

Technical Appendix 8.3: Watercourse Crossings

Technical Appendix 8.3: Watercourse Crossing Assessment

1.1 Introduction

- 1.1.1 As part of the Environmental Impact Assessment (EIA) process, it was identified that several new watercourse crossings would be required associated with access tracks for the Proposed Development and the upgrading/replacement of existing crossings may also be required.
- 1.1.2 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)¹ and the Scottish Environment Protection Agency’s (SEPA) good practice guidance² at the post-consent stage.
- 1.1.3 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 in order to minimise changes to the hydrological regime and reduce any potential impacts on river morphology and aquatic ecology, without detailed baseline assessment of watercourses.

1.2 Legislation

- 1.2.1 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.
- 1.2.2 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.
- 1.2.3 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.
- 1.2.4 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.
- 1.2.5 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.

- 1.2.6 Further SEPA EASR engineering activity guidance in relation to watercourse crossings⁴ and management of surface water runoff from construction sites⁵ have also been taken into account within this Technical Appendix, along with the supporting guidance provided in the River Crossings Good Practice Guide⁶ (while this guidance document is no longer available via SEPA’s EASR pages design guidance it contains remains applicable).

1.3 Identification of Watercourse Crossing Locations

- 1.3.1 Following a desk-based review of surface water features, informed by OS 1:10,000 mapping and aerial imagery, a site walkover was undertaken by Ramboll in October 2025. This field survey focused on likely watercourse crossings along the proposed track alignment for the Proposed Development and was used to identify key watercourse characteristics in order to determine the likely level of EASR authorisation required.
- 1.3.2 A total of sixteen potential watercourse crossings were identified, as presented in Table 8.3.1 below and **Figure 8.3.1** (Annex 1). A photographic record of watercourses surveyed during the site walkover is provided as Technical Annex 2 of this report.

Table 8.3.1: Watercourse Crossing Identification				
WCC ID	Crossing Category	Description	Grid Reference	
			X	Y
WC1	Existing Crossing	Watercourse	292172	621628
WC2	Existing Crossing	Watercourse	291374	621184
WC3	Existing Crossing	Watercourse	290770	620951
WC4	Existing Crossing	Watercourse	290210	620571
WC5	New Crossing	Drain	288425	619216
WC6	New Crossing	Watercourse	287073	619168
WC7	New Crossing	Watercourse	287046	619109
WC8	New Crossing	Ephemeral Flow Path	287285	617128
WC9	New Crossing	Ephemeral Flow Path	287352	617013
WC10	New Crossing	Watercourse	287294	616823
WC11	New Crossing	Small Minor Watercourse	287187	616816
WC12	Existing Crossing	Ephemeral Flow Path	292442	618148
WC13	Existing Crossing	Drain	292334	618329

¹ SEPA Environmental Authorisations (Scotland) Regulations (EASR) (2018) <https://www.legislation.gov.uk/sdsi/2018/9780111039014/contents> (Accessed January 2026)

² Scottish Environment Protection Agency (SEPA) <https://beta.sepa.scot/regulation/authorisations-and-compliance/easr-authorisations/water-activities/engineering/crossings/> (Accessed January 2026)

³ Scottish Environment Protection Agency (SEPA). (2026). *Engineering – Water activities*. SEPA Beta. Available at: <https://beta.sepa.scot/regulation/authorisations-and-compliance/easr-authorisations/water-activities/engineering/> (Accessed January 2026).

⁴ Scottish Environment Protection Agency (SEPA) (2025) *WAT-g-024: EASR Guidance: Engineering: Activity Guide: Crossings*. Available at: <https://beta.sepa.scot/regulation/authorisations-and-compliance/easr-authorisations/water-activities/engineering/crossings/> (Accessed June 2026).

⁵ Scottish Environment Protection Agency (SEPA) August 2025. *WAT-G-075 EASR Guidance: The discharge of water run-off from construction sites And*, SEPA August 2025, *WAT-G-034 EASR Guidance: Construction works and silt/pollution mitigation* Available at: <https://beta.sepa.scot/regulation/authorisations-and-compliance/easr-authorisations/water-activities/engineering/crossings/all-other-crossings-including-bridges-with-piers-causeways-and-fords/> (Accessed June 2026).

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.confor.org.uk/media/246360/good-practice-guide-river-crossings.pdf> (Accessed June 2026).

Table 8.3.1: Watercourse Crossing Identification				
WCC ID	Crossing Category	Description	Grid Reference	
			X	Y
WC14	New Crossing	Watercourse	292539	618918
WC15	New Crossing	Small Minor Watercourse	290622	617596
WC16	New Crossing	Small Minor Watercourse	288231	618012

1.4 Type of Crossing

- 1.4.1
- 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:

 - Single span structures: recommended where there is a need to minimise disturbance to the bank and bed of the watercourse. Where it is possible to set back abutments from the watercourse, it is possible to maintain bank habitats under the crossing. Taking into account the maximum width of crossings to be undertaken on the Proposed Development, it is not anticipated that in-stream supports would be necessary at any crossings. Such crossings include half barrel culverts with a sufficient span to incorporate the existing bed and banks of watercourses;
 - 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;
 - 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
 - Porous granular rock fill blanket and perforated pipes: where there is no clearly defined channel flow, flow can be maintained by a drainage blanket wrapped in geotextile placed below the road construction. Where such a crossing structure is utilised, flow is predominantly sub-surface interflow and a porous fill below the track provides flow continuity without concentrating the discharges into a narrow channel.
- 1.4.2
- 1.4.3
- 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.
- 1.4.4
- 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, an open bottomed crossing would be utilised to maintain the natural bed of the watercourse.

1.5 EASR Authorisations

- 1.5.1
- Under SEPA Guidance, engineering activities that could impact the water environment (except culverting for land-gain, dredging and permanent diversions or realignments) on minor watercourses do not require authorisation under EASR. A minor watercourse is one that is not shown on the 1:50,000 scale Ordnance Survey maps (Landranger series). However, in relation to activities that have potential to cause, or become likely to cause, environmental harm, SEPA may take enforcement action even where authorisation is not required.
- 1.5.2
- Where authorisation is required, four types of authorisation are used for all activities.

General Binding Rules (GBRs)
- 1.5.3
- General Binding Rules (GBRs) are mandatory rules that apply to low-risk activities. If the activity you are carrying out is covered by a GBR, as long as you comply with the rules in full, you are authorised. There is no need to apply for any other authorisation and there is no need to notify SEPA.

Notification
- 1.5.4
- Notifications are used for low-risk activities that SEPA require to know are being carried out and by who, but SEPA do not need to decide whether to grant or refuse an authorisation. The activity is considered authorised as soon as SEPA have been notified.

Registration
- 1.5.5
- Registrations are used for activities that need a simple assessment before SEPA decide to grant or refuse the authorisation following application for a registration.
- 1.5.6
- Activities that are authorised by a registration have standard conditions (rules) that apply and must be complied with.

Permit
- 1.5.7
- 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
- 1.5.8
- The detailed design of crossings for the Proposed Development would include the application to SEPA for the necessary consents under EASR by an appointed contractor.

Likely Levels of Authorisation
- 1.5.9
- In order to take a conservative approach to the assessment of likely EASR Authorisation levels it is assumed that where circular culverts are likely to be used for the crossing of smaller watercourses, Registration would be required. This level of authorisation is also likely to be applicable to smaller bottomless culverts where engineering on the banks of a watercourse may be necessary. A Permit level of Authorisation is applied where crossings exceed 2 m in width.
- 1.5.10
- Based on the assessment of watercourses crossed by the proposed access tracks, it is anticipated that the levels of authorisation shown in **Table 8.2.2** would be required under EASR.

Table 8.2.2: Likely Levels of EASR Authorisation				
WCC ID	Likely Level of Authorisation	Basis of the EASR Authorisation	Grid Reference	
			X	Y
WC1	Permit	Existing ford crossing is approximately 3.5 m wide	292172	621628
WC2	Permit	Existing ford crossing is approximately 2 m wide	291374	621184
WC3	Permit	Existing ford crossing is approximately 2 m wide	290770	620951
WC4	Permit	Existing ford crossing is approximately 8 m wide	290210	620571
WC5	Registration	Cut drain/flow path	288425	619216
WC6	Registration	Small minor watercourse approximately 1 m wide	287073	619168
WC7	Registration	Small minor watercourse approximately 0.5 m wide	287046	619109
WC8	Registration	Small flow path	287285	617128
WC9	Registration	Small flow path	287352	617013
WC10	Registration	Small watercourse approximately 0.3 m wide	287294	616823
WC11	Registration	Small watercourse approximately 0.3 m wide	287187	616816
WC12	Registration	Existing circular culvert, approximately 0.4 m wide	292442	618148
WC13	Registration	Existing circular culvert, approximately 0.3 m wide	292334	618329
WC14	Registration	Cut drain/flow path	292539	618918
WC15	Registration	Cut drain/flow path	290622	617596
WC16	Registration	Cut drain/flow path	288231	618012

1.6 Watercourse Crossing Design

- 1.6.1 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.
- 1.6.2 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.
- 1.6.3 Detailed flow calculations would be undertaken by the Contractor in order to inform detailed design and to inform applications for EASR authorisation. Should any new crossings be 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.

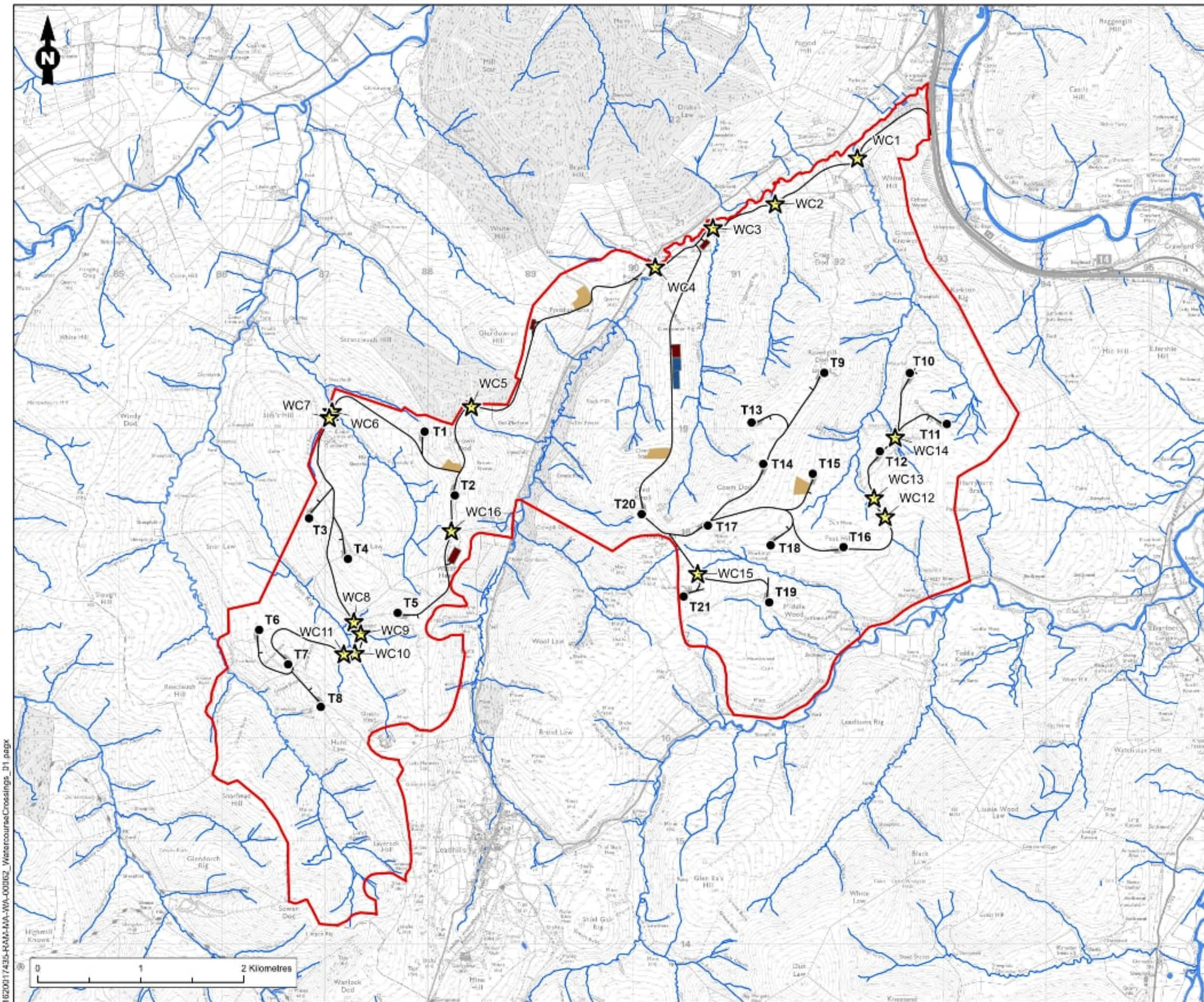
- 1.6.4 At crossing location WC4, a bridge would span a width of approximately 8 m. At this location the track would be raised as it leads into the crossing (both to the north and south of the watercourse). It is anticipated that the bridge at this location would comprise a single-span structure that would not necessitate works within the watercourse. In line with SEPA guidance, the bridge would be designed to accommodate the 1 in 200 year + climate change flood event. Specification for this crossing at this location would be developed at detailed design stage and would include the preparation of hydraulic modelling to demonstrate that the proposed works would not lead to an increase in flood risk due to either the constriction of flows or the displacement of water on the floodplain. Any measures to mitigate construction on the floodplain, such as openings to allow flows via the proposed track raising or volumetric floodplain compensation, would also be specified in detailed design.

1.7 Conclusions

- 1.7.1 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.

- 1.7.2
- Watercourse crossings would be designed in line with SEPA guidance such that crossing would:
 - Have sufficient capacity to pass the climate change adjusted 1 in 200 year flood; and
 - Allow the free passage of mammals and aquatic ecology.
- 1.7.3
- Closed culverts, where employed, would be oversized to allow naturalisation of the culvert bed substrate, and ensure they do not obstruct the passage of fish and other fauna.
- 1.7.4
- Post-consent, the Principal Contractor would assume responsibility for the detailed design and execution, including undertaking precise flow calculations and securing necessary authorizations under EASR.
- 1.7.5
- Detailed design of the WC4 crossing 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 Crossing Locations



Legend

- Site Boundary
- Turbine Layout
- All Tracks
- Turbine Hardstanding
- Indicative Substation and BESS
- Indicative Construction Compound
- Borrow Pit Search Area
- Watercourse Crossing
- Watercourse
- Waterbody

Figure Title
Watercourse Crossings

Project Name
Ravengill Energy Park

Project No./File ID
1620017435 / REH2024N04129

Date June 2026	Figure No. 8.3.1	Revision 1.0
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Prepared By LM	Scale 1:35,000 @A3
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Client
Ravengill Energy Park Limited

RAMBOLL

Annex 2: Photolog

Location: WC 1 (Glencaple Burn – Desktop Review)

Location: WC 2 (Kirk Gill)

Photo 1: Downstream



Location: WC 2 (Kirk Gill)**Photo 2: Upstream****Location: WC 2 (Kirk Gill)****Photo 3: Cross Section**

Location: WC 3 (Laggen Gill)**Photo 1: Downstream****Location: WC 3 (Laggen Gill)****Photo 2: Upstream**

Location: WC 3 (Laggen Gill)**Photo 3: Cross Section****Location: WC 4 (Glengonnar Water)****Photo 1: Downstream**

Location: WC 4 (Glengonnar Water)**Photo 2: Upstream****Location: WC 4 (Glengonnar Water)****Photo 3: Cross Section****Location: WC 5 (Carle Gill – Desktop Review)**

Location: WC 6 (Glendorch Burn)**Photo 1: Downstream****Location: WC 6 (Glendorch Burn)****Photo 2: Upstream**

Location: WC 6 (Glendorch Burn)**Photo 3: Cross Section****Location: WC 7 (Sim's Burn)****Photo 1: Downstream**

Location: WC 7 (Sim's Burn)**Photo 2: Upstream****Location: WC 7 (Sim's Burn)****Photo 3: Cross Section**

Location: WC 8 (Tributary of Glenkip Burn)**Photo 1: Downstream****Location: WC 8 (Tributary of Glenkip Burn)****Photo 2: Upstream**

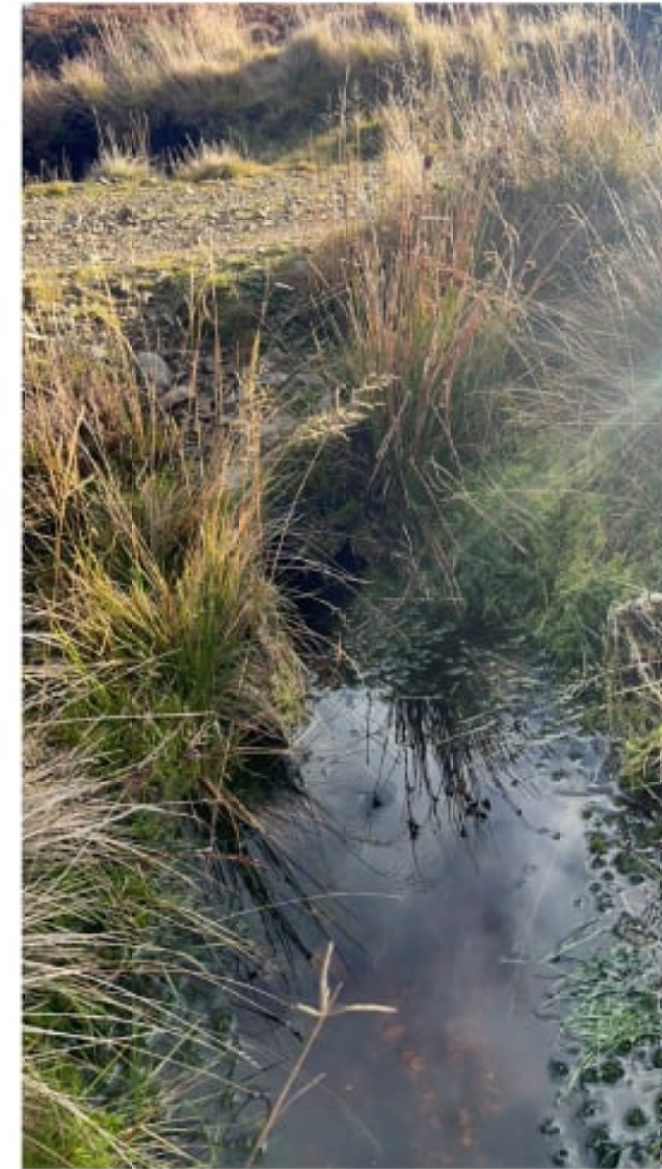
Location: WC 9 (Tributary of Glenkip Burn)**Photo 1: Downstream****Location: WC 9 (Tributary of Glenkip Burn)****Photo 2: Upstream**

Location: WC 10 (Tributary of Glenkip Burn)**Photo 1: Downstream****Location: WC 10 (Tributary of Glenkip Burn)****Photo 2: Upstream**

Location: WC 11 (Tributary of Glenkip Burn)**Photo 1: Downstream****Location: WC 11 (Tributary of Glenkip Burn)****Photo 2: Upstream**

Location: WC 12 (Flow Path leading to Glencaple Burn)**Photo 1: Downstream****Location: WC 12 (Flow Path leading to Glencaple Burn)****Photo 2: Upstream**

Location: WC 12 (Flow Path leading to Glencaple Burn)**Photo 3: Cross Section****Location WC 13 (Flow Path leading to Glencaple Burn)****Photo 1: Downstream**

Location WC 13 (Flow Path leading to Glencaple Burn)**Photo 2: Upstream****Location WC 13 (Flow Path leading to Glencaple Burn)****Photo 3: Cross Section**

Location WC 14 (Burnts Cleuch)

Photo 1: Downstream



Location WC 14 (Burnts Cleuch)

Photo 2: Upstream



Location WC 14 (Burnts Cleuch)**Photo 3: Cross Section****Location WC 15 (Tributary of Long Cleuch)****Photo 1: Downstream**

Location WC 15 (Tributary of Long Cleuch)**Photo 2: Upstream****Location WC 16 (Tributary of Glendorch Burn – Desktop Review)**