# Appendix 11.4

Hydromorphology Assessment Part 3



Catchment No. Catchment Name	117				
Catchinent Hame		<u></u>			
Channel Nature	Nature of water course		Drain		
Cildiller Nature	Size of water course		Other		
		 T			
Quantitative Spatial	Catchment Area (km <sup>2</sup> ) Average slope in catchment (°)		No Data No Data		
Elements	% Catchment over 750m (for snow melt risk)		0		
	Water, flows and levels		Good		
Catchment Name Channel Nature Quantitative Spatial Elements WFD classification Geology Environmental designations (see Drawing 11.4.3.1 c, Catchment 117) Sediment source and supply - Catchment Scale Morphology and Processs Reach upstream of crossing	Physical condition Overall ecological status		Good Moderate		
	Overall ecological status		Modelate		
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 117)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable		
Geology	Is an alluvial fan present at or near the crossing?	No			
	Ramsar	No			
	SAC SPA	No			
	SSSI	NO			
	Changes in slope and channel confinement		11.4.3.2, Catchment 117		
	Is peat present in the catchment Is there a bog burst risk	No			
	Current valley side or terrace erosion	No			
	Potential valley side or terrace erosion	No			
Sediment source and	Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel	No			
		No			
	Bank erosion/lateral migration	No			
	Unvegetated bars	No No			
	Wooded/forested areas in catchment Infrastructure type (see Drawing 11.4.3.1 d, Catchment 117)	No			
	Comment on sediment source potential in catchment		Limited		
	Comment on sediment supply potential to crossing		Limited		
r	Channel morphology	Plane bed			
	Predominant sediment size	Fines and some cobbles			
	Unvegetated bars	No			
Morphology and Process-	Vertical incision	Low	Incision of drain possible led to failure of drain banks but now seem stabilised		
	Deposition	None			
	Lateral migration/bank erosion	Low	Previous failure of drain banks evident due to		
	Presence and nature of infrastructure (Map 1d)	None	incision but now stabilised		
ĺ	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 117)				
Ĺ	Channel realignment	Drain has captured hillslope drainage			
	Channel morphology	Engineered			
	Predominant sediment size	Large gravel with fine drape u/s of			
	Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars	1.4 No			
Morphology and Process-	Vertical incision	None			
At crossing	Deposition	Low	Small culvert exit appears choked with sediment		
ĺ	Lateral migration/bank erosion	None			
	Damaged/unstable drains or armouring	None			
·					
	Channel morphology Prodominant codiment cite	Plane bed fine			
	Predominant sediment size Unvegetated bars	No			
Morphology and Process-	Vertical incision	None			
	Deposition	None			
crossing	Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d)	None Yes	Railway		
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 117)	Railway	Channel realigned to join others to pass under		
ĺ			railway at one single point.		
l	Channel realignment	Yes	See above		
Summary behaviour	Very little happening . Cut drains u/s of crossing have previously inc stabilised. Small amounts of large gravel are deposited u/s of the culv D/s of the small culvert has become choked with fine sediment, whic	vert where the drains drop to below road I	evel, but the armouring here seems mostly intact.		

Damaged/unstable drains or armouring     Yes     D/s of culvert substantial scour appears occurred at end of concrete apron, under the apron.       Morphology and Process- Reach downstream of     Channel morphology     Plane bed       Vertical incision     Large gravel       Vertical incision     Medium       Scour after concrete apron       Deposition     Low	Catchment No.	118					
Channel Nature         Size of water course         Minor           Quantitative Spatial Benerits         Coldmant Action Structure Course Scatchment Coldmant December 2006 (for snow melt risk)         No Data           WD classification         Marce Town Structure Mysical condition         Good           WD classification         Moderate Mysical condition         Good           Bajerity Bedrock (see Drawing 11.4.3.1 a di b Cathment 1131) is an allowing for snow need roles Socie         No         Sector Structure Moderate           Environmental designations (see Socie         Socie         No         Socie           Drawing 11.4.3.1 c, cathment 1131         Socie         No         Socie           Sediment 2005         Socie         No         Socie           Drawing 11.4.3.1 c, cathment 1131         Socie         No         Socie           Sediment source and work value value of transc conting         No         Socie         No           Sediment source and work value value of transc conting         No         Socie         No           Sediment source and work value value of transc conting         No         Socie         No           Sediment source and work value value of contained         No         Socie         No         Socie           Sediment source and work value of transc contained debris flows and sldes)         No	Catchment Name	-					
Channel Nature         Size of water course         Minor           Quantitative Spatial Benerits         Coldmant Action Structure Course Scatchment Coldmant December 2006 (for snow melt risk)         No Data           WD classification         Marce Town Structure Mysical condition         Good           WD classification         Moderate Mysical condition         Good           Bajerity Bedrock (see Drawing 11.4.3.1 a di b Cathment 1131) is an allowing for snow need roles Socie         No         Sector Structure Moderate           Environmental designations (see Socie         Socie         No         Socie           Drawing 11.4.3.1 c, cathment 1131         Socie         No         Socie           Sediment 2005         Socie         No         Socie           Drawing 11.4.3.1 c, cathment 1131         Socie         No         Socie           Sediment source and work value value of transc conting         No         Socie         No           Sediment source and work value value of transc conting         No         Socie         No           Sediment source and work value value of transc conting         No         Socie         No           Sediment source and work value value of contained         No         Socie         No         Socie           Sediment source and work value of transc contained debris flows and sldes)         No							
Size of water course         Minor           Quantitative Spatal Benents         Catchment Area (un <sup>1</sup> ) No Data Mergan Solar Inchannet (1) No Data         No Data No Data           WPD classification         Mergan Solar Inchannet (1) No Data         No Data           WPD classification         Mergan Solar Inchannet (1) No Data         Solar Inchannet (1) No Data           Geology         Majority Electric for Incomment Solar Inchannet (1) Solar Inchannet (1) So		Nature of water course		Natural			
Quantities Split         Model           Exemption         Model           WD classification         Model           WD classification         Good           Provide Statistication         Good           Bood Statistication         Good           Centroling         Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 118)         Good Action           Cendlogy         Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 118)         Good Action           Environmental         No         Modernet           Catchment 118         Statistication         No           Environmental         No         Modernet           Statistication (see Drawing 11.4.3.1 a and b Catchment 118)         No         Modernet           Experiment (see Barbard)         No         Modernet         No           Statistication (see Drawing 11.4.3.2, Catchment 118)         Statistication (see Drawing 11.4.3.2, Catchment 118         No           Statistication (see Drawing 11.4.3.2, Catchment 118         No         No         No           Statistication (see Drawing 11.4.3.1, Catchment 118         No         No         No           Statistication (see Drawing 11.4.3.1, Catchment 118         No         No         No           Statistication (see Drawing 11.4.3.1, Catchment 118         No </th <th>channer Nature</th> <th>Size of water course</th> <th></th> <th>Minor</th>	channer Nature	Size of water course		Minor			
Quantities Sphil         Server space stops in catchment (r)         No Data           Konnott         % Catchment over 750m (for snow met risk)         No Data           WP classification         Good         Good           Provide staffaction         Good         Good           Provide staffaction         Good         Good           Revision staffaction         Good         Good           Revision staffaction         Good         Good           Revision staffaction         Good         Moderate           Revision staffaction         No         Intervision staffaction           Revision staffaction         Saffaction         No         Intervision staffaction           Revision staffaction staffactio							
Elements         No Data           WFD classification         Mode and American Source and American American American American American American American Ameri	Quantitative Spatial	Catchment Area (km <sup>2</sup> )					
WPD classification         Water, flows and levels         Good           WPD classification         Good         Good           Overall ecological status         Moderse         Good           Geology         Is an alloval fan present at or near the crossing?         No         Issection           designation (spee)         Size         No         Issection         No           designation (spee)         Size         No         Issection         No           designation (spee)         Size         No         Issection         No           station (spee)         Size         No         Issection         No           station (spee)         Size         No         Issection         No         Issection           station (spee)         Size (size)         No         Issection         No         Issection         Issection         Issection         No         Issection         Iss	· ·						
WPD classification         Order         Order           Overall ecological status         Moderate         Moderate           Geology         Majority Edectock (see Drawing 11.4.3.1 and b Catchment 118)         Galck Rammite formation-Rammite resistant to weathering, ingermeable           designation (see Drawing 11.4.3.1 c, SPA         SPA         No         No           designation (see Drawing 11.4.3.1 c, SPA         SPA         No         No           designation (see Drawing 11.4.3.1 c, SPA         SPA         No         No           designation (see Drawing 11.4.3.2, Catchment 118)         See Drawing 11.4.3.7, Catchment 118         See Drawing 11.4.3.7, Catchment 118           is there a log but risk Cornert valley also ar thrace contain (in this dope failures couple dick and debts flows and slides)         No         Intell dope failures couple dick and debts flows and slides)           Hill dope failures couple dick and debts flows and slides)         No         Intelled amount         See couple dick and debts flows and slides)           Hill dope failures couple dick and debts flows and slides)         No         Intelled amount         No           Statement source and Worded/forested areas in act/ment         Vers Unified amount         No         No           Morphology and Process- Reck upstream         Comment on sediment supply potential to crossing         Versid incoversing         No		% Catchment over 750m (for snow melt risk)		No Data			
WPD classification         Order         Order           Overall ecological status         Moderate         Moderate           Geology         Majority Edectock (see Drawing 11.4.3.1 and b Catchment 118)         Galck Rammite formation-Rammite resistant to weathering, ingermeable           designation (see Drawing 11.4.3.1 c, SPA         SPA         No         No           designation (see Drawing 11.4.3.1 c, SPA         SPA         No         No           designation (see Drawing 11.4.3.1 c, SPA         SPA         No         No           designation (see Drawing 11.4.3.2, Catchment 118)         See Drawing 11.4.3.7, Catchment 118         See Drawing 11.4.3.7, Catchment 118           is there a log but risk Cornert valley also ar thrace contain (in this dope failures couple dick and debts flows and slides)         No         Intell dope failures couple dick and debts flows and slides)           Hill dope failures couple dick and debts flows and slides)         No         Intelled amount         See couple dick and debts flows and slides)           Hill dope failures couple dick and debts flows and slides)         No         Intelled amount         No           Statement source and Worded/forested areas in act/ment         Vers Unified amount         No         No           Morphology and Process- Reck upstream         Comment on sediment supply potential to crossing         Versid incoversing         No							
Overall encloped status         Moderate           Geology         Molerate         Geology         Environmental sis an allovia fan present at or near the crossing?         Gaick Pranmite formation-Pranmite is an allovia fan present at or near the crossing?         No           Environmental designations (see Drawing 11.4.3.1, c)         Barsiar         No         Integer Present and the construction of the cathement         No           Environmental designations (see Drawing 11.4.3.2, c)         Barsiar         No         Integer Present and the cathement         No           Sediment 100         SSI         No         Integer Present and the cathement         No         Integer Present and the cathement         No           Sediment source and supply - Cathement Source and tigoe flucters coupled to channel         No         Integer Present and the cathement         No         Integer Present and the cathement         No           Sediment source and supply - Cathement Source and supply - Cathement Source and tigoe flucters couplet to channel         No         Integer Present and the cathement is No         No           Sediment source and supply - Cathement Source and tigoe flucters couplet to channel         No         Integer Present and the cathement is No         No           Sediment source potential in catchment crossing         Comment on sediment source potential in catchment infrastructure type (sed Drawing 11.4.3.1, 4.2.tothment 11.8)         No         No <td></td> <td></td> <td></td> <td></td>							
Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 118) is an alloval fan present at or near the crossing?         Gack Paanmite formation-Paanmite No         resistant to weathering, impermeable           Environmental deignations (set SAC         Ramsar         No         Impermeable         No           Drawing 11.4.3.1         SSI         No         No         Impermeable           Section         No         No         Impermeable         No           Section         No         No         Impermeable         No           Section         No         No         Impermeable         No         Impermeable           Section         No         No         No         Impermeable         No         Impermeable         No         Impermeable         No         Impermeable         No         Impermeable         No         Impermeable         Impermeable         No         Impermeable         No         Impermeable	WFD classification						
Geology         Is an alluvial fan present at or near the crossing?         No           Environmental designations (see Sec         Ramsar         No         No           Drawing 11.4.3 (SAC         No         No         No           Catchment 110)         SS3         No         No         No           Sec Drawing 11.4.3.2, Catchment 118         Base Drawing 11.4.3.2, Catchment 118         No         No           Sectiment 110)         SS3         No         No         No         No           Sectiment 111         Spata present in the catchment         No         No         No         No           Sectiment source and supply - Catchment Source and catchment source and source and source and source and source and source and source and source and sourc	<u> </u>	Overall ecological status		Moderate			
Geology         Is an alluvial fan present at or near the crossing?         No           Environmental designations (see Sec         Ramsar         No         No           Drawing 11.4.3 (SAC         No         No         No           Catchment 110)         SS3         No         No         No           Sec Drawing 11.4.3.2, Catchment 118         Base Drawing 11.4.3.2, Catchment 118         No         No           Sectiment 110)         SS3         No         No         No         No           Sectiment 111         Spata present in the catchment         No         No         No         No           Sectiment source and supply - Catchment Source and catchment source and source and source and source and source and source and source and source and sourc		Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 118)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable			
Environmental delignation (see Draving 11.4.3.1, C. JPA Catchment 118)         No         No           Sed         No         No         No           Sed         No         No         No           Sed         No         No         No           Catchment 118)         SSI         No         No           Sed         No         No         No           Is peak reserve in the catchment         No         No         No           Sediment source and supply - Catchment State Baak ensolv/later in during reserve in catchment         No         No         No           Sediment source and supply - Catchment State Baak ensolv/later in gration         No         No         No         No           Unregetated bars         No         No         No         No         No           Sediment source and supply - Catchment State Baak ensolv/lateral ingration         No         No         No         No           Unregetated bars         No         No         No         No         No         No           Unregetated bars         Comment on sediment source potential in catchment         No         No         No         No         No           Unregetated bars         Comment on sediment source potential in catchment         No         <				8/ F			
designations (see Drawing 11.4.3.1, Stathment 118)         SAC SSI         No           Set Support (Section 118)         SSI         No         No           Set Set Set Set Set Set Set Set Set Set		is an alluvial fan present at or near the crossing?	NÖ				
designations (see Drawing 11.4.3.1         SAC SSI         No           atchment 118)         SSI         No           Self         No         No           separation of the set of the s				T			
Drawing 11.4.3.1 c, Catchment 118)         SPA SPA         No           Catchment 118)         SPA         No           Set Drawing 11.4.3.2, Catchment 118         Set Drawing 11.4.3.2, Catchment 118           Is bare a big bark risk Set Department source and supply - Catchment source and Unregetated bars Set Department source and Supply - Catchment Set Department in Catchment         No           Set Inter Set Department source and Supply - Catchment Set Department Hill slope failures (Linklein Catchment 10)         No           Set Inter Set Department source and Supply - Catchment Set Department Hill Set Department in Catchment 118         No           Set Inter Set Department source and Supply - Catchment Set Department in Catchment 118         No           More Department source potential in catchment 118         No           Infrastructure type (see Drawing 11.4.3.1.4, Catchment 118)         4x track in upper catchment may generate some run-off and sediment to upper feat Department source potential in catchment           More Department Set Department Set Department Set Department Set Department Set Department Set Department De							
Catchment 118)         SSI         No           Exclament 118)         SSI         No         See Drawing 11.4.3.2, Catchment 138           Is peak present in the catchment         No         No         No           Is beak present in the catchment         No         No         No           Eurer Nulley side or terrace erosion         No         No         No           Potential valley side or terrace erosion         No         No         No           Hill slope failures (noculing escludes and debris flows and sides)         No         No         No           Supply - Catchment Sate Bank erosion/lated ingration         No         No         No         No           Wortsch Indiscip present in a catchment         Yes         Univeget and ingration         No         No           Nonemet on sediment source potential in catchment         No         No         No         No           Comment on sediment source potential in catchment         No         No         No         No           Morphology and Process         Vertical incicion         No         No         No         No           Morphology and Process         Vertical incicion         None         No         No         No           Infrastructure type (see Drawing 11.4.3.1.6, Catchment 118)	• •						
Sediment source and supply - Catchment source and sucre and suc	,						
Sediment source and supply - Catchment source and sucre and suc							
Sediment source and supply - Catchment source and supply - Catchment Scale Bank erosion/lativalley side or terrace erosion         No           Sediment source and supply - Catchment Scale Bank erosion/lativalley side or terrace erosion         No         Imilialope failures (nucleoperatival)           Supply - Catchment Scale Bank erosion/lativalley side or terrace erosion         No         Imilialope failures (nucleoperatival)           Supply - Catchment Scale Bank erosion/lativalley side or terrace erosion         No         Imilialope failures (nucleoperatival)           Supply - Catchment Scale Bank erosion/lativalley side or terrace erosion         No         Imited amount           Unvegetated bars Wooded/forested areas in catchment         No         Imited amount           Morphology and Process- Vertical Incision         Comment on sediment size Incision         No           Comment on sediment size Intrastructure type (ee Drawing 11.4.3.1.4, Catchment 118)         No         Imited amount           Morphology and Process- Vertical Incision         Comment on sediment size Incision         -         Imited amount           Divergetated bars Intrastructure type (ee Drawing 11.4.3.1.4, Catchment 118)         No         Imited amount         Imited amount           Morphology and Process- Vertical Incision         Comment on sediment size Incision         -         -         -           Precominant sediment size Intrastructure typic faulters on amouring         Engineer				1.4.3.2, Catchment 118			
Sediment source and supply - Catchment Scale         Current valley side or treace erosion         No           Sediment source and supply - Catchment Scale         Failures coupled to channel         No         Imited amount           Supply - Catchment Scale         Bank erosion/lateral nigration         No         No         Imited amount           Wooded//forested areas in catchment         Yes         Limited amount         No         Imited amount           Comment on sediment source potential in catchment         No         No         Imited amount         No           Comment on sediment source potential in catchment         4x track in upper catchment may generate some run-off and sediment to upper her but limited.         Comment on sediment source potential in catchment         4x track in upper catchment may generate some run-off and sediment to upper her but limited.           Comment on sediment source potential in catchment         4x track in upper catchment may generate some run-off and sediment to upper her but limited.         Comment on sediment source potential to crossing         Ukely. Steep and short channel so likely to deliver sediment. Evidenced by gravel d us of culvert.           Reach upstream         Predominant sediment size         -         -         -           Turvegetate bars         None         -         -         -         -           Reach upstream         Opesiton         None         -         - <td></td> <td></td> <td></td> <td></td>							
Sediment source and supply - Catchment Source and supply - Catchment Source and supply - Catchment Source and supply - Catchment Source and No         No         Imited amount           Supply - Catchment Source and supply - Catchment Source and metro source and No         No         No         No           Supply - Catchment Source and supply - Catchment Source and No         No         No         No           More Source and Wooded/forested areas in catchment         No         No         No           Comment on sediment source potential in catchment         No         No         No           Comment on sediment source potential in catchment         Vers and short channels on Belley to deliver sediment. Evidenced by gravel d u/s of culvert.         No           Morphology and Process- resch Source and nature of infastructure (Map 1d)         None         None         None           Infastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         None         No           Morphology and Process- vertical incision         None         None         None           Infastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         Infastructure (Map 1d)         No           Infastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         Infastructure (Map 1d)         No           Infastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         Infastructure (Map 1d) <td></td> <td></td> <td></td> <td></td>							
Sediment source and supply - Catchment Scale isupply - Catchment Scale in a sediment source and supply - Catchment Scale in a sediment source prosent in catchment         No         Image and No           Unvegetated bars Wooded/forested areas in catchment         No         No         No           Unvegetated bars Wooded/forested areas in catchment         No         No         No           Comment on sediment source potential in catchment         No         No         No           Comment on sediment source potential in catchment         As track in upper catchment may generate some run-off and sediment to upper here but limited.         Durvegetated bars         No           Morphology and Process         Channel morphology         Engineered         Vertical incision           Reach uptream         Channel morphology         Engineered         Vertical incision           Reach uptream         Predominant sediment size         -         Unvegetated bars           Reach uptream         Predominant sediment size         -         No           Predominant sediment size         No         No         No           Unvegetated bars         No ne         No         No           Predominant sediment size         Gravel         Social incision         No           Unvegetated bars         No         No         No         No <t< th=""><td></td><td></td><td></td><td></td></t<>							
Sediment source and supply - Catchment Scale         Hill slope failures coupled to channel         No           Supply - Catchment Scale         Bank erosion/lateral migration         No         No           Unvegetated bars         No         No         No           Unvegetated bars         No         No         No           Unvegetated bars         No         No         No           Comment on sediment source potential in catchment         Yes         Rough 4x4 track in upper catchment may generate some run-off and sediment to upper her but limited.           Comment on sediment supply potential to crossing         Engineered         Unvegetated bars           Woorphology and Process- ressing         Channel morphology         Engineered         -           Predominant sediment size         -         -         -           Unvegetated bars         No         None         -           Reach upstream of crossing         Deposition         None         -           Predominant sediment size         -         -         -           Unvegetated bars         No         None         -           Predominant sediment size         -         -         -           Unvegetated bars         No         None         -           Predominant sediment siz							
Sediment source and supply - Catchment Scale         Vertical incision present in catchment         Yes         Limited amount           supply - Catchment Scale         No         No         No         No           Unvegetated bars         No         No         No         No           Infrastruture type (see Drawing 11.4.3.1.d, Catchment 118)         Yes         Rough 4x4 track in upper catchment to upper here but timited.           Comment on sediment source potential in catchment         Ax track in upper catchment may generate some run-off and sediment to upper here but timited.           Comment on sediment supply potential to crossing         Likely. Steep and short channel so likely to deliver sediment. Evidenced by gravel d u/s of culvert.           Morphology and Process         Predominant sediment size         -           Unvegetated bars         No            Predominant sediment size         -            Lateral Inrigitation/Dank erosion         None            Presence and nature of infrastructure (Map 10)         No            Lateral Ingration/Dank erosion         No            Channel morphology         Engineered            Presence and nature of infrastructure (Map 10)         No            Lateral Ingration/Dank erosion         No							
Supply - Catchment Scale         Bank erosion/lateral migration         No           Invegetated bars         No           Wooded/forested areas in catchment         No           Wooded/forested areas in catchment         No           Comment on sediment source potential in catchment         Ax track in upper catchment may generate some run-off and sediment to upper here but limited.           Comment on sediment supply potential to crossing         Ax track in upper catchment may generate some run-off and sediment to upper here but limited.           Comment on sediment supply potential to crossing         Engineered           Predominant sediment size         -           Unvegetated bars         No           Verital incision         None           Presoniant sediment size         -           Unvegetated bars         No           Verital incision         None           Presoniant sediment size         -           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No           Channel morphology         Engineered           Presoniant sediment size         -           Unvegetated bars         No           No         Infrastructure (Map 1d)         No           Channel morphology         Engineered           Predominant sediment size         Gravel </th <td>Sediment source and</td> <td></td> <td></td> <td>Limited amount</td>	Sediment source and			Limited amount			
Unvegetated bars         No           Woode/forested areas in catchment         No           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         Yes         Rough 4x4 track in upper catchment           Comment on sediment source potential in catchment         4x track in upper catchment may generate some run-off and sediment to upper here buil limited.           Comment on sediment supply potential to crossing         Likely. Steep and short channel so likely to deliver sediment. Evidenced by gravel d u/s of culvert.           Morphology and Process         Channel morphology         Engineered           Predominant sediment size         -         -           Unvegetated bars         No         -           Worphology and Process         Vertical incision         None           Each upstream of Lateral migration/bank erosion         None         -           Presence and nature of infrastructure (Map 10)         None         -           Channel morphology         Engineered         -           Presence and nature of infrastructure (Map 10)         No         -           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         -           Channel morphology         Engineered         -         -           Predominant sediment size         Gravel         -         -           Lowing							
Wooded/forsets areas in catchment         No           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         Yes         Rough 4x4 track in upper catchment           Comment on sediment source potential in catchment         4x track in upper catchment may generate some run-off and sediment to upper here but limited.           Comment on sediment supply potential to crossing         Likely. Steep and short channel Solikely to deliver sediment. Evidenced by gravel d u/s of culvert.           Morphology and Process- Reach upstream of crossing         Channel morphology.         Engineered           Predominant sediment size         -         -           Unvegetated bars         No         -           Vertical incision         None         -           Presence and nature of infrastructure (Map 1d)         None         -           Presence and nature of infrastructure (Map 1d)         No         -           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         -           Presence and nature of infrastructure (Map 1d)         No         -         -           Presence and nature of infrastructure (Map 1d)         No         -         -           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         -         -           Morphology and Process- At crossing         Channel morphology         Engineered							
Comment on sediment source potential in catchment         4x track in upper catchment may generate some run-off and sediment to upper here but limited.           Comment on sediment supply potential to crossing         Likely. Steep and short channel so likely to deliver sediment. Evidenced by gravel d u/s of culvert.           Morphology and Process- Reach upstream of crossing         Channel morphology         Engineered           Predominant sediment size         -         -           Unvegetated bars         No         -           Vertical incision         None         -           Presence and nature of infrastructure (Map 1d)         No         -           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         -           Channel morphology         Engineered         -           Predominant sediment size         Gravel         -           Channel morphology         Engineered         -           Predominant sediment size         Gravel         -           Estimated discharge at 1:200 event (m <sup>3</sup> /s)         1.4         -           Unvegetated bars         None         -           Vertical incision         None         -           Deposition         Low         -         -           Lateral migration/bank erosion         None         -         -			No				
Lomment on sediment source potential in catchment         but limited.           Comment on sediment supply potential to crossing         Likely. Steep and short channel so likely to deliver sediment. Evidenced by gravel of u/s of culvert.           Morphology and Processs         Channel morphology         Engineered         -           Worphology and Processs         Vertical incision         No         -           Vertical incision         None         -         -           Deposition         None         -         -           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         -         -           Channel morphology         Engineered         -         -         -           Presence and nature of infrastructure (Map 1d)         No         -         -         -           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         -         -         -           Morphology and Process         Channel morphology         Engineered         -         -         -           Morphology and Process         Channel morphology         Engineered         -         -         -           Morphology and Process         Channel morphology         Engineered         -         -         -         -         -         -		Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)	Yes	Rough 4x4 track in upper catchment			
Dutimities.         Dutimities.           Comment on sediment supply potential to crossing         Likely. Steep and short channel so likely to deliver sediment. Evidenced by gravel d u/s of culvert.           Morphology and Process.         Channel morphology Predominant sediment size         Engineered           Consent of crossing         Channel morphology Predominant sediment size         No           Lateral migration/bank erosion         None           Deposition         None           Lateral migration/bank erosion         None           Presence and nature of infrastructure (Map 1d)         No           Infrastructure (See Drawing 11.4.3.1 d, Catchment 118)         No           Channel morphology         Engineered           Predominant sediment size         Gravel           Estimated discharge at 1:200 event (m <sup>3</sup> /s)         1.4           Unvegetated bars         No           Vertical incision         None           Deposition         Low           Lateral migration/bank erosion         None           Unvegetated bars         No           Vertical incision         None           Deposition         Low           Lateral migration/bank erosion         None           Dredominant sediment size         Low           Damaged/unstable drains or ar		Comment on sediment source notential in catchment	4x track in upper catchment may generate	e some run-off and sediment to upper headwaters,			
Comment on sediment supply potential to crossing         u/s of culvert.           Morphology and Process- Reach upstream of crossing         Channel morphology         Engineered            Morphology and Process- Reach downstream of Reach downstream of Reach downstream of Reach downstream of Reach downstream of Reach downstream of         Channel morphology         Engineered            Morphology and Process- Reach downstream of Reach downstream of Reach downstream of         Channel morphology         None            Morphology and Process- Reach downstream of         Channel morphology         Engineered             Morphology and Process- Reach downstream of         Channel morphology         Infrastructure (ma <sup>2</sup> /s)         1.4            Morphology and Process- Reach downstream of         Channel morphology         None             Morphology and Process- Reach downstream of         Channel morphology         None		comment on sediment source potential in catchment					
Channel morphology         Engineered           Predominant sediment size         -           Unvegetated bars         No           Reach upstream of crossing         Vertical incision           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No           Channel morphology         Engineered           Predominant sediment size         Gravel           Estimated discharge at 1:200 event (m <sup>3</sup> /s)         1.4           Unvegetated bars         No           Vertical incision         None           Vertical incision         None           Unvegetated bars         No           Vertical incision         Low           Lateral migration/bank erosion         Low           Damaged/unstable drains or armouring         Yes           Damaged/unstable drains or armouring         Yes           Predominant sediment size         Large gravel           U/s of culvert engineered drains seem si occurred at end of concrete apron, unde the apron.		Comment on sediment supply potential to crossing					
Morphology and Process.         Predominant sediment size         -           Reach upstream of crossing         Deposition         None         -           Deposition         None         -         -           Lateral migration/bank erosion         None         -         -           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         -         -           Channel realignment         Yes         Natural channel incorporated into drain           Morphology and Process.         Channel morphology         Engineered         -           Unvegetated bars         Gravel         -         -           Unvegetated bars         No         -         -           Vertical incision         No         -         -           Morphology and Process.         Deposition         Low         -           At crossing         Channel morphology         Engineered         -           Junvegetated bars         No         -         -           Vertical incision         None         -         -           Lateral migration/bank erosion         None         -         -           Jamaged/unstable drains or armouring         Yes         D/s of culvert engineered drains seems i D/s of culvert substantial scour appea	L		u/	s of culvert.			
Morphology and Process.         Predominant sediment size         -           Reach upstream of crossing         Deposition         None         -           Deposition         None         -         -           Lateral migration/bank erosion         None         -         -           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         -         -           Channel realignment         Yes         Natural channel incorporated into drain           Morphology and Process.         Channel morphology         Engineered         -           Unvegetated bars         Gravel         -         -           Unvegetated bars         No         -         -           Vertical incision         No         -         -           Morphology and Process.         Deposition         Low         -           At crossing         Channel morphology         Engineered         -           Junvegetated bars         No         -         -           Vertical incision         None         -         -           Lateral migration/bank erosion         None         -         -           Jamaged/unstable drains or armouring         Yes         D/s of culvert engineered drains seems i D/s of culvert substantial scour appea		Channel morphology	Engineered				
Morphology and Process- Reach upstream of crossing         Vertical incision         None           Lateral migration/bank erosion         None         None           Presence and nature of infrastructure (Map 1d)         No         None           Presence and nature of infrastructure (Map 1d)         No         None           Channel realignment         Yes         Natural channel incorporated into drain           Channel morphology         Engineered         Predominant sediment size           Estimated discharge at 1:200 event (m³/s)         1.4         Unvegetated bars           Vertical incision         None         Deposition           Lateral migration/bank erosion         Low         Lateral migration/bank erosion           At crossing         Channel morphology         Engineered           Morphology and Process- At crossing         Channel morphology         Low           Lateral migration/bank erosion         Low         Low           Damaged/unstable drains or armouring         Yes         U/s of culvert engineered drains seems i D/s of culvert engineered drains seems i U/s of culvert substantial scour appears occurred at end of concrete apron, unde the apron.           Morphology and Process- Reach downstream of         Channel morphology         Plane bed           Dregosition         Large gravel         Unvegetated bars         Yes     <	Morphology and Process- Reach upstream of		-				
Reach upstream of crossing         Deposition         None           Lateral migration/bank erosion         None         None           Presence and nature of infrastructure (Map 1d)         No         No           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No         Natural channel incorporated into drain           Channel realignment         Yes         Natural channel incorporated into drain           Morphology and Process- A t crossing         Channel morphology         Engineered           Damaged/unstable drains or armouring         Yes         U/s of culvert engineered drains seems i D/s of culvert substatial scour appears occurred at end of concrete apron, unde the apron.           Morphology and Process- Reach downstream of Reach downstream of         Channel morphology         U/s of culvert engineered drains seems i D/s of culvert substatial scour appears occurred at end of concrete apron, unde the apron.		Unvegetated bars	No				
crossing       Lateral migration/bank erosion       None         Presence and nature of infrastructure (Map 1d)       No       No         Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)       No       No         Channel morphology       Engineered       Predominant sediment size         Fredominant sediment size       Gravel       Estimated discharge at 1:200 event (m³/s)       1.4         Unvegetated bars       None       Vertical incision       None         Deposition       Low       Low       U/s of culvert substantial scour appears occurred at end of concrete apron, unde the apron.         Morphology and Process-       Channel morphology       Plane bed       Plane bed         Morphology and Process-       Channel morphology       Plane bed       Vertical incision         Morphology and Process-       Channel morphology       Plane bed       Vers         Morphology and Process-       Channel morphology       Plane bed       Vers         Morphology and Process-       Channel morphology       Plane bed       Vers         Morphology and Process-       Version       Morphology       None         D/s of culvert substantial scour appears occurred at end of concrete apron, unde the apron.       Version       No         Morphology and Process-       Channel morphology       <			None				
Presence and nature of infrastructure (Map 1d)         No           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)         No           Channel realignment         Yes           Version         Natural channel incorporated into drain           Morphology and Process- At crossing         Channel morphology           Damaged/unstable drains or armouring         Yes           Morphology and Process- Reach downstream of Reach downstream of         Channel morphology           Morphology and Process- Reach downstream of         Channel morphology           Vertical incision         Morphology and Process- Reach downstream of		Deposition	None				
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)       No         Channel realignment       Yes       Natural channel incorporated into drain         Channel realignment       Yes       Natural channel incorporated into drain         Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)       Yes       Natural channel incorporated into drain         Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)       Yes       Natural channel incorporated into drain         Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)       Yes       Natural channel incorporated into drain         Predominant sediment size       Gravel       Incorporated discharge at 1.200 event (m <sup>3</sup> /s)       1.4         Unvegetated bars       No       No       Vertical incision       None         Vertical incision       Low       Low       Incorporated drains seems i         Damaged/unstable drains or armouring       Yes       U/s of culvert engineered drains seems i         D/s of culvert substantial scour appears: occurred at end of concrete apron, unde the apron.       D/s of culvert substantial scour appears: occurred at end of concrete apron, unde the apron.         Morphology and Process       Channel morphology       Plane bed       Incipient         Morphology and Process       Reach downstream of       Yes       Incipient         Morphology and Process       Reach downs		Lateral migration/bank erosion	None				
Channel realignment         Yes         Natural channel incorporated into drain           Image: Channel morphology         Engineered         Engineered           Predominant sediment size         Gravel         Engineered           Estimated discharge at 1:200 event (m³/s)         1.4         Image: Channel morphology           Unvegetated bars         No         Image: Channel morphology         Image: Channel morphology           At crossing         Deposition         Low         Image: Channel morphology         Image: Channel morphology           Damaged/unstable drains or armouring         Yes         U/s of culvert engineered drains seems i D/s of culvert substantial scour appears occurred at end of concrete apron, unde the apron.           Morphology and Process- Reach downstream of         Channel morphology         Plane bed           Morphology and Process- Reach downstream of         Channel morphology         Plane bed							
Channel morphology         Engineered           Predominant sediment size         Gravel           Estimated discharge at 1:200 event (m³/s)         1.4           Unvegetated bars         No           Vertical incision         None           Deposition         Low           Lateral migration/bank erosion         None           Damaged/unstable drains or armouring         Yes           Unvegetated bars         D/s of culvert substantial scour appears occurred at end of concrete apron, unde the apron.           Morphology and Process         Channel morphology           Predominant sediment size         Large gravel           Unvegetated bars         Yes           Morphology and Process         Predominant sediment size           Reach downstream of         Reach downstream of							
Predominant sediment size         Gravel           Estimated discharge at 1:200 event (m³/s)         1.4           Unvegetated bars         No           Vertical incision         None           Deposition         Low           Lateral migration/bank erosion         Ves           Damaged/unstable drains or armouring         Yes           Vestical incision         Vestor           Damaged/unstable drains or armouring         Yes           Vestor         Unvegetated bars           Vestor         U/s of culvert engineered drains seems i D/s of culvert substantial scour appears occurred at end of concrete apron, unde the apron.           Morphology and Process- Reach downstream of Reach downstream of         Plane bed	L	Channel realignment	Yes	Natural channel incorporated into drain			
Predominant sediment size         Gravel           Estimated discharge at 1:200 event (m³/s)         1.4           Unvegetated bars         No           Vertical incision         None           Deposition         Low           Lateral migration/bank erosion         None           Damaged/unstable drains or armouring         Yes           Vertical incision         Vertical incision           Damaged/unstable drains or armouring         Yes           Vertical incision         None           U/s of culvert engineered drains seems i D/s of culvert substantial scour appears occurred at end of concrete apron, unde the apron.           Morphology and Process Reach downstream of         Channel morphology           Reach downstream of         Verso           Incipient         Verso           Incipient         Deposition           Lateral migration/bank erosion         Low	Channel morphology Engineered						
Morphology and Process- At crossing     Estimated discharge at 1:200 event (m <sup>3</sup> /s)     1.4       Morphology and Process- At crossing     No     Image: Comparison of the process of the p							
Morphology and Process       Unvegetated bars       No         At crossing       Vertical incision       None         Lateral migration/bank erosion       Low       U/s of culvert engineered drains seems i         Damaged/unstable drains or armouring       Yes       U/s of culvert substantial scour appears occurred at end of concrete apron, under the apron.         Morphology and Process       Channel morphology       Plane bed         Predominant sediment size       Large gravel         Unvegetated bars       Yes       Incipient         Vertical incision       Medium       Scour after concrete apron         Morphology and Process       Reach downstream of       Low							
Morphology and Process At crossing         Vertical incision         None           Deposition         Low         Low           Lateral migration/bank erosion         None         U/s of culvert engineered drains seems i D/s of culvert substantial scour appears occurred at end of concrete apron, unde the apron.           Morphology and Process Reach downstream of Reach downstream of         Channel morphology Predominant sediment size         Plane bed           Morphology and Process Reach downstream of         Channel morphology Predominant sediment size         Large gravel           Incipient         Vertical incision         Medium         Scour after concrete apron			No				
At crossing       Lateral migration/bank erosion       None         Damaged/unstable drains or armouring       Yes       U/s of culvert engineered drains seems i D/s of culvert substantial scour appears occurred at end of concrete apron, under the apron.         Morphology and Process- Reach downstream of       Channel morphology       Plane bed         Vertical incision       Yes       Incipient         Vertical incision       Medium       Scour after concrete apron         Deposition       Low       Low			None				
Damaged/unstable drains or armouring     Yes     U/s of culvert engineered drains seems i D/s of culvert substantial scour appears occurred at end of concrete apron, under the apron.       Channel morphology     Plane bed       Predominant sediment size     Large gravel       Unvegetated bars     Yes       Vertical incision     Medium       Scour after concrete apron       Deposition     Low       Interpreter apport     Low	Morphology and Process-	Deposition	Low				
Damaged/unstable drains or armouring     Yes     D/s of culvert substantial scour appears occurred at end of concrete apron, under the apron.       Morphology and Process Reach downstream of Lateral migration/bank erosion     Channel morphology Plane bed     Plane bed       Vertical incision     Yes     Incipient       Vertical incision     Medium     Scour after concrete apron       Deposition     Low     Incipient	At crossing	Lateral migration/bank erosion	None				
Damaged/unstable drains or armouring     Yes     D/s of culvert substantial scour appears occurred at end of concrete apron, under the apron.       Morphology and Process- Reach downstream of     Channel morphology     Plane bed       Vertical incision     Vers     Incipient       Vertical incision     Medium     Scour after concrete apron       Vertical incision     Low     Incipient				U/s of culvert engineered drains seems intact.			
Damaged/Unisidate drains of armouring         Yes         occurred at end of concrete apron, under the apron.           Vertical incision         Plane bed         Vertical incision         Vertical incision           Morphology and Processe         Vertical incision         Medium         Scour after concrete apron           Reach downstream of Later		Demonstrative device an environment	N	D/s of culvert substantial scour appears to have			
Channel morphology         Plane bed           Predominant sediment size         Large gravel           Unvegetated bars         Yes           Vertical incision         Medium           Deposition         Low           Interpretent price         Low		Damaged/unstable drains or armouring	Yes	occurred at end of concrete apron, undermining			
Predominant sediment size         Large gravel           Unvegetated bars         Yes           Vertical incision         Medium           Deposition         Low           Interpretation         Low				the apron.			
Predominant sediment size         Large gravel           Unvegetated bars         Yes           Incipient         Vertical incision           Vertical incision         Medium           Deposition         Low           Itateral mieration/bank erosion         Iow		<u></u>	1	1			
Morphology and Process         Unvegetated bars         Yes         Incipient           Morphology and Process         Vertical incision         Medium         Scour after concrete apron           Deposition         Low         Interpretation         Low         Interpretation		Channel morphology	Plane bed				
Morphology and Process         Vertical incision         Medium         Scour after concrete apron           Reach downstream of Lateral migration/bank erosion         Low         Interview         Interview		Predominant sediment size	Large gravel				
Morphology and Process- Reach downstream of Lateral migration/bank erosion							
Reach downstream of Letzer lanieration/hank erosion Low Low	Morphology and Process-			Scour after concrete apron			
	crossing	Lateral migration/bank erosion	Low	Dellusu			
Presence and nature of infrastructure (Map 1d)     Yes     Railway     Chapter to pass	-		Tes	Railway Channel realigned to join others to pass under			
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118) Railway railway at one single point.		Infrastructure type (see Drawing 11.4.3.1 d, Catchment 118)	Railway				
Channel realignment Yes See above		Channel realignment	Yes				
Channel steep but stable u/s of culvert with engineered sections near culvert intact and gravel seems to be delivered from natural bed activities further of deposited where gradient drops at culvert entrance. D/s of culvert exit is a concrete apron. At the end of this concrete apron the channel has scoured babegun to undermine the apron, so there are opportunities for improvement here.	Summary behaviour	deposited where gradient drops at culvert entrance. D/s of culvert e	exit is a concrete apron. At the end of this c	oncrete apron the channel has scoured back and			

#### Catchment No. 119 Catchment Name Nature of water course Natural Channel Nature Size of water course Minor No Data Catchment Area (km<sup>2</sup>) Quantitative Spatial No Data Average slope in catchment (°) Elements % Catchment over 750m (for snow melt risk) No Data Water, flows and levels Good WFD classification Physical condition Good Overall ecological status Moderate Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 119) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology Is an alluvial fan present at or near the crossing? No Environmental Ramsar No designations (see SAC No Drawing 11.4.3.1 c, ΡA No SSSI No Catchment 119) Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 119 Is peat present in the catchment No Is there a bog burst risk No No Current valley side or terrace erosion No Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) No Sediment source and Hill slope failures coupled to channel No supply - Catchment Scal /ertical incision present in catchment No Bank erosion/lateral migration No No Unvegetated bars Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 119) No Comment on sediment source potential in catchment Limited Comment on sediment supply potential to crossing No evidence of sediment delivery to culvert Channel morphology Engineered Predominant sediment size No Jnvegetated bars Morphology and Process None /ertical incision Reach upstream of Deposition None crossing ateral migration/bank erosion None Presence and nature of infrastructure (Map 1d) No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 119) No Channel realignment No Engineered Channel morphology Predominant sediment siz Estimated discharge at 1:200 event (m<sup>3</sup>/s) 1.4 Unvegetated bars No Morphology and Process Vertical incision None At crossing Deposition None Lateral migration/bank erosion None Limited amount of damage to cascade - blocks Damaged/unstable drains or armouring Yes loosened and possible scour at base (but difficult to see) Channel morphology Plane bed Predominant sediment size fine No Unvegetated bars /ertical incision Low Morphology and Process None Deposition Reach downstream of Lateral migration/bank erosion None crossing Presence and nature of infrastructure (Map 1d) None Channel realigned to join others to pass under nfrastructure type (see Drawing 11.4.3.1 d, Catchment 119) Railway railway at one single point Yes Channel realignment See above Little happening at this crossing, except that there may be opportunities to improve the substantial 2m drop u/s of the culvert and there is limited damage to the Summary behaviour cascade d/s of the culvert and possible scour at its base. Relatively low priority.



Photograph 11.4.3.106- Upstream to cascade



Photograph 11.4.3.107-Downstream



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Legend	
General	
Crossing Location     Catchment Area	
Solid Geology	
Gaick Psammite Formation - Psammite	
Drift Geology	
Peat Glaciofluvial Ice Contact Deposits	
Gaick Plateau Moraine Formation	
Hummocky Glacial Deposits	
Ardverikie Till Formation - Diamicton     Glaciofluvial Sheet Deposits	
Alluvium	
River Terrace Deposits	
Alluvial Fan Deposits	
Talus - Rock Fragments	
Talus Cone	
Environmental Designations	
Special Area of Conservation <ul> <li>Railway Bridge</li> </ul>	
Road Bridge	
A Track/Footbridge	
Culvert	
<ul> <li>Step in Bed</li> </ul>	
<ul> <li>Catchpit</li> </ul>	
Drainage Ditch	
	-
REV SUIT DATE DESCRIPTION BY APP	
CH2MHILL Fairburst JV	
C/O: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525	
ΩΔ.)	
TAANSPORT SCORLOUM ALMA CORLOUM ALMA Darbinice to Creatementer	
PROJECT 8 DALWHINNIE TO CRUBENMORE EIA	
Drawing 11.4.3.1 Catchment116- 120 Catchment Overview	
DESIGN: DRAWN: CHK: APP: EL EV EL EL	
DATE: 12/07/2017	
PROJ: 495298 DWG: A9P08-CFJ-EWE-X_ZZZZZ_ZZ-DR-EN-0001	
SHEET:         REVISION:         SUITABILITY:           1 of 1         C01         A3	
	J



Annex 11.4.3 - Hydromorphological	Catchment	Assessment - 121
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Durani Naturel Base di vator course         Naturel Magor         Naturel Magor           Oumit Naturel Vice di vator course di vator di vator course         Attenter di vator course di vator di va	Catchment No. Catchment Name	121 Allt Garbh	]	
Outcome Nature Section Planta         Section Planta         Major           Outcome Nature Been Section Planta         Control Nature Section Planta         Control Nature Section Planta         Control Nature Section Planta         Control Nature Section Planta           Wear Description Planta         Major Restrict Control Nature Section Planta         Control Nature Section Planta         Control Nature Section Planta         Control Nature Section Planta           Based Planta         Major Restrict Control Nature Section Planta         Nature Section Planta         Nature Section Planta         Nature Section Planta           Based Planta         Nature Section Planta         Nature Section Planta         Nature Section Planta         Nature Section Planta         Nature Section Planta           Based Planta         Nature Section Planta         Nature Section Planta         Nature Section Planta         Nature Section Planta         Nature Section Planta           Based Planta         Nature Section Planta         Nature Sec				Natural
Generation Special Itensions         Merge gauge in calcument (1)         9           WPD conductions         Conductions         0           WPD conductions         Exclusions         Conductions           Project conductions         Conductions         Conductions           Geology         Marcin flows and levels         Conductions           Provide conductions         Conductions         Conductions           Geology         Marcin flows and levels         Conductions           Provide conductions         Sections         Non-           Provide conductions         Sections         Non-           Provide conductions         Sections         Non-           Sections         Non-         Non-           Sections         Sections         Non-           Sections         Sections         Non-         Non-	Channel Nature			
Generalize Special Binetics         Average splace in calculament [1]         9           WPD conductation         Scatament or 2000 (or straw mell risk)         0           WPD conductation         Marter, flows and levels         Good           Project conductation         Marter, flows and levels         Good           Project conductation         Marter, flows and levels         Good           Project conductation         Cood         Cood           Beams         Scatament or 2000 (or straw mell risk)         Golds Paramete formation Paramete         mestamet to wasthering, impermeable           Forwing 11.4.12, Conductation         Scatameter or 2000 (or straw mell risk)         Scatameter or 2000 (or straw mell risk)         Scatameter or 2000 (or straw mell risk)           Forwing 11.4.12, Conductation (or straw mell risk)         No         Imperation (or straw mell risk)         No           Forwing 11.4.12, Conductation (or straw mell risk)         No         Imperation (or straw mell risk)         No           Forwing 11.4.12, Conductation (or straw mell risk)         No         Imperation (or straw mell risk)         No           Forwing 11.4.12, Conductation (or straw mell risk)         No         Imperation (or straw mell risk)         No           Forwing 11.4.12, Conductation (or straw mell risk)         No         No         Imperation (or straw mell risk)         N				2.2
Image: Construction of the state of the				
Wrb dissification         Operal ecological status         Good           Recordsr         Majority decide (Scie Drawing 11.4.3.1 and b Catchment 121)         Gark Paammite formation Paammite (Existant to weathering, impermeable)         Existant to weathering, impermeable           Revisionmental designation (Scie Drawing 11.4.3.1 C         Sanars/ SA         No         Image: Science 1000           Sectionmental designation (Scie Drawing 11.4.3.1 C         Sanars/ SA         No         Image: Science 1000           Sectionmental designation (Scie Drawing 11.4.3.2 C         Catchment 121         Sanars/ SA         No         Image: Science 1000           Sectionmental designation (Scie Drawing 11.4.3.2 C         Catchment 121         Scie Science 1000         No         Image: Science 1000         Image: Science 1000           Section 1210         Scie Science 1210         Control (Nill Science 1000)         Yes         Traggotter 1000         Image: Science 10000         Image: Sci	Elements	% Catchment over 750m (for snow melt risk)		0
Densities acclegical status         Monterere           Gookgy         Majority kednok (see Drawing 11.4.3.1 and & Catchment 12)         Gald Paintific formation Ammitte formation Ammitter formatis and anammitter formation Ammitter formation Ammitter formatin				
Geology         Majority Bedick (see Drawing 11.4.3.1 a and b Catchment 121)         Gaick Planment formation Planment medication of the second	Catchment Name Channel Nature Quantitative Spatial Elements WFD classification Geology Environmental designations (see Drawing 11.4.3.1 c, Catchment 121) Sediment source and supply - Catchment Scale Morphology and Process Reach upstream of crossing Morphology and Process At crossing Morphology and Process Reach downstream of			
Geology         Is an allovial fan present at or near the cossing?         No           Environmental designations (see SAC.         See SAC.         No         No           Environmental designations (see SAC.         See SAC.         No         No           Environmental designations (see SAC.         See SAC.         No         No           Environmental designations (see SAC.         See Drawing 11.4.3.2, Catchment 127         See Drawing 11.4.3.2, Catchment 127           Environmental designations (see Sachiment source potential, will be three a bage part risk.         No         High sediment source potential, will be transported directly to crossing directly to crossing d			1 	1
designation (see prawing 11,43,1 Cathment 121)         No         International (Signature)           Sediment scale         Signature)         No         International (Signature)           Sediment scale         Signature)         Signature)         Signature)           Sediment scale         No         International (Signature)         International (Signature)           Sediment scale         No         No         International (Signature)         International (Signature)           Sediment scale         Vertical inclose present in addiment (Signature)         No         Ioos scale         Ioos scale           Unogatade dars         No         Ioos scale         Ioos scale         Ioos scale         Ioos scale           Unogatade dars         No         Ioos scale         Ioo	Geology		Gaick Psammite formation-Psammite	resistant to weathering, impermeable
Orawing 11.4.3.1.c, catchment 121)         No         Image: In slope and channel confinement         No           Section 11.21)         Changes in slope and channel confinement         No         Section 12.2.           Is there a loge tyres in the catchment         No         Image: Im	Environmental	Ramsar	No	
Catchment 121)         SS3         No           Sediment 2012         SS3         No         Sed Drawin 1.4.2. Catchment 121           Sediment 2014         No         Sed Drawin 1.4.2. Catchment 121           Sediment 2014         No         High sediment source potential, will be transported directly to crossing           Current valley side or terrace erosion         Ves         High sediment source potential, will be transported directly to crossing           Full signed fullers (including past sides and debris flows and sides)         yes-many debris flows within catchment           Hill signe failures (including past sides and debris flows and sides)         yes-many debris flows within catchment           Vertical incision generatin catchment         No         Low sediment source potential           Unregetted bars         No         Low sediment source potential           Unregetted bars         No         Low sediment source potential           Unregetted bars         No         Low source of floatting debris           Infrastructure type (see Drawing 1.4.3.1.4.3.1.4.4.4.4.4.4.4.4.4.4.4.4.4.				
Sediment source potential, will be transported directly to crossing the potential will be transported directly to crossing the potential, will be transported directly to crossing the potential be different to crossing and not coupled with the channel will be dimension to proce potential and block different to crossing the potential be different to crossing the potential to crossing				
Sediment source potential, will be transcension         No           Sediment source potential, will be transcension         Yes         High sediment source potential, will be transported directly to crossing           Sediment source potential, will be transported directly to crossing         High sediment source potential, will be transported directly to crossing           Sediment source potential, will be transported directly to crossing         High sediment source potential, will be transported directly to crossing           Sediment source potential, will be transported directly to crossing         No         Low sediment source potential           Sediment source potential         No         Low sediment source potential           Sediment source potential         No         Low sediment source potential           Unregetated bars         No         Low sediment source potential           Unregetated bars         No         Low sediment source potential           Unregetated bars         No         Low sediment source potential           Comment on sediment source potential in catchment         High sediment source potential         Low sediment source potential           Comment on sediment source potential to crossing         Low sediment source potential         Low sediment source potential           Comment on sediment source potential to crossing         Low sediment source potential         Low sediment source potential           Comment		AL	Soo Drowing 1	1 4 2 2 Catchmont 121
Item a log burk risk         No           Gurrent valley side or terrace erosion         Yes         High softment source potential, will be transported directly to cossing           Sediment source potential, will be transported directly to cossing         Yes         High softment source potential, will be transported directly to cossing           Sediment source potential, will be transported directly to cossing         Yes         High softment source potential, will be transported directly to cossing           Sediment source potential         No         Low sediment source potential         Concert source potential           Baak erosing/relateral ingration         No         Low sediment source potential         Concert source potential           Mongetzed bars         instructure type (see Drawing 11.4.3.1.6, Catchment 221)         No         Low sediment source potential           Mongetzed bars         instructure type (see Drawing 11.4.3.1.6, Catchment 221)         No         Low sediment source potential           Comment on sediment source potential for adhysical de expositon         Total of adhysical de expositon         Total adhysical de expositon           Morphology and Process         Present adhysical de expositon         Total adhysical de expositon         Total adhysical de expositon           Morphology and Process         Connent on sediment source potential for adhysical de expositon         Total adhysical de expositon         Total adhysical de expositon <td></td> <td></td> <td></td> <td></td>				
Sediment source and speciment source and speciment source and speciment source and speciment source potential, will be the source potential, will be transported directly to crossing dinterent source potential directly to crossing directly			No	
Sediment supply - clurical values used to channel         It is loop failures (including peet sides and debris flows and sides)         It is loop failures (including peet sides and debris flows and sides)         It is loop failures (including peet sides and debris flows and sides)           Sediment source potential         Werkan including peet sides and debris flows and sides)         No         Iow sediment source potential           Sediment Source potential         Werkan including peet sides and source potential         Iow source potential         Iow source potential           Unreget side fail         No         Iow source potential         Iow source potential           Worde Afforested ares in carbinent         No         Iow source potential           Infrastructure type (see Drawing 11.4.3.1.d, Catchment 122)         High sediment source potential from upper catchment from debris flows, shallow siles           Comment on sediment source potential in catchment         Source and confined towards crossing, funnelling sediment downstream           Comment on sediment supply potential to crossing         High sediment source potential from upper catchment from debris flows, shallow siles           Morphology and Proces         Predominant sediment size         Boolder           Unreget and basis         None         Ioward control of three crossing           Predominant sediment size         Boolder         Ioward control control of three crossing           Predominant sediment size		Current valley side or terrace erosion	Yes	transported directly to crossing
Sediment source and supply - Channel incision present in catchment         No         High sediment source potential to crossing and not coupled with the channel           Scale         Bail ension/fateral migration         No         Low sediment source potential minimum to coupled with the channel           Scale         Bail ension/fateral migration         No         Low sediment source potential minimum to coupled with the channel           Vertical incision present in catchment         No         Low sediment source potential infinitiature type (see Drawing 11.4.3.1.d, Catchment 121)           Comment on sediment source potential in catchment         No         Low sediment source potential from upper catchment from upper catchment from debris flows, shallow siles and valley side ensions in Till and Alloval fan deposits bot are and faculey side ensions from Till and Alloval fan deposits for cassing with new for future transport           Comment on sediment supply potential to crossing         Medianet source potential for upper catchment from upper catchment from upper catchment for upper crossing with on a facter location (area of deposition)           Morphology and Process Reach upstream crossing         Channel morphology         Bedrock           Predominant sediment size         Bouldern           Unegetated bars         None           Vertical incision         None           Presence and nature of infrastructure (Map 10)         None           Presence and nature of infrastructure (Map 10)         None		Potential valley side or terrace erosion		
Sediment source and suppir - Catchment Scale         Vertical incision present in catchment         Channel naturality incised         Low sediment source potential           Scale         Bank erosion/lateral migration         No         Low sediment source potential           Wooded/forested bars         No         Low sediment source potential           Comment on sediment source potential in catchment         No         Low sediment source potential           Comment on sediment source potential in catchment         High sediment source potential from upper catchment from debris flows, shalow sides and valley side crossion in Till and Allival fan deposits           Comment on sediment supply potential to crossing         Container from hiliside to crossing, funnelling sediment downstream Crossing is then on a fulley side crossing, funnelling sediment downstream Crossing is then on a fulley side crossing, funnelling sediment downstream Crossing is then on a fulley side crossing           Morphology and Proces         Predominant sediment size         Boulder           Intrastructure type (see Drawing 11.4.3.1.4, Catchment 121)         None         Intrastructure type (see prawing 11.4.3.1.4, Catchment 121)           Morphology and Proces         Predominant sediment size         Boulder         Intrastructure type (see prawing 11.4.3.1.4, Catchment 121)           Morphology and Proces         Predominant sediment size         Boulder         Intrastructure type (see prawing 11.4.3.1.4, Catchment 122)           Morphology and Proces		Hill slope failures (including peat slides and debris flows and slides)	yes-many debris flows within catchment	High sediment source potential, but distant from
supply - Catchment Scale         Bank erosion/lateral migration         No         Low sediment source potential (unegetated bas)           Mo         Low sediment source potential (unegetated bas)         No         Low sediment source potential (narstructure type (see Drawing 11-A3.1 d, Gatchment 121)           Infrastructure type (see Drawing 11-A3.1 d, Gatchment 121)         No         Low sediment source potential (bas) sole erosion in 111 and Alluval fan depoists and value is bor disance factors and value is factors bor disance factors bor dis an beconon dis bor disance factors bor disance factor bor dis				crossing and not coupled with the channel
Scale         Investigated bars         No         Low sediment source opticitial Wooded/forested areas in catchment         No         Low sediment source opticitial (bw source of floating debris)           Comment on sediment source potential in catchment         No         Low source of floating debris           Comment on sediment source potential in catchment         High sediment source optential flow, shallow sides and valley side erosion in Till and Alluvial fan deposits           Comment on sediment supply potential to crossing         Use of channets to crassport sediment shord distance from hill side to main channel Short area of reduced signe upstream of crossing, but sediment will remain here for future transport           Comment on sediment supply potential to crossing         Boot for anones to crossing, but sediment will remain here for future transport           Morphology and Procesrift         Predominant sediment size         Boulder           Vertical incision         None         Morehology           Predominant sediment size         Boulder         Unvegetated bars           Vertical incision         Low         Ender           Predominant sediment size         Boulder         Unvegetated bars           Vertical incision         Low         Ender           Predominant sediment size         Boulder         Unvegetated bars           Vertical incision         Morehology         Plane hed           Predomin				
Wooded/forested areas in catchment         No         Low source of floating debris           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)         High sediment source potential from upper catchment from debris flows, shallow sides a construction in Till and Alluvia fan deposits           Comment on sediment source potential in catchment         Lots of channels to transport sediment short distance from hill dot to main channel           Short area of reduced slope upstream of crossing will increase deposition here, reducing speed of transport from hillsde to crossing, but ediment will researe deposition           Morphology and Process free and submit size         Bedrock           Predominant sediment size         Boulder           Unsegettate bars         None           Unsegettate bars         None           Vertical incision         Low           Predominant sediment size         Low           Unsegettate bars         None           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)         NA           Predominant sediment size         Boulder           Unsegettate bars         None           Predominant sediment size         Boulder           Unsegettate bars         None           Predominant sediment size         Boulder           Unsegettate bars         Some           At crossing         Predominant sediment size				
Comment on sediment source potential in catchment         High sediment source potential for upper catchment from debrs flows, shallow sides and valuey dide crossion in illian dallowish and exposits           Morphology and Process Reach upstream of crossing         Comment on sediment souply potential to crossing         Lots of channels to transport sediment sing in increase deposition here, reducing speed of transport for inhibide to crossing, but sediment will remain here for future transport           Morphology and Process Reach upstream of crossing         Channel morphology         Bedrock           Predominant sediment size Unregetated bars         None         Interval           Vertical incision         Low         Interval           Predominant sediment (Map 10)         None         Interval           Infrastructure (Map 10)         None         Interval           Infrastructure (Map 10)         None         Interval           Infrastructure (Map 10)         None         Interval           Vertical incision         Low         Interval           Predominant sediment size         Boulder         Interval           Unregetated bars         Some         Available sediment at the crossing           Predominant sediment size         Boulder         Interval           Unregetated bars         Some         Available sediment at the crossing           Vertical incision         Hig				
Comment on sediment source potential in datament         and valley side ension in Till and Alluvial fan deposits           Lots to channels to toransport sediment should stance from hills det to main channel         Short area of reduced slope upstream of crossing ull increase deposition here, reducing speed of transport from hills de to ransing. Funnelling sediment will remain here for future transport           Morphology and Process         Channel morphology         Bedrock           Predominant sediment size         Boulder         Increase deposition           Unsgetated bars         None         Increase deposition           Vertical incision         None         Increase deposition           Predominant sediment size         Boulder         Increase deposition           Unsgetated bars         None         Increase deposition           Predominant sediment size         Low         Increase           Vertical incision         Low         Increase           Predominant sediment size         Low         Increase           Channel morphology         Plane bed         Increase           Predominant sediment size         Boulder         Increase           Unvegetated bars         Some         Available sediment at the crossing           Vertical incision         Med         Increase         Boulder           Unvegetated bars         Some<		Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)		and the second for an electric former shall be all des-
Morphology and Processing     Channel morphology     Dedition       Reach uptree of infrastructure (Map 1d)     None     None       Presonical sediment size     Boulder     Deposition       Presonical sediment size     Boulder     Deposition       University     Presonical sediment size     Boulder       University     Deposition     Low       Presonical sediment size     Boulder     Deposition       University     Deposition     Low       Presonical sediment size     Boulder     Deposition       Deposition     Low     Deposition       Presonical sediment size     Boulder     Deposition       Deposition     Low     Deposition       Presence and nature of infrastructure (Map 1d)     None     None       Presence and nature of infrastructure (Map 1d)     None     Deposition       Channel morphology     Plane bed     Deposition       Predominant sediment size     Boulder     Deposition       Channel morphology     Plane bed     Deposition       Channel morphology     Plane bed     Deposition       Predominant sediment size     Boulder     Deposition       Unvegetated bars     Some     Available sediment at the crossing       Vertical incision     Med     Reduced by presence of Reno mattres, but t		Comment on sediment source potential in catchment		
Morphology and Process Reach upstream of crossing         Predominant sediment size         Boulder           Morphology and Process Reach upstream of crossing         Predominant sediment size         None           Morphology and Process Reach upstream of crossing         Channel realignment         Low           Morphology and Process At crossing         Channel morphology         Plane bed           Morphology and Process At crossing         Channel morphology         Plane bed           Vertical incision         Some         Available sediment at the crossing           Vertical incision         Modent         Some           Vertical incision         Modent         None           Vertical incision         Med         Reduced by presence of Reno mattress, but this has been reworked indicating excess energy           Vertical incision         Med         Reduced by presence of Reno mattress, but this has been reworked indicating excess energy           Deposition         Low         Single area of bank erosion at the crossing           Damaged/unstable drains or armouring         No         No           Morphology and Process At crossing         Channel morphology         Cascade           Predominant sediment size         Boulder         Med           Morphology and Process Predominant sediment size         Yes         Lots of available sediment		Comment on sediment supply potential to crossing	speed of transport from hillside to crossing, but sediment will remain here for future transport Channel becomes steep and confined towards crossing, funnelling sediment downstream	
Morphology and Process Reach upstream of crossing         Unvegetated bars         None           Vertical incision         None         Incision           Lateral migration/bank erosion         Low         Incision           Presence and nature of infrastructure (Map 1d)         None         Incision           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)         NA         Incision           Channel realignment         yes         straightened at crossing           Predominant sediment size         Boulder         Incision           Estimated discharge at 1:200 event (m³/s)         11.6         Invegetated bars           Unvegetated bars         Some         Available sediment at the crossing           Vertical incision         Med         Reduced by presence of Reno mattress, but this has been reworked indicating excess energy           Vertical incision         Med         Single area of bank erosion at the crossing           Deposition         Lateral migration/bank erosion         Low           Damaged/unstable drains or armouring         No         Incision           Wortphology and Process         Predominant sediment size         Boulder           Unvegetated bars         Channel morphology         Cascade           Predominant sediment size         Boulder         Unvegetated bars		Channel morphology	Bedrock	
Morphology and Process Reach upstream of crossing         Vertical incision         None           Lateral migration/bank erosion         Low				
Reach upstream of crossing         Deposition         Low         Image: construction of the presence and nature of infrastructure (Map 1d)         None           Presence and nature of infrastructure (Map 1d)         None         Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)         NA         Image: construction of the presence and nature of infrastructure (Map 1d)         None           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)         NA         Image: construction of the presence and nature of infrastructure (Map 1d)         None           Morphology and Process At crossing         Channel morphology         Plane bed         Image: construction of the presence and construction of the presence of Reno mattress, but this has been reworked indicating excess energy           Morphology and Process At crossing         Vertical inclsion         Med         Reduced by presence of Reno mattress, but this has been reworked indicating excess energy           Deposition         Lateral migration/bank erosion         Low         Single area of bank erosion at the crossing           Deposition         Lateral migration/bank erosion at mouring         No         No         Image: construction of the crossing           Morphology and Process Reach downstream of crossing         Channel morphology         Cascade         Image: construction of the crossing           Morphology and Process         Vertical inclsion         Med         Concentrated just downstream of the crossing </td <td>Morphology and Process-</td> <td></td> <td></td> <td></td>	Morphology and Process-			
Lateral migration/bank ension     Low       Presence and nature of infrastructure (Map 1d)     None       Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)     NA       Channel realignment     yes       Straightened at crossing       Channel morphology     Plane bed       Predominant sediment size     Boulder       Estimated discharge at 1:200 event (m³/s)     11.6       Unvegetated bars     Some       Vertical incision     Med       Deposition     Lateral migration/bank erosion       Lateral migration/bank erosion     Cascade       Vertical incision     No		Deposition		
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)       NA         Channel realignment       yes         Straightened at crossing         Channel morphology       Plane bed         Predominant sediment size       Boulder         Estimated discharge at 1:200 event (m <sup>3</sup> /s)       11.6         Unvegetated bars       Some         Vertical incision       Med         Deposition       Lateral migration/bank erosion         Lateral migration/bank erosion       No         Morphology and Process- Reach downstream of crossing       Channel morphology         Vertical incision       Med         Channel morphology       Cascade         Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)       NA	crossing			
Morphology and Process- At crossing       Channel morphology Predominant sediment size       Boulder         Vertical incision       11.6         Unvegetated bars       Some         A vailable sediment at the crossing         Vertical incision       Med         Reduced by presence of Reno mattress, but this has been reworked indicating excess energy         Deposition       High         Lateral migration/bank erosion       Low         Single area of bank erosion at the crossing         Damaged/unstable drains or armouring       No         Morphology and Process- Reach downstream of crossing       Vertical incision         Morphology and Process- Reach downstream of crossing       Vertical incision         Morphology and Process- Reach downstream of crossing       Vertical incision		Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)		
Morphology and Process- At crossing         Predominant sediment size         Boulder           Morphology and Process- At crossing         Estimated discharge at 1:200 event (m³/s)         11.6           Unvegetated bars         Some         Available sediment at the crossing           Vertical incision         Med         Reduced by presence of Reno mattress, but this has been reworked indicating excess energy           Deposition         High         Lots of available sediment           Lateral migration/bank erosion         Low         Single area of bank erosion at the crossing           Damaged/unstable drains or armouring         No         No           Morphology and Process- Reach downstream of crossing         Vertical incision         Med           Morphology and Process- Reach downstream of crossing         Vertical incision         Med         Concentrated just downstream of the crossing           Deposition         High         Lots of available sediment         Med		Channel realignment	yes	straightened at crossing
Morphology and Process- At crossing         Estimated discharge at 1:200 event (m³/s)         11.6           Unvegetated bars         Some         Available sediment at the crossing           Vertical incision         Med         Reduced by presence of Reno mattress, but this has been reworked indicating excess energy           Deposition         High         Lots of available sediment           Lateral migration/bank erosion         Low         Single area of bank erosion at the crossing           Damaged/unstable drains or armouring         No         Single area of bank erosion at the crossing           Morphology and Process- Reach downstream of crossing         Vertical incision         Med           Deposition         Med         Concentrated just downstream of the crossing           Deposition         Med         Concentrated just downstream of the crossing				
Morphology and Process- At crossing         Channel morphology         Channel morphology         Cascade         End           Morphology and Process- At crossing         Channel morphology         Cascade         Image: Concentrate distance				
At crossing       Vertical incision       Med       Reduced by presence of Reno mattress, but this has been reworked indicating excess energy         Deposition       High       Lots of available sediment         Lateral migration/bank erosion       Low       Single area of bank erosion at the crossing         Damaged/unstable drains or armouring       No       No         Predominant sediment size       Boulder       Imaged/unstable sediment         Unvegetated bars       Yes       Lots of available sediment         Vertical incision       Med       Concentrated just downstream of the crossing         Predominant sediment size       Med       Concentrated just downstream of the crossing         Presition       Med       Med       Concentrated just downstream of the crossing         Deposition       High       Lots of available sediment       Concentrated just downstream of the crossing         Presition       High       Lots of available sediment       Concentrated just downstream of the crossing         Deposition       High       Lots of available sediment       Concentrated just downstream of the crossing         Reduction       None       None       Lots of available sediment       Lots of available sediment				Available sediment at the crossing
Lateral migration/bank erosion         Low         Single area of bank erosion at the crossing           Damaged/unstable drains or armouring         No         No           Reach downstream or crossing         Channel morphology         Cascade           Vertical incision         Yets         Lots of available sediment           Deposition         Med         Concentrated just downstream of the crossing           Deposition         High         Increased           Lateral migration/bank erosion         None         Increased		Vertical incision	Med	
Damaged/unstable drains or armouring         No           Damaged/unstable drains or armouring         No           Channel morphology         Cascade           Predominant sediment size         Boulder           Unvegetated bars         Yes           Vertical incision         Med           Deposition         High           Lateral migration/bank erosion         None		Deposition		Lots of available sediment
Channel morphology         Cascade           Predominant sediment size         Boulder           Unvegetated bars         Yes           Vertical incision         Med           Deposition         High           Lateral migration/bank erosion         None				Single area of bank erosion at the crossing
Predominant sediment size         Boulder           Morphology and Process- rcrossing         Vertical incision         Yes         Lots of available sediment           Deposition         Med         Concentrated just downstream of the crossing           Lateral migration/bank erosion         None		pamageu/unstable drains or armouring	NU	I
Morphology and Process- rcrossing         Unvegetated bars         Yes         Lots of available sediment           Durphology and Process- rcrossing         Vertical incision         Med         Concentrated just downstream of the crossing           Deposition         High         Incision         High         Incision           Letral migration/bank erosion         None         Incision         Incision				
Morphology and Process- Reach downstream of crossing         Vertical incision         Med         Concentrated just downstream of the crossing           Deposition Lateral migration/bank erosion         High         <				Lots of available sediment
Beach downstream of crossing         Deposition         High           Lateral migration/bank erosion         None				
crossing Lateral migration/bank erosion None				Concentrated just downstream of the crossing
	crossing			
		Presence and nature of infrastructure (Map 1d)	Railway crossing	
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)         Impounding flows and fixing channel         Increase deposition upstream           Channel realignment         yes         straightened at crossing				
Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121) Impounding flows and fixing channel Increase deposition upstream		Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 121)	Boulder Yes Med High None Railway crossing Impounding flows and fixing channel	Concentrated just downstream of the crossing
	Summany babaviour	High sediment source and supply potential to the crossing from valle	y side erosion, upstream of a very steep cl	hannel
Downstream incision caused by scour from the crossing	Summary behaviour	Low risk of upstream incision-bedrock Med risk for bypassing crossing- erosion on left bank side upstream		



Flow through rather than over mattress causing collapse

Channel incision due to step

Photograph 11.4.3.108- Upstream to crossing



Photograph 11.4.3.109-Channel



Photograph 11.4.3.110- Downstream

Deposition of sediment where floodplain opens up

> Flow through mattress scouring below



Photograph 11.4.3.111- Area of scour



Photograph 11.4.3.112-Upstream

Wave bed forms formed by reworking of gravel in gabions

Some cobble deposition over mattress



Photograph 11.4.3.113- Downstream



Photograph 11.4.3.114- Upstream

Some cobble deposition over mattress

Photograph 11.4.3.115- Downstream under crossing



Photograph 11.4.3.116- Upstream to bedrock channel

Photograph 11.4.3.117 – Downstream to crossing



Photograph 11.4.3.118- Left bank

Photograph 11.4.3.119-Left bank







Photograph 11.4.3.120 – Downstream of crossing- steep sided channel



Photograph 11.4.3.122-Steep narrow catchment

Photograph 11.4.3.123- Catchment



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Legend

•	Major crossing
•	Minor crossing
•	Other crossing
	Coupled debris flow
	Debris flow
$\bigcirc$	Valley side erosion
	Unvegetated bar
	Break in slope

Crossing catchment



DRAWING 11.4.3.2. Catchment 121 Baseline Assessment

DESIGN:	DRAWN:	AWN: CHK: APP:			
EL	AB	EL	EL		
DATE: 11/07/2017 PROJ: 495298					
PROJ: 495298					
DWG: A9P08-CFJ-EWE-X_ZZZZZ_ZZ-DR-EN-0002					
SHEET: 1 of 1	REVI C01	SION:	SUITABILITY: A3		

h	, , , , , , , , , , , , , , , , , , , ,	1				
Catchment No. Catchment Name	123					
	-	l				
Character	Nature of water course		Natural			
Channel Nature	Size of water course		Minor			
Quantitative Spatial	Catchment Area (km <sup>2</sup> )		0.2			
Elements	Average slope in catchment (°) % Catchment over 750m (for snow melt risk)		<u>10</u> 0			
			0			
	Water, flows and levels Physical condition		Good Good			
WFD classification	Overall ecological status		Moderate			
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 123)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable			
Geology	Is an alluvial fan present at or near the crossing?	No				
Environmental	Ramsar	No				
designations (see	SAC	No				
Drawing 11.4.3.1 c,	SPA	No				
Catchment 123)	SSSI	No				
	Changes in slope and channel confinement	See Drawing	11.4.3.2, Catchment 123			
	Is peat present in the catchment	Yes	Limited amount possible in headwaters			
	Is there a bog burst risk Current valley side or terrace erosion	No				
	Potential valley side or terrace erosion	Yes	600m			
	Hill slope failures (including peat slides and debris flows and slides)	No				
	Hill slope failures coupled to channel Vertical incision present in catchment	No				
Sediment source and	Bank erosion/lateral migration	No				
supply - Catchment Scale	Unvegetated bars	No				
	Wooded/forested areas in catchment Infrastructure type (see Drawing 11.4.3.1 d, Catchment 123)	No				
	innastructure type (see brawing 11.4.5.1 d, catchment 12.5)		moment with incision limited to immediately u/s			
	Comment on sediment source potential in catchment		el changes (e.g. further cutting into hillslope) may			
			hannel with very limited flood plain may lead to discussion discussion discussion discussion discussion of the second sec			
		High, if the sources are created, as catchment is steep with high supply potent				
	Comment on sediment supply potential to crossing	opportunities for depositi	on within the catchment are limited.			
l	Channel morphology	Cascade				
	Predominant sediment size	Large Gravel and Cobble				
	Unvegetated bars	No				
Morphology and Process- Reach upstream of	Vertical incision Deposition	Medium Low				
crossing	Lateral migration/bank erosion	Low				
	Presence and nature of infrastructure (Map 1d)	No				
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 123) Channel realignment	No				
	Channel morphology	Engineered				
	Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s)	Cobble 0.6				
	Unvegetated bars	Yes	at outflow of culvert - deposited sediment			
Morphology and Process-		Low	forming bar			
At crossing	Vertical incision		at outflow of culvert - deposited sediment			
	Deposition	Medium	forming bar			
	Lateral migration/bank erosion	Low				
	Damaged/unstable drains or armouring	Yes	Evidence of paving slabs torn up u/s of crossing			
	Channel morphology Predominant sediment size	Plane bed Cobble				
	Unvegetated bars	No				
			Incision may have occurred previously (during big			
	Vertical incision	Medium	events?) but vegetation encroaching on channel			
Morphology and Process- Reach downstream of			indicates that the channel is mostly stable at present.			
crossing	Deposition	Low				
	Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d)	Low Yes				
			Channel probably realigned to join others to			
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 123)	Railway	pass under railway at one single point.			
-	Channel realignment	Yes	See above			
Summary behaviour	This is a long, narrow and steep catchment which for most of it's ler erosion of the valley slide toes and subsequent coupled hillslope fai coarse sediment which is being transported through the crossing and up paving slaps (armouring) both u/s and d/s of the culvert indicates energy profile and there	lures. Incision appears to have occurred d being deposited at the d/s end of the c	immediately u/s of the crossing and is generating ulvert where gradient reduces. Evidence of ripped careful design needed to avoid creating increased			
	up paving slaps (armouring) both u/s and d/s of the culvert indicates	that this a high energy channel. Suggest	careful design needed to avoid creating increas			



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<u>Legend</u>					
General					
Crossi	na locatio	n			
Solid Geo	-				
		Formati	on Peammit		
Gaick Psammite Formation - Psammite					
Drift Geology					
Peat		_			
	fluvial Ice		•		
	Plateau M				
	ocky Glac	-			
			- Diamicton		
Glacio		et Depos	sits		
Alluviu					
River 7					
Alluvia	I Fan Dep	osits			
Head					
Talus -	Rock Fra	gments			
Talus (	Cone				
Environme	ental Des	ignation	s		
🔲 Specia	I Area of	Conserva	ition		
Morpholog	gical Pres	sures			
🔺 Railwa	y Bridge				
Road I	Bridge				
Track/	-	Э			
Culver	-				
<ul> <li>Step ir</li> </ul>					
<ul> <li>Catchp</li> </ul>					
- Draina					
REV     SUIT     DATE     DESCRIPTION     BY     APP       Ch20000     FAIRHURST       CH2MHILL Fairhurst JV     C/O: City Park 368 Alexandra Parade Glasgow G31 3AU       Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525       Image: Constraint of the second s					
C/O: City I Tel + 44 (0	AL ALBA	Datwhinnie	to Crubenmere		
C/O: City Tel + 44 (0 PROJECT	T 8 DALWHINI	NIE TO CRUI	to Crubenmere		

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#### Catchment No. 124 Catchment Name Nature of water course Natural Channel Nature Size of water course Minor Catchment Area (km<sup>2</sup>) 0.1 **Quantitative Spatial** 11.8 Average slope in catchment (°) Elements % Catchment over 750m (for snow melt risk) 0 Water, flows and levels Good WFD classification Physical condition Good Moderate Overall ecological status Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 124) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology Is an alluvial fan present at or near the crossing? No Environmental Ramsar No designations (see SAC No Drawing 11.4.3.1 c, SPA No Catchment 124) 1222 No Changes in slope and channel confinement See Drawing 11.4.3.2, Catchment 124 Indicated in very uppermost part of catchment in Is peat present in the catchment Yes watershed area, but very limited. No Is there a bog burst risk No Frosion of valley sides evident in mid catchment Current valley side or terrace erosion Yes where channel incised Potential valley side or terrace erosion Yes In incised channel Sediment source and Hill slope failures (including peat slides and debris flows and slides) No supply - Catchment Hill slope failures coupled to channel No Scale Vertical incision present in catchment Yes On steeper slope into main Truim valley No Bank erosion/lateral migration No Unvegetated bars Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 124) No Sediment in channel bed appears mobile and likely supply is from erosion of incised channe Comment on sediment source potential in catchment valley sides in mid catchment Channel is steep all the way to the crossing so high potential for sediment transfer to Comment on sediment supply potential to crossing crossing Channel morphology Cascade Gravel-cobble Predominant sediment size Unvegetated bars No Morphology and Process Low Vertical incision Incision reduces towards crossing Deposition Reach upstream of Medium Lateral migration/bank erosion crossing Low Presence and nature of infrastructure (Map 1d) No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 124) No Channel realignment No Channel morphology Engineered Pipe culvert Predominant sediment size Small cobble Estimated discharge at 1:200 event (m<sup>3</sup>/s) 0.5 No Unvegetated bars Morphology and Process None Vertical incision At crossing Coarse material deposited at culvert entrance Medium Deposition where gradient reduces Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Plane bed Channel morphology Predominant sediment size Pebble-cobble Unvegetated bars No Vertical incision Medium Channel incised into slope below road Coarse material deposited in fan at confluence Medium Morphology and Process Deposition with channel that collects flow to go under Reach downstream of railway bridge Lateral migration/bank erosion crossing low Presence and nature of infrastructure (Map 1d) No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 124) No Captured by channel d/s of road designed to take Channel realignment Yes flow of this channel and 123 and 125 through on single railway culvert Channels don't fully form in catchment until downslope edge of flatter 'bench' in the mid-catchment. Downstream/slope of this the channel has incised (like its neighbours) creating a very narrow and steep lower catchment until the road crossing. Sediment appears to be generated from this vertically incised section and is deposited immediately u/s of the crossing when gradient reduces. Crossing is a relatively small aperture pipe culvert through an embankment which is built across Summary behaviour the valley this channel has incised, indicating high flows are probably substantially restricted. D/s of the road the channel is incised until gradient reduces at confluence with cross-cutting channel which takes flow of 124 and its neighbours through one railway crossing. Between the end of the incised section and the confluence there is a fan-like deposit of coarse material visible in the aerial photos.



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Gen	gend					
	eral					
•	Crossing location					
Soli	d Geology					
	Gaick Psammite Formation - Psammite					
Drif	t Geology					
Peat						
	Glaciofluvial Ice Contact Deposits					
	Gaick Plateau Moraine Formation					
	Hummocky Glacial Deposits					
	Ardverikie Till Formation - Diamicton					
	Glaciofluvial Sheet Deposits					
	Alluvium					
	River Terrace Deposits					
	Alluvial Fan Deposits					
	Head					
	Talus - Rock Fragments					
	Talus Cone					
Env	ironmental Designations					
	Special Area of Conservation					
_	phological Pressures					
	Railway Bridge					
	Road Bridge					
	Track/Footbridge					
	Culvert					
	Cascade					
-	Step in Bed					
	Catchpit					
	Drainage Ditch					
	Power Lines					
REV	SUIT         DESCRIPTION         BY         APP           CH2MHILL Fairhurst JV CVC: City Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525					
	CH2MHILL Fairhurst JV CYC: City Park 368 Alexandra Parade Glasgow G31 3AU					
	CH2MHILL Fairhurst JV C/C Citly Park 368 Alexandra Parade Glasgow G31 3AU Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525					
Dr	CH2MIHLL Fairhurst JV         CYC City Park 368 Alexandra Parade Glasgow G31 3AU         Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525         Difference					
Dr DESI EL	CH2MIILL Fairhurst JV         C/O: Citly Park 368 Alexandra Parade Glasgow G31 3AU         Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525         Image: Comparison of the state o					
Dr DESI EL DATE	CH2MIHLL Fairhurst JV         CYC City Park 368 Alexandra Parade Glasgow G31 3AU         Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 2525         Difference					
Dr DESI EL DATE PRO.	CH2MHILL Fairhurst JV           CYC: City Park 368 Alexandra Parade Glasgow G31 3AU           Tel + 44 (0) 141 552 2000 Fax +44 (0) 141 552 255           Difference           Diffe					



#### 125 Catchment No. Catchment Name Nature of water course Natural Channel Nature Size of water course Minor 0.2 Catchment Area (km<sup>2</sup>) Quantitative Spatial 11.8 Average slope in catchment (°) Flements % Catchment over 750m (for snow melt risk) 0 Water, flows and levels Good WFD classification Physical condition Good Overall ecological status Moderate Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 125) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology Is an alluvial fan present at or near the crossing? No Environmental No Ramsar designations (see SAC No Drawing 11.4.3.1 c, SPA No Catchment 125) SSSI No See Drawing 11.4.3.2, Catchment 125 Changes in slope and channel confinement No Is peat present in the catchment No Is there a bog burst risk Current valley side or terrace erosion Yes Potential valley side or terrace erosion Yes 0 17 Hill slope failures (including peat slides and debris flows and slides) Yes Vegetated over Hill slope failures coupled to channel No Vertical incision leading to slope failure on right Sediment source and Vertical incision present in catchment Yes upply - Catchment Scale bank u/s of crossing Bank erosion/lateral migration No No Unvegetated bars Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 125) None Comment on sediment source potential in catchment Eroding till valley sides potential to supply fines and coarse material High - Eroding valley side immediately upstream of crossing. Steep channel will deliver Comment on sediment supply potential to crossing sediment to crossing Cascade Channel morphology Predominant sediment size Coarse Unvegetated bars No Vertical incision High Morphology and Process Deposition Low Reach upstream of Lateral migration/bank erosion High crossing Presence and nature of infrastructure (Map 1d) No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 125) No Not evident from historic maps, but must be to Channel realignment Yes achieve one of the two near 90° bends just u/s of crossing Channel morphology Cascade Predominant sediment size Coarse 0.7 Estimated discharge at 1:200 event (m<sup>3</sup>/s) Morphology and Process Unvegetated bars None At crossing Vertical incision Low Deposition Low Lateral migration/bank erosion Low Damaged/unstable drains or armouring No Channel morphology Cascade Coarse (gravel-cobble) Predominant sediment size Unvegetated bars No Vertical incision High Morphology and Process Deposition Low Reach downstream of Lateral migration/bank erosion Low crossing No Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 125) No Captured by another tributary coming in from the Channel realignment Yes left bank to go under the railway Summary behaviour Some realignment undertaken to take watercourse through the crossing. Evidence of valley side erosion upstream and vertical incision downstream



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<b>Legend</b>			
General			
Crossir	ng locatio	on	
Solid Geol	ogy		
Gaick I	Sammite	e Forma	ation - Psammi
Drift Geolo	gy		
Peat			
Glaciof	iuvial Ice	Contac	t Deposits
			Formation
Humm			
	-	•	n - Diamicton
Glaciof			
Alluviu			0010
River T		onocite	
Alluvia			
Head	ran De	posits	
	De els En		_
Talus -		agments	<sup>5</sup>
Talus C			
Environme		-	
Specia			vation
Morpholog	•	ssures	
🔺 Railwa			
🔺 Road E	-		
A Track/F	-	e	
Culvert			
🔵 Cascad	de		
🔸 Step in	Bed		
Oatchp	vit		
- Draina	ge Ditch		
- Power	Lines		
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Drawing 11.	4.3.1 Catchn	nent 125 C	atchment Overview
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#### Catchment No. 126 Catchment Name Natural Nature of water course Channel Nature Size of water course Other No Data Catchment Area (km<sup>2</sup>) Quantitative Spatial No Data Average slope in catchment (°) Flements % Catchment over 750m (for snow melt risk) No Data Water, flows and levels Good WFD classification Physical condition Good Overall ecological status Moderate Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 126) Gaick Psammite formation-Psammite resistant to weathering, impermeable Geology Is an alluvial fan present at or near the crossing? No nvironmenta No Ramsai designations (see No SAC Drawing 11.4.3.1 c, SPA No Catchment 126) SSSI No See Drawing 11.4.3.2, Catchment 126 Changes in slope and channel confinement Yes Limited thin cover possible in headwater Is peat present in the catchment No Is there a bog burst risk Current valley side or terrace erosion No Potential valley side or terrace erosion No Yes Hill slope failures (including peat slides and debris flows and slides) Not coupled with channels and now vegetated Sediment source and Hill slope failures coupled to channel No upply - Catchment Scale Vertical incision present in catchment No Bank erosion/lateral migration No Unvegetated bars No Wooded/forested areas in catchment No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 126) No Limited. Channel development very limited and no exposed sediment evident. Comment on sediment source potential in catchment Low Comment on sediment supply potential to crossing Cascade Channel morphology Predominant sediment size Gravel Unvegetated bars No Morphology and Process Vertical incision Medium Reach upstream of Deposition Medium crossing Lateral migration/bank erosion Low Presence and nature of infrastructure (Map 1d) No Infrastructure type (see Drawing 11.4.3.1 d, Catchment 126) No No Channel realignment Channel morphology Engineered Predominant sediment size Gravel-cobble Estimated discharge at 1:200 event (m<sup>3</sup>/s) 2.6 Unvegetated bars None Morphology and Process Vertical incision Low At crossing Deposition Low Lateral migration/bank erosion Low Damaged/unstable drains or armouring Yes Drain armouring appears to have been ripped up Channel morphology Cascade Predominant sediment size Cobble Unvegetated bars No Vertical incision Medium Deposition Low Morphology and Process Lateral migration/bank erosion None Reach downstream of Presence and nature of infrastructure (Map 1d) Yes Railway crossing Flow has to pass through cut drain to get through Infrastructure type (see Drawing 11.4.3.1 d, Catchment 126) Yes railway embankment Drain cut to take flow southwards to join other Channel realignment Yes channels and pass through a crossing in the ailway embankment Only limited channel headwaters u/s of road. Joined by flow from road-parallel drains at crossing. Paving flag armouring appears to have been ripped up and deposited just u/s of culvert. Downstream there is some vertical incision but this might be natural. Cut drain takes flow southwards to join other channels where Summary behaviour gradient reduces, so that flow from several channels passes through just one railway crossing. Where the natural channel ends and cut drain begins, there is a smal fan of coarse material evident in the aerial photos.

Catchment No.	127			
Catchment Name	-	1		
	Nature of water course		Drain	
Channel Nature	Size of water course		Other	
Quantitative Spatial	Catchment Area (km <sup>2</sup> )	No Data		
Elements	Average slope in catchment (°)		No Data	
Liements	% Catchment over 750m (for snow melt risk)		No Data	
	Water, flows and levels	Good		
WFD classification	Physical condition		Good	
	Overall ecological status		Moderate	
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 127)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable	
Geology	Is an alluvial fan present at or near the crossing?	No		

			1
Environmental	Ramsar	No	
designations (see	SAC	No	
Drawing 11.4.3.1 c,	SPA	No	
Catchment 127)	SSSI	No	
	Changes in slope and channel confinement	See Drawing 1	1.4.3.2, Catchment 127
	Is peat present in the catchment	Yes	Small possible deposit in upper catchment
	Is there a bog burst risk	No	
	Current valley side or terrace erosion	No	
	Potential valley side or terrace erosion	No	
	Hill slope failures (including peat slides and debris flows and slides)	Yes	Not coupled with channels and now vegetated
Sediment source and	Hill slope failures coupled to channel	No	
supply - Catchment Scale	Vertical incision present in catchment	No	
	Bank erosion/lateral migration	No	
	Unvegetated bars	No	
	Wooded/forested areas in catchment	No	
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 127)	No	
	Comment on sediment source potential in catchment	Looks limited. Some possible s	hallow translational (peat?) failure scars
	Comment on sediment supply potential to crossing		Limited

	Channel morphology	Engineered	Channel starts as two drains above cutting which capture hillslope drainage and bring them to a cascade, which descends the cutting to road level, where the flow enters a road parallel drain for c.160m.
	Predominant sediment size	-	no sediment present in road-parallel drain
Morphology and Process-	Unvegetated bars	No	
Reach upstream of	Vertical incision	None	
	Deposition	None	
crossing	Lateral migration/bank erosion	None	
	Presence and nature of infrastructure (Map 1d)	Cascade	c. 160m south of crossing
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 127)	No	
	Channel realignment	Yes	Natural channel appears to have been present here on 1902 six inch map, but road cutting has cut off the channel's headwaters.

	Channel morphology	Engineered	
	Predominant sediment size	Gravels	
	Estimated discharge at 1:200 event (m <sup>3</sup> /s)	2.6	
	Unvegetated bars	No	
Morphology and Process-	Vertical incision	None	
At crossing	Deposition	Low	Some deposition of gravel in catch pit and in
	Deposition	EOW	culvert.
	Lateral migration/bank erosion	None	
	Damaged/unstable drains or armouring	Yes	At cascade further up there is limited damage - dislodging of blocks.

	Channel morphology	Plane bed	
	Predominant sediment size	None visible	
	Unvegetated bars	No	
	Vertical incision	Medium	Possible scour pool visible in aerial photo
Morphology and Process-	Deposition	Low	
Reach downstream of	Lateral migration/bank erosion	Medium	Possible scour pool visible in aerial photo
crossing	Presence and nature of infrastructure (Map 1d)	Yes	Railway
crossing	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 127)	Yes	Channel restricted in route it can follow to pass under railway crossing c.70m d/s of culvert exit
	Channel realignment	No	Channel appears to be in original place d/s of road

Summary behaviou

Headwaters of original channel have been removed by the cutting through which the road runs. Drainage is now captured above cutting by cross-slope drains which actually drop to road level via a cascade which descends the cutting 160m to the south of the crossing. The channel turns abruptly to the north once at road level and flows northwards to crossing 127. At the u/s end of the culvert (in the catch pit) and within the culvert there is a small amount of small gravel deposited. D/s of the culvert, the channel seems to follow it's original alignment, but the aerial photos indicate a possible scour pool where engineering measures stop. D/s of this, c. 70m d/s of the road crossing, the channel passes under the railway. Possible opportunity to remove some of the sharp unnatural turns in the channel.

Catchment No. Catchment Name	128		
		a 1	Network
Channel Nature	Nature of water course		Natural
	Size of water course		Other
	Catchment Area (km²)		No Data
Quantitative Spatial	Average slope in catchment (°)		No Data
Elements	% Catchment over 750m (for snow melt risk)		No Data
		1	
WFD classification	Water, flows and levels Physical condition		Good
WPD classification	Overall ecological status		Good Moderate
		L.	
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 128)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable
Geology	Is an alluvial fan present at or near the crossing?	No	
	Ramsar	No	
Environmental designations (see	SAC	No	
Drawing 11.4.3.1 c,			
Catchment 128)	SPA	No	
	SSSI	No	
	Changes in slope and channel confinement	See Drawing	11.4.3.2, Catchment 128
		See Drawing	
	Is peat present in the catchment	Yes	Small possible deposit in upper catchment
	Is there a bog burst risk	No	
	Current valley side or terrace erosion	No	
6	Potential valley side or terrace erosion	No	
Sediment source and supply - Catchment	Hill slope failures (including peat slides and debris flows and slides)	Yes	Not coupled with channels and now vegetated
Scale	Hill slope failures coupled to channel	No	
	Vertical incision present in catchment	No	
	Bank erosion/lateral migration Unvegetated bars	No No	
	Wooded/forested areas in catchment	No	
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128)	No	
	Comment on sediment source potential in catchment		Limited
	Comment on sediment supply potential to crossing	Limited - seems to	be little sediment in catch pit
	Channel morphology	Engineered	Drains and cascade
	Predominant sediment size	Angular large gravel/small cobble	Generated from damage to cascade
	Unvegetated bars	No	
Morphology and Process	Vertical incision Deposition	None Low	
Reach upstream of		None	
	Lateral migration/bank erosion	NOTE	
crossing	Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d)	Yes	Cascade
crossing			Generating sediment, limiting energy reaching
crossing	Presence and nature of infrastructure (Map 1d)	Yes	Generating sediment, limiting energy reaching crossing.
crossing	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128)	Yes Yes	Generating sediment, limiting energy reaching
crossing	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology	Yes Yes Yes Engineered	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert
crossing	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size	Yes Yes Yes Engineered Gravel	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned
	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated base	Yes Yes Yes Engineered	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert
Morphology and Process	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated base	Yes Yes Engineered Gravel 2.6	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert
	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Deposition	Yes Yes Engineered Gravel 2.6 No None Low	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert
Morphology and Process	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion	Yes Yes Engineered Gravel 2.6 No None Low None	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit
Morphology and Process	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Deposition	Yes Yes Engineered Gravel 2.6 No None Low	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert
Morphology and Process	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring	Yes Yes Engineered Gravel 2.6 Non Low None Low Yes	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing coarse angular material
Morphology and Process	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology	Yes Yes Engineered Gravel 2.6 No None Low None Yes Engineered	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing
Morphology and Process	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size	Yes Yes Engineered Gravel 2.6 Non Low None Low Yes	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing coarse angular material
Morphology and Process At crossing	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision	Yes Yes Engineered Gravel 2.6 No None Low None Yes Engineered Fine No No	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing coarse angular material
Morphology and Process	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Deposition	Yes Yes Engineered Gravel 2.6 No Low Low Yes Engineered Fine No None Low	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing coarse angular material
Morphology and Process At crossing Morphology and Process	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion	Yes Yes Engineered Gravel 2.6 None Low None Yes Engineered Fine No None Low Yes	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing coarse angular material Cut drain Fines and organics only. Sluggish
Morphology and Process At crossing Morphology and Process Reach downstream of	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/Dank erosion Deposition Lateral migration/Dank erosion Presence and nature of infrastructure (Map 1d)	Yes Yes Yes Engineered Gravel 2.6 No None Low Yes Engineered Fine No None Low None Low Yes	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing coarse angular material Cut drain
Morphology and Process At crossing Morphology and Process Reach downstream of	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damagetated bars Vertical incision Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128)	Yes Yes Engineered Gravel 2.6 Non Low None Yes Engineered Fine No None Low Low Yes Yes	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing coarse angular material Cut drain Fines and organics only. Sluggish Railway Channel in cut drain and joins 127 to pass under railway
Morphology and Process At crossing Morphology and Process Reach downstream of	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/Dank erosion Deposition Lateral migration/Dank erosion Presence and nature of infrastructure (Map 1d)	Yes Yes Yes Engineered Gravel 2.6 No None Low Yes Engineered Fine No None Low None Low Yes	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing coarse angular material Cut drain Fines and organics only. Sluggish Railway Channel in cut drain and joins 127 to pass under
Morphology and Process At crossing Morphology and Process Reach downstream of	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128) Channel realignment Channel morphology Predominant sediment size Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars Vertical incision Damaged/unstable drains or armouring Channel morphology Predominant sediment size Unvegetated bars Vertical incision Deposition Lateral migration/bank erosion Damagetated bars Vertical incision Deposition Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 128)	Yes Yes Yes Yes Engineered Gravel 2.6 No None Low None Yes Engineered Fine No None Low Yes	Generating sediment, limiting energy reaching crossing. In cutting so must have been realigned Pipe culvert accumulated in catch pit Limited damage to cascade steps producing coarse angular material Cut drain Fines and organics only. Sluggish Railway Channel in cut drain and joins 127 to pass under railway See above



Photograph 11.4.3.124- Cascade upstream of crossing



Photograph 11.4.3.125-Downstream- low slope and unconstrained channel





distance is:         10           Construction:         Name at none:         Name at noe none:         Name at noe: <t< th=""><th></th><th>Annex 11.4.3 - Hydromorphologica</th><th></th><th></th></t<>		Annex 11.4.3 - Hydromorphologica		
Consolid Line         Matrix of water cause         Natural (as of dual as cause)         Natural (built of a function cause)         Natural (built of a function cause)         Natural (built of a function cause)           Consolid Line Based of Based of the cause)         Consolid Line (built of the cause)           Web credit of the cause)         Consolid Line (built of the cause)           Section of the cause)         Consolid Line (built of the cause)		- 129		
Considering State Internet Series         Disk during cause (additional cause)         Disk during cause (additional cause)         Disk during cause (additional cause)           Outside Internet Series         Model, for additional cause)         Disk during cause (additional cause)         Disk during cause)         Disk during cause)           Outside Internet Series         Model, for additional cause)         Disk during cause)         Disk during cause)         Disk during cause)           Outside Internet Series         Disk during cause)         Disk during cause)         Disk during cause)         Disk during cause)           Series         Disk during cause)         Disk during cause)         Disk during cause)         Disk during cause)           Series         Disk during cause)         Disk during cause)         Disk during cause)         Disk during cause)           Series         Disk during cause)         Disk during cause)         Disk during cause)         Disk during cause)           Series         Disk during cause)         Disk during cause)         Disk during cause)         Disk during cause)           Series         Disk during cause)         Disk during cause)         Disk during cause)         Disk during cause)           Series         Disk during cause)         Disk during cause)         Disk during cause)         Disk during cause)           Series			4	
Constraints for part of a collimater ()         Description of a collimater ()         Description of a collimater ()           WPD constraints         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()           WPD constraints         Section on a collimater ()           Constraints ()         In a collimater ()         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()           Constraints ()         In a collimater ()         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()           Constraints ()         In a collimater ()         Section on a collimater ()           Section on a collimater ()         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()           Section on a collimater ()         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()           Section on a collimater ()         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()         Section on a collimater ()	Channel Nature			
Selence of the selection of the se				
same         © columnment or 2000 (in provine) (sp)         O           VPP classification         Good         Good           VPP classification         Good         Good           results         Marking free forming 1.4.3.1.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.	Quantitative Spatial			
Why classification         Occord           Reveals conception that, and if chainest 120.         Gald Framming contrasts of contrast	Elements			
Why classification         Occord           Reveals conception that, and if chainest 120.         Gald Framming contrasts of contrast				Cont
Geology         Majority Betrack (see Drawing 11.4.1.1 and 5 Celchinert 129)         Gas A Parameter formation Parameter In an allowed in preperties or need the closing?         No         Personal set to weathering impermade international set of the closing?           Foreigness of the set of the closing?         No         No         Personal set of the closing?         No           Set of the set of the closing?         No         No         Personal set of the closing?         No           Set of the set of the closing?         No         No         Personal set of the closing?         No           Set of the set of the closing?         No         <	WFD classification			
Gening/ tape allocating present at or near the occupy <sup>2</sup> No           Developmental designation teer provincemental designation teer designation teer designated teer designation teer designation teer designation		Overall ecological status		Moderate
Balance         No           Environmental Beingendisse ige Brander 11.11.12, Citchtnet 129         No         No           Side Separation 11 Beingendisse ige Brander 11.11.12, Citchtnet 129         No         No         No           Side Separation 11 Beingendisse ige Brander 11.11.12, Citchtnet 129         No         No         No           Side Separation 11 Beingendisse ige Brander 11 Beingendisse ige		Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 129)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable
Encirculation         Note-Sep-2 Alteric scale suppry           Sections121         Sc         Note-Sep-2 Alteric scale suppry           Sections121         Sc         Note-Sep-2 Alteric scale suppry           Sections121         Sc         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale super-Sep-2 Alteric scale super-Sep	Geology	Is an alluvial fan present at or near the crossing?	No	
Encirculation         Note-Sep-2 Alteric scale suppry           Sections121         Sc         Note-Sep-2 Alteric scale suppry           Sections121         Sc         Note-Sep-2 Alteric scale suppry           Sections121         Sc         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale suppry         Note-Sep-2 Alteric scale suppry           Scale         Note-Sep-2 Alteric scale super-Sep-2 Alteric scale super-Sep		Ramsar	No	
designation (or Carbon 12.3)         Sci         mask of the sci binnery is a log at confusions of the Sci bin at confusions with the main sci bin at confusions with the main sci bin at confusions with the sci binner is a log at confusions with the sci Sci bin at confusions with the sci sci at confusions withe sci at confusions with the sci at confusions wit	Environmental	Ramsar		
Gutiment 139         DA         No.         Mon the function           563         No.         No.         No.         No.         No.           Set System         Set System         Set Drawing 11.4.12, Cathment 129         Set Drawing 11.4.12, Cathment 129           System 149, Set System         Set Drawing 11.4.12, Cathment 129         No.         No.         No.           System 149, Set System         Set Drawing 11.4.12, Cathment 129         No.         No.         No.           System 149, Set System         Control Major Set System 149         No.         No.         No.         No.           System 149, Set System 149, Set Set Transactore resolution         No.		SAC	Yes	mussel, otter, sea lamprey
SSI         No         Inclusion           Self and the state in the definition of the state in the definint of the sta		CDA	No	NB only at confluence with the Truim
Sediment space         Description         No         Instance           Sediment space         Instance and space         No         Instance           Sediment space         Instance and space         No         Instance           Sediment space         Instance         Instance         Instance           Sediment space         Instance         Instance         Instance           Sediment space         Instance         Instance         Instance           Comment on sediment space         Instance         Instance         Instance           Predominant addiment Size         Instance         Instance         Instance           Instance         Instance         Instance         Instance           Instance         Instance         Instance         Instance				
Sediment space         Description         No         Instance           Sediment space         Instance and space         No         Instance           Sediment space         Instance and space         No         Instance           Sediment space         Instance         Instance         Instance           Sediment space         Instance         Instance         Instance           Sediment space         Instance         Instance         Instance           Comment on sediment space         Instance         Instance         Instance           Predominant addiment Size         Instance         Instance         Instance           Instance         Instance         Instance         Instance           Instance         Instance         Instance         Instance		Changes in slope and channel confinement	See Drawing 1	1.4.3.2. Catchment 129
Selicest control of the section of t		Is peat present in the catchment	No	
Section         No         Inclusion           Section         Initial solute fails and effection of and addeed and effection of addeed add				
Sediment source and suppriment source and s		Potential valley side or terrace erosion	No	
Sedimet source and supply - Catchment supply -				
Sediment source any spely - Scale         Unsequent datases in attimute infrastructure type (see Drawing 11.4.3.1.4, Catchment 129)         No           Vocable/forest datases in attimute scale         Comment on sediment source potential in catchment 129)         No         No           Comment on sediment source potential in catchment         Limited - well vegetated throughout but there are numerous bouldes located around the catchment, indicating possible ready supply of coarse material below vegetation.           Morphology and Processing         Limited by supply but steepness means that in flood conditions large sediment could be canneed on sediment supply potential to crossing         Description         Description           Morphology and Processing         Defaured morphology Preformant sediment supply potential to crossing         Description         Description           Morphology and Processing         Defaured morphology Preformant set and sediment state         No         Description           Morphology and Processing         Defaured morphology Preformant set and sediment set and Unsequented in the set and Description         None         Description           Morphology and Processing         Defaured morphology Preformant set and sediment set and Description         None         Description           Morphology and Processing         Defaured morphology Preformant set and set and set and set and Description         None         Description           Morphology and Processing         Defaure different set and Descripho				
Sedment source an supply - Catchines Scale         Wooded/forested areas in catchment         Yes         Test multipuy & and dy/s of road and railway crossing. Now in wider acthment.           Scale         Camment on sediment source potential in catchment         Wooded/forested areas in catchment.         Limited - well wegetated throughout but there are numerous boulders located airound the catchment, indicating possible ready supply of came material below wegetation.           Morphology and Process Reach bustrament crossing         Camment on sediment supply potential to crossing         Limited by supply but steepness means that in fload conditions large sediment could be come easily mubilised with little opportunity for deposition.           Morphology and Process Reach bustrament crossing         Default for the second for				
Sediment source and spiph - Carlother Scale         Woods processed areas in a clonment         It is a resolution         Consists, Kone in wider catchment.           Scale         Intrastructure type (see Drawing 11.4.3.1.6, Catchment 129)         No         No           Comment on sediment source potential in catchment         Limited - well vegetated throughout but there are numerous boulders located around the catchment, indicating possible ready supply of cases material below vegetation.           Morphology and Process Reach upstrand         Channel morphology         Exercise Case and in flood conditions large sediment could be come easily mobilized with little opportunity for deposition.           Morphology and Process Reach upstrand         Channel morphology         Exercise Case and into bedrock Prediominant sediment supply potential to crossing         Cascade cut into bedrock Prediominant sediment supply potential to crossing           Morphology and Process Reach upstrand         Cascade cut into bedrock Prediominant sediment supply potential to crossing         Cascade cut into bedrock Prediominant sediment supply potential to crossing           Morphology and Process Reach upstrand         Presence and native of infrastructure (Mp 10)         Bedrock scade Reach upstrand         Reach upstrand Presence and native of infrastructure (Mp 11)         Bedrock scade Reach         Reach upstrand Presence and native of infrastructure (Mp 14)         Reach upstrand None         Presence and native of infrastructure (Mp 14)         Reach upstrand None         Presence and nater and potential well well         None </td <td></td> <td></td> <td></td> <td>Trees in valley u/s and d/s of road and railway</td>				Trees in valley u/s and d/s of road and railway
Scale         Initial systems of the source potential in catchment         Umited -veli vegetated throughout but there are numerous boulders located around the catchment, indicating possible ready supply of coarse material below vegetation.           Comment on sediment supply potential to crossing         Limited -veli vegetated throughout but there are numerous boulders located around the catchment, indicating possible ready supply of coarse material below vegetation.           Morphology and Precession         Comment on sediment supply potential to crossing         Limited by supply but steepness means that in flood conditions large sediment could be come easily mobilised with little opportunity for deposition.           Morphology and Precession         Coarse material below vegetation.         No           Precedominant sediment size:         No         Coarse           Unregetated bars         No         Coarse           Vertical incident         Non         Coarse           Case of morphology         Precence and nucle bedrock         Regulared for channel to descend cutting to road level           Vertical incident         Non         Regulared for channel to descend cutting to road level           Vertical incident         None         None         None           Vertical incident         None         None         None           Vertical incident         None         None         None           Vertical incident         None				
Comment on sediment source potential in catchment         catchment, indicating possible ready supply of carse material below vegetation.           Comment on sediment supply potential to crossing         Limited by supply but steepness means that in flood conditions kings sediment could be come easily mobilised with Ittle opportunity for deposition.           Morphology and Procest Reach potential in crossing         Imited by supply but steepness means that in flood conditions kings sediment could be come easily mobilised with Ittle opportunity for deposition.           Morphology and Procest Reach potential in crossing         Imited by supply but steepness means that in flood conditions kings sediment could be come easily mobilised with Ittle opportunity for deposition.           Morphology and Procest Reach poly (carse and nature of infrastructure (Map 1d)         Bedrock cascade Required for channel to descend cutting to road level           Infrastructure type (see Dawing 11.3.1.6, Catchment 129)         No         Proceinant stolement to get to road level           Morphology and Procest Reach poly (carse and nature of infrastructure (Map 1d)         Bedrock         Ppe culvert           Precomant stolement size         None         Proceinant stolement size         None           Morphology and Procest Reach poly (carse and nature of infrastructure (Map 1d)         None         Proceinant stolement size         None           Infrastructure type (see Dawing 11.4.3.1.6, Catchment 129)         None         Proceinant stolement size         None           Intrastructur		Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)	No	
Comment on sediment supply potential to crossing     United by supply but steepness means that in flood conditions large sediment could be core easily mobilised with little opportunity for deposition.     Comment on sediment supply potential to crossing     Channel morphology     Predominant sudment size     Comment on sediment size     Comment realignment     Comment realignment to get to read level     Infrastructure (bigs 10)     Reduck scade     Reduck     Precence and neure of Infrastructure (bigs 10)     Reduck     Reduck     Precence and neure of Infrastructure (bigs 10)     Reduck     Reduck     Precence and neure (bigs     Reduck     R		Commont on codiment source notential in established	Limited - well vegetated throughout but	there are numerous boulders located around the
Comment on Sedment suppy potential to crossing         come easily mobilised with little opportunity for deposition.           Morphology and Process Reach opstream         Dannet morphology (Presence and nature of infrastructure (Map 1a))         Bedrock No         Cascade cut into bedrock           Presence and nature of infrastructure (Map 1a)         Bedrock cascade level         Required for channel to descend cutting to road level           Presence and nature of infrastructure (Map 1a)         Bedrock cascade level         Required for channel to descend cutting to road level           Channel morphology At crossing         Channel morphology Presence and nature of infrastructure (Map 1a)         Bedrock cascade None         Pipe culvert           Morphology and Process At crossing         Channel morphology Predominant sediment size         None         Pipe culvert           Morphology and Process At crossing         Channel morphology Predominant sediment size         None         Pipe culvert           Deposition At crossing         Channel morphology Predominant sediment size         None         Pipe culvert           Morphology and Process Reach downtame         Channel morphology Predominant sediment size         None         Pipe culvert           Presencess Reach downtame         Pipe culvert         None         Pipe culvert         Pipe culvert           Presencess Reach downtame         Pipe culvert         None         Pipe culvert <td< td=""><td></td><td>comment on sediment source potential in catchment</td><td>catchment, indicating possible read</td><td>y supply of coarse material below vegetation.</td></td<>		comment on sediment source potential in catchment	catchment, indicating possible read	y supply of coarse material below vegetation.
Comment on Sedment suppy potential to crossing         come easily mobilised with little opportunity for deposition.           Morphology and Process Reach opstream         Dannet morphology (Presence and nature of infrastructure (Map 1a))         Bedrock No         Cascade cut into bedrock           Presence and nature of infrastructure (Map 1a)         Bedrock cascade level         Required for channel to descend cutting to road level           Presence and nature of infrastructure (Map 1a)         Bedrock cascade level         Required for channel to descend cutting to road level           Channel morphology At crossing         Channel morphology Presence and nature of infrastructure (Map 1a)         Bedrock cascade None         Pipe culvert           Morphology and Process At crossing         Channel morphology Predominant sediment size         None         Pipe culvert           Morphology and Process At crossing         Channel morphology Predominant sediment size         None         Pipe culvert           Deposition At crossing         Channel morphology Predominant sediment size         None         Pipe culvert           Morphology and Process Reach downtame         Channel morphology Predominant sediment size         None         Pipe culvert           Presencess Reach downtame         Pipe culvert         None         Pipe culvert         Pipe culvert           Presencess Reach downtame         Pipe culvert         None         Pipe culvert <td< td=""><td rowspan="2"></td><td></td><td></td><td></td></td<>				
Comment on Sedment suppy potential to crossing         come easily mobilised with little opportunity for deposition.           Morphology and Process Reach opstream         Dannet morphology (Presence and nature of infrastructure (Map 1a))         Bedrock No         Cascade cut into bedrock           Presence and nature of infrastructure (Map 1a)         Bedrock cascade level         Required for channel to descend cutting to road level           Presence and nature of infrastructure (Map 1a)         Bedrock cascade level         Required for channel to descend cutting to road level           Channel morphology At crossing         Channel morphology Presence and nature of infrastructure (Map 1a)         Bedrock cascade None         Pipe culvert           Morphology and Process At crossing         Channel morphology Predominant sediment size         None         Pipe culvert           Morphology and Process At crossing         Channel morphology Predominant sediment size         None         Pipe culvert           Deposition At crossing         Channel morphology Predominant sediment size         None         Pipe culvert           Morphology and Process Reach downtame         Channel morphology Predominant sediment size         None         Pipe culvert           Presencess Reach downtame         Pipe culvert         None         Pipe culvert         Pipe culvert           Presencess Reach downtame         Pipe culvert         None         Pipe culvert <td< td=""><td></td><td></td><td></td></td<>				
Come easily monitored with inter opportunity for deposition. Come easily monitored with inter opportunity for deposition deposition. Come easily monitored with easily for easily easily for definition. Come easily mon		Commont on andiment supply notontial to succeive	Limited by supply but steepness means	that in flood conditions large sediment could be
Morphology and Process Reach upstream of crossing         Predominant sediment size Unvegetated bars         -         -         -           Morphology and Process Reach upstream of crossing         Vertical incision         None         - <td></td> <td>comment on sediment supply potential to crossing</td> <td>come easily mobilised with</td> <td>th little opportunity for deposition.</td>		comment on sediment supply potential to crossing	come easily mobilised with	th little opportunity for deposition.
Morphology and Process Reach upstream of crossing         Predominant sediment size Unvegetated bars         -         -         -           Morphology and Process Reach upstream of crossing         Vertical incision         None         - <td></td> <td></td> <td></td> <td></td>				
Morphology and Process Reach upstream of crossing         Predominant sediment size Unvegetated bars         -         -         -           Morphology and Process Reach upstream of crossing         Vertical incision         None         - <td></td> <td></td> <td></td> <td></td>				
Morphology and Process Reach upstram of crossing         Unregrated bars bench upstram of crossing         None bench upstram of crossing         Unregrated bars bench upstram of crossing         Unregrated bars bench upstram of crossing         Unregrated bars bench upstram of crossing         Unregrated bars bench upstram of crossing         Required for channel to descend cutting to road level           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         No         Required for channel to descend cutting to road level           Channel realignment         Yes         Vertical realignment to get to road level           Morphology and Process At crossing         Channel morphology Predominant sediment size         None           Unregrated bars         None         None           Unregrated bars         None         None           Unregrated bars         None         None           Vertical incision         None         None           Unregrated bars         None         None           Vertical incision         None         None           Damaged/unstable drains or arroung         None         None           Unregrated bars         None         None           Unregrated bars         No         None           Unregrated bars         No         None           Unregrated bars         No         None			Bedrock	Cascade cut into bedrock
Morphology and Proces Reach upstream of crossing         Vertical incision         None           Deposition         Low         Required for channel to descend cutting to road level           Infrastructure of infrastructure (Map 1d)         Bedrock cascede level         Required for channel to descend cutting to road level           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         No         Vertical realignment to get to road level           Morphology and Process At crossing         Channel morphology         Bedrock         Pipe culvert           Upredominant sediment size         None         None         None           Deposition         None         None         None           Upredominant sediment size         None         None         None           Deposition         None         None         None           Utract all migration/bank erosion         None         None         None           Deposition         Later all migration/bank erosion         None         None         None           Damaged/unstable drains or armouring         Plane bed         None         None         None         None           Infrastructure of infrastructure (Map 1d)         Yerical incision         Low         None         None         None         None         None         None			- Ne	
Breach upstream of crossing         Lateral migration/bank erosion         Low           Interfarming the presence and nature of infrastructure (Map 1d)         Bedrock cascade level         Required for channel to descend cutting to road level           Channel morphology         Redured for channel to get to road level         Vertical realignment to get to road level           Morphology and Process At crossing         Channel indicharare at 1200 event (m <sup>2</sup> /s)         No           Vertical realignment tick         None         None           Deposition         None         None           At crossing         Vertical realignment size         None           Deposition         None         None           Deposition         None         None           Deposition         None         None           Datareal migration/bank erosion         Low         None           Lateral migration/bank erosion         Low         None           Datareal distructure of infrastructure (Map 1d)         Yes         Realing defirit is creating step. In poor condition and a swell as possibly creating on realing defirit is creating step. In poor c	Morphology and Process	Vertical incision		
crossing         Presence and nature of infrastructure (Map 1d)         Bedrock cascade         Required for channel to descend cutting to road level           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         No         Vertical realignment         Vertical realignment to get to road level           Channel morphology         Bedrock         Pipe culvert         Precominant sediment size         None           Extinated discharge at 1200 event (m <sup>1</sup> /s)         0.5         Image: Comparison of the co	Reach upstream of		-	
Morphology and Process Reach downstream of Reach downstream of Reach downstream of Channel realignment Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no definition of or	crossing			
Channel realignment         Yes         Vertical realignment to get to road level           Morphology and Process- At crossing         Channel morphology         Bedrock         Pipe culvert           Morphology and Process- At crossing         Unvegetated bars         None         Image: Comparison of the compar				level
Morphology and Process         Predominant sediment size         None           At crossing         Usertical incision         0.5           At crossing         Vertical incision         None           Deposition         None         None           Lateral migration/bank erosion         None         None           Damaged/unstable drains or armouring         None         None           Channel morphology         Plane bed         Predominant sediment size           Unvegetated bars         None         None           Vertical incision         Low         None           Deposition         Low         None           Predominant sediment size         Cobbie (angular)         Unvegetated bars           Unvegetated bars         No         None           Vertical incision         Low         None           Itariar migration/bank erosion         Low         None           Itariar migration/bank erosion         Low         Railway and associated cascade and bank retention/protection (gabion baskets). Plus engineered bed at railway crossing. Plus fence retaining debris us orasing step. In poor condition and as well as possibly creating step. In poor condition and s well as possibly creating step. In poor condition and s well as possibly creating step. In poor road and railway, but not shown on historic maps.           Summary behavior <t< td=""><td></td><td></td><td></td><td>Vertical realignment to get to road level</td></t<>				Vertical realignment to get to road level
Morphology and Process         Predominant sediment size         None           At crossing         Usertical incision         0.5           At crossing         Vertical incision         None           Deposition         None         None           Lateral migration/bank erosion         None         None           Damaged/unstable drains or armouring         None         None           Channel morphology         Plane bed         Predominant sediment size           Unvegetated bars         None         None           Vertical incision         Low         None           Deposition         Low         None           Predominant sediment size         Cobbie (angular)         Unvegetated bars           Unvegetated bars         No         None           Vertical incision         Low         None           Itariar migration/bank erosion         Low         None           Itariar migration/bank erosion         Low         Railway and associated cascade and bank retention/protection (gabion baskets). Plus engineered bed at railway crossing. Plus fence retaining debris us orasing step. In poor condition and as well as possibly creating step. In poor condition and s well as possibly creating step. In poor condition and s well as possibly creating step. In poor road and railway, but not shown on historic maps.           Summary behavior <t< td=""><td></td><td>Channel morphology</td><td>Bedrock</td><td>Pine culvert</td></t<>		Channel morphology	Bedrock	Pine culvert
Morphology and Process- Vertical incision         None           At crossing         Vertical incision         None           Deposition         None         Integrated bars           Lateral migration/bank erosion         None           Damaged/unsable drains or armouring         None           Channel morphology         Plane bed           Predominant sediment size         Cobble (angular)           Unvegetated bars         No           Vertical incision         Low           Deposition         Low           Integrated bars         No           Vertical incision         Low           Deposition         Low           Lateral migration/bank erosion         None           Reach downstream of crossing         Presence and nature of infrastructure (Map 1d)         Yes           Presence and nature of infrastructure (Map 1d)         Yes         Fence retaining debris us or alway crossing. Plus fence retaining debris us or alway crossing.           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         Yes         Channel ikely to be in original position d/s of road arailway, but not shown on historic maps.           Summary behaviour         Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing. D/s of the		Predominant sediment size	None	
At crossing         Vertical incision         None           Deposition         None         None           Lateral migration/bank erosion         None         None           Damaged/unstable drains or armouring         None         None           Channel morphology         Plane bed         Predominant sediment size         Cobble (angular)           Unvegetated bars         No         No         Plane bed         Plane bed           Vertical incision         Low         Deposition         Low         Plane bed         Plane bed         Plane bed         Plane bed         Plane bed         Plane bed         Predominant sediment size         Dow         Deposition         Deposition         Deposition         Low         Deposition         Deposition         Deposition         Deposition         Deposition         Deposition         Deposition         Plane bed         Presence and nature of infrastructure (Map 1d)         Yes         Plane bed is is creating step. In poor condition and as well as possibly creating nick plane yis debris is creating step. In poor condition and as well as possibly creating nick plane yis debris is creating step. In poor condition and as well as possibly creating nick plane yis debris is creating step. In poor condition and are well at position d/s of rad arilway crossing.           Summary behavior         Channel realignment         No         Plane bed/radine yis creasing debris is creati			News	
Lateral migration/bank erosion         None           Damaged/unstable drains or armouring         None           Channel morphology         Plane bed           Predominant sediment size         Cobble (angular)           Unvegetated bars         No           Vertical inclision         Low           Deposition         Low           Presence and nature of infrastructure (Map 1d)         Yes           Presence and nature of infrastructure (Map 1d)         Yes           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         Yes           Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway indege althouge this may be emplaced specifically. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway bridge althouge this may be emplaced specifically. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway tridge althouge this may be emplaced specifically. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway tridge althouge this may be emplaced specifically. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway tridge althouge this may be emplaced specifically. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment	At crossing			
Damaged/unstable drains or armouring         None           Damaged/unstable drains or armouring         None           Precominant sediment size         Cobble (angular)           Unvegetated bars         No           Vertical incision         Low           Deposition         Low           Lateral migration/bank erosion         None           Presence and nature of infrastructure (Map 1d)         Yes           Presence and nature of infrastructure (Map 1d)         Yes           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         Yes           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         Yes           Channel realignment         No           Channel realignment         No           Channel i s natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing. D/s of the crossing, there appears to be a now wooden dam and fence which is retaining debris. This is in yon condition and sourd could release sediment, increasingly coarse towards railway pride although this may be emplaced specifically. D/s of the crossing. There appears to be a now wooden dam and fence which is retaining debris. This is in yon condition and be wild position d/s of cross angular sediment, increasingly coarse towards railway bridge although this may be emplaced specifically. D/s of the crossing. There is a low wooden dam and fence which is retaining debris. This is in yon condition and could release a low wooden dam				
Channel morphology         Plane bed           Predominant sediment size         Cobble (angular)           Unvegetated bars         No           Vertical incision         Low           Deposition         Low           Lateral migration/bank erosion         None           Reach downstream of crossing         Presence and nature of infrastructure (Map 1d)         Yes           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         Yes         Fence retaining debris is creating steps of condition and as well as possibly creating nick           Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway they after which is retaining debris. This is in poor condition and could release sediment, wircreasing steps. They are of condition retain well bed is possible bed is crassing wears of road and railway. but not shown on historic maps.           Summary behaviour         Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris built-up u/s of the crossing. D/s of the crossing. There appears to be a nobile bed of coarse angular sediment, increasingly coarse towards railway prideg although this may be emplaced specifically. D/s of the ross to be appeared which is retaining debris. This is in por condition and could release of the ross of ther oread there is a low wooden dam and fence which is retaining				
Predominant sediment size         Cobble (angular)           Unvegetated bars         No           Vertical incision         Low           Deposition         Low           Lateral migration/bank erosion         None           Reach downstream of crossing         Presence and nature of infrastructure (Map 1d)         Yes           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         Yes         Fence retaining debris u/s or dating a see and a sel as possibly creating nick point, this structure may fail, delivering debris to condition and as well as possibly creating nick point, this structure may fail, delivering debris to creating step. In poor condition and as well as possibly creating debris to realiway crossing.           Channel realignment         No         Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway thigh although this may be emplaced specifically. D/s of the crossing. There al there is a low wooden dam and fence which is retaining debris. This is in jon condition and so cold create as well as possible and could release sediment such which is retaining debris. This is in poor condition and be there is a low wooden dam and fence which is retaining debris. This is in poor condition and so the reasing the emplaced specifically. D/s of the crossing. The allow wooden dam and fence which is retaining debris. This is in poor condition and so the rease of energy				
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Morphology and Process- Reach downstream of crossing         Low         Image: Complexity of the construction of the constru		Unvegetated bars	No	
Morphology and Process- Reach downstream of crossing         Interaction (application) bank erosion         None         Railway and associated cascade and bank retention/protection (gabion baskets). Plus engineered bed at railway crossing. Plus fence retaining debris u/s of railway           Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)         Yes         Fence retaining debris u/s of railway condition and as well as possibly creating step. In poor condition and as well as possibly creating step. In poor condition and as well as possibly creating debris to railway crossing.           Channel realignment         No         Channel likely to be in original position d/s of road and railway, but not shown on historic maps.           Summary behaviour         Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway be maplaced specifically. D/s of the crossing, there is a low wooden dam and fence which is retaining debris. This is in jon condition and could release this may be emplaced specifically. D/s of the road there is a low wooden dam and fence which is retaining debris. This is in yoor condition and could release this may be emplaced specifically. D/s of the crossing. The fall from the road to the railway is very steep and straight and will have high levels of energy				
Morphology and Process- Reach downstream of crossing     resence and nature of infrastructure (Map 1d)     Yes     retention/protection (gabion baskets). Plus engineered bed at railway crossing. Plus fence retaining debris u/s of railway       Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)     Yes     Fence retaining debris u/s of railway crossing.       Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)     Yes     Fence retaining debris u/s of railway crossing.       Channel realignment     No     Channel is not urb of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing. D/s of the crossing, there appears to be a nowble bed crosse angular sediment, increasingly coarse towards railway bridge although this may be emplaced specifically. D/s of the crossing. There as a low wooden dam and fence which is retaining debris. This is in por condition and could release diment subter which is retaining debris. This is in on condition and could release this may be emplaced specifically. D/s of the road there is a low wooden dam and fence which is retaining debris. This is in por condition and could release diment suddent if it flats and cause an u/s wave of erosion. The fall from the road to the railway is very steep and straight and will have high levels of energy				
Reach downstream of crossing     Presence and nature or infrastructure (Map 10)     res     engineered bed at railway crossing. Plus fence retaining debris u/s of railway       Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)     Yes     Fence retaining debris is creating step. In poor condition and as well as possibly creating nick point, this structure may fail, delivering debris to railway crossing.       Channel realignment     No     Channel likely to be in original position d/s of road and railway, but not shown on historic maps.       Summary behaviour     Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing, D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway be maplaced specifically. D/s of the crossing, there is alow wooden dam and fence which is retaining debris. This is in jono condition and could release this may be emplaced specifically. D/s of the crossing, there is a low wooden dam and fence which is retaining debris. This is in you condition and could release diment sudden u/s were of energy	Morphology and Process			
crossing       retaining debris u/s of railway         Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)       Yes       Fence retaining debris to creating step. In poor condition and as well as possibly creating nick point, this structure may fail, delivering debris to railway crossing.         Channel realignment       No       Channel likely to be in original position d/s of road and railway, but not shown on historic maps.         Summary behaviour       Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing, D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway bridge although this may be emplaced specifically. D/s of the crossing. There is a low wooden dam and fence which is retaining debris. This is in poor condition and could release diment such wave of erosion. The fall from the road to the railway is very steep and straight and will have high levels of energy		Presence and nature of infrastructure (Map 1d)	Yes	
Summary behaviour     Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris     condition and as well as possibly creating nick point, this structure may fail, delivering debris to railway crossing.       Summary behaviour     Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris to the railway crossing behaviour     Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris to the railway the match and could release und and and mange the railway to the road there is and there which is retaining debris. This is in por condition and could release the railway were of ensoin. The fall from the road to the railway is very steep and straight and will have high levels of energy				retaining debris u/s of railway
Summary behaviour       Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris         Summary behaviour       Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris				
Summary behaviour       Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris         build-up u/s of the crossing, D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway bridge although         Summary behaviour       channel is natural u/s of or od cutting, but descends road turting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris		Infrastructure type (see Drawing 11.4.3.1 d, Catchment 129)	Yes	point, this structure may fail, delivering debris to
Channel realignment       No       road and railway, but not shown on historic maps.         Summary behaviour       Channel is natural u/s of road cutting, but descends road cutting via a cascade cut into the bedrock. This seems to be operating effectively and there is no debris build-up u/s of the crossing. D/s of the crossing, there appears to be a mobile bed of coarse angular sediment, increasingly coarse towards railway bridge although this may be emplaced specifically. D/s of the crossing. There is a low wooden dam and fence which is retaining debris. This is in poor condition and could release diment suddement, increasingly tand will have high levels of energy				
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	Summary behaviour	this may be emplaced specifically. D/s of the road there is a low w	ooden dam and fence which is retaining de	ebris. This is in poor condition and could release
which need to be designed for in dry new clossings.				ep and straight and will have high levels of energy
		which hed to	Brice for in any new crossings.	



Photograph 11.4.3.126-Downstream

Crossing exit

Railway

crossing

Debris build up behind fence creating a step in the channel

Photograph 11.4.3.127-Upstream



Photograph 11.4.3.129



Photograph 11.4.3.128-Upstream

Cascade upstream of railway

crossing



Photograph 11.4.3.130-Upstream embankment



Photograph 11.4.3.132-Downstream to catchpit

Moorland catchment

Steep channel gradient Cascade



Photograph 11.4.3.131-Looking down embankment

Bedrock cascade down embankment



Photograph 11.4.3.133



Photograph 11.4.3.134

Photograph 11.4.3.135



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	Legend
	-
	General
	<ul> <li>Crossing location</li> </ul>
	-
	Solid Geology
	Gaick Psammite Formation - Psammite
	Drift Geology
	Peat
	Glaciofluvial Ice Contact Deposits
	-
_	Gaick Plateau Moraine Formation
	Hummocky Glacial Deposits
	Ardverikie Till Formation - Diamicton
	Glaciofluvial Sheet Deposits
	Alluvium
	River Terrace Deposits
	Alluvial Fan Deposits
	Head
	Talus - Rock Fragments
	Talus Cone
	Environmental Designations
	Special Area of Conservation
	Morphological Pressures
	🔺 Railway Bridge
	Track/Footbridge
	-
	Culvert
	Cascade
	<ul> <li>Catchpit</li> </ul>
	Drainage Ditch
	- Power Lines
	- Fower Lines
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Catchment No.	130	I	
Catchment Name	Allt na Ceàrdaich (Allt a' Mhill Odharaich in upper catchment)	1	
Channel Nature	Nature of water course		Natural
channel Nature	Size of water course		Major
	Catchment Area (km <sup>2</sup> )		3.3
Quantitative Spatial Elements	Average slope in catchment (°)		7.5
	% Catchment over 750m (for snow melt risk)		0
WFD classification	Water, flows and levels Physical condition		Good Good
WPD classification	Overall ecological status		Moderate
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment 130)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable
Geology	Is an alluvial fan present at or near the crossing?	No	resistant to weathering, impermeasie
Environmental	Ramsar	No	
designations (see	SAC	No	
Drawing 11.4.3.1 c, Catchment 130)	SSSI	No No	
	Changes in slope and channel confinement	See Drawing	11.4.3.2, Catchment 130
	Is peat present in the catchment	Yes	
	Is there a bog burst risk	Yes	But low as possible peaty areas are valley mires
	Current valley side or terrace erosion	Yes	Mostly revegetated but not wholly unrecent.
	Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides)	Yes	Throughout terraced section. C. 400m Not coupled
	Hill slope failures coupled to channel Vertical incision present in catchment	No Yes	
Sediment source and	Bank erosion/lateral migration	Yes	In incised gorge In incised gorge
supply - Catchment Scale	Unvegetated bars	Yes	There are some, but they are limited in number and extent to lower catchment
Scale	Wooded/forested areas in catchment	Yes	Some trees near channel u/s of road. More
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 130)	Yes	wooded d/s of railway Wooden bridge
	Comment on sediment source potential in catchment	High - In terraced section, outsides of b	ends are eroding the valley side, likely to produce
	Comment on sediment supply potential to crossing	High - some sediment may be deposited	arious grades from till slopes. if eroded from valley sides, but this is likely to be ngly steep channel (as far as road and railway
			mobilised is transported to Truim main valley. Steep natural cascade channel. Waterfall noted
	Channel morphology	Cascade	on historic maps, but likely to have been modified to be even steeper bedrock cascade when road cutting constructed
	Predominant sediment size Unvegetated bars	Gravel-Cobble and bedrock No	
Morphology and Process	Vertical incision Deposition	Medium Low	
Morphology and Process- Reach upstream of	Lateral migration/bank erosion	Low	
crossing	Presence and nature of infrastructure (Map 1d) Infrastructure type (see Drawing 11.4.3.1 d, Catchment 130)	Yes	Wooden bridge Bridge in poor condition, but seems to be well above channel so not influencing. If collapses,
	Channel realignment	Yes	could lead to debris dam. Possibly some vertical realignment with construction of crossing, but channel probably
			follows same plan/horizontal alignment.
	Channel morphology	Engineered	Concrete bed. Very steep, spillway-like
	Predominant sediment size	None visible 10.4	
Morphology and Process-	Estimated discharge at 1:200 event (m <sup>3</sup> /s) Unvegetated bars	No	
At crossing	Vertical incision Deposition	None None	
	Lateral migration/bank erosion	None	
	Damaged/unstable drains or armouring	No	Seems to be in good condition
	Channel morphology	Engineered	Engineered to d/s of railway, then becomes plane bed
	Predominant sediment size	-	
	Unvegetated bars Vertical incision	Yes	D/s of railway Difficult to see d/s of railway
	Deposition	Low	Difficult to see d/s of railway
Morphology and Process-	Lateral migration/bank erosion Presence and nature of infrastructure (Map 1d)	Low Yes	Difficult to see d/s of railway Railway
Reach downstream of crossing	Infrastructure type (see Drawing 11.4.3.1 d, Catchment 130)	Yes	Very limited options for realignment as short distance and steep between road and railway
	Channel realignment	No	D/s of road the channel seems to be on original alignment. Although the georeferenced historic maps indicates there is an offset, this is unlikely to be real as it also occurs in the unaltered natural channel well u/s of the road.
Summary behaviour	Channel rises c. 3.5km u/s of crossing in Coire Mill Odharaich and fall D/s of this, the channel enters a wandering section where incision ha Truim main valley. In this section the outsides of the meander bends to the channel. This sediment is likely to be easily transported in deposition before the crossing as the channel nears the main Truim under the road is very steep still, as is the engineered bed under th crossing, but this is not possible to tell from either set of field photog looks to see the nature of the channel and deposition to undersi Suggest careful design is needed to ensure sediment is efficiently trans-	as occurred (probably over Holocene time are eroding the valley sides which have t flood conditions as the channel steepens i valley. Little deposition is evident at the e railway immediately d/s. It is possible t raphs or aerials due to tree cover. Sugges tand the actual sediment delivery to the I	scale) possibly in response to down cutting in the he potential to deliver large amounts of sediment and straightens with limited opportunities for crossing and the engineered bed of the crossing hat the channel is quite active d/s of the railway t further inspection checks this side of the railway owest reaches of this channel and the Truim.



Photograph 11.4.3.136



Upstream to crossing exit

Bedrock fall

Paved channel bed

Railway

crossing



Photograph 11.4.3.137 - Downstream

Railway crossing



Photograph 11.4.3.139 -Downstream under railway crossing





Photograph 11.4.3.147- Catchment



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Catchment No.		1	
Catchment Name	Truim		
caterinent Hame	1	4	
	Nature of water course		Natural
Channel Nature	Size of water course		Major
	Size of water course		Wajoi
	-		
Quantitative Spatial	Catchment Area (km <sup>2</sup> )		131
Elements	Average slope in catchment (°)		
	% Catchment over 750m (for snow melt risk)		
-			
WFD classification	Water, flows and levels		Good
WPD classification	Physical condition		Good
	Overall ecological status	Good ( River Truim from source to Alit	Cuaich ) Moderate (River Truim-lower catchment)
	Majority Bedrock (see Drawing 11.4.3.1 a and b Catchment Truim)	Gaick Psammite formation-Psammite	resistant to weathering, impermeable
Geology			resistant to weathering, impermeable
Geology	Is an alluvial fan present at or near the crossing?	N/A	
	Domeor	No	
	Ramsar	No	
			Drumochter Hills - Acidic scree, alpine and
			subalpine heaths, blanket bog, dry heaths,
			montane acid grasslands , mountain willow scrub,
			plants in crevices on acid rocks, species-rich
	SAC	Yes	grassland with mat-grass in upland areas, tall herb
Environmental			communities, wet heathland with cross-leaved heath.
designations (see			neath.
Drawing 11.4.3.1 c, Catchment Truim)			River Spey - Atlantic salmon, freshwater pearl
Catchinent fruini)			mussel, otter, sea lamprey
	CD4	¥	Drumochter Hills - Dotterel breeding, merlin
	SPA	Yes	breeding
			Development of the second
	SSSI	Yes	Drumochter Hills - Breeding bird assemblage, fluvial geomorphology of Scotland, montane
	SSSI	Yes	fluvial geomorphology of Scotland, montane
	SSSI	Yes	
			fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage
	SSSI Changes in slope and channel confinement		fluvial geomorphology of Scotland, montane
			fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage
	Changes in slope and channel confinement	See Drawing 1:	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage
	Changes in slope and channel confinement Is peat present in the catchment	See Drawing 1: Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk	See Drawing 1: Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion	See Drawing 1 Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk	See Drawing 1: Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion	See Drawing 1 Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Within catchment, but not with a direct impact on
Sediment source and	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion	See Drawing 1: Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim
Sediment source and	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion	See Drawing 1: Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Within catchment, but not with a direct impact on
Sediment source and supply - Catchment Scale	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel	See Drawing 1: Yes Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Within catchment, but not with a direct impact on
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides)	See Drawing 1: Yes Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Within catchment, but not with a direct impact on
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel	See Drawing 1: Yes Yes Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Within catchment, but not with a direct impact on the Truim
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel Vertical incision present in catchment	See Drawing 1: Yes Yes Yes Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Within catchment, but not with a direct impact on
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel Vertical incision present in catchment Bank erosion/lateral migration	See Drawing 1: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Uthin catchment, but not with a direct impact on the Truim Currently impacting on the road
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel Vertical incision present in catchment Bank erosion/lateral migration Urvegetated bars	See Drawing 1: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Within catchment, but not with a direct impact on the Truim Currently impacting on the road Through main channel
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel Vertical incision present in catchment Bank erosion/lateral migration Uvregetated bars Wooded/forested areas in catchment	See Drawing 1: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Uthin catchment, but not with a direct impact on the Truim Currently impacting on the road
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel Vertical incision present in catchment Bank erosion/lateral migration Urvegetated bars	See Drawing 1: Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Within catchment, but not with a direct impact on the Truim Currently impacting on the road Through main channel thin the Truim catchment, fro the steep slopes and
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	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel Vertical incision present in catchment Bank erosion/lateral migration Urvegetated bars Wooded/forested areas in catchment Infrastructure type (see Drawing 11.4.3.1 d, Catchment Truim) Channel morphology	See Drawing 1: Yes Yes Yes Yes Yes Yes Yes Yes Yes There are extensive sediment sources wi these are delivered to the Truim from th reduced getting to the Truim by the under and by the SSE in Wandering	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Utility of the second structure of the second scotle
	Changes in slope and channel confinement Is peat present in the catchment Is there a bog burst risk Current valley side or terrace erosion Potential valley side or terrace erosion Hill slope failures (including peat slides and debris flows and slides) Hill slope failures coupled to channel Vertical incision present in catchment Bank erosion/lateral migration Unvegetated bars Wooded/forested areas in catchment Infrastructure type (see Drawing 11.4.3.1 d, Catchment Truim)	See Drawing 1: Yes Yes Yes Yes Yes Yes Yes Yes Yes There are extensive sediment sources wi these are delivered to the Truim from th reduced getting to the Truim by the under and by the SSE a	fluvial geomorphology of Scotland, montane assemblage, vascular plant assemblage 1.4.3.2, Catchment Truim Uthin catchment, but not with a direct impact on the Truim Currently impacting on the road Through main channel thin the Truim catchment, fro the steep slopes and e steep tributaries. Some of this supply is currently rsized culverts, catchment pits etc. that form the A9, and Hydro power scheme.

	Channel morphology	Wandering	river type
	Predominant sediment size	Gravels	
	Unvegetated bars	Yes	
	Vertical incision	Medium	
	Deposition	High	
	Lateral migration/bank erosion	High	At time at or close to the toe of the road embankment and railway embankment
Morphology and Process	Presence and nature of infrastructure (Map 1d)	Railway and Road, several bridges and culverts over tributaries. Aqueduct taking flow from catchment	
	Impact of infrastructure	Altering discharge and sediment inputs to the Truim, casing a change in the natural process, including channel narrowing	
	Channel realignment	Yes	Between the road and the railway in several locations
	Infrastructure type (see Drawing 11.4.3.1 d, Catchment Truim)		

 Summary behaviour
 The Truim is an active channel, migrating laterally across its flood plain, however it has a number of pressures that are limiting the rate of this natural change.

 22% of the River Truim catchment is regulated by a hydropower scheme initiated in the 1930's, and extended in the 1940's and 50's with most of the water abstracted going into Loch Ericht in the Tay catchment. Loch an t-Seilich has a compensation flow of 1.263m3/s released continuously down through the fish pass on the dam, with flows above this diverted to Loch Cuaich or spilled, and a flow of 0.684m3/s is released continuously down the Truim at Dalwhinnie through the fish pass on the intake (Enviro Centre, 2008). All of the bed load is trapped behind the diversion dams has historically been removed for the river system and stockpiled (Gilvear, 2004).

As well as the Hydropower scheme the flow and sediment supply of the Truim are also impacted by the tributary crossings of the A9 and the Railway, where these are undersized and reducing flow and sediment supply to the main channel. There are also areas of bank protection along the channel to protect the railway and road embankments from erosion, as well as locations where bank protection may be required in the near future. Despite these pressures the morphology of the channel is varied and as expected for a channel of this type. There is little bank protection fixing the channel, and there is good channel floodplain connectivity.







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