



Blair Hill Wind Farm

Technical Appendix 10.1

Watercourse Crossing Schedule

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1 Introduction

- 1.1.1 This Watercourse Crossing Schedule (WCS) has been produced to highlight the presence of watercourses which will be intersected by the Proposed Development access tracks and to provide relevant information on the nature of the crossings, likely crossing type required and design recommendations.
- 1.1.2 The basis of the WCS and recommendations is around the following design guidance:
- The Construction Industry Research and Information Association (CIRIA) Culvert, Screen and Operational Manual (CIRIA, 2019);
 - Scottish Environment Protection Agency (SEPA) Good Practice Guide, River Crossings, 2nd Edition;
 - SEPA Good Practice Guide, Bank Protection Rivers and Lochs, 1st Edition; and
 - SEPA The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) A Practical Guide, Version 9.3.
- 1.1.3 A hydrological site survey was conducted in March 2024 by an experienced Hydrologist to inform this document.
- 1.1.4 The hydrology of the Site is governed by the plantation forestry and rough grazing land with varying topography. The Site is predominantly located within the River Cree catchment, and the catchments of its tributaries; the Penkiln Burn and Palnure Burn. The site entrance is drained by tributaries of the Palnure Burn, with the east of the Site drained by Penkiln Burn and its tributaries Glenshalloch Burn and Pulcree Burn. Tributaries of the River Cree drain the west of the Site, which includes the Cordorcan Burn and Coldstream Burn.
- 1.1.5 The number of watercourse crossings required has been minimised as far as practicable as part of the Site's design evolution through liaison within the project team, and existing watercourse crossings have been used wherever possible.
- 1.1.6 Watercourses that have been identified on Ordnance Survey (OS) 1:10k scale and confirmed through the hydrological site walkover, have been identified in Section 2.1. Watercourses which are present at OS 1:50k scale and which may require CAR (Controlled Activity Regulations) authorisation from SEPA have been noted. Existing crossings on current access tracks located on minor watercourses, not visible at OS 1:10k scale, or as part of trackside drainage, are outlined in Section 2.2.
- 1.1.7 The watercourse crossing locations are shown in Drawing 1. These are presented on OS 1:50k scale mapping to show which watercourse crossings may require CAR authorisation. As outlined in Chapter 10, there has been considerable variance identified between OS 1:50k and OS 1:10k. Due to this, the watercourse crossing locations have been confirmed by the Site walkover to correlate with the higher resolution OS 1:10k mapping, therefore these co-ordinates have been used to accurately identify crossing locations. For that reason, there may be some variability noted between watercourses on OS 1:50k mapping and watercourse crossing locations. Where this has resulted in a significant difference, this is highlighted in Section 2.1.
- 1.1.8 It should be noted that this WCS does not outline all watercourse crossings required to maintain hydrological connectivity as part of the detailed drainage design. This will depend on local hydrology, slope, and excavations required, as well as potential micro-siting. In addition, to maintain connectivity between small scale hydrological features, including peatland flushes, the detailed drainage design will include mitigation in the form of suitable trackside drainage and regular spacing of cross-drains. These mitigation measures are included in the outline Construction Environmental Management Plan (CEMP).

2 Watercourse Crossing Schedule

2.1 Watercourses Identified at OS 1:50k, 1:25k and 1:10k Scale

Watercourse Crossing 3 (WCX3)	
Location Description	Located on existing track to be upgraded
Grid Co-ordinates	245496, 569702
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Crossing location identified from onsite visit is 18 m south of OS 1:50k mapping.
Watercourse Name	Loch of the Lowes Strand
Catchment	Penkiln Burn
Watercourse Description	Watercourse in spate, with high level and flow during the Site visit. Rock present in streambed with densely vegetated banks.
Watercourse Dimensions	Approx 1 m width, depth not measured due to spate conditions.
Existing or New Crossing	Existing closed culvert (700 mm)
Proposed Crossing Type	Closed culvert



Watercourse Crossing 5 (WCX5)	
Location Description	Located on existing track to be upgraded
Grid Co-ordinates	245261, 570216
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Onsite observations found OS 1:50k mapping to be accurate.
Watercourse Name	Unnamed tributary of Penkiln Burn
Catchment	Penkiln Burn
Watercourse Description	Watercourse follows alongside the track, upslope of the crossing. Medium flow and level observed during the Site visit.
Watercourse Dimensions	Approx <0.1 m depth, 0.5 m width.
Existing or New Crossing	Existing closed culvert (400 mm)
Proposed Crossing Type	Closed culvert



Watercourse Crossing 6 (WCX6)	
Location Description	Located on proposed new track prior to Penkiln Burn crossing.
Grid Co-ordinates	245112, 570254
OS Mapping/Onsite Visit	Watercourse identified on 1:50k. Crossing location identified from OS 1:10k, to be located approximately 90 m west of location on OS 1:50k. Watercourse not visited during Site visit due to design iterations.
Watercourse Name	Unnamed tributary of Penkiln Burn
Catchment	Penkiln Burn
Watercourse Description	Photos and observations taken at approximately 80 m downstream at 245029, 570288. Observed to be shallow and of medium flow.
Watercourse Dimensions	Approx 0.1 m depth, 2 m width.
Existing or New Crossing	New Crossing
Proposed Crossing Type	Culvert or single span structure, depending on width at crossing location.



Watercourse Crossing 7 (WCX7)	
Location Description	Located on new access track, downstream of existing Auchenleck Bridge crossing.
Grid Co-ordinates	244838, 570315
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. During site visit crossing was confirmed to be accurate.
Watercourse Name	Penkiln Burn
Catchment	Penkiln Burn
Watercourse Description	Watercourse in spate during the Site visit following heavy rainfall, with high level and flow. Upstream at the existing Auchenleck Bridge crossing, the watercourse was approximately 13 m wide.
Watercourse Dimensions	Approx 13 m wide, depth not measured due to spate conditions and watercourse size.
Existing or New Crossing	New Crossing
Proposed Crossing Type	Single span bridge



Watercourse Crossing 8 (WCX8)	
Location Description	Located on existing track to be upgraded
Grid Co-ordinates	244424, 570520
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Location confirmed to be accurate to OS 1:50k during Site visit.
Watercourse Name	Unnamed tributary of Penkiln Burn
Catchment	Penkiln Burn
Watercourse Description	Watercourse is very linear, with potential artificial modification by forestry activities. Low level and flow observed during the Site visit.
Watercourse Dimensions	Approx <0.1 m depth, 0.6 m width.
Existing or New Crossing	Existing closed culvert (500 mm)
Proposed Crossing Type	Closed culvert



Watercourse Crossing 9 (WCX9)	
Location Description	Located on existing track to be upgraded
Grid Co-ordinates	243959, 570661
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Site visit confirmed OS 1:50k location to be accurate.
Watercourse Name	Unnamed tributary of Penkiln Burn
Catchment	Penkiln Burn
Watercourse Description	Minor watercourse with vegetated banks. Medium flow and level observed during the Site visit.
Watercourse Dimensions	Approx <0.1 m depth, 0.5 m width.
Existing or New Crossing	Existing closed culvert (500 mm)
Proposed Crossing Type	Closed culvert






Watercourse Crossing 13 (WCX13)

Location Description	Located on existing track to be upgraded.
Grid Co-ordinates	242860, 571252
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Onsite visit found OS 1:50k watercourse location to be accurate.
Watercourse Name	Black Burn
Catchment	Glenshalloch Burn
Watercourse Description	Watercourse in spate during, with High flow and level observed during the Site visit, overtopping banks of channel.
Watercourse Dimensions	Approx 2.5 m width, depth not measured due to spate conditions.
Existing or New Crossing	Existing single span bridge (5.5 m)
Proposed Crossing Type	Single span bridge






Watercourse Crossing 14 (WCX14)	
Location Description	Located on existing track to be upgraded.
Grid Co-ordinates	242991, 571597
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Site visit found crossing to be 10 m east of OS 1:50k mapping.
Watercourse Name	Black Burn
Catchment	Glenshalloch Burn
Watercourse Description	Watercourse is noted to have high flow over steep slopes.
Watercourse Dimensions	Approx 1.5 m width, depth not measured due to spate conditions.
Existing or New Crossing	Existing closed culvert (1200 mm)
Proposed Crossing Type	Closed culvert

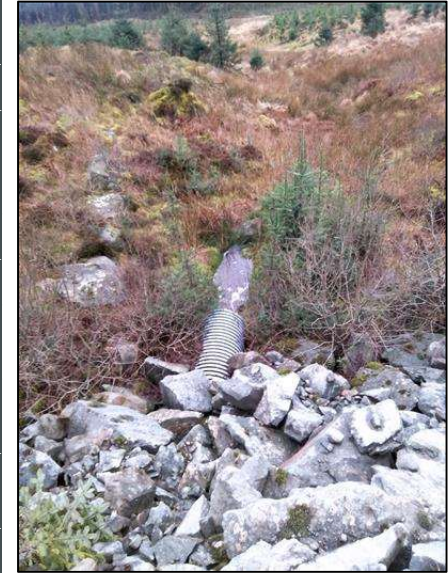
Watercourse Crossing 16 (WCX16)		
Location Description	Located on existing track to be upgraded	
Grid Co-ordinates	243153, 571621	
OS Mapping/Onsite Visit	Watercourse identified on OS 1:10k, with crossing location confirmed by onsite visit.	
Watercourse Name	Unnamed tributary of Black Burn	
Catchment	Glenshalloch Burn	
Watercourse Description	Watercourse in spate during Site visit with high level and flow. Upslope watercourses crosses steep slopes with densely vegetated banks.	
Watercourse Dimensions	Measurements unable to be taken due to spate conditions.	
Existing or New Crossing	Existing closed culvert (750 mm)	
Proposed Crossing Type	Closed culvert	



Watercourse Crossing 23 (WCX23)	
Location Description	Located on existing track to be upgraded
Grid Co-ordinates	242978, 572267
OS Mapping/Onsite Visit	Watercourse identified on OS 1:10k, with crossing location confirmed by onsite visit.
Watercourse Name	Black Burn
Catchment	Glenshalloch Burn
Watercourse Description	High flow and level
Watercourse Dimensions	Approx <0.2 m depth, 0.4 m width
Existing or New Crossing	Existing closed culvert (500 mm)
Proposed Crossing Type	Closed culvert





Watercourse Crossing 24 (WCX24)		
Location Description	Located on existing track to be upgraded.	
Grid Co-ordinates	242915, 572259	
OS Mapping/Onsite Visit	Watercourse identified on OS 1:10k, with crossing location confirmed by onsite visit.	
Watercourse Name	Unnamed tributary of Glenshalloch Burn	
Catchment	Glenshalloch Burn	
Watercourse Description	Medium flow and level observed during the Site visit. Is a meandering small stream, with cobbles in streambed and small pool downslope of crossing.	
Watercourse Dimensions	Approx <0.2 m depth, 0.4 m width.	
Existing or New Crossing	Existing closed culvert (500 mm)	
Proposed Crossing Type	Closed culvert	

Watercourse Crossing 26 (WCX26)	
Location Description	Located on upgraded track between T6 and T7.
Grid Co-ordinates	242069, 572293
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Site visit confirmed crossing location to be 14 m west of OS 1:50k mapping.
Watercourse Name	Tributary of Glenshalloch Burn
Catchment	Glenshalloch Burn
Watercourse Description	Medium flow and level observed, overlain by brash and trees upslope.
Watercourse Dimensions	Approx 0.1 m depth, approximately 0.4 m width
Existing or New Crossing	Existing closed culvert (500 mm)
Proposed Crossing Type	Closed culvert



Watercourse Crossing 32 (WCX32)			
Location Description	Located on upgraded track to the west of T8.		
Grid Co-ordinates	242078, 572120		
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Site visit confirmed crossing location to be 20 m west of OS 1:50k mapping.		
Watercourse Name	Tributary of Glenshalloch Burn		
Catchment	Glenshalloch Burn		
Watercourse Description	High level and flow observed during Site visit. Vegetation present within channel, with series of pools formed upslope and downslope of crossing.		
Watercourse Dimensions	Approx <0.2 m depth, 0.5 m width		
Existing or New Crossing	Existing closed culvert (500 mm)		
Proposed Crossing Type	Closed culvert		

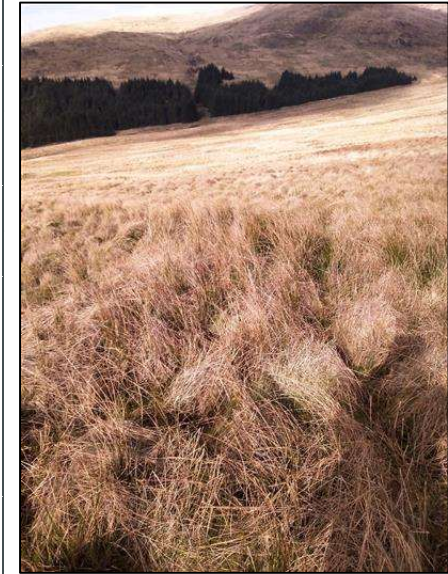
Watercourse Crossing 34 (WCX34)		
Location Description	Located on upgraded track between T9 and T11.	
Grid Co-ordinates	241640, 571611	
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Site visit confirmed crossing location to be 18 m south of OS 1:50k mapping.	
Watercourse Name	Unnamed tributary of Glenshalloch Burn	
Catchment	Glenshalloch Burn	
Watercourse Description	In spate and overtopping channel banks during visit. Densely vegetated with brash present upstream and large surface waterbody downstream.	
Watercourse Dimensions	Approx 0.5 m width, could not be safely accessed to measure depth.	
Existing or New Crossing	Existing two closed culverts (500 mm)	
Proposed Crossing Type	Closed culvert	


Watercourse Crossing 40 (WCX40)

Location Description	Located on new site tracks, south of T4.
Grid Co-ordinates	241651, 572756
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k. Site visit confirmed crossing location 20 m south of OS 1:50k location.
Watercourse Name	Black Burn
Catchment	Cordorcan Burn
Watercourse Description	In spate, overtopping channel, with high flow and level during Site visit. Present meandering across gently sloping area.
Watercourse Dimensions	Approximately <0.2 m depth, 1.5 m width.
Existing or New Crossing	New Crossing
Proposed Crossing Type	Bottomless arch or closed culvert



Watercourse Crossing 41 (WCX41)	
Location Description	Located on new site tracks between T4 and T1.
Grid Co-ordinates	242172, 573516
OS Mapping/Onsite Visit	Watercourse identified on OS 1:25k and 1:10k mapping.
Watercourse Name	Unnamed tributary of Cordorcan Burn.
Catchment	Cordorcan Burn
Watercourse Description	During site visit, the area was wet underfoot with no visible channel. Area identified on mapping is likely ephemeral and cross drainage is recommended to maintain hydrological connectivity. Photographs taken approximately 80 m downslope due to design iterations.
Watercourse Dimensions	No defined channel.
Existing or New Crossing	New Crossing
Proposed Crossing Type	Bottomless arch or closed culvert



Watercourse Crossing 42 (WCX42)		
Location Description	Located on new site tracks between T4 and T1.	
Grid Co-ordinates	242317, 573615	
OS Mapping/Onsite Visit	Watercourse identified on OS 1:50k mapping. Watercourse on OS 1:10k located approximately 24 m south of OS 1:50k mapping.	
Watercourse Name	Unnamed tributary of Cordorcan Burn.	
Catchment	Cordorcan Burn	
Watercourse Description	Medium flow and level observed during the Site visit, with flow constrained to channel. Banks are densely vegetated with grassland. Photographs and site notes taken approximately 120 m downslope due to design iterations.	
Watercourse Dimensions	Approx 0.5 m depth, 0.3 m width	
Existing or New Crossing	New Crossing	
Proposed Crossing Type	Bottomless arch or closed culvert	

2.2 Minor Watercourses and Trackside Drainage

ID	Grid Co-ordinates	Description
WCX1	245696, 569411	Trackside drainage present with existing closed culvert
WCX2	245534, 569495	Densely vegetated trackside drainage with existing closed culvert
WCX4	245488, 569923	Densely vegetated trackside drainage with existing closed culvert
WCX10	243304, 570330	Densely vegetated trackside drainage with existing closed culvert (approximately 300 mm).
WCX11	243108, 570456	Minor watercourse with dense vegetation at trackside, suspected existing closed culvert.
WCX12	243036, 570903	Minor watercourse of medium level and flow with existing closed culvert (300 mm).
WCX15	243014, 571597	Minor watercourse with existing closed culvert.
WCX17	243197, 571724	Minor watercourse of high level and flow with existing closed culvert (500 mm).
WCX18	243188, 571832	Minor watercourse with existing closed culvert.
WCX19	243195, 571881	Minor watercourse with existing closed culvert.
WCX20	243146, 572143	Minor watercourse with existing closed culvert.
WCX21	243125, 572192	Minor watercourse in spate, with high level and flow with existing closed culvert.
WCX22	242978, 572261	Minor watercourse in spate, with high level and flow with existing closed culvert.
WCX25	242455, 572397	Trackside drainage present with existing closed culvert (300 mm)
WCX27	242044, 572288	Minor watercourse with medium level and high flow with existing closed culvert (300 mm).
WCX28	241886, 572229	Minor watercourse with medium level and high flow with existing closed culvert (400 mm).
WCX29	241917, 572139	Minor watercourse with medium level and high flow with existing closed culvert (400 mm).
WCX30	242011, 572131	Minor watercourse with very low level and flow, channel densely vegetated, with existing closed culvert.

ID	Grid Co-ordinates	Description
WCX31	242052, 572126	Minor watercourse with very low level and flow, channel densely vegetated, with existing closed culvert.
WCX33	242226, 572105	Minor watercourse with very low level and flow, channel densely vegetated, with existing closed culvert (400 mm).
WCX35	241455, 571414	Minor watercourse with high level and flow, existing closed culvert present.
WCX36	241375, 571162	Trackside drainage with very low level and flow culverted under existing track.
WCX37	241422, 571055	Trackside drainage with very low level and flow, existing closed culvert present.
WCX38	241460, 571012	Minor watercourse modified by forestry drainage and trackside drainage present, of medium flow and level, with existing closed culvert.
WCX39	241581, 570907	Minor watercourse and trackside drainage present, with existing closed culvert.

3 Summary

- 3.1.1 The Proposed Development requires a total of 42 watercourse crossings, of which 37 are existing crossings, and only five are proposed new crossings. The requirement for upgrading any existing crossings will be considered at detailed design stage, and it is currently assumed that existing crossings can be reused. Where existing structures require upgrading or replacement, bottomless arch culverts would be primarily considered prior to closed culverts. Of the six new crossings, one will be a single span bridge, three will be a culvert (bottomless arch or closed), and two will be a single span structure or culvert depending on detailed design.
- 3.1.2 In accordance with the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR), all engineering works at surface waterbodies are subject to authorisation. Reviewing the proposed new crossings, these will likely require registration, however, this is subject to review at detailed design. If the length of bank affected is greater than 20 m, a licence will be required for the bridge. Any design of new crossings or replacement of existing crossings would be agreed with SEPA prior to construction in accordance with CAR.

Annex 1: Drawing 1: Watercourse Crossing Locations