

Appendix 13.5 Outline Surface Water Quality Monitoring Plan

Appendix 13.5 Surface Water Quality Monitoring Plan

Executive Summary

- 13.5.1 The outline water monitoring plan is subdivided into three types of monitoring to ensure a flexible approach for the full lifecycle of the proposed wind farm, which allows for monitoring activities to be scaled up or down based on environmental risk.
- 13.5.2 The monitoring plan will be reviewed at key stages throughout the development, including immediately prior to commencement construction to ensure that the plan remains relevant and focussed on planned site activities.
- 13.5.3 Illustration TA13.5.1 provides a summary of the outline monitoring plan for the proposed wind farm.

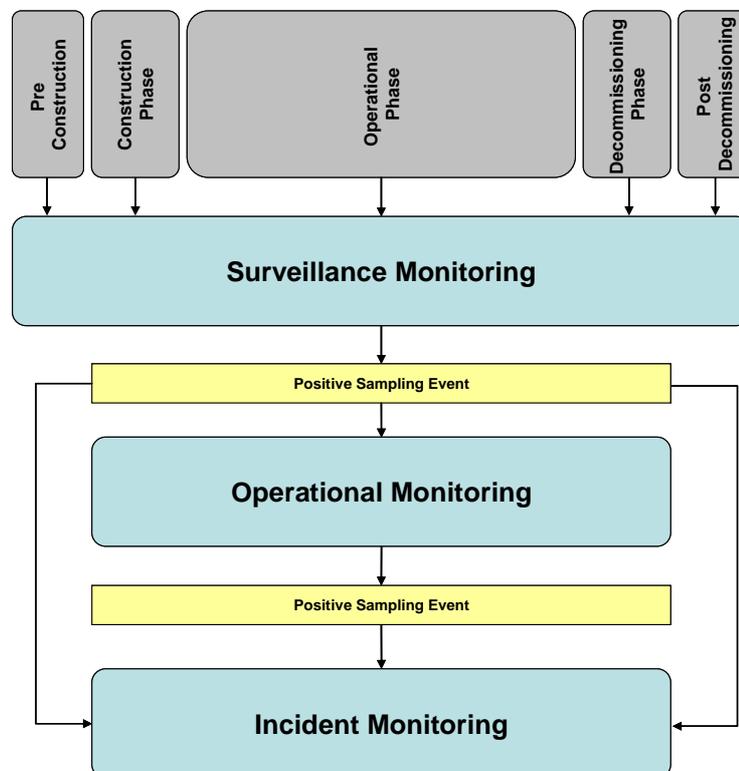


Illustration TA13.5.1 Surface Water Monitoring Summary

Introduction

- 13.5.4 This is a Technical Appendix (TA) to Chapter 13: Hydrology, Hydrogeology and Ground Conditions of the Environmental Statement (ES) for West Benhar Wind Farm and should be read with reference to this chapter.
- 13.5.5 RPS was commissioned by Partnership for Renewables (PfR) in August 2012 to complete an ES for the proposed wind farm of which this chapter forms a part.
- 13.5.6 The following outline Surface Water Quality Monitoring Plan has been produced in order to support the ES and in so doing the requirements of planning application for the proposed wind farm.

- 13.5.7 The final draft of this document should be prepared once the detailed site investigation works are complete and before any construction works commence on site. The final document should be prepared in liaison with the relevant regulators and approved by them prior to construction activities.

Scope

- 13.5.8 This document has been produced in support of Chapter 13 (Hydrology, Hydrogeology and Ground Conditions) of the ES for the West Benhar Wind Farm.
- 13.5.9 The purpose of this document is to provide an outline water quality monitoring plan for the proposed wind farm, which will be incorporated within the site Health, Safety and Environmental Management System (HSEMS).
- 13.5.10 At present, it is only possible to provide an outline monitoring plan as the details can only be added when the final construction and operational details have been confirmed, i.e. once planning permission has been granted and any associated planning conditions and permits have been confirmed. Once these details are available, the monitoring plan will be revised and updated accordingly.

Objectives

- 13.5.11 The objectives of the surface water monitoring plan are to:
- establish the baseline water quality parameters;
 - verify compliance with the Water Environment (Controlled Activities)(Scotland) Regulations 2011;
 - verify compliance with any licences, permits or planning conditions;
 - ensure the effectiveness of mitigation measures in place;
 - ensure the effectiveness and suitability of infrastructure design; and
 - identify any incidents of non-compliance, and provide guidance on appropriate actions.
- 13.5.12 Where incidents occur, reasons for non-compliance should be established, so that any shortfalls in mitigation measures or in site practices are identified early, mitigation measures adjusted accordingly and the monitoring plan revised if necessary.

Monitoring Approach

- 13.5.13 The EIA identifies that the proposed wind farm poses a potential risk to the water environment, and that any impacts on water quality and river flows may give rise to secondary impacts on designated drinking water bodies, aquatic flora and fauna both within and downstream of the site.
- 13.5.14 As a result of these potential impacts, to minimise any effects on the environment, mitigation measures will be put in place. However, monitoring of the surface water within the site is required to ensure the effectiveness of these measures in protecting the baseline environment and to identify any failures or pollution incidents quickly to allow for a decisive and effective response.

- 13.5.15 The surface water monitoring plan is made up from three separate types of monitoring, to ensure that suitable approach to monitoring is adopted at appropriate points throughout the life cycle of the development, providing a flexible monitoring methodology that can be scaled up or down based on the stage of the development. These three types of monitoring are:
- surveillance monitoring;
 - operational monitoring; and
 - investigative monitoring.
- 13.5.16 Surveillance monitoring represents the minimum long term monitoring regime that will be in place for the life time of the proposed wind and will form the foundation of the site Surface Water Monitoring Plan.
- 13.5.17 The purpose of the surveillance monitoring is to monitor set locations regularly for signs of deterioration of the quantity or quality of water leaving the site, and will act as a trigger for investigative monitoring if any issues are identified.
- 13.5.18 The results of the surveillance monitoring will also establish a baseline for water quality for the site, and enable an assessment of any long-term changes resulting from the development.
- 13.5.19 Operational monitoring is additional short- to medium-term monitoring required for specific high risk activities, and will be predominantly used during the construction and decommissioning phases. During these phases, the operational monitoring would form part of the site Surface Water Management Plan.
- 13.5.20 The purpose of operational monitoring is to monitor the water environment that may be impacted by specific high-risk or sensitive activities, such as concrete batching or pouring, or from the presence of sensitive infrastructure, such as upgraded water crossings or tracks in peat deposits. The monitoring is more focussed and detailed than the surveillance monitoring, and will remain in place while the works are underway and for a short time afterwards.
- 13.5.21 The results of the operational monitoring can be used to demonstrate any localised changes resulting from specific activities or developments, and compared to the wider long-term changes to the site.
- 13.5.22 Investigative monitoring takes place when an incident is identified through the surveillance monitoring, or during operational monitoring, where the water environment is known to have been impacted, but the cause of the incident is unclear.
- 13.5.23 The purpose of the investigative monitoring is to locate the cause(s) of the incident and trigger an incident response, including any remediation measures required.
- 13.5.24 The results of the investigative monitoring should allow the site operators and regulators to ascertain the magnitude of the incident and assess what it may have had on water quality and downstream receptors. As such, investigative monitoring may remain in place as long as the incident continues and as long as its impacts are felt.

Surveillance Monitoring

- 13.5.25 The surveillance monitoring will include sampling of the following basic parameters:
- Visual Inspection (e.g. for suspended solids and oil sheen);

- BOD;
- COD;
- pH;
- Total Dissolved Solids/Conductivity; and
- Temperature.

- 13.5.26 The full suite of monitoring proposed will be subject to revision based on the findings of any investigations to characterise any potential contaminated land sources (see TA 13.2).
- 13.5.27 The proposed locations of the surveillance monitoring points are shown in Figure TA 13.5.1, and have been selected to ensure all potential surface water receptors are monitored from a location that is easy to access.
- 13.5.28 The final monitoring locations will be discussed and agreed with the regulators prior to the commencement of monitoring activities.
- 13.5.29 It is recommended that the frequency and duration of monitoring vary with the phase of the proposed wind farm, as provided in Table 1 below.

Table 1 Frequency of Surveillance (Chemical) Monitoring

Phase	Frequency	Duration
Pre-Construction	Monthly	Six months
Construction	Visual inspection – twice a day Other parameters – weekly	Throughout phase
Operational	Quarterly	Throughout phase
Decommissioning	Twice Daily	Throughout phase
Post-Decommissioning	Monthly	Six months

- 13.5.30 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.
- 13.5.31 The monitoring locations will be clearly marked to ensure the same locations are used throughout all phases, thereby allowing comparison of results over time and easy identification of trends away from the baseline.
- 13.5.32 The results of the surveillance monitoring will be kept on site as part of the site Surface Water Management Plan during the construction, operational and decommissioning phases of the development, and be made available to regulators on request. A monitoring proforma will be drawn up to ensure consistency of records. Completed monitoring forms will be stored on site.

Operational Monitoring

- 13.5.33 The operational monitoring locations will be confirmed and/or updated immediately prior to the commencement of each of the construction, operational and decommissioning phases.
- 13.5.34 The operational monitoring will include inspection of mitigation measures and key infrastructure that has been identified as having the potential to impact the water environment.

13.5.35 Operational monitoring can be split into two subgroups, activity related operational monitoring and infrastructure based operational monitoring.

Activity Related Operational Monitoring

13.5.36 Where certain higher risk activities are being undertaken, it will be necessary to monitor them and the local water environment that may be affected.

13.5.37 The final list of activities that will require monitoring should be confirmed prior to commencement of the construction phase and reviewed regularly until the completion of the decommissioning phase. However, as a minimum, the following activities should be monitored:

- earthworks (e.g. excavations, bunding, soil stripping etc);
- refuelling activities;
- any discharge points (e.g. from treatment ponds or welfare facilities);
- any abstraction points (e.g. for dust suppression or concrete batching);
- concrete batching and pouring;
- temporary stockpiling of materials (inc. chemicals, oils, fuel and soils); and
- wheel washing.

13.5.38 The operational monitoring for these activities will form part of the site method statement for undertaking the activity. Copies of each activity method statement, including the required monitoring, should be kept on site in the appendices of the Surface Water Management Plan for reference.

13.5.39 The parameters to be included in the operational monitoring will be dependant on the type of activity being monitored, though visual inspection and observation will form the foundation of the monitoring.

13.5.40 Weather conditions will be an important factor in managing the risks posed by activities during construction, therefore all activity related operational monitoring will include review of the forecast weather 7 days prior to the scheduled start date of an activity, so that the activity can be rescheduled to avoid adverse weather conditions if necessary.

13.5.41 Records of the activity specific monitoring will be stored on site and made available to regulators for review on request. A monitoring proforma will be drawn up to ensure consistency of records. Completed monitoring forms will be stored on site.

13.5.42 The frequency and duration of the operational activity monitoring is shown in Table 2.

Table 2 Frequency of Activity Operational Monitoring

Phase	Frequency	Duration
Pre-Construction	N/A	N/A
Construction	As required	As required
Operational	As required	As required
Decommissioning	As required	As required
Post-Decommissioning	N/A	N/A

Infrastructure Related Operational Monitoring

- 13.5.43 Checking the integrity of infrastructure and suitability of design is the other aspect of operational monitoring, as these have the potential to allow for the release of pollutants, affect flow, increase erosion or change sedimentation patterns.
- 13.5.44 The final list of infrastructure within the site that will require monitoring, and its location, should be confirmed prior to commencement of the construction phase, and reviewed as required, until the completion of the decommissioning phase. However, as a minimum, the following types of infrastructure should be monitored:
- chemical and oil storage containers, bunds and areas;
 - any processing areas;
 - buildings;
 - parking areas;
 - site drainage Ditches;
 - treatment/SuDS ponds; and
 - water crossings.
- 13.5.45 The monitoring of infrastructure will be visual, and assess if the infrastructure meets its design brief and best practice and if it is fit-for-purpose will form part of the site method statement for undertaking the activity. Copies of each activity method statement, including the required monitoring, should be kept on site in the appendices of the Surface Water Management Plan for reference.
- 13.5.46 The parameters to be included in the operational monitoring will be dependant on the type of activity being monitored, though visual inspection and observation will form the foundation of the monitoring.
- 13.5.47 Records of the activity specific monitoring will be stored on site and made available to regulators for review on request.
- 13.5.48 The nature of the monitoring will be predominantly visual with photographs taken as part of the recording process. A monitoring proforma will be drawn up to ensure consistency of records. Completed monitoring forms will be stored on site.
- 13.5.49 The frequency and duration of the operational infrastructure monitoring is shown in Table 3.

Table 3 Frequency of Infrastructure Operational Monitoring

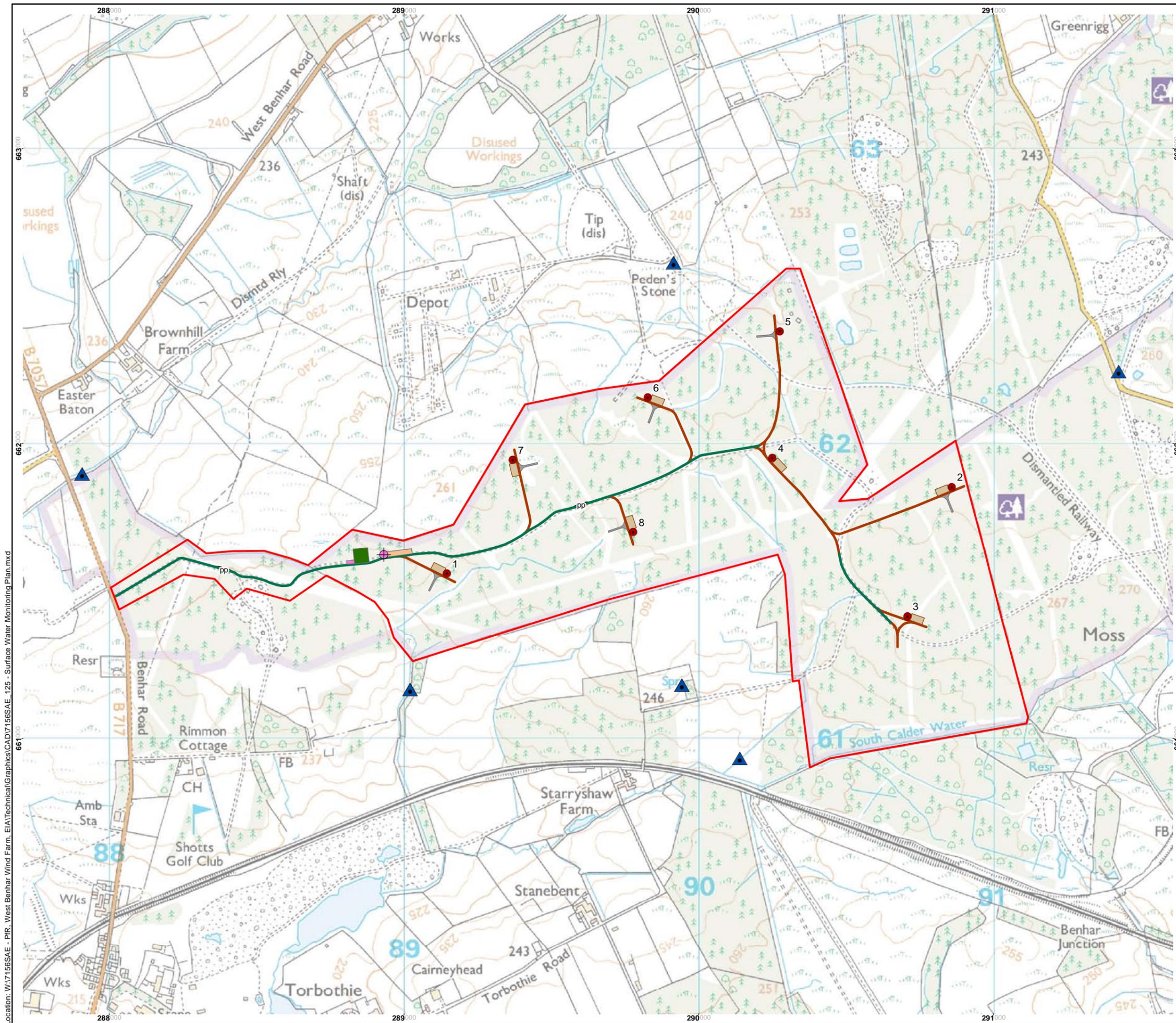
Phase	Frequency	Duration
Pre-Construction	N/A	N/A
Construction	Daily - weekly	Throughout phase
Operational	Quarterly - yearly	Throughout phase
Decommissioning	Daily - weekly	Throughout phase
Post-Decommissioning	If required.	As required.

Incident Monitoring

- 13.5.50 In the event of an incident, identified through the surveillance or operational monitoring, it will be necessary to confirm the origin, as well as its magnitude and the extent of any impact on the receiving environment through additional incident monitoring.
- 13.5.51 When an incident is identified at one of the surveillance monitoring point downstream, the upstream incident monitoring points are automatically sampled to trace the incident back to its source and to confirm the extent of the incident. Sampling from several points along the watercourse affected, including upstream of any incident, will also allow for the magnitude of the impact and it's attenuation along the surveyed reach to be assessed.
- 13.5.52 Once the source of the incident has been confirmed, and a suitable response is underway, it will be necessary to continue incident monitoring to ensure the effectiveness of the remediation measures taken, and ensure there are no residual impacts.
- 13.5.53 The frequency, duration and sampling parameters of monitoring vary with dependant on the nature and extent of the incident that has occurred, and specialist advice should be sought where the incident includes the release of chemicals, fuels or oils into a watercourse, if the source of the incident cannot be found, or if the magnitude of the release is significant.
- 13.5.54 All incidents should be reported to the regulators and records of the cause, magnitude and remediation measures take, along with the monitoring regime and results, should be kept on site so that any patterns or repeats of similar incidents can be noted.

Periodic Plan Review

- 13.5.55 The monitoring plan should be reviewed at key stages of the development of the proposed wind farm and periodically within phases to ensure it remains relevant and effective.
- 13.5.56 As a minimum, the plan should be reviewed at the following stages:
- on award of planning permission and confirmation of construction details;
 - annually during construction;
 - on completion of construction;
 - every 3 years during operation;
 - 6 months prior to decommissioning; and
 - on completion of decommissioning.
- 13.5.57 In the event that there is considered no need to alter the monitoring plan, that decision and the date should still be recorded in the monitoring plan.






A CARBON TRUST ENTERPRISE

Legend

- Application site boundary
- Proposed turbine locations
- Existing access track (to be upgraded)
- Proposed access track
- Proposed control building and compound
- Proposed temporary construction compound
- Proposed crane hardstanding
- Proposed turning area
- PP Proposed passing place
- + Permanent met mast location (288932, 661623)
- Permanent met mast laydown area
- Surface Water Monitoring Locations



Project name: West Benhar Wind Farm

Title : Surface Water Monitoring Locations

Date: 23/05/2013 **Created by :** AS **Checked :** OB

Scale @ A3 1:12,500
0 0.05 0.1 0.2 0.3 0.4 0.5 Kilometres

REV: - **A3** **Figure :** 13.5.1

Location: W:\7156SAE - PR - West Benhar Wind Farm - EIA\Technical\Graphics\CAD\7156SAE - 125 - Surface Water Monitoring Plan.mxd

Appendix 13.6 Site Photos

Appendix 13.6 Site Photos



Photo 1 Site entrance viewed from road



Photo 2 Existing site entrance drainage



Photo 3 B717 from site entrance facing north, with drainage ditch running parallel to road on the right



Photo 4 View from entrance looking west to the North Shotts and Hassock Rigg SSSI and SAC



Photo 5 View from site entrance facing south west showing topography flowing towards site



Photo 6 Burn, facing upstream, adjacent to northern edge of track by first passing place along existing site track. Track to right of picture



Photo 7 Burn, facing downstream, adjacent to northern edge of track by first passing place along existing site track, flowing away from site



Photo 8 Area of standing water adjacent to track, small flow through drainage channel under track. Typical of similar areas across the site



Photo 9 Road drainage typical of the site



Photo 10 Example of an abandoned mine shaft adjacent to access track. Area of deep standing water, fenced off. Water overflows, draining west, via a small channel, northwards



Photo 11 Area of water draining from forestry track into drainage channel under the road and into the standing water in the mine shaft



Photo 12 Typical area of felled forestry with areas of standing water and small discontinuous drainage features



Photo 13 Abstraction pond in case of fire, marked on OS maps as 'issues'. Water overflows in a southwesterly direction into a small drainage channel under track