Benbrack Wind Farm

Surface Water Quality Monitoring Plan

June 2021

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Red Rock Power Ltd

Document history

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A	14/04/2021	Submitted
B	29/06/2021	Minor updates following receival of consultation responses

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Contents

1. Introduction

This document forms the Water Quality Monitoring Plan (WQMP) for the proposed Benbrack Wind Farm (herein referred to as "the Development"). This WQMP is a supporting document to the Construction Environmental Management Plan (CEMP) relative to the variation planning consent reference (Section 36C of the Electricity Act 1989) which was granted on 05 November 2019 by the Scottish Ministers (Reference ECU00001773).

The Development is situated near to Carsphairn, Dumfries and Galloway and comprises of the construction of up to 18 wind turbines and associated infrastructure.

Construction works have the potential to cause pollution to the water environment. All construction works on site, and specifically construction works to be undertaken within and in the vicinity of any watercourses, will be completed in compliance with current legislation and best practice as detailed in the CEMP and published guidance documents including the Marine Scotland Science generic monitoring programme guidance document[1].

The purpose of this WQMP is to provide a continual review of water quality prior to, during and post completion of construction works and will serve to identify construction impacts (pollution), if any, and corrective actions if required.

This WQMP extends to all watercourses within the catchment of the construction areas.

1.1. Planning Requirements

A number of planning conditions associated with the Development require detailed attention and subsequent design of environmental protection through appropriate and detailed design considerations as well as the adoption of site-specific monitoring and contingency plans.

Planning Condition (PC) 14 of the decision letter requires the completion of a CEMP to be approved by consultees, including but not limited to, the Scottish Environment Protection Agency (SEPA), NatureScot (formerly SNH) and on those parts of relevance to them, the Galloway Fisheries Trust, Scottish Water and Marine Scotland. The conditions sets out the requirements of the CEMP and whilst no text explicitly states the requirement for surface water quality monitoring, there will be the expectation that this will be undertaken to ensure compliance with the CEMP commitments.

As part of the Red Rock's (the Client) continuing commitment to protect all aspects of the natural environment during the construction and operation of the Development, the following methodology for the site-specific WQMP has been proposed.

This methodology, as detailed, will include the hierarchy of monitoring requirements needed to assess and monitor the water quality from watercourses which are potentially susceptible to impacts from infrastructure and construction areas within the site. This monitoring plan is designed to outline the means of assessing the effectiveness of wind farm construction and the implementation of associated mitigation measures.

It should also be noted that a separate migratory fish monitoring plan (MFMP) under PC 16 would include a detailed sampling strategy to further monitor changes in water quality with the aim of reducing the impact on fish populations. This monitoring plan has been submitted to the SEPA, NatureScot, the Galloway Fisheries Trust, Scottish Water and Marine Scotland for consultation and comment (25th May 2021). NatureScot and Scottish Water responded with no comments. A response has not been received from Marine Scotland at the time of updating this document (29th June 2021). The details of the consultation responses from SEPA and Galloway Fisheries Trust have been provided in Appendix A and the plan has been updated to address these comments.

[1] Scottish Government (2018), Marine Scotland Science, Generic monitoring programme for monitoring watercourses in relation to onshore wind farm developments

2. Responsibilities

2.1. Balance of Plant Contractor

The Balance of Plant (BoP) Contractor is responsible for pollution prevention for the duration of the construction works and until such time as permanent measures, such as permanent drainage and silt mitigation controls, are deemed to be adequate and appropriately constructed.

As part of the site induction process the BoP encourages all personnel and visitors to report, any visual indications of changes in water quality (i.e. discolouration or other evidence of contamination) in any watercourses on site. Any evidence must be reported to the Ecological Clerk of Works (ECoW) and BoP Contractor.

2.2. Ecological Clerk of Works

The ECoW undertakes visual monitoring on site and liaises with the nominated water quality monitoring consultant and the BoP Contractor.

2.3. Water Quality Monitoring Works

The overall implementation and management of the water quality monitoring programme will lie with the nominated water quality monitoring consultant, employed by the Client. This responsibility extends to overall coordination of both field and laboratory aspects of the monitoring programme, liaison with the ECoW or other nominated site personnel and the BoP Contractor.

The nominated water quality monitoring consultant shall provide regular reporting of the field and laboratory analysis as detailed in Section 3.

Natural Power Consultants is currently responsible for the implementation of the Water Quality Monitoring Plan with associated qualified persons from the Hydrology team carrying out the surface water quality monitoring.

3. Monitoring Requirements

The proposed monitoring methodology has been derived based on the following:

- Consideration of the potential natural and anthropogenic influences on the hydrological environment;
- Identification of on-site and downstream sensitive receptors;
- Once all possible effects have been identified, consider water management, construction management and monitoring practices that need to be taken into account; and
- If the sustainable water management measures fail or have not been implemented appropriately or the results of water quality monitoring record prolonged increases in concentrations that do not correlate with climatic conditions, consideration of the emergency procedures that should be implemented to reduce the effects on the hydrological environment.

Water quality monitoring at the Development will include:

- Visual inspections;
- In-situ sampling using a handheld monitoring meter; and
- Extractive sample collection for laboratory analysis.

Table 3.1 provides a summary of the monitoring commitments to ensure compliance.

Table 3.1: Water Quality Monitoring Requirements

Item	Monitoring Method	Monitoring Locations	Monitoring Frequency	Monitoring Phases	Parameter
1	Visual	Site wide and receiving watercourses 11 locations	Daily Weekly	Construction (as part of ECoW role)	Discolouration Cloudiness Olfactory (hydrocarbon spillage)
2	In-Situ (data collected using handheld monitors)	9 locations	Monthly Bi-Monthly	At least 6 months but no more than 12 months Pre-Construction Construction Post Construction (up to 1 year)	pH Electrical Conductivity Dissolved Oxygen Turbidity Temperature
3	Water Sample Collection (samples collected and sent to a UKAS laboratory for analysis)	8 locations	Monthly Bi-Monthly	At least 6 months but no more than 12 months Pre-Construction Construction Post Construction (up to 1 year)	Biological Oxygen Demand Dissolved Organic Carbon Iron Manganese Nitrate Phosphate Total Alkalinity Total Suspended Solids Total Petroleum Hydrocarbons* *during construction phase

3.1. Water Quality Monitoring Locations

The nine sampling locations have been considered to be representative of the surface water quality within the main catchments of the development and are located downstream of construction works or in the case of the control

location situated outside of the influence of construction related works. The monitoring locations will be clearly identified to ensure that the same locations are used throughout all phases of the development, ensuring a consistent approach, and allowing for comparison of results over time and identification of any trends.

Grid references for the proposed monitoring locations are provided in Table 3.3 below, and illustrated in Figure 1, Appendix B. These locations were informed by a site visit from the Wood Group in October 2020[2]. This was followed up by a detailed desk study by Natural Power and a site visit in April 2021 to carry out a site walkover and the first round of baseline water quality monitoring.

Furthermore, it is noted in Table 3.1 that visual monitoring would be carried out site wide during the construction phase as part of the ECoW role. For fisheries interests, a visual sampling location for additional observations in addition to the nine locations includes a monitoring location on the Brownhill Burn (suggested location just upstream of Waterhead) at National Grid Reference (NGR) 254384,599360. This monitoring location captures the wider catchment area incorporating the Development infrastructure and South Kyle Wind Farm and forest. If concerns are highlighted, the ECoW should check to confirm that it is not associated with the Development. Visual checks should also provide additional coverage of the Meadowhead Burn, specifically upstream of the access track (suggested location at NGR 252766,599737).

[2] Wood Environment & Infrastructure Solutions UK Limited on behalf of RWE (2020) Benbrack Wind Farm, Water Monitoring Scheme.

Table 3.2: Water Quality Monitoring Sampling Points

ID	Easting	Northing	Justification	Comment	Photo (upstream)	Watercourse	Proposed level of monitoring
WQ1	251987	599632	Location will capture potential impacts from access track construction. The sampling point is approximately 230 m S of proposed access track. Potential to capture impact from Scotland overhead tower line and track located upstream of WQ1.	Incised channel with surface run-off; Moderate gradient; Deep V-valley; Slow flow; Moorland/Agricultural grazing riparian corridor; Stable banks; Vegetation/boulders/soil bed material; and Agricultural grazing in catchment.		Unnamed tributary of Meadowhead Burn	Visual, in-situ and extractive
WQ2	252131	599128	Location will capture potential impacts from track construction, construction compound and quarrying activities in borrow pit. The closest infrastructure, the proposed borrow pit, is approximately 500 m NE of the sample point. No identified influence from adjacent wind farms or developments.	Meandering Channel; Moderate gradient; Deep V-valley; Slow flow; Moorland/Agricultural grazing riparian corridor; Unstable banks (potential recent collapse); Fine sand/silt/ Rounded pebbles/Coarse gravel/Boulders bed material; and Agricultural grazing in catchment.		Meadowhead Burn	Visual, in-situ and extractive
WQ3	252482	598966	Downstream of proposed borrow pit which is approximately 560 m NE of the sample point. Potential to capture impacts from existing track and agricultural fields. Included to provide WQ monitoring coverage of borrow pit, however it is not yet confirmed that the borrow pit will be utilised for the Development. This is the only infrastructure element in the catchment	Incised/Meandering Channel; Steep gradient; Deep V-valley; Moderate flow; Moorland/Agricultural grazing riparian corridor; Undercut banks; Boulders/coarse gravel bed material; and Agricultural grazing in catchment		Lamford Burn	Visual and in-situ

ID	Easting	Northing	Justification	Comment	Photo (upstream)	Watercourse	Proposed level of monitoring
			area therefore proposed for visual and in-situ monitoring only.				
WQ4	254176	599845	Location will capture potential impacts from track construction, T15, T16, T18, substation, anemometer mast and quarrying activities in borrow pit. The closest infrastructure, T18, is approximately 340 m NW of the sample point. No identified influence from adjacent wind farms or developments.	Joins Water of Deugh 440 m downstream. Incised/Meandering Channel; Moderate gradient; Deep V-valley; Moderate flow; Moorland/Agricultural grazing riparian corridor; Undercut banks; Fine sand/silt/coarse gravel/ rounded pebbles/boulders/ vegetation bed material; and Agricultural grazing in catchment.		Goat Burn	Visual, in-situ and extractive
WQ5	254600	601169	Location will capture potential impacts from track construction, T8, T10, T11, T12, T13 and T14. The closest infrastructure, T10 is approximately 500 m W of the sample point. Sampling point positioned prior joining the Brownhill Burn. No identified influence from adjacent wind farms or developments.	Incised/Meandering Channel; Moderate gradient; Shallow V-valley; Moderate flow; Moorland/Agricultural grazing riparian corridor; Undercut banks; Fine sand/silt/rounded pebbles/coarse gravel/boulders/vegetation bed material; and Agricultural grazing in catchment.		Polgavin Burn	Visual, in-situ and extractive
WQ6	254261	601489	Location will capture potential impacts from track construction, T2, T4, T5 (not to be built), T7 and T9. Location will capture potential impacts from infrastructure in the E of the site. The closest infrastructure, T5 is approximately 175 m W of the sample point. No identified influence from adjacent wind farms or developments.	Incised/Meandering Channel; Gentle gradient; Concave/bowl valley form; Very slow flow; Moorland/Agricultural grazing riparian corridor; Undercut banks; Fine sand & silt/rounded pebbles/coarse gravel bed material; and Agricultural grazing in catchment.		Unnamed tributary of Brownhill Burn	Visual, in-situ and extractive

ID	Easting	Northing	Justification	Comment	Photo (upstream)	Watercourse	Proposed level of monitoring
WQ7	253954	601992	Location will capture potential impacts from track construction, T1, T3, T6 and T17. Location will capture potential impacts from infrastructure in the N of the site. Potential to capture impacts from outwith red line boundary as the NW encompasses forestry track and Todden Hill (477 m AOD) and an adjacent developments track.	Incised/Meandering Channel; Gentle gradient; U-shaped valley; Moderate flow; Moorland/Agricultural grazing riparian corridor; Unstable banks (potential recent collapse); Fine sand & silt/rounded pebbles/coarse gravel/ boulders; Agricultural grazing and forestry in catchment.		Unnamed tributary of Brownhill Burn	Visual, in-situ and extractive
WQ8	252132	600660	Location will capture potential impacts from track construction and anemometer mast. The closest infrastructure, the anemometer mast, is approximately 760 m NE of the sample point. Potential to capture impacts from outwith red line boundary as the NW encompasses Campbells Hill (453 m AOD).	Incised/Meandering Channel; Moderate gradient; Shallow V-valley; Moderate flow; Moorland/Agricultural grazing riparian corridor; Undercut banks; Fine sand & silt/rounded pebbles/coarse gravel/boulders bed material; and Agricultural grazing in catchment.		Polnaskie Burn	Visual, in-situ and extractive
WQ9 (Control monitoring location)	251985	600238	Monitoring location located within the red line boundary, but catchment area does not contain any proposed infrastructure. The catchment characteristics are comparable with the selected monitoring locations allowing comparisons to be drawn between the selected monitoring locations and the control point. No identified influence from adjacent wind farms or developments.	Incised/Meandering Channel; Moderate gradient; Shallow V-valley; Moderate flow; Moorland/Agricultural grazing riparian corridor; Undercut banks; Fine sand & silt/rounded pebbles/coarse gravel/boulders bed material; Agricultural grazing and forestry in catchment.		Small Burn	Visual, in-situ and extractive
WQ10	254384	599360	This monitoring location captures the wider catchment area incorporating the	ECoW to monitor during construction phase.	-	Brownhill Burn	Visual

ID	Easting	Northing	Justification	Comment	Photo (upstream)	Watercourse	Proposed level of monitoring
			Development infrastructure and South Kyle Wind Farm and forest. It has been added to ensure water quality remains good for fish populations. If concerns are highlighted, the ECoW should check to confirm that it is not associated with the Development works.				
WQ11	252766	599737	Visual checks should also provide additional coverage of the Meadowhead Burn, specifically upstream of the access track. These results will remain directly comparable with WQ2 (downstream of the access track) to determine impact of Development on water quality.	ECoW to monitor during construction phase.	Comparable with WQ2.	Meadowhead Burn	Visual

Selected catchment characteristics of the monitoring locations have been summarised in Table 3.3 below to demonstrate the comparable characteristics of the control location with the other monitored locations. The 1981-2010 annual rainfall value at Glenlee climate station is 1720.9 mm which will be comparable to the precipitation totals within the monitored catchments[3].

Table 3.3: Catchment characteristics summary

ID	Bedrock geology[1]	Superficial deposits[2]	Soil type[3]	Bedrock Aquifer classification[4]	Channel & Gradient	Bankfull water width (m)	Bankfull water height (m)
WQ1	Kirkcolm Formation - Wacke	Hummocky (moundy) Glacial Deposits, Devensian - Diamicton	Mineral Gleys	Low productivity	Incised, Surface run-off/wetlands only; Moderate gradient	1.0	0.65
WQ2	Kirkcolm Formation - Wacke	Hummocky (moundy) Glacial Deposits, Devensian - Diamicton	Mineral Gleys	Low productivity	Meandering; Moderate gradient	2.8	0.7
WQ3	Kirkcolm Formation - Wacke	Till, Devensian - Diamicton	Peat	Low productivity	Incised, Meandering; Steep gradient	2.1	0.7
WQ4	Kirkcolm Formation - Wacke	Till, Devensian - Diamicton	Peat	Low productivity	Incised, Meandering; Moderate gradient	1	0.55
WQ5	Kirkcolm Formation - Wacke	Peat	Peat	Low productivity	Incised, Meandering; Moderate gradient	1.2	0.55
WQ6	Kirkcolm Formation - Wacke	Peat	Peat	Low productivity	Incised, Meandering; Gentle gradient	0.3	0.4
WQ7	Kirkcolm Formation - Wacke	Peat	Peat	Low productivity	Incised, Meandering; Gentle gradient	0.77	0.65
WQ8	Kirkcolm Formation - Wacke	Peat	Peat	Low productivity	Incised, Meandering; Moderate gradient	1.1	0.7
WQ9 (Control)	Kirkcolm Formation - Wacke	Peat	Peat	Low productivity	Incised, Meandering; Moderate gradient	0.5	0.3
WQ10	Kirkcolm Formation - Wacke	Alluvium – Gravel, Sand and silt	Mineral Gleys	Low productivity	-	-	-
WQ11	Kirkcolm Formation - Wacke	Peat	Peat	Low productivity	Meandering; Moderate gradient	2.8	0.7

[1] British Geological Survey, BGS 1:50K Bedrock

[2] British Geological Survey, BGS 1:50K Superficial deposits

[3] The James Hutton Institute, National Soil Map of Scotland and NSIS

[4] British Geological Survey, Aquifer Classification

[3] Met Office (2019), Glenlee, https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcv12y3xn, accessed 19/03/2021

3.2. Visual Inspection

During the construction phase of the development, as per Item 1 in Table 3.1, the ECoW, will carry out a visual check of the watercourses within the development site for the following:

- Oils;
- Scum;
- Turbidity; and
- Algal blooms.

Visual inspections will include an assessment from the river bank of the condition of the water, with photographic records taken, facing upstream and downstream of the monitoring point, for reference. Via an electronic form submission, the following is recorded:

- Precipitation (last 24 hours);
- Catchment construction activity;
- Vegetation;
- Bank condition;
- Oil presence;
- Visual colour observations (clear to very dark);
- Visual turbidity observations (clear, no visible siltation to opaque significant siltation);
- Flow condition (ranging from dry to very fast); and
- Water levels (ranging from dry to very high (out of bank)).

Where any higher risk activities are being undertaken that may result in a pollution incident in the vicinity of nearby watercourses, such as concrete pouring, stockpiling of materials, refuelling, felling and any in-channel works, visual inspections will be focussed in these areas and immediately downstream by the ECoW, or other nominated person, during the supervision of these works.

If any of the visual inspection checks during construction indicate a potential pollution incident, onsite sampling will be undertaken at these specific locations to help identify the source and type of contamination and inform the corrective/remedial actions.

Should a construction related incident be identified, construction should cease until the problem is identified and isolated. Following discovery of incident, SEPA should be informed on their pollution hotline number (0800 80 70 60) and mitigation measures implemented (e.g. placement of additional silt traps, check dams, diversion of runoff or other pollution responses) to ensure that no further effects can occur. Further details on emergency response will be provided in the CEMP.

Aside from the detail above during the construction phase of the development visual information will be collected during each phase of the water quality monitoring programme. Visual field monitoring will include the following:

- Field measurements of parameters listed in Section 3.3;
- Date and time of monitoring and name of person undertaking monitoring;
- Construction activities occurring in the catchment areas of the monitoring location;
- Rainfall and weather conditions preceding and during monitoring;
- Observations of flow rate (high, moderate, or low compared to baseline/steady state at comparative time of year) and any visual/olfactory observations on water quality or potential pollution;
- Whether any samples have been taken for laboratory analysis; and
- Whether site management are to be informed of pollution concerns.

A pro-forma will be developed prior to the commencement of monitoring to ensure consistency of data recording and ease of reporting.

3.3. In-Situ Monitoring

In-situ handheld monitoring as per Item 2 in Table 3.1 will be undertaken by a nominated person trained in the use of the handheld equipment. The sampling will be undertaken from a stable bank location and no in-river working will be required as all sensors are attached to a 4 m cable that allows measurements to be collected away from potentially unstable banks or periods of high flow.

The following parameters can be monitored using the handheld equipment:

- Dissolved Oxygen;
- Electrical Conductivity;
- pH;
- Temperature; and
- Turbidity.

Further details on the justification for inclusion of the above parameters is given in Appendix C.

The use of handheld water quality monitors allows for the collection of instantaneous water quality, providing a real-time indication of water quality in the sampled watercourses.

The in-situ monitoring equipment is calibrated on a regular basis in order to maintain accuracy of the data being recorded. Text will be added to the monitoring reports which confirms that the equipment was in calibration during the data collection period, and that certificates can be provided upon request. The results of the in-situ sample collection will be captured using an App which transfers data from the field to the office using mobile data. This pre-determined form will be used in conjunction with the visual monitoring indicators described in Section 3.2. This will provide additional information which can be put into context with the conditions at the time of sample collection to fully appreciate the effects of natural climatic fluctuations on water quality as well as the influence of construction activities. If high values or exceedances are identified from the in-situ monitoring and / or Visual Turbidity and Colour observations indicate that water quality has deteriorated the sampler will observe the runoff sources entering the watercourses in order to identify the cause of the exceedance.

3.4. Water Sample Collection

Water sample collection, as per Item 3 in Table 3.1 will be followed in accordance with sample collection methods for surface water sampling. Water samples are collected using an extendable pole (up to 3 m) with a beaker attached to the end. Collecting samples in such a manner ensures that the sampler is away from the bank edge and do not need to enter the watercourses. All samples will be dispatched to the laboratory, under chilled conditions accompanied with the relevant chain of custody documentation. All samples will be dispatched to the laboratory within 24 hours of being collected. There is a standard turnaround of 5 working days to receive the results of the analysis. The UKAS accredited laboratory will analyse the collected water samples for the following parameters:

- Biological Oxygen Demand;
- Dissolved Organic Carbon;
- Iron;
- Manganese;
- Nitrate;
- Phosphate;
- Total Alkalinity;

- Total Suspended Solids; and
- Total Petroleum Hydrocarbons (TPH)*.

*TPH will be included in the monitoring suite during the construction phase only.

Further details on the justification for inclusion of the above parameters is given in Appendix C.

Sampling should be undertaken under a range of flow conditions, such as immediately after a period of heavy rainfall and after a period of no to minimal rainfall, in order to collect a representative dataset.

4. Monitoring Frequency & Duration

4.1. Baseline (Pre-construction)

Baseline monitoring will comprise of all monitoring locations and all parameters as detailed in Section 3. The monitoring shall commence for a period of at least 6 months but no more than 12 months prior to the commencement of construction.

All watercourse monitoring locations will be collected for in-situ and laboratory analysis on a monthly basis during the baseline (pre-construction) phase.

4.2. Construction

During construction daily visual monitoring will be undertaken when construction activities (i.e. ground-breaking and or erection works) are within 500 m or upstream of a monitoring location by the ECoW. Weekly visual monitoring will be undertaken at all locations by the ECoW.

All watercourse monitoring locations will be collected for in-situ and laboratory analysis on a monthly basis during the main construction phase.

Additional monitoring will be undertaken in the event that a potential pollution incident is reported during any of the weekly checks by the ECoW.

4.3. Post-Construction

All watercourse monitoring locations will be collected for in-situ and laboratory analysis bi-monthly (once every 2 months) during the post-construction phase for a period up to 1 year at which point the results will be evaluated. It is envisaged that if there is no impact noted as a result of the construction of the Development that the monitoring would be completed otherwise monitoring would be recommended to cover up to two years post-construction.

5. Reporting

The following reporting regime is proposed for the water quality monitoring programme, subject to agreement:

- Baseline report – following collection of at least 6 months of data;
- Monthly reports during main construction period; and
- Final report will provide an overall summary of construction works prior to entering the post-construction phase of water quality monitoring.

Weekly environmental reports will be prepared by the ECoW and as such will assist in the preparation of the monthly report as well as targeted laboratory sampling in the week(s) ahead. Laboratory and monitoring results shall be monitored for trends with regards to baseline levels and the control location results. Should these be exceeded immediate contact shall be made with the ECoW to inform of situation and take appropriate action on site.

A monthly report is proposed during construction. This report will consider all field monitoring and results of the laboratory analysis completed in that period. Reports shall describe how the results compare to the baseline data as well as the previously collected construction period data on water quality. The maximum (e.g. Total Suspended Solids), minimum (e.g. Dissolved Oxygen) or upper and lower limit range (e.g. pH) observed during baseline is used as a threshold limit. Results will be provided in a table and will be highlighted if they are noted to exceed the site-specific baseline criteria and they are also compared to applicable water quality standards. As part of the assessment, results should be compared with reference to the Environmental Quality Standards for freshwater rivers as provided by The Scotland River Basin District (Standards) Directions 2014[4] and Amendment Directions 2015[5]. The results will also detail any deterioration or improvement in water quality which has been observed and whether any effects are attributable to construction activities and, if so, what remedial measures or corrective actions have been implemented. Results are compared with seasonal trends and with reference to; local rainfall data, the control catchment characteristics, and maximum limits observed. Graphs which display the continuation of the dataset baseline through to construction will be displayed in the appendix of the report to allow for the longer-term trends to be observed across the eight monitored locations.

The baseline, construction, and final report (prior to post-construction) will detail the field monitoring and laboratory analysis results.

Any significant results and observations will be communicated as soon as possible by the relevant personnel to the onsite team (during construction).

Watercourse pollution incidents are preventable and a pro-active water quality monitoring campaign (inclusive of visual inspections, sampling, and reporting) alongside the development and implementation of mitigation measures will ensure the water environment does not suffer any adverse impacts as a result of the Development.

In line with available guidance, good practise measures would be employed to ensure a comprehensive coordinated approach to the management of the hydrological aspects of the Development and the surrounding environment.

[4] The Scottish Government (2014), Environmental Protections, The Scotland River Basin District (Standard) Directions 2014, https://www.gov.scot/publications/scotland-river-basin-district-standards-directions-2014/ [accessed 19/03/21]

[5] The Scottish Government (2015), Environmental Protection, The Scotland River Basin District (Standards) Amendment Directions 2015, https://www.gov.scot/publications/scotland-river-basin-district-standards-amendment-directions-2015/ [accessed 19/03/21]

Appendices

A. Consultation Responses

A.1. SEPA

From: Planning SW <planning.sw@sepa.org.uk>
Sent: 15 June 2021 07:57
To: Emma Bryder <emmab@naturalpower.com>
Cc: Benjamin.King@inchcapewind.co.uk
Subject: RE: Surface Water Quality Programme for Comment/Approval, Benbrack - SEPA Comments (Case Ref. 1581)

OFFICIAL – BUSINESS

Good morning Emma,

Thank you for sharing the Water Quality Monitoring Plan for Benbrack Wind Farm. We can confirm that we don't have any specific concerns with the sampling or pre-construction testing. In terms of sample points, we will expect more visual checkpoints during construction and recommend this include a visual check on the Meadowhead Burn upstream of the access track.

As you will be aware, you will require to obtain a construction site licence (CSL) under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) for the management of surface water run-off during construction. We are content to review further information on this matter at that point and closer to the construction stage. Further details on requirements for CSLs can be obtained on our website: https://www.sepa.org.uk/regulations/water/pollution-control/construction-site-licences/

Kind regards,
Simon

Simon Watt
Senior Planning Officer
Scottish Environment Protection Agency | Strathearn House | Broxden Business Park | Lamberkine Drive | Perth PH1 1RX
e: simon.watt@sepa.org.uk
w: http://www.sepa.org.uk/environment/land/planning

A.2. Galloway Fisheries Trust

RE: Surface Water Quality Programme for Comment/Approval, Benbrack

Reply | Reply All | Forward | ...

Tue 25/05/2021 11:16

Jamie Ribbens <jamie@gallowayfisheriestrust.org>
To Emma Bryder [NPC]
Cc Benjamin King

Dear Emma
Thank you for sending through the document. I have had a chance now to have a look.

The sampling strategy and sites are sensible. From GFT's point of view we are particularly interested to ensure any water quality impacts do not go far enough to impact on the main fish supporting burns such as Brownhill Burn so would be keen for a sampling point to be on the main burn below where all of the potential pollution sources could join from. I understand why you would be wary of this as other nearby developments could influence the water quality here but could it be considered please. It would need to be recognised that other developments could cause impacts at that point but if the ECoW picked up concerns he could investigate back to double check it was not associated with your development.

Also while I fully support checking pH due to the risk that any damage to peatland could lower pH I do think you need to consider a detailed sampling strategy that takes account of water heights as pH changes so much depending on water flows. I do feel it is important to monitor pH but this should be done during flood conditions to pick up the scale of any lowered pH figures which is when they would impact on fish. Random pH figures collected at a range of water heights will not really provide very useful data to allow any conclusions to be drawn from.

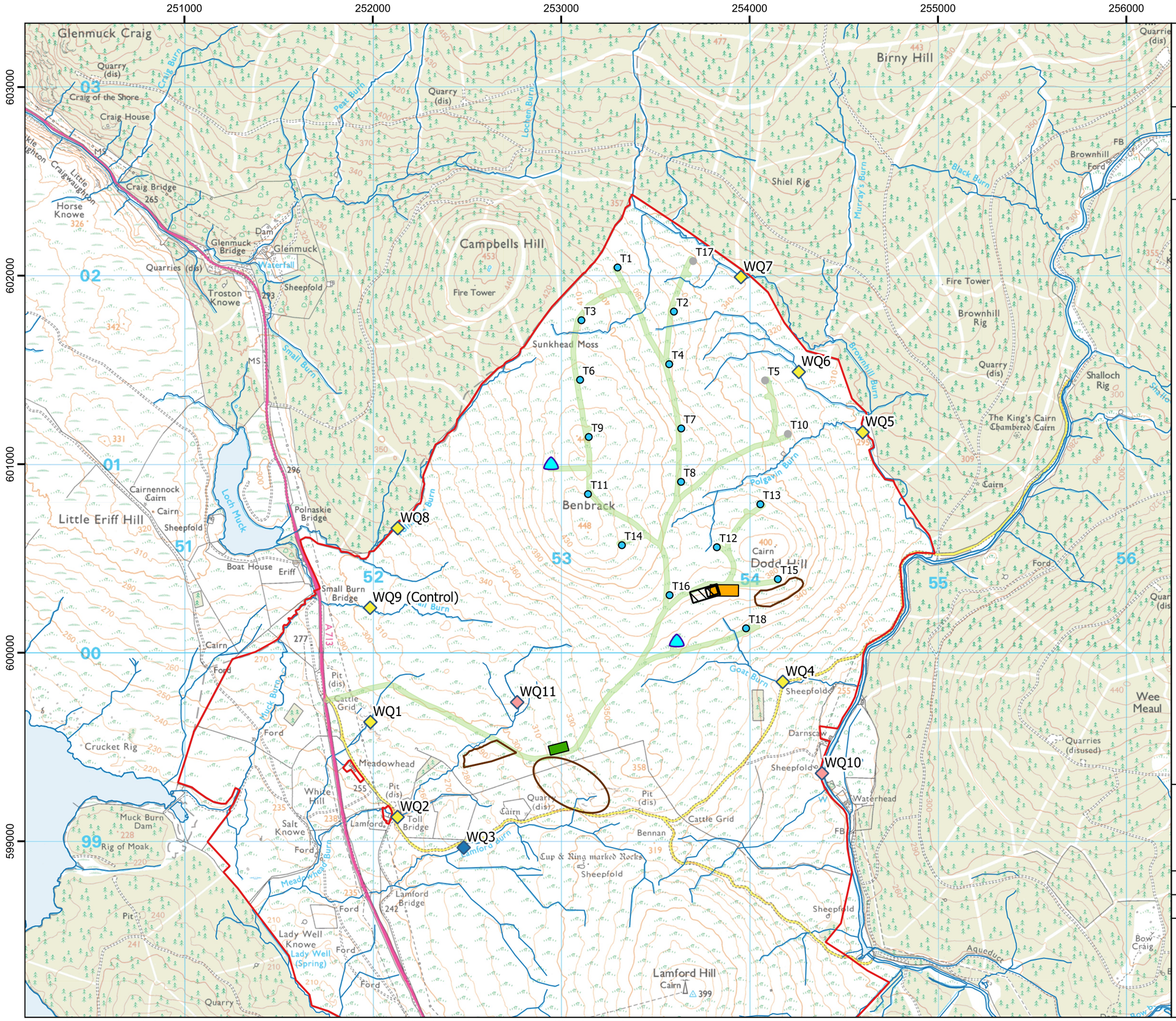
Regards
Jamie

Jamie Ribbens BSc (Hons) MSc
Senior Fisheries Biologist

Galloway Fisheries Trust, Fisheries House, Station Industrial Estate, Newton Stewart, Wigtownshire, DG8 6ND
Tel: 01671 403011
A Scottish Registered Charity (No. SC 020751)

E: jamie@gallowayfisheriestrust.org W: www.gallowayfisheriestrust.org

B. Water Quality Sampling Map



Project:

Benbrack Wind Farm

Title:

Water Quality Monitoring Map

Key

- Site boundary

Water sampling point

- Visual & Insitu
- Visual, Insitu & Extractive
- Visual

Turbine

- Proposed not to be built
- Proposed to be built
- Anemometry mast
- Surface water
- Borrow pit
- Substation
- Consented track micrositing corridor
- Construction compound
- Consented substation

Scale @ A3: 1:20,000

Coordinate System: British National Grid

0 125 250 375 500 m

N

Date: 29-06-21	Prepared by: EB	Checked by: FC
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C. Suite of Determinants for Monitoring

Table C.1: Suite of parameters for analysis

Suite	Units	Description/Justification
Dissolved Oxygen	mg/l	A measure of the free oxygen within water, necessary to aquatic life.
Electrical Conductivity	µS/cm	Useful indicator of the overall salinity of surface water.
pH	pH Units	Overall water quality parameter which could indicate effects of water acidity due to changes with forestry removal and disturbance of peat soils.
Temperature	ºC	General physical indicator.
Turbidity	NTU	A control mechanism most measurable on site. The most noticeable indicator of impact to a watercourse.
Biological Oxygen Demand	mg/l	A measure of the biologically degradable substances in water and a standard surface water quality parameter.
Dissolved Organic Carbon	mg/l	Key component of carbon cycle and known to be sensitive to development on peatland. Organic carbon can help reduce metal toxicities. May correlate closely with Colour.
Iron	mg/l	Aeration of iron-containing layers in the soil can affect the quality of both groundwater and surface water if the groundwater table is lowered or nitrate leaching takes place. Dissolution of iron can occur as a result of oxidation and decrease in pH.
Manganese	µg/l	Manganese occurs naturally in many surface water and groundwater sources and in soils that may erode into these waters. However, human activities are also responsible for much of the manganese contamination in water in some areas.
Nitrate	mg/l	Nitrate end product of nitrogen pollution. Principal nutrient and standard nutrient parameter. Indicator of background pollution and needed for assessing any impact of forestry removal or ground disturbance during construction.
Phosphate	µg/l	Known to occur as pulse after ecosystem disruption and may lead to eutrophication (algal blooms), can increase with felling.
Total Alkalinity	mg/l	Acid neutralising capacity of water.
Total Suspended Solids	mg/l	Is a measure of water quality for construction developments and hence a limit is generally specified for discharges from construction sites.
Total Petroleum Hydrocarbons	mg/l	TPH is a term used to describe a large family of several hundred chemical compounds that originally come from crude oil. Crude oil is used to make petroleum products, which can contaminate the environment.

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