Technical Appendix 9.2: Watercourse Crossing Assessment

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9.2.1 Introduction

9.2.1.1 As part of the Environmental Impact Assessment (EIA) process, it was identified that all watercourse crossings are located on existing access tracks and will therefore require upgrading to meet the needs of the Proposed Development.

9.2.1.2 The purpose of this Technical Appendix is to provide a conceptual assessment of watercourse crossings and to outline the strategic approach to proposed crossings. This Technical Appendix does not comment on the detailed engineering design. The Principal Contractor (the 'Contractor') would have overall responsibility for the detailed design of water crossings, for the production of a final Watercourse Crossing Plan and for compliance with the Environmental Authorisations (Scotland) Regulations (EASR) and the Scottish Environment Protection Agency's (SEPA) good practice guidance[1] at the post-consent stage.

9.2.1.3 This Technical Appendix identifies the locations of proposed crossings and sets out the general principles of design which the Contractor would be required to follow to minimise changes to the hydrological regime and reduce any potential impacts on river morphology and aquatic ecology, without detailed baseline assessment of watercourses.

9.2.2 Legislation

9.2.2.1 The water environment in Scotland is managed through a legal framework built around the EU Water Framework Directive (WFD) which aims to protect and enhance the quality of surface freshwater (including lakes, rivers and streams), groundwater, Groundwater Dependent Terrestrial Ecosystems (GWDTEs), estuaries and coastal waters. Scottish Ministers, SEPA and a range of public bodies have a legal duty to secure compliance with the WFD.

9.2.2.2 The key objectives of the WFD relevant to this assessment are:

- To prevent deterioration and enhance aquatic ecosystems; and
- To establish a framework of protection of surface freshwater and groundwater.

9.2.2.3 The WFD has been transposed into Scottish legislation as the Water Environment and Water Services (Scotland) Act 2003 (WEWS Act), which gives Scottish Ministers powers to introduce regulatory controls over water activities, in order to protect, improve and promote sustainable use of Scotland's water environment.

9.2.2.4 From 01 November 2025, the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended in 2021) (CAR) have been replaced by the Environmental Authorisations (Scotland) Regulations (EASR) (2018)[2].

9.2.2.5 EASR guidance sets out the required level of authorisation for engineering works in the environment and provides specific guidance for watercourse crossings (under Engineering Activities)[3].

9.2.2.6 The SEPA Position Statement on Culverting of Watercourses (WAT-PS-06-02)[4] and Supporting Guidance on Sediment Management (WAT-SG-78)[5] have also been taken into account within this Technical Appendix, along with the supporting guidance provided in the River Crossings Good Practice Guide[6].

9.2.3 Identification of Watercourse Crossing Locations

9.2.3.1 Following a desk-based review of surface water features (based on OS 1:10,000 mapping and aerial imagery), the desk-based identification of surface water features was followed up with a Site walkover which was conducted by Ramboll in June 2024. This field survey of likely crossings, based on the proposed alignment of track infrastructure for the Proposed Development, have has been used to determine various watercourse characteristics in order to identify the likely level of EASR authorisation required. A total of twenty-one potential watercourse crossings were identified, as presented in Table 9.2.1 below and Figure 9.2.1. A photographic record of watercourses surveyed during the site walkover is provided in Annex 1 of this report.

Table 9.2.1: Watercourse Crossing Identification

WCC ID	Crossing Category	Description	Grid Reference	
			X	Y
WC1	Existing Crossing	Ephemeral Flow Path	261086	867123
WC2	Existing Crossing	Ephemeral Flow Path	261040	867138
WC3	Existing Crossing	Small Minor Watercourse	260530	867231
WC4	Existing Crossing	Ephemeral Flow Path	260119	867814
WC5	Existing Crossing	Ephemeral Flow Path	259513	867920
WC6	Existing Crossing	Watercourse	257996	867043
WC7	Existing Crossing	Ephemeral Flow Path	257831	867180
WC8	Existing Crossing	Ephemeral Flow Path	257440	867217
WC9	Existing Crossing	Ephemeral Flow Path	257396	867252

[1] Scottish Environment Protection Agency (SEPA) (2025) *Crossings*. Available at: https://beta.sepa.scot/regulation/authorisations-and-compliance/easr-authorisations/water-activities/engineering/crossings/ [Accessed December 2025].

[2] SEPA Environmental Authorisations (Scotland) Regulations (EASR) (2018) https://www.legislation.gov.uk/sdsi/2018/9780111039014/contents (Accessed December 2025)

[3] Scottish Environment Protection Agency (2025) *Engineering – Water activities*. Available at: https://beta.sepa.scot/regulation/authorisations-and-compliance/easr-authorisations/water-activities/engineering/ [Accessed December 2025].

[4] Scottish Environment Protection Agency (SEPA) (2015) *WAT-PS-06-02: Culverting of Watercourses – Position Statement and Supporting Guidance*. Version 2.0, June 2015. Available at: https://www.sepa.org.uk/media/150919/wat_ps_06_02.pdf [Accessed December 2025].

[5] Scottish Environment Protection Agency (SEPA) (2012) *Water Use Supporting Guidance (WAT-SG-78): Sediment Management Authorisation*. Version 1, December 2012. Available at: https://www.sepa.org.uk/media/151062/wat-sg-78.pdf [Accessed December 2025].

[6] Scottish Environment Protection Agency (SEPA) (2010) *Engineering in the Water Environment: Good Practice Guide – River Crossings* (WAT-SG-25), 2nd ed., November 2010. Available at: https://www.sepa.org.uk/media/151036/wat-sg-25.pdf [Accessed December 2025].

Table 9.2.1: Watercourse Crossing Identification

WCC ID	Crossing Category	Description	Grid Reference	
			X	Y
WC10	Existing Crossing	Ephemeral Flow Path	257374	867599
WC11	Existing Crossing	Ephemeral Flow Path	257367	867813
WC12	Existing Crossing	Watercourse	256982	868263
WC13	Existing Crossing	Watercourse	256753	868515
WC14	Existing Crossing	Ephemeral Flow Path	256682	868669
WC15	Existing Crossing	Ephemeral Flow Path	256566	868919
WC16	Existing Crossing	Ephemeral Flow Path	256439	869118
WC17	Existing Crossing	Small Minor Watercourse	256191	869600
WC18	Existing Crossing	Small Minor Watercourse	254648	870658
WC19	Existing Crossing	Ephemeral Flow Path	257358	872144
WC20	Existing Crossing	Watercourse	257960	873431
WC21	Existing Crossing	Ephemeral Flow Path	256478	870627

9.2.4 Type of Crossing

9.2.4.1 Watercourse characteristics, both physical and ecological, will be matched to the most appropriate crossing type as part of detailed design. The potential crossing types typically considered are described below:

- **Bottomless Box/Arches**: can be used where there are watercourses narrower than those appropriate for bridge construction, but which have a requirement to provide mammal and/or fish passage and ensure sufficient hydraulic capacity during peak flow periods. Arches minimise disruption to the stream bed. Box culverts may incorporate mammal ledges and can be buried below stream bed level to enable bed material replacement; and
- **Circular Culverts**: where potential impact is negligible due to the size, location or typology of the watercourse, circular culverts can be embedded into the channel to allow the natural bed to re-establish and, where necessary, provision can be made for mammals adjacent to the culvert. Where a circular culvert is utilised, it is assumed that neither natural bed material, nor water velocity nor depth are critical other than in the purely hydraulic sense; and

9.2.4.2 Generally bottomless culverts or single span bridges would be the preferred options for watercourses wherever feasible, in order to minimise alteration of the hydromorphology of watercourses and to reduce potential impact on aquatic habitats.

9.2.4.3 At locations where a culverted crossing is already in place or where drains or ephemeral flow paths have been recorded, it is likely that crossings will comprise circular culverts. At more natural, larger watercourses (WC21) it is anticipated that the single span bridge would be retained.

9.2.4.4 **Figure 3.7 (EIAR Volume 3a)** indicates that the typical watercourse crossing types proposed across the scheme comprise circular culverts and bottomless arch structures. These align with the general design approach outlined above, with circular culverts likely to be utilised in more constrained or previously modified channels, and bottomless arches preferred where maintaining natural bed and bank conditions is feasible.

9.2.5 EASR Authorisations

9.2.5.1 In accordance with SEPA guidance, most engineering activities on minor watercourses, defined as watercourses not depicted on the 1:50,000 Ordnance Survey Landranger maps, do not require authorisation under the EASR. This exemption applies to activities that may affect the water environment, with the exception of culverting for land gain, dredging, and permanent diversions or realignments.

9.2.5.2 However, SEPA retains the power to take enforcement action where an activity, even if not requiring authorisation, causes or is likely to cause environmental harm. Where authorisation is required, four categories of EASR authorisation may apply, as outlined below.

General Binding Rules (GBRs)

9.2.5.3 GBRs apply to defined low-risk activities and set out mandatory conditions that must be complied with in full. If an activity is covered by a GBR and the rules are met, it is considered authorised automatically and no separate application or notification to SEPA is required.

Notification

9.2.5.4 Notifications apply to low-risk activities for which SEPA must be informed of the works and the responsible party. No regulatory decision is involved, and the activity becomes authorised immediately upon notification.

Registration

9.2.5.5 Registrations are required for activities that warrant a simple assessment prior to authorisation. SEPA will determine whether to grant or refuse authorisation following the submission of a registration application. Activities authorised under a registration must comply with a defined set of standard conditions.

Permits

9.2.5.6 Permits are used for higher risk and non-standard activities that need a rigorous assessment before SEPA decide to grant or refuse the application. Activities that need a detailed Fit and Proper Person assessment, bespoke conditions or involve public consultation will be authorised under a permit.

Requirements for Bridges and Other Crossings

9.2.5.7 The detailed design of watercourse crossings for the Proposed Development will be undertaken by the appointed contractor, who will also be responsible for preparing and submitting the required EASR applications to SEPA.

Likely Levels of EASR Authorisation

9.2.5.8 For the purpose of this assessment, a conservative approach has been adopted. Where circular culverts are anticipated for crossings of smaller watercourses, it is assumed that a Registration will be required. This level of authorisation is also likely to apply to smaller bottomless culverts where engineering works to the watercourse banks may be necessary. Crossings with a clear span or width greater than 2 m are considered higher-risk and therefore assumed to require a Permit.

9.2.5.9 Based on the assessment of the watercourses crossed by the proposed access tracks, it is anticipated that the levels of authorisation shown in Table 9.2.2 would be required under EASR.

Table 9.2.2: Likely Levels of EASR Authorisation

WCC ID	Likely Level of EASR Authorisation	Basis of the EASR Authorisation	Grid Reference	
			X	Y
WC1	Registration	Existing circular culvert crossing approx. 0.7 m wide	261086	867123
WC2	Registration	Existing circular culvert crossing approx. 0.5 m wide	261040	867138
WC3	Registration	Existing circular culvert crossing approx. 0.5 m wide	260530	867231
WC4	Registration	Existing watercourse crossing, assumed to be a circular culvert. Unable to see due to vegetation	260119	867814
WC5	Registration	Existing circular culvert crossing approx. 0.5 m wide	259513	867920
WC6	Registration	Allt Riabhach circular culvert approx. 0.5 m wide	257996	867043
WC7	Registration	Existing crossing, no culvert visible, approx. 0.3 m wide	257831	867180
WC8	Registration	Existing crossing in an incised channel, approx. 0.2 m wide	257440	867217
WC9	Registration	Existing crossing in an incised channel, approx. 1 m wide	257396	867252
WC10	Registration	Existing circular culvert crossing approx. 0.5 m wide	257374	867599
WC11	Registration	Existing watercourse crossing, assumed to be a circular culvert. Unable to see due to vegetation	257367	867813
WC12	Registration	Allt an Fhigheadair, existing circular culvert crossing approx. 1 m wide	256982	868263
WC13	Permit	Allt Achadh nan Gall, located in an incised channel approx. 2 m wide	256753	868515
WC14	Registration	Existing circular culvert crossing approx. 0.5 m wide	256682	868669
WC15	Registration	Existing watercourse crossing, assumed to be a circular culvert. Unable to see due to vegetation	256566	868919
WC16	Registration	Existing watercourse crossing, assumed to be a circular culvert. Unable to see due to vegetation	256439	869118
WC17	Registration	Existing circular culvert crossing approx. 1 m wide	256191	869600
WC18	Registration	Existing circular culvert crossing approx. 0.7 m wide	254648	870658
WC19	Registration	Cut drain/flow path	257358	872144
WC20	Permit	Allt na Seasgaich, approx. 4 m wide	257960	873431
WC21	Registration	Cut drain/flow path	256478	870627

9.2.6 Watercourse Crossing Design

9.2.6.1 The detailed design of each watercourse crossing shall seek to ensure hydraulic conveyance is maintained to prevent any restriction of flows, as well as allowing the free passage of mammals and aquatic ecology, including provision of suitable ledges or mammal crossings to ensure free passage to otters during periods of high water-flow. Therefore, it is proposed each watercourse crossing would have sufficient capacity to pass the climate change adjusted 1:200-year flood and include an allowance for potential partial blockage.

9.2.6.2 Where closed culverts are employed, they shall be oversized such that the base of culvert may be below the natural bed level of the watercourse allowing the naturalisation of the culvert bed substrate. Culverts shall follow the natural flow path and gradient of watercourses to which they are installed and shall be designed such that they do not represent a barrier to fish and other fauna. Culverts shall not include screening.

9.2.6.3 Detailed flow calculations would be undertaken by the Contractor to inform detailed design and to inform applications for EASR authorisation. Were any new crossings identified, consideration would be given to any local variations in channel dimensions and to bankside conditions. Where feasible within micro-siting allowances, the narrowest locations would be selected, and the stability of the channel banks would also be considered. The Contractor shall submit a detailed plan of proposed watercourse crossings to SEPA for acceptance.

9.2.6.4 At crossing location WC20 (Allt na Seasgaich), the watercourse is situated within an area identified as having a high likelihood of fluvial flooding. This flood extent covers approximately 35 m, including the watercourse itself, measuring roughly 4 m in width, and the adjacent land. Aerial imagery indicates an existing single-span bridge is present at this location, and it is anticipated that this structure would be retained and upgraded, with no requirement for in-channel works. Consistent with the approach adopted for other crossings, the upgraded bridge would be designed to accommodate the 1 in 200-year flood event, inclusive of allowances for climate change.

9.2.7 Conclusions

9.2.7.1 This TA sets out the conceptual approach to watercourse crossings, to demonstrate that the approach taken would align with the EASR guidance for crossings (engineering in the water environment) and would ensure the condition of the surrounding water environment would not be negatively impacted.

9.2.7.2 Watercourse crossings would be designed in line with SEPA guidance such that crossing would:

- Have sufficient capacity to pass the climate change adjusted 1:200-year flood; and
- Allow the free passage of mammals and aquatic ecology.

9.2.7.3 Closed culverts, where employed, will be oversized to allow naturalisation of the culvert bed substrate, ensuring they do not obstruct the passage of fish and other fauna.

9.2.7.4 Post-consent, the Principal Contractor would assume responsibility for the detailed design and execution, including undertaking precise flow calculations and securing necessary authorisations under EASR.

9.2.7.5 Detailed design of the Allt na Seasgaich crossing (WC20) would be carried out in consultation with SEPA prior to the commencement of construction work. Design of the crossing would ensure that the proposed crossing would not lead to an increase in flood risk due to either the constriction of flows or the displacement of water on the floodplain.

Annex 1: Watercourse Crossings Photo Doc

Location: WC 1



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 2



Photo 1: Downstream



Photo 2: Cross Section

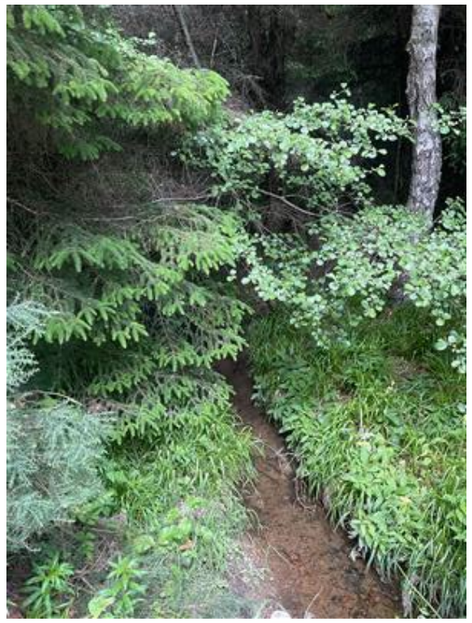


Photo 3: Upstream

Location WC 3



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 4



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 5



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 6 (Allt Riabhach)



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream



Photo 1: Downstream



Photo 2: Cross Section

Location: WC 7



Photo 3: Upstream

Location: WC 8



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 9



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 10 (Glac nan Siolaig)



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 11



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 12 (Allt an Fhigheadair)



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 13



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 14



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 15



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 16

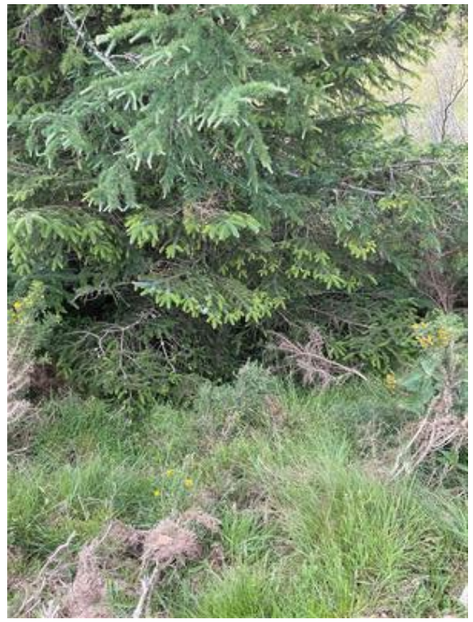


Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 17



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Location: WC 18



Photo 1: Downstream



Photo 2: Cross Section



Photo 3: Upstream

Figures

Legend

- Application Boundary
- Turbine Locations
- Track Centreline
- Hardstandings
- Substation
- Construction Compound
- Borrow Pit Search Area

Hydrology

- Watercourse Crossings
- Watercourse
- Waterbody

Figure Title
Watercourse Crossing Locations

Project Name
Novar 1 Wind Farm Repowering

Project No./Filery ID
1620016706 / REH2023N04156

Date	Figure No.	Revision
September 2026	9.2.1	1.0

Prepared By	Scale
RS	1:30,000 @A3

Client
nadara

RAMBOLL

0 1 2 Kilometres

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