Appendix A11.7: Impact Assessment

1 Introduction

1.1.1 This appendix describes the potential adverse impacts of the proposed scheme prior to mitigation on the attributes 'Hydrology and Flood Risk', 'Fluvial Geomorphology', 'Water Quality', 'Water Supply', 'Dilution and Removal of Waste Products' and 'Biodiversity for each of the identified water features. Proposed mitigation and a summary of the residual impact significance are provided.

2 Water Features Scoped Out

2.1.1 During the assessment, the following water feature was scoped out due to a lack of hydraulic connectivity (i.e. is located up-gradient) from the proposed activities:

- WF45/WF46 (minor watercourses north of Kindallachan).

2.1.2 In addition, a number of water features shown on Ordnance Survey (OS) mapping were observed not to exist, or were existing road drainage features, and hence were discounted entirely from the assessment.

3 Construction and Operational Activities

3.1.1 The construction and operational activities associated with each water feature are detailed in Table 1 below.

Table 1: Proposed construction and operational activities

Water Feature	Dualled Mainline (within 50m)	Side Road/ Access Track	New Bridge/ Bridge Extension	New Culvert/ Culvert Extension	Mainline SuDS Outfall	Pre-Earthwork Drain (PED)	Channel Re-grading / Realignment
WF6 (River Tay)	✓	✓			✓ (6: A1, A2, B, C, D2, E)	✓	
WF16	✓			✓ (1)		✓	x2 (US & DS)
WF18	✓	✓		✓ (1)		✓	x2 (US & DS)
WF19	✓	✓		✓ (1)		✓	x1 (US)
WF20	✓	✓		✓ (2)		✓	x2 (US & DS)
WF21	✓			✓ (1)		✓	x1 (US)
WF22	✓					✓	x1 (US)
WF23	✓			✓ (1)		✓	x2 (US & DS)
WF24	✓			✓ (1)		✓	x2 (US & DS)
WF25	✓			✓ (1)		✓	x2 (US & DS)
WF28	✓						
WF29	✓						
WF30	✓			✓ (1)		✓	x2 (US & DS)
WF31	✓	✓		✓ (1)		✓	x1 (US)
WF32	✓	✓		✓ (1)		✓	x2 (US & DS)
WF33	✓			✓ (1)		✓	x2 (US & DS)
WF34	✓			✓ (1)		✓	x1 (DS)
WF35	✓			✓ (1)		✓	x1 (US)

Water Feature	Dualled Mainline (within 50m)	Side Road/ Access Track	New Bridge/ Bridge Extension	New Culvert/ Culvert Extension	Mainline SuDS Outfall	Pre-Earthwork Drain (PED)	Channel Re-grading / Realignment
WF36 (Dowally Burn)	✓	✓		✓ (1)		✓	
WF37	✓	✓		✓ (1)		✓	x2 (US & DS)
WF38	✓	✓		✓ (3)	✓ (D1)	✓	x2 (US & DS)
WF39 (Sloggan Burn)	✓	✓		✓ (2)		✓	
WF40 (Kindallachan Burn)	✓	✓	✓ (1)			✓	
WF41	✓			✓ (1)			x1(US)
WF42	✓			✓ (1)	✓ (F1+F2)	✓	x2 (US & DS)
WF47	✓	✓		✓ (1)		✓	x2 (US & DS)
WF49	✓	✓		✓ (1)		✓	x2 (US & DS)
WF50	✓			✓ (1)	✓ (G1+G2)	✓	x2 (US & DS)
WF52	✓	✓		✓ (1)		✓	X4 (x3 US & x1 DS)
WF53	✓			✓ (1)		✓	x1(US)
WF55					✓ (H)		
WF70 (River Tummel)							

4 Impact Assessment

4.1.1 This section reports on the assessment of the specific impacts affecting water features during both the construction and operational phase of the proposed scheme. Where no impacts are anticipated across all attributes, these water features have been listed above in section 2 and are not included within this section. All impacts reported are adverse unless otherwise stated.

4.1.2 Standard mitigation will be applied to all water features affected by the proposed scheme. Specific mitigation measures have also been provided at certain water features in Table 2 and 3 below, and a full description of the standard and specific mitigation measures to be adopted is provided in Chapter 11 (Road Drainage and the Water Environment), Tables 11.18 to 11.19. Tables 2 and 3 are colour coded by impact significance, whereby:

- Neutral significance = Blue;
- Slight significance = Yellow;
- Moderate significance = Orange;
- Large significance = Red;
- Very Large significance = Crimson; and
- Beneficial Impacts = Green.

4.1.3 Table 11.7 of Chapter 11 (Road Drainage and the Water Environment) allows for the use of professional judgement to assign a significance rating in certain circumstances. The selection of a significance from the two options available has been undertaken based on professional judgement.

4.1.4 It is noted that within Chapter 11 (Road Drainage and the Water Environment) and Appendix A11.1 (Baseline Conditions), a distinction has been made between the receptor 'Water Quality' and 'Water Supply', due to the potential for the magnitude of impact on these attributes to differ depending on the source location of the water supply. The assessment and significance of the impact on water supply is provided within brackets in the water quality (water supply) column of Table 2 and Table 3.

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Construction Impacts

Table 2: Specific construction impacts

Water Feature	Potential Construction Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF6 (River Tay)	**Flood Risk:** Temporary increase in impermeable areas within the catchment and construction of new road drainage outfalls have the potential to increase peak flow rates. Loss of floodplain storage due to construction works within the floodplain in multiple locations results in increased flood levels throughout the floodplain according to hydraulic modelling results. Impact varies by location, but there is increased flood risk to several properties including Haugh of Kilmorich, Guay Farmhouse, Dowally Farm and properties on the west bank of the Tay floodplain, although these increases are negligible in some cases. Potential for increased flood risk to A9 and Highland Mainline railway **Fluvial Geomorphology:** Potential fine sediment input to water feature from direct construction activities within the channel and indirectly from works within the tributaries, surrounding earthworks and construction activities (including construction of drainage, embankments and side roads in the floodplain). This could lead to changes of the morphological features present, including smothering of bed substrate and depositional features. Works within the vicinity and along the banks of the River Tay altering channel banks and reducing floodplain area. This could alter the lateral connectivity of the water feature. Permanent removal of a length of natural bank and bed at each outfall, with localised changes to flow dynamics and the potential for alterations in sediment processes. Lateral connectivity with the floodplain altered as a result of new headwalls, with permanent removal of riparian vegetation. Potential for localised erosion of bed and banks around headwall structures. Works along the banktop and/or bankface to install a contiguous bore piled wall (River Tay bank stabilisation) between ch1600-1900 has the potential for the release of fine sediment into the River Tay. This could lead to changes to the existing baseline conditions, including smothering of bed substrate and depositional features, and potential for alteration to flow patterns. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats and agricultural abstractions (water supplies) from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances. In relation to the bank stabilisation works between ch1600-1900, there is potential for significant release of sediment into the River Tay SAC without appropriate mitigation, due to works being undertaken on unstable ground in very close proximity to the River Tay.	very high x moderate = Very Large	high x moderate = Moderate	very high x major = Very Large (high x moderate = Large)	low x negligible = Neutral	very high x major = Very Large	P03-W18 P03-W19 P03-W20 P03-W21 P03-W23	very high x negligible = Neutral	high x minor = Slight	very high x negligible = Neutral (high x negligible = Neutral)	low x negligible = Neutral	very high x negligible = Neutral
WF16	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Potential for localised flood risk increase upstream of A9 **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from culvert replacement and extension, localised channel realignment and SuDS pond construction. Diversion/damming of flow during in-channel works to install extended culvert. Changes to channel morphology due to increase of artificial bed and bank material and partial channel realignment. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF18	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Potential for localised flood risk increase upstream of A9 **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from culvert replacement and extension, channel realignment upstream and downstream of the culvert, channel regrading, PED, road widening and road and temporary roundabout construction. Diversion/damming of flow during in-channel works to construct culvert extension. Changes to channel morphology due to increase of artificial bed and bank material and partial channel realignment. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x moderate = Slight	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral

Water Feature	Potential Construction Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF19	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. These could increase flood risk to the A9. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from culvert replacement and extension, channel regrading, PED, road widening and road construction. Diversion/damming of flow during in-channel works to construct culvert extension. Changes to channel morphology due to increase of artificial bed and bank material and channel regrading. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	very high x minor = Large	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	very high x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF20	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. These could increase flood risk to the A9 **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from culvert replacement and extensions, channel regrading, PED, road widening and road construction. Diversion/damming of flow during in-channel works to construct culvert extensions. Changes to channel morphology due to increase of artificial bed and bank material and channel regrading. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	very high x minor = Large	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	very high x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF21	**Flood Risk:** Potential for temporary increase in runoff rates from site areas that could increase flood risk immediately upstream of the A9 and downstream of the A9 culvert. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from channel realignment, road widening, road construction and new culvert installation. Diversion/damming of flow likely to be required during in-channel works to construct channel realignment and install culvert. Changes to channel morphology due to partial channel realignment including combining WF21 and WF22 and creation of a new channel downstream of the existing A9 to the River Tay. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF22	**Flood Risk:** Potential for temporary increase in runoff rates from site areas that could increase flood risk immediately upstream of the A9 and downstream of the A9 culvert. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from potential channel realignment, road widening and road construction. Changes to channel morphology due to partial channel realignment. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for less than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x minor = Neutral	low x moderate = Slight	low x negligible = Neutral	low x moderate = Slight	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF23	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area upstream of A9. **Fluvial Geomorphology:** Refer to potential impacts for WF18. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	medium x minor = Slight	medium x major = Large	low x negligible = Neutral	medium x major = Large	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	medium x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral
WF24	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area upstream of A9. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from culvert extension, PED, road widening and road construction. Diversion/damming of flow likely to be required during in-channel works to construct culvert. Changes to channel morphology due to partial culvert extension. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	medium x minor = Slight	medium x major = Large	low x negligible = Neutral	medium x major = Large	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	medium x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral

Water Feature	Potential Construction Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF25	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area upstream of A9. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from culvert extension construction, PED, channel regrading, road widening and road construction. Diversion/damming of flow likely to be required during in-channel works to construct culvert. Changes to channel morphology due to partial culvert extension. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x major = Slight	medium x minor = Slight	medium x major = Large	low x negligible = Neutral	medium x major = Large	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	medium x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral
WF28	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road construction. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Slight	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF29	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road construction. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF30	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. **Fluvial Geomorphology:** Refer to potential impacts for WF19. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF31	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. **Fluvial Geomorphology:** Refer to potential impacts for WF25. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x minor = Neutral	medium x major = Large	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF32	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from culvert extension construction, PED, channel regrading, channel realignment, road widening, road and retaining wall construction. Diversion/damming of flow likely to be required during in-channel works to construct culvert. Changes to channel morphology due to partial culvert extension. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Slight	medium x minor = Slight	medium x major = Large	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	medium x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF33	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. **Fluvial Geomorphology:** Refer to potential impacts for WF19. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral

Water Feature	Potential Construction Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF34	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. **Fluvial Geomorphology:** Refer to potential impacts for WF19. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x moderate = Slight	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF35	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. **Fluvial Geomorphology:** Refer to potential impacts for WF25. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF36 (Dowally Burn)	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Increase in flood risk to farmland and access roads could result. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road widening and road construction, PED, culvert extension for the A9 and two side roads and construction of three outfalls. Culvert extension involves extension of the existing A9 culvert; installation of a new box culvert to carry the Network Rail access track over WF36. Changes to channel morphology due to increase of artificial bank material. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	high x major = Large	medium x moderate = Moderate	high x major = Large	medium x minor = Slight	very high x major = Very Large	P03-W18 P03-W20 P03-W21	high x negligible = Neutral	medium x minor = Slight	high x negligible = Neutral	medium x negligible = Neutral	very high x negligible = Neutral
WF37	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Increase in flood risk to farmland could result. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road widening and road construction, culvert extension, PED, outfall, two channel regradings upstream and downstream of the culvert and four outfalls. Diversion/damming of flow likely to be required during in-channel works to construct culvert extension. Changes to channel morphology due to increase of artificial bed and bank material and partial channel realignment. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	medium x major = Large	low x major = Slight	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	medium x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF38	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Increase in flood risk to farmland could result. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from extensive construction activities in this locality, including: two culvert replacement and extensions; one new culvert; channel realignment and channel regrading; PED; two new outfalls; road widening and road construction. Diversion/damming of flow during in-channel works to construct culvert extensions. Changes to channel morphology due to increase of artificial bed and bank material and partial channel realignment. Construction of compensatory flood storage area would cause significant delivery of fine sediment to downstream section of water feature caused by large area of exposed soil following excavation. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	medium x major = Large	medium x moderate = Moderate	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21 P03-W22	medium x negligible = Neutral	medium x minor = Slight	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral

Water Feature	Potential Construction Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF39 (Slogga n Burn)	**Flood Risk:** Change to runoff rates from site drainage and change in vegetation type. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Increase in flood risk to farmland, A9, Highland Mainline railway and Guay Farmhouse could result. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road widening and road construction, one new outfall, PED and culvert extension for the A9 and new culvert for the side road. Changes to channel morphology due to increase of artificial bank material. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances. Source for TB-PWS5 water supply is located upstream from the construction activities and therefore no impact is anticipated.	very high x major = Very Large	medium x moderate = Moderate	medium x major = Large (high x negligible = Neutral)	low x minor = Neutral	medium x major = Large	P03-W18 P03-W20 P03-W21	very high x negligible = Neutral	medium x minor = Slight	medium x negligible = Neutral (high x negligible = Neutral)	low x negligible = Neutral	medium x negligible = Neutral
WF40 (Kindalla chan Burn)	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Potential for increased flood risk to open areas upstream of A9. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road widening and road construction, one new outfall, PED and A9 bridge extension. Changes to channel morphology due to increase of artificial bank material. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	very high x major = Very Large	high x moderate = Moderate	high x major = Large	medium x minor = Slight	very high x major = Very Large	P03-W18 P03-W20 P03-W21	very high x negligible = Neutral	high x minor = Slight	high x negligible = Neutral	medium x negligible = Neutral	very high x negligible = Neutral
WF41	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Potential for increased flood risk to open areas upstream or downstream of A9. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road construction. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	medium x moderate = Moderate	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF42	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Potential for increased flood risk to open areas upstream or downstream of A9. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road widening and road construction, culvert extension, PED, one new outfall, channel realignment and regrading. Diversion/damming of flow during in-channel works to construct culvert extension. Changes to channel morphology due to increase of artificial bed and bank material and partial channel realignment. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	medium x moderate = Moderate	low x moderate = Slight	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF47	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Potential for increase to flood risk to woodland and road embankment upstream of the A9. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road widening and road construction, culvert extension, installation of a new culvert, PED, channel regrading and channel realignment. Diversion/damming of flow during in-channel works to construct culvert extension. Changes to channel morphology due to increase of artificial bed and bank material and partial channel realignment. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	low x minor = Neutral	low x moderate = Slight	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral

Water Feature	Potential Construction Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF49	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Potential for increase to flood risk to woodland and road embankment upstream of the A9. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road widening and road construction, culvert extension, installation of a new culvert, PED, channel regrading, channel realignment and construction of a retaining wall. Diversion/damming of flow during in-channel works to construct culvert extension. Changes to channel morphology due to increase of artificial bed and bank material and partial channel realignment. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	medium x minor = Slight	low x moderate = Slight	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	medium x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF50	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Potential for increased flood risk up or downstream of the A9 impacting on woodland or agricultural land. **Fluvial Geomorphology:** Temporary increase in fine sdeiment delivery from road widening, new culverts, PED, retaining wall and two channel realignments and channel regradings both upstream and downstream. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	very high x major = Very Large	medium x moderate = Moderate	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	very high x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF52	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Potential for increased flood risk to A9, side roads or downstream agricultural land. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road widening and road construction, four culvert extensions and PED. Diversion/damming of flow during in-channel works to construct culvert extension. Changes to channel morphology due to increase of artificial bed and bank material and partial channel realignment. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	medium x minor = Slight	low x moderate = Slight	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF53	**Flood Risk:** Potential for temporary increase in runoff rates from site areas. Culvert and in channel works may cause restriction in flood flows. Loss of floodplain area. Potential for increase in flood risk within field upstream of A9. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from road widening, culvert extension and PED. Changes to channel morphology due to increase of artificial bed and bank material. **Water Quality:** A temporary measurable decrease in water quality (including EQS) for greater than one month with temporary impacts on designated species/habitats from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	medium x major = Large	low x minor = Neutral	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W18 P03-W20 P03-W21	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF55	**Flood Risk:** No impact anticipated. **Fluvial Geomorphology:** Temporary increase in fine sediment delivery from outfall construction. **Water Quality:** Potential for temporary works to be located within catchment with a temporary measurable decrease in water quality for less than one month from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	medium x minor = Slight	low x negligible = Neutral	low x minor = Neutral	medium x minor = Slight	low x minor = Neutral	P03-W18 P03-W20 P03-W21	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral	low x minor = Neutral
WF70 (River Tummel)	**Flood Risk:** Negligible impacts expected due to downstream works in River Tay floodplain changing water levels. **Fluvial Geomorphology:** No impacts anticipated during construction. **Water Quality:** Potential for temporary works to be located within catchment with a temporary measurable decrease in water quality for less than one month from the generation of turbid runoff and/or accidental spillage of fuels, oils, cementitious material or other polluting substances.	very high x minor = Moderate	high x negligible = Neutral	high x minor = Moderate	low x negligible = Neutral	very high x minor = Large	P03-W18 P03-W20 P03-W21	very high x negligible = Neutral	high x negligible = Neutral	high x negligible = Neutral	low x negligible = Neutral	very high x negligible = Neutral

Operational Impacts

Table 3: Specific operation impacts

Water Feature	Potential Operational Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF6 (River Tay)	**Flood Risk:** Change to runoff rates from road drainage. Surrounding earthworks may cause restriction in flood flows. Loss of floodplain area resulting in increased flood risk, including to properties and Highland Mainline railway. **Fluvial Geomorphology:** Potential for alterations to flow and sediment regime due to proposed outfalls. Potential for alteration of lateral floodplain connectivity due to new road embankments. Bank stabilisation works may alter the fluvial dynamics of the watercourse, in particular erosion and deposition processes, prevention of natural lateral migration and with the potential to cause downstream fluvial adjustment. Potential for cumulative change in flow and sediment regime from affected tributaries. **Water Quality:** Operational discharges from mainline drainage (outfalls A1, A2, B, C, D2 and E). HAWRAT 'Pass' for soluble and sediment-bound pollutants during operation. Risk of pollution from spillage <0.5% during operation.	very high x moderate = Very Large	high x moderate = Moderate	very high x negligible = Neutral (high x negligible = Neutral)	low x negligible = Neutral	very high x negligible = Neutral	P03-W24 P03-W30 P03-W31 P03-W32 P03-W33 P03-W34 P03-W35 P03-W36 P03-W38 P03-W40 P03-W43 P03-W44 P03-W45	very high x minor = Moderate	high x minor = Slight	very high x negligible = Neutral (high x negligible = Neutral)	low x negligible = Neutral	very high x negligible = Neutral
WF16	**Flood Risk:** Culvert replacement reduces flood risk upstream of A9 as flood levels in bank. Small loss of floodplain area downstream of the A9 due to drainage pond unlikely to impact flood risk. **Fluvial Geomorphology:** Potential for alteration of existing fluvial processes and loss of existing channel features by increasing culverted length. Potential for alteration of lateral floodplain connectivity and riparian corridor due to extended culvert and addition of flood attenuation pond. Increase of artificial bed and bank material associated with extended culvert. Change to channel morphology and sediment and flow regime due to channel realignment. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF18	**Flood Risk:** Culvert replacement anticipated to have negligible impact on flood risk. **Fluvial Geomorphology:** Potential for alteration of existing fluvial processes and loss of existing channel features by increasing culverted length. Potential for alteration of lateral floodplain connectivity and riparian corridor due to extended culvert. Increase of artificial bed and bank material associated with extended culvert. Change to channel morphology and sediment and flow regime due to channel realignment. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF19	**Flood Risk:** Culvert replacement results in reduced flood risk upstream of A9. Impact downstream of A9 negligible as within River Tay floodplain **Fluvial Geomorphology:** Refer to potential impacts for WF18. **Water Quality:** No impacts anticipated.	very high x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	very high x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF20	**Flood Risk:** Culvert replacement results in reduced flood risk upstream of A9. Impact downstream of A9 negligible as within River Tay floodplain. **Fluvial Geomorphology:** Refer to potential impacts for WF18. **Water Quality:** No impacts anticipated.	very high x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	very high x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF21	**Flood Risk:** Small changes due to change in runoff in vicinity where scheme earthworks required. Not anticipated to alter flows significantly. **Fluvial Geomorphology:** Potential for changes in flow and sediment patterns caused by channel realignment and the creation of a new channel to the River Tay. Loss of existing geomorphological features including channel substrate. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x moderate = Slight	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF22	**Flood Risk:** Small changes due to change in runoff in vicinity where scheme earthworks required. Not anticipated to alter flows significantly. **Fluvial Geomorphology:** Refer to potential impacts for WF21. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral

Water Feature	Potential Operational Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF23	**Flood Risk:** Increase in flood risk downstream of the A9 culvert due to increased flows through the culvert. **Fluvial Geomorphology:** Refer to potential impacts for WF18. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	medium x minor = Slight	medium x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	medium x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral
WF24	**Flood Risk:** Small changes due to change in runoff in vicinity where scheme earthworks required. **Fluvial Geomorphology:** Potential for alteration of existing fluvial processes and loss of existing channel features by increasing length culverted. Potential for alteration of lateral floodplain connectivity and riparian corridor due to extended culvert. Increase of artificial bed and bank material associated with extended culvert. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	medium x minor = Slight	medium x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	medium x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral
WF25	**Flood Risk:** Small changes due to change in runoff in vicinity where scheme earthworks required. **Fluvial Geomorphology:** Refer to potential impacts for WF24. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	medium x minor = Slight	medium x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	medium x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral
WF28	**Flood Risk:** Potential for small change in surface water flows due to scheme earthworks and associated drainage altering existing flows **Fluvial Geomorphology:** No impacts anticipated. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W26	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF29	**Flood Risk:** Potential for small change in surface water flows due to scheme earthworks and associated drainage altering existing flows. **Fluvial Geomorphology:** No impacts anticipated. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W26	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF30	**Flood Risk:** Small changes due to change in runoff in vicinity. Small loss of floodplain area, culvert extension results in existing flood risk upstream of culvert being moved. **Fluvial Geomorphology:** Refer to potential impacts for WF24. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF31	**Flood Risk:** Small changes due to change in runoff in vicinity. Small loss of floodplain area, culvert extension results in existing flood risk upstream of culvert being moved. **Fluvial Geomorphology:** Refer to potential impacts for WF18. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x minor = Neutral	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF32	**Flood Risk:** Small changes due to change in runoff in vicinity. Increased conveyance through culvert will result in increased flood risk downstream of A9. **Fluvial Geomorphology:** Refer to potential impacts for WF18. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	medium x minor = Slight	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	medium x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF33	**Flood Risk:** Small changes possible due to change in runoff in vicinity as a result of scheme earthworks and drainage. **Fluvial Geomorphology:** Potential for alteration of existing fluvial processes and loss of existing channel features by increasing culverted length. Potential for alteration of lateral floodplain connectivity and riparian corridor due to replacement and extension of existing culvert. Increase of artificial bed and bank material associated with replaced culvert. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x moderate = Slight	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF34	**Flood Risk:** Small changes possible due to change in runoff in vicinity as a result of scheme earthworks and drainage. **Fluvial Geomorphology:** Refer to potential impacts for WF24. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x moderate = Slight	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF35	**Flood Risk:** Small changes due to change in runoff in vicinity where scheme earthworks required. Not anticipated to alter flows significantly. **Fluvial Geomorphology:** Refer to potential impacts for WF24. **Water Quality:** No impacts anticipated.	low x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral

Water Feature	Potential Operational Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF36 (Dowally Burn)	**Flood Risk:** Small changes due to change in runoff in vicinity where scheme earthworks required. Not anticipated to alter flows significantly. **Fluvial Geomorphology:** Loss of existing geomorphological features (including channel substrate and depositional features) through extending the existing culvert to accommodate the A9 and the installation of a new culvert for two new access tracks. Potential for change in flow and sediment processes within the channel at this location. **Water Quality:** Operational discharge from side road drainage, with potential for metals, hydrocarbons and Total Suspended Solids (TSS) within discharges. Simple index approach indicates proposed treatment is sufficient for anticipated pollutant concentrations.	high x negligible = Neutral	medium x moderate = Moderate	high x minor = Slight	medium x minor = Slight	very high x minor = Moderate	P03-W25 P03-W26 P03-W29 P03-W45	high x negligible = Neutral	medium x minor = Slight	high x negligible = Neutral	medium x negligible = Neutral	very high x negligible = Neutral
WF37	**Flood Risk:** Small changes due to change in runoff in vicinity where scheme earthworks required. Not anticipated to alter flows significantly. **Fluvial Geomorphology:** Potential for alteration of existing fluvial processes and loss of existing channel features by increasing length culverted and the addition of an outfall. Potential for alteration of lateral floodplain connectivity and riparian corridor due to extended culvert and outfall headwall. Increase of artificial bed and bank material associated with extended culvert and outfall headwall. **Water Quality:** Operational discharge from side road drainage, with potential for metals, hydrocarbons and Total Suspended Solids (TSS) within discharges. Simple index approach indicates proposed treatment is sufficient for anticipated pollutant concentrations.	medium x negligible = Neutral	low x minor = Neutral	low x minor = Neutral	low x negligible = Neutral	low x minor = Neutral	P03-W25 P03-W26 P03-W45	medium x negligible = Neutral	low x minor = Neutral	low x minor = Neutral	low x negligible = Neutral	low x minor = Neutral
WF38	**Flood Risk:** Reconfigured culvert results in an increase in flood risk downstream of the A9 due to an increase in pass forward flows. **Fluvial Geomorphology:** Loss of existing geomorphological features (including channel substrate and depositional features) through extending one existing culvert and the addition of two new culverts. Potential impact on fluvial processes and loss of natural bank through the installation of two new outfalls. Flood compensation area would reduce the height of water feature banks downstream of the A9. Potential for change in flow and sediment processes within the channel at these locations. **Water Quality:** Operational discharges from mainline drainage (outfall D1). HAWRAT 'Fail' for soluble and sediment-bound pollutants, and failure of compliance with EQS (Cu) prior to mitigation. Risk of pollution from spillage <0.5%. HAWRAT 'Fail' for soluble pollutants post-mitigation after adoption of SuDS, but 'Pass' for sediment-bound pollutants and compliance with EQS. Operational discharge from side road drainage, with potential for metals, hydrocarbons and Total Suspended Solids (TSS) within discharges. Simple index approach indicates proposed treatment is sufficient for anticipated pollutant concentrations.	medium x major = Large	medium x minor = Slight	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W25 P03-W26 P03-W31 P03-W40 P03-W45	medium x negligible = Neutral	medium x minor = Slight	low x minor = Neutral	low x negligible = Neutral	low x minor = Neutral
WF39 (Slogga n Burn)	**Flood Risk:** Extension to structure due to A9 widening and constriction of existing flood plain due to the scheme results in increase in flood risk upstream of A9. Works to bank to prevent this results in increased flood risk to farmland downstream of A9 **Fluvial Geomorphology:** Refer to potential impacts for WF36. **Water Quality:** Operational discharge from side road drainage, with potential for metals, hydrocarbons and Total Suspended Solids (TSS). Simple index approach indicates proposed treatment is sufficient for anticipated pollutant concentrations. Source for TB-PWS5 water supply is located upstream from the operational activities and therefore no impact is anticipated.	very high x major = Very Large	medium x moderate = Moderate	medium x minor = Slight (high x negligible = Neutral)	low x minor = Neutral	medium x minor = Slight	P03-W25 P03-W26 P03-W29 P03-W37 P03-W39 P03-W45	very high x negligible = Neutral	medium x minor = Slight	medium x negligible = Neutral (high x negligible = Neutral)	low x negligible = Neutral	medium x negligible = Neutral
WF40 (Kindalla chan Burn)	**Flood Risk:** Works reduce spill from watercourse upstream of A9, resulting in a small increase in conveyance and a negligible increase in flood risk downstream. Small change due to changes in runoff also anticipated to be negligible. **Fluvial Geomorphology:** Potential for loss of existing riparian zone through the extension of the bridge over the watercourse. Loss of lateral connectivity with the floodplain at this location and potential for changed flow and sediment patterns during high flows. **Water Quality:** No impacts anticipated.	very high x negligible = Neutral	high x minor = Moderate	high x negligible = Neutral	medium x negligible = Neutral	very high x negligible = Neutral	P03-W25 P03-W25 P03-W27 P03-W28	very high x negligible = Neutral	high x negligible = Neutral	high x negligible = Neutral	medium x negligible = Neutral	very high x negligible = Neutral

Water Feature	Potential Operational Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF41	**Flood Risk:** Potential for small increase in flood risk up and downstream of the A9 due to diversion of flows from WF50 into this area. **Fluvial Geomorphology:** No impacts anticipated. **Water Quality:** No impacts anticipated.	medium x moderate = Moderate	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26 P03-W41	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF42	**Flood Risk:** Potential for small increase in flood risk up and downstream of the A9 due to diversion of flows from WF50 into this area. **Fluvial Geomorphology:** Potential for changed sediment patterns due to decreased surface area of the pond. **Water Quality:** Operational discharges from mainline drainage (outfalls F1 and F2). HAWRAT 'Fail' for soluble and sediment-bound pollutants prior to mitigation. Risk of pollution from spillage <0.5%. When assessed cumulatively (outfalls F1 and F2), HAWRAT 'Fail' for soluble pollutants and failure of compliance with EQS (Cu) both pre- and post-mitigation.	medium x moderate = Moderate	low x minor = Neutral	low x major = Moderate	low x major = Slight	low x major = Moderate	P03-W25 P03-W26 P03-W32 P03-W41 P03-W46	medium x negligible = Neutral	low x negligible = Neutral	low x major = Slight	low x major = Slight	low x major = Slight
WF47	**Flood Risk:** Replacement culvert and flows from WF49 result in a small increase in flood risk downstream of the A9 due to an increase in pass forward flows. Flows still in bank and therefore negligible increase in flood risk. **Fluvial Geomorphology:** Potential for alteration of existing fluvial processes and loss of existing channel features by increasing culverted length. Potential for alteration of lateral floodplain connectivity and riparian corridor due to extended culvert. Increase of artificial bed and bank material associated with extended culvert. Change to channel morphology and sediment and flow regime due to channel realignment. **Water Quality:** Operational indirect discharges from low usage access tracks with over the edge drainage. No impacts anticipated.	low x negligible = Neutral	low x major = Slight	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26 P03-W45	low x negligible = Neutral	low x moderate = Slight	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF49	**Flood Risk:** Watercourse is diverted into watercourse WF47, reducing flood risk from this watercourse **Fluvial Geomorphology:** Potential for alteration of existing fluvial processes and loss of existing channel features by increasing culverted length. Potential for alteration of lateral floodplain connectivity and riparian corridor due to extended culvert. Increase of artificial bed and bank material associated with extended culvert. Change to channel morphology and sediment and flow regime due to channel realignment. Change in flow regime during high flows as flows from WF50 are diverted into WF47/WF49. No significant changes to geomorphology features or transportation of sediment. **Water Quality:** No impacts anticipated.	medium x negligible = Neutral	low x moderate = Slight	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26 P03-W35	medium x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF50	**Flood Risk:** Significant increase in flood risk downstream of the watercourse due to increased culvert size and relocation of watercourse due to side roads. **Fluvial Geomorphology:** Loss of existing geomorphological features (including channel substrate and depositional features) through extending the existing culvert and realignment of the channel both upstream and downstream. This has the potential to change flow and sediment processes within the channel at this location. Ralignment would be designed to include geomorphological improvements to channel downstream of the A9 crossing. Changed flow regime associated with channel realignment into WF49. This has the potential to alter sediment processes and geomorphological features within the new realigned downstream reach. **Water Quality:** Operational discharges from mainline drainage (outfall G1 + G2). HAWRAT 'Fail' for soluble and sediment-bound pollutants, and failure against EQS compliance (Cu), prior to mitigation. Risk of pollution from spillage <0.5%. HAWRAT 'Fail' for soluble pollutants post-mitigation and failure of compliance with EQS (Cu).	very high x major = Very Large	medium x moderate = Moderate	low x major = Moderate	low x negligible = Neutral	low x major = Moderate	P03-W25 P03-W26 P03-W32 P03-W35 P03-W41	very high x negligible = Neutral	medium x minor = Slight	low x major = Slight	low x negligible = Neutral	low x major = Slight
WF52	**Flood Risk:** Small changes due to change in runoff in vicinity where scheme earthworks required. Culvert replacement results in increased flood risk downstream. **Fluvial Geomorphology:** Refer to potential impacts for WF18. **Water Quality:** Operational indirect discharges from low usage access tracks with over the edge drainage**.** No impacts anticipated.	medium x minor = Slight	low x moderate = Slight	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26 P03-W42 P03-W45	medium x minor = Slight	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral

Water Feature	Potential Operational Impacts	Pre-Mitigation: Sensitivity x Magnitude = Significance					Specific Mitigation	Post-Mitigation: Sensitivity x Magnitude = Significance				
		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity		Flood Risk and Hydrology	Fluvial Geomorphology	Water Quality (Water Supply)	Dilution & Removal of Waste Products	Biodiversity
WF53	**Flood Risk:** Increase in flood risk downstream of the culvert due to increased culvert size. **Fluvial Geomorphology:** Refer to potential impacts for WF18. **Water Quality:** No impacts anticipated.	medium x negligible = Neutral	low x minor = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	P03-W25 P03-W26	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral
WF55	**Flood Risk:** No change to flood risk **Fluvial Geomorphology:** No impacts anticipated. **Water Quality:** Operational discharges from mainline drainage (outfall H). HAWRAT 'Fail' for soluble pollutants, and failure against EQS compliance (Cu), prior to mitigation. Risk of pollution from spillage <0.5%. HAWRAT 'Pass' for all components post-mitigation.	medium x negligible = Neutral	low x negligible = Neutral	low x major = Moderate	medium x major = Large	low x major = Moderate	P03-W30 P03-W46	medium x negligible = Neutral	low x negligible = Neutral	low x negligible = Neutral	medium x negligible = Neutral	low x negligible = Neutral
WF70 (River Tummel)	**Flood Risk:** Negligible impacts expected due to downstream changes in River Tay floodplain changing water levels **Fluvial Geomorphology:** No impacts anticipated. **Water Quality:** No impacts anticipated.	very high x negligible = Neutral	high x negligible = Neutral	high x negligible = Neutral	low x negligible = Neutral	very high x negligible = Neutral		very high x negligible = Neutral	high x negligible = Neutral	high x negligible = Neutral	low x negligible = Neutral	very high x negligible = Neutral