Donich Water Hydro Scheme

Detailed Construction Method Statement

Report No: P626 / Detailed Construction Method Statement r6

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Contents

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Definitions

ECoW - Ecological Clerk of Works

LCoW - Landscape Clerk of Works

GWDTE - Groundwater Dependent Terrestrial Ecosystems

Date	Revision	Edit	Comments
October 2015	6	KA	Updated hours of operation
September 2015	5	KA	Update construction timetable & hours of operation
September 2015	4	KA	Updated with LLTNP comments
September 2015	3	KA	Updated with LLTNP comments
September 2015	2	KA	Updated with LLTNP comments & updated landslip protection
August 2015	1	KA	Updated with LLTNP comments
May 2015	0	KA	Original Document

1 Project Overview

1.1 General Information

It is proposed to construct and operate a small-scale hydroelectric scheme on the Donich Water, Lochgoilhead.

The proposed scheme will consist of an intake weir built across the Donich Water. Buried pipelines will be constructed from the intake weirs to a powerhouse that will be located on the right bank of the Donich Water (facing downstream), near Inveronich.

The plant will be run-of-river status (i.e. will not involve storage) and the electricity generated will be exported to the nearby 11kV grid.

The construction of a run-of-river hydroelectric generating scheme comprises the following, but not necessarily sequential, stages:

- Construction of site compounds, lay-down areas and other initial preparatory works;
- Delivery of equipment onto site;
- Initial construction works - Permanent and temporary access tracks, bridges etc.;
- Main construction works - Intake weirs, pipeline, turbine house and tailrace; and
- Reinstatement.

The construction period is expected to last approximately 12-14 months, although much of the main construction works will be achieved in a shorter period of about 9-11 months. In accordance with Condition 2 of the Planning Consent for this project, all activities shall be completed within a 24-month period taken from the start date provided to the National Park.

This is possible by progressing key stages concurrently, which not only achieves cost-effective construction but also minimises disturbance-type environmental impacts and interruptions to activities on the site. However, it is likely that periods of poor weather, such as heavy snowfall or periods of high rainfall, will lead to temporary cessation of some aspects of construction, such as pipe laying and pouring concrete. Heavy rain would also interrupt intake weir construction.

There may be some changes to the method described as the project proceeds and as more knowledge of ground conditions is gained. However, the final detailed design is not expected to differ significantly from that described. In addition, the detailed design and the construction contract will ensure that the mitigation measures identified in this CMS, or measures achieving equivalent performance, are incorporated into the detailed design, construction and operation of the scheme.

This CMS looks at the construction of the access tracks, the pipeline, the intake weirs, the powerhouse and temporary construction areas. It considers how the construction of these may be made with as little disturbance to the environment as possible.

1.2 Construction Elements

Table 1 Summary description of construction elements

Element	Description	Drawing No.
Access	• Via the B839, forestry roads and the unclassified road to Inveronich	• P626 10100
Access Tracks	• An existing track runs from the B839 to Inveronich • Approximately 250m of new permanent forest road will be constructed to the intake • Approximately 300m of new permanent forest road will be constructed to access pipeline • A temporary track will then be constructed along the pipeline route from the intake to the powerhouse	• P626 10103
Pipeline	• HPPE pipe will be used for the low-pressure section near the intakes and GRP pipe will be used for the remainder of the pipeline. The tailrace will be an open concrete channel. • HPPE will have a construction corridor of 18m • GRP will have a construction corridor of 28m	• P626 10109
Construction Areas	• There will be two construction compounds; one at the powerhouse and one at the intake. • There will also be two pipe lay down areas; one near the powerhouse location and one near the intake location	• P626 10108
Quarries	• 3 quarries will be used to provide material to construct the intake and the access tracks and as bedding material for the pipe.	• P626 10106
Stream Crossings	• The pipeline will cross a number of minor ditches and streams using appropriate culverts	• P626 31101 • P626 31201
Intakes	• A “washover” intake of the Alpine type will be used at the intake.	• P626 20101
Powerhouse	• This will be a new structure on the right bank of the Donich Water (facing downstream)	• P626 40101 • P626 40102 • P626 40104
Grid Connection	• This will be via an overhead 11kV line. The connection point is an existing 11kV overhead line north of the powerhouse.	• P626 50100

1.3 Consents

- Planning Permission Ref. – 2013/0120/DET
- CAR Licence No – CAR/L/1112677

1.4 Relevant Regulatory Guidance

The SEPA pollution prevention guidelines that will be followed include:

- PPG 01 "General guide to the prevention of pollution"
- PPG 02 "Above ground oil storage"
- PPG 05 "Works and maintenance in or near water"
- PPG 21 "Pollution incident response planning"
- PPG 22 "Incident response – dealing with spills"

The SEPA best practice guidelines that will be followed include:

- WAT-SG-29 Construction Methods
- WAT-SG-26 Sediment management
- WAT-SG-25 River Crossings

The SNH guidance includes:

- Hydroelectric schemes and the natural heritage
- Constructed tracks in the Scottish Uplands
- Floating Roads on Peat

1.5 Environmental Management Plans

From this assessment the specific areas of concern are:-

- Enforcement of Site –Specific Mitigation (Section 2)
- Pollution Prevention & Control (Section 5)
- Fuel Handling and Storage procedure (Section 6)
- Borrow Pits (Section 13)
- Peat Excavation and Management (Section 14)
- GWDTE (Section 15)
- Restoration (Section 16)
- Monitoring (Section 17)
- Emergency Action Plan (Section 18)

2 Enforcement of Site-Specific Mitigation

2.1 Schedule of Mitigation

Table 2 lists the potential environmental hazards and associated mitigation measures specific to the construction phase only. This table also includes the environmental protection measures that are specific to the Donich Water hydro scheme.

Table 2 Summary of Construction Phase Environmental Protection Measures

Best Construction Practice Environmental Protection Measures		
	Hazard / Risk	**Mitigation**
1	Silt making the water turbid and causing damage to aquatic plants and fish populations	• Install geotextile material below areas of excavation to filter out suspended solids in the water • Install silt traps and service on a daily basis where siltation is likely to be a problem
2	Cement entering the watercourse	• Pour cement used in the construction of project structures in accordance with SEPA pollution prevention guidelines 5 & 6
3	Spilled / leaked vehicle fuel and hydraulic oil entering watercourses, affecting water quality and fish populations	• Store diesel in double skinned, bunded tanks with 110% required capacity away from watercourses • Check construction vehicles leaks and supply spillage contingency kits • Adequately maintain vehicles
4	Oil and fuel contaminating soil	• Keep pollution spill kits on site • Move soils contaminated with fuel or oil to a waste site with appropriate licence to accept such special waste by a Registered Waste Carrier • Correct paperwork will be in place • SEPA will be notified of an incident
5	Chemicals entering the watercourse	• Keep chemicals and oils in a locked bunded steel container • Avoid using polluting substances • Advise workers of importance of avoiding spillage
6	Waste water drainage	• No waste water will be generated during operation of the scheme • Any temporary waste generated during construction for welfare facilities (e.g. portaloos) will be removed by a registered waste carrier to a licenced disposal site
7	Protected mammals such as badgers and otters becoming trapped within open pipe runs	• Adopt a cut and fill strategy such that the length of open pipe run is minimised • Install ramps at frequent intervals within open pipe runs at the end of each working day • Cap the open ends of stored and installed pipes to prevent access to animals
8	Trampling and vehicle damage during the construction phase	• Confine the pipeline corridor to a width of 30m for GRP / 20m for HPPE and restricted at corepath • Use vehicles designed to spread load and excavators with wide tracks • Wherever possible route vehicles to avoid flushes, streams and soaks • Ensure that culverts used are made out of a neutral pH material and are large enough to carry heavy flow • Culvert all burns alongside tracks to avoid erosion of track sides • Take care to avoid disturbing the soil around the streams enabling the groundwater to seep naturally through the peat • Minimise the number of journeys made across unprotected ground • Mark out areas which should not be touched • Advise all staff as to where important habitats are and provide alternative routes to avoid crossing them
9	Changes to drainage regime during construction	• Avoid drains as far as possible but, where necessary dig around the contour rather than downslope • thDo not use drains to transfer large volumes of water laterally • Make culverts from a material with a neutral pH • Ensure that culverts reserve natural drainage continuity • Ensure that culverts do not lead to erosion, scouring or spread of sediment

10	Damage to vegetation and habitat	• Cut turves leaving the vegetation intact and replace as soon as possible • Avoid stacking turves wherever possible. If this is unavoidable, stack at a maximum of two turves thick • Turves will always be stored vegetation side up • Avoid all linear features, for example, pile excavated peat in heaps rather than as a continuous strip-pile • After back filling, spread excess peat thinly over the peat surface • Pile excavated mineral subsoil and return mineral soil • Keep all excavated peat soil separate from mineral soil • Place all excavated mineral soil at bottom of trench • Ensure that turves are irregular in shape and replaced as soon as possible • Return the peat within the trench to as near natural structure as possible • Consolidate mineral soil and peat round pipe to exclude air and avoid water following the pipeline • Restore vegetation cover to as it was before construction
11	Damage/disturbance to fish populations	• Install diversion before 31st October 2015 ensuring adequate silt protection to protect fish populations. Remove diversion during in river period 1st June – 30th September 2016).
Site-Specific Environmental Protection Measures		
	Hazard / Risk	**Mitigation**
12	Disturbance to Birds	• Pre-construction checks should be carried out by the ECoW to ensure there are no breeding birds on site • Toolbox talks to be given to all site personnel • Mark out 'no-go' areas prior to construction works
13	Damage to Archaeological features	• Temporary fencing to be erected around structures (site 3 & site 5) and damage to be kept to a minimum (site 2) and to be reinstated.
14	Loss of Trees	• Clearly identify trees for retention and trees destined for felling, particularly the trees identified in Target Notes of the Habitat Report • At the advice of the ECoW, calculate the Root Protection Areas of any trees in close proximity to the pipeline according to BS 5837-2012 and mark out on the ground using barrier tape or protective fencing if they are to be avoided.
15	Disturbance to Protected Species	• Pre-construction checks for otter, badger, red squirrels and pine marten • Species Protection Plans will be drawn up • ECoW Toolbox Talks to be carried out for Protected Species to be encountered ensuring that all personnel are clear that if any protected species is encountered then work should stop and advice sought from ECoW • Licence sought from SNH to destroy/disturb 2 Red Squirrel dreys .

2.2 Duration, Timing and Phasing of Works Construction Programme

Table 3 Preliminary Donich Water Construction Programme

	2015												2016											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Programme																								
Preconstruction Surveys																								
Clear Trees																								
Civil Works - Access to Intake																								
Civil Works – Install intake diversion																								
Civil Works - Intake																								
Civil Works - Tailrace																								
Civil Works - Powerhouse																								
Civil Works - Pipeline																								
Grid Connection																								
Install & Commission																								

2.3 Hours of Operation and Timing Constraints

Subject to pre-construction surveys, the following ecological timing constraints will apply:

- No in-river works between 31st October and 30th May (diversion in place before 31st October 2015).

Typical hours of operation include:

- Monday – Friday 08:00 – 18:00
- It is likely that the Contractor would like to work an 11-day shift pattern (i.e. working one weekend, off the next). Hours of operation at weekends would also be 08:00-18:00 (no working south of reservoir on weekends)
- Deliveries to the site will be scheduled for Monday – Friday between 08:00 -18:00.

2.4 Ecological Clerk of Works

Nikki Dayton (and her representatives) of Quadrat Scotland Ltd, has been appointed as an Ecological Clerk of Works (ECoW) for the duration of the construction works.

The main roles of the ECoW;

- Pre-construction checks
- Carry out ‘toolbox’ talks for protected species likely to be encountered onsite
- Give advice on micro-siting construction elements
- Give advice on restoration techniques
- Monitor pollution control measures

3 Traffic Management

The construction of the proposed hydroelectric scheme will require the importation of construction materials and heavy plant to the site. Traffic management is required to minimise any conflict between construction vehicles and other road users. Therefore the following measures will be taken:

- All construction personnel and project suppliers will be notified and supplied with a map of approved routes prior to commencement of construction.
- The appropriate signage will be provided at important junction points to alert drivers of the correct route and to warn motorists of construction traffic.
- All contractors will be issued with a code of conduct for HGV and small vehicles that includes the following guidelines:
  - All HGV drivers will be informed of the importance of the use of passing places, to help relieve queuing traffic.
  - All HGV drivers must adhere to the approved route.
  - Avoid grouping of lorries and leave room for smaller vehicles to overtake easily without having to pass more than two lorries at once.
- The emergency/breakdown arrangements will apply:
  - All suppliers will be provided with a site contact prior to commencement of construction in case of a vehicle breakdown. HGVs from distributors are likely to have their own protocol for vehicle breakdown.
  - All personnel on-site will be made aware of key contacts prior to commencement of construction e.g. Contractor, Project Manager and the Forestry Commission.
  - All vehicles will be supplied with the appropriate documentation in the event of a breakdown.
  - All vehicles will be maintained in line with the standard practice to ensure that breakdowns are unlikely.
  - Every effort will be made to deal with the breakdown as quickly as possible, so that there is no further disruption to the road.
- All unloading will take place on site and not on the highway.
- A traffic log will be kept on site by the contractor to record all vehicle traffic to and from the construction site.

4 Public Access

The construction of the scheme will require the closure of a core footpath and a diversion for public access.

- Prior to work on the core footpath, all appropriate signage will be put in place (see P626 10112).
- Prior to the diversion being implemented the vegetation management plan, for the diversion routes shall be executed.
- The construction corridor on the core footpath will be restricted to the varying widths agreed on the track section drawings (P626 10115). The temporary track will not exceed 3.5m in width.
- Upon completion of laying the pipeline, the core footpath will be completely reinstated to a good standard, ensuring adequate drainage measures to prevent scouring of the footpath.

- Upgrading of the bend above Inveronich by improving surface, using stone extracted from the borrow pits and ensuring the width of the track matches the rest of the track (2.5m). If necessary the drainage to the side of the footpath will be improved (cleared and deepened).
- After construction is completed, and the footpath re-opened the diversion signs will be removed, however it is practical to leave signage warning of construction works until the project is complete.

5 Common Working Methods

5.1 Prior to Construction Works

- Site management to contain working areas and access routes, including a walk over with ECoW.
- Land made available demarked by temporary fence at commencement and fence retained until completion or such time as stock may be allowed access whereupon the fence will be removed.
- Prior to the commencement of any works, carry out long section survey of all the watercourses and natural drainage, leaving marking in the temporary fencing where such drainage enters and leaves the construction corridor so that during restoration such natural drainage may be re-instated.
- Prior to commencement of any works, preliminary silt management will be put into place, please refer to drawing P626 r0 10117

5.2 Sediment Control measures

- Carry out works to natural drainage across the site, diverting or directing the watercourses so as to avoid erosion and outwash of disturbed soils.
- Silt traps will be placed at all possible outfalls to prevent silt from flushing across any peat surface
- Control and prevention of silt run off and construction pollution into adjacent water courses by means of cut off drains, silt traps and attenuation ponds, all to be removed and restored at completion.

5.3 Stripping and storing materials

- Careful side stripping of top peat from all areas to be disturbed. Depth of strip to be at least 250mm but to be determined on site depending on ground conditions. Peat and turf to be lifted and stored at the edges of the construction corridor in one operation where possible and retained as intact turfs where feasible.
- Do not mix sub-soil with top-soil or peat.
- Use defined top peat storage areas to avoid mixing of materials and double handling where possible, with top peat stored ‘vegetation or turf side up’ to avoid desiccation.
- Substrate and turves will be stored separately for each habitat, particularly for flush, peat and woodland habitat.
- All material dug from the pipeline trench will be returned in the order of excavation so that all mineral soil dug out from the pipeline trench will be returned to the bottom of the trench.

- When returning excavated materials to the trench, provide an adequate layer of top-soil or peat for replaced turf species to root.

5.4 Turf Management

- Stripped turves should be stored at the edges of the construction corridor 'vegetation or turf side up' with adequate growing conditions e.g. water, light & temperature.
- Generally, turves will be placed 'turf side up' wherever possible. However, where space is restricted within the construction corridor, it may be necessary to stack the turves, up to a maximum of thickness of two turves.
- Turves will always be stored vegetation side up.
- Avoid storing turves on good quality heath/blanket bog
- Turves should be re-used in areas with similar vegetation and hydrology
- Restoration of stripped turves should be replaced consecutive to track formation or backfilling of the pipeline to avoid prolonged storage of stripped materials and allow assimilation of the track to commence as soon as possible.
- The heath/bog turves should be replaced no later than 2-3 weeks after the initial cut. However, if this is not possible and heath/bog vegetated turves are to be stored for longer than 2-3 weeks, they should not be stacked. Providing there are adequate growing conditions, turves can be stored for up to 2 months during March / September (growing season)
- Grassland turves can be stored for a maximum period of 2 months.
- The scheme avoids flushes and Groundwater Dependent Terrestrial Ecosystems (GWDTE) where possible. However where turves will be stripped from GWDTEs, they should be replaced as soon as possible, ideally on the same day (please refer to Section 15).
- The geomorphology of some features, particularly flush and soak-way habitats, must be correctly re-established to ensure that the original hydrology is maintained.
- Turf transfer should not be undertaken in periods of hot and dry conditions or sub-zero conditions to avoid desiccation or frost damage.
- Monitor turves and water during dry spells to ensure that they remain viable and do not desiccate.

5.5 Tree Protection

- All trees destined for felling shall be identified and clearly marked prior to construction.
- As best practice, tree felling should be undertaken outside of critical bird/squirrel breeding periods
- The widths of the felled corridors are sufficient that excavations are not likely to encroach on the Root Protection Areas (RPAs) of any trees on the margins of the corridor.
- However, if it appears that there are trees in close proximity to the pipeline route that will be affected by excavations, then the RPAs should be calculated marked out (in accordance with BS 5837:2012). Advice should then be sought from the ECoW, whether the RPA should be avoided.
- Exclusion zone for retained trees will be protected by orange net-long fencing which will remain in place until the development is complete.

- If for any reason, an exclusion zone around an RPA cannot be accommodated, constructed will adhere to the guidelines of BS 5837:2012 (specifically Section 7 – demolition and construction demolition and construction in proximity to existing trees).
- Do not store excavated materials within 2m of tree trunks.

5.6 Landslip Protection

The previous design of the Donich Water scheme involved construction within the gorge above the Scottish Water reservoir; this was identified as an area of concern for landslips. However the current scheme has been designed to avoid this high risk area and therefore the landslip concern is diminished.

- Use topographic survey and trail pits to identify areas of higher risk of landslips. Undertake engineering assessment. If slope appears to unstable, re-design required.
- Limit construction activity in these identified areas during periods of high rainfall
- Use coir matting or similar to help bind soil together
- Erect temporary fencing below high risk areas as a safety precaution

6 Pollution Prevention and Control

6.1 Sediment Control Measures

6.1.1 Planning

Prior to any form of construction taking place, the existing ground will be surveyed and construction work micro-sited where possible to avoid water features. Prevention and protection features will be pre-planned and installed before the potential pollution is created. Overall construction will be programmed to minimise the area of ground disturbed at any one time. Wherever possible, side slopes and track surfaces will be protected with vegetation and crushed rock before works proceeds.

6.1.2 Prevention

Interceptor ditches will be employed to divert water at source and prevent contamination. If construction levels allow, watercourses passing directly across excavations will be culverted immediately. If a suitably large area of vegetation is unavailable, interceptor ditches will incorporate settlement lagoons to reduce suspended sediments eroded from the channel itself.

6.1.3 Protection

The following methods of preventing silt from entering the watercourse will be employed on site:

- **Drainage ditches** - Drainage ditches will be constructed on one or both sides of all access roads, around the perimeter of the large working areas and at the foot of temporary fill stock piles. These ditches will be carefully landscaped so they are sympathetic to the environmental setting and shall incorporate sediment traps
- **Sediments traps** - i.e. silt fences or straw bales. These serve to slow down the flow of water, allowing suspended solids to settle out for mechanical extraction. This extraction will form part of a regular maintenance scheme. The spacing between traps depends on the longitudinal gradient of the road and on localised groundwater conditions. All silt traps will be checked on a daily basis. Any settled silt will be

disposed of on site, unless it is believed to be contaminated, (e.g. oil, concrete etc.) and then the silt will be disposed of appropriately.

- **Track design** - The camber of tracks leading towards a watercourse will be constructed to prevent the inflow of untreated water from the track running surface. Temporary cross-ditches will be excavated into the track running surface to encourage water into roadside ditches until final surfacing is complete. When it is unavoidable for ditches to enter a watercourses, additional sediment traps and lagoons will be employed to minimise the pollution risk.

- **Settlement lagoons** - The purpose of a lagoon is to slow and even the stop the flow of water so that suspended solids can settle. The lagoon dimensions must be sufficient to allow this settlement to occur under the flow conditions anticipated. A detailed plan of the site drainage arrangements will be produced prior to work commencing detailing proposed lagoon locations and discharges to vegetation. A hydrological catchment study will be undertaken for the site to assist with the design of the site drainage scheme and will assist with the sizing of the lagoons, if required.

- **Vegetation buffer zones** - Surface water collected within the network of drainage ditches will be routed into suitable vegetation buffer zones at frequent intervals along the track. A buffer zone is a large area of vegetated land bordering a watercourse. When surface water passes over this land, it acts as a natural filtering system by trapping silt and sediment. Discharge to a buffer zone is suitable provided the distance between the point of release and the nearest watercourse is large enough, the vegetation is sufficient to slow down the flows and the topography is not excessively steep. In the early stages of construction, the effectiveness of each buffer zone will be closely scrutinised during periods of rainfall. If it becomes apparent that a buffer zone is not performing, the discharge will be stopped and water routed further along the drainage ditch to a different buffer zone.

6.1.4 Monitoring

A monitoring scheme will be undertaken to ensure the effectiveness of water protection measures employed within the site drainage scheme. All new work fronts will be inspected on a daily basis. Checks on completed sections will be weekly or after a rainfall event. Results of each check will be recorded to ensure issues are dealt with quickly. The ECoW will also assist site staff in identifying potential risks. These comments will be incorporated into the monitoring scheme records. The ECoW may also perform regular water quality checks at specific monitoring points throughout the site and will liaise with site staff to minimise pollution.

7 Fuel Handling and Storage Procedure

This procedure sets out the steps to be taken in order to prevent pollution on our construction sites from our most significant potential sources of pollution:

- Fuel and oil storage and use
- Concrete wash waters
- Sediment (silt) run off
- Dust

7.1 General Site Guidelines in relation to Fuels and Oils

To reduce the potential risk of pollution, the following guidelines will be adhered in relation to all items of plant and equipment on site:

7.1.1 General Plant

- To be regularly serviced, in good condition and free from oil and fuel leakages.
- Hydraulic hoses, brake and fuel lines to be checked regularly .
- Static plant (mixers, pumps, etc.) to be securely installed on prepared level areas with access for maintenance and re-fuelling.
- All mobile plant to be equipped with spillage response kits.
- Weekly inspection and reporting of faults.

7.1.2 Fuel Bowsers

- Double skinned, steel mounted on stable chassis with transfer pump, hose and lockable isolation valve on nozzle. Filling and vent caps to be fully scalable.
- Secure towing arrangements with safety chain.
- Set of wheel chocks to be provided.
- Pollution control kit to be mounted on each bowser.

7.1.3 Fuel Cans

- 25 litre steel 'Jerry' cans or 5 litre plastic fuel cans only to be used.
- Cans to be replaced if damaged. Storage to be within a purpose built store, or on covered bunded pallets within the main storage area.
- Petrol cans to be red and marked 'Petroleum Spirit, Highly Inflammable'. Diesel cans to be green and marked 'Diesel Fuel, Inflammable'.

7.2 Authority and Responsibilities

Table 4 Fuel Handling Responsibilities of Personnel

Project Manager	Liaise with SEPA; Obtain necessary consents (if required)
Project Manager / Site Foreman	Monitoring of concrete wash areas and wash water discharge points
Project Manager	Completion of Environmental Risk Assessment
Site Foreman	Responsible for the handling and control of fuel oil

7.3 Records

- Discharge consents — if required
- Environmental Risk Assessment
- Site inspection records

7.4 Fuel Storage and Refuelling

A single operative (i.e. the Site Foreman) will be designated responsible for the handling and control of diesel fuel during each shift. All staff will be trained in the use of the refuelling facilities but no one will be permitted to undertake operations involving the transport or transfer of fuel without the express permission of the Site Foreman. The following conditions will apply:-

- Fuel oil will be transported to site in approved mobile bowsers complying with SEPA PPG. Bowsers will be parked on the level with wheels chocked to prevent movement. Filling and vent caps will be securely fastened prior to movement, to prevent leakage in the event of overturning. To prevent runaway in the event of the failure of a tow hitch, bowsers will only be towed by approved plant with appropriate hitching arrangements

including safety chains. Towing will only take place over designated, well-maintained access routes at an appropriate and safe speed. Reversing will not be undertaken without a Banksman. The Fuel Supervisor will check that the hose valve is closed, filling and air vents are fully sealed and that the bowser is properly hitched with the safety chain in place prior to each journey. The bowser delivery hose valve will be locked at all times when the bowser is unattended.

- Re-fuelling will only be carried out on level ground, away from watercourses or drainage channels. The towing vehicle brakes will be applied and the bowser wheels chocked to prevent movement prior to commencement of transfer. Transfer of fuel oil will be by means of the bowser transfer hose which will be continuously held by an operative during transfer. The operative will watch the tank level to prevent overfilling. An absorbent mat/ plant nappy will be used to catch any drips from the hose nozzle following removal from the tank or bowser and oil absorbent matting will be immediately to hand to mop up inadvertent spillages.

7.5 Re-fuelling of Small Plant

- Petrol containers will be filled offsite. Storage of large volumes of petrol on-site is not permitted.
- Diesel containers may be filled on-site from the mobile fuel bowser providing they are first placed within a refuelling drip tray/ plant nappy.
- Fuel will be poured from approved containers into the plant fuel tank using a suitable funnel. Care will be taken to avoid overfilling. Caps will only be removed from a fuel container when placed securely within the re-fuelling tray and will be replaced securely immediately after re-fuelling. Spillage into a re-fuelling tray will be pumped into a waste oil barrel and the tray dried out with an absorbent wipe. If fuel is spilled onto the base or frame of the plant, it will be dried off using an absorbent wipe before removal from the re-fuelling tray.
- Small plant fuel containers will be stored within designated, bunded and secure areas within the welfare compound.

7.6 Vehicle Servicing

Vehicle servicing will generally be undertaken off site. If on site servicing proves unavoidable, the following procedures will apply:

- Servicing will be carried out by suitably qualified personnel on level ground in a location away from any watercourse or drainage path;
- Prior to commencement, the operative will ensure that a pollution response kit is to hand;
- Where servicing involves the risk of oil or fuel spillage (e.g. filter removal, renewal of hydraulic hoses etc.) a suitable drip tray or absorbent matting will be placed below the potential source of leakage;
- Waste oils will be placed in a bunded secure container for disposal off-site.
- Following servicing, plant will be wiped down thoroughly to remove any contamination by fuel or oil.
- Hydraulic fluid and engine oils will be delivered to site in sealed containers and stored in a secure purpose made container or covered bunded pallets within the main storage area. Where possible containers should be no more than 25 litre capacity to allow lifting by hand.

- Funnels will be used when decanting hydraulic fluid or lubricating oil from containers. Operatives will ensure that they are working from a secure platform to enable them to pour safely from the container without risk of spillage or injury due to falling.
- Used funnels will be placed within a suitable drip tray prior to wiping down.

7.7 Oil

All oil will be stored appropriately as detailed in The Water Environment (Oil Storage) (Scotland) Regulations 2006.

7.7.1 Oil Storage

- The site agent will plan deliveries of oil to the site to minimise the practical volume of oil stored within the site.
- All oil will be stored within permanent fuel tanks which will be clearly identified on the site plan.
- The container that the oil is stored in will be structurally sound and stored within a bund which will have a volume of at least 110% of the storage container. Any fluid pumped out of the bund will be disposed of as waste at a suitably licensed facility.

7.8 Concrete

7.8.1 Storage of cement/concrete

Any cement stored onsite will be stored in appropriate facilities and be protected from the elements.

7.8.2 Transportation and Mixing of concrete

It is likely that most of the concrete will be mixed offsite and then transported to the site. There may be some hand mixing on site for small areas or difficult to reach areas. This activity will be carried out well away from watercourses.

7.8.3 Concrete Wash Water

In most situations a designated impermeable containment area will be established at a suitable place on the site, leak proof skip or similar may be used. This is the only area on site where concrete activities are permitted to wash out, including mixers, barrows and rakes. As far as possible concrete mixing or delivery lorries should return for washout to the batching plant with only chutes being washed out on site.

The volume of wash water used will be kept to a minimum. Concrete wash water will be reused on site wherever possible. For example, for subsequent washing. It will be stored to allow as much wash water to evaporate as is practicable and for the particles to drop out of suspension.

Any excess wash water should be disposed of onto the ground adhering to the following rules:-

- The location of the discharge point:
- Can’t be within, or less than, 50 metres from a riverine or terrestrial SSSI, SAC or within a site designated for nature conservation.
- Must not be within 250m of any spring, well or borehole used for domestic or food production purposes.
- Must not be within 50m of any other borehole.
- Must be at least 10m from any watercourse (including drains, ditches, etc.).

- Concrete wash water must not be discharged onto bare rock surfaces or where the effluent will drain rapidly into natural features such as fissures or sink holes.
- Concrete wash water must be clear of any suspended particles before and during discharge.
- An environmental risk assessment for dealing with the control and disposal of concrete wash water must be carried out on each site.

7.9 Spillage Protocol

In the event of a spillage of any polluting substance and/or the pollution of the water environment, the contractor must notify the Project Manager and SEPA (please refer to Section 16 – Emergency Action Plan). In the event of a spill the contents will be removed by a specialist contractor to a suitable disposal site.

7.10 Dust Suppression

The scheme is in a region with one of the highest rainfalls in the Country. However, if required dust suppression will be undertaken with sprayed water which will be pumped from a suitable local supply (Burn) complying with the CAR General Binding Rules.

7.11 Waste Disposal

No permanent waste water from the Powerhouse is required. Any temporary waste generated from the site construction (e.g. Portaloos) will be removed by a registered waste carrier to a licenced disposal site.

8 Pipeline

8.1 Description of Works

Approximately 2km of buried pipeline will be installed between the intakes and the powerhouse. The pipeline will be made of 1275m of High Performance Polyethylene (HPPE) and 725m Glass Reinforced Plastic (GRP). This reflects the fact that the pressure increases as the pipe drops down the hill making it necessary to use GRP for the high pressure section.

8.2 Method of Construction

A pipeline trench will be dug in order to bury the pipeline and the stripping and storing of materials will conform to the method outlined in Section 5. All the pipes will be delivered to the pipe storage areas as marked on Drawing. P626 10108. The pipe-laying contractor will be responsible for moving the pipes from this area to the pipeline route and for laying out the pipe ready for jointing / fusion welding. It is expected that the pipe can be moved from the delivery point to appropriate points along the pipe route with a tractor and trailer or similar.

8.3 Sequence of Operations for HPPE Pipeline

1 Mark out exact route of the pipeline (with ECoW)
2 Prepare existing ground (Move rocks and tree roots as necessary)
3 Remove turf and topsoil/peat
4 Level subsoil to form bench (with appropriate drainage)
5 Bring in pipe sections and weld together
6 Lay pipe and cover, including restoring turf
7 Continue in sections until all HPPE pipe is laid
8 Restore landscape, following guidance from landscape restoration plan (still to be advised).

8.4 Sequence of Operations for GRP Pipeline

1 Mark out exact pipe route, avoiding deep peat and rocky areas (with ECoW)
2 Prepare existing ground (move loose rocks)
3 Create temporary, protective drainage ditches
4 Remove turf and topsoil/peat
5 Lay track base material (this is important that GRP pipe is laid on a prepared bed of graded material)
6 Lay pipe and cover
7 Restore peat and turf
8 Fill in temporary drainage ditches
9 Restore landscape, following guidance from landscape restoration plan (still to be advised)

8.5 Pipeline Corridors

The pipeline corridors will stick to within the consented limits. The construction corridor is restricted along the core path and the temporary access at this point shall not exceed 3.5m (please refer to Drawing P626 10115 r3 for details)

8.6 Air Release Valves

Chambers are required to house the air release valves. These will consist of a flanged tee section of pipe to allow the connection of the air valve, and a simple chamber, constructed using pre-cast concrete rings with a pre-cast concrete lid providing manhole access and ventilation. While small in size (400mm high), these may be disguised by the careful placement of rocks during the reinstatement of the pipeline route, with reference to recommendations from the landscape restoration plan (still to be advised).

8.7 Pipe cover

The depth of the pipe trench will be dependent on the size of the pipe being installed. Generally, for pipes equal to or less than 1000mm in diameter, the minimum depth of the pipeline cover should be equal to the diameter of the pipe. For pipelines with a diameter greater than 1000mm, the depth of the pipeline cover should be a minimum of 1.5 times the pipeline diameter.

8.8 Pipeline within riparian buffer

The pipe is positioned according to the hydraulics of the scheme and the pipe level must not exceed the intake crest level. Moreover, a minimum gradient is required on the pipe in order for the scheme to perform correctly. The preference is to take the pipe away from the burn as quickly as possible, not only to minimise in-river working, but also to protect the pipe from the river during flood events. The limitation to this is that the ground level can rise significantly as the bank moves away from the river, requiring deeper and deeper excavation in order to keep the pipe at the correct level. Hence, there may be sections where the pipeline will encroach on the 10m riparian buffer to the watercourse. The pollution control measures outlined in Section 7.6.1 (below) are generally employed as best practice construction measures throughout pipeline installation. However, it will be particularly important to enforce these measures when working within the riparian buffer zone.

8.8.1 Pollution Control for Pipeline Works

The following mitigation measures are employed as best practice, and will be monitored by the ECoW during site visits:

- SEPA Guidelines on pollution control should be followed.
- Work in dry areas by diverting/pumping the water body around the working area or alternatively by forming temporary culverts through the working area, after obtaining agreement from SEPA.
- Intercept surface run-off from undisturbed areas surrounding a site (e.g. by using cut-off trenches) and divert this around the works.
- The period of time that the stockpiles and ground are exposed will be kept to a minimum where possible and ideally the pipeline will be reinstated as soon as possible.
- Install silt traps at the toe of a slope where pipeline excavation or road construction crosses existing drainage. This will reduce silt transportation and to filter out suspended solids in the water caused by excavation works.
- Excavated materials will be kept well away from watercourses
- Excavated rock, mineral soil and peat should be kept separate
- Where pipe trenches are excavated in close proximity to the burn, storage of the materials can be on the topside on the trench, to prevent and excavated material falling into the watercourse.
- No plant or wheel washing will be carried out within 10m of the burn but at designated areas of hard standing.
- Fuel will be stored in steel bunded tanks away from any watercourse at designated construction compounds
- Pollution spill kits will be on site and any soils contaminated with fuel or oil will be removed to a suitable landfill site. All site staff will be trained in the use of spill kits.
- Chemicals and oils to be kept in a locked steel container away from any watercourse at designated construction compounds.
- Settlement ponds can be created as a control measure at the outfall of track culverts to allow suspended sediments to settle before entering a watercourse.
- Temporary, erosion proof, outfalls should be utilised where necessary.
- Ensure that developers, Contractors and others involved in earthworks which could pollute the water environment are aware of their statutory responsibly not to cause water pollution or damage habitats. All such persons should be aware, and should make their employees aware, of the likely causes and consequences of environmental pollution and should be familiar with any control measures and emergency procedures to be deployed.

8.9 Mitigation

- Install ramps in open pipe trenches to prevent otter and other mammals from being trapped in the trenches.
- Cap open pipes at end of each working day to prevent otter and other mammals from being trapped in the pipes.

9 Access Tracks

Reference is made to the booklet "*Constructed tracks in the Scottish Uplands*," published by SNH on which this method statement is based.

Access tracks to the Powerhouse and Intakes are required for the following reasons:

- Transport of plant, machinery and materials during construction.
- Construction of the pipeline.

- Permanent access to the powerhouse to allow HGV vehicles to service turbine and permanent access to Intake for maintenance.

9.1 Track Specifications

9.1.1 Access to Intake

A new permanent road will extend from the existing forest road to access the intake. The road will be constructed to meet the requirements of the FCS and will be filled with a stone surface. Intercepting ditches and cut off drains will be established on the topside of the tracks.

9.1.2 Temporary Construction Tracks

Temporary tracks will be constructed to allow excavator access to the pipeline. A temporary track will run adjacent from the intake to the existing footpath (which links to the Cowal Way), another temporary track will be constructed adjacent to this footpath up the the existing forestry track which will aid access for machinery. Also a temporary track will be constructed along the core footpath to allow the installation of the pipeline down to the powerhouse. The temporary tracks will consist of a simple stone course, which will be laid on the ground without any excavation and this will provide tracking for excavators and once construction is completed, these tracks will be completely reinstated.

9.2 Method of Track Construction

9.2.1 Normal Track Excavation

Track construction will involve the normal procedure of stripping top peats and topsoil until solid substrate in unearthed and stockpiling in linear strips at the edge of the corridor (please refer to Section 4).

Best practice guidelines and the Landscape Restoration Plan (still to be advised) will be followed for the restoration of the margins of the access tracks and extending over the disturbed area of the pipeline. The general principles will apply:

- In most cases and where cross slope is not steep, the corridor width will be kept to the minimum. Where tracks are to be cut into steep cross slopes or widening at corners is required, consideration will be given to widening the construction corridor to avoid side slopes that are too steep to allow soiling and re-establishment of vegetation and to allow integration of slopes into the adjoining landform.
- For the permanent track, restoration of the edges will be carried out progressively as part of the construction; this will consist of ensuring that excavated mineral soil is buried on top of mineral soil and covered over with vegetative/organic soil and covered with turf. The bulk of the restoration of verges and cuts should be undertaken consecutive to the initial track formation to avoid prolonged storage of stripped materials and allow assimilation of the track to commence as soon as possible.
- Temporary tracks will be removed by breaking up the hard core of the track to relieve compaction and replacing any excavated topsoil and turves stockpiled adjacent to the track and pipeline. Temporary culverts will be removed and intercepting ditches will be filled in to restore the natural ground profile and maintain the original ground hydrology.
- Where scree is exposed on the topside of the track, every effort will be made to retain soil and top peat on the slope, including benching the exposed sub grade, over excavating to allow slope gradients to be reduced.

- Where rock is exposed, every effort is to be made to break up the profile; to round off the top edge; to create ledges and gullies where soil can be placed.
- Monitoring and management over a three-year post construction period to ensure establishment takes place with remedial work carried out if required.

9.3 Sequence of Operations – Track Construction

1. Mark out track routes and corridor widths (with ECoW)
2. Set up pollution prevention measures and drainage solutions
3. Strip off turves and carefully place to the side (within the construction corridor)
4. Excavate track and fill with crushed locally sourced rock (from borrow pits)
5. Verge reinstatement (on permanent tracks)
6. Construction complete
7. Remove temporary tracks completely
8. Reduce width of tracks to intakes to 2.5m and reinstate using a central strip of vegetation
9. Carry out any remedial landscape works as advised by the landscape restoration guide and the ECoW

10 Intakes

10.1 Description of Works

The weirs will consist of a low concrete structure built across the rivers as shown in Drawing No. P626 20101. From the right bank, the intake will form part of the weir and will be fitted with an Alpine wash-over type screen. Water will pass through the screen and will be collected in a stilling chamber on the left bank of the watercourse prior to entering the pipeline. The remainder of the weir will be a concrete wall running into the left bank.

10.2 Method of Construction

The base rock will be exposed and prepared for the foundation slab on which the weir structure is to be built. This preparation will include the removal of any loose material and some rock excavation may be required. This will be achieved by use of an excavator and rock hammer and smaller hand held tools. The base rock will be drilled to allow the slab to be keyed into the rock surface using rock anchors.

Construction of the intake weir should be carried out during a period of low to moderate flow between 1st June and 30th September and will require the temporary diversion of water. This will involve the construction of a temporary cofferdam across one half of the riverbed using sand bags or material available on site. Part of the weir is built downstream of the cofferdam. The temporary cofferdam is then moved over to the other half of the river. The river then passes through the scour valve that is capable of passing a flow equivalent to Q_{20} and cast into the first half of the weir while the remaining part of the weir is built. This work may last for about three to four weeks.

Concrete will be placed by direct placement, the first pour being for the base slab. The weir wall and the intake part of the structure will then be placed in two lifts to simplify the shuttering requirements.

10.3 Fishery Protection

No in-stream construction works shall take place after 31st October or before 1st June. The river diversion will be fully operational before 31st October 2015 ensuring a dry working area for building the intake during the winter of 2015/2016.

10.4 Pollution Control for In-River Works

During the intake works the following pollution risks have been identified while redirecting the watercourse:

- Water level rising and overflowing so construction area is inundated.
- Excess silt being washed into the watercourse.
- Oil and fuel entering the watercourse.
- Chemicals entering the watercourse.

At all the stages of construction, the contractor will be contractually bound to follow the relevant pollution prevention guidelines which will include the following mitigation measures:

- SEPA Guidelines on pollution control should be followed.
- Where possible, prior to construction a diversion will be created upstream of the works to channel the water around the working area to prevent it becoming contaminated.
- Where it is not possible to divert the watercourse, the water will be channelled into large diameter pipes and taken directly through the works.
- Geotextile and/or straw bales should be installed in the watercourse before excavation begins.
- The geotextile and straw bales should be replaced before they become ineffective and a supply of these should always be kept on site.
- Excavated material should be kept well away from the watercourse.
- Excavated rock, mineral soil and peat should be kept in separate heaps.
- Pouring of concrete should not take place when heavy rain is imminent.
- Cementous material will not be placed into water.
- Fuel will be stored in steel bunded tanks away from any watercourse
- Chemicals and oils to be kept in a locked steel container.
- Any static water should be pumped onto the surface not less than 10m away from the watercourse. The pumping of water will prevent stop any suspended solids from entering the watercourse.
- Pollution spill kits will be on site and any soils contaminated with fuel or oil will be removed to a suitable landfill site.
- Straw bales/silt nets shall remain in the water until it runs clean, then the coffer dam can be removed.
- All operatives made aware of the need to prevent the watercourse from being contaminated.
- Regular monitoring of water quality downstream of these should be carried out.

10.5 Sequence of Operations for Intake Construction

1. Arrive on site and receive site induction.
2. Create appropriate signage.
3. Take receipt of relevant drawings.
4. Carry out a site survey.
5. Mark out “no go” zones (with input from ECoW/LCoW).
6. Make temporary water diversion to allow work to continue at the site of the intake structure.
7. Remove overburden to base rock using an excavator.
8. Keep excavated material away from edge of watercourse in separate heaps.

9. Excavate rock to formation level using an excavator and hydraulic rock hammer.
10. Drill base rock and fix steel dowels.
11. Blind formation with concrete.
12. Install steel reinforcement.
13. Install valves and fittings.
14. Construct formwork.
15. Compact concrete using a vibrating poker.
16. Strike formwork once the concrete has been cured.
17. Dress surface of first layer of concrete using a scabbler.
18. Place second lift of concrete and compact.
19. Fix fixtures and fittings.
20. Install Fish Screen.
21. Remove pollution control methods.
22. Tidy site on conclusion.

10.6 Landscaping

The ground will be graded to screen the wing walls of the intake structure where possible, by using riprap or rock boulders and surplus excavated spoil and turf and following any recommendations from the landscape restoration plan (still to be advised) and ECoW .

11 Powerhouse

11.1 Description of Works

Powerhouse construction (see Drawings.P626 40101 & 40102), will include the construction of a substantial concrete sub-structure capable of withstanding the thrust of the entire pipe line; the superstructure including a gantry crane, pigging chamber, tailrace and the connection of the pipeline to the main inlet valve and turbine will be an integral part of this.

The powerhouse will house a turbine, a synchronous generator and control equipment; it will be constructed as a portal frame structure on a reinforced concrete floor with timber-clad walls and a green onduline roof, in keeping with the surrounding buildings. All power generating equipment will be acoustically enclosed to attenuate noise in accordance with condition 13 of the planning consent.

11.2 Special Requirements

Due to the proximity of the powerhouse and tailrace to the Scottish Water (SW) building and underground water mains and cable there are some special requirements for construction;

- Before commencing work or moving heavy plant material, Scottish Water shall be contacted to confirm all underground plant within the site.
- One week's notice will be given for any work that may endanger the SW plant, so that it can be clearly marked on site
- A fence will be erected to exclude mechanical excavation from within 1.5m of the SW plant unless special instruction has been given by SW to allow machinery in this area
- Once water main is exposed, it will be treated with the upmost care to prevent damage. Only short lengths should be exposed at any time
- Any damage to the water main (even slight) should be reported to SW immediately and work suspended until an assessment of the extent of damage/repair is carried out.

- For permanent road crossings the minimum cover over the top of the pipe barrel to finished road level shall be 900mm
- Where apparatus or other services are to be laid alongside a water main, a minimum separating distance of 600mm shall be observed.
- Before any landscaping is carried out near any mains, approval will be sought from SW.
- No building (temporary or permanent), stationary plant, equipment, scaffolding, construction materials or excavated materials shall be placed on top of a water pipe or sewer.
- Care must be taken to avoid covering or filling stopcock, valve and other SW chambers. Any alterations of the level of any such chambers must be made in conjunction with the Water, Drainage and Wastewater Engineer.
- Construction methods involving vibration should be controlled to prevent damage to water or sewer pipes.

11.3 Method of Construction

After the powerhouse position has been surveyed and laid out, careful consideration should be given to using the excavated spoil in the most effective manner. It is expected that the excavation of the powerhouse will provide a large amount of rock and some turf. The broken rock will be used for access road construction and the turf may be used in the restoration of the pipeline.

11.4 Pollution Control

At all the stages of powerhouse construction, the contractor will be contractually bound to follow the relevant pollution prevention guidelines which will include the following mitigation measures:

- Regular monitoring of water downstream of the works should be carried out
- Excavated material should be kept well away from the watercourse
- Excavated rock, mineral soil and peat should be kept separate
- Pouring of concrete should not take place when heavy rain is imminent
- Any static water should be pumped onto the surface not less than 10m away from the watercourse
- SEPA Guidelines on pollution control should be followed.

11.5 Sequence of Operations for Powerhouse Construction

1. Give notice to Scottish Water that works due to commence (Minimum of 1 week)
2. Arrive on site and receive site induction.
3. Create appropriate signage.
4. Take receipt of relevant drawings.
5. Carry out a site survey and mark out “no go” zones (with advice from ECoW).
6. Removal and storage of vegetation and topsoil.
7. Remove over burden to base rock using an excavator.
8. Move excavated material to contractor’s compound.
9. Excavate rock to formation level.
10. Drill rock head and fix steel dowels.
11. Blind formation with concrete.

12. Install steel reinforcement.
13. Install Earth network.
14. Construct formwork.
15. Place concrete.
16. Compact concrete using a vibrating poker.
17. Strike formwork once the concrete has been cured.
18. Where a second lift of concrete is required, place second lift of concrete and compact.
19. Take structure up to foundation level (ready for the Steel Erector sub-contractor, if appropriate).
20. Build superstructure.
21. Carry out ground works including reinstating and landscaping around powerhouse.
22. Remove anti-pollution method.
23. Tidy site on conclusion.

11.6 Landscaping

The ground around the powerhouse will be landscaped in such a way to ensure it is blended into the surrounding landscape. The detailed landscape restoration plan (still to be advised) will give specific restoration techniques.

11.7 Tailrace

11.7.1 Description of Works

The flow from the turbine will discharge into a tailrace pit, which will return the water directly to the Donich Water. Attention will be given to the design so that water velocities do not lead to any scouring of the stream bank or act as an attractant flow for fish. This could include widening and deepening the outfall of the tailrace structure to decelerate flow velocities.

Provision has been made for the exclusion of mammals and any migrating fish and screens will be fitted to attenuate noise from the tailrace in order to comply with Condition 13 of the Planning Consent. Particular attention will be given to the visual appearance, i.e. by minimising exposed concrete where possible.

11.7.2 Method of Construction

The tailrace is a relatively simple structure in comparison to the intake and powerhouse, the construction will be carried out during the in-river working period, although apart from breaking out of the bank there will be no in river works. The site will be excavated to a suitable depth and then the base slab will be laid, the pipe will then be placed and secured, the wing walls will be completed. Scour protection will then be put in place and the site will be reinstated as per the landscape restoration plan (to be advised).

The construction of the tailrace will require the closure of access to the east of the residential properties/deer larder. It is expected the access will be closed for 4 weeks. Disruption will be kept to a minimum during this time by keeping a narrow working corridor and the works being completed as quickly as possible (See Drawing P626 10114 r0).

11.7.3 Tailrace Construction Sequence

1. Breaking out works for the tailrace will be completed between 1st June and 30th September 2016.
2. Give notice to Scottish Water that works due to commence (1 Week minimum)

3. Liaise with residents, giving plenty of notice before closing the driveway, erect diversion signage to advise residents construction is taking place.
4. Construction will adhere to the guidelines for in-river works (Section 9.4)
5. Excavation of the tailrace area down to bedrock or solid ground – some bedrock may need to be removed to gain sufficient depth. Existing bed material to be placed to one side for reinstatement
6. The floor slab will then be cast in concrete
7. Once cured the main outfall structure will be shuttered and cast with reinforced concrete, around the pipe from the turbine
8. Wing walls will be completed, tied into the banks
9. River bed reinstated to original level
10. Bank and bed scour protection (gabions and/or boulders in concrete) will be completed
11. Outfall screens fitted.
12. Driveway reinstated and re-opened to residents.

11.8 Transformer compound

The transformer and associated switchgear will be accommodated adjacently as shown in Drawing No. P626 40101. The compound will have a concrete base with bund walls and will be fenced off.

11.9 Grid Connection

Please refer to P626 50100 for the grid connection arrangement. The scheme will connect to the National Grid via an overhead 11kV line.

12 Construction Areas

12.1 Locations of Construction Compounds

Construction Areas will generally be located on existing areas of hard standing or naturally flat terrain. Four construction areas are shown on Drawing No. P626 10108.

- CA 1 – At the Powerhouse
- CA 2 – At Intake 1

There will also be two pipe-storage areas; one adjacent to powerhouse (PL1) and one near the intake (PL2)

12.2 Construction Site Facilities

- Construction huts are likely to be located at CA1
- Construction materials and vehicle equipment will be stored at CA1 and CA2.
- Construction workers will probably carpool. However there is an ample areas within the forestry road network that can be used for parking of small vehicles.

12.3 Pollution Control at Construction Areas

This type of construction involves limited use of hazardous substances; however, activities associated with the transfer or storage of fuel and lubricants have the potential to cause pollution by contamination of the sub soil and by transfer directly into the watercourse.

Please refer to Section 5 – *Fuel Handling and Storage Procedure*, however for clarification, the following mitigation measures should be put in place to ensure that this cannot happen:

- The compound should be sited on a level area.
- The compound should not be directly adjacent to the watercourse.
- Refuelling and the storage oils and other hazardous substances will take place at the Construction Areas. These sites adhere to the Best Practice guidance of a minimum 10m buffer from the nearest watercourse.
- There should be no artificial drainage associated with the compound that could lead to accidental spillage (if any) reaching the watercourse.
- All used oil and filters should be removed from the site immediately.
- Any hazardous substances should be kept in a locked container, away from any watercourse.
- Fuel will be stored in steel bunded tanks away from any watercourse
- In the event of contamination of any part of the compound, the area should be immediately excavated, stored on a chemical resistant material and disposed of by an approved contractor. SEPA should be notified to this.
- All staff should be made aware of their responsibility to protect the environment.
- A copy of SEPA's Pollution Prevention Guidelines – PPG 2, 5, 21 and 26 should be kept on site.
- On completion of construction, the hard standing area will be reduced in size by covering over, reusing firstly the subsoil and then the organic material as advised in the Landscape Restoration Plan (still to be advised).

13 Water Crossings and Drainage

This section sets out in detail the procedure for in-river works and draws upon both previous site experience and SEPA's *Good Practice Guide for River Crossings*.

As the pipeline/track traverses the hillside, it is required to cross a number of small streams and ditches. Intercepting ditches and cut off drains will be re-established on the topside of the track; this will not serve to transfer water horizontally for long distances or to concentrate run off where it did not exist before. Where a topside drain or cut through a bank on the top side of the track is made, the peat and turf should be re-used within a few hours to cover over the change in land form.

The type of water crossing employed is dependent on the size of the watercourse, width of the channel and the depth of the river banks. The proposed type and locations of watercourse crossings are subject to detailed topographic survey.

13.1 Track Culverts

Where the burns are less than 2m in width, twin-walled plastic culvert pipes are preferred. Culverts will be placed to preserve the continuity of the existing drainage; they should be placed at locations where streams or natural drainage channels cross the track route. They should also be located at regular intervals between these points (Table 5).

The existing normal watercourse channel width will be maintained and if multiple barrels are required, channel width will be maintained across all barrels.

Culverts will be placed in deep enough and at an angle so as to avoid scouring at the outfall. The exit points of culverts should not be onto peaty soils in order to avoid scouring and peat erosion. Where possible, the culvert will be laid below bed level to attempt to retain material

and replicate a natural bed. The calculated culvert capacity will take this into account, in addition to flow and flood levels (Please refer to Drawing No. P101 60010).

Table 5 Recommended Spacing for Ditch Relief Culverts

Ditch Gradient	Culvert Spacing	
%	Normal Conditions Ground Cross Slope <15%	Very Wet or Steep Conditions Ground Cross Slope >15%
<4	200	100
5	160	80
6	130	65
7	115	55
8	100	45
9	90	40
10	80	35
11	70	30
12	65	25

13.2 Pollution control

During the in-river works for water crossings, the following pollution risks have been identified while redirecting the watercourse:

- Water level rising and overflowing so construction area is inundated.
- Excess silt being washed into the watercourse.
- Oil and fuel entering the watercourse.
- Chemicals entering the watercourse.

At all the stages of culvert construction, the contractor will be contractually bound to follow the relevant pollution prevention guidelines which will include the following mitigation measures:

- SEPA Guidelines on pollution control should be followed.
- Track culverts will be made of inert materials.
- If concrete is required, please refer to Section 9.4 Pollution Control for In-River Works.
- Sediment traps should be installed on watercourses downstream of the works and regular monitoring of the watercourses should be carried out.
- Excavated material should be kept well away from watercourses.
- Excavated rock, mineral soil and peat should be kept separate.
- Any static water should be pumped onto the surface not less than 10m away from the watercourse.

13.3 Track Culvert Construction Sequence

1. Install silt traps downstream of construction area.
2. Place closed pipe culvert barrels of suitable dimensions in the burn.
3. Construct a stone riprap or a concrete headwall at the inlet and outlets for scour protection. Depending on whether concrete is required, it may not be necessary to divert the watercourse as the flow will be directed straight through the construction area via the culvert.
4. The culvert pipe is mounded over with earth or a rock-free compacted fill.

5. A surface fill can be laid on the top so that the crossing is suitable for construction vehicles.

14 Quarries

There is a requirement for some material both for back filling the pipeline trench and the creation and upgrading of access tracks. This will primarily be sourced from an existing quarries identified in Drawing No. P626 10106. Material can also be won from small mounds along the pipeline or access track excavation route.

14.1 Pollution Control

- Artificial drainage may be necessary and geotextile and/or straw bales should be installed in such channels before excavation begins.
- Regular monitoring of water quality downstream of these channels should be carried out before they join a watercourse.
- The geotextile and straw bales should be replaced before they become ineffective and a supply of these should always be kept on site.
- Any static water should be pumped onto the surface not less than 10m away from the watercourse.

14.2 Drainage

The key issues for consideration for the management of surface water at borrow pits are;

- Surface run-off from access road.
- Water entering the works.
- Water exiting the works.
- Run-off from stockpiled material.
- Run-off from extracted material.

A cut-off ditch may be formed at the top of the working edge, behind the bund (formed by the stripped top soil/peat), to catch surface water run-off from the hillside. The ditch will discharge onto open vegetation some distance outside the borrow pit. Should it be required, following on site monitoring silt fences may be installed if cut off ditch runoff is discoloured.

Water accumulating within the working area will be channelled towards the settlement ponds to be located outside the borrow pit. These will be sized in accordance with best practice and additional settlement ponds can be installed should this be required. This will be assessed and reviewed once the borrow pit has commenced. Discharge from the settlement ponds will percolate through the existing vegetation.

The borrow pit area will be monitored daily and in particular during and immediately after periods of wet weather. Excessive silty material that may build-up in the base of the borrow pit will be scraped off and deposited to a storage area until suitable for use.

14.3 Sequence of Operations for Quarry Extraction

1. Mark out extent of proposed quarry.
2. Ensure buffer strip of not less than 10m between the extent of this and any watercourse.

3. Construct initial cut-off areas around the perimeter of the proposed quarry and stockpile areas. As this will be clean runoff, it is not intended that the cut-off ditch will be subject to any particular treatment, but will be allowed to filter into the natural vegetation prior to entering any watercourses (see Section 13.3).
4. Stripping and storing of topsoil, peat and unsuitable overburden material. The work area will be levelled, if possible, to create a safe working area.
5. Formation of access into quarry.
6. Clear area sufficient to install screen and allow for area for graded material.
7. Standard earth moving equipment will be employed to excavate the gravel and load onto dumpers for use on the site. This will be a straight forward excavate and load operation. The quarry floor will be graded such that any water accumulation will flow towards the settlement pond. This will allow plant to work in the dry.
8. Extraction and processing of material; Where large boulders are encountered within the gravel these may be set aside, or screened and processed, depending on the suitability of the rock. The crusher and loading plant will be located within the borrow pit to minimize the effects of noise.
9. When all material is used up cover over using previous heaps of vegetative and organic material.
10. Reinstatement should seek to blend in with the surrounding environment, the surface being compacted to make it stable but sufficiently rough to promote re-establishment of flora. The end result should be that the reinstated area does not look out of context when compared with the surrounding landscape. Guidance shall be sought from the landscape restoration plan for the final result (still to be advised).

14.4 Material Storage

In the quarry there will be an area allocated for topsoil, overburden material and excavated/blasted material. It is anticipated that the topsoil will be stored as in a bund around the top side of the borrow pit. It is anticipated that the material will be excavated to suit site requirements and that there will not be a requirement for large stockpile areas.

14.5 Drill and Blast Operations

If hard rock is encountered, drill and blast excavation methods will need to be adopted. Blasts will be designed in accordance with Quarries (Explosives) Regulations 1988.

14.5.1 Preparation

1 Inspect excavation area for any geological features and site constraints that may affect blasting.
2 Assess and establish blast size and sequence.
3 Maintain safe access on and off rock head by levelling working area.
4 All blasting will take place between 14:00 and 16:00 where practicable.

14.5.2 Drilling

1 Check rock surface and face for overhang and loose rock.
2 Set out hole pattern and depth of drill holes on top of rock.
3 Set rig over proposed hole positions and designed inclination with tracks safely away and perpendicular to the face where applicable.
4 Drill to appropriate depth. Ear defenders, goggles and a dust mask to be worn.
5 Check depth of holes and temporarily cap off.

6 Additional holes to be drilled to accommodate surplus explosive if required.

14.5.3 Blast Design

1 Check inclination of holes and confirm burden to front face.
2 Survey positions of drill holes and record on blast report.
3 Estimate potential of fly rock.
4 Design blast to follow Quarries (Explosives) Regulations 1988.
5 Design blast to minimise environmental effects.

14.5.4 Explosives Delivery

- Explosives to be delivered to site on immediate use basis only.
- All explosives to be used on day.

14.5.5 Charging of Drill Holes

1 Re-check depth of holes
2 Place explosives and detonators as per blast design and check charged depth.
3 Fill remainder of holes and stemming material.
4 Check quantity of explosives and primers against blast design and make area safe for firing.

14.5.6 Blasting

1. All blasting to be controlled by competent personnel.
2. Short (20 second) soundings of a siren will be used to warn personnel and others in the area that blasting is about to commence.
3. Whilst blasting is in progress, sentries will be in posted on all access roads leading to the blast area.
4. Prior to the commencement of blasting, the daily sign-in register will be inspected so that the whereabouts of all personnel is known.
5. The shot firer will visually inspect the danger area and encourage any animals to leave.
6. The siren will sound continuously whilst blasting is carried out.
7. Once complete, the shot firer will check for misfires and clear if required.
8. The shot firer will indicate that the area is safe by giving a 10 second sounding of the siren.

14.6 Public Protection Measures

- The neighbouring properties will be given as much notice as possible of blasting days. A member of the site team will be appointed to be responsible for liaising with the owners of the neighbouring properties. They will be issued with letters advising them of the proposed blasts and invited to visit site to witness the blasting operations, if necessary.
- Signage and sentries will be used to cordon off the area within the 500m blast radius. Sentries will be present throughout firing.

14.7 Quarry Re-instatement

Guidance will be sought from the landscape restoration plan but the following general principles will include:

- Where it is possible the front wall should be preserved and access made from the side or the back.
- Vegetative peat and topsoil will be side stripped from all drainage channels and silt trap pond areas and stockpiled at the edge of the pits in separate heaps so that the vegetation may continue to live, under advisement from the ECoW.
- If the quarry is within glacial till the back wall will, where feasible, be graded back and benched to a slope capable of retaining top peat / top soil. The upper edge will be rounded off and integrated into the surrounding topography. Vegetative peat will be spread over the exposed till to achieve a minimum of 300mm cover. Peat will only be used for quarry restoration if it can be placed on mineral substrate of a low drainage capacity to prevent degradation.
- If the quarry exposes bed rock, every effort is to be made to break up the profile and naturalise the exposed rock face; to round off the top edge; to create ledges and gullies where soil / top peat can be placed.
- On completion the floor of the quarry will be broken up and re-graded to an undulating, rough profile, ramping fill material up against the base of the face of the excavation. Surplus rock material in the vicinity of the pit will be removed into the quarry. The base of the quarry, and back face where feasible, will be fully covered with reclaimed top peat spread to a minimum of 300mm or to match the top peat depths in the adjacent area.
- As the quarry may be in use for a number of months, the stripped turves that will be used for restoration may be degraded. Supplementary turves or seeding may be required to successfully restore the vegetation; however seeding will only be considered as a last resort and advice shall be sought from ECoW on seed mixture.

15 Peat Excavation & Management – Refer to Peat Report

The peat survey demonstrated that the development is unlikely to require deep excavations of peat. However in areas where deep peat may be encountered floating tracks will be used to minimise the production of surplus peat. It is important to note that reinstatement of peat needs to consider the localised hydrology to ensure that the peat will regenerate. With reference to Scottish Renewables' '*Guidance on the assessment of peat volumes, reuse of peat and minimisation of waste'*, the following guidelines for the management of peat will be followed:

- Following advice from the ECoW, cut-off ditches may be excavated around temporary stockpiles in order to divert clean water away from stockpiles.
- Excavated peat will be reinstated as soon as practically possible. There will be certain temporary stockpiles which will be hauled to different areas of the site for reinstatement purposes.
- Peat re-use will be limited to the areas already disturbed during construction and that peat should not be spread on intact vegetated areas as this will smother vegetation.
- Surplus acrotelmic peat will be reused for track verge reinstatement where possible. The height of the deposited peat should not exceed 1m and the slope angle should not exceed 15° to ensure slope stability. Turves will be placed on top of the peat wherever possible to prevent desiccation. For tracks near to watercourses, the peat will only be reused on the topside of tracks.
- Unconsolidated, saturated peat (catotelmic) can be used for the restoration of borrow pits. Surplus peat may be deposited at a maximum depth of 1m. Peat will only be used for borrow pit restoration if it can be placed on mineral substrate of a low drainage capacity to prevent degradation and maintain hydrology. Turves will be

replaced on top, wherever possible to prevent peat desiccation. Alternatively, reseeding could be done if appropriate to help maintain structure.

- Surplus and excavated catotelmic peat will be kept well away from any watercourses.
- Peat may be utilised as backfill material for cable installations, although electrical and thermal design criteria will need to be considered. It is important that only peat uncontaminated with debris is used for this application (i.e. no large stones or tree stumps, etc.).
- The 10m buffer zone will be adhered to and if necessary peat will only be stored on one side if there is insufficient space between the road track and the watercourse. If run-off from the road excavation is entering a buffer zone then the buffer distance may have to be increased and the construction procedure altered and control measures put in place.
- It may be necessary to water peat stockpiles during periods of dry weather.
- Before the material is excavated the Site Team will identify a storage area that takes into account the following:

- Nearby watercourses
- Habitat
- Stability of ground
- Topography of ground

- Remaining subsoil will be excavated down to a suitable stratum and stockpiled along each side of the road for later use in landscaping and verge reinstatement. The sub-soil will be kept separate from the peat at the edges of the track. Where more peat is generated than can be feasibly used (as per estimates above) in the track construction then it will be hauled to the borrow pit for use or temporary storage. This decision will be at the discretion of the experienced Site Foreman.

16 Groundwater Dependent Terrestrial Ecosystems (GWDTE)

In order to minimise the increased drainage across any wetland habitats created by linear features (pipeline, drains), the following steps will be implemented:

- Where any GWDTE may be intersected by the pipeline or tracks, the habitat should be marked, by the ECoW to prevent unplanned disturbance and the exact route through the habitat should be clearly defined.
- Approach flushes from either side using boards to protect the vegetation.
- Drains will be avoided as far as possible but, where necessary, will be dug around the contour rather than downslope.
- When laying pipeline, turves will be cut leaving the vegetation intact and replaced as soon as possible, ideally on the same day.
- Vegetation turves will be cut in an irregular pattern to prevent surface lines which may channel flow.
- If construction takes place during dry weather (or in the event of any delays to construction) water the turves to keep them wet.
- Excavate the pipe trench, taking care to store topsoil and sub-soil separately.
- Install the pipeline and, if necessary, place bunds at more regular intervals to prevent the pipeline trench becoming a preferential conduit of water and to maintain groundwater flow through the wetland.

- To prevent the pipeline trench from channelling the water along it, the peat within the trench will be returned to as near natural structure as possible. As much material will be returned to the trench as possible and tamped down very firmly to evict air and close any gaps caused by cutting, without causing compaction.
- Excavated material will be replaced in the order that it was removed.
- Take care to replicate the original soil profile and, in the case of flushes, recreate any slight depression that channelled the flush across the peat.
- Replace the turves, with any flush turves replaced along the original line of the flush.

17 Reinstatement

The key to successful restoration lies in managing the disturbance so that it lasts for as short a period as possible and planning the timing of the disturbance to offer the best conditions to do the work, which in turn will allow successful restoration.

17.1 Guiding principles for restoration

The landscape restoration plan (still to be advised) and best practice guidelines will be followed in the restoration of the temporary construction impacts, paying particular attention to sensitive areas. The general principles of restoration include:

- Rapid, progressive restoration as the project proceeds, wherever possible, to reduce the duration of visual impact and to reduce the risk of loss, damage and desiccation to stockpiled top peat and turfs.
- Careful reinstatement of undulating / rough landform over construction corridor using re-spread till, rock and deep peat prior to final shaping with top peat and including forming watercourses to natural irregular alignment to match existing character and integration of the construction site into the adjoining rough and uneven moorland.
- Use of low ground pressure machinery and avoidance of over compaction and blade grading in placement of peat. Top peat will, in preference, be placed by digger bucket, loosely graded with bucket teeth and left rough and undulating. Where intact turfs are being placed these will be lifted in as large a unit as feasible and placed right side up, lightly compacted and all roots buried.
- Where surrounding landscape has numerous boulders on the surface, consideration will be given to retaining irregular groups of rock in random distribution.
- Removal of temporary culverts over water courses at completion and reinstatement of hydrology at completion.
- Utilising the existing top peat and turf as the principle material for reinstatement by careful placement of turfs with roots well buried and creating a matrix of cover over the site if there is a shortage of suitable turf material.
- Give consideration to the continuation of stock exclusion / additional stock management to reduce deer and sheep grazing within the establishment period.

17.2 Habitat Restoration Contingency

- Monitoring of habitat restoration is typically over a three-year post construction period to ensure establishment takes place with remedial work carried out if required. However, a Landscape Restoration Plan will be written prior to the substantial completion of the development that shall detail the reinstatement and management of all areas of the scheme.
- Typical remedial works may include:

- Seeding of turves, if natural regeneration fails (species mix to be agreed in consultation with ECoW or SNH)
- Management of invasive species such as *Rhododendron ponticum* if required
- Monitoring the recruitment of any tree planting and making provisions for tree protection measures if unsuccessful.

18 Monitoring

18.1 Site Diary

As per good practice guidelines, a daily site diary is kept and generally includes the following information:

- Weather conditions
- Work in progress/work completed
- Any health and safety/environmental issues
- Any other information relevant to the ongoing construction project

18.2 Site Monitoring Schedule

A site monitoring schedule will be completed with inspection times noted and signed off as required. Inspections of EPMs are generally undertaken daily but more frequently during adverse weather. The various control measures set out in this CMS will require regular monitoring and assessment.

Day to day monitoring will be carried out by the Site Team, with the Project Manager responsible for carrying out this assessment and recording the details. The areas assessed as part of these daily checks includes, but is not limited to the following:

- Visual sediment monitoring
- Surface Run-off
- Buffer zone around the burn
- Record of any Environmental Incident
- Dust Suppression
- Material Storage
- Fuel Storage
- Waste Storage

This is based on the evaluation that several members of the Site Team have a suitable knowledge of construction activities and impacts, are more than capable of carrying out visual inspections on a number of the control measures and recording the findings.

The Project Manager and the Site Foreman on the Contract are deemed to be the responsible person for assessing the daily weather conditions and deciding on the daily programme of works. In that process, they consider the Health, Safety and Environmental Risks. They will liaise with the Client and the ECoW daily. Appropriate weather forecasts will be consulted on a daily basis and a site meteorological station continuously recording temperature, wind and rainfall will be maintained to provide local information on conditions. The information will be transferred to the site operatives through daily briefings, conducted

every morning on site, and specific tool box talks, as required. The site team will be encouraged to use Hold Points within the method statements for the site activities to ensure that control measures are in place before the work commences.

18.3 Monitoring of Water Quality

Weekly samples will be taken either by the ECoW or the Agent during the construction stage to identify any impacts of the development on water quality and to identify the requirement for remedial mitigation measures. The analysis will likely include: conductivity, turbidity, pH, dissolved oxygen, and oxidation reduction potential. All subsequent monitoring results will be compared with a pre-construction baseline data-set.

19 Emergency Action Plan

The objective of the Emergency Action Plan is to define the management activities to be undertaken by the Contractor to minimise and where possible eradicate nuisance caused by the discharge of pollutants to the ground and water environment in relation to construction activities; and define how the accidental release of significant potential pollutants may be controlled.

19.1 Exceptional Incident Procedure

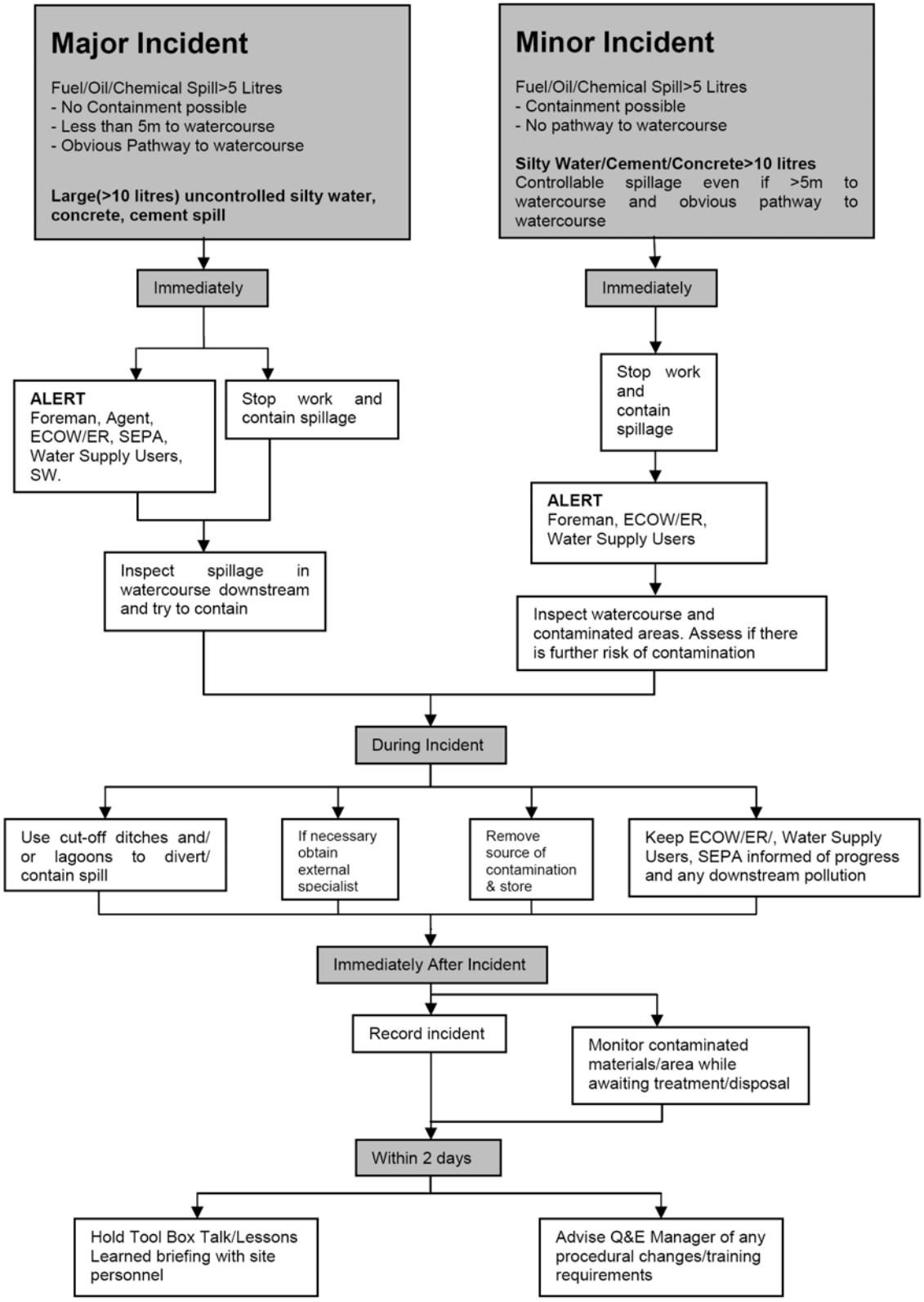
In the unlikely event that the Environmental Protection Measures (EPMs) should fail and an unforeseen pollution incident should occur, the following procedure is to be followed (also see figure 1):

1. Discoverer of incident to alert Site Foreman of nature and magnitude of the incident.
2. Site Foreman to report incident to Private Water Supply Users, SEPA and Scottish Water immediately in order to inform other water users of potential hazards and to take advice on how to proceed.
3. Site Foreman and Team to attempt to prevent situation from getting any worse (i.e. stop pollution source if possible).
4. If not possible to stop pollution source, Site Foreman and Team to try to contain situation and minimise damage.
5. Work not to be recommenced until pollution incident is resolved and all mitigation measures (EPMs, etc.) have been checked and reinstated.
6. Following incident, Site Foreman to review site EPMs and working practices with SEPA officer to ensure good practice as per WAT-SG-29 Temporary Construction Methods.

19.2 Adverse Weather

- The Site Foreman will assess the weather conditions on the day and the short range forecast before undertaking any task that may pose a threat.
- All excavated material will be stored in a safe manner with increased monitoring during adverse weather.
- Spill kits are in every vehicle and trained operators will be used throughout.

Figure 1 Emergency Procedure Flow Chart



19.3 Emergency measures for siltation event

The site drainage will be maintained on a regular basis and designed to cater for expected flows. As a precaution, personnel will also be briefed on what actions to take in an emergency. These will include, but not be limited to the following:

- Excavate an interceptor drainage ditch to direct contaminated water away from a watercourse.
- Construct and enlarge settlement lagoons where appropriate.
- Reinforce filtration weirs with additional straw bales etc.
- Deepen drainage ditches.
- Cover stock piled materials and surround with interceptor ditches.
- Notify SEPA depending on the nature and size of discharge.

19.4 Responsibilities

Table 6 Emergency Responsibilities of Personnel

Project Manager	• Approval of appropriate corrective actions, maintain contact with ECoW, Hydroplan, SEPA, Water Supply Users etc.
Site Foreman	• Organising labour and plant to deal with incidents • Carrying out duties as defined by Project Manager.
Hydroplan	• Provide specialist advice and assistance to site team during and after any incident • Monitoring the effectiveness of corrective actions • Monitoring reports for trends.

19.5 Records

- Environmental Incident Report - Copies to be held by Contractor for a min. of 3 years
- Waste Transfer Notes - Minimum 2 years
- Water Consignment Notes - Minimum 3 years

19.6 Emergency Contact Details

Table 7 Personnel emergency contact details

Role	Organisation	Name	Details
Project Manager	Hydroplan (Agent)	To be Appointed	01202 886622
Site Foreman	To Be Appointed	To be Appointed	-
ECoW	Quadrat Scotland	Nikki Dayton	01369 860732 / 0790 979 1615
Environment Protection Officer	SEPA	Samuel Kyeremeh	01546 602876
Principal Planning Officer	LLTNP	Erin Goldie	01389 722600
Service Relocation Team	Scottish Water	Scott Macdonald	0845 6018855

19.7 Health and Safety

Table 8 Potential Hazards and Remedial Measures

	Risk	Mitigation
1	Plant and vehicle movements	Standard construction site practice plus signage and fencing on hazardous areas
2	Injuries from falls and manual handling of equipment and materials	Use of Personal Protective Equipment (PPE), staff awareness program and First Aid provision
3	Adverse weather conditions	All staff will be made aware of the possibility of rapid changes in local weather conditions and will have additional items of warm clothing and wet-weather gear
4	Parasites – ticks and keds	All staff will be made aware of Lyme's disease and primary treatment will be provided on site
5	River flooding	All staff will be made aware of the possibility of river flooding. Construction works in the river during flood season will be avoided.

19.8 Operatives on Site and Relative Training

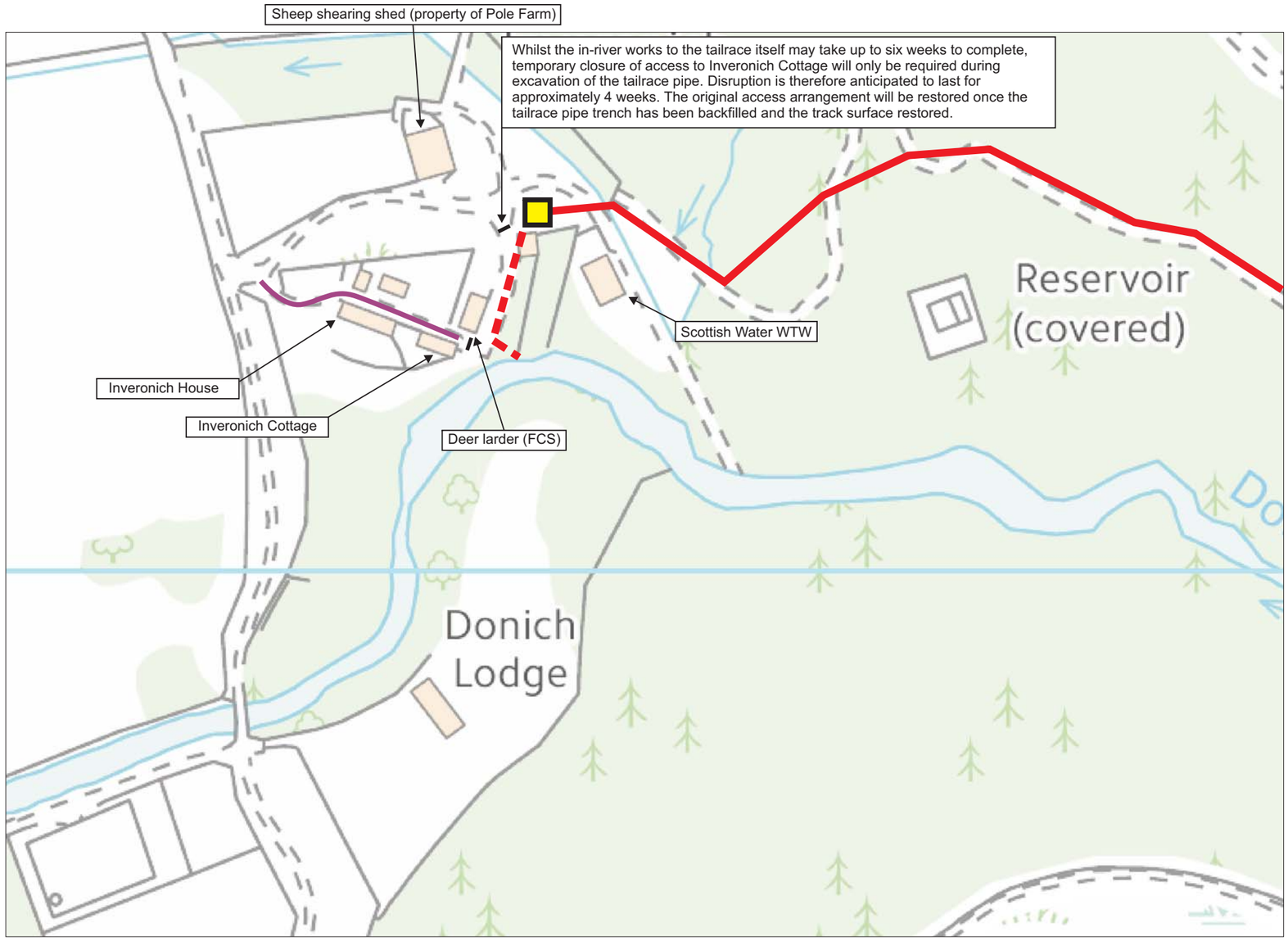
- Supervisors
- Plant Operators
- Steel fixers
- Joiners
- Labourers
- All preferred contractor employees to have completed a CITB safety awareness course. Any plant operators to hold the relevant CITB certificate for that item of plant.

19.9 Personal Protective Equipment (PPE)

Hard hats, eye protection, foot protection, protective trousers, gloves and reflective clothing will be worn as a minimum. Hearing protection, masks and wet weather clothing will be available to operatives as necessary.

19.10 Plant on Site

- Wide Tracked Excavator
- Rock breaking/trimming tools
- Drilling machine
- Pumps
- Vibrating pokers
- Compressor
- Generators
- Small hand tools
- Wide Tracked Dumper
- Welding machine
- Tipper lorries
- Concrete lorries
- Concrete pumps



Legend

- Intake
- Pipeline
- Tailrace
- Powerhouse
- Alternative Route of Access
- Temporary Access Closure

Iss	Description	Drawn	Chk'd	Date
0	Original Drawing Issue	NF	-	07.10.13

Client

BROADLAND RENEWABLE CONSTRUCTION Ltd

Project Title

DONICH WATER

Drawing Title

INVERONICH ACCESS ARRANGEMENT

Hydroplan
Water & power engineering

Unit 12, Riverside Park, Station Road
Wimborne, Dorset, BH21 1QU. ENGLAND
Tel: ++44 (0)1202 886622 Fax: ++44 (0)1202 886609
Email: info@hydroplan.co.uk

Scale Bar
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Scale	Prints from this drawing are	Original Size
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Project No	Drawing No	Issue
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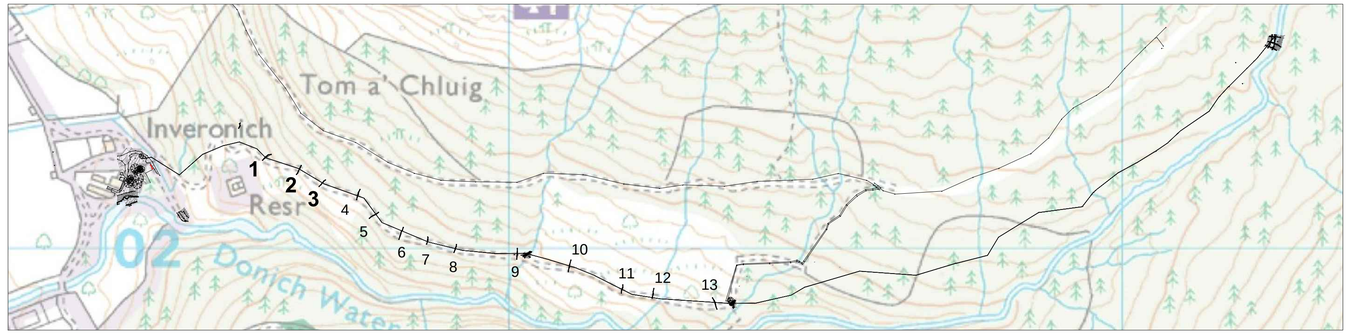

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TRACK SECTION 1

STAGE 1:
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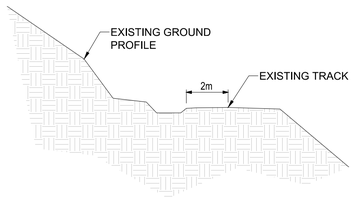
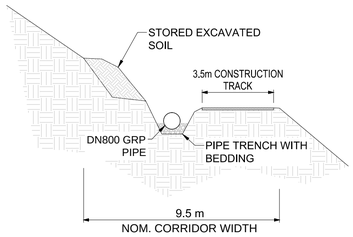


STAGE 2:
DURING CONSTRUCTION



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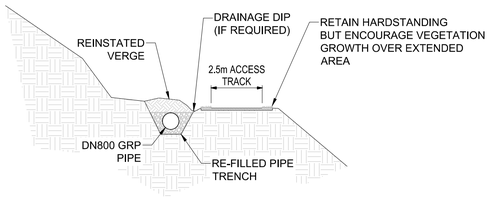

TRACK SECTION 2

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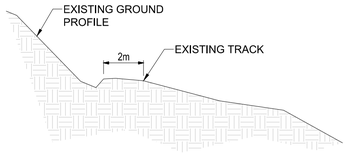

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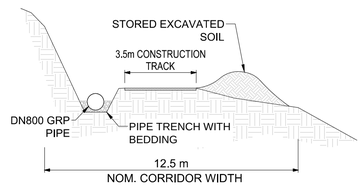

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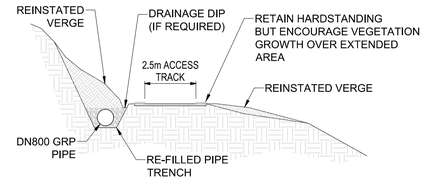

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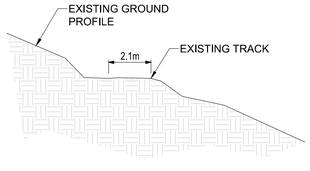

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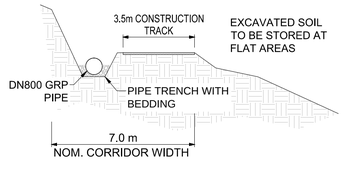

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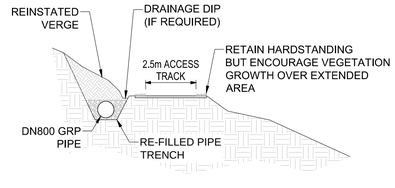

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3	Nominal corridor width added	TJA	HD	15.04.14
2	Pipe route updated	FK	NF	21.11.13
1	More Sections Added	WS	NF	13.11.13
0	Original Drawing Issue	WS	NF	18.10.13

Client

BROADLAND RENEWABLE CONSTRUCTION Ltd

Project Title

DONICH WATER

Drawing Title

ACCESS TRACK
CROSS SECTIONS
(SHEET 1 OF 4)

Hydroplan
Water & power engineering

Unit 12, Riverside Park, Station Road
Wimborne, Dorset, BH21 1QU, ENGLAND
Tel: ++44 (0)1202 886622 Fax: ++44 (0)1202 886609
Email: info@hydroplan.co.uk

Scale Bar

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Scale	Prints from this drawing are	Original Size
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Project No	Drawing No	Issue
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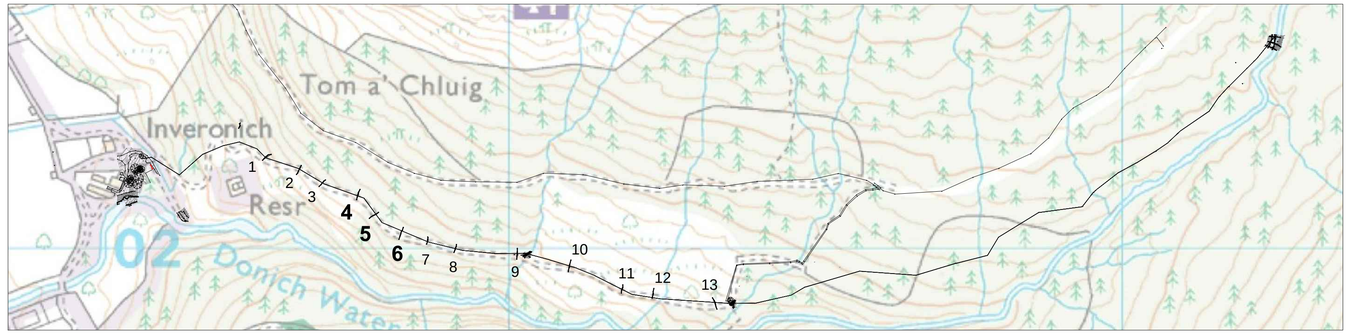

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TRACK SECTION 4

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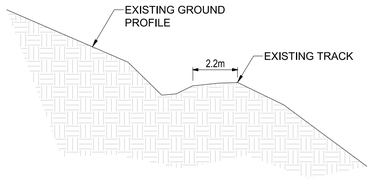
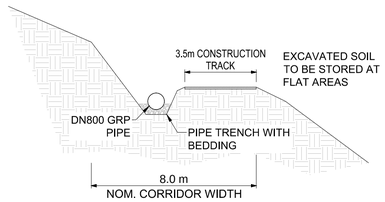
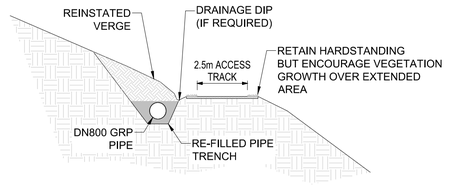


STAGE 2:
DURING CONSTRUCTION

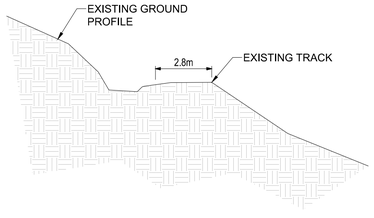


STAGE 3:
AFTER CONSTRUCTION

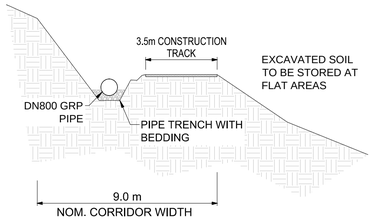


TRACK SECTION 5

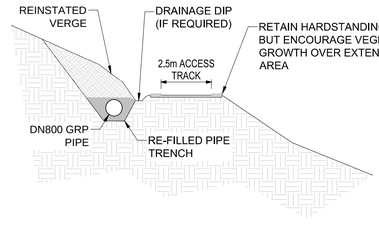
STAGE 1:
BEFORE CONSTRUCTION



STAGE 2:
DURING CONSTRUCTION

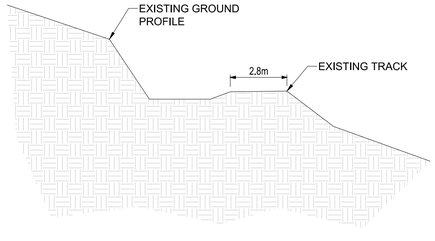


STAGE 3:
AFTER CONSTRUCTION

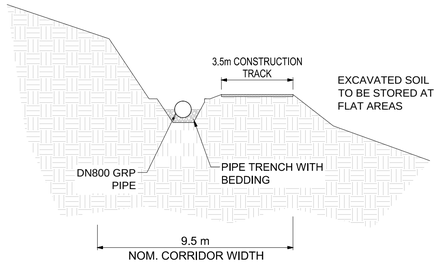


TRACK SECTION 6

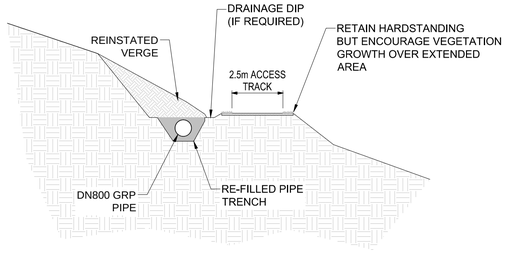
STAGE 1:
BEFORE CONSTRUCTION



STAGE 2:
DURING CONSTRUCTION



STAGE 3:
AFTER CONSTRUCTION



Iss	Description	Drawn	Chk'd	Date
3	Nominal corridor width added	TJA	HD	15.04.14
2	Pipe route updated	FK	NF	21.11.13
1	More Sections Added	WS	NF	13.11.13
0	Original Drawing Issue	WS	NF	18.10.13

Client

BROADLAND RENEWABLE CONSTRUCTION Ltd

Project Title

DONICH WATER

Drawing Title

ACCESS TRACK
CROSS SECTIONS
(SHEET 2 OF 4)

Hydroplan
Water & power engineering

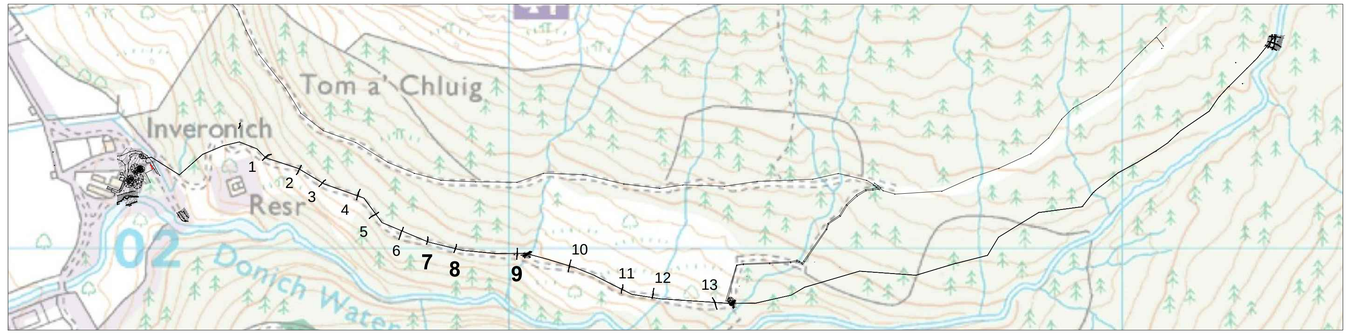
Unit 12, Riverside Park, Station Road
Wimborne, Dorset, BH21 1QU, ENGLAND
Tel: ++44 (0)1202 886622 Fax: ++44 (0)1202 886609
Email: info@hydroplan.co.uk

Scale Bar

0m 1.5 3.0 4.5 6 9 12 15m

Scale	Prints from this drawing are	Original Size
1:150	UNCONTROLLED unless otherwise indicated	A1

Project No	Drawing No	Issue
P626	10115-2	3

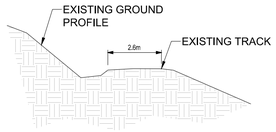


MAP SCALE BAR: 1:5000

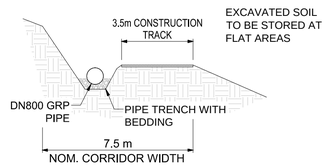
0m 100 200 300 400 500m

TRACK SECTION 7

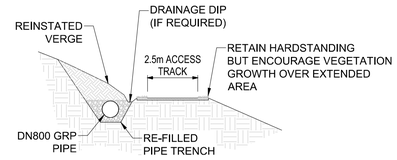
STAGE 1:
BEFORE CONSTRUCTION



STAGE 2:
DURING CONSTRUCTION

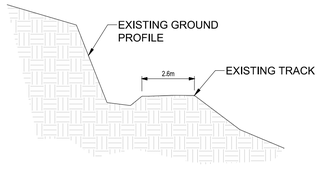


STAGE 3:
AFTER CONSTRUCTION

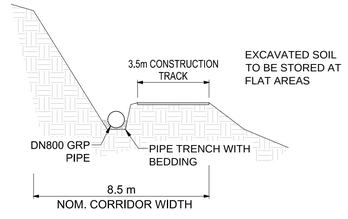


TRACK SECTION 8

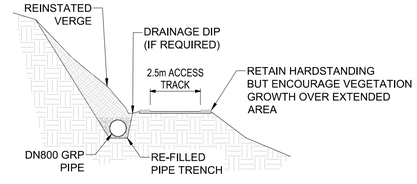
STAGE 1:
BEFORE CONSTRUCTION



STAGE 2:
DURING CONSTRUCTION

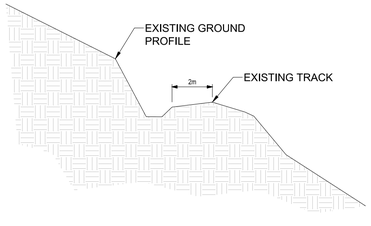


STAGE 3:
AFTER CONSTRUCTION

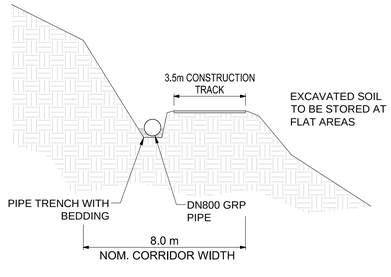


TRACK SECTION 9

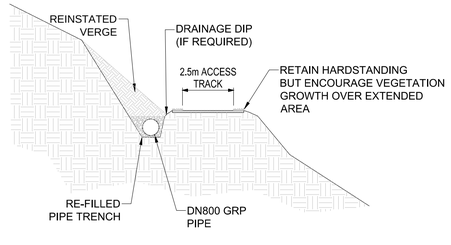
STAGE 1:
BEFORE CONSTRUCTION



STAGE 2:
DURING CONSTRUCTION



STAGE 3:
AFTER CONSTRUCTION



Iss	Description	Drawn	Chk'd	Date
3	Nominal corridor width added	TJA	HD	15.04.14
2	Pipe route updated	FK	NF	21.11.13
1	More Sections Added	WS	NF	13.11.13
0	Original Drawing Issue	WS	NF	18.10.13

Client

BROADLAND RENEWABLE CONSTRUCTION Ltd

Project Title

DONICH WATER

Drawing Title

ACCESS TRACK
CROSS SECTIONS
(SHEET 3 OF 4)

Hydroplan
Water & power engineering

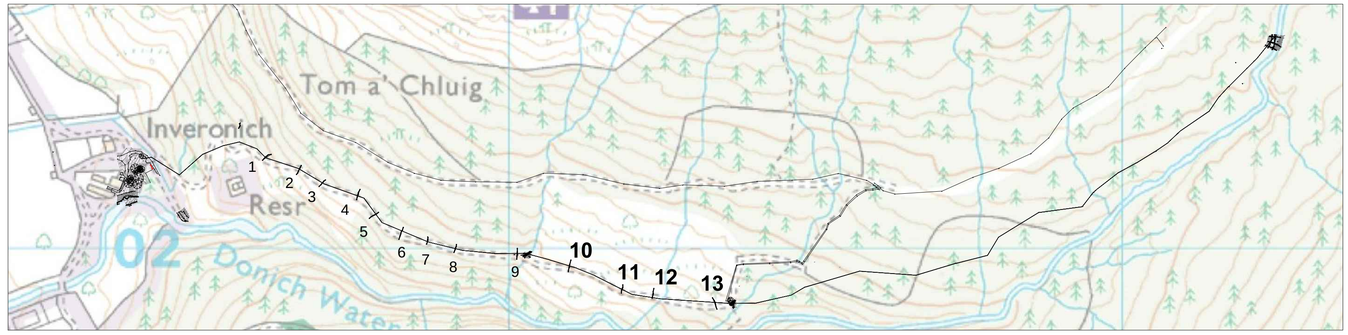
Unit 12, Riverside Park, Station Road
Wimborne, Dorset, BH21 1QU, ENGLAND
Tel: ++44 (0)1202 886622 Fax: ++44 (0)1202 886609
Email: info@hydroplan.co.uk

Scale Bar

0m 1.5 3.0 4.5 6 9 12 15m

Scale	Prints from this drawing are	Original Size
1:150	UNCONTROLLED unless otherwise indicated	A1

Project No	Drawing No	Issue
P626	10115-3	3

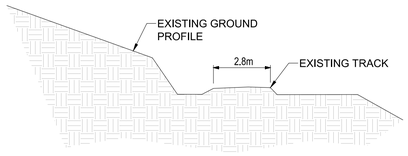


MAP SCALE BAR: 1:5000

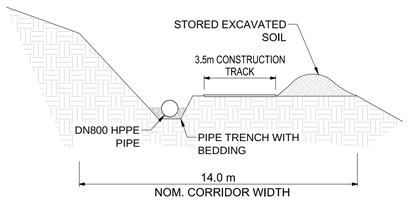
0m 100 200 300 400 500m

TRACK SECTION 10

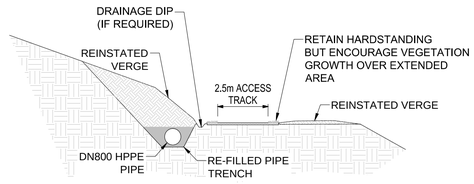
STAGE 1:
BEFORE CONSTRUCTION



STAGE 2:
DURING CONSTRUCTION

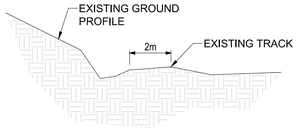


STAGE 3:
AFTER CONSTRUCTION

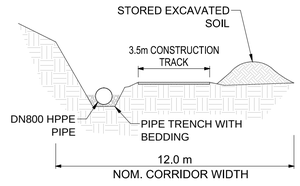


TRACK SECTION 11

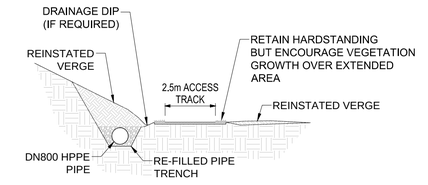
STAGE 1:
BEFORE CONSTRUCTION



STAGE 2:
DURING CONSTRUCTION

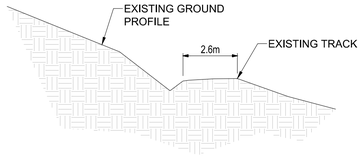


STAGE 3:
AFTER CONSTRUCTION

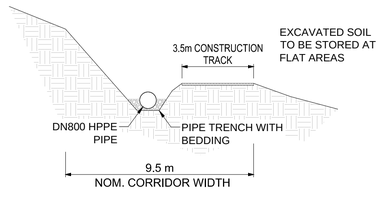


TRACK SECTION 12

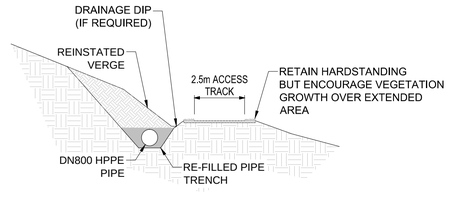
STAGE 1:
BEFORE CONSTRUCTION



STAGE 2:
DURING CONSTRUCTION

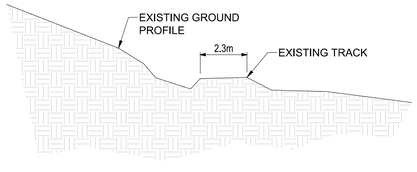


STAGE 3:
AFTER CONSTRUCTION

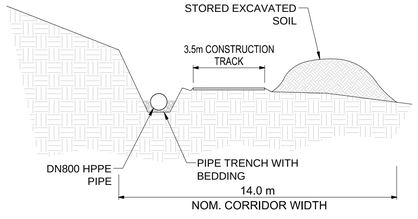


TRACK SECTION 13

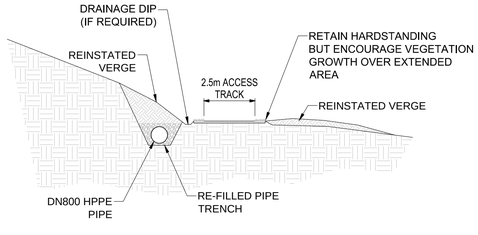
STAGE 1:
BEFORE CONSTRUCTION



STAGE 2:
DURING CONSTRUCTION



STAGE 3:
AFTER CONSTRUCTION



Iss	Description	Drawn	Chk'd	Date
3	Nominal corridor width added	TJA	HD	15.04.14
2	Pipe route updated	FK	NF	21.11.13
1	More Sections Added	WS	NF	13.11.13
0	Original Drawing Issue	WS	NF	18.10.13

Client

BROADLAND RENEWABLE CONSTRUCTION Ltd

Project Title

DONICH WATER

Drawing Title

ACCESS TRACK CROSS SECTIONS (SHEET 4 OF 4)

Hydroplan
Water & power engineering

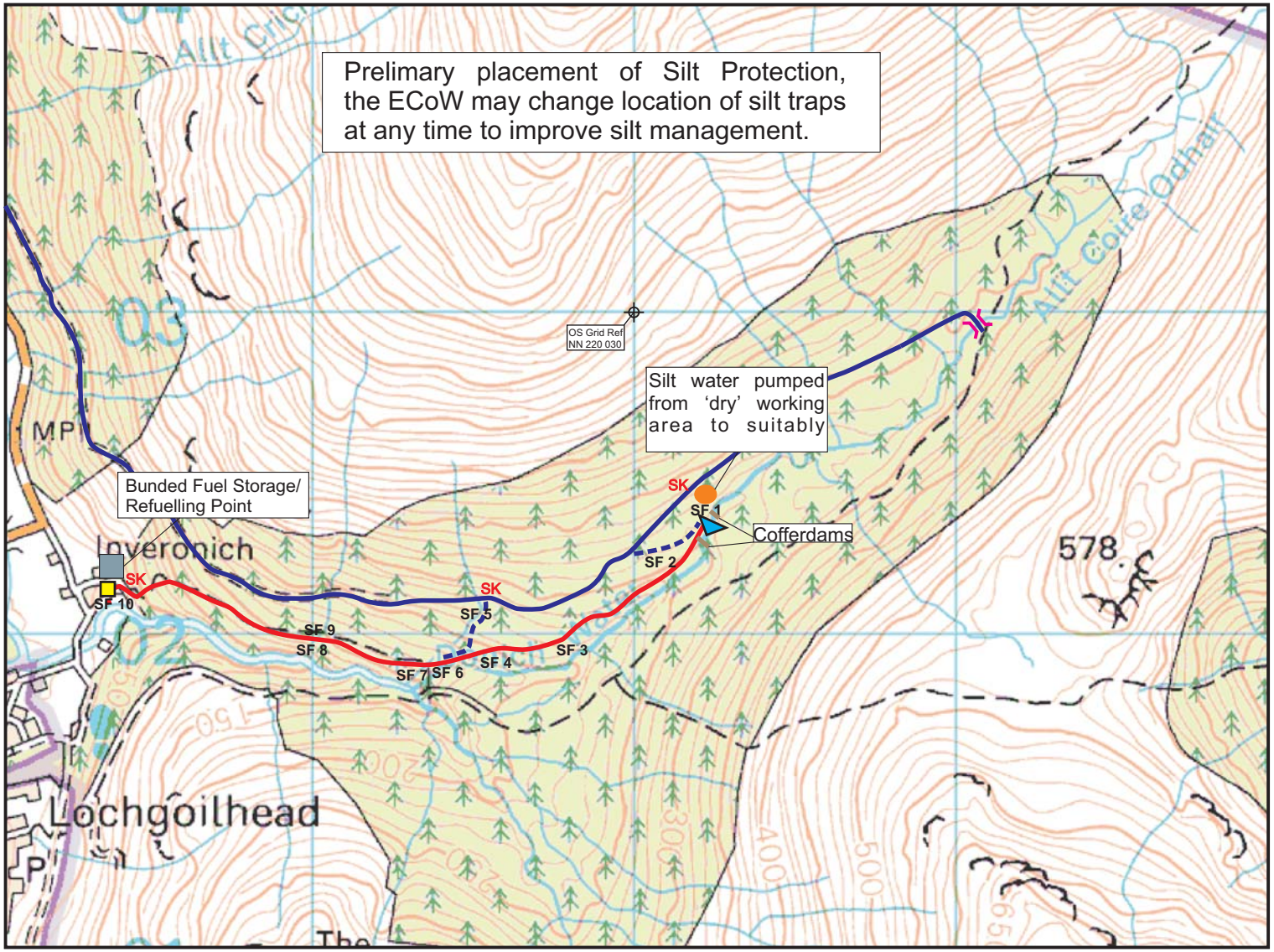
Unit 12, Riverside Park, Station Road
Wimborne, Dorset, BH21 1QU, ENGLAND
Tel: ++44 (0)1202 886622 Fax: ++44 (0)1202 886609
Email: info@hydroplan.co.uk

Scale Bar

0m 1.5 3.0 4.5 6 9 12 15m

Scale	Prints from this drawing are	Original Size
1:150	UNCONTROLLED unless otherwise indicated	A1

Project No	Drawing No	Issue
P626	10115-4	3



LEGEND

SF 1	Silt Fence/ Silt Protection
SK	Location of Spill Kits

Scheme Layout

- Intake
- Powerhouse
- Buried Pipeline
- New Forest Road
- Existing Access

Iss	Description	Drawn	Chk'd	Date
0	Original Drawing Issue	KA	-	03.09.15

Client

BROADLAND RENEWABLE CONSTRUCTION Ltd

Project Title

DONICH WATER

Drawing Title

SILT MANAGEMENT PLAN

Hydroplan
Water & power engineering

Unit 12, Riverside Park, Station Road
Wimborne, Dorset, BH21 1QU. ENGLAND
Tel: ++44 (0)1202 886622 Fax: ++44 (0)1202 886609
Email: info@hydroplan.co.uk

Scale	Prints from this drawing are	Original Size
NTS	UNCONTROLLED unless otherwise indicated	A3

Project No	Drawing No	Issue
P626	10117	0