



BEN NEVIS PATH– ACHINTEE TO JOHN’S WALL

Grid Ref NN126729 to NN147724

SITE DESCRIPTION

This section of about 3.5 kilometres is almost half the total length of the Ben Nevis pony path. From the road end at Achintee it climbs out of Glen Nevis, traversing round the slopes of Meall an Suidhe before passing the Lochan Meall an Suidhe (commonly known as the Halfway Lochan). For most of the way the path has been built into a cross slope, sufficiently steep to contain the path along a relatively narrow corridor, despite the walking surface being extremely rough. The traversing line of the path intercepts all the water running off the long slopes above the path and failed drainage has resulted in some of this water running down and washing out the path surface. Effective path drainage is often hampered by bedrock on the inside/uphill edge and bedrock is a frequent feature in the path itself. There are a series of small burns that are crossed by a variety of means; notably, two aluminium bridges, three wooden deck bridges and several stone lined fords (some which date from the original path construction). The path gradient is typically around 10 degrees but varying from almost level to over 20 degrees in a few places. As the path climbs out of Glen Nevis there are two zigzags and both of these suffer from shortcutting. The upper of these two zigzags (at NN136719) has an extremely rough and awkward section of path which has contributed to more walkers taking the short-cuts hence causing widespread ground erosion. The various shortcuts on the lower zigzag (at NN133720) are primarily used by runners; bracken conveniently grows up and hides them during the summer months although they become more gullied and wider each year; where runners re-join the path the ditches quickly fill up with material (soil, peat or stones) brought down by feet and water. As the path passes the Halfway Lochan the terrain, and the path itself becomes less steep and more open. The path is much larger than the average hill path in the Highland’s but this is necessary due to the sheer volume of walkers using it.

PREVIOUS WORK TO THIS SECTION

Much of this 3.5 kilometre section has had work done to it in the past, particularly between the mid 1980’s and 2000. For example, the Manpower Services Commission worked on the path during the 1980’s, Highland Council employed two maintenance wardens through the 1990’s and there were several more intensive sections worked on by Contractors such as Pathcraft and Conserve, under Highland Council management. After 2000 the section in the long gully above the higher aluminium bridge was worked on by Northern Conservation and the section past the Halfway Lochan was up-graded around 2005 by Chris Cairns/Alex Grant. Over the last few years various small sections along the first mile up from Achintee have been used as sites for footpath training by Lochaber College.

A lot can be learnt from inspecting the previous work or (in some areas) what remains of it.

1. Pitching Styles

The sections of path with a stone pitched surface have a wide range of different styles. For example there is cobbling, “small-step” pitching, “multi-angled treads”, downward sloping treads, boulder-steps and near the Halfway Lochan a more modern style of “staggered riser/level tread” layout has been installed. None of the pitched surfaces are particularly comfortable to walk down for any distance but the sections people find most awkward are the steeper sections with “small steps” and the downward sloping treads that can be slippery

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2. Gravel surface

Where the surface is not stone it is gravel. This provides the most comfortable walking surface and where gravel is available it is less labour intensive hence cheaper to construct. However, most of this path is too steep for a gravel surface to last for any length of time. During the 1980's Manpower Services tried to compensate for the steep gradient by installing stone risers (steps) every few metres to lessen the gradient of the gravel surface. But over time the "steps" became progressively higher and higher due to the (softer) gravel surface wearing away; people simply walked round them and the stone risers eventually became undermined and collapsed. The maintenance of gravel sections is a lot higher than on stone sections. Gravel particles gradually fill up the cross drains and water bars. Unless they're regularly cleared out (often they have not been) they choke up, water then over-flows down the path and rapidly wears out the gravel surface. Many sections that were once gravel now more closely resemble a river bed.

3. The transition from a gravel surface to a stone surface

The gravel wears over time, the stone doesn't. The steeper the gravel path the more quickly it wears down. This is evident on the downhill side of all stonework, be it a section of pitching, a cross drain, a water bar or a stone step/riser. To minimise this, the most effective solution is to keep the gradient of the gravel as low as possible and gain height on the stone. Other important factors are good drainage and selecting gravel with good binding and hard-wearing qualities. The future maintenance of gravel sections should ideally include topping up the surface, particularly just below any transition to stone.

4. Downhill Edge of Path

There are many places where the downhill edge has become trampled and has worn badly. The downhill edge often consists of softer ground (soil) and is far more comfortable to walk on than the path itself. Along these trampled sections the outflow of some cross drains and water bars no longer extends far enough to direct water away down the bank but instead feeds water along the trampled downhill edge scouring the ground deeply and exacerbating the problem caused initially by walkers.

5. Drainage features

The existing cross drains and water bars are extremely variable. Many of them need rebuilding and nearly all of them need improving. Often they are not big enough and frequently the stones used in their construction are not of suitable size and shape. The side ditches are again variable and many have completely failed. Notably, the side ditches above the second aluminium bridge nearly all have a stone lined base and downhill edge and most of these have remained intact.

PRIORITISATION OF THE WORK

The prime objective of this upgrade work should be to achieve long term ground stability; the most rapidly deteriorating/unstable sections are considered the priority. This is very much a mountain path hence ease of walking is a secondary priority, however for the work to be successful the path needs to be made a significantly more comfortable and inviting line to follow than the sides. The most unstable sections are often the roughest for the walkers so the upgrade will inherently result in an easier path on these sections. However, there are exceptions to this. For example some sections have a rough surface but are stable, relatively narrow and without severe side trampling and therefore these areas would be a lower priority. Some sections are awkward i.e. the walker must scramble up or down jagged or sloping bedrock. Bedrock is a feature of many mountains, including Ben Nevis and one should expect to be clambering on bedrock if that's the nature of the terrain. However, should the bedrock be causing walkers to stray off onto softer ground then the remedial action needed to prevent this will be a higher priority.

THE TYPE OF PATH TO CONSTRUCT

The path needs to be built to a style typical of upland paths seen elsewhere in the Scottish Highlands, only to a larger scale due to the much higher numbers of people using this path. It is important that materials used in the construction (stone and gravel) are locally won or, at worst, are a very close match of imported stone. The existing path is basically the right sort of path but with obvious improvements needed. The width of the path needs to be about 2 metres – unless containing features (such as crags and steep drops) are effectively keeping it narrower. The first 400 metres up from Achintee (until the path goes out of sight) should not be widened too much as visually a wider path here would impact too much on the view from Achintee. The type of pitching constructed must be with a highly walk-able surface. By inspecting the existing pitched surfaces (see paragraph above) it is clear that “small steps” on steep gradients are not acceptable and neither are “treacherous downward sloping surfaces”. But, if given this remit there is a high risk of making the pitching too “steppy”; which, over a long distance can be detrimental to one's natural gait and make the descent an uncomfortable experience. The 2 metre wide path has an advantage over a narrow path in having enough width to incorporate a wider variety of treading options. For example, by varying tread layout, heights of risers and size of the treads. A lot of the pitched sections are not particularly steep and this makes a comfortable surface easier to construct than pitching up a steep gradient.

MATERIALS FOR CONSTRUCTING THE PATH

Construction Stone

A lot more stone is required than exists in the vicinity of the path. To construct the new sections of stone pitching, plus the new cross drains, water bars and stone revetments, suitable construction stone will need to be bagged up from elsewhere and airlifted to the site. The slopes of Meall an Suidhe have some areas where stone can be bagged up but the pickings are neither as suitable nor abundant as the boulder screes higher up the mountain that supplied stone for the John's Wall to Corner 1 section. However the upper slopes of Ben Nevis have already been “cherry picked” too much and should not be picked over again. Other sources of comparable local granite need to be sought. Although all the stone in the path and the surrounding area is available for re-use, there is not enough, in particular there are not enough larger, angular shaped stones necessary for good construction work. Part of the problem with much of the previous work has been the inadequate stones that were available. The scale of the work needs to be more substantial and of larger proportion than the existing work.

Gravel

Along the first 1200m gravel exists in the ground, although the quality is variable and some used on the path has been more like fine silt than durable gravel. There is relatively easy access for a small excavator along this section and this would help to dig deeper in the ground where the gravel quality is expected to be better. However beyond the first 1200m and up as

far as the Halfway Lochan there is no access for an excavator and the ground adjacent to the path is dominated by bedrock. This section has various ribs of gravel/stony material evident close to the path; these are worth investigating but are anticipated to win only small quantities dug by hand. To excavate by hand and transport the quantities needed for any distance along this section would be very time consuming. Therefore, it is likely to prove cost effective to airlift the gravel onto site from an area where it can be excavated, graded and bagged up ready for airlifting and the gravel-pit site landscaped over once done.

Bedrock on Inside Edge

Bedrock can prevent or restrict effective drainage and the frequently awkward walking surface it presents tends to deflect people onto smoother, softer ground, invariably the outside edge. In truly wild mountain areas there is a reluctance to break bedrock. Freshly broken bedrock can look unsightly for many years and drill lines require extra work to remove. However, on this path leaving the bedrock unbroken would mean importing a lot more material to build over the bedrock. There is evidence of previous drilling and blasting, probably dating from the original path construction (in 1883). In the proposed upgrade importance must be placed on breaking the bedrock in a sensitive manner. The bedrock varies along the length of this section, some is naturally shattered and will break easily, other areas have a more solid, "whaleback" appearance and this is where drilling and blasting techniques are anticipated. The material broken out from the bedrock is expected to consist of shattered shards, unlikely to be of any use in the construction work but will be ideal as base material for deeply gullied sections.

Aluminium Bridges

The two aluminium bridges originally supplied by the local aluminium factory currently both need repairing. It is proposed to replace the lower one with a 450mm or 600mm diameter culvert with stone retaining edges. The higher one spans a deep gully therefore a bridge is considered necessary. A slightly longer bridge is proposed (6 metre span instead of the existing 5 metres) but its design is undecided. The current aluminium bridges have lasted well (about 40 years) but during that time they have needed cracked decking replaced and other repair work. They are not at all aesthetic in this location but as aluminium production has been an important industry to the area it could be argued that the bridges are made of an appropriate "locally made" material.

THE HALFWAY LOCHAN SECTION

This section (620m in length, covered by sheet 47) is on more open ground, much of it quite level and wind-swept. A machine built path was built here about 2005 with further upgrading work by volunteer groups since then. Its main shortcoming from a path maintenance point of view has been where the gravel surface steepens on the climb up to John's Wall and the water bars on this section that rapidly fill up and require clearing out very frequently. It is proposed to re-surface this section and convert all the water bars into cross drains; the existing cross drains along this section require far less maintenance; they have a much larger channel that will accommodate more material hence take longer before they need clearing out; plus the top side of a cross drain effectively holds back the gravel on the uphill side and reduces the gravel gradient slightly. Another solution would be to stone pitch the steepest gravel section; this would create a stable surface but is likely to need more peripheral obstruction work as the sides have no natural containment. The Halfway Lochan area is a lot more exposed to high wind than the path lower down. These prevailing strong winds have caused fine particles of gravel to blow off the path onto the North side, blowing into and stunting the adjacent vegetation. With some side trampling evident the struggling vegetation could get trampled out. Remedial action to obstruct/discourage the side trampling is advised. To re-surface this section gravel can be excavated nearby and transported along the path to save airlifting costs. But suitable stones for converting the water bars into cross drains are not available nearby and will therefore need bagging up and airlifting across.

THE SURVEY SHEETS

The path was surveyed during the Summer/Autumn of 2011. Sheet 1 starts from the Road End at Achintee (NN126729) and the Survey follows the path uphill. The junction with the Youth Hostel Spur path is at 1308m on sheet 16, the higher aluminium bridge is at 2277m on sheet 30, the corner at the end of the long gully is at 2925m on sheet 43 and John's Wall is at 3672m on sheet 47 (NN147724).

Due to the rapidly changing condition of this path the Survey/Specification will soon go out of date and will need revising should there be a period of several years before the proposed work is undertaken.

SITE SAFETY

For most of its length (from the junction with the Youth Hostel Spur up to the open ground approaching the Halfway Lochan) the site presents major safety concerns for both the workers and the people using the path. The main reasons for this are the steep cross-slope that the path is benched into and the non-existence of a safe, temporary by-pass to allow walkers to pass round the worksite. Therefore walkers will have to pass through the worksite. This will mean that the workers must be prepared to stop work when walkers approach and ensure a safe passage through the site at all times. Clear signage will be needed to warn approaching walkers of the work in progress and the potential danger. The steep ground below most of the site necessitates that extreme care must be taken when moving stones to ensure that nothing falls or rolls over the edge.

TIMING OF THE WORK

The most suitable time of year to undertake major works on the lower sections is during the winter months (end of October to the following Easter). This is mainly because the path is significantly less busy at this time of year. While the disadvantages of doing this are the short daylight and predominately wet weather it is unusual for snow and ice to last for long periods on the lower sections. Therefore working (on the first 2 kilometres at least) is perfectly possible. In addition, unless the contractor undertaking the work happens to be locally based, nearby accommodation for itinerant workers is likely to be far more available and affordable during the winter and this would certainly be reflected in the contractors tender. It is expected to take at least 3 winters. The order of which the work is undertaken, for example, whether to upgrade the worst sections first, or work from the top downwards or the bottom upwards will be decided later.

OUTSTANDING ISSUES

There are two key aspects of this proposed upgrade that will need further refinement before any work can commence. These are:

1. Stone and gravel supplies.
2. How to best manage the walkers as they pass through the site.

BEN NEVIS TOURIST TRACK

Section between Achintee and John's Wall Bill of Quantities

Stone Pitched Path

These sections will require a continuous stone surface incorporating a flight of large area, level treads. Use large, locally won, weathered stone with good grip and close fitting, angular qualities. Minimum depth of stone = 300mm. The tread/riser layout must have a variety of treading options to suit a wide range of walking strides and styles.

The path tray will need preparing, ensuring a hard foundation for the pitching stones. The stones must be close fitting and any gaps tightly packed with gravel. The treading areas can be made up of a number of stones but each tread must form a level and comfortable surface

to tread on. There must be no part of the surface where feet can get trapped. The risers must not be sharp edged or overhanging. Use the larger/deeper stones for the risers.

Total length 1268m x 2m wide

Gravel Path

These sections will require de-roughening, levelling and surfacing with a suitable, locally won gravel. Grade the gravel (20mm down) to cover the existing track surface to a depth of 50mm and compact the surface.

Total length 1992m x 2m wide

Fill Gullied Path

This applies to where the path has gullied deeply and needs building up by 300mm to 400mm. The gullied path will need filling with suitable hardcore before surfacing to a depth of 50mm with graded gravel (20mm down).

Total length 153m x 2m wide

Construct New Cross Drain

There may be a cross drain on this site but needs complete or major re-building using better stone. Construct cross drain onto a hard base using suitable, weathered stone. Stones for the cross drain sides should be close fitting with a good treading surface and a ditch face, which is steep but not overhanging. Dimensions of channel through drain should be 350mm to 450mm deep by 350mm to 450mm wide. Stone line the base of the drain onto a hard base with deep close fitting stones, with a through gradient of 5° and ensure that there is no possibility of scouring taking place at the outflow. Install splash plate stones if necessary and ensure that they are effective. It is important that the stonework extends beyond the edge of the track on both sides by a minimum of 300mm, not necessarily with good treading surfaces but to ensure containment of the track and protection of the ditch in years to come. The uphill side of the cross drain must be proportionally higher than the downhill side. The length of the cross drain channel will need to be a minimum of 2.5 metres.

Total 105

Improve Cross Drain

The cross drain already exists but needs improving. The improvements needed to each cross drain will vary but most will need some of the stones replaced with better treads, better fitting stones or larger stones or the drainage channel may need enlarging. They will require at least 50% less work than constructing a new one.

Total 75

Construct Water Bar

Construct water bar using suitable weathered stone. Water bars are designed to shed any water landing on the track during heavy rainfall. They may sometimes require a short outflow ditch but not an inflowing one. Water bar stones should be close fitting with a good treading surface and a shedding face that is steep but not overhanging. They should be set into the track at an angle of between 60° and 40° to the line of the track. The treading surfaces should be flush with each other and flush with the track surface on the downhill side. On the uphill side, lining stones should meet with the base of the shedding face and hence form a lip to deflect water off the track. The lining stones should be close fitting and flush and should form a smooth, step surface to allow water to flow quickly and assist self-cleansing. The surface of the lining stones should be parallel to the track gradient and flush with the track surface on the uphill side. The height of the water bars shedding face should gradually increase from approximately 100mm at the top end to approximately 150mm at the lower end. A water bar should not appear as an interruption in the walking surface. The stonework will need to extend beyond the edge of the track on both sides by a minimum of 300mm. The exact location of water bars is often very important and so is their exact height relative to the track. Unless located at the break of a slope the gradient of the track immediately above and below the

water bar should be equal. If it is not, the water bar is either too high or too low and will need adjusting. The length of each water bar will need to be a minimum of 2.5 metres.

Total 11

Culvert (on Estate Track at start of path)

Use 300mm diameter twin walled pipe 3 metres long. Remove existing collapsed/blocked culvert. Prepare trench, ensuring the pipe will sit snug in the trench with its base flush with the base of the ditch and a minimum fall of 5 degrees. Fill round pipe with graded gravel. Surface over the pipe to a minimum depth of 200mm and compact. Stone face both ends of the pipe using large stones (50 to 150 kg) to ensure that the stonework is solid and will contain the gravel surface. Install a large splash plate at the pipe outflow.

Total 3

Culvert 600mm

This will replace the lower of the two aluminium bridges. Additional work to the standard culvert specification (see above) is required. The bedrock at the base of the watercourse will need preparing in order to sit the pipe snug. The stone facing needs to be 1 metre high on the uphill side, 2 metres high on the downhill side and 2 to 3 metres in length. A very solid construction is essential. The path surface needs to be stone pitched over the culvert. Should suitable stone be available a culvert constructed entirely of stone is another solution.

Total 1

New Ditch

Form Ditch 300mm deep x 400mm wide at base with sides sloping outwards slightly. Dimensions of each ditch must be in proportion to the maximum amount of water flowing through and the shape/angle of the ditch sides will vary according to the type of ground and topography. Shape and landscape each ditch to fit the surroundings. Ensure that water flows along base of ditch and does not puddle.

Total length 650m

Improve Ditch

The ditch already exists but needs improving or enlarging to the dimensions of a new ditch (see above). Total length 763m

Obstruct/Landscape

This is necessary to discourage side trampling. The side paths need to be disguised and made rougher/less inviting to tread/walk on. This requires installing large obstruction boulders and re-using turf to cover areas devoid of vegetation. The landscaped areas must closely resemble the adjacent undamaged ground and must be un-inviting and difficult to walk on.

Area to be obstructed/landscaped = 1173 square metres.

Stone Edge the Ditch/Path Margin

This is necessary along sections where there is no room to have a wider natural margin between the path edge and side ditch. The stonework must form a hard edge to retain both the path surface and support the edge of the ditch.

Total 180 metres

Stone Revet Lower Edge

Use large, weathered stones (average 200kg) Base of stones must be set into hard ground. The revetment must retain the downhill edge of the path. The top of the stonework must be at path height and must retain the surface material. Pack stones and gravel tightly behind each course of stones. Partially hide stonework when landscaping with turf (where available).

Total length 222m

Break bedrock

Break with a rock breaker/jackhammer if possible. The bedrock in some areas may need drilling and splitting with expandable grout. Some bedrock will need breaking in order to lay

pitching or cross drain stones. Areas of broken bedrock that will remain exposed will need to be sculptured to match the adjacent, natural bedrock, leaving no obvious drill lines.
Total area to break 317 square metres (no deeper than 500mm)

Retaining Wall

This is to retain/stabilize the uphill side of the path. Base of stonework must be set into hard ground. Use large, weathered stones. Several courses of stone required. Stonework to be close fitting, cover all joins. Pack stones and gravel tightly behind each course of stones.
Total length 12 metres.



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