, to ensure a clear run;
- the channel width and depth can be variable, but will normally be a minimum of 300mm deep and 300mm wide; this will allow room for a spade during maintenance, and less chance of being choked with larger debris;
- the channel should not be so wide as to provide an obstacle to path users;
- the top surface of the side stones should be flush with the path surface, to allow

collection of path surface water, and to provide a tread surface for walkers stepping across the channel;

- The Cross-drain should extend approximately 300mm either side of the path, as the site allows, to protect path edges and prevent water flowing onto the path.

MATERIALS

Large block stone is required, preferably available, from within reach of the path. It should be large enough to withstand the pressure of path use, the greatest waterflow, and frost heave. If it can be moved and lifted easily by one person it is probably too small.

It should be used in its natural form, preferably weathered (see Section 2.0), although it may be necessary to shape the stone slightly by chipping off minor protrusions. The quantity of stone required will depend on the size of cross-drain to be built and the path width.

Points to note when selecting stone.

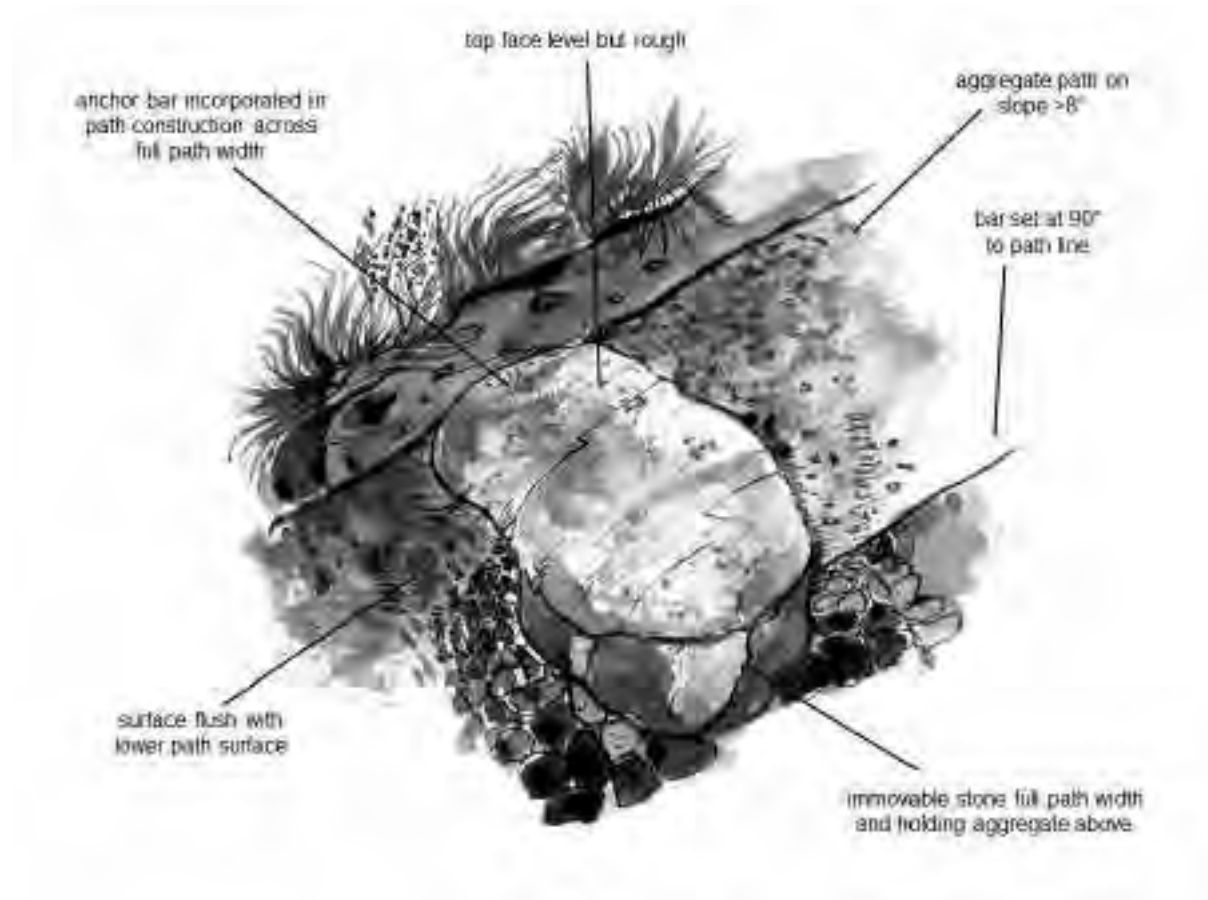
- side, or face stones should be deep enough for at least 1/3 to be below the surface of the liner, and to provide the required channel depth above the liner;
- faces forming the channel side should be as even as possible, with no protrusions that may hamper water flow or collect debris;
- tread faces should be as even as possible, with no protrusions for walkers to trip on;
- the shape should match evenly and tightly with the adjacent side stones;
- liner stones can be smaller, but must be wide enough for the required channel width, and at least 1/3 of the depth of the side stones; also large enough to prevent undermining by fast and high volumes of water;
- upper surfaces should provide an even channel surface with adjoining liners, and have no protrusions to hamper water flow and collect debris.

Specification 4 - Anchor Bars: Aggregate Paths on Slopes

Where an aggregate path is constructed on a slope greater than 8° (15%), there is the risk of the material migrating down the slope, particularly if the binding properties are not good, or there is a high level of path use. To help prevent this occurring stone anchor bars can be incorporated into the path structure. However, not all paths on gradients require anchor bars. They may not be necessary if the surface and base material binds well, or if the path is well protected by drainage features, and the level of use is low.

A range of options should be considered for paths on gradients including ensuring that there are plenty of waterbars and using short sections of pitching. The selection of

techniques needs to be based on a judgement of how the path will be used and maintained bearing in mind that long flights of pitching at relatively low gradients do not get used and that aggregate is not stable on steeper slopes. There is also a need to consider the potential for mountain bikes bouncing on the aggregate off the anchor step and actually speeding up deterioration.



Function

Anchor bars form solid, immovable structures within the path construction and, depending on their spacing, hold the aggregate on the slope above. The anchor bar may be used with water bar construction, as the stabilising stone below the shedding bar stones. Anchor bars can be added to existing paths that are showing signs of movement.

Bill of Quantities (example)

Re-construct existing path with aggregate to a variable width, between 600-1000mm. Use large block stone to construct anchor bars every 10m, across the full path width, and flush with the path surface on the upper edge.

Positioning of Anchor Bars

Anchor bars will generally be used on paths with a gradient between 8° to 16° (15-30%), but if the surface material does not bind well anchor bars can be useful on slopes as low as 5° (10%). On mobile slopes extra effort should be made to improve the binding

properties of surfacing and to compact firmly, as well as carefully, considering the spacing of anchor bars. Depending on the gradient and surface material anchor bars should be positioned at intervals of between 3 and 20 metres.

The following table gives a general guide to spacing.

Gradient of Path			
Gradient	low 8-10°	medium 10-12°	high 12-16°
Spacing	10-15m	5-10m	3-5m

Construction

Components

The anchor bar is an informal structure, comprising one or two large block stones, set across the path line. The block stone is sunk into the path with the top face just visible as a part of the path surface and should not normally stick up like a step. Depending on the gradient and the size of stone available it may be necessary to have a double row, or two courses, of stone.

Dimension Guidelines

- the bar should span the full width of the path line; this may require the use of more than one stone;
- the bar should be positioned at approximately 90° to the path line;
- stone should be set in approximately 200mm deeper than the path construction depth, so that the bar is an immovable, "independent" structure, which will withstand the weight of aggregate and the pressure of use;
- the top surface, or tread, of the stone should be flush with the path surface; the lower edge should not normally form a step up from the surface below;
- on steeper paths it may be necessary to have a slight step, to avoid the tread being at an uncomfortable angle to walk on;
- a double course of stone may be used to provide the height gain required without creating too high and unnatural a step.

Materials

The local stone selected should be in its natural form, preferably weathered.

- the stone should be large enough to hold the compacted aggregate above and the pressure of path use - if it can be moved and lifted easily it will be too small;
- the stone should be at least the width of the constructed path, if two stones are used each should be at least half the path width; it is better for stone to extend outside the path edges than be too narrow;
- the stone should be deep enough to bury into the ground by approximately 200mm below the path base;
- it should have a level, but rough top face for the tread; it should have no large protrusions, but not be so smooth that people will slip with gravel on the surface.

Method of Construction

Anchor bars are built into the excavated path tray before the aggregate is laid.

Step 1

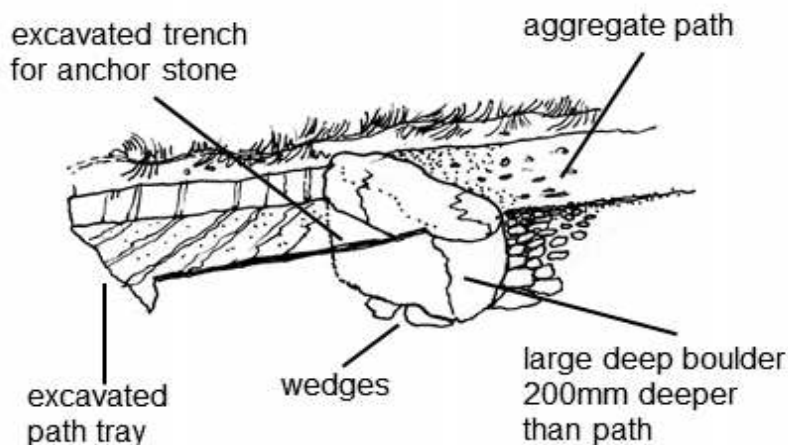
Excavate a trench

- dig a trench approximately 200mm deep across the full width of the path tray;
- the trench should be wide enough to allow for the width of the bar stone and the depth required for bar stone tread to be flush with the path surface.

Step 2

Position the anchor bar stone or stones

- set the anchor bar stone so that the surface will be flush with the compacted path surface, and not create a step, unless the path is steep;
- if a second stone is necessary they should be tightly butted together to form a solid bar across the path and provide an even tread surface;
- wedge and pack any gaps with smaller stone, and backfill the trench firmly, to form an immovable structure.



Step 3

Construct the aggregate path.

- take care not to dislodge the anchor bar when compacting the path material above and below the bar;
- make sure that the surface layer is compacted to be flush with the top and bottom edges of the bar stone or stones.

Troubleshooting

Key points to watch out for:

- use large stone, if possible one to span the full path width - too small a stone will become loose with the weight and pressure of the path;
- keep the bar flush with the uphill path surface - avoid steps up from the downhill surface;
- avoid using anchor bars on too steep and mobile a gradient – short sections of pitching and aggregate may be a better solution.

Variations

If large block stone is not available the anchor bar may be formed by constructing short sections of pitching. This will also be suitable on steeper gradients where double rows of large block stone, or longer sections of pitching, may be required to "take up" the gradient without creating high and formal steps.

An anchor bar can be built 2 or 3m down a path from a water feature, such as a waterbar. The anchor bar will hold the surfacing on the ramp below the waterbar, creating a more durable walking surface and preventing erosion behind the face stones.

A further variation on steeper slopes is to build anchor bars with a step. This reduces the gradient of the aggregate between the anchor bars, but will require more maintenance and is likely to be less successful on very mobile slopes.

Maintenance Tasks

Anchor bars require maintenance on a regular basis:

- check the stability of the stonework - re-pack where there is movement or any visible gaps;
- re-pack aggregate surfacing above and below the bar where compaction or erosion may have taken place;
- if anchor bars are not preventing downhill movement of aggregate, some re-alignment of the path may be required using short sections of pitching and aggregate.

Often anchor bars are added to an existing aggregate path on a slope, at time of maintenance, to solve problems of surface movement.

ENVIRONMENTAL SENSITIVITIES

Use natural looking weathered stone, that will blend in with the surrounding landscape turf over the edges of the anchor bar where they extend outside the path edge.

HEALTH AND SAFETY HAZARDS

Use safe lifting techniques when moving or positioning stone for the anchor bar.

TAKE CARE

The path's dynamics must be carefully considered before deciding to use anchor bars to

stabilise it, in particular consider the gradient of the path, the mobility of path material, and the levels of use particularly on well used steeper paths where the surfacing does not bind well, migration material is likely to create 'steps' below anchor bars as the surfacing migrates downhill.

This encourages people to leave the path to avoid the step, creating braids and can increase the chances of erosion by bikes dropping off the step help avoid braiding by ensuring that anchor bars extend past the edges of the path or use blockers/vegetation mounds.

Specification 5 - Bank and Slope Stabilisation

Upland slopes are prone to slippage, particularly when vegetation has been lost. Initial loss and erosion may be caused by pressure of use, but fragile vegetation, thin friable and mobile soils, high rainfall, and frequent freeze thaw action all contribute. Slopes will need stabilising if a path solution is to be effective.



Function

The revetment wall is solidly built to retain loose or unstable ground on steep slopes. The stabilised slope will then provide a better base for revegetation. Revetments are also used to support and consolidate banks along path edges. The most typical situations for its use are:

- on open eroded slopes, or gullies associated with the old path alignment;
- where the path traverses a slope, either on one line or zigzagging;
- to support a lower path edge from collapsing down the slope;
- to retain the bank or slope above from collapsing onto the path, either at the path

edge or on the slope above.

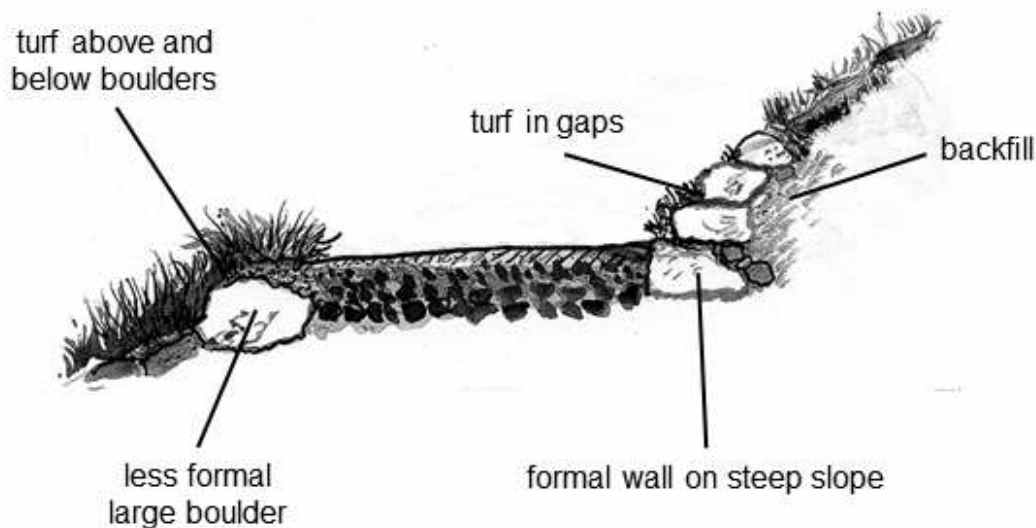
Bill of Quantities (example)

Using natural weathered stone construct an informal revetment wall to retain the slope above the path. The construction must be solid and stable, with large foundation stones, off-set joins, pinned and backfilled firmly. Pack gaps between the courses with turf, and turf over the top to blend with the upper slope.

Where revegetation over an eroded slope is necessary the revetment may be combined with turf banks and transplants, or geotextile with seed (see Restoring Vegetation).

Construction

The revetment is a rough-faced, random coursed, drystone wall. On steep slopes the structure may need to be a formal retaining wall, of approximately 500mm height, or more. Preferably, a less formal approach should be used, with large boulders butted together along the path edge to support the banking. Both should be made to look as natural as possible by incorporating turfs into and over the structure.



Materials

Revetments are built from the following:

- large boulders for informal revetments;
- variable sized, block stone for formal revetment walls;
- spoil for back-filling;
- turf for landscaping the revetment.

These are described in detail in Materials and Use. Stone for revetments should be in its natural form with the outer faces weathered, preferably lichen or moss covered, to blend

with the surroundings

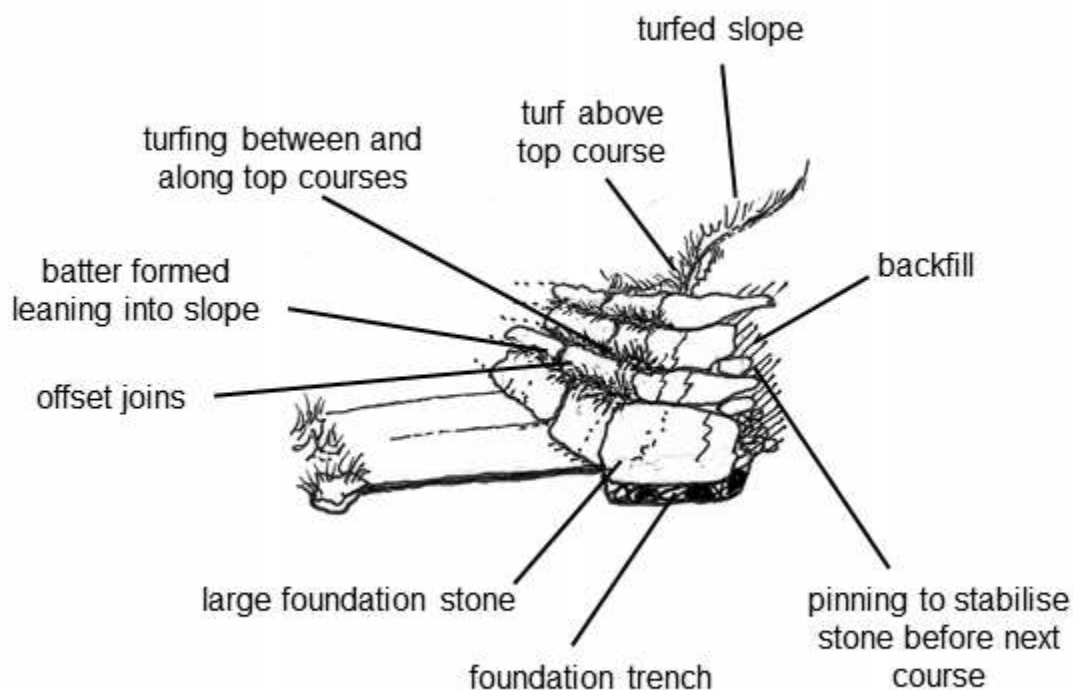
Method of construction

Foundation

The key to a solid revetment is the foundation. Whether it is the more formally constructed wall or the random boulder edge, a solid base should be excavated and levelled to build on. This should be to at least one third of the depth of the base stone.

Courses

- use the largest stones for the wall base stones, progressing with courses reducing in size towards the top; the final course should use stone that is large enough to form a solid top to the wall;
- the courses should form a batter, leaning into the slope, to provide more resistance to any slumping of the slope behind;
- outer stone faces should not protrude, as these may be used as steps, by people or animals, to climb over the wall, which will ultimately result in weakening of the structure.



- lay the stone a course at a time, butting adjoining stones tightly, and with off-set joints, to provide a solid structure;
- pin each course from behind with smaller stone wedges, to ensure that no movement occurs, before the next stone is laid;
- backfill any space behind the revetment as each course is laid; it is essential that this is packed tightly to minimise movement and settling of the soil which inevitably happens

after construction is complete.

Finishing

- fill gaps between courses on the face of the wall with turf off-cuts to help create a natural appearance;
- revetment above the path should be topped off with turf, and landscaped into the upper slope;
- to keep walkers off the top of revetments below the path edge, spoil and turf should also be used on the path edge;
- revetments supporting the lower path edge should have spoil and turf in front of the foundation stones, to help stabilise and blend them with the lower slope;
- revetments on open slopes should have turf and spoil above and below to blend into the slope and aid stabilization.

Troubleshooting

Key points to watch:

- always build on top of securely wedged stone - if the course below is loose then all those above will be unstable
- extend the revetment by one metre past the end of the bank that requires stabilising, to prevent banks collapsing around the ends

Maintenance Tasks

The following maintenance task should be carried out regularly:

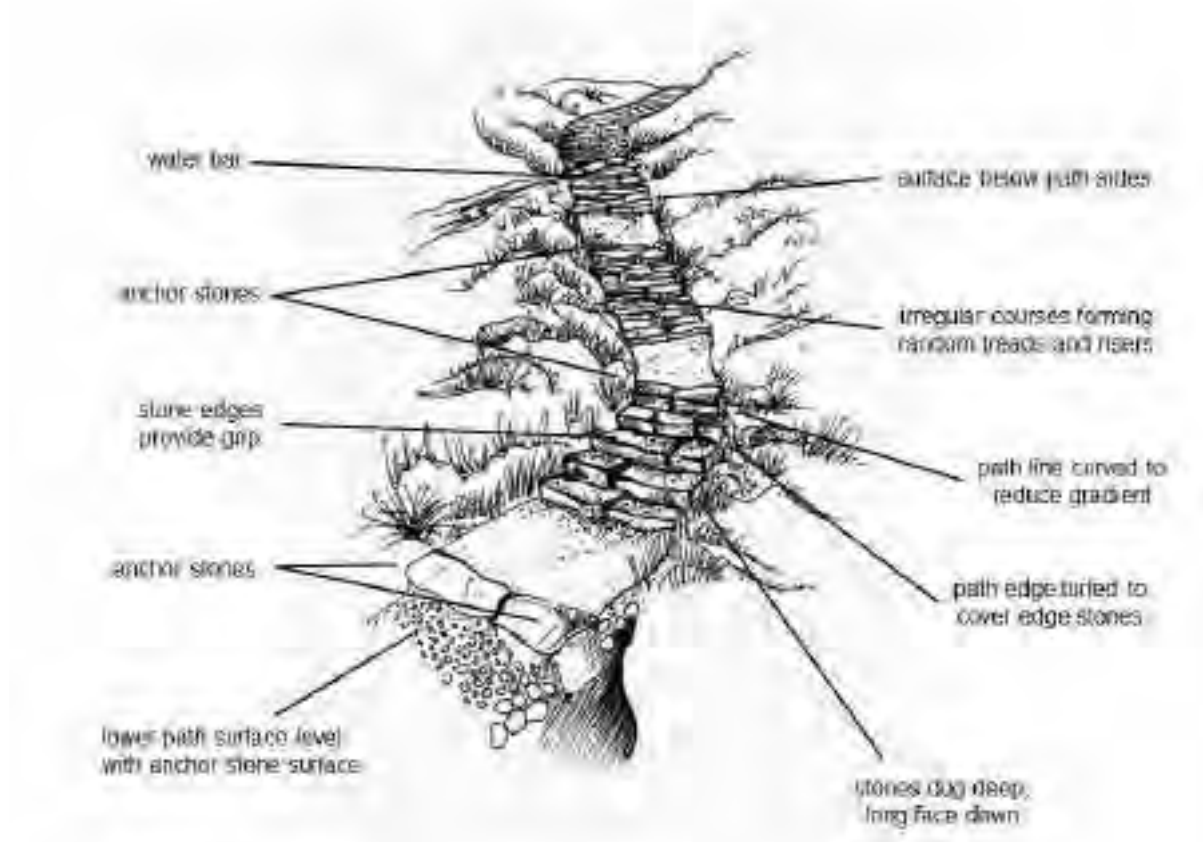
- re-packing of loose stone work with turf or stone wedges;
- re-turfing of any areas where turf has died or been damaged.

Specification 6 - Stone Pitching

Introduction

Stone pitching evolved from the smooth cobbled surface of ancient tracks and roads, into the traditional rougher cobbling of stalkers paths, suitable in the upland environment. Further adaptation developed the technique for recreational use, and to merge with the landscape.

It has gone through many years of experimentation, such as using larger boulders placed with a horizontal surface rather than angled down the slope, and this is ongoing. Stone pitching should only be used where there is no viable alternative because it is uncomfortable to walk on, particularly in descent. On steep slopes efforts should be made to align the path so that only small sections of pitching are required interspersed with an aggregate path.



Stone pitching provides a hard-wearing surface for steeper paths. It is used where aggregate is impractical or has failed due to the gradient and erosive pressure of feet and water. The pitched surface can withstand these pressures, and, with sensitive construction can blend aesthetically with the surrounding landscape.

The best sites for pitched paths are where they merge naturally with the rocky appearance of the landscape and provide an easier route than the surrounding ground. To enhance the aesthetic appearance they should avoid steep straight lines, and incorporate curves and variations in width, making use of natural features wherever possible.

A pitched path is not always easy to use. It does not absorb impact, and may be steep and rough. If the surrounding ground is easier, or more comfortable to walk or ride on users will cause further erosion by short-cutting or walking on landscaped edges. An alternative of short vegetation will invariably be used if it is available.

A comfortable walking surface is therefore essential for both ascent and descent, in all conditions, which means that treads need to be at a low angle to avoid becoming slippery when wet or icy. It is also very important to ensure that site restoration and landscaping encourages people to stay on the path. To encourage success of the work path lines should minimise the amount of pitching required. This may require altering the path line and managing zigzags to reduce the gradient.

Pitching may act as a hazard to bikes or be treated as a 'thrill feature' if poorly executed or badly placed – low gradient pitching should therefore be avoided.

Bill of Quantities (example)

Use local, weathered stone to construct a pitched path, average 1.2m wide. Irregular, random treads must be comfortable to use, with risers of no more than 150mm. The construction must be solid with stones fitting tightly, well packed, with overlapping joins. Use excavated turfs, spoil and boulders to define and contain the path edge.

Construction

After choosing an alignment that fits the landscape and requires the minimum amount of pitching, the main considerations are:

- provide a good surface for users, particularly on descent; allowing walkers to place a whole foot on a single tread wherever possible;
- reduce the gradient with angled lines across the slope and intersperse with aggregate path wherever possible;
- produce a structure that is solid and immovable, and will withstand the most extreme pressures of use and water flow;
- incorporate drainage features for a path surface that will not be under-mined, will be long-lasting and require the minimum amount of maintenance;
- avoid having an excessively large drop-off which can cause bikes to 'ground' the chain ring on the descent;
- ensure that the bottom step is flush with the path as this stone will become higher than the aggregate below due to the compaction and migration of the aggregate;
- pitching changes the rhythm of walkers' strides and a few lower steps to lead into it helps to encourage use, rather than an abrupt big first step;
- landscape carefully to further encourage walkers to stay on the path.

Components

Stone pitching comprises various stone shapes and sizes, used in rough courses across the slope, to provide a series of irregular and random low steps and footholds, with a cobbled

or bouldery appearance.

The largest block stones are used as anchor stones at the bottom of pitched lengths, and at regular intervals throughout the length to support the stonework above. Large stones are also used at the path edge for structural stability.

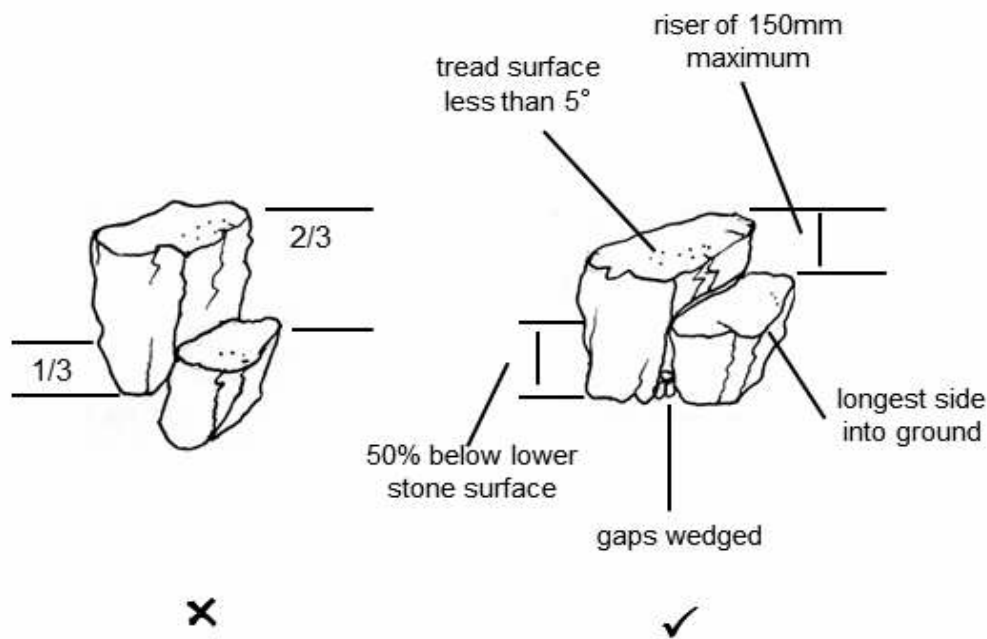
Drainage features are incorporated at regular intervals. For path surface water these will be water bars, although cross drains can also be used. It is good practice to protect the path surface below the pitching with a drain close to the bottom. The top of the pitched length should be similarly protected, but this does not need to be directly at the top of the 'flight'.

The path edges are contained, defined, and softened with turf, spoil and boulders (see Restoration Techniques).

Dimension guidelines

There are varying styles of pitching, attributed predominantly to the stone type available. The basic principles for construction remain the same.

- the overall path gradient should be kept as constant as possible by incorporating curves on short steep sections, and adjusting the pitched depth and surface level;
- the path surface should be flush with the adjacent ground, with the vegetation or turf higher than the pitching. It may be necessary to raise the path edge by turving and landscaping. Higher turf edges help the path to blend in better in the landscape as well as encouraging users to stay on the path;
- anchor stones at the start of pitched lengths should have the tread flush with the lower path surface; if a step down is created, the surface below will erode, the step will become too high, and the anchor stones will be under-mined; this will cause the pitching above to fail;
- pitching must not start anywhere other than at a change of gradient. If the path below the bottom anchor bar is too steep, then it will quickly erode away creating a step;
- path stone should be pitched with at least half the stone depth below the surface of the lower stone, and the longest side into the ground; the deeper the pitched depth the more solid the construction;
- the resulting upstand, or riser should ideally be no more than 150mm; if it exceeds 200mm it can be difficult to use.



- adjoining stones should form a rough course across the path with variable upstands to avoid a formal step appearance;
- stone should be pitched vertically, with the tread surface more or less horizontal; downhill tread angles should not exceed 5°;
- it is important that the overall surface is not a sloping ramp without good footholds.

Materials

The local stone selected should be in its natural form, and preferably weathered (see Environmental Impact). The quantity of stone required for pitching is high - approximately 1 tonne for 2m², depending on the density and depth. If not enough is available in the vicinity of the path it may be necessary to import material to site by helicopter.

To avoid uniform steps a variety of irregular and random stone size should be selected. Stone varies considerably from thin slaty schists, and large rounded granite, to chunky sandstone blocks. Depending on what is available the following points should be noted:

- each stone should be deep enough to provide the pitched depth required - a general guide is no less than 300mm; anchor and edge stones will be deeper;
- tread faces should provide a "grippy" surface; not so rough that protrusions may be tripped over, nor smooth and slippery.

The best sources for stone are glacial surface deposits, scree slopes or rock falls on the surrounding open hill. Stream beds are another source but tend to provide rounded smooth stone which has to be used with skill.

Method of Construction

Step 1

Form a path tray

- excavate a path tray along the selected path alignment, to the required variable width;
- the depth of the tray should allow for the depth of the stone available, and for a finished path level below the surrounding vegetation;
- where the path line is severely eroded, to a variable width and depth, it may require realignment, infilling or narrowing, without any excavation; this can be achieved with careful use of spoil, turf and boulders.

Step 2

Set the pitched stone

Depending on the number of workers and the length of the path, pitching may be split into sections. If these are pitched simultaneously pay close attention to the overall gradient. To ensure that the path climbs at a steady rate, and avoid joining either too low or high, the next set of anchor stones should be visible to judge the height gain required.

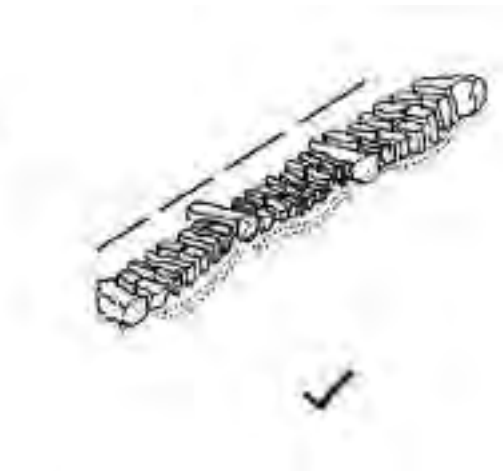
Always start at the bottom of a section and work uphill.

- the first line of stone will be large anchor stones set flush with the lower path surface; it is essential that they are dug in deep and are immovable; they may also form the lower side wall for a cross drain at the base of the pitched length;
- progressing up the slope pitch the stone into the tray in rough courses across the slope, to achieve the required random footholds and risers;
- use large, deep stone at the path edges to form a strong edge;
- butt adjoining stones tightly together, on all side faces, maintaining good footholds;
- wedge all gaps firmly, before subsequent courses are pitched, so that all path stones are solid and immovable;
- overlap joins on adjoining courses for a sound structure;
- pack remaining gaps with smaller stone and gravel; this is essential to prevent the ingress of water under the pitching, which may cause loosening and wash out, or break up with water freeze and expansion in winter;
- incorporate waterbars or cross drains at intervals required, with the bar, or side wall, stones tied in with path stone to maintain footholds.

Uneven gradient



Even gradient over changing terrain



Step 3

Edge finishing

- use turf, boulders and spoil from path tray excavation to landscape path edges, ensuring that edge stone side faces are covered, the line is defined, and the appearance "softened";
- where necessary the edge finishing should raise the path sides to contain path use, particularly to avoid short cutting at corners;
- use excess turf and spoil to re-instate eroded or damaged ground (see Introduction to Restoration Techniques).

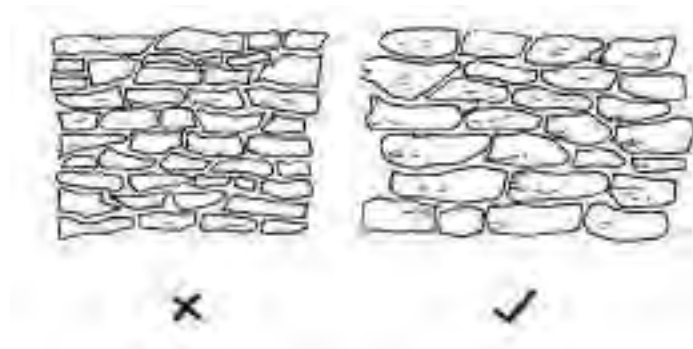
Troubleshooting

Key points to watch:

- firmly pack all stonework - this is time consuming but if neglected or not done thoroughly it will result in water damage and stonework collapse;
- make sure joins overlap for a solid, stable structure;
- provide secure footing - a rough uncomfortable surface will not be used;
- avoid regular courses of stone that create a formal step;
- match the pitching gradient to the path alignment - avoid steep sections by re-aligning and incorporating curves;
- ensure that the bottom step is flush, or nearly flush with the path leading up to it, ideally the first stone should have a big, deep tread to lead walkers on to the pitching;

Edges too straight
and too many ***small stones***

Better edge - bigger stone



Variations

Stone pitched paths throughout Scotland reflect regional variations, the main influence being the geology.

The type and size of stone results in styles such as:

- Granite (boulder pitching)- large rounded stone - pitching with treads bigger than the average foot size and larger rises;
- Schist - thin slate like stone - pitching with small treads of several stones, but dug in deep;
- Sandstone - smaller blocky stone - pitching using several stone courses to form a "grippy" foothold.

The incorporation of grass seed or small strips of turf, in the packing between stones is suitable on some sites. The vegetation softens the visual impact of the hard pitched path. It can also help to stabilise pitching that may be susceptible to loosening.

Maintenance Tasks

Stone-pitching should require minimal maintenance, other than drainage features and edge work. The main tasks are:

- pack and re-set stonework where there is any movement or visible gaps;
- turf the edges where trampling and erosion has occurred;
- block any shortcuts that develop.



○ **ENVIRONMENTAL SENSITIVITIES**

- take care to avoid creating trample lines when collecting large quantities of stone from within reach of the path - vary the route to spread the pressure
- carefully turf over scars left from removed stone, particularly if within sight of the path
- dispose of excess stone sensitively, or use to create landscaped mounds or to in-fill borrow pits

○ **HEALTH AND SAFETY HAZARDS**

- take care to prevent stone falling onto path users or anyone working below when off-loading collected stone, or moving it from a stockpile
- the work site is often steep, rough and restricted for space - provide alternative routes for the public whenever possible

○ **TAKE CARE**

- stone pitching should only be used where there is no alternative available - it is notoriously uncomfortable to walk on for descending walkers
- incorporate path drainage - surface water, or ice, can make the surface very slippery, assess the site for alternative routes or better alignment
- if the pitching is lower than the surrounding vegetation, water and snow, will collect on the path. Conversely, pitching which is high and proud does not blend in so well and is more likely to be avoided by walkers

A Functional Wetland Typology for Scotland - Field Survey Form

Date and Time	
Surveyor Name	
Location	General description: National grid reference:
Weather	Current weather: Preceding weather:

Photos	Photo Number	Description
	1	
	2	
	3	
	4	
Continue on separate sheet if necessary		

Landscape setting: refer to guidance manual for further detail	1a Coastal: Sand dunes	3b Waterside: Isolated floodplain	5 Valley bottom/ basin
	1b Coastal: Intertidal or near-tidal	3c Waterside: Stream-side	6 Peatland
	2 Coastal plain	3d Waterside: Loch-side	7a Cliff ledges and boulder/scree fields
	3a Waterside: Floodplain	4 Slope	7b Other montane
	If the landscape setting does not fit with the above, or more detail is required, add information here:		

Hydrological features	Coast	Pond	Spring
	Sea loch	River	Standing water/ puddles
	Freshwater loch	Stream	
	If there are other features, or more detail is required, add information here:		

Soil indicators	Peat	Peat hags	Tufa
	Mineral soil (e.g. sand, clay, loam)	Peat gullies	Machair sands
	Bare rock	Sand dunes	
	If the soil type does not fit with the above, or you can also describe the geology, add information here:		

Vegetation indicators	Willow	Birch	Scots Pine
	Alder	Rushes	Small sedges
	Broad-leaved sedges	Tussock sedge	Reeds
	Carpet-forming mosses	Heather	Cottongrass
	Other (specify):		
	Height of vegetation (excluding trees): Ankle height <input type="checkbox"/> Knee height <input type="checkbox"/> Waist height <input type="checkbox"/> Head height <input type="checkbox"/> Above head height <input type="checkbox"/>		

Existing pressures: refer to guidance manual for more detail	Impoundment	Flood defences	Drainage
	Nutrient enrichment	Over-grazing	Poaching of ground
	Cutting of vegetation	Lack of management	Peat cutting
	Invasive non-native species		
	Other, or more detail:		

Sketch	<p>On a separate sheet of paper, sketch the wetland and surrounding area. The sketch should include:</p> <ul style="list-style-type: none"> - The surrounding landscape and topography - Any hydrological features - Locations and extents of different habitat types within the wetland - An indication of scale and orientation of the sketch (usually north points to the top of the page)
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Habitat type identification:

In the box below, record decisions about the wetland type. If there is more than one habitat type within the wetland, record all types and mark on the sketch map their extents. Note which are the most dominant types in the comments box below.

Wetland type		Select if present (✓)	Photo number or sketch	Comments, including brief description of location and extent
1a	Bog woodland			
1b	Other wet woodland			
2a	Marshy grassland			
2b	Montane grassland			
3a	Montane flushes			
3b	Tufa-forming springs			
3c	Other springs			
3d	Seepages/ flushes			
4	Fen			
5	Swamp			
6	Reedbed			
7	Wet heath			
8a	Peat bog			
8b	Quaking bog			
9	Saltmarsh			
10	Dune slacks			
11	Machair			

State dominant wetland type(s), and add any other comments:



Photo 1: Spring forming from below tree root plate.



Photo 2: Soft wet grasses/mosses with surface breakage



Photo 3: Mineral soils showing through on slope



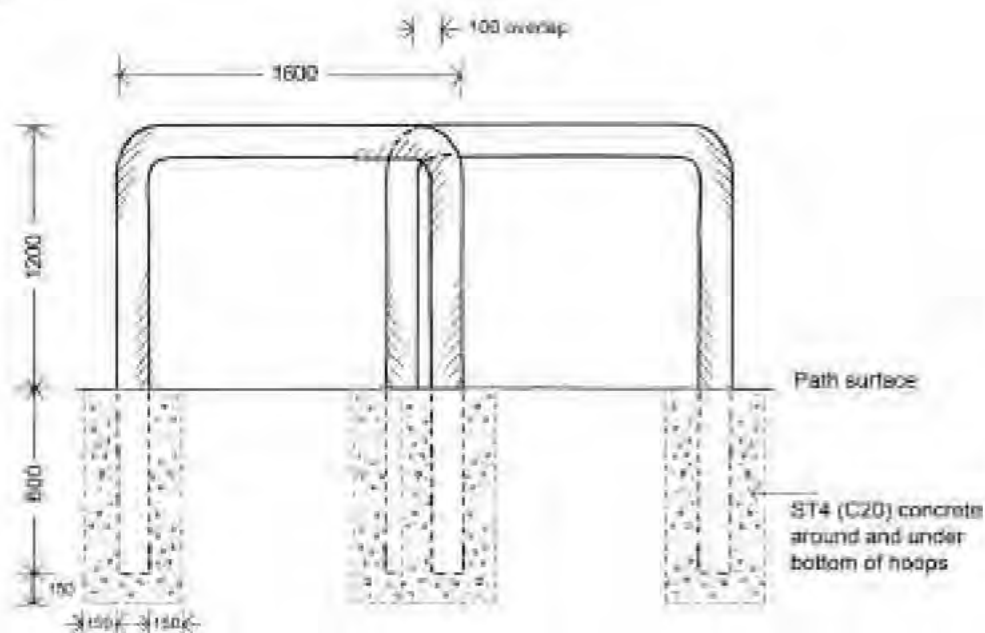
Photo 4: Mosses and grass indicative of area on whole.



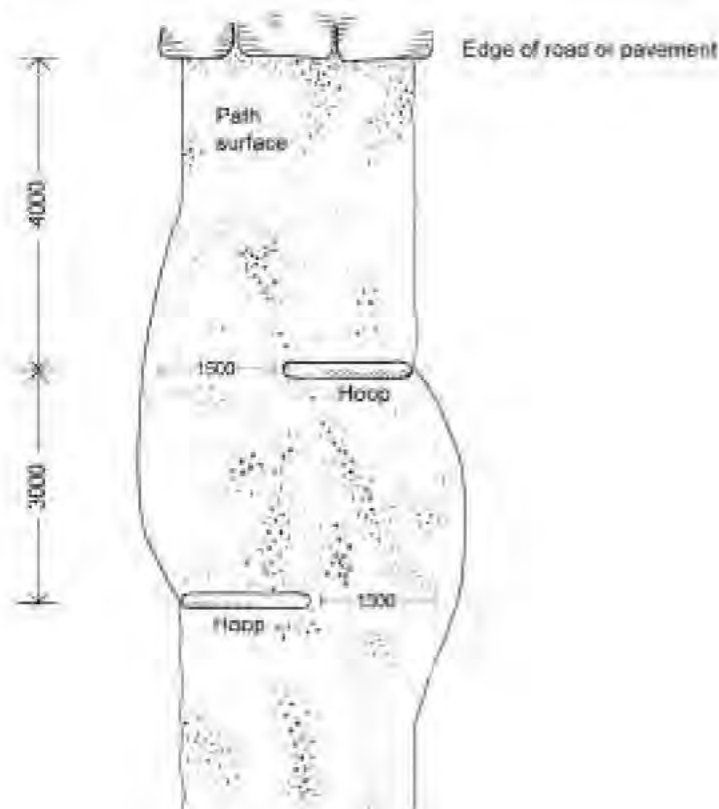
5.4 Metal hoop chicane



Elevation



Plan



This consists of prefabricated metal hoops, creating 1500mm wide gaps at the start or end of a path. The clear space of 3000mm in the chicane, and 4000mm between the chicane and road or pavement, provides room for turning.



Materials List

For one chicane:

- ❖ 2 x galvanised steel hoops, 1800 x 1600 x 100mm diameter
- ❖ ST4 (C20) concrete, 150mm around and under bottom of hoops.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

- ❖ On the left side of the path, 7000mm from the edge of the road or pavement and 100mm inwards from the edge of the path surface, dig a 400mm wide round hole to a depth of 600mm.
- ❖ On the right side of the path and at the edge of the surface, 4000mm from the edge of the road or pavement, dig a 400mm wide round hole to a depth of 750mm.
- ❖ From the inside edges of those holes and towards the middle of the path, dig 2 x 400mm wide round holes to a depth of 600mm and at a spacing of 1300mm.
- ❖ We recommend that the spacing between the middle of those holes is 3000mm, and that the inside edges of the holes overlap by 100mm.
- ❖ Place concrete in the bottom of the holes to form 150mm thick base layers.
- ❖ Place the hoops in the middle of the holes on concrete base layers. Check that the gap between the hoops is 3000mm wide and that the gaps between the ends of the hoops and edges of the path surface are 1500mm wide. Check that the hoops are overlapping by 100mm. Check that the hoops are 1200mm above the surface, and use a spirit level to check that they are square and standing upright.
- ❖ Carefully backfill the holes around the hoops with concrete to the level of the surrounding surface.