Volume 5: Appendix 13.1 - Watercourse Crossing and Buffers Assessment

February 2026 – Additional Information

Scottish & Southern Electricity Networks

TRANSMISSION

CONTENTS

LIST OF ABBREVIATIONS

EIA – Environmental Impact Assessment

LUC – Land Use Consultants ltd

OHL – Overhead Line

PWS – Private Water Supply

SAC - Special Area of Conservation

SEPA – Scottish Environment Protection Agency

SuDS – Sustainable Drainage Systems

1 INTRODUCTION

1.1.1 This appendix details the assessment undertaken to identify and describe all new and existing watercourse crossings that will be required during the construction of the Kintore to Tealing 400 kV OHL and associated infrastructure (the 'Proposed Development') as described in **Volume 1, Chapter 3: Project Description**. This document should be read in conjunction with **Volume 1, Chapter 3: Project Description** and **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils** of the Kintore to Tealing 400 kV OHL Environmental Impact Assessment Report (EIAR).

1.1.2 This appendix presents information on proposed engineering activities in the water environment or close to the water environment required for the Proposed Development. This information is required to assess the effects on the water environment and also to inform statutory consultees (eg Scottish Environment Protection Agency (SEPA)) on the likely requirements for registrations and authorisations under the *Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)* (CAR Regulations).

1.1.3 This appendix is supported by the following figures, appendices and annexes:

- **Volume 3, Figures 13.2.1 to 13.2.26: Hydrology, Flood Risk and Buffers**;
- **Volume 5, Appendix 13.8: Flood Modelling Study Report**;
- **Annex 13.1.1: Details of Watercourse Crossings**; and
- **Annex 13.1.2: Details of Buffer Encroachments**.

1.1.4 Extensive hydrology site walkovers were conducted between November 2022 and February 2025. Watercourses in the vicinity of the Proposed Development were recorded during the hydrology surveys and used to feed into early iterations of the routeing and design.

1.1.5 Supplementary site visits were undertaken in November 2025 to secure further detail and photography, and these are included in this appendix.

1.1.6 New watercourse crossings were avoided as much as possible in the design and existing tracks were utilised as much as possible. **Annex 13.1.1: Details of Watercourse Crossings** presents data on the existing and proposed new watercourse crossings that will be utilised as access tracks for the Proposed Development. It is noted that the OHL itself crosses many small (<2 m wide) watercourses and several larger named watercourses along the alignment. Details of stringing the OHL over watercourses is described in **Volume 1, Chapter 3: Project Description** and no works will take place within any of the watercourses during OHL oversailing. Therefore, OHL crossings are not considered in this appendix.

1.1.7 SEPA initially recommended a buffer width of 50 m around each waterbody/watercourse in their early consultation in June 2023. During the initial design stage, elements of the Proposed Development (ie OHL towers) were located whenever practicable to achieve a minimum 50 m separation from nearby watercourses and waterbodies. Following later consultation with SEPA in August and October 2024, a 10 m minimum buffer from water features was recommended for all infrastructure (temporary and permanent) along with adherence to SEPA recommended riparian corridor buffers, geomorphic risk buffers and avoidance of flood risk areas based on SEPA's Future Flood maps[1], where practicable (see **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils, Table 13.1: Summary of Relevant Consultation**).

1.1.8 Adherence with SEPA recommended riparian corridor buffers was achieved for most of the Proposed Development, with the exception of the locations described and assessed in detail in **Annex 13.1.2: Details of Buffer Encroachments**.

1.1.9 Embedded and Applied Mitigation measures (eg construction Sustainable Drainage Systems (SuDS) and pollution control measures) specific to watercourse crossings and around all construction working areas and infrastructure to avoid and minimise the risk to the water environment are described in **Volume 2, Chapter 13: Hydrology,**

[1] SEPA, n.d. Future Flood Maps. [Online] Available at: https://map.sepa.org.uk/floodmaps/FloodRisk/FutureFloodMaps.

Hydrogeology, Geology and Soils, Section 13.5 Mitigation and Monitoring and **Table 13.14: Applied Mitigation**.

- **Section 2** of this appendix summarises the results of the watercourse crossing assessment and **Section 3** summarises the results of the buffer encroachments. Additional mitigation measures at buffer encroachment locations are set out in the annexes to this report (**Annex 13.1.1: Details of Watercourse Crossings** and **Annex 13.1.2: Details of Buffer Encroachments**) and also summarised in **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils, Table 13.22: Committed Additional Mitigation Construction**.

2 WATERCOURSE CROSSINGS

2.1.1 Existing access tracks and watercourse crossings will be used to access the Proposed Development wherever possible and new tracks and crossings have been minimised as much as practicable. However, 30 new watercourse crossings are proposed, most of which are temporary (for construction).

2.1.2 The existing tracks have existing culverts or bridges at the watercourse crossings; details of which are provided in **Annex 13.1.1: Details of Watercourse Crossings**. There are 57 existing watercourse crossings that will be used to access the Proposed Development. The Applicant will carry out a structural check of existing watercourse crossings (ie culverts and bridges) on the existing access tracks that will be used for construction. If they are found to be structurally unsound for construction loads, a temporary over-bridging solution will be put in place during construction that will not affect the bed and banks of the watercourse/drain. As such it is assumed that no upgrades for the majority of the existing watercourse crossings will be required. If this changes, the Applicant will maintain dialogue with SEPA such that the appropriate CAR authorisations can be obtained, if required.

2.1.3 Based on the findings of engineering assessments, a few of the existing crossings at the Diamond Crossing (Gormack Burn area) are known to require to be upgraded or repaired to facilitate the Proposed Development. Given the proximity of the proposed infrastructure to the flood risk areas associated with the Gormack Burn and tributaries, a hydraulic modelling study (**Volume 5, Appendix 13.8: Flood Modelling Study Report**) has been undertaken to inform the detailed design of watercourse crossings and to understand flood risk in this area. Details of upgrades/repairs are provided in **Annex 13.1.1: Details of Watercourse Crossing**.

2.1.4 The locations of existing and new crossings are shown in **Volume 3, Figures 13.2.1 to 13.2.26: Hydrology, Flood Risk and Buffers** in the EIAR and a summary is provided in **Table 13.1.1: Existing and New Watercourse Crossings**, split between Sections A – F of the Proposed Development and in each main river catchment. It is noted that the crossing ID numbering is not continuous; this is due to changes in design iterations resulting in watercourses being avoided and some crossings no longer being required in the final design. As the ID numbers have already been used for ongoing engineering assessment they have not been renumbered to avoid confusion.

Table 13.1.1: Existing and New Watercourse Crossings

Section	Main River Catchment	No of Existing Crossings in Catchment	Existing Crossing ID Number	No of New Crossings in Catchment	New Crossing ID Number
A	Dighty Water	6	2, 3, 8, 9, 10, 11	3	7 (temporary) 12,13 (permanent)
	Dean Water	2	17, 18	3	15, 16 (temporary) 14 (permanent)
B	Dean Water	0	-	2	19 (temporary) 20 (permanent)
	River South Esk	6	22, 24, 25, 27, 28, 29	2	26 (temporary) 23 (permanent)
	River North Esk	0	-	1	30 (temporary)
C	River North Esk	4	33, 34, 35, 41	7	31,32,36,37,38,39,40 (temporary)
D	River North Esk	3	42, 44, 45	1	43 (permanent)
	Bervie Water	7	47, 48, 49, 50, 52, 55, 56	4	46, 51, 53, 54 (temporary)
	Carron Water	4	57, 60, 61, 62	2	58, 59 (temporary)
E	Carron Water	0	-	0	-
	Cowie Water	10	63, 64, 65, 66, 67, 68, 69, 70, 71, 72	0	-
	River Dee	4	73, 74, 75, 76	1	77 (temporary)

Section	Main River Catchment	No of Existing Crossings in Catchment	Existing Crossing ID Number	No of New Crossings in Catchment	New Crossing ID Number
F	River Dee	10	79, 80, 81, 82, 83, 84, 87, 88, 90, 92	4	78a, 85 (temporary) 78b, 89 (permanent)
	River Don	1	93	0	-
TOTAL		**57**		**30**	

2.1.5 New watercourse crossings will be designed to accommodate the 0.5% annual exceedance probability (1 in 200 year) flows (with an appropriate allowance for climate change) where practicable. At locations where new or upgraded crossings are not able to be designed to accommodate the 0.5% annual exceedance probability flows plus climate change, justification has been provided in **Annex 13.1.1: Details of Watercourse Crossings**.

2.1.6 Crossing design will follow SEPA guidance on watercourse crossing design (SEPA 2010[2]). A note is provided in **Table 13.1.1: Existing and New Watercourse Crossings** and **Annex 13.1.1: Details of Watercourse Crossings** to note whether the new crossings are permanent or temporary. All existing crossings are permanent. Most of the new crossings are temporary and over small watercourses or drains and required during the construction period only. Temporary crossings will be designed to pass the 1 in 30 year flow where practicable, or to maintain and not reduce the existing capacity of the channel; justification has been provided in **Annex 13.1.1: Details of Watercourse Crossings**.

2.1.7 Temporary crossings sized to the 1 in 30 year flow or to maintain the existing capacity of the channel is considered suitable for the rural setting, location, size of watercourses and the temporary nature of the track crossings. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the bridge or culvert, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for temporary crossings in a rural setting. The proposed design will allow temporary crossings to be removed at the end of the construction period with no legacy effect on the existing channel. Based on a site specific assessment of each new temporary crossing in **Annex 13.1.1: Details of Watercourse Crossings**, the crossings will not result in an increased flood risk to other receptors.

2.1.8 Part of the Proposed Development is located within the catchments of three riverine Special Areas of Conservation (SACs) and crossing design in these catchments has been informed via consultation with NatureScot. SEPA recommend single-span bridges or bottom-less arched culverts for new crossings. Given the sensitive environment, single span crossings will be used for all new watercourse crossings of natural channels within the SAC catchments, where practicable. It is noted that there are no new or existing track crossings of watercourses that are within the designated SAC.

2.1.9 Catchment areas upstream of each watercourse crossing were calculated in GIS software based on LiDAR topographic data, Ordnance Survey mapping and supplemented by field observations. Catchment areas upstream of the track crossings are provided in **Annex 13.1.1: Details of Watercourse Crossings.** Hydrological analysis for each individual catchment at each new crossing location will be undertaken to determine the design flows to provide sizing and detailed design of new crossings prior to construction.

2.1.10 New engineering activities (such as bridges and culverts) in Scotland's rivers, lochs and wetlands require an authorisation under the *Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)* (CAR Regulations). Watercourse crossings as engineering works in inland waters and wetlands come under Section 6 of CAR. Further details are provided in SEPA (2024) The Water Environment (Controlled Activities) (Scotland) Regulations. A Practical Guide[3], particularly Table 5.

2.1.11 CAR authorisations, if required, will be sought prior to construction. It is noted that SEPA do not normally require an authorisation for engineering activities on minor watercourses with the exception of culverting for land-gain, dredging and permanent diversions/realignments. A minor watercourse is defined by SEPA as one that is not shown on

[2] SEPA, 2010. Engineering in the Water Environment Good Practice Guide – River Crossings, WAT-SG-25.

[3] SEPA (2024) The Water Environment (Controlled Activities) (Scotland) Regulations. A Practical Guide v9.4, July 2024

1:50,000 scale Ordnance Survey maps[3]. Most of the new watercourse crossings required for the Proposed Development are on minor watercourses and are temporary and therefore will not require a registration or licence under CAR. The works will be covered by SEPA's General Binding Rules (GBR), in particular GBR6 and GBR9, which the principal contractor will adhere to.

2.1.12 The following watercourse crossings will likely require authorisation under CAR (registration or simple licence). As discussed above, the Applicant will maintain dialogue with SEPA such that the appropriate CAR authorisations can be obtained prior to construction.

- ID12 - Registration
- ID14 - GBR or Registration
- ID36 - GBR or Registration
- ID37 - GBR or Registration
- ID39 - GBR or Registration
- ID40 - GBR or Registration
- ID81 - Registration
- ID84 - GBR or Registration
- ID85 - GBR or Registration
- ID89 - Registration or Licence

2.1.13 Existing crossing ID80 will need structural repairs to the existing bridge deck but will not need to be replaced and there will be no work in the bed or banks. Dialogue will be maintained with SEPA during the pre-construction phase such that the appropriate CAR authorisation can be obtained, if required.

3 WATERCOUSE BUFFER ENCROACHMENT

3.1.1 SEPAs (2024[4]) recommended riparian corridor buffer were adhered to, where possible, in the design and are shown in **Volume 3, Figures 13.2.1 to 13.2.26: Hydrology, Flood Risk and Buffers**, along with flood risk areas and geomorphic risk buffers. It is noted that some small drains (marked on Ordnance Survey 1:10,000 mapping and/or identified during surveys) do not have mapped buffers in the SEPA riparian corridor shapefile layer. These small drains have also been buffered by 10 m for the Proposed Development, where possible. The locations where the recommended buffers from the proposed infrastructure could not be achieved are described and assessed in detail in **Annex 13.1.2: Details of Buffer Encroachments** and summarised in **Table 13.1.2: Summary of Watercourse Riparian Buffer Encroachments**.

3.1.2 The recommended riparian corridor buffers are scaled to channel width. The recommended minimum corridor widths from each bank are provided below (from SEPA, 2024):

Channel width	***Recommended corridor width on each channel bank***
< 2 m	*10 m*
2 – 15 m	*15 m*
> 15 m	*30 m*

3.1.3 Apart from the 87 watercourse crossings and 38 buffer breaches (labelled A-AR) (shown on **Volume 3, Figures 13.2.1 to 13.2.26: Hydrology, Flood Risk and Buffers**), all proposed infrastructure is situated at least 10 m away from watercourses and water features. Larger buffers were provided for larger watercourses, sensitive water features, geomorphic risk buffers and flood risk areas, where possible.

3.1.4 It is noted that the buffer encroachment ID numbering is not continuous, as a result of evolving design, where the Applicant has aimed to reduce the number of buffer encroachments as much as practicable. Many of the permanent buffer encroachments are associated with the use of existing access tracks or roads for the construction works, which often track along field boundaries close to watercourses. As the preference was to utilise existing tracks (and their associated watercourse crossings) this meant that some existing tracks are within the riparian watercourse buffers.

3.1.5 Additional mitigation will be put in place at buffer encroachments, as detailed in **Annex 13.1.2: Details of Buffer Encroachments** and summarised in **Volume 2, Chapter 13: Hydrology, Hydrogeology, Geology and Soils, Table 13.22: Committed Additional Mitigation Construction**.

Table 13.1.2: Summary of Watercourse Riparian Buffer Encroachments

Section	Main River Catchment	No. of Permanent Buffer Breaches (includes Existing Tracks)	ID Number	No. of Temporary Buffer Breaches	ID Number
A	Dighty Water	2	D, G	0	-
	Dean Water	2	I,J	1	H
B	Dean Water	0		0	-
	River South Esk	2	N, O	2	L,M
	River North Esk	0		0	-
C	River North Esk	4	Q,R,U,Y	7	S,T,V,W,X,Z,AA
D	River North Esk	0		0	-
	Bervie Water	3	AC,AD, AF	2	AB, AE
	Carron Water	1	AG	0	-

[4] SEPA, 2024. *Recommended Riparian Corridor Layer for use in Land Use Planning, July 2024*. [Online] Available at: https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.sepa.org.uk%2Fmedia%2Fpuqhuwhn%2Frecommended-riparian-corridor-note.docx&wdOrigin=BROWSELINK.

Section	Main River Catchment	No. of Permanent Buffer Breaches (includes Existing Tracks)	ID Number	No. of Temporary Buffer Breaches	ID Number
E	Carron Water	0		0	-
	Cowie Water	0		0	-
	River Dee	1	AH	0	-
F	River Dee	8	AJ,AL,AM,AN, AO,AP,AQ,AR	3	AI, AK, ALL
	River Don	0	-	0	-
TOTAL		**23**		**15**	

ANNEX 13.1.1: DETAILS OF WATERCOURSE CROSSINGS

Section A

ID – 2 (Existing track crossing)	Unnamed tributary of Tealing Burn
Description: Unnamed Tributary of the Tealing Burn flows east in straightened channel adjacent to road and then flows beneath public road in stone arch bridge, which will be used for construction.	
NGR Ref: 339493 738693	
Photo –Unnamed Tributary in straightened channel looking west upstream 	
Width of watercourse (m)	1.1 m
Bed Sediment	Mix of silt and cobble
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing bridge with stone arch culvert of unknown dimensions
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.43 km^2
Minor Watercourse	Yes
Main river catchment	Dighty Water
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 3 (Existing track crossing)	Unnamed tributary of Tealing Burn
Description: Open straightened channel flows to the east and is culverted beneath existing crossing in a stone box culvert 1m wide.	
NGR Ref: 340188 738640	
Photo – Unnamed Tributary looking west, upstream 	Photo – Unnamed tributary looking east 
Width of watercourse (m)	1.2 m
Bed Sediment	Mix of silt and pebble
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing bridge with stone box culvert of unknown dimensions
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.82 km^2
Minor Watercourse	No
Main river catchment	Dighty Water
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 7 (Proposed track crossing – temporary)	Unnamed tributary of Tealing Burn/ Fithie Burn
Description: Unnamed tributary is heavily modified as straightened here as it flows through vegetated channel to the east.	
NGR Ref: 338208 738852	
Photo – Unnamed tributary looking upstream to the west 	
Width of watercourse (m)	1.5 m
Bed Sediment	Mix of silt and pebble
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Single Span Bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of watercourse and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the bridge, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for a temporary crossing in a rural setting. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.
Additional Mitigation	None
Catchment (km^2)	1.05 km^2
Minor Watercourse	Yes
Main river catchment	Dighty Water
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 8 (Existing track crossing)	Unnamed tributary of Tealing Burn/ Fithie Burn
Description: Unnamed tributary is heavily modified as straightened here as it flows through vegetated channel to the east.	
NGR Ref: 338367 738865	
Photo – Unnamed tributary looking downstream 	
Width of watercourse (m)	1.4 m
Bed Sediment	Mix of silt and pebble
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing crossing with stone box culvert of unknown dimensions
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	1.15 km^2
Minor Watercourse	Yes
Main river catchment	Dighty Water
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 9 (Existing track crossing)	Unnamed tributary of Tealing Burn/ Fithie Burn
Description: At the crossing location, the watercourse is crossed by an existing farm access track.	
NGR Ref: 338463 738881	
Photo – Unnamed tributary looking downstream	Photo – Unnamed tributary looking upstream at crossing

ID – 9 (Existing track crossing)	Unnamed tributary of Tealing Burn/ Fithie Burn
	
Width of watercourse (m)	1.5 m
Bed Sediment	Mix of silt and pebble
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing crossing with stone box culvert of unknown dimensions
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	1.24 km^2
Minor Watercourse	Yes
Main river catchment	Dighty Water
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 10 (Existing track crossing)	Unnamed tributary of Tealing Burn
Description: Minor watercourse tributary flows east beneath track, vegetated upstream of crossing and less defined, whereas downstream of crossing channel is more open, defined and less vegetated, with steeper and larger banks.	
NGR Ref: 339753 739590	
Photo – Watercourse looking downstream 	Photo – looking upstream 
Width of watercourse (m)	0.5 m
Bed Sediment	Mix of silt and pebble
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing crossing with stone box culvert of unknown dimensions
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.04 km^2
Minor Watercourse	Yes
Main river catchment	Dighty Water
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 11 (Existing track crossing)	Tealing Burn
Description: Tealing Burn flows to the southeast in fluctuating channel, moving between wider sediment deposition zones and narrower vegetated channel sections. The watercourse is culverted beneath the existing track in a 450 mm arch pipe, watercourse is heavily modified.	
NGR Ref: 339605 740020	
Photo – Tealing Burn 	Photo – Tealing Burn looking downstream from crossing 
Width of watercourse (m)	2.0 m
Bed Sediment	Silt to Cobble
Bank Erosion	No
Natural Channel	Yes - but heavily modified
Existing Crossing	Existing crossing with broken 450 mm pipe
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.82 km^2
Minor Watercourse	No
Main river catchment	Dighty Water
Within catchment of SAC designated river	No
CAR Authorisation Required	No

<table>
<tr><th>ID – 12
(Proposed track crossing - permanent)</th><th>Unnamed Watercourse</th></tr>
<tr><td colspan="2"><u>Watercourse Description:</u> The small watercourse is an upstream tributary of the Tealing Burn. It flows southeast within a ~140 m long culvert under a field at the proposed access track crossing location. The watercourse was dry at the time of the site visit, the culverted section was not visible and the culvert size is unknown. The watercourse is natural and open further upstream then heavily modified and straightened/culverted through grazing land. Approximately 25 m downstream of the track crossing location, the watercourse emerges from the culvert and becomes an open channel again. The proposed new stone permanent track would cross the culverted section of the watercourse at ID12.

An alternative crossing location ~200 m upstream of ID12 in the open section of the channel, where the channel is confined in a small valley (as shown on the second photo and in Volume 3, Figure 13.2.1: Hydrology, Flood Risk and Buffers) is proposed as an alternative. The Applicant is currently in discussion with the landowner and, if secured, the upstream crossing is the preferred access which will be taken forward and will require a new single span bridge.</td></tr>
<tr><td>NGR Ref: 339189 740147</td><td></td></tr>
<tr><td>Photo – natural upstream section of watercourse looking downstream</td><td>Photo – looking upstream (the arrow shows the approximate location of the alternative crossing location in the open part of the channel)</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Width of watercourse/ drain (m)</td><td>Estimated ~ 0.6 m</td></tr>
<tr><td>Bed Sediment</td><td>Vegetated Channel (upstream). The small watercourse is culverted at crossing location ID12.</td></tr>
<tr><td>Bank Erosion</td><td>No</td></tr>
<tr><td>Natural Channel</td><td>No – the small channel is within a culvert under the field at the proposed track location. The watercourse is natural ~200 m upstream in the open section at the alternative crossing location (second photo)</td></tr>
<tr><td>Existing Crossing</td><td>None – The small watercourse is culverted under the field.</td></tr>
<tr><td>Proposed Crossing</td><td>It is not proposed to upgrade to the underground culverted section of the watercourse. However, an engineering assessment of the hydrology/hydraulics and structure of the culverted section of the watercourse will be carried by the Contractor in advance of construction to assess, design and manage the suitability of crossing location ID12. The alternative crossing location (~200 m upstream in the open part of the watercourse) may be considered instead, following the engineering assessment and is currently the preferred option for the permanent track crossing, if landowner permissions can be secured.

If the culvert were to block, there is a risk of localised flooding to the proposed permanent track crossing at ID12. If the culvert were to block or not be able to pass flood flows, flood water would flow overland across the new track following the topography and then continue back into the open channel downstream. The crossing location is in the upper reaches of the burn and the contributing catchment is small (0.2 km^2) so flood flows</td></tr>
</table>

ID – 12 (Proposed track crossing - permanent)	Unnamed Watercourse
	will be low. The flow pathways in this situation would be no different from the current situation. There are no nearby receptors and there is considered to be no increased flood risk to others. The main risk is localised flooding to the Applicant's proposed permanent track and the Applicant is cognisant of this risk. If the crossing remains at location ID12, it will be designed with suitable drainage ditches and mitigation measures in place, as identified during the engineering/ hydraulic assessment.
Additional Mitigation	Engineering and hydraulic assessment of the existing culvert to inform detailed design and assess the suitability of the new access track at the crossing location. If taken forward the crossing will be designed with mitigation (eg drainage ditches, flow pathways) to take account of the flood risk of the track from culvert blockage or the alternative upstream crossing location will be taken forward (assuming landowner agreement is secured), with a new single span bridge in the open reach of the watercourse. This could be secured by a condition.
Catchment (km^2)	0.2 km^2
Minor Watercourse	No
Main river catchment	Dighty Water
Within catchment of SAC designated river	No
CAR Authorisation Required	Yes - Registration

ID – 13 (Proposed track crossing - permanent)	Unnamed Drain
Watercourse Description: Small unnamed drain flowing south adjacent to the main access road. Proposed access crosses drain at the location of a poor quality, stone box culvert.	
NGR Ref: 339501 740317	
Photo – drain looking upstream adjacent to road	Photo – stone box culvert at proposed crossing location
	
Width of watercourse/ drain (m)	~ 0.5 m
Bed Sediment	Mixed sediment
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing crossing of the drain using a stone box culvert
Proposed Crossing	Pipe Culvert or Single Span Bridge (permanent)
Additional Mitigation	None
Catchment (km^2)	0.1 km^2
Minor Watercourse	Yes
Main river catchment	Dighty Water
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 14 (Proposed track crossing - permanent)	Unnamed Spring fed watercourse
Watercourse Description: Small unnamed watercourse tributary to Glen Ogilvie Burn. Watercourse flows downhill to the west and is fed by two springs upslope of the proposed crossing. The watercourse channel is heavily vegetated.	
NGR Ref: 340669 744061	
Photo – Upstream of proposed crossing location, looking upstream	Photo - Looking downstream to crossing location
	
Width of watercourse/ drain (m)	~ 0.6 m
Bed Sediment	Mixed, heavily vegetated
Bank Erosion	No
Natural Channel	Yes
Existing Crossing	None
Proposed Crossing	Pipe Culvert or Single Span Bridge (permanent)
Additional Mitigation	None
Catchment (km^2)	0.52 km^2
Minor Watercourse	No
Main river catchment	Dean Water
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	Yes – GBR or Registration

ID – 15 (Proposed track crossing - temporary)	Unnamed drain
Watercourse Description: Drain flowing south but was fairly dry when viewed. Drain is vegetated but well-defined in places, there appears to have been construction nearby with a gravel mound which had spilled into part of the drain.	
NGR Ref: 340837 746504	
Photo – Drain viewed looking upstream	
	
Width of watercourse/ drain (m)	0.9 m
Bed Sediment	Pebble cobble
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Pipe Culvert or Single Span Bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of watercourse and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the crossing, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for a temporary crossing in a rural setting. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.
Additional Mitigation	None
Catchment (km^2)	0.25 km^2
Minor Watercourse	Yes
Main river catchment	Dean Water
Within catchment of SAC designated river	Yes (River Tay SAC)

ID – 15 (Proposed track crossing - temporary)	Unnamed drain
CAR Authorisation Required	No

ID – 16 (Proposed track crossing - temporary)	Unnamed Drain
Watercourse Description: Unnamed drain flows east towards the Kerbet Water. Channel is wide, deep and well defined, with a large volume of stagnant water, with minimal flow.	
NGR Ref: 341030 746911	
Photo – Drain viewed looking upstream to the west	
	
Width of watercourse/ drain (m)	0.9 m
Bed Sediment	Pebble cobble
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Pipe Culvert or Single Span Bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of drain and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the crossing, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for a temporary crossing in a rural setting. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.

ID – 16 (Proposed track crossing - temporary)	Unnamed Drain
Additional Mitigation	None
Catchment (km^2)	0.71 km^2
Minor Watercourse	Yes
Main river catchment	Dean Water
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 17 (Existing track crossing)	Unnamed Drain
Watercourse Description: Large unnamed drain with existing crossing for field access, drain is largely stagnant with minor flow direction to the north. There is an existing 500 mm culvert to provide farm access at the crossing location.	
NGR Ref: 340989 747525	
Photo – Unnamed drain	Photo – Culvert visible, heavily vegetated channel
	
Width of watercourse/ drain (m)	0.9 m
Bed Sediment	Pebble, gravel
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing pipe culvert (500 mm)
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.16 km^2
Minor Watercourse	Yes
Main river catchment	Dean Water
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 18 (Existing track crossing)	Unnamed drain tributary to Kerbet Water
Watercourse Description: Large unnamed drain tributary to Kerbet Water flows west. Channel is large and well defined. There is a 500 mm culvert at the existing crossing which provides farm track access across the drain.	
NGR Ref: 341050 748552	
Photo – Drain looking west downstream	
	
Width of watercourse/ drain (m)	1.2 m
Bed Sediment	Gravel, pebble, Cobble
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing pipe culvert (500 mm)
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.65 km^2
Minor Watercourse	No
Main river catchment	Dean Water
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

Section B

ID – 19 (Proposed track crossing - temporary)	**Unnamed Drain**
Watercourse Description: Large drain flows west to Gairie Burn and then Dean Water	
NGR Ref: 341045 750045	
Photo – Whiting Burn – upstream of proposed track crossing	Photo – Whiting Burn
	
Width of watercourse/ drain (m)	1.7 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Pipe Culvert or Single span bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of drain and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the crossing, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for a temporary crossing in a rural setting. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.
Additional Mitigation	None
Catchment (km^2)	0.68 km^2
Minor Watercourse	Yes
Main river catchment	Dean Water
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

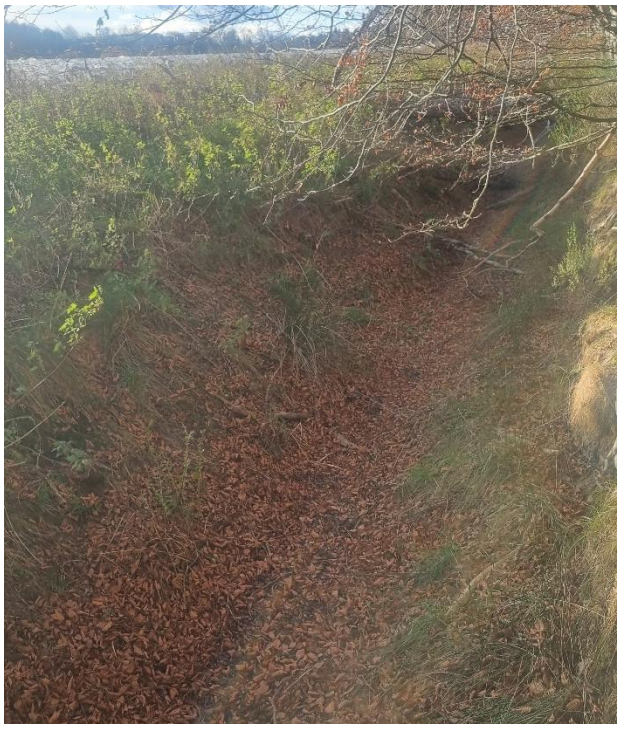
ID – 20 (Proposed track crossing - permanent)	Unnamed Drain
Watercourse Description: Proposed crossing in open field over a culverted section of drainage. Drain flows south. Proposed new track crossed over a culverted section of unknown width at time of writing, culvert links to drainage further northeast.	
NGR Ref: 341006 750940	
Photo – Drain viewed looking downstream to the south	Photo – culvert outlet is hidden
	
Width of watercourse/ drain (m)	1.7 m
Bed Sediment	Silt gravel
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing culvert, dimensions and structure unknown
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	1.97 km^2
Minor Watercourse	Yes
Main river catchment	Dean Water
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 22 (Existing track crossing)	Unnamed drain
Watercourse Description: Unnamed drain flows south in well-defined but heavily vegetated channel, extensive coverage of gorse and other shrubs. There is an existing culvert, but culvert dimensions are unknown at the time of writing. The existing track crossing is in poor condition.	
NGR Ref: 343524 754284	
Photo – Heavily vegetated channel viewed looking south	
	
Width of watercourse/ drain (m)	1.0 m
Bed Sediment	Silt gravel
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing culvert, dimensions unknown
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.12 km^2
Minor Watercourse	Yes
Main river catchment	River South Esk
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 23 (Proposed track crossing - permanent)	Unnamed Field Drain
Watercourse Description: Proposed access track crosses over section of culverted drain, the outlet of which is a 300 mm pipe around 5 m from the proposed track. Although mapped, the drain is not visually obvious in the field at all and is entirely culverted through the field. The drain culvert outlet meets an adjacent open drain which also has a smaller 150 mm culverted field drain within the drainage ditch. These outlets are both drained through a grated culverted to the southeast.	
NGR Ref: 343869 754254	
Photo – Unnamed Drain 300 mm culvert outlet and adjacent drain outlet, with grated culvert draining flows southeast	
	
Width of watercourse/ drain (m)	Estimated ~ 0.5 m
Bed Sediment	Silt gravel pebble
Bank Erosion	No
Natural Channel	No
Existing Crossing	None - although existing field drainage culvert present.
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.26 km^2
Minor Watercourse	Yes
Main river catchment	River South Esk
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 24 (Existing track crossing)	Tributary to King's Burn
Watercourse Description: Existing large crossings over tributary to King's Burn which flows south in small channel. If this existing access route is to be used to access the Proposed Development, there will be an existing culvert and its suitability will be assessed at detailed design stage.	
NGR Ref: 344524 754983	
Photo - Tributary viewed looking upstream to the north	Photo - Several 250mm culverts (4 visible)
	
Width of watercourse/ drain (m)	0.8 m
Bed Sediment	Silt gravel pebble
Bank Erosion	No
Natural Channel	Yes
Existing Crossing	Existing pipe culverts (4 x 250 mm)
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	1.08 km^2
Minor Watercourse	No
Main river catchment	River South Esk
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 25 (Existing track crossing)	King's Burn
Watercourse Description: Existing track crossing of the upper King's Burn, which flows to the south. There is an existing crossing in place to provide field access with an existing culvert and its suitability will be assessed at detailed design stage.	
NGR Ref: 344690 755000	
Photo – King's Burn viewed looking north upstream	Photo – Culvert outlet
	
Width of watercourse/ drain (m)	2.2 m
Bed Sediment	Mix silt to cobble
Bank Erosion	Yes
Natural Channel	Yes
Existing Crossing	Existing culvert (750 mm)
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	7.04 km^2
Minor Watercourse	No
Main river catchment	River South Esk
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

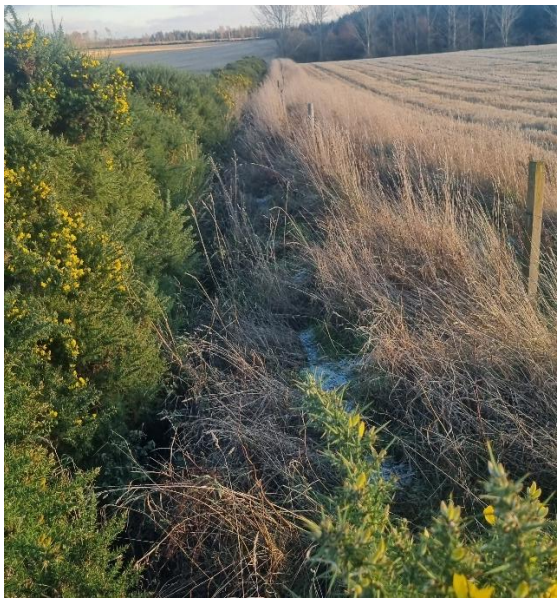
ID – 26 (Proposed track crossing - temporary)	Unnamed drain
Watercourse Description: Wide but short, defined drain was entirely dry during survey, but otherwise would drain flows to the east and is a tributary drain to River South Esk. There is no existing crossing over the drain, so would require a new crossing.	
NGR Ref: 345135 756961	
Photo – Dry, unnamed drain viewed looking upstream to the west	Photo – Dry, unnamed drain
	
Width of watercourse/ drain (m)	1.2 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Pipe Culvert or Single span bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of drain and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the crossing, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for a temporary crossing in a rural setting. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.
Additional Mitigation	None
Catchment (km^2)	0.05 km^2
Minor Watercourse	Yes

ID – 26 (Proposed track crossing - temporary)	Unnamed drain
Main river catchment	River South Esk
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 27 (Existing track crossing)	Unnamed drain
Watercourse Description: Drain flows east beneath Inshewan Avenue access road, the drain is very wide with significant water but almost no flow. There are two overflow culverts at 300 mm in diameter with a much smaller pipe.	
NGR Ref: 344533 757317	
Photo – Drain viewed looking west, upstream	Photo – Drain viewed looking east, downstream
	
Width of watercourse/ drain (m)	2.1 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing pipe culverts (2 x 300 mm)
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.29 km^2
Minor Watercourse	Yes
Main river catchment	River South Esk
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 28 (Existing track crossing)	Unnamed drain
Watercourse Description: Drain flows southeast beneath existing track towards River South Esk.	
NGR Ref: 345061 757237	
Photo – Drain viewed upstream looking northwest, around 70 m upstream of here channel is straightened	Photo – Drain viewed looking downstream to the east
	
Width of watercourse/ drain (m)	0.8 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	Yes but altered
Existing Crossing	Existing crossing with stone box culvert with irregular dimensions.
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.83 km^2
Minor Watercourse	Yes
Main river catchment	River South Esk
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 29 (Existing track crossing)	Unnamed drain
Watercourse Description: Narrow but defined drain was entirely dry during one survey and had significant flow during another, drain flows to the east and is a tributary drain to River South Esk. There is an existing field crossing, culvert dimensions unknown	
NGR Ref: 345135 756961	
Photo – Small, vegetated channel looking upstream	Photo – Channel viewed looking downstream
	
Width of watercourse/ drain (m)	0.7 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	Yes
Existing Crossing	Existing crossing with stone box culvert, dimensions unknown
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.5 km^2
Minor Watercourse	Yes
Main river catchment	River South Esk
Within catchment of SAC designated river	Yes (River Tay SAC)
CAR Authorisation Required	No

ID – 30 (Proposed track crossing - temporary)	Unnamed drain
Watercourse Description: Heavily vegetated but well-defined drain which is not shown on Ordnance Survey mapping. Connects to adjacent drain which is mapped and flows into Coe Burn.	
NGR Ref: 350938 762097	
Photo – Dry, unnamed drain viewed looking upstream to the east. Not mapped and connects to adjacent mapped drain	Photo – adjacent mapped drain which flows southeast to Coe Burn adjacent to track
	
Width of watercourse/ drain (m)	0.8 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Pipe Culvert or Single Span Bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of drain and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the crossing, which is not appropriate for a temporary crossing in a rural setting. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.
Additional Mitigation	None
Catchment (km^2)	0.04 km^2
Minor Watercourse	Yes
Main river catchment	River North Esk
Within catchment of SAC designated river	No
CAR Authorisation Required	No

Section C

ID – 31 (Proposed track crossing - temporary)	Unnamed drain
Watercourse Description: Heavily vegetated drainage channel, very straight and feeds into Willie Mills Burn further downstream. No existing crossing over the drain.	
NGR Ref: 356045 762860	
Photo – Drain further downstream of crossing	Photo – Drain
	
Width of watercourse/ drain (m)	0.9 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Single Span Bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of drain and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the bridge, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for a temporary crossing in a rural setting. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.
Additional Mitigation	None
Catchment (km^2)	0.04 km^2
Minor Watercourse	Yes
Main river catchment	River North Esk
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 32 (Proposed track crossing - temporary)	Unnamed drain
Watercourse Description: Minor mapped drain, flows downstream to the southeast, heavily vegetated.	
NGR Ref: 356806 763081	
Photo – Vegetated drain clogged with bull rush, looking southeast	Photo – Drain
	
Width of watercourse/ drain (m)	0.4 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Pipe Culvert or Single span bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of drain and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the crossing, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for a temporary crossing in a rural setting. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.
Additional Mitigation	None
Catchment (km^2)	0.01 km^2
Minor Watercourse	Yes
Main river catchment	River North Esk
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 33 (Existing track crossing)	Unnamed drain tributary to Cruick Water
Watercourse Description: Unnamed drain flows to the east beneath existing crossing in a wide channel. There is a stone box culvert beneath the existing crossing.	
NGR Ref: 357015 763391	
Photo – Drain looking upstream, west	Photo – Drain looking downstream, east
	
Width of watercourse/ drain (m)	1.1 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing stone box culvert
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.12 km^2
Minor Watercourse	Yes
Main river catchment	River North Esk
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 34 (Existing track crossing)	Unnamed drain tributary to West Water
Watercourse Description: Unnamed drain flows to the east beneath existing crossing with a large, stone box culvert. The drain is large and well-defined.	
NGR Ref: 358777 765481	
Photo – Drain viewed looking upstream	Photo – Box culvert
	
Width of watercourse/ drain (m)	1.0 m
Bed Sediment	Silt to cobble
Bank Erosion	No
Natural Channel	No
Existing Crossing	Existing stone box culvert
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	0.12 km^2
Minor Watercourse	No
Main river catchment	River North Esk
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 35 (Existing track crossing)	Whishop Burn
Watercourse Description: Existing crossing and track over Whishop Burn in well-defined channel with a 300 mm culvert beneath the track. Whishop Burn flows to the east.	
NGR Ref: 361393 766403	
Photo – Whishop Burn upstream of crossing	Photo – Whishop Burn downstream of crossing
	
Width of watercourse/ drain (m)	2.0 m
Bed Sediment	Silt, gravel, pebble
Bank Erosion	No
Natural Channel	Yes
Existing Crossing	Existing crossing (300 mm culvert)
Proposed Crossing	No upgrade. If engineering assessment determines the crossing to be structurally unsound, a temporary over-bridging solution will be put in place during construction.
Additional Mitigation	None
Catchment (km^2)	3.1 km^2
Minor Watercourse	No
Main river catchment	River North Esk
Within catchment of SAC designated river	No
CAR Authorisation Required	No

ID – 36 (Proposed track crossing - temporary)	Whishop Burn
Watercourse Description: Proposed crossing over Whishop Burn in well-defined channel which flows to the south.	
NGR Ref: 363988 766380	
Photo – Whishop Burn upstream of crossing	Photo – Whishop Burn upstream of proposed crossing, looking downstream
	
Width of watercourse/ drain (m)	2.0 m
Bed Sediment	Silt, gravel, pebble
Bank Erosion	No
Natural Channel	Yes
Existing Crossing	None
Proposed Crossing	Single Span Bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of watercourse and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the bridge, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for a temporary crossing in a rural setting. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.
Additional Mitigation	None
Catchment (km^2)	3.84 km^2
Minor Watercourse	No
Main river catchment	River North Esk
Within catchment of SAC designated river	No
CAR Authorisation Required	Yes – GBR or Registration

ID – 37 (Proposed track crossing - temporary)	Unnamed drain
Watercourse Description: Heavily vegetated drain, which is a well-defined tributary channel to River North Esk.	
NGR Ref: 362715 767086	
Photo – shows the heavily vegetated drainage channel, approximately 600 m upstream of crossing location	Photo – Heavily vegetated drain, approximately 600 m upstream of crossing location
	
Width of watercourse/ drain (m)	1.0 m
Bed Sediment	Silt, gravel
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Pipe Culvert or Single Span Bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of watercourse and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the crossing, requiring widening of the channel at the crossing and the need for raised embankments, which is not appropriate for a temporary crossing in a rural setting. The crossing and temporary track is at the edge of the future flood risk area associated with the River North Esk, so the track (and bridge embankments) will not be raised. The proposed design will allow the crossing to be removed at the end of the construction period with no legacy effect on the existing channel. In the event of a higher flood event occurring when the temporary crossing is in place, water would overtop the track and return back into the channel downstream of the track. There are no nearby receptors and there is considered to be no increased flood risk to others.
Additional Mitigation	None
Catchment (km^2)	0.96 km^2
Minor Watercourse	No
Main river catchment	River North Esk
Within catchment of SAC designated river	No
CAR Authorisation Required	Yes – GBR or Registration

ID – 38 (Proposed track crossing - temporary)	Unnamed drain
Watercourse Description: Small field drain alongside road, well maintained and dry during survey. Very small upstream catchment and not a natural watercourse, just a roadside drain.	
NGR Ref: 364550 768790	
Photo – Looking upslope to northeast	Photo – Looking downslope to southwest
	
Width of watercourse/ drain (m)	0.3 m
Bed Sediment	Silt
Bank Erosion	No
Natural Channel	No
Existing Crossing	None
Proposed Crossing	Pipe Culvert or Single Span Bridge (temporary). The crossing location is rural and a temporary crossing sized to the 1 in 30 year flow is considered suitable for the location, size of drain and temporary nature of the track crossing. Designing for a 1 in 200 year flow (plus climate change) could result in oversizing the crossing which is not appropriate for a temporary crossing in a rural setting. The catchment area of the drain is small and flood flows in this roadside drain will be low. In the event of a higher flood event occurring when the temporary crossing is in place, water could overtop the existing banks of the drain anyway and it is not considered that the temporary crossing would result in an increased flood risk to other receptors (ie the public road).
Additional Mitigation	None
Catchment (km^2)	0.16 km^2
Minor Watercourse	Yes
Main river catchment	River North Esk
Within catchment of SAC designated river	No
CAR Authorisation Required	No