

# **Appendix A10.3**

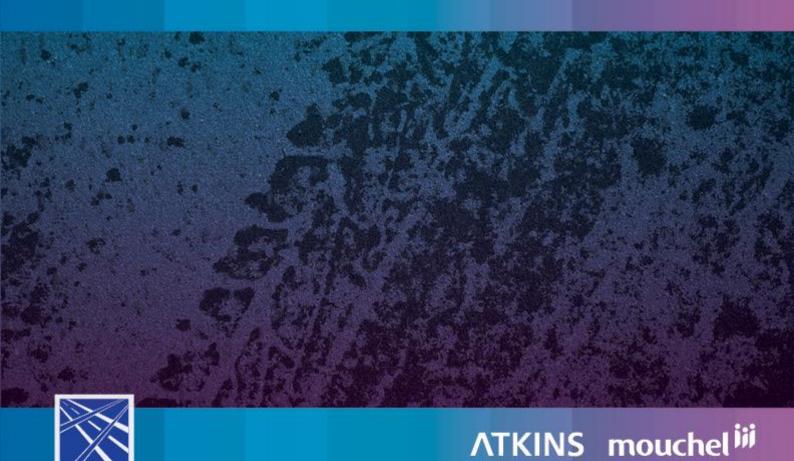
**Road Drainage** 

Water Quality Calculations

Transport Scotland

August 2016







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# **Glossary and Abbreviations**

Terminology	Abbreviation	Description
Accidental spillage	-	An incident on the road network, such as a road traffic accident, which results in non-routine potential pollutants being spilled on the road, entering the road drainage network and being discharged to the receiving surface or groundwater body, potentially leading to an acute pollution event
Annual average daily traffic	AADT	Daily volume of vehicle traffic, based on annual traffic volumes to incorporate variations across the year
Design Manual for Roads and Bridges	DMRB	A series of 15 volumes that provide standards, advice notes and other documents relating to the design, assessment and operation of trunk roads, including motorways in the United Kingdom.
Drainage network	-	Specific road drainage catchments, including permeable (e.g. grassed verges and central reservations), and impermeable (e.g. surfaced carriageway) surfaces, collecting precipitation to be transferred from The Proposed Scheme to a local receiving water body via either surface water or groundwater discharge
Environmental Quality Standards	EQS	Environmental Quality Standards (EQS) are the maximum permissible annual average concentrations of potentially hazardous chemicals, as defined by the Water Framework Directive. The assessment of EQS considers long-term risks over the period of one year by comparing discharge concentrations of pollutants against EQS level
Groundwater Discharge		Drainage network that discharges via outfall to a groundwater body
Highways Agency Water Risk Assessment Tool	HAWRAT	Standard approach specified in Design Manual for Roads and Bridges document HD 45/09, a Microsoft Excel application designed to assess the short-term risks related to the intermittent nature of road runoff. Assesses acute and chronic pollution impacts on aquatic ecology associated with soluble and sediment bound pollutants (with dissolved copper and dissolved zinc used as indicators)
Mainline	-	Main carriageway of The Proposed Scheme; A9 dual carriageway between Dalraddy and Slochd
Outfall	-	Discharge location for drainage network
Routine runoff	-	Rainfall which collects on the road surface and is transferred via the drainage network to an outfall. This may be contaminated with pollutants such as sediment and soluble metals, which collect on the road surface as part of normal use and operation of the road, resulting in chronic pollution of the receiving surface or groundwater body
Surface water discharge	-	Drainage network that discharges via outfall to surface water body
Sustainable Drainage Systems	SuDS	Techniques used to manage flow attenuation and water quality treatment of runoff, to minimise adverse effects on receiving water body, examples include filter drains, swales, retention/detention ponds, surface flow wetlands and infiltration basins



### 1. Introduction

1.1.1. This report provides a technical appendix to the A9 Dualling Dalraddy to Slochd – DMRB Stage 2 Scheme Assessment Report, Chapter 9: Geology, Soils and Groundwater and Chapter 10: Road Drainage and the Water Environment.

### 1.2. Aims and Objectives

- 1.2.1. This document provides the calculations and results of water quality assessments for the operational phase of the Proposed Scheme, discussed in both Chapter 9 and Chapter 10.
- 1.2.2. This document provides an assessment of:
  - Pollution during road operation due to contaminants within routine road runoff. A
    broad range of potential pollutants, such as hydrocarbons i.e. fuel and lubricants, fuel
    additives, metal from corrosion of vehicles, de-icer and gritting material, can
    accumulate on road surfaces. These can subsequently be washed off the road
    surface during rainfall events, polluting the receiving surface water bodies and
    groundwater aquifers.
  - Pollution during road operation due to accidental spillage. On all roads there is a risk
    that accidents or vehicle fires may lead to an acute pollution incident. Where
    commercial vehicles are involved, potential pollutants that may be spilled could range
    from hazardous chemicals to milk, alcoholic beverages, organic sludge and
    detergents. Spilled materials may drain from the road surface, polluting the receiving
    surface water bodies and groundwater aquifers.

### 2. Assessment Approach and Methodology

- 2.1.1. Preliminary drainage network data is detailed in Chapter 5: Engineering Assessment.
- 2.1.2. For the mainline a single drainage design was provided, common to all Proposed Mainline Alignment Options. The outfall locations for the networks are common to all the Mainline Alignment Options. The road drainage network area draining to several of these outfalls varies between the options, however the differences are small and have no material effect on the assessment results, which are identical across all three Mainline Alignment Options.
- 2.1.3. For the junctions, as with the mainline, a single drainage design has been provided for each junction location. At each junction the location of outfalls are common to all the Proposed Junction Options, there are however significant differences in the complexity of junction layouts and the drainage network areas draining to each outfall. To overcome this the junction option deemed to have the greatest complexity and drainage area has been selected for drainage design and water quality assessment. In the case of the Aviemore South junction this is Junction Option A18, for the Granish junction Junction Option D51 has been assessed, and for the Black Mount junction Junction Option D51 has been assessed. This follows a precautionary principal and allows for a conservative assessment in that the other junction options, which are of a lower drainage area or less complex layout, can be assumed to perform better in relation to potential water quality impacts.
- 2.1.4. The drainage design for each mainline and junction network includes at least two levels of treatment, in the form of sustainable drainage systems (SuDS), as standard. A third



- stage of treatment has been provided where preliminary water quality assessments indicated a requirement. The treatment stages typically consist of filter drains and wet/retention or dry/detention ponds, with swales proposed as a third level of treatment where required.
- 2.1.5. The water quality assessments within this report have taken this treatment into account as the proposed SuDS are an intrinsic part of the proposed road design, and are not considered to be additional mitigation.
- 2.1.6. No design work has been carried out to date on side roads or accommodation tracks, and therefore these are not assessed at DMRB Stage 2.

#### 2.2. **Groundwater Assessments**

- 2.2.1. Chapter 9 summarises the procedures for the assessment of pollution impacts from routine runoff on groundwater, known as Method C, as provided in The Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 10, HD 45/09 i- Road Drainage and the Water Environment.
- 2.2.2. The Method C assessments considers the drainage discharge scale, potential inherent pathways and the vulnerability of the receiving aquifer. The method applies various factors of scale, (low medium or high) to site specific conditions, resulting in an overall score and category of risk. Details of the parameters for which each groundwater discharge is assessed against are outlined in Chapter 9: Geology, Soils and Groundwater.
- 2.2.3. Six mainline drainage networks and a single junction network at Black Mount are intended to discharge to groundwater and have been assessed against Method C.

#### 2.3. **Surface Water Assessments**

- 2.3.1. Chapter 10 summarises the procedures for the assessment of pollution impacts from routine runoff on surface water, known as Method A, as provided in The Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 10, HD 45/09 - Road Drainage and the Water Environment.
- 2.3.2. The Method A assessments can be split into two categories; Tier 1 and Tier 2. Tier 1 can be defined as a simple assessment in which an estimated or known river width is used to estimate sediment impacts upon the receiving watercourse. Tier 2 is a more detailed assessment which requires detailed survey data for the receiving watercourse. Assessments at DMRB Stage 2 have been conducted as Tier 1 simple assessments, with Tier 2 assessment to be conducted, where applicable, at Stage 3 as more design and watercourse data becomes available.
- 2.3.3. A total of 32 individual drainage discharges, associated with both the mainline and junctions, are intended to discharge to surface water and have been assessed against Method A.

#### 2.4. **Accidental Spillage Assessment**

2.4.1. DMRB document HD 45/09 also specifies procedures for the assessment of pollution impacts on both surface and ground waters from accidental spillage, known as Method D. A summary of this methodology is provided in Chapter 10: Road Drainage and the Water Environment.



2.4.2. A total of 39 drainage discharges have been assessed against Method D and include both surface water and groundwater discharges.

#### 2.5. **Cumulative Assessment**

2.5.1. Cumulative assessment of proposed road discharges in close proximity to each other has not been undertaken at DMRB Stage 2. All drainage networks and treatment measures shall be refined and re-assessed following the selection of the Preferred Route and additional data collation, with the final design reported at DMRB Stage 3. This will include cumulative assessments of outfalls as outlined in DMRB document HD 45/09.

#### Results 3.

- 3.1.1. The Proposed Scheme options involve a total of 39 preliminary drainage networks of which 32 are intended to discharge to surface water and seven to discharge to groundwater.
- 3.1.2. Sensitive receptors have been identified as part of the Stage 2 assessment. Of the proposed surface water discharges 11 either discharge directly into or are within 1km upstream of a sensitive receptor. In context for this assessment, sensitive receptors are considered as internationally or nationally designated sites specifically protected and recognised for hydrological or ecological purposes (e.g. Special Areas of Conservation (SACs) or Sites of Special Scientific Interest (SSSIs)).
- 3.1.3. The results for each individual drainage network are summarised in Table 3.1.
- 3.1.4. Highways Agency Water Risk Assessment Tool (HAWRAT) datasheets are provided in Annex A of this report, which includes details on the baseline conditions of the receiving watercourse, proposed mitigation and summary results. Annex A also contains accidental spillage parameters and results for all drainage networks within the Proposed Scheme.

Table 3.1 Summary of Individual HAWRAT, EQS and Accidental Spillage Results for Drainage Networks

					HAWRAT	EQS As	sessmen	t					
ķΒ			HAWRAT Impact As	Acute ssessment	Chronic Impact Assessment	Annual Dissolve	Average ed Coppe	r	Annual Dissolve	Average ed Zinc		Accide Spillag	
Drainage Network ID	Mitigation	Receiving Waterbody	Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (μg/l)	Pass / Fail	Value (μg/l)	Pass / Fail	Pass /Fail	Return Period 1 in "x" (years)
1 B	Filter Drains & Wet/Retenti on Pond	Allt na Fhearna	Pass	Pass	Pass	0.04	2	0.01	Pass	0.01	Pass	Pass	11405
1 C	Filter Drains & Wet/Retenti on Pond	Allt Chriochaidh	Pass	Pass	Pass	0.01	19	0.08	Pass	0.15	Pass	Pass	8930
1 E	Filter Drains & Wet/Retenti on Pond	Caochan Ruadh	Pass	Pass	Pass	0.08	6	0.08	Pass	0.25	Pass	Pass	16308
1 F	Filter Drains & Wet/Retenti on Pond	Unnamed Tributary of Loch Alvie	Pass	Pass	Pass	0.01	11	0.08	Pass	0.16	Pass	Pass	27943

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					HAWRAT	EQS As	sessment	t					
k ID			HAWRAT Impact As	Acute ssessment	Chronic Impact Assessment		Average ed Coppe	r	Annual Dissolve	Average ed Zinc		Accide Spillag	
Drainage Network ID	Mitigation	Receiving Waterbody	Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (μg/l)	Pass / Fail	Value (μg/l)	Pass / Fail	Pass /Fail	Return Period 1 in "x" (years)
2 A (Mainlin e & Junction Opt A18)	Filter Drains & Wet/Retenti on Pond & Grass Surface Channels / Swales	Allt na Criche (Lynwilg)	Pass	Pass	Pass	0.02	5	0.04	Pass	0.08	Pass	Pass	608
3A B1	Filter Drains & Wet/Retenti on Pond	Allt na Criche (Lynwilg)	Pass	Pass	Pass	0.02	14	0.04	Pass	0.09	Pass	Pass	6512
3A C	Filter Drains & Infiltration Basin	Groundwater	Method C	Calculation of	Medium Risk (	Groundw	ater Discl	harge)				Pass	11775
3B B	Filter Drains & Wet/Retenti on Pond & Grass Surface Channels / Swales	Loch Puladdern	Pass	Pass	Pass	0.03	40	0.55	Pass	1.09	Pass	Pass	3442



					HAWRAT	EQS As	sessment						
κD			HAWRAT Impact As	Acute ssessment	Chronic Impact Assessment		Average ed Coppe	r	Annual Dissolve			Accide Spillag	
Drainage Network ID	Mitigation	Receiving Waterbody	Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (μg/l)	Pass / Fail	Value (μg/l)	Pass / Fail	Pass /Fail	Return Period 1 in "x" (years)
4 A	Filter Drains & Wet/Retenti on Pond	Aviemore Burn	Pass	Pass	Pass	0.04	10	0.05	Pass	0.11	Pass	Pass	7047
5 A	Filter Drains & Wet/Retenti on Pond	Unnamed Drain/Waterc ourse	Pass	Pass	Pass	0.03	38	0.35	Pass	0.69	Pass	Pass	19218
5 B	Filter Drains & Dry/Detenti on Pond	Allt na Criche (Granish) North Bifurcation	Pass	Pass	Pass	0.06	19	0.6	Pass	1.01	Pass	Pass	19460
5 C	Filter Drains & Infitration Basin	Groundwater	Method C	Calculation of	Medium Risk (	Groundw	ater Discl	narge)				Pass	10789
5 D	Filter Drains & Wet/Retenti on Pond	Allt na Criche	Pass	Pass	Pass	0.02	12	0.07	Pass	0.13	Pass	Pass	14977



					HAWRAT	EQS As	sessment	t					
ķιD			HAWRAT Impact As	Acute ssessment	Chronic Impact Assessment		Average ed Coppe	r	Annual Dissolve	Average ed Zinc		Accide Spillag	
Drainage Network ID	Mitigation	Receiving Waterbody	Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (μg/l)	Pass / Fail	Value (μg/l)	Pass / Fail	Pass /Fail	Return Period 1 in "x" (years)
5 E	Filter Drains & Wet/Retenti on Pond	Unnamed Drain/ Watercourse	Pass	Pass	Pass	0.03	18	0.21	Pass	0.4	Pass	Pass	33564
5 F	Filter Drains & Wet/Retenti on Pond	Unnamed Drain/Waterc ourse	Pass	Pass	Pass	0.03	48	0.44	Pass	0.85	Pass	Pass	14668
5 G	Filter Drains & Wet/Retenti on Pond	Unnamed tributary of Avie Lochan	Pass	Pass	Pass	0.03	26	0.27	Pass	0.52	Pass	Pass	102444
Granish Junction Opt C34	Filter Drains & Wet/Retenti on Pond	Allt na Criche (Granish)	Pass	Pass	Pass	0.02	23	0.12	Pass	0.23	Pass	Pass	616
6A A	Filter Drains & Infiltration Basin	Groundwater	Method C	Calculation of	Medium Risk (	Groundw	ater Discl	harge)				Pass	17722



					HAWRAT	EQS As	sessmen	t					
κID			HAWRAT Impact As	Acute ssessment	Chronic Impact Assessment		Average ed Coppe	r	Annual Dissolv	Average ed Zinc		Accide Spillag	
Drainage Network ID	Mitigation	Receiving Waterbody	Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (μg/l)	Pass / Fail	Value (μg/l)	Pass / Fail	Pass /Fail	Return Period 1 in "x" (years)
6A C	Filter Drains & Infiltration Basin	Groundwater	Method C	Calculation of	Medium Risk (	Groundw	ater Disc	harge)				Pass	17023
6A E	Filter Drains & Infiltration Basin	Groundwater	Method C	Calculation of	Medium Risk (	Groundw	ater Discl	harge)				Pass	74135
6B A	Filter Drains & Infiltration Basin	Groundwater	Method C	Calculation of	Medium Risk (	Groundw	ater Disc	harge)				Pass	14104
6B B	Filter Drains & Wet/Retenti on Pond	Allt Cnapach	Pass	Pass	Pass	0.02	48	0.27	Pass	0.52	Pass	Pass	5478
7 A	Filter Drains & Wet/Retenti on Pond	Feith Mhor	Pass	Pass	Pass	0.03	46	0.23	Pass	0.45	Pass	Pass	6017



					HAWRAT	EQS As	sessment	t					
κD			HAWRAT Impact As	Acute ssessment	Chronic Impact Assessment		Average ed Coppe	r	Annual Dissolve	Average ed Zinc		Accide Spillag	
Drainage Network ID	Mitigation	Receiving Waterbody	Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (μg/l)	Pass / Fail	Value (μg/l)	Pass / Fail	Pass /Fail	Return Period 1 in "x" (years)
7 B	Filter Drains & Wet/Retenti on Pond	Tributary of Feith Mhor	Pass	Pass	Pass	0.05	75	0.75	Pass	1.45	Pass	Pass	3014
8 A	Filter Drains & Dry/Detenti on Pond	River Dulnain	Pass	Pass	Pass	0.06	1	0	Pass	Pass	0	Pass	10326
8 C	Filter Drains & Dry/Detenti on Pond	Allt nan Ceatharnach	Pass	Pass	Pass	0.03	3	0.01	Pass	0.02	Pass	Pass	27125
8 D	Filter Drains & Dry/Detenti on Pond	Allt nan Ceatharnach	Pass	Pass	Pass	0.03	11	0.04	Pass	0.08	Pass	Pass	7429
9 A	Filter Drains & Wet/Retenti on Pond	Unnamed Drain/Waterc ourse	Pass	Pass	Pass	0.03	64	0.56	Pass	1.08	Pass	Pass	8785



					HAWRAT	EQS As	sessment	:					
ķD			HAWRAT Impact As	Acute ssessment	Chronic Impact Assessment	Annual Dissolve	Average ed Coppe	r	Annual Dissolve			Accide Spillag	
Drainage Network ID	Mitigation	Receiving Waterbody	Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (μg/l)	Pass / Fail	Value (μg/l)	Pass / Fail	Pass /Fail	Return Period 1 in "x" (years)
9 B (Black Mount Junction Opt D54)	Filter Drains & Wet/Retenti on Pond & Grass Surface Channels / Swales	Unnamed Drain/Water course	Pass	Pass	Pass	0.03	41	0.59	Pass	1.16	Pass	Pass	749
9 B2 (Black Mount Junction Opt D54)	Filter Drains & Infiltration Basin	Groundwater	Method C	Calculation of	Medium Risk (	Groundw	ater Discl	narge)				Pass	42409
9 B3 (Black Mount Junction Opt D54)	Filter Drains & Wet/Retenti on Pond	Bogbain Burn	Pass	Pass	Pass	0.05	4	0.03	Pass	0.06	Pass	Pass	3295
9 D	Filter Drains & Wet/Retenti on Pond	Unnamed Drain/ Water course	Pass	Pass	Pass	0.06	54	0.79	Pass	1.52	Pass	Pass	6601

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					HAWRAT	EQS As	sessment	t					
¥ ا			HAWRAT Impact As	Acute ssessment	Chronic Impact Assessment		Average ed Coppe	r	Annual Dissolve	Average ed Zinc		Accide Spillac	
Drainage Network ID	Mitigation	Receiving Waterbody	Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (μg/l)	Pass / Fail	Value (μg/l)	Pass / Fail	Pass /Fail	Return Period 1 in "x" (years)
10 A	Filter Drains & Dry/Detenti on Pond	Bogbain Burn	Pass	Pass	Pass	0.03	28	0.43	Pass	0.71	Pass	Pass	95101
10 B	Filter Drains & Wet/Retenti on Pond	Allt Slochd Mhuic	Pass	Pass	Pass	0.05	27	0.2	Pass	0.39	Pass	Pass	12384
10 C	Filter Drains & Wet/Retenti on Pond	Allt Slochd Mhuic	Pass	Pass	Pass	0.03	16	0.22	Pass	0.42	Pass	Pass	7105
11 C	Filter Drains & Wet/Retenti on Pond & Grass Surface Channels / Swales	Allt Slochd Mhuic	Pass	Pass	Pass	0.02	7	0.11	Pass	0.22	Pass	Pass	25017
11D	Filter Drains & Wet/Retenti on Pond	Unnamed Drain/Waterc ourse	Pass	Pass	Pass	0.03	11	0.27	Pass	0.52	Pass	Pass	8780

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					HAWRAT	EQS As	sessmen	t					
κD			HAWRAT Impact As	Acute ssessment	Chronic Impact Assessment		Average ed Coppe	r	Annual Dissolve	Average ed Zinc		Accide Spillag	
Drainage Network ID	Mitigation	Receiving Waterbody	Soluble Copper	Soluble Zinc	Sediment	Low Flow Vel. (m/s)	Deposition Index	Value (μg/l)	Pass / Fail	Value (μg/l)	Pass / Fail	Pass /Fail	Return Period 1 in "x" (years)
11 J	Filter Drains & Dry/Detenti on Pond	Allt Sloch Mhuic	Pass	Pass	Pass	0.02	37	0.39	Pass	0.65	Pass	Pass	15703
11 K	Filter Drains & Wet/Retenti on Pond	Allt Cosach	Pass	Pass	Pass	0.01	50	0.42	Pass	0.80	Pass	Pass	11309

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#### **Conclusion** 4.

- 4.1.1. There are a total of 39 preliminary road drainage network options. After applying the planned mitigation, all 32 networks discharging to surface waters meet acceptable HAWRAT and EQS standards for routine runoff impacts. All seven drainage networks which discharge to groundwater are considered to be of a medium risk and therefore deemed acceptable for routine runoff impacts.
- 4.1.2. Accidental spillage calculations and assessments were conducted for each mainline and junction drainage network. All networks pass the higher standard of at least a 1 in 200 year return period (to be applied where sensitive receptors are identified within 1km downstream). The minimum return period has been calculated as 1 in 608 years return period.
- 4.1.3. All drainage networks and treatment measures shall be refined and assessed following the selection of the Preferred Route and additional data collation during DMRB Stage 3. DMRB Stage 3 Assessments will also involve cumulative assessment of confirmed discharge outfall locations. Stage 3 will also include individual assessments of specific side roads and accommodation tracks against guidance detailed within CIRIA's The SuDS Manualii.



# **Annex A. Calculations**

#### **HAWRAT Datasheets** A.1.

HIGHW	AYS	Highw	vavs A	gen cy Wa	ter Ris	k Assessi	ment Too	version 1	0 Nove	nher 200	9								
AGENCY		3	,	<b>JJ</b>		le - Acute Im							Sedime	nt - C	hronic	Impac	t		
		Annual Av		once ntration		Copper		Zinc											
		Step 2	Copper 0.01			Pass		Pass		Alort I	Protected	1 Ama	Sed im Accun			n for t	his site	is judg	jed as: fow Vel m/s
		Step 2	0.00	0.03 ug/l		1 4 55		1 4 55		Aleit.	TOTECTE	niea.	Exten			lo	2		osition Index
Location Details				<u> </u>															
Road number				A9				HA Area /	DBFO	number									
Assessment type				Non-cumu	lative ass	sessment (sin	ngle outfall)	•											
OS grid reference of as	ssessme	nt point (m)		Easting		285672					Northin	q		8093	51				
OS grid reference of ou	ıtfall stru	cture (m)		Easting		285672		_			Northin	q		8093	51				
Outfall number				DS1B				List o	foutfall										
Receiving watercourse				Allt an Fhea	ama														
E A receiving water D et	tailed Riv	ver Network I	D					Assessor						LN A	MJV				
Date of assessment				16/05 <i>[</i> 2016				Version of	fassess	sment				1					
Notes																			
Step 1 Runoff Qu	ality	AADT >1	0,000 and	<50,000	Cli	maticregion	Colder	Wet	•	Rai	nfall site	e A	Ardtalnaig (	(SAAR	1343.9m	m)			•
Step 2 River Impa		Annual 95% Impermeabl			(ha)	0.1		zero in Anr able area d				ox to as	ssess St	ep1r	unoff q	uality	only)		
For discount discount		Base Flow Ir				411	Is the	discharge ir	n or with	iin 1 km	upstrea	m of a	protecte	d site	for con	servat	ion?		Yes 🔻
For dissolved zinc of		Water hardn		Low = < 50mg		ond or canal	thatreduce	es the veloc	aty with	in 100m	ofthen	oint of	dischar	ge?			No	• D	
		Tier1 E	stimate	d river width		6.5		_		_	·		_		_				
	-	Tier2 B	ed width	h (m)		3	Manni	ng's n 0.0		D	Sidesl		,	0.5	<u> </u>	Long:	slope (	m/m)	0.0001
Step 3 Mitigation	_									stimate							Pre	dict in	npact
				Briefdesc	ription			Treatmen solubles (		soluble	nuation s - restr rge rate	icted		ement nents (		s	how [	)etalle	d Results
E xisting measures							(	)	D	Unlimite	d 🕌	Б	0		D				
Proposed measures	Filter Dr	ains & Wet/Re	tention Po	onds (Cu 40%,	Zn 62%, S	Sed 84%)	(	32		Unlimite	ed .	D	84				ı	Exit To	ool
																_			
HIGHW	ΔVS	112-1			4 D!-	l. <b>8</b>	T												
HIGHWA AGENCY	AYS	Highw	vays A	gen cy Wa		k Assessi		version 1.0	0 Nove	nber 200	9								
	AYS			gen cy Wa		k Assessi le - Acute Im Copper		version 1.0	0 Nove	nber 200	9		Sedime	ent - C	hronic	Impac	:t		
	AYS	Annual Av	erage Co Copper	oncentration Zinc	Solubi	le-Acutelm Copper		Zinc	0 Nove				Sedim	nent de	positio	n for t	his site	is judg	
	AYS	Annual Av	erage Co Copper 0.13	once ntration Zinc 0.39 ug/l	Solubi	le - Acute Im			0 Nove		9 Protected		Sed im	nent de	position	n for t	his site	1 Low	fow Vel m/s
AGENCY	AYS	Annual Av	erage Co Copper	oncentration Zinc	Solubi	le-Acutelm Copper		Zinc	0 Nove				Sedim	nent de	position	n for t	his site	1 Low	
	AYS	Annual Av	erage Co Copper 0.13	once ntration Zinc 0.39 ug/l	Solubi	le-Acutelm Copper		Zinc		Alert. I			Sed im	nent de	position	n for t	his site	1 Low	fow Vel m/s
AGENCY  Location Details	AYS	Annual Av	erage Co Copper 0.13	0.39 ug/l	Solubi	le-Acutelm Copper	npact	Zinc Pass		Alert. I			Sed im	nent de	position	n for t	his site	1 Low	fow Vel m/s osition Index
AGENCY  Location Details  Road number		Annual Av Step 2 Step 3	erage Co Copper 0.13	0.39 ug/l	Solubi	le - Acute Im Copper Pass	npact	Zinc Pass		Alert. I		i Area.	Sed im	nent de	e positio g? Y	n for t	his site	1 Low	fow Vel m/s osition Index
AGENCY  Location Details  Road number  Assessment type	ssessme	Annual Av Step 2 Step 3	erage Co Copper 0.13	0.39 ug/l 0.15 ug/l Non-cumu	Solubi	e - Acute Im Copper Pass sessment (sin	npact	Zinc Pass		Alert. I	Protected	d Area.	Sed im	nent de nulatin sive?	position P	n for t	his site	1 Low	fow Vel m/s osition Index
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HIGHWAYS	Highw	ays A	gen cy l	Water	Risk Assessm	nent Lo	Ol version 1.0 N	lovember :	2009							
AGENCY					oluble - Acute Imp	pact	_				Sedime	nt - Chro	nic l	mpact		
	Annual Av	Copper		on ]	Copper		Zinc				Sedin	nent de po	sition	n for thi	s site is iu	dged as:
	Step 2	0.13	0.41	ug/l	Pass		Pass		rt.Protecte			nulating?	Ye			ow flow Vel m/s
	Step 3	0.05	0.16	ug/l					C DF O OLI GC	Acure.	Exten	sive?	No	0	6 [	Deposition Index
Location Details																
Road number			A9				HA Area / DB	FO numb	er							
Assessment type OS grid reference of assessm	nort point (m)				assessment (sind	qle outtal	)		Morthi	200		000072				
OS grid reference of outfall st			E asting E asting		286678				Northi			809973				
Outfall number	luciule (III)		DS1E		286678		Listofou	ıtfalls in	NOTEII	пц		809973			1	
Receiving watercourse			Caocha	n Duadh			cumulative a		nt						+	
E A receiving water D etailed I	River Network II	D.	Caocia	IIIVuuuii	'		Assessor and	affiliation				LN AMJ	·/			
Date of assessment	TOTAL TOTAL A		16/05/20	116			Version of as					1	·			
Notes			10/03/20	010			Volumental	occument.				'				
Step 1 Runoff Quality	AADT >10	0,000 and	<50,000	-	Climaticregion	Cold	er Wet	• F	Rainfall si	ite /	Ardtalnaig	(SAAR 1343	3.9mm	1)		-
Step 2 River Impacts	Annual95%	ile river	flow (m <sup>3</sup> /	/s)	0.009	(Ente	rzero in Annual	195%ile ri	ver flow b	oox to a	ssess St	tep 1 rung	off au	ality on	v)	
	Imperm eable	o road a	ron dmir	nod/ha	1.28		eable area drain			0					**	
				neu (na,				_								
	Base Flow In	ndex (Bi	FI)		0.52	Is the	discharge in or	within 1 k	m u pstre	am of a	protecte	d site for	cons	ervation	1?	Yes 🔻
For dissolved zinc only	Water hardn	ess	Low = <56	0mg CaO	O3/I 🔻 🖸											
																_
For sediment impact only					e, pond or canal th	hatredu	ces the velocity i	within 10	om of the	point of	dischar	ge?		Yes	•	
			d river wi	idth (m)							_					
	↑Tier2 B	ed widtl	h (m)		3	Manr	ing's n 0.07	D	Side	slope (m	ı/m)	0.5	L	ong slo	pe (m/m)	0.0001
Stop 2 Mitigation						1		Entino	atad affa	di. o o o o			$\overline{}$	1		
Step 3 Mitigation			Brinfd	escriptio	n.		Treatment for		ated effect Attenuation			ement of	4		Predict	Impact
			Dileiu	CSCIIPIII	JII		solubles (%)	solu	bles - res	tricted		nents (%)				
								_	harqe rat	e(Vs)				Sho	w Deta	lled Results
E xisting measures							0	Unlin	nited 🕌	D	0	D				
Proposed measures Filter	Drains & Wet/Ret	tention Po	onds (Cu 4	0%, Zn 6:	2%, Sed 84%)		62	Unlin	nited _	D	84				Exit	Tool
										_						
HIGHWAYS	Highw	vays A	gencyl	Water	Risk Assessm	nent To	Ol version 1.0 N	lovember :	2009							
HIGHWAYS AGENCY	Ingilw			So	oluble - Acute Imp			lovember :	2009		Sedime	ent - Chro	nic I	mpact		
	Highw Annual Av	erage Co	once ntra ti	So			OI version 1.0 M								s site is ju	dged as:
	Annual Av	Copper 0.13	Zinc 0.42	So	oluble - Acute Imp			Ale	rt. Protecti		Sedin	ent - Chro nent de po nulating?	sitio r Ye	n for thi	0.01 L	idged as: ow fow Vel m/s
AGENCY	Annual Av	erage Co	oncentration	on Sc	oluble - Acute Imp Copper		Zinc	Ale			Sedin	nent de po nulating?	sition	n for thi	0.01 L	
AGENCY  Location Details	Annual Av	Copper 0.13	7 Zinc 0.42 0.16	on ug/l	oluble - Acute Imp Copper		Zinc Pass	Ale	rt.Protects k.D/S Struc		Sed in	nent de po nulating?	sitio r Ye	n for thi	0.01 L	ow flow Vel m/s
AGENCY  Location Details  Road number	Annual Av	Copper 0.13	0.42 0.16	on ug/l ug/l	oluble - Acute Imp Copper Pass	pact	Zinc Pass HA Area / DB	Ale	rt.Protects k.D/S Struc		Sed in	nent de po nulating?	sitio r Ye	n for thi	0.01 L	ow flow Vel m/s
Location Details Road number Assessment type	Annual Av	Copper 0.13	Once ntra ti	on ug/l ug/l	oluble - Acute Imp Copper Pass e assessment (sind	pact	Zinc Pass HA Area / DB	Ale	rt. Protecti LD/S Struc er	oture.	Sed in	nent de po nulating? sive?	sitio r Ye	n for thi	0.01 L	ow flow Vel m/s
AGENCY  Location Details  Road number	Annual Av. Step 2 Step 3	Copper 0.13	A9 Non-cu E asting	Scoon lug/l lug/l lug/l	Pass e assessment (sing	pact	Zinc Pass HA Area / DB	Ale	rt. Protects D/S Struc er Northi	nq	Sed in	nent de po nulating? sive?	sitio r Ye	n for thi	0.01 L	ow flow Vel m/s
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AGENCY  Location Details  Road number  Assessment type  OS grid reference of assessin  OS grid reference of outfall st	Annual Av. Step 2 Step 3	Copper 0.13	A9 Non-cu E asting DS1F	Scoon ug/l ug/l ug/l	Pass e assessment (sing	pact	Zinc Pass  HA Area / DB	FO numb	er Northi	nq	Sed in	nent de po nulating? sive?	sitio r Ye	n for thi	0.01 L	ow flow Vel m/s
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Step 2 River Impac	cts Ar	nnual95%	ile river t	flow (m <sup>3</sup>	3/s)	[	0.035	(Ente	r zero in Anr	nual95	%ile rive	r flow box	to asses	ss Ste	ep 1 run	off qu	ality on	ıly)	
	Im	iperm eabl	e road a	rea drai	ned(ha	i u	5.708		eable area d				0				•		
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For dissolved zinc on	ıly W	ater hardn	ness	Low = <5	0mg Ca0	DO3/I	▼ □												
For sediment impact of	only Is	there a do	wnstrea	ım struc	ture, lal	ke, pon	nd or canal	thatreduc	ces the velo	ity with	in 100m	of the poi	nt of disc	charg	e?		Ye	· .	
	(9)	Tier1 E	stimate	d river w	/idth (m	)	4.5												
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Step 3 Mitigation								Г			etimate	ed effective	nace			$\overline{}$	1		
<u>step s mitigation</u>				Briefd	lescripti	ion			Treatmen			enuation fo		Settle	ement of	$\blacksquare$		Predic	t Impact
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Location Details Road number Assessment type OS grid reference of ass OS grid reference of outf Outfall number Receiving water Course EA receiving water Deta Date of assessment Notes  Step 1 Runoff Qua	sessment fall structural structur	Step 2 Step 3  Point (m)  r Network I  ADT >1  nnual 95%	Copper 0.07 0.03	A9 Non-cic Easting Easting DS 3A Alltra Q 22/06/2	Side Side Side Side Side Side Side Side	clim  O.41	- Acute Im Copper Pass Passment (sin 288360 288360 i)	cold Cold Cold Is the	List to cumulativ Assessor Version o	of outfall by outfall of assessment of asses	Alert. & D  number  s in system to utilize rive to outfall.	Protected A/S Structure  Northing Northing Infall site  or flow box II (ha)	Ardtal to assess	Sedim Accum Extens	ent depoulating?sive?  810624 810624 LN AM. 2	Number of the state of the stat	n for the	0.02 14	Low flow Vel m/s Deposition Index
AGENCY  Location Details Road number Assessment type OS grid reference of ass OS grid reference of outf Outfall number Receiving watercourse EA receiving water Deta Date of assessment Notes  Step 1 Runoff Qua	sessment fall structural structur	Step 2 Step 3  Step 2  Step 3  Step 3  Step 3  Step 2  Step 3  Step 3  Step 3  Step 4  Step 4	Copper O.0.7 O.0.03	A9 Non-ci Easting DS 3A Alt na (C 22/06/2  1<50,000  Low = <f< th=""><th>umulativ</th><td>Clim  0.41</td><td>- Acute Im Copper Pass essment (sin 288360 288360 3))</td><td>cold Cold Cold I (Ente</td><td>List to cumulativ Assessor Version o</td><td>of outfall by outfall for the control of outfall for the control of outfall for the control of outfall for the control outfall</td><td>Alert.  &amp; D  number  s in  sssment  liation  Ra  Wille rive to outfa</td><td>Northing Northing Northing Infall site Infall site Infall site Infall site Infall site Infall site Infall site</td><td>Ardtal  Ardtal  to asset o</td><td>Sedim Accum Extens</td><td>ent deppululating 13 sive?  810624  LN AM. 2</td><td>Number of the state of the stat</td><td>n for the</td><td>0.02 14</td><td>Low flow Vel m/s Deposition Index</td></f<>	umulativ	Clim  0.41	- Acute Im Copper Pass essment (sin 288360 288360 3))	cold Cold Cold I (Ente	List to cumulativ Assessor Version o	of outfall by outfall for the control of outfall for the control of outfall for the control of outfall for the control outfall	Alert.  & D  number  s in  sssment  liation  Ra  Wille rive to outfa	Northing Northing Northing Infall site	Ardtal  Ardtal  to asset o	Sedim Accum Extens	ent deppululating 13 sive?  810624  LN AM. 2	Number of the state of the stat	n for the	0.02 14	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of ass OS grid reference of out Outfall number Receiving water Ceta Date of assessment Notes  Step 1 Runoff Qua  Step 2 River Impact  For dissolved zinc on	ality A/ Cts Ar Ba	Step 2 Step 3  Point (m)  r Network I  ADT >1  nual 95%  apermeable ase Flow Ir  ater hardn there a do	Copper O.0.7 O.0.03	A9 Non-ci Easting Easting L22/06/2  1<50,000  1<50,000  L22/06/2  L22/06/2  L0w = <f< th=""><th>Signature of the state of the s</th><td>Clim  Clim  0.41  0.42  Ce, pon</td><td>- Acute Im Copper Pass essment (sin 288360 288360 3))</td><td>cold Cold Cold I (Ente</td><td>HA Area / I)  List cumulativ Assessor Version o</td><td>of outfall by outfall for the control of outfall for the control of outfall for the control of outfall for the control outfall</td><td>Alert.  &amp; D  number  s in  sssment  liation  Ra  Wille rive to outfa</td><td>Northing Northing Northing Infall site Infall site Infall site Infall site Infall site Infall site Infall site</td><td>Ardtal  Ardtal  to asset o</td><td>Sedim Accum Extens</td><td>ent deppululating 13 sive?  810624  LN AM. 2</td><td>Number of the state of the stat</td><td>n for the</td><td>0.02 14</td><td>Low flow Vel m/s Deposition Index</td></f<>	Signature of the state of the s	Clim  Clim  0.41  0.42  Ce, pon	- Acute Im Copper Pass essment (sin 288360 288360 3))	cold Cold Cold I (Ente	HA Area / I)  List cumulativ Assessor Version o	of outfall by outfall for the control of outfall for the control of outfall for the control of outfall for the control outfall	Alert.  & D  number  s in  sssment  liation  Ra  Wille rive to outfa	Northing Northing Northing Infall site	Ardtal  Ardtal  to asset o	Sedim Accum Extens	ent deppululating 13 sive?  810624  LN AM. 2	Number of the state of the stat	n for the	0.02 14	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of ass OS grid reference of out Outfall number Receiving water Ceta Date of assessment Notes  Step 1 Runoff Qua  Step 2 River Impact  For dissolved zinc on	ality AA  Cts Ar  Bally W  only Is	Step 2 Step 3  Step 4  Step 4	DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD	A9 Non-ci Easting Easting Low = <- Low	Signature of the state of the s	Clim  Clim  0.41  0.42  Ce, pon	- Acute Im Copper Pass essment (sin 288360 288360 0.035 2.774	Cold  Cold	HA Area / I)  List cumulativ Assessor Version o	of outfall by outfall for the control of outfall for the control of outfall for the control of outfall for the control outfall	Alert.  & D  number  s in  sssment  liation  Ra  Wille rive to outfa	Northing Northing Northing Infall site	Ardalacto assess	Sedim Accum Extens Selection (1) Ses Steet Selection (2)	ent deppululating 13 sive?  810624  LN AM. 2	osition?	n for the ses	0.02 14	Low flow Vel m/s Deposition Index  Yes
Location Details Road number Road number Assessment type OS grid reference of ass OS grid reference of out Outfall number Receiving watercourse EA receiving water Deta Date of assessment Notes  Step 1 Runoff Qua  Step 2 River Impact For dissolved zinc on For sediment impact of	ality AA  Cts Ar  Bally W  only Is	Step 2 Step 3  Step 4  Step 4	DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD	A9 Non-ci Easting Easting Low = <- Low	Signature of the state of the s	Clim  Clim  0.41  0.42  Ce, pon	- Acute Im Copper Pass essment (sin 288360 288360 9)  natic region 0.035 2.774	Cold  Cold	HA Area / List a cumulativ Assessor Version o  Ler Wet r zero in Ann eable area d discharge in	of outfall	number s in sin ssment liation Ra %///le rive to outfal in 100m	Protected A/S Structure  Northing  Northing  Infall site  or flow box  II (ha)  upstream  of the poi	Ardtal to assets 0 of a prot	Sedim Accum Extens Selection (1) Ses Steet Selection (2)	ent deppululating 13 sive?  810624  810624  LN AM.  2  SSAAR 13:  app 1 run  d site for	osition?	n for the ses	0.02 14	Yes V
Location Details Road number Assessment type OS grid reference of ass OS grid reference of out Outfall number Receiving water Ceta Date of assessment Notes  Step 1 Runoff Qua  Step 2 River Impact  For dissolved zinc on	ality AA  Cts Ar  Bally W  only Is	Step 2 Step 3  Step 4  Step 4	DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD	A9 Non-cic Easting Easting A1 A2 Non-cic Easting Easting A3 Allt na C A2 A2 A2 A2 A2 A2 A2 A2 A3	Signature of the state of the s	Clim  0.41  0.41  0.41  0.41	- Acute Im Copper Pass essment (sin 288360 288360 9)  natic region 0.035 2.774	Cold  Cold	List to cumulativ Assessor Version o  Let Wet r zero in Ann eable area d discharge in ces the veloce ining's n  Treatmer	of outfall ou	number s in sssment liation sment Ra Rainin 1 km in 100m Estimate Att	Northing Nor	Ardial  Ardial  Ardial  Ardial  Ardial  Ardial	Sedim Accum Setion Settle Sedim Settle Sedim Settle Sedim Se	ent deppulating issive?  810624  810624  LN AM. 2  LN AM. 2  ee?  eo.	osition? Yyungan Yang Yang Yang Yang Yang Yang Yang	n for the ses	0.02 14	Low flow Vel m/s Deposition Index  Yes
Location Details Road number Road number Assessment type OS grid reference of ass OS grid reference of out Outfall number Receiving watercourse EA receiving water Deta Date of assessment Notes  Step 1 Runoff Qua  Step 2 River Impact For dissolved zinc on For sediment impact of	ality AA  Cts Ar  Bally W  only Is	Step 2 Step 3  Step 4  Step 4	DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD	A9 Non-cic Easting Easting A1 A2 Non-cic Easting Easting A3 Allt na C A2 A2 A2 A2 A2 A2 A2 A2 A3	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l	Clim  0.41  0.41  0.41  0.41	- Acute Im Copper Pass essment (sin 288360 288360 9)  natic region 0.035 2.774	Cold  Cold	HA Area / I)  List to cumulative Assessor Version of the Wet  List to cumulati	of outfall ou	number s s in ssment liation Ra Wille rive to outfal in 100m Estimata Attt	Protected A/S Structure  Northing Northing Infall site  or flow box II (ha) upstream II (ha) defective enuation fces - restrices	Ardtal to asset 0 of a prot obe (m/m)	Sedim Accum Setion Settle Sedim Settle Sedim Settle Sedim Se	ent deppulating is sive?  810624  810624  LN AM. 2  LN AM. 2  epp 1 run d site for	osition? Yyungan Yang Yang Yang Yang Yang Yang Yang	n for the ss oo	0.02 14	Ves
Location Details Road number Road number Assessment type OS grid reference of ass OS grid reference of out Outfall number Receiving watercourse EA receiving water Deta Date of assessment Notes Step 1 Runoff Qua  Step 2 River Impact For dissolved zinc on For sediment impact of	ality AA  Cts Ar  Bally W  only Is	Step 2 Step 3  Step 4  Step 4	DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD	A9 Non-cic Easting Easting A1 A2 Non-cic Easting Easting A3 Allt na C A2 A2 A2 A2 A2 A2 A2 A2 A3	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l	Clim  0.41  0.41  0.41  0.41	- Acute Im Copper Pass essment (sin 288360 288360 9)  natic region 0.035 2.774	Cold  Cold	List to cumulativ Assessor Version o  Let Wet r zero in Ann eable area d discharge in ces the veloce ining's n  Treatmer	of outfall of e assessand affine assess and affine asset as a second asset as a second asset as a second asset as a second as a second asset as a second as	number s s in ssment liation Ra Wille rive to outfal in 100m Estimata Attt	Northing Northing Northing Infall site Inf	Ardal to asset 0 of a prot of a prot telefold (see (m/m))	Sedim Accum Setion Settle Sedim Settle Sedim Settle Sedim Se	ent deppulating isive?  810624 810624 810624 LN AM. 2 LN AM. 4 site for e? e?	OSITION NO.	n for the ss oo	0.02 14	Yes V
Location Details Road number Road number Assessment type OS grid reference of ass OS grid reference of out Outfall number Receiving watercourse EA receiving water Deta Date of assessment Notes  Step 1 Runoff Qua  Step 2 River Impact  For dissolved zinc on For sediment impact of  Step 3 Mitigation	sessment fall structuality A/  cts Ar  Im  Baily W  only Is	Step 2 Step 3  Step 4  Step 4	Copper 0.07 0.03 0.03 0.000 and 0.00	A9 Non-cic Easting Easting A1 Low = <t< th=""><th>ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l</th><td>Clim  O.41  O.41</td><td>- Acute Im Copper Pass  Pass</td><td>Cold  Cold  Cold</td><td>List of cumulative Assessor Version of the Wet Coes the velocity of the Veloci</td><td>of outfall of outfall ou</td><td>number s in sssment liation sment Ra Riside rive to outfainin 1 km</td><td>Northing Northing Infall site Infall site</td><td>Ardral  Ardral  to assess  o  of a prot  rr  reted  s  rr  reted  s  s  reted  s  s  s  reted  s  s  s  s  s  s  s  s  s  s  s  s  s</td><td>Sedim Accum Sextens Sextens Sextens Sextens Sextens Sextine Se</td><td>ent deppulating isive?  810624 810624 810624 LN AM. 2 LN AM. 4 site for e? e?</td><td>osition? Yyungan Yang Yang Yang Yang Yang Yang Yang</td><td>n for the ss oo</td><td>0.02 14  14  19  19  19  19  19  19  19  19</td><td>Ves Ves Ves Ves Ves Ves Ves Ves Ves Ves</td></t<>	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l	Clim  O.41  O.41	- Acute Im Copper Pass  Pass	Cold  Cold	List of cumulative Assessor Version of the Wet Coes the velocity of the Veloci	of outfall ou	number s in sssment liation sment Ra Riside rive to outfainin 1 km	Northing Northing Infall site	Ardral  Ardral  to assess  o  of a prot  rr  reted  s  rr  reted  s  s  reted  s  s  s  reted  s  s  s  s  s  s  s  s  s  s  s  s  s	Sedim Accum Sextens Sextens Sextens Sextens Sextens Sextine Se	ent deppulating isive?  810624 810624 810624 LN AM. 2 LN AM. 4 site for e? e?	osition? Yyungan Yang Yang Yang Yang Yang Yang Yang	n for the ss oo	0.02 14  14  19  19  19  19  19  19  19  19	Ves

AGENCY	Highways A	.gency Water	RISK ASSESSM	entTool version 1.0 Nove	mber 200	)9			
AGENCI			oluble - Acute Impa			:	Sediment - Chron	ic Impact	
	Annual Average Co		Copper	Zinc			Sediment depos	ition for this	s site is judged as:
	Step 2 1.84	5.74 ug/l	Pass	Pass		Protected Area //S Structure.	Accumulating?	Yes	0.03 Low flow Vel m/s
	Step 3 0.35	1.09 ug/l			a D	73 Structure.	Extensive?	No	40 Deposition Index
Location Details									
Road number		A9		HA Area / DBFO	number				
Assessment type		Non-cumulative	e assessment (sing	le outfall)					
OS grid reference of assessm		Easting	289112			Northing	812105		
OS grid reference of outfall str	ucture (m)	Easting	289112			Northing	812105		
Outfall number		DS 3B B		List of outfall cumulative asse					
Receiving watercourse		Loch Puladderr	1	curiulative asse	SSITIETIL				
EA receiving water Detailed R	iver Network ID			Assessor and affi	liation		LN AMJV		
Date of assessment		17/06/2016		Version of assess	sment		1		
Notes									
Step 1 Runoff Quality	AADT >10,000 and	d <50,000 <b>▼</b>	Climatic region	Colder Wet 🔻	Rai	infall site Ar	rdtalnaig (SAAR 1343.	9mm)	
Step 2 River Impacts	Annual 95%ile river	flow (m <sup>3</sup> /s)	0.001	(Enter zero in Annual 959	%ile rive	rflow box to as	sess Step 1 runof	f quality on	ly)
	Impermeable road a	rea drained (ha	4.253	Permeable area draining	to outfa	ll (ha) 0			
	•			_					
	Base Flow Index (BI	FI)	0.699	Is the discharge in or with	nin 1 km	upstream of a p	protected site for co	onservation	1? Yes -
For dissolved zinc only	Water hardness	Low = <50mg CaC	DO3/I						
T OF GISSOIVEG ZING OTHY	-	Low = <50mg Cac	- B						
For sediment impact only	Is there a downstrea	am structure, lak	e, pond or canal th	at reduces the velocity with	in 100m	of the point of o	discharge?	Yes	s 🔻
	Tier 1 Estimate	d river width (m)	0.5						
	○ Tier 2 Bed widt	h (m)	3	Manning's n 0.07	D	Side slope (m/	/m) 0.5	Long slo	ope (m/m) 0.0001
						• • • •	, L		,
Step 3 Mitigation				-	Estimate	ed effectiveness			Boodlet loos set
		Brief description	on	Treatment for		enuation for	Settlement of	7	Predict Impact
				solubles (%)		es - restricted	sediments ( %)		
Evicting managers						rge rate ( l/s )		Sho	ow Detailed Results
Existing measures				0 D	Unlimite		0 D		
Proposed measures Filter I	Drains & Wet/Retention P	onds & Swales (Cu	70%, Zn 81%, Sed 97%	6) 81	Unlimite	ed D	97		Exit Tool
HIGHWAYS	Highways A	gency Water	Risk Assessm	entTool version 1.0 Nove	mber 200	09			
HIGHWAYS AGENCY	Annual Average Co	oncentration Zinc	Risk Assessm Oluble - Acute Impa Copper					ition for thi	s site is judged as:
	Annual Average Co	Soncentration	Oluble - Acute Impa Copper	act Zinc		;		•	
	Annual Average Co Copper Step 2 0.09	oncentration  Zinc  0.28 ug/l	Oluble - Acute Impa Copper	act Zinc	Alert.	;	Sediment deposition Accumulating?	ition for thi	0.04 Low flow Vel m/s
AGENCY	Annual Average Co Copper Step 2 0.09	oncentration  Zinc  0.28 ug/l	Oluble - Acute Impa Copper	act Zinc	Alert.	;	Sediment deposition Accumulating?	ition for thi	0.04 Low flow Vel m/s
Location Details Road number Assessment type	Annual Average Ct	Sconcentration   Zinc   0.28   ug/l   ug/l   A9	Oluble - Acute Impa Copper	Zinc Pass HA Area / DBFO	Alert.	D/S Structure.	Sediment deposition Accumulating?	ition for thi	0.04 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm	Annual Average CC Copper Step 2 0.09 Step 3 0.03	Soncentration  Zinc  0.28  0.11  ug/l  A9  Non-cumulative	oluble - Acute Impa Copper Pass	Zinc Pass HA Area / DBFO	Alert.	D/S Structure.	Sediment deposi Accumulating? Extensive?	ition for thi	0.04 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Annual Average CC Copper Step 2 0.09 Step 3 0.03	A9 Non-cumulative Easting Non-cumulative	Pass  e assessment (sing	Pass  HA Area / DBFO le outfall)	Alert.	D/S Structure.	Sediment depositions Accumulating? Extensive?	ition for thi	0.04 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm	Annual Average CC Copper Step 2 0.09 Step 3 0.03	Soncentration  Zinc  0.28  0.11  ug/l  A9  Non-cumulative	Pass  e assessment (sing 289376	HA Area / DBFO le outfall)  List of outfall	Alert.	D/S Structure.	Sediment deposi Accumulating? Extensive?	ition for thi	0.04 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Annual Average CC Copper Step 2 0.09 Step 3 0.03	A9 Non-cumulative Easting Non-cumulative	Pass  e assessment (sing 289376	Pass  HA Area / DBFO le outfall)	Alert.	D/S Structure.	Sediment deposi Accumulating? Extensive?	ition for thi	0.04 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Annual Average Ct Copper Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)	A9 Non-cumulative Easting Easting DS4A	Pass  e assessment (sing 289376	HA Area / DBFO le outfall)  List of outfall	Alert. number	D/S Structure.	Sediment deposi Accumulating? Extensive?	ition for thi	0.04 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving water Detailed R Date of assessment	Annual Average Ct Copper Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)	A9 Non-cumulative Easting Easting DS4A	Pass  e assessment (sing 289376	HA Area / DBFO le outfall)  List of outfall cumulative asse	Alert.  number  s in essment liation	D/S Structure.	Sediment deposition Accumulating? Extensive?  813856 813856	ition for thi	0.04 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R	Annual Average Ct Copper Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)	A9 Non-cumulative Easting Easting DS4A Aviemore Burn	Pass  e assessment (sing 289376	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	Alert.  number  s in essment liation	D/S Structure.	Sediment deposition Accumulating? Extensive?  813856 813856	ition for thi	0.04 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving water Detailed R Date of assessment	Annual Average Ct Copper Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)	A9 Non-cumulative Easting DS4A Aviemore Burn 16/06/2016	Pass  e assessment (sing 289376	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	number s in ssment liation sment	D/S Structure.  Northing Northing	Sediment deposition Accumulating? Extensive?  813856 813856	Yes No	0.04 Low flow Vel m/s
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average Cr Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and	A9 Non-cumulative Easting DS4A Aviemore Burn  16/06/2016	e assessment (sing 289376 289376 Climatic region	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess	number s in ssment liation sment Rai	D/S Structure.  Northing Northing infall site  Ar	Sediment deposition Accumulating? Extensive?  813856 813856 LN AMJV 1	ves No	0.04 Low flow Vel m/s 10 Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Average Ct Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river	A9 Non-cumulative Easting DS4A Aviemore Burn  1d<0,000 v  flow (m³/s)	e assessment (sing 289376 289376 Climatic region 0.023	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 955	number s in essment liation sment Rai	D/S Structure.  Northing Northing infall site  Arr	Sediment deposition Accumulating? Extensive?  813856 813856 LN AMJV 1	ves No	0.04 Low flow Vel m/s 10 Deposition Index
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average Cr Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and	A9 Non-cumulative Easting DS4A Aviemore Burn  1d<0,000 v  flow (m³/s)	e assessment (sing 289376 289376 Climatic region 0.023	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess	number s in essment liation sment Rai	D/S Structure.  Northing Northing infall site  Arr	Sediment deposition Accumulating? Extensive?  813856 813856 LN AMJV 1	ves No	0.04 Low flow Vel m/s 10 Deposition Index
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average Ct Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river	A9 Non-cumulative Easting Easting DS4A Aviemore Burn  1d <50,000  flow (m³/s) area drained (ha	e assessment (sing 289376 289376 Climatic region 0.023	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 955	number s in ssment liation Rai	Northing Northing Infall site Arriflow box to as II (ha) 0	Sediment deposi Accumulating? Extensive?  813856 813856  LN AMJV 1  rdtalnaig (SAAR 1343.1	ition for this Yes No No Amm)	0.04 Low flow Vel m/s 10 Deposition Index
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average Ct Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a	A9 Non-cumulative Easting Easting DS4A Aviemore Burn  1d <50,000  flow (m³/s) area drained (ha	e assessment (sing 289376 289376 289376 0.023 2.404 0.33	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95° Permeable area draining	number  s in sssment lilation Rai	Northing Northing Infall site Arriflow box to as II (ha) 0	Sediment deposi Accumulating? Extensive?  813856 813856  LN AMJV 1  rdtalnaig (SAAR 1343.1	ition for this Yes No No Amm)	0.04 Low flow Vel m/s 10 Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Cc Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness	A9 Non-cumulative Easting Easting DS4A Aviemore Burn  16/06/2016  16/06/2016  Low = <50mg CaC	e assessment (sing 289376 289376 289376 0.023 2.404 0.33	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95° Permeable area draining	Alert.  Is in sin sessment liation sment Rail kille rive to outfall killer ive to outfall killer ive to outfall killer ive to outfall killer ive killer iv	Northing Northing Infall site  Ar  Inflow box to as all (ha)  Upstream of a p	Sediment deposition Accumulating? Extensive?  813856 813856  LN AMJV 1  rettainaig (SAAR 1343.1) seess Step 1 runofication of the control of	ition for this Yes No No Amm)	0.04 Low flow Vel m/s 10 Deposition Index  ly)  No v
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving waterourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Cc Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a Base Flow Index (BI Water hardness Is there a downstrea	A9 Non-cumulative Easting Easting DS4A Aviemore Bum  16/06/2016  16/06/2016  Low = <50mg CaC am structure, lake	e assessment (sing 289376 289376 289376 0.023 2.404 0.33	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining is the discharge in or with	Alert.  Is in sin sessment liation sment Rail kille rive to outfall killer ive to outfall killer ive to outfall killer ive to outfall killer ive killer iv	Northing Northing Infall site  Ar  Inflow box to as all (ha)  Upstream of a p	Sediment deposition Accumulating? Extensive?  813856 813856  LN AMJV 1  rettainaig (SAAR 1343.1) seess Step 1 runofication of the control of	emm)  f quality onlonservation	0.04 Low flow Vel m/s 10 Deposition Index  ly)  No v
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Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Cc Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a Base Flow Index (BI Water hardness Is there a downstrea	A9 Non-cumulative Easting DS4A Aviemore Bum  16/06/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016	e assessment (sing 289376 289376 289376 0.023 2.404 0.33	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining is the discharge in or with	Alert.  Is in sin sessment liation sment Rail kille rive to outfall killer ive to outfall killer ive to outfall killer ive to outfall killer ive killer iv	Northing Northing Infall site  Ar  Inflow box to as all (ha)  Upstream of a p	Sediment deposi Accumulating? Extensive?  813856 813856 13856 LN AMJV 1  rottalnaig (SAAR 1343.) seess Step 1 runoff protected site for co	ition for this Yes No No Permittion  Figure 1 of the second of the secon	0.04 Low flow Vel m/s 10 Deposition Index  ly)  No v
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average Cc Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea © Tier 1 Estimate	A9 Non-cumulative Easting DS4A Aviemore Bum  16/06/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016	e assessment (sing 289376 289376 289376 0.023 0.023 0.033 0.033 0.034 0.035 0.	HA Area / DBFO  List of outfall)  List of outfall  cumulative asses  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 959  Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n	Alert.  number  s in sysment liation ment  Rai wilderive to outfall in 100m  in 100m	Northing Nor	Sediment deposi Accumulating? Extensive?  813856 813856 13856 LN AMJV 1  rottalnaig (SAAR 1343.) seess Step 1 runoff protected site for co	ition for this Yes No No Permittion  Figure 1 of the second of the secon	0.04 Low flow Vel m/s 10 Deposition Index  ly)  No v
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Cc Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea © Tier 1 Estimate	A9 Non-cumulative Easting Easting DS4A Aviemore Burn  16/06/2016  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 <	e assessment (sing 289376 289376 289376 0.023 2.404 0.33 0.034	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95: Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n 0.07	Alert.  number  s in sssment liation sment  Rai  in 100m  Estimate	Northing Northing Infall site  Ar  Infall site  Infall site  Ar  Infall site  Infall	Sediment deposi Accumulating? Extensive?  813856 813856  LN AMJV 1  rettalnaig (SAAR 1343.1  ssess Step 1 runoff  protected site for continuous sites for co	ition for this Yes No No Permittion  Figure 1 of the second of the secon	0.04 Low flow Vel m/s 10 Deposition Index  ly)  No v
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only	Annual Average Cc Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea © Tier 1 Estimate	A9 Non-cumulative Easting DS4A Aviemore Bum  16/06/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016	e assessment (sing 289376 289376 289376 0.023 2.404 0.33 0.034	HA Area / DBFO  List of outfall)  List of outfall  cumulative asses  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 959  Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n	number s s in sssment liation Rai Wille rive to outfa in 100m Attt Soluble	Northing Nor	Sediment deposi Accumulating? Extensive?  813856 813856 13856 LN AMJV 1  rottalnaig (SAAR 1343.) seess Step 1 runoff protected site for co	ition for this Yes No No Permittion  Figure 1 of the second of the secon	Deposition Index  Low flow Vel m/s 10 Deposition Index  Deposition Index  Deposition Index
Location Details Road number Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only  Step 3 Mitigation	Annual Average Cc Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea © Tier 1 Estimate	A9 Non-cumulative Easting Easting DS4A Aviemore Burn  16/06/2016  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 <	e assessment (sing 289376 289376 289376 0.023 2.404 0.33 0.034	HA Area / DBFO  List of outfall)  List of outfall cumulative assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95' Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n  0.07	number s in sssment liation sment Rai liation sment liation	Northing Northing Northing Northing  Infall site  Ar  Infall site  Ar  Infall site  O  Upstream of a p  Infall site  O  Upstream of a p  Infall site  O  Upstream of a p  Infall site  O  Infa	Sediment deposite Accumulating? Extensive?  813856 813856 813856  LN AMJV 1  rdtalnaig (SAAR 1343.1  ssess Step 1 runoff protected site for continuous contents of the content	emm)  Type	Deposition Index  Low flow Vel m/s 10 Deposition Index  Deposition Index  Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average Cc Step 2 0.09 Step 3 0.03  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea © Tier 1 Estimate	A9 Non-cumulative Easting Easting DS4A Aviemore Burn  16/06/2016  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 < 50,000  10 <	e assessment (sing 289376 289376 289376 0.023 2.404 0.33 0.034	HA Area / DBFO  List of outfall)  List of outfall cumulative assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95' Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n  0.07	number s s in sssment liation Rai Wille rive to outfa in 100m Attt Soluble	Northing Northing Northing Northing  Infall site  Ar  Infall site  Ar  Infall site  O  Upstream of a p  Infall site  O  Upstream of a p  Infall site  O  Upstream of a p  Infall site  O  Infa	Sediment deposite Accumulating? Extensive?  813856 813856 813856  LN AMJV 1  rdtalnaig (SAAR 1343.1  ssess Step 1 runoff protected site for continuous contents of the content	emm)  Type	Deposition Index  10 Deposition Index

AGENCY	Highways A	Agency water i	KISK ASSESSMENT	Tool version 1.0 Nove	mber 200	)9					
AGENOT	A A		luble - Acute Impact	7:			Sediment	- Chroni	c Impac	i	
	Annual Average C		Copper	Zinc			Sedimen	ıt deposit	ion for th	nis site is	judged as:
	Step 2 0.58	1.80 ug/l	Pass	Pass		Pass	Accumula		Yes	0.03	Low flow Vel m/s
	Step 3 0.22	0.69 ug/l					Extensiv	re?	No	38	Deposition Index
Location Details					•						
Road number		A9		HA Area / DBFO	number						
Assessment type		Non-cumulative	assessment (single ou	tfall)							▼
OS grid reference of as	ssessment point (m)	Easting	289698			Northing	81	14684			
OS grid reference of ou	ıtfall structure (m)	Easting	289698			Northing	81	14684			
Outfall number		DS5A		List of outfall							
Receiving watercourse		Unnamed Water	course	cumulative asse	essment		•				
EA receiving water Det	ailed River Network ID			Assessor and affi	iliation	•	LI	N AMJV		·	
Date of assessment		16/06/2016		Version of assess	sment		1				
Notes											
Step 1 Runoff Qua	ality AADT >10,000 ar	id <50,000	Climatic region	Colder Wet	Ra	infall siteA	Ardtalnaig (SA	AR 1343.9	nm)		•
Step 2 River Impa	icts Annual 95%ile rive	rflow (m <sup>3</sup> /s)	0.001 (E	nter zero in Annual 95	%ile rive	rflow box to as	ssess Step	1 runoff	quality o	nly)	
	Impermeable road	area drained (ha)	0.763 Pe	ermeable area draining	to outfa	ll (ha) 0					
				-		· · · —					No. 11 co
	Base Flow Index (B	5F1)	0.699 Is	the discharge in or with	nın 1 km	upstream of a	protected s	site for co	nservatio	on?	No - D
For dissolved zinc or	nly Water hardness	Low = <50mg CaCC	D3/I ▼ □								
	-										
For sediment impact		am structure, lake	e, pond or canal that re	duces the velocity with	in 100m	of the point of	discharge?	,	N	0 🔻	D
	<ul><li>Tier 1 Estimate</li></ul>	ed river width (m)	0.5								
	○ Tier 2 Bed wid	th (m)	3 Ma	anning's n 0.07	D	Side slope (m	n/m) 0.5		Longs	lope (m/r	m) 0.0001
Step 3 Mitigation					Estimate	ed effectiveness	3			Prodi	ct Impact
		Brief descriptio	n	Treatment for		enuation for	Settlem		1	Fieur	ct impact
				solubles ( %)		es - restricted arge rate ( l/s )	sedimer	nts (%)			
Existing measures				0	Unlimit	od 🗆	0		Si	low Det	tailed Results
-					-			D			
Proposed measures	Filter Drains & Wet/Retention F	Ponds (Cu 40%, Zn 62	!%, Sed 84%)	62	Unlimit	ed 🔻 D	84			Ex	it Tool
,											
HIGHWA	AYS Highways A	Agency Water I	Risk Assessment	Tool version 1.0 Nove	mber 200	19					
HIGHWA AGENCY	Tignways	Sol	luble - Acute Impact		mber 200		Sediment	- Chroni	Impact	t	
	Annual Average C	Sol concentration		Tool version 1.0 Nove	mber 200						induced as:
	Annual Average C	Sol	luble - Acute Impact		mber 200		Sedimen	t deposit			judged as:
	Annual Average C	Sol concentration	luble - Acute Impact Copper	Zinc	mber 200			t de posit ating?	ion for th	nis site is	<b>-</b>
	Annual Average C Coppe Step 2 0.60	Solution Solution Time I Solution	luble - Acute Impact Copper	Zinc	mber 200		Sed imen Accumula	t de posit ating?	ion for th	0.08	Low flow Vel m/s
AGENCY	Annual Average C Coppe Step 2 0.60	Solution Solution Time I Solution	luble - Acute Impact Copper	Zinc			Sed imen Accumula	t de posit ating?	ion for th	0.08	Low flow Vel m/s
AGENCY  Location Details	Annual Average C Coppe Step 2 0.60	Soloncentration r Zinc 1.84 1.01 ug/l	luble - Acute Impact Copper	Zinc Pass HA Area / DBFO			Sed imen Accumula	t de posit ating?	ion for th	0.08	Low flow Vel m/s
AGENCY  Location Details  Road number	Annual Average C Coppe Step 2 0.80 Step 3 0.33	Soloncentration r Zinc 1.84 1.01 ug/l	luble - Acute Impact Copper Pass	Zinc Pass HA Area / DBFO			Sed imen Accumula Extensiv	t de posit ating?	ion for th	0.08	Low flow Vel m/s
AGENCY  Location Details  Road number  Assessment type	Annual Average C	Soloncentration r Zinc 1.84 1.01 ug/l A9 Non-cumulative	luble - Acute Impact Copper Pass	Zinc Pass HA Area / DBFO		Pass	Sed imen Accumuli Extensiv	it de posit ating? ve?	ion for th	0.08	Low flow Vel m/s
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AGENCY  Location Details Road number Assessment type OS grid reference of as OS grid reference of ou	Annual Average C	Soloncentration r Zine 1.84 ug/l 1.01 ug/l  A9  Non-cumulative E asting DS5B	uble - Acute Impact Copper Pass assessment (single ou 289863 289863	Zinc Pass  HA Area / DBFO tall)  List o foutfall	number	Pass	Sed imen Accumula Extensiv	it de posit ating? ve?	ion for th	0.08	Low flow Vel m/s
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Location Details Road number Assessment type OS grid reference of as OS grid reference of ou Outfall number Receiving watercourse EA receiving water Det Date of assessment Notes  Step 1 Runoff Qu	Annual Average C  Coppe Step 2 0.60 Step 3 0.33  ssessment point (m)  If all structure (m)  ality AADT >10,000 an  ICTS Annual 95%ile rive Impermeable road.	A9	assessment (single ou 289863 289863 289863 Orth Bi Lication)	Zinc  Pass  HA Area / DBFO  tall)  List of outfall  cumulative asse  Assessor and aff  Version of assess  Colder Wet  Inter zero in Annual 95'  ermea ble area draining	number lis in essment filiation sment Ra %ile rive	Northing Northing Infall site  Afflow box to a:	Sed imen Accumula Extensiv  81 81 1 1 1 Additional (SA	t de posit ating? re? 15012 15012 N AMJV	nm)	nis site is 0.08 19 19 19 19 19 19 19 19 19 19 19 19 19	Low fow Vel m/s Deposition Index
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Location Details Road number Assessment type OS grid reference of as OS grid reference of ou Outfall number Receiving watercourse E A receiving water Det D ate of a ssessment Notes  Step 1 Runoff Qu.	Annual Average C    Coppe	A9	assessment (single ou 289863 289863 outh Bituation)  Climatic region  0.001 (E 0.783 Pe	Zinc  Pass  HA Area / DBFO  tall)  List of outfall  cumulative asse  Assessor and aff  Version of assess  Colder Wet  Inter zero in Annual 95'  ermea ble area draining	number lis in essment filiation sment Ra %ile rive	Northing Northing Infall site  Afflow box to a:	Sed imen Accumula Extensiv  81 81 1 1 1 Additional (SA	t de posit ating? re? 15012 15012 N AMJV	nm)	nis site is 0.08 19 19 19 19 19 19 19 19 19 19 19 19 19	Low fow Vel m/s Deposition Index
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Location Details Road number Assessment type OS grid reference of as OS grid reference of ou Outfall number Receiving watercourse E A receiving water Det D ate of a ssessment Notes  Step 1 Runoff Qu.	Annual Average C  Coppe Step 2 0.60 Step 3 0.33  Seessment point (m)  If all structure (m)  alled River Network ID  allity AADT >10,000 an  Icts Annual 95%ile river Impermeable road Base Flow Index (E	A9	assessment (single ou 289863 289863 289863 Onth Bifucation)  Climatic region (E 0.001 (E 0.783 Pe 0.009 Is 0.001 (E 0.009 Is 0.001 (E 0.783 Pe 0.009 Is 0.001 (E 0.001 (E 0.783 Pe 0.009 Is 0.001 (E 0.00	Zinc  Pass  HA Area / DBFO  tall)  List of outfall  cumulative asse  Assessor and aff  Version of assess  Colder Wet  Inter zero in Annual 95'  ermea ble area draining	number is in essment Ra %ile rive y to outfa	Northing Northing infall site  If flow box to a: Il (ha)  Upstream of a	Sed imen Accumula Extensive  81 81 1 1 1 Addalnaig (SA	it de posit ating? re? 15012 15012 N AMJV AR 1343.9i	nm)	nis site is 0.06 0.06 119	Low fow Vel m/s Deposition Index
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Location Details Road number Assessment type OS grid reference of as OS grid reference of ou Outfall number Receiving watercourse E A receiving water D et D ate of a ssessment Notes  Step 1 Runoff Qu.  Step 2 River Impa  For dissolved zinc of For sediment impact	Annual Average C    Coppe	Soloncentration r Zine 1.84 1.01 ug/l 1.01 ug/	assessment (single ou 289863 289862 2	Assessor and aff Version of assess  Colder Wet  Interzero in Annual 95' ermeable area draining the discharge in or with duces the velocity with anning's n 0.07	number Is in Is in Is sament Ra Ra Willerive It to outfal In in 100m  E stimata Attit Attit Solubil	Northing Northing Infall site	Sed imen Accumula Extensiv  81 81 1 1 1 Additional (SA ssess Step protected s discharge?	it de posit ating? re? 15012 15012 N AMJV AR 1343.9 1 runoff site for co	ion for the service of the service o	nis site is 0.00 0.00 19 19 19 19 19 19 19 19 19 19 19 19 19	Low fow Vel m/s Deposition Index  No No Deposition Index  No Deposition
Location Details Road number Road number OS grid reference of as OS grid reference of outfall number Receiving watercourse E A receiving water Det D ate of assessment Notes  Step 1 Runoff Qu.  Step 2 River Impa  For dissolved zinc of For sediment impact	Annual Average C    Coppe	Soloncentration r Zine 1.84 1.01 ug/l 1.01 ug/	assessment (single ou 289863 289862 2	HA Area / DBFO tall)  List of outfall cumulative asses Assessor and aff Version of assess  Colder Wet  Inter zero in Annual 95' ermeable area draining the discharge in or with duces the velocity with anning's n 0.07	number is in essment  Ra %ile rive gto outfa hin 100m  E stimate  Atta discha	Northing Northing Infall site  A Inf	Sed imen Acoumula Extensiv  81 81 81 1 1 1 1 Arditalnaig (SA. sssess Step protected s discharge? s Settlem sedimen	it de posit ating? re? 15012 15012 N AMJV AR 1343.9 1 runoff site for co	ion for the service of the service o	nis site is 0.00 0.00 19 19 19 19 19 19 19 19 19 19 19 19 19	Low fow Vel m/s Deposition Index  No
Location Details Road number Assessment type OS grid reference of as OS grid reference of ou Outfall number Receiving watercourse E A receiving water D et D ate of a ssessment Notes  Step 1 Runoff Qu.  Step 2 River Impa  For dissolved zinc of For sediment impact	Annual Average C    Coppe	A9 Non-cumulative E asting D 55B Allt na Criche (Not 1,000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	assessment (single ou 299863 299863 299863 Onth Bifucation)  Climatic region (E 0.001 (E 0.783 Pe 0.009 Is 0.33 Mt	Assessor and aff Version of asses:  Colder Wet  Inter zero in Annual 95'  anning's n  0.07  Treatment for	number Is in Is in Is sament Ra Ra Willerive It to outfal In in 100m  E stimata Attit Attit Solubil	Northing Northing Northing Infall site  If flow box to as an of the point of the point of the side slope (more than the si	Sed imen Accumula Extensive  81 81 11 11 11 Additainaig (SA ssess Step protected s discharge?	it de posit ating? re? 15012 15012 N AMJV AR 1343.9 1 runoff site for co	ion for the service of the service o	nis site is 0.00 0.00 19 19 19 19 19 19 19 19 19 19 19 19 19	Low fow Vel m/s Deposition Index  No No Deposition Index  No Deposition

HIGHWAY	<b>S</b> Highw	vays A	gency W	ater Ris	k Assessmen	ıt Too	version 1.0 Nove	mber 200	19					
AGENCY					le - Acute Impact	t	_			Sedime	nt - Chron	ic Imp	pact	
	Annual Av	Copper	oncentration Zinc		Copper		Zinc			Sedim	ent de nos	ition fo	orthis site is ju	idned as:
	Step 2	0.11	0.33 ug	И	Pass	ш	Pass		Pass		nulating?	Yes		ow flow Vel m/s
	Step 3	0.04	0.13 ug							Exten	_	No	12	Deposition Index
Location Details														
Road number			A9				HA Area / DBFO	number						
Assessment type				ulative ass	sessment (single o	outfall)								•
OS grid reference of assess	sment point (m)		Easting		290143				Northing		815663			
OS grid reference of outfall	structure (m)		Easting		290143		_		Northing		815663			
Outfall number			DS5D				List o foutfall							
Receiving watercourse			Allt na Cric	he (Grani	sh)		cumulative asse	ssment						
E A receiving water D etailed	l RiverNetwork I	ID					Assessor and aff	iliation	•		LN AMJV	,	•	
Date of assessment			16/06/2016	6			Version of asses	sment			1			
Notes							1				<u> </u>			
Step 1 Runoff Quality	¥ AADT >1	0,000 and	1 <50,000	• Cli	imaticregion [	Colder	Wet -	Ra	infall site	Ardtalnaig (	(SAAR 1343.	9mm)		•
Step 2 River Impacts	Annual95%	ile river	flow (m <sup>3</sup> /s)		0.008	Enter	zero in Annual 95	Vilo rivo	rflowbox to a	reare St	on 1 rupof	f au ali	thr only)	
	•				\					33633 31	ep i iunoi	i quan	ity Offiy)	
	Imperm eabl	e road a	rea draine	d(ha)	1.015 p	Perme	able area draining	to outfa	II (ha)					
	Base Flow Ir	ndex (Bi	FI)	0.3	349	s the c	discharge in or with	nin 1 km	upstream of a	protecte	d site for c	onserv	vation?	No ▼ □
For dissolved zinc only	Water hardn	ness	Low = <50m	g CaCO3/I	• D									
F di d : d d								:- 400		ali a ala a a	2		No .	_
For sediment impact only						reauce	es the velocity with	in iuum	or the point of	discharg	ge?		No -	D
			d river widt	n (m)	2					_				
	©Tier2 B	ed widt	h (m)		3	Mannir	ng's n 0.07	D	Side slope (m	/m)	0.5	Lon	ng slope (m/m)	0.0001
												<b>5</b>		
Step 3 Mitigation									ed effectiveness			J	Predict	Impact
			Briefdes	cription			Treatment for solubles (%)		enuation for es - restricted		ement of nents (%)	-		
							Solubics ( 70)		rge rate (Vs)	Scuiii	101125 ( 70)		Show Detail	lled Results
E xisting measures							0	Unlimite	ed 🗸 🕞	0	D	٦   ١		
Proposed measures Filt	er Drains & Wet/Re	tention P	ands (Cu 40%	7n 82% 9	Sed 94%\	-	32	Unlimite		84		-		Tool
HIGHWAY	S Highy	vave A	gency W	ator Ric	·k Assassman	nt Too	l 4.0. No	20 <i>/</i>	20					
AGENCY	riigiiv		oncentration	Solub	k Assessmen le - Acute Impact Copper		Version 1.0 Nove	mber 200		Sedin	ent - Chron nent depos nulating?	·	or this site is ju	udged as: Low flow Vel m/s
	Annual Av	verage Co	oncentration Zinc	Solub	le - Acute Impact Copper		Zinc	mber 200		Sedin	nent depos	ition fo	or this site is ju	
AGENCY  Location Details	Annual Av	Copper	oncentration r Zinc 1.05 ug 0.40 ug	Solub	le - Acute Impact Copper		Zinc Pass			Sedin Accur	nent depos	ition fo	or this site is ju	Low flow Vel m/s
AGENCY  Location Details  Road number	Annual Av	Copper	1.05   ug   ug   A9	Solubi	le - Acute Impact Copper Pass	t	Zinc			Sedin Accur	nent depos	ition fo	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type	Annual Av Step 2 Step 3	Copper	Procentration Transport Tr	Solubi	le - Acute Impact Copper Pass	t	Zinc Pass		Pass	Sedin Accun Exten	nent depos nulating? ssive?	ition fo	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess	Annual Av Step 2 Step 3	Copper	A9 Non-cumu	Solubi	le - Acute Impact Copper Pass sessment (single of 290157	t	Zinc Pass		Pass Northing	Sedin Accun Exten	nent depos nulating? sive?	ition fo	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall	Annual Av Step 2 Step 3	Copper	A9 Non-cum Easting	Solubi	le - Acute Impact Copper Pass	t	Zinc Pass  HA Area / DBFO	number	Pass	Sedin Accun Exten	nent depos nulating? ssive?	ition fo	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number	Annual Av Step 2 Step 3	Copper	A9 Non-cum Easting DS5E	Soluble Solubl	le - Acute Impact Copper Pass sessment (single of 290157	t	Zinc Pass  HA Area / DBFO  List of outfal	number	Pass Northing	Sedin Accun Exten	nent depos nulating? sive?	ition fo	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall: Outfall number Receiving watercourse	Annual Av Step 2 Step 3  Sment point (m) Structure (m)	verage Cc Copper 0.34 0.13	A9 Non-cum Easting	Soluble Solubl	le - Acute Impact Copper  Pass  sessment (single of 290157 290157	t	HA Area / DBFO  List of outfal  cumulative asse	number	Pass Northing	Sedin Accun Exten	nent depos nulating? sive? 816074	Yes No	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall: Outfall number Receiving water Detailed	Annual Av Step 2 Step 3  Sment point (m) Structure (m)	verage Cc Copper 0.34 0.13	A9 Non-cum Easting Easting DS5E Unnamed	Solubly Julative ass	le - Acute Impact Copper  Pass  sessment (single of 290157 290157	t	Zinc Pass  HA Area / DBFO  List of outfal cumulative asser  Assessor and aff	number	Pass Northing	Sedin Accun Exten	nent depos nulating? sive?	Yes No	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed Date of assessment	Annual Av Step 2 Step 3  Sment point (m) Structure (m)	verage Cc Copper 0.34 0.13	A9 Non-cum Easting DS5E	Solubly Julative ass	le - Acute Impact Copper  Pass  sessment (single of 290157 290157	t	HA Area / DBFO  List of outfal  cumulative asse	number	Pass Northing	Sedin Accun Exten	nent depos nulating? sive? 816074	Yes No	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess Os grid reference of outfall: Outfall number Receiving watercourse EA receiving water Detailed	Annual Av Step 2 Step 3  Sment point (m) Structure (m)	verage Cc Copper 0.34 0.13	A9 Non-cum Easting Easting DS5E Unnamed	Solubly Julative ass	le - Acute Impact Copper  Pass  sessment (single of 290157 290157	t	Zinc Pass  HA Area / DBFO  List of outfal cumulative asser  Assessor and aff	number	Pass Northing	Sedin Accun Exten	nent depos nulating? sive? 816074	Yes No	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed Date of assessment	Annual Av Step 2 Step 3  sment point (m) structure (m)	Copper 0.34 0.13	A9 Non-cum Easting Easting DS5E Unnamed	Solubly Ulative ass	le - Acute Impact Copper  Pass  sessment (single of 290157 290157	t	List of outfall cumulative asses	number Is in essment iliation sment	Northing Northing	Sedin Accun Exten	nent depos nulating? sive? 816074	ition fo	or this site is ju	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of outfall: Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality	Annual Av  Step 2 Step 3  Sment point (m)  structure (m)  d River Network	D	A9 Non-cum Easting DS5E Unnamed 1 16/06/2011	Solubly VI Ulative assume Watercou	le - Acute Impact Copper  Pass  sessment (single of 290157 290157  imatic region	colder	List of outfall cumulative asser Assessor and aff	number Is in Isssment Isliation Isment Ra	Northing Northing infall site	Sedin Accun Exten	ent depos nulating? sive? 816074 816074 LN AMJV 1	Yes No	or this site is ju 0.03 l 18 c	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall: Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes	Annual Av  Step 2 Step 3  Sment point (m)  Structure (m)  d River Network	Copper 0.34 0.13	A9 Non-cum Easting DSSE Unnamed 1 16/06/2011  d <50,000	Solubly VI	le - Acute Impact Copper Pass sessment (single of 290157 290157 rise	Colder :	List of outland cumulative asses  Assessor and aff Version of asses	number Is in essment iliation sment Ra	Northing Northing Infall site	Sedin Accun Exten	ent depos nulating? sive? 816074 816074 LN AMJV 1	Yes No	or this site is ju 0.03 l 18 c	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of outfall: Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality	Annual Av  Step 2 Step 3  Sment point (m)  Structure (m)  d River Network  Y AADT >1  Annual 95% Impermeable	Copper 0.34 0.13	A9 Non-cum Easting Easting DSSE Unnamed 16/06/2010 d < 50,000	Watercou 6	le - Acute Impact Copper Pass  sessment (single of 290157 290157  rise  imatic region  0.001 0.437  F	Colder:	List of outfall cumulative asses  Assessor and aff Version of asses  Twet	number Is in Is in Is seement Ra Ra	Northing Northing Infall site	Sedim Accun Exten	ent depos nulating? sive? 816074 816074 LN AMJV 1	9mm)	or this site is juice of the site of the s	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Av  Step 2 Step 3  sment point (m) structure (m)  d River Network  AADT >1  Annual 95% Impermeabl Base Flow Ir	Copper 0.34 0.13	A9 Non-cum Easting DSSE Unnamed 1 16/06/2011 16/06/2011	Watercoude 6 Clid d (ha)	le - Acute Impact Copper Pass  Sessment (single of 290157	Colder:	List of outland cumulative asses  Assessor and aff Version of asses	number Is in Is in Is seement Ra Ra	Northing Northing Infall site	Sedim Accun Exten	ent depos nulating? sive? 816074 816074 LN AMJV 1	9mm)	or this site is juice of the site of the s	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall: Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Av  Step 2 Step 3  Sment point (m)  structure (m)  d River Network  Y AADT >1  Annual 95% Impermeabl Base Flow Ir  Water hardn	Coppers 0.34 0.13	A9  Non-cum Easting DS5E Unnamed 1  16/06/2011  16/06/2011  Low = <50m	Watercoude 6 Clind (ha)	sessment (single of 290157 290157 290157 20016 1001 1001 1001 1001 1001 1001 100	Colder: (Enter: Sist the c	List of outfall cumulative asses  Assessor and aff Version of asses  Wet  zero in Annual 95 able area draining discharge in or with	number Is in Is in Is sessment Ra Wille rive to outfa	Northing Northing Infall site  If flow box to a: Il (ha)  upstream of a	Sedim Accument Extension Accument Accum	ent depos nulating? sive? 816074 816074 LN AMJV 1	9mm)	ty only)	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Av  Step 2 Step 3  Sment point (m)  Structure (m)  Annual 95%  Annual 95%  Impermeabl  Base Flow Ir  Water hardn  y Is there a do	Copperation of the control of the co	A9  Non-cum Easting DS5E Unnamed 1  16/06/2011  16/06/2011  Low = <50m  A9  Non-cum Easting Losse Lonamed 1  Low = <50m  Low = <50m	Watercould (ha)  0.  0.  0.  0.  0.  0.  0.  0.  0.  0	le - Acute Impact Copper Pass  sessment (single of 290157 290157 290157  imatic region  0.001 0.437 F 404 I ond or canal that	Colder: (Enter: Sist the c	List of outfall cumulative asses  Assessor and aff Version of asses  Twet	number Is in Is in Is sessment Ra Wille rive to outfa	Northing Northing Infall site  If flow box to a: Il (ha)  upstream of a	Sedim Accument Extension Accument Accum	ent depos nulating? sive? 816074 816074 LN AMJV 1	9mm)	or this site is juice of the site of the s	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall: Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Av  Step 2 Step 3  Sment point (m)  Structure (m)  Annual 95%  Annual 95%  Impermeabl  Base Flow Ir  Water hardn  y Is there a do  © Tier 1 E	Copperation of the control of the co	A9 Non-cum Easting DS5E Unnamed 1 16/06/2011 16/06/2011 Low = <50m am structure driver width	Watercould (ha)  0.  0.  0.  0.  0.  0.  0.  0.  0.  0	sessment (single of 290157 290	Colder: (Enter: Sist the c	List of outtal cumulative asses  Assessor and aff Version of asses  Twet  Type Type Type Type Type Type Type Type	number Is in Is in Is sessment Ra Wille rive to outfa	Northing Northing Infall site  If flow box to a: Il (ha)  upstream of a	Sedim Accum Exten	ent depos nulating? sive? 816074 816074 LN AMJV 1	9mm)  f qualification for the second	ty only)	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall: Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Av  Step 2 Step 3  Sment point (m)  Structure (m)  Annual 95%  Annual 95%  Impermeabl  Base Flow Ir  Water hardn  y Is there a do  © Tier 1 E	Copperation of the control of the co	A9 Non-cum Easting DS5E Unnamed 1 16/06/2011 16/06/2011 Low = <50m am structure driver width	Watercould (ha)  0.  0.  0.  0.  0.  0.  0.  0.  0.  0	sessment (single of 290157 290	Colder (Enter:	List of outfal  Cumulative asse  Assessor and aff Version of asses  TWet  Zero in Annual 95 able area draining discharge in or with es the velocity with	number Is in Issument Ra Ra Raide rive to outfall in 100m	Northing Northing Infall site  or flow box to a: Il (ha)  upstream of a	Sedim Accum Exten	ent depos nulating? sive? 816074 816074 LN AMJV 1 (SAAR 1343.	9mm)  f qualification for the second	ty only)  No valone (m/m)	No Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes Step 1 Runoff Quality Step 2 River Impacts  For dissolved zinc only For sediment impact only	Annual Av  Step 2 Step 3  Sment point (m)  Structure (m)  Annual 95%  Annual 95%  Impermeabl  Base Flow Ir  Water hardn  y Is there a do  © Tier 1 E	Copperation of the control of the co	A9 Non-cum Easting DS5E Unnamed 1 16/06/2011 16/06/2011 Low = <50m am structure driver width	Watercou  6 Cli d (ha) 0. g CaCO3/l e, lake, pch (m)	sessment (single of 290157 290	Colder (Enter:	List of outfal  Cumulative asse  Assessor and aff Version of asses  TWet  Zero in Annual 95 able area draining discharge in or with es the velocity with	number Is in Issement Ra Ra Rainin 1 km in 100m Atti	Northing Northing Northing Infall site  If flow box to a: Il (ha)  upstream of a  of the point of Side slope (m  ed effectiveness enuation for es - restricted	Sedim Accum Exten	ent depos nulating? sive? 816074 816074 LN AMJV 1 (SAAR 1343.	9mm)  f qualification for the second	ty only)  No valone (m/m)	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only  Step 3 Mitigation	Annual Av  Step 2 Step 3  Sment point (m)  Structure (m)  Annual 95%  Annual 95%  Impermeabl  Base Flow Ir  Water hardn  y Is there a do  © Tier 1 E	Copperation of the control of the co	A9 Non-cum Easting DS5E Unnamed 1 16/06/2014 d <50,000  Low = <50m am structured river width (m)	Watercou  6 Cli d (ha) 0. g CaCO3/l e, lake, pch (m)	sessment (single of 290157 290	Colder  (Enter: Permei	List of outfal  — List of outfal — cumulative asses  — Assessor and aff Version of asses  Twet  — version of asses  Treatment for solubles (%)	number Is in systement Ra Ra Wille rive to outfar anin 1 km Iin 100m Estimate Attitus olubid discha	Northing Northing Northing Infall site  If flow box to as all (ha)  upstream of a  sof the point of Side slope (m  ed effectiveness enuation for es - restricted urge rate ( \( V_S \))	Sedini Accum Exten Exten Accum Exten	ent depos mulating? sive?  816074  816074  LN AMJV  1  (SAAR 1343.  ep 1 runof d site for c	9mm)  f qualification for the second	ty only)  No  Predict	No Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only	Annual Av  Step 2 Step 3  Sment point (m)  Structure (m)  Annual 95%  Annual 95%  Impermeabl  Base Flow Ir  Water hardn  y Is there a do  © Tier 1 E	Copperation of the control of the co	A9 Non-cum Easting DS5E Unnamed 1 16/06/2014 d <50,000  Low = <50m am structured river width (m)	Watercou  6 Cli d (ha) 0. g CaCO3/l e, lake, pch (m)	sessment (single of 290157 290	Colder (Enter:	List of outfal  — List of outfal — cumulative asses  — Assessor and aff Version of asses  Twet  — version of asses  Treatment for solubles (%)	number Is in Issement Ra Ra Rainin 1 km in 100m Atti	Northing Northing Northing Infall site  If flow box to as all (ha)  upstream of a  sof the point of Side slope (m  ed effectiveness enuation for es - restricted urge rate ( \( V_S \))	Sedim Accum Exten	ent depos mulating? sive?  816074  816074  LN AMJV  1  (SAAR 1343.  ep 1 runof d site for c	9mm)  f qualification for the second	ty only)  No  Predict	No Double Impact

HIGHWAYS AGENCY	Highw	ays Ag	gency Wate	r Risk Assessme	ent Tool version 1.0 Nove	mber 200	19				
AGENCY				Soluble - Acute Impa				Sediment - Chron	ic Impact		
	Annual Ave	rage Cor Copper		Copper	Zinc			Sediment deposi	tion for th	ie eita ie i	inqueq se.
	Step 2	0.74	2.24 ug/l	Pass	Pass		Pass	Accumulating?	Yes		Low flow Vel m/s
	Step 3	0.28	0.85 ug/l					Extensive?	No	48	Deposition Index
Location Details											
Road number			A9		HA Area / DBFO	number					
Assessment type				ve assessment (single	e outfall)		I				▼
OS grid reference of assessm			Easting	290249			Northing	816261			
OS grid reference of outfall str	ucture (m)	1	Easting	290249	List of outfall	o in	Northing	816261		T	
Outfall number			DS5F		cumulative asse						
Receiving watercourse	to an a Nilado caralla IF		Unnamed Inb	utary of Avie Lochan		E-6		1		l	
EA receiving water Detailed R	iver inetwork il				Assessor and affi Version of assess			LN AMJV			
Date of assessment Notes		L	16/06/2016		version or assess	sment		1			
ivoles											
Step 1 Runoff Quality	AADT >10	0,000 and	<50.000 <b>-</b>	Climatia ragion	Colder Wet ▼	Do.	infall site A	rdtalnaig (SAAR 1343.9	lmm)		
otop : italie: quality	AADI >10	7,000 and	<b>430,000</b>	Climatic region	Colder Wet	ĸa	mansile ^	ilutalilaly (SAAK 1343.8	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Step 2 River Impacts	Annual 95%il	le river f	low (m <sup>3</sup> /s)	0.001	(Enter zero in Annual 959	%ile rive	rflow hov to as	sees Sten 1 runoft	quality or	dv)	
								l	quality of	iiy)	
	Impermeable	road ar	rea drained (h	a) 1.152	Permeable area draining	to outra	II (ha) 0				
	Base Flow In	dex (BF	FI)	0.404	Is the discharge in or with	nin 1 km	upstream of a	protected site for co	onservatio	n?	No ▼ □
For dissolved zinc only	Water hardne	000	Low = <50mg Ca	.002/							
For dissolved Zinc Only	vvater maturit		Low = <50mg Ca	aCO3/I							
For sediment impact only	Is there a dov	wnstrea	m structure, la	ake, pond or canal tha	at reduces the velocity with	in 100m	of the point of	discharge?	No		D
	Tier1 Es	stimated	d river width (m	n) 0.5							
	○ Tier 2 Be	ed width	n (m)	3	Manning's n 0.07	D	Side slope (m	/m) 0.5	Long sl	ope (m/m	0.0001
Step 3 Mitigation						Estimate	ed effectiveness			Predic	t Impact
			Brief descrip	tion	Treatment for solubles (%)		enuation for	Settlement of sediments (%)			
					Solubles ( 70)		es - restricted irge rate ( l/s )	Sediments (70)	Sh	ow Dot	ailed Results
Existing measures					0 D	Unlimit	ed D	0 D	311	ow Deta	alleu Nesults
Proposed measures Filter I	Drains & Wet/Rete	ention Po	nds (Cu 40%, 7n	62%, Sed 84%)	62	Unlimit		84			
							, J			EXI	t Tool
- HIGHWAYS	Highw	ave Ar	nency Wate	r Piek Aeegeem	ent Tool	20 <i>/</i>	•				
HIGHWAYS AGENCY	Highw	ays Aç			ent Tool version 1.0 Nove	mber 200		Sediment - Chron	ic Impact		
	Highwa		S	er Risk Assessme Soluble - Acute Impa Copper		mber 200		Sediment - Chron	-		
	Annual Ave	erage Cor Copper	ncentration Zinc	Soluble - Acute Impa Copper	Zinc	mber 200		Sediment deposi	tion for th		1 -
	Annual Ave	crage Cor Copper 0.45	ncentration Zinc 1.37 ug/l	Soluble - Acute Impa	act	mber 200		Sediment deposi Accumulating?	tion for th	0.03	Low flow Vel m/s
AGENCY	Annual Ave	erage Cor Copper	ncentration Zinc	Soluble - Acute Impa Copper	Zinc	mber 200		Sediment deposi	tion for th	0.03	1 -
	Annual Ave	Copper 0.45 0.17	ncentration Zinc 1.37 ug/l	Soluble - Acute Impa Copper	Zinc			Sediment deposi Accumulating?	tion for th	0.03	Low flow Vel m/s
AGENCY  Location Details	Annual Ave	Copper 0.45 0.17	ncentration Zinc 1.37 ug/l 0.52 ug/l	Soluble - Acute Impa Copper	Zinc Pass HA Area / DBFO			Sediment deposi Accumulating?	tion for th	0.03	Low flow Vel m/s
AGENCY  Location Details  Road number	Annual Ave Step 2 Step 3	Copper 0.45 0.17	ncentration Zinc 1.37 ug/l 0.52 ug/l	Soluble - Acute Impa Copper Pass	Zinc Pass HA Area / DBFO			Sediment deposi Accumulating?	tion for th	0.03	Low flow Vel m/s
AGENCY  Location Details  Road number  Assessment type	Annual Ave Step 2 Step 3 ent point (m)	Copper 0.45 0.17	ncentration Zinc 1.37 0.52 ug/l  A9 Non-cumulati	Copper Pass  ve assessment (single	Zinc Pass HA Area / DBFO		Pass	Sediment deposi Accumulating? Extensive?	tion for th	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm	Annual Ave Step 2 Step 3 ent point (m)	Copper 0.45 0.17	ncentration Zinc 1.37 0.52 ug/l  A9 Non-cumulatin	Pass  ve assessment (single 290506	Pass  HA Area / DBFO e outfall)  List of outfall	number	Pass Northing	Sediment deposition Accumulating? Extensive?	tion for th	0.03	Low flow Vel m/s
AGENCY  Location Details  Road number  Assessment type  OS grid reference of assessm OS grid reference of outfall str	Annual Ave Step 2 Step 3 ent point (m)	Copper 0.45 0.17	A9 Non-cumulati Easting Easting DS5G	Pass  ve assessment (single 290506	Pass  HA Area / DBFO e outfall)	number	Pass Northing	Sediment deposition Accumulating? Extensive?	tion for th	0.03	Low flow Vel m/s
AGENCY  Location Details Road number Rassessment type OS grid reference of assessm OS grid reference of outfall str Outfall number	Annual Ave Step 2 Step 3  ent point (m) ucture (m)	Copper 0.45 0.17	A9 Non-cumulati Easting Easting DS5G	Pass  ve assessment (single 290506   290506	Pass  HA Area / DBFO e outfall)  List of outfall	number s in	Pass Northing	Sediment deposition Accumulating? Extensive?	tion for th	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse	Annual Ave Step 2 Step 3  ent point (m) ucture (m)	0.45 0.17	A9 Non-cumulati Easting Easting DS5G	Pass  ve assessment (single 290506   290506	HA Area / DBFO e outfall)  List of outfall cumulative asse	number s in essment	Pass Northing	Sediment deposi Accumulating? Extensive? 816710 816710	tion for th	0.03	Low flow Vel m/s
AGENCY  Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R	Annual Ave Step 2 Step 3  ent point (m) ucture (m)	0.45 0.17	A9 Non-cumulatir Easting Easting DS5G Unnamed Trib	Pass  ve assessment (single 290506   290506	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi	number s in essment	Pass Northing	Sediment deposi Accumulating? Extensive? 816710 816710	tion for th	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Ave Step 2 Step 3  ent point (m) ucture (m)	Copper 0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib	ve assessment (singli 290506   290506   utary of Avie Lochan	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi	number s in ssment liation sment	Northing Northing	Sediment deposi Accumulating? Extensive? 816710 816710	tion for th	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment	Annual Ave Step 2 Step 3  ent point (m) ucture (m)	0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib	Pass  ve assessment (single 290506   290506	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi	number s in ssment liation sment	Northing Northing	Sediment deposi Accumulating? Extensive? 816710 816710	tion for th Yes No	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  AADT >10	0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib  <50,000  V	ve assessment (single 290506 290506 290506 Uttary of Avie Lochan	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi Version of assess	number s in ssment liation sment	Northing Northing	Sediment deposit Accumulating? Extensive?  816710 816710 LN AMJV 1	tion for th	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Ave Step 2 Step 3  ent point (m) ucture (m)	0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib  <50,000  V	ve assessment (single 290506 290506 290506 Climatic region	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi	number s in ssment liation sment	Northing Northing	Sediment deposit Accumulating? Extensive?  816710 816710 LN AMJV 1	tion for th	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  iver Network ID  AADT >10  Annual 95%il	0.45 0.17 0.000 and	A9 Non-cumulati Easting Easting DS5G Unnamed Trib  <50,000  V	ve assessment (single 290506 290506 290506 Uttary of Avie Lochan Climatic region	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi Version of assess	number s in essment liation sment Ra	Northing Northing Infall site  A	Sediment deposit Accumulating? Extensive?  816710 816710 LN AMJV 1	tion for th	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  iver Network ID  AADT >10  Annual 95%il	Copper 0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib  16/06/2016	ve assessment (single 290506 290506 290506 Uttary of Avie Lochan Climatic region	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 955	number s in ssment liation rment Ra	Northing Northing Infall site Arflow box to as II (ha) 0	Sediment deposit Accumulating? Extensive?  816710 816710 LN AMJV 1  rdtalnaig (SAAR 1343.6	tion for the Yes No	0.03 26	Low flow Vel m/s
AGENCY  Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  AADT >10  Annual 95%il Impermeable Base Flow In	Copper 0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib  (50,000 v) Tiow (m³/s) rea drained (h: 1)	ve assessment (single 290506 290506 290506 utary of Avie Lochan  Climatic region  0.001 0.608 0.404	HA Area / DBFO e outfall)  List of outfall cumulative asses Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95% Permeable area draining	number s in ssment liation rment Ra	Northing Northing Infall site Arflow box to as II (ha) 0	Sediment deposit Accumulating? Extensive?  816710 816710 LN AMJV 1  rdtalnaig (SAAR 1343.6	tion for the Yes No	0.03 26	Low flow Vel m/s Deposition Index
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Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  AADT >10  Annual 95%il Impermeable Base Flow In Water hardne	Copper 0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib  16/06/2016  C50,000  Low = <50mg Ca	ve assessment (single 290506 290506 290506 20001 a) 0.608 0.404	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95° Permeable area draining Is the discharge in or with	number s in sssment liation sment Ra Wille rive to outfa	Northing Northing Infall site A  rflowbox to as Il (ha) 0  upstream of a	Sediment deposition Accumulating? Extensive?  816710 816710  LIN AMJV 1  arctalnaig (SAAR 1343.9)  seess Step 1 runoff	emm)	0.03 26	Low flow Vel m/s Deposition Index
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Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  AADT >10  Annual 95%il Impermeable Base Flow In: Water hardne Is there a dov © Tier 1 Es	Copper 0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib  16/06/2016  10w (m³/s) rea drained (h: Fi) Low = <50mg Ca m structure, lad	ve assessment (single 290506 290506 290506 20001 a) 0.608 0.404	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95' Permeable area draining Is the discharge in or with	number s in sssment liation sment Ra  Wille rive to outfal in 1 00m	Northing Northing Infall site A  rflowbox to as Il (ha) 0  upstream of a	Sediment deposit Accumulating? Extensive?  816710 816710 10 11  LIN AMJV 11  Indianaig (SAAR 1343.5) Seess Step 1 runoff protected site for conditional discharge?	emm)  quality or	0.03 26	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  AADT >10  Annual 95%il Impermeable Base Flow In: Water hardne Is there a dov © Tier 1 Es	Copper 0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib  16/06/2016  10w (m³/s) rea drained (h: Fi) Low = <50mg Ca m structure, lad	ve assessment (single 290506 290506 290506 20001 a) 0.608 0.404 0.5001 v 0.5001 ake, pond or canal that it is considered to the considered	HA Area / DBFO e outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 959 Permeable area draining Is the discharge in or with at reduces the velocity with  Manning's n 0.07	number ssin sssment liation Ra Wile rive to outfal in 100m	Northing Northing Infall site A If low box to as Il (ha) 0 upstream of a lofthe point of delivers and the point of deliver	Sediment deposit Accumulating? Extensive?  816710 816710 LN AMJV 1  rdtalnaig (SAAR 1343.5) ssess Step 1 runoff protected site for conditional conditions and conditions are seen as a second condition of the conditions are seen as a second condition of the conditions are seen as a second condition of the conditi	emm)  quality or	0.03 26	Low flow Vel m/s Deposition Index  No   Do   Do  Do  Do  Do  Do  Do  Do  Do
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AGENCY  Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  AADT >10  Annual 95%il Impermeable Base Flow In: Water hardne Is there a dov © Tier 1 Es	Copper 0.45 0.17	A9 Non-cumulati Easting Easting DS5G Unnamed Trib  4006/2016  Compared trib  Comp	ve assessment (single 290506   290506   290506   290506   20010   2001	HA Area / DBFO e outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95' Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n  0.07	number s in sssment liation Ra widelerive to outfal in 100m Attu	Northing Northing  Infall site  A  If low box to as all (ha)  Upstream of a graph of the point o	Sediment deposit Accumulating? Extensive?  816710 816710 10 11  LN AMJV 11  Indianaig (SAAR 1343.5) Seess Step 1 runoff protected site for conditional conditions and conditions are seen as a second condition of the condition of	emm)  quality or  No  Long sl	0.03 26  Illy)  n?  Predic	Low flow Vel m/s Deposition Index  No   Do   Do  Do  Do  Do  Do  Do  Do  Do

HIGHWAY	S Highv	vays A	gen cy Wa	iter Risk	k Assessment 1	Tool	version 1.0 Nove	mber 200	19						
AGENCY				Soluble	e - Acute Impact		_			Sedime	nt - Chro	nic Im	pact		
	Annual Av	Copper	Zinc Zinc		Copper		Zinc			Sedin	nent de nos	ition f	or this site	is judaed	l as:
	Step 2	0.20	0.60 ug/l		Pass		Pass		Pass		nulating?	Yes	0.02		w Vel m/s
	Step 3	0.07	0.23 ug/l							Exten	_	No	23	Deposit	ition Index
Location Details															
Road number			A9				HA Area / DBFO	number							
Assessment type				lative asse	essment (single out	tfall)									•
OS grid reference of assess	sment point (m)		E asting		290143				Northing		815663				
OS grid reference of outfall	structure (m)		E asting		290490		_		Northing		815490				
Outfall number			DSJUNCT	10 N C34			List o foutfall								
Receiving watercourse			Allt na Crich	ne (Granis	h) *See Note		cumulative asse	ssment							
E A receiving water D etailed	RiverNetwork	ID					Assessor and aff	iliation			LN AMJV	/			
Date of assessment			16/06/2016	i			Version of assess	sment			1				
Notes			Outfall to Si	ide Road	Network. Assessm	ent P	o int taken at exist	ing A9 C	rossing Locati	on with A	Alt na Crich	e (Gra	ınish)		
Step 1 Runoff Quality	X AADT >1	0,000 and	I <50,000 •	Clin	maticregion C	Colder 1	Wet -	Ra	infall site	Ardtalnaig	(SAAR 1343.	9mm)			Ŀ
Step 2 River Impacts	Annual95%	ile river	flow (m <sup>3</sup> /s)		0.008 (Fr	nter z	zero in Annual 95	%ile rive	rflow how to a	ssess St	en 1 runo	ff qual	ity only)		
									_		op i idilo	ii quui	ny orny)		
	Imperm eabl	le road a	rea drained	(ha)	1.525 Pe	rmea	able area draining	to outfa	ll (ha)						
	Base Flow I	ndex (Bf	FI)	0.34	49 Is t	the d	lischarge in or with	nin 1 km	upstream of a	protecte	d site for o	onser	vation?	N	vo ▼ □
For dissolved zinc only	Water hardr	ness	Low = <50mg	CaCO3/I	- D										
For and import import only	v. In thoropole	wastas	om etrueture	laka par		duas	s the velocity with	in 100m	of the point of	dicabas	202		No	- D	
For sediment impact onl	-				nd or canal that red	au ce	stne velocity with	in toon	i of the point of	dischar	ger		140		
			d river width	(m)	2					_				_	
	↑Tier2 E	ed widtl	h (m)		3 Ma	nnin	ng's n 0.07	D	Side slope (n	n/m)	0.5	Lo	ng slope (m	ı/m) (	0.0001
Step 3 Mitigation						F		F etimate	ed effectivenes			$\overline{\neg}$			
Step 5 Miligation			Briefdesci	dation		+	Treatment for		enuation for		ement of	41	Pred	lict Imp	act
			bileidesci	приоп			solubles (%)		es - restricted		nents (%)				
								discha	rge rate (Vs)				Show D	etalled	Results
E xisting measures						0	D	Unlimite	ed 🕌 🕞	0	D	7			
Proposed measures Filt	er Drains & Wet/Re	etention Po	onds (Cu 40%.	Zn 62%, Se	ed 84%)	6		Unlimite	ed . D	84		$\dashv \blacksquare$		xlt Too	
HIGHWAY AGENCY	S Highv	ways A	gency Wa		k Assessment 1	Tool	version 1.0 Nove	mber 200	09						
AGENCY	Annual Av		oncentration Zinc	Soluble	e - Acute Impact Copper	Tool	Zinc		D/S Structure.	Sedin	ent - Chronnent depose		pact for this site		d as:
	riigiiv	verage Co	oncentration Zinc	Soluble	e - Acute Impact Copper	Tool	Zinc			Sedin Accur	nent depos	ition f	or this site	Low flo	
AGENCY  Location Details	Annual Av	Copper 0.45	Zinc   1.37   ug/l   0.52   ug/l	Soluble	e - Acute Impact Copper		Zinc Pass	Alert.		Sedin Accur	nent depos	ition f	or this site	Low flo	w Vel m/s
AGENCY  Location Details  Road number	Annual Av	Copper 0.45	Zinc   1.37   ug/l   0.52   ug/l	Soluble	e - Acute Impact Copper Pass		Zinc	Alert.		Sedin Accur	nent depos	ition f	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type	Annual Av Step 2 Step 3	Copper 0.45	Doncentration  Zinc  1.37 ug/l  0.52 ug/l  A9  Non-cumul	Soluble	e - Acute Impact Copper Pass		Zinc Pass	Alert.	D/S Structure.	Sedin Accur	nent depos mulating? usive?	ition f	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type OS grid reference of assess	Annual Av Step 2 Step 3	Copper 0.45	A9 Non-cumul	Soluble	e-Acute Impact Copper Pass essment (single out 290993		Zinc Pass	Alert.	D/S Structure.	Sedin Accur	nent depos mulating? ssive?	ition f	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type OS grid reference of asses: OS grid reference of outfall	Annual Av Step 2 Step 3	Copper 0.45	A9 Non-cumuli Easting Rocentration 1.37 ug/l 0.52 ug/l	Soluble	e - Acute Impact Copper Pass		Zinc Pass  HA Area / DBFO	Alert.	D/S Structure.	Sedin Accur	nent depos mulating? usive?	ition f	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type OS grid reference of asses: OS grid reference of outfall Outfall number	Annual Av Step 2 Step 3	Copper 0.45	A9 Non-cumuli Easting Easting 6BB	Soluble	e-Acute Impact Copper Pass essment (single out 290993		Zinc Pass  HA Area / DBFO  List of outfal	Alert.	D/S Structure.	Sedin Accur	nent depos mulating? ssive?	ition f	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type OS grid reference of asses: OS grid reference of outfall Outfall number Receiving watercourse	Annual Av Step 2 Step 3  Sment point (m) Structure (m)	verage Cc Copper 0.45 0.17	A9 Non-cumuli Easting Rocentration 1.37 ug/l 0.52 ug/l	Soluble	e-Acute Impact Copper Pass essment (single out 290993	tfall)	Zinc Pass  HA Area / DBFO  List of outfall cumulative asse	number	D/S Structure.	Sedin Accur	nent depos mulating? ssive? 818533 818533	Yes No	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving water Detailed	Annual Av Step 2 Step 3  Sment point (m) Structure (m)	verage Cc Copper 0.45 0.17	A9 Non-cumuli Easting Easting 6BB Allt Cnapaci	Soluble lative asset	e-Acute Impact Copper Pass essment (single out 290993	tfall)	Zinc Pass  HA Area / DBFO  List or outfal cumulative asses Assessor and affi	number	D/S Structure.	Sedin Accur	nent depos mulating? ssive?	Yes No	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed Date of assessment	Annual Av Step 2 Step 3  Sment point (m) Structure (m)	verage Cc Copper 0.45 0.17	A9 Non-cumuli Easting Easting 6BB	Soluble lative asset	e-Acute Impact Copper Pass essment (single out 290993	tfall)	Zinc Pass  HA Area / DBFO  List of outfall cumulative asse	number	D/S Structure.	Sedin Accur	nent depos mulating? ssive? 818533 818533	Yes No	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed	Annual Av Step 2 Step 3  Sment point (m) Structure (m)	verage Cc Copper 0.45 0.17	A9 Non-cumuli Easting Easting 6BB Allt Cnapaci	Soluble lative asset	e-Acute Impact Copper Pass essment (single out 290993	tfall)	Zinc Pass  HA Area / DBFO  List or outfal cumulative asses Assessor and affi	number	D/S Structure.	Sedin Accur	nent depos mulating? ssive? 818533 818533	Yes No	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type OS grid reference of assess OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed Date of assessment	Annual Av Step 2 Step 3  Sment point (m)  structure (m)	verage Cc Copper 0.45 0.17	A9 Non-cumul Easting Balting Allt Cnapaci	Soluble lative asset	e-Acute Impact Copper Pass essment (single out 290993 290993	tfall)	Zinc Pass  HA Area / DBFO  List of outfal - cumulative asse  Assessor and aff Version of assess	number s in essment iliation sment	D/S Structure.  Northing Northing	Sedin Accur Exten	nent depos mulating? ssive? 818533 818533	Yes No	or this site	Low flo	w Vel m/s
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Location Details Road number Assessment type OS grid reference of asses: OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality	Annual Av Step 2 Step 3  Sment point (m)  Structure (m)  d River Network	Copper 0.45 0.17	A9 Non-cumul Easting Easting 6BB Allt Cnapacl 1<50,000  flow (m³/s)	Soluble lative asso	e-Acute Impact Copper Pass  essment (single out 290993 290993  contact region C 0.004 (Er	tfall)	Zinc Pass  HA Area / DBFO  List of outfall cumulative asse  Assessor and affi Version of assess  Wet	number  s in essment iliation sment  Ra	Northing Northing Northing Infall site	Sedin Accur Exten	nent depos nulating? sive? 818533 818533 LN AMJV	Yes No	or this site	Low flo	w Vel m/s
Location Details Road number Assessment type OS grid reference of asses: OS grid reference of outfall Outfall number Receiving watercourse EA receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality	Annual Av Step 2 Step 3  Sment point (m)  Structure (m)  d River Network	ID  IO,000 and ale road a	A9 Non-cumul Easting Easting 6BB Allt Cnapacl 14 < 50,000  flow (m³/s) area drained	Soluble lative asso	e-Acute Impact Copper Pass  essment (single out 290993 290993  matic region  C  0.004  (Er 2.593  Pe	tfall)  Colder  nter z	List of outfall cumulative asses Assessor and affit Version of assession and assession of assession and affit version and aff	Alert.  Is in ssment Ra	Northing Northing Infall site	Sedin Accur Exten	818533 818533 8186533 818533	Yes No	or this site 0.00 488	Low floo	w Vel m/s tition Index
Location Details Road number Assessment type OS grid reference of asses: OS grid reference of outfall Outfall number Receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Av  Step 2 Step 3  Sment point (m)  structure (m)  d River Network  AADT >  Annual 95% Impermeable Base Flow I	Copperage CC COPPE	Ag Non-cumul Easting Easting 6BB Allt Cnapacl 16/06/2016  16/06/2016  The components of the components	lative association (ha)	essment (single out 290993  pass  matic region  0.004  2.593  Pe 44  Is t	tfall)  Colder  nter z	Zinc Pass  HA Area / DBFO  List of outfall cumulative asse  Assessor and affi Version of assess  Wet	Alert.  Is in ssment Ra	Northing Northing Infall site	Sedin Accur Exten	818533 818533 8186533 818533	Yes No	or this site 0.00 488	Low floo	w Vel m/s tition Index
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🚣 HIGHWA	YS	Highw	ays A	gency Wate	er Risk Asses	sment To	ool version 1.0	November	2009							
AGENCY					Soluble - Acute	Impact					Sedime	nt - Chro	nic In	npact		
	-   '	Annual Ave	erage Co Copper	Zinc	Copper	_	Zinc				Sedim	ent denos	sition	for this sit	nhui zi e	red as:
		Step 2	0.39	1.18 ug/l	Pass		Pass	Ale	rt. D/S Stru	ucture.		nulating?	Ye			flow Vel m/s
		Step 3	0.15	0.45 ug/l							Exten	sive?	No	4	6 Dep	osition Index
Location Details Road number				A9			HA Area / DE	REO numb	er							
Assessment type					tive assessment (	sinale outfa		SFO Humb	ei							
OS grid reference of asse	essment p	oint (m)		Easting	290826	on igic oduc	,		Northi	ng		820822				
OS grid reference of outfa				Easting	290826				Northi	-		820822				
Outfall number				7A	"			uttalls in								
Receiving watercourse				Feith Mhor			cumulative	assessme	nt							
EA receiving water Detail	led River	Network I	D				Assessor and	d affiliation	n '			LN AMJ\	V	,		
Date of assessment				16/06/2016			Version of as	ssessmen				1				
Notes																
Step 1 Runoff Qual	litz															
Step i Kulloli Qual	lity AAI	DT >10	0,000 and	1 <50,000 ▼	Climatic region	on Col	der Wet	<u> </u>	Rainfall si	te A	rdtalnaig (	SAAR 1343	3.9mm)			
Step 2 River Impact	ts Ann	nual 95%i	ile river	flow (m <sup>3</sup> /s)	0.007	/Ent	er zero in Annua	J 059/ilo r	vorflow b	ov to o	0000 Ct	on 1 runo	eff and	ality on ly)		
otop 2 ittioi impao	_				-						1	ep i iuno	ııı qua	ality Orliy)		
	Imp	ermeable	e road a	rea drained (f	na) 3.551	Pern	neable area drair	ning to ou	fall (ha)	0						
	Bas	se Flow In	ndex (BF	FI)	0.41	Is th	e discharge in or	r within 1 l	m upstrea	am of a	protecte	d site for o	conse	ervation?		No - D
For dissolved zinc only	v Wa	ter hardn	ess	Low = <50mg C	aCO3/I	D										
	-															
For sediment impact of	-				ake, pond or can	al that redu	ces the velocity	within 10	om of the	point of	discharg	je?		Yes	_	
	⊕ Ti			d river width (	· —						_		1			
	O Ti	ier2 B	ed width	h (m)	3	Man	ning's n 0.07	D	Sides	slope (m	/m)	0.5	L	ong slope (	m/m)	0.0001
Step 3 Mitigation								Eetim	ated effec	tivonocc			$\exists 1$			
Step 3 Willigation				Brief descrip	otion		Treatment fo		ttenuation			ement of		Pre	dict In	npact
							solubles (%	solu	bles - res	tricted		nents (%)				
Edeler man									harge rate	e (l/s)				Show I	Detaile	ed Results
Existing measures								D	nited	D	0	D	Ш			
Proposed measures F	Filter Drains	& Wet/Ret	tention Po	onds (Cu 40%, Z	n 62%, Sed 84%)		62	Unlii	nited	D	84				Exit To	ool
							·									
HIGHWA' AGENCY		Annual Ave	erage Co Copper 1.25	once ntration Zinc 3.82 ug/l	er Risk Asses Soluble - Acute Copper	Impact	Zinc		2009 rt. D/S Stru		Sed im	nulating?	sition Yes	for this site	5 Low	flow Vel m/s
AGENCY		Annual Ave	erage Co Copper	oncentration Zinc	Soluble - Acute Copper	Impact	Zinc				Sed im	ent de pos nulating?	sition	for this site	5 Low	
		Annual Ave	erage Co Copper 1.25	once ntration Zinc 3.82 ug/l	Soluble - Acute Copper	Impact	Zinc	A le	rt. D/S Stru		Sed im	ent de pos nulating?	sition Yes	for this site	5 Low	flow Vel m/s
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AGENCY  Location Details  Road number	,	Annual Ave Step 2 Step 3	erage Co Copper 1.25	oncentration Zinc 3.82 ug/l 1.45 ug/l	Soluble - Acute Copper Pass	Impact	Zinc Pass HA Area / DB	A le	rt. D/S Stru	ucture.	Sed im	ent de pos nulating?	sition Yes	for this site	5 Low	flow Vel m/s
AGENCY  Location Details  Road number  Assessment type  OS grid reference of asse OS grid reference of outfa	essment p	Step 2 Step 3	erage Co Copper 1.25	Discontration  Zinc  3.82 ug/l  1.45 ug/l  A9  Non-cumulat	Soluble - Acute Copper Pass	Impact	Zinc Pass HA Area / DB	A le	ert. D/S Stru	ucture.	Sed im	ent de pos nulating? sive?	sition Yes	for this site	5 Low	flow Vel m/s
AGENCY  Location Details Road number Assessment type OS grid reference of asse OS grid reference of outfall Outfall number	essment p	Step 2 Step 3	erage Co Copper 1.25	A9 Non-cumulat E asting E asting 7B	Soluble - Acute Copper Pass tive assessment ( 290815	Impact	Zinc Pass HA Area / DE	BFO numb	er Northir	ucture.	Sed im	ent de pos nulating? sive?	sition Yes	for this site	5 Low	flow Vel m/s
Location Details Road number Assessment type OS grid reference of outs Outfall number Receiving watercourse	essment p	Step 2 Step 3 Step 3	erage Co Copper 1.25 0.47	A9 Non-cumulat E asting	Soluble - Acute Copper Pass tive assessment ( 290815	Impact	Zinc Pass  HA Area / DE  II)  List o for cumulative is	A le BFO numb	er Northin	ucture.	Sed im	ent de pos nulating? sive? 820894	sition Yes No	for this site	5 Low	flow Vel m/s
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Location Details Road number Assessment type OS grid reference of asse OS grid reference of outfal Outfall number Receiving watercourse EA receiving water Detail	essment p	Step 2 Step 3 Step 3	erage Co Copper 1.25 0.47	A9 Non-cumulal Easting Easting Tributary of Fe	Soluble - Acute Copper Pass tive assessment ( 290815	Impact	Zinc Pass  HA Area / DE  II)  List of or cumulative is Assessor and	A ke BFO numb  utfalls in assessme d affiliation	er Northin	ucture.	Sed im	ent de pos nulating? sive? 820894	sition Yes No	for this site	5 Low	flow Vel m/s
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Location Details Road number Assessment type OS grid reference of outs Outfall number Receiving watercourse EA receiving water Detail Date of assessment Notes  Step 1 Runoff Qual	essment p all structure led River I	Step 2 Step 3  Step 3  Step 1  Step 3  Step 4  Step 5  Step 5  Step 5  Step 5  Step 6  Step 6  Step 6  Step 6  Step 6  Step 6  Step 7  Step 6  Step 7  Step 6  Step 7	erage Copper 1.25 0.47	A9 Non-cumulat E asting Trib utary of Fr  450,000  flow (m³/s) rea drained (l	Soluble - Acute Copper Pass  iive assessment ( 290815 290815 290815 Climaticregic	single outs  (Ent	HA Area / DE    HA Area / DE   II)    List of or   cumulative   cumula	Ake BFO numb  utfalls in assessment d affiliation ssessment	er Northin Northin Rainfall sit	nq nq ox to as	Sed im Accum Exten	sent depos sulating? sive? 820894 820894 LN AMJV 1	Sition Yes No	for this sittle is 0.0.0 or 1.0 or 1.	5 Low	flow Vel m/s
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Location Details Road number Assessment type OS grid reference of asse OS grid reference of outse Outfall number Receiving watercourse EA receiving water Detail Date of assessment Notes  Step 1 Runoff Qual  Step 2 River Impact	essment plant structure led River I lity AAI ts Ann Imp Bas y Wat very Is the Time	Step 2 Step 3  soint (m) e (m)  Network II  DT >10  nual 95% be meable se Flow Inter hardnere a do	D  D  D  D  D  D  D  D  D  D  D  D  D	A9	Climatic regin	impact  single outfa  (Entre Perm Is the p	List of for cumulative in Assessor and Version of as very wet.	A ke  BFO numb  utfalls in assessment  d affiliation assessment  in 195%ile rining to our within 1 ke  within 10 ke  within 10 ke	er Northin Northin Rainfall sit ver flow b tfall (ha)	te A	Sed im Accum Exten	sent de pos sulating? sive? 820894 820894 LN AMJV 1	No N	for this sitting of the second	Depoi	fow Vel m/s osition Index
Location Details Road number Assessment type OS grid reference of asse OS grid reference of outse Outfall number Receiving watercourse EA receiving water Detail Date of assessment Notes  Step 1 Runoff Qual  Step 2 River Impact	essment plant structure led River I lity AAI ts Ann Imp Bas y Wat very Is the	Step 2 Step 3  soint (m) e (m)  Network II  DT >10  nual 95% be meable se Flow Inter hardnere a dorer1 E.	D  D  D  D  D  D  D  D  D  D  D  D  D	A9	Climatic region	impact  single outfa  (Entre Perm Is the p	List of or cumulative a Assessor and Version of as Version are a drained bie area drained bie area drained bie area drained bie area drained bies area drain	A ke BFO numb  utfalls in assessment  d affiliation ssessment  I 195%iller in ning to ou r within 1 ke within 10	er Northin Northin Rainfall sit ver flow b tfall (ha)	nq nq ox to a:	Sed im Accumum Extension (Sed in Accumum Ext	sive?  820 894  820 894  LN AMJV  1  SAAR 1343  ep 1 runo  d site for o	No N	for this sittle and the state of the state o	Depo	fow Vel m/s osition Index
AGENCY  Location Details Road number Assessment type OS grid reference of asse OS grid reference of outia Outfall number Receiving waterourse EA receiving water Detail Date of assessment Notes  Step 1 Runoff Qual  Step 2 River Impact  For dissolved zinc only For sediment impact of	essment plant structure led River I lity AAI ts Ann Imp Bas y Wat very Is the	Step 2 Step 3  soint (m) e (m)  Network II  DT >10  nual 95% be meable se Flow Inter hardnere a dorer1 E.	D  D  D  D  D  D  D  D  D  D  D  D  D	A9	Soluble - Acute Copper Pass  iive assessment ( 290815 290815 290815 eith Mhor  Climatic region 0.002 4.729 0.48 aCO34  ake, pond or can m) 0.5 3	impact  single outfa  (Entre Perm Is the p	List of or cumulative a Assessor and Version of as Version of as et al. (a) and the control of the cumulative are a drained as the control of the control of the control of the control of the cumulative area of the control of the control of the control of the control of the cumulative area of the control o	A ke  BFO numb  utfalls in assessment  d affiliation seessment  in 195%ile rinning to our within 11 ke  within 10 ke  E stim	er Northir Northir nt Rainfall sit ver flow b tfall (ha) Om of the p Side s	ox to a:	Sed im Accument Accum	B20894 B20894 B20894 LN AMJV 1 SAAR 1343 ep 1 runo d site for c	No N	for this sittle and the state of the state o	Depoi	fow Vel m/s osition Index
AGENCY  Location Details Road number Assessment type OS grid reference of asse OS grid reference of outia Outfall number Receiving waterourse EA receiving water Detail Date of assessment Notes  Step 1 Runoff Qual  Step 2 River Impact  For dissolved zinc only For sediment impact of	essment plant structure led River I lity AAI ts Ann Imp Bas y Wat very Is the	Step 2 Step 3  soint (m) e (m)  Network II  DT >10  nual 95% be meable se Flow Inter hardnere a dorer1 E.	D  D  D  D  D  D  D  D  D  D  D  D  D	A9	Soluble - Acute Copper Pass  iive assessment ( 290815 290815 290815 eith Mhor  Climatic region 0.002 4.729 0.48 aCO34  ake, pond or can m) 0.5 3	impact  single outfa  (Entre Perm Is the p	HA Area / DE    HA Area / DE   II)    List of for cumulative a large in a lar	atfalls in assessment of affiliation or within 10 within 10 Estimator of a state of the state of	er Northin Nor	te A  ox to a:  ox am of a	Sed im Accument Accum	sent depos sulating? sive?  820894 820894 LN AMJV 1 SAAR 1343 ep 1 runo d site for o	No N	ality only)  Yes  Pre	Low Depo	No No Double On No No Double On
AGENCY  Location Details Road number Assessment type OS grid reference of asse OS grid reference of outia Outfall number Receiving waterourse EA receiving water Detail Date of assessment Notes  Step 1 Runoff Qual  Step 2 River Impact  For dissolved zinc only For sediment impact of	essment plant structure led River I lity AAI ts Ann Imp Bas y Wat very Is the	Step 2 Step 3  soint (m) e (m)  Network II  DT >10  nual 95% be meable se Flow Inter hardnere a dorer1 E.	D  D  D  D  D  D  D  D  D  D  D  D  D	A9	Soluble - Acute Copper Pass  iive assessment ( 290815 290815 290815 eith Mhor  Climatic region 0.002 4.729 0.48 aCO34  ake, pond or can m) 0.5 3	impact  single outfa  (Entre Perm Is the p	List of or cumulative a Assessor and Version of as Version of as et al. (a) and the control of the cumulative are a drained as the control of the control of the control of the control of the cumulative area of the control of the control of the control of the control of the cumulative area of the control o	atfalls in assessment assessment assessment at 195% iller in ing to our within 10 within 10 within 10 best in solutions.	Northin Northi	te A  ox to a:  ox am of a	Sed im Accument Accum	B20894 B20894 B20894 LN AMJV 1 SAAR 1343 ep 1 runo d site for c	No N	ality only)  Yes  Pre	Low Depo	fow Vel m/s osition Index



AGENCY AGENCY	Highways A	gency Water	r KISK ASSESSM	ent Tool version 1.0 Nove	mber 200	)9			
AGENOT			oluble - Acute Imp			:	Sediment - Chror	nic Impact	
	Annual Average Co		Copper	Zinc			Sediment depos	ition for this	site is judged as:
	Step 2 0.00	0.01 ug/l	Pass	Pass		Protected Area //S Structure.	Accumulating?	Yes	0.06 Low flow Vel m/s
	Step 3 0.00	0.00 ug/l			a L	73 Structure.	Extensive?	No	1 Deposition Index
Location Details									
Road number		A9		HA Area / DBFO	number				
Assessment type		Non-cumulativ	e assessment (sing	le outfall)					•
OS grid reference of assessm		Easting	289609			Northing	822506		
OS grid reference of outfall str	ucture (m)	Easting	289609			Northing	822506		
Outfall number		8A		List of outfall cumulative asse					
Receiving watercourse		River Dulnain		curiulative asse	SSITIETIL				
EA receiving water Detailed R	iver Network ID			Assessor and affi	liation		LN AMJV	1	
Date of assessment		16/06/2016		Version of assess	sment		1		
Notes							'		
Step 1 Runoff Quality	AADT >10,000 and	d <50,000	Climatic region	Colder Wet 🔻	Ra	infall site A	rdtalnaig (SAAR 1343.	9mm)	•
Step 2 River Impacts	Annual 95%ile river	flow (m <sup>3</sup> /s)	0.884	(Enter zero in Annual 959	%ile rive	rflow box to as	sess Step 1 runof	f quality only	')
	Impermeable road a	rea drained (ha	1.829	Permeable area draining	to outfa	ll (ha) 0	1		
	•			_					
	Base Flow Index (BI	FI)	0.44	Is the discharge in or with	nin 1 km	upstream of a p	protected site for c	onservation'	? Yes -
For dissolved zinc only	Water hardness	Low = <50mg Ca0	CO3/I 🔻 🗖						
T OF GISSOIVEG ZING OTHY									
For sediment impact only	Is there a downstrea	am structure, lal	ke, pond or canal th	at reduces the velocity with	in 100m	of the point of o	discharge?	Yes	<b>_</b>
	Tier 1 Estimate	d river width (m	) 18						
	○ Tier 2 Bed widt	h (m)	3	Manning's n 0.07	D	Side slope (m.	/m) 0.5	Long slop	oe (m/m) 0.0001
							, L		
Step 3 Mitigation					Estimate	ed effectiveness			
		Brief descripti	ion	Treatment for		enuation for	Settlement of	7	Predict Impact
				solubles ( %)		es - restricted	sediments (%)		
Existing measures						rge rate ( l/s )		Shov	w Detailed Results
				0 D	Unlimit		0 D		
Proposed measures Filter I	Drains & Dry/Detention Po	ond (Cu 0%, Zn 45%	%, Sed 80%)	45	Unlimit	ed D	80		Exit Tool
HIGHWAYS	Highways A	gency Water	r Risk Assessm	ent Tool version 1.0 Nove	mber 200	09			
HIGHWAYS AGENCY	Annual Average Co	Soncentration Zinc	oluble - Acute Imp Copper	Zinc		;		ition for this	site is judged as:
	Annual Average Co Copper Step 2 0.01	Soncentration  Zinc  0.04  ug/l	oluble - Acute Imp	act			Sediment depos Accumulating?	ition for this	0.03 Low flow Vel m/s
AGENCY	Annual Average Co	Soncentration Zinc	oluble - Acute Imp Copper	act Zinc		;	Sediment depos	ition for this	
	Annual Average Co Copper Step 2 0.01	Soncentration  Zinc  0.04  0.02  ug/l  ug/l	oluble - Acute Imp Copper	act Zinc	Alert.	;	Sediment depos Accumulating?	ition for this	0.03 Low flow Vel m/s
AGENCY  Location Details Road number	Annual Average Co Copper Step 2 0.01	Soncentration   Zinc   0.04   ug/l   0.02   ug/l	oluble - Acute Imp Copper Pass	Zinc Pass HA Area / DBFO	Alert.	;	Sediment depos Accumulating?	ition for this	0.03 Low flow Vel m/s
AGENCY  Location Details	Annual Average CC	Soncentration   Zinc   0.04   ug/l   0.02   ug/l	Pass  Pass  Pe assessment (sing	Zinc Pass HA Area / DBFO	Alert.	;	Sediment depos Accumulating? Extensive?	ition for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type	Annual Average CC	Soncentration  Zinc  0.04  0.02  ug/l  A9  Non-cumulativ	oluble - Acute Imp Copper Pass ve assessment (sing 289152	Zinc Pass HA Area / DBFO	Alert.	Protected Area.	Sediment depos Accumulating?	ition for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm	Annual Average CC	Soncentration  Zinc 0.04 ug/l 0.02 ug/l  A9  Non-cumulativ Easting Easting	Pass  Pass  Pe assessment (sing	Zinc Pass HA Area / DBFO	Alert.	Protected Area.	Sediment depos Accumulating? Extensive?	ition for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Annual Average CC	A9 Non-cumulativ Easting Easting 8C	ve assessment (sing 289152   289152	HA Area / DBFO	Alert.	Protected Area.	Sediment depos Accumulating? Extensive?	ition for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse	Annual Average Ct	Soncentration  Zinc 0.04 ug/l 0.02 ug/l  A9  Non-cumulativ Easting Easting	ve assessment (sing 289152   289152	HA Area / DBFO  List of outfall  cumulative asse	Alert. number	Protected Area.	Sediment depos Accumulating? Extensive?	Yes No	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Annual Average Ct	A9 Non-cumulativ Easting Easting 8C Allt nan Ceatha	ve assessment (sing 289152   289152	HA Area / DBFO le outfall)  List of outfall	Alert.  number  s in essment	Protected Area.	Sediment depos Accumulating? Extensive?	Yes No	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R	Annual Average Ct	A9 Non-cumulativ Easting Easting 8C	ve assessment (sing 289152   289152	HA Area / DBFO  He outfall)  List of outfall  cumulative asse  Assessor and affi	Alert.  number  s in essment liation	Protected Area.	Sediment depos Accumulating? Extensive?	Yes No	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Average Ct Copper Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)	A9 Non-cumulativ Easting Easting 8C Allt nan Ceatha	ve assessment (sing 289152   289152	HA Area / DBFO  He outfall)  List of outfall  cumulative asse  Assessor and affi	Alert.  number  s in essment liation	Protected Area.	Sediment depos Accumulating? Extensive?	Yes No	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Average Ct Copper Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)	A9 Non-cumulativ Easting Easting 8C Allt nan Ceatha	ve assessment (sing 289152 289152 arnach	HA Area / DBFO  List of outfall)  List of outfall  cumulative asses  Assessor and affi  Version of assess	Alert.  number  s in ssment liation sment	Protected Area.  Northing Northing	Sediment depos Accumulating? Extensive?	ves No	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving water Detailed R Date of assessment	Annual Average Ct Copper Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)	A9 Non-cumulativ Easting Easting 8C Allt nan Ceatha	ve assessment (sing 289152   289152	HA Area / DBFO  List of outfall)  List of outfall  cumulative asses  Assessor and affi  Version of assess	Alert.  number  s in ssment liation sment	Protected Area.  Northing Northing	Sediment depos Accumulating? Extensive? 822981 822981 LN AMJV	ves No	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Average Ct Copper Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)	A9 Non-cumulativ Easting Easting 8C Allt nan Ceatha	ve assessment (sing 289152 289152 arnach	HA Area / DBFO  Ha Area / DBFO  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet	number s in ssment liation sment	Northing Northing infall site	Sediment depos Accumulating? Extensive?  822981 822981 1 LN AMJV 1	ves No	0.03 Low flow Vel m/s 3 Deposition Index
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average Ct Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river	A9 Non-cumulativ Easting Easting 8C Allt nan Ceatha	ve assessment (sing 289152 289152 arrnach	HA Area / DBFO  He outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 955	Alert.  number  s in essment liation sment  Ra	Northing Northing infall site  Autoriflow box to as	Sediment depos Accumulating? Extensive?  822981 822981 1 LN AMJV 1	ves No	0.03 Low flow Vel m/s 3 Deposition Index
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average Ct Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a	A9 Non-cumulativ Easting Easting 8C Allt nan Ceatha 1d<50,000	ve assessment (sing 289152 289152 arrach Climatic region 0.044 0.63	HA Area / DBFO  Ha Area / DBFO  List of outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining	Alert.  number  s in sssment liation Ra	Northing Northing infall site Auriflow box to as II (ha) 0	Sediment depos Accumulating? Extensive?  822981 822981 1 LN AMJV 1 rdtainaig (SAAR 1343	west and the second sec	0.03 Low flow Vel m/s Deposition Index
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average Ct Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river	A9 Non-cumulativ Easting Easting 8C Allt nan Ceatha 1d<50,000	ve assessment (sing 289152 289152 arrnach	HA Area / DBFO  He outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 955	Alert.  number  s in sssment liation Ra	Northing Northing infall site Auriflow box to as II (ha) 0	Sediment depos Accumulating? Extensive?  822981 822981 1 LN AMJV 1 rdtainaig (SAAR 1343	west and the second sec	0.03 Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving waterourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Ct Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a Base Flow Index (B)	A9 Non-cumulativ Easting BC Allt nan Ceatha  16/06/2016  d < 50,000   flow (m³/s)  area drained (ha FI)	ve assessment (sing 289152 289152 arrach  Climatic region 0.044 0.63 0.28	HA Area / DBFO  Ha Area / DBFO  List of outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining	Alert.  number  s in sssment liation Ra	Northing Northing infall site Auriflow box to as II (ha) 0	Sediment depos Accumulating? Extensive?  822981 822981 1 LN AMJV 1 rdtainaig (SAAR 1343	west and the second sec	0.03 Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness	A9  Non-cumulativ Easting Easting 8C  All nan Ceatha 16/06/2016  d <50,000   flow (m³/s) area drained (ha FI)  Low = <50mg Cat	ve assessment (sing   289152   289152   289152   289152   289152   289152   289152   289152   289152   289152   289152   289152   289152   299152	HA Area / DBFO  List of outfall)  List of outfall  cumulative asses  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining ls the discharge in or with	Alert.  s in sssment liation Ra  Wille rive to outfa	Northing Northing Infall site  All (ha)  Upstream of a p	Sediment depos Accumulating? Extensive?  822981 822981 LN AMJV 1  rdtaineig (SAAR 1343.	9mm)  f quality only	0.03 Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving waterourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a Base Flow Index (B) Water hardness Is there a downstrea	A9 Non-cumulativ Easting BC All nan Ceatha  16/06/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016	ve assessment (sing 289152 289152 arnach Climatic region 0.044 0.63 0.28 0.28 0.28 0.28 0.28 0.28 0.28 0.28	HA Area / DBFO  Ha Area / DBFO  List of outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining	Alert.  s in sssment liation Ra  Wille rive to outfa	Northing Northing Infall site  All (ha)  Upstream of a p	Sediment depos Accumulating? Extensive?  822981 822981 LN AMJV 1  rdtaineig (SAAR 1343.	west and the second sec	0.03 Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a Base Flow Index (B) Water hardness Is there a downstrea	A9  Non-cumulativ Easting Easting 8C  All nan Ceatha 16/06/2016  d <50,000   flow (m³/s) area drained (ha FI)  Low = <50mg Cat	ve assessment (sing 289152 289152 arnach Climatic region 0.044 0.63 0.28 0.28 0.28 0.28 0.28 0.28 0.28 0.28	HA Area / DBFO  List of outfall)  List of outfall  cumulative asses  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining ls the discharge in or with	Alert.  s in sssment liation Ra  Wille rive to outfa	Northing Northing Infall site  All (ha)  Upstream of a p	Sediment depos Accumulating? Extensive?  822981 822981 LN AMJV 1  rdtaineig (SAAR 1343.	9mm)  f quality only	0.03 Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and  Annual 95%ile river Impermeable road a Base Flow Index (B) Water hardness Is there a downstrea	A9 Non-cumulativ Easting BC All nan Ceatha  16/06/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016	ve assessment (sing 289152 289152 arnach Climatic region 0.044 0.63 0.28 0.28 0.28 0.28 0.28 0.28 0.28 0.28	HA Area / DBFO  List of outfall)  List of outfall  cumulative asses  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining ls the discharge in or with	Alert.  s in sssment liation Ra  Wille rive to outfa	Northing Northing Infall site  All (ha)  Upstream of a p	Sediment depos Accumulating? Extensive?  822981 822981 1 LN AMJV 1 rotalnaig (SAAR 1343.	9mm)  f quality only	0.03 Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea	A9 Non-cumulativ Easting BC All nan Ceatha  16/06/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016	ve assessment (sing 289152 289152 arrach  Climatic region  0.044 0.63 0.28 0.28 cools ve pond or canal the cools of the co	HA Area / DBFO  HA Area / DBFO  List of outfall)  List of outfall  cumulative asses  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 959  Permeable area draining Is the discharge in or with the dis	Alert.  number  s in sysment liation sment  Ra  Wille rive to outfall in 100m	Northing Nor	Sediment depos Accumulating? Extensive?  822981 822981 1 LN AMJV 1 rotalnaig (SAAR 1343.	9mm)  onservation (No	0.03 Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea	A9 Non-cumulativ Easting Easting BC Allt nan Ceatha 16/06/2016  It is a drained (ha FI) Low = <50mg Cat am structure, lai d river width (m h (m)	ve assessment (sing	HA Area / DBFO  List of outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95° Permeable area draining Is the discharge in or with  att reduces the velocity with  Manning's n 0.07	Alert.  number  s in sssment liation sment  Ra  Wille rive to outfa nin 1 km	Northing Northing Infall site  A  Infall site	Sediment depos Accumulating? Extensive?  822981 822981 1 LIN AMJV 1 rdtaining (SAAR 1343.  ssess Step 1 runol protected site for continuous sites for contin	9mm)  If quality only  Onservation?	Low flow Vel m/s 3 Deposition Index  Peposition Index  Yes V
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea	A9 Non-cumulativ Easting BC All nan Ceatha  16/06/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016  10/08/2016	ve assessment (sing	HA Area / DBFO  Hase  HA Area / DBFO  List of outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95' Permeable area draining Is the discharge in or with  at reduces the velocity with  Manning's n  0.07	Alert.  number  s in ssment  liation sment  Ra  Wille rive to outfal in 100m  Atti	Northing Northing Infall site  All Infall site Infow box to as Ill (ha) Infall site of the point of or Infall site of the po	Sediment depos Accumulating? Extensive?  822981 822981  LN AMJV 1  rdtaining (SAAR 1343. ssess Step 1 runol protected site for c	9mm)  If quality only  Onservation?	0.03 Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea Tier 1 Estimate	A9 Non-cumulativ Easting Easting BC Allt nan Ceatha 16/06/2016  Id <50,000  It low = <50mg Cat am structure, lai d river width (m h (m)	ve assessment (sing	HA Area / DBFO  List of outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95° Permeable area draining Is the discharge in or with  att reduces the velocity with  Manning's n 0.07	Alert.  number  s in sssment liation sment  Ra  %ille rive to outfal in 100m  Estimata Attus solubi	Northing Northing Infall site  A  Infall site	Sediment depos Accumulating? Extensive?  822981 822981 1 LIN AMJV 1 rdtaining (SAAR 1343.  ssess Step 1 runol protected site for continuous sites for contin	9mm)  If quality only onservation?	Low flow Vel m/s Deposition Index  Yes V  Predict Impact
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea Tier 1 Estimate	A9 Non-cumulativ Easting Easting BC Allt nan Ceatha 16/06/2016  Id <50,000  It low = <50mg Cat am structure, lai d river width (m h (m)	ve assessment (sing	HA Area / DBFO  Ha Area / DBFO  List of outfall)  List of outfall  cumulative asses  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 950  Permeable area draining is the discharge in or with att reduces the velocity with Manning's n  Treatment for solubles (%)	Alert.  number  s in sssment liation sment  Ra  %ille rive to outfal in 100m  Estimata Attus solubi	Protected Area.  Northing Northing  Infall site  Area  Infall site  Infall site	Sediment depos Accumulating? Extensive?  822981 822981  LN AMJV 1  rdtaining (SAAR 1343. ssess Step 1 runol protected site for c	9mm)  If quality only onservation?	Low flow Vel m/s 3 Deposition Index  Peposition Index  Yes V
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only  Step 3 Mittigation  Existing measures	Annual Average Cc Step 2 0.01 Step 3 0.01  ent point (m) ucture (m)  AADT >10,000 and Annual 95%ile river Impermeable road a Base Flow Index (Bi Water hardness Is there a downstrea Tier 1 Estimate	A9 Non-cumulativ Easting Easting BC Allt nan Ceatha 16/06/2016  Id <50,000  Id	ve assessment (sing	HA Area / DBFO  List of outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining Is the discharge in or with  att reduces the velocity with  Manning's n 0.07  Treatment for solubles (%)	Alert.  number  s in sssment liation sment  Ra  Wille rive to outfa anin 1 km  In 100m  Attute Soluble discha	Northing Northing Northing Northing  Infall site  A  Infall site  Infall site  A  Infall site  A  Infall site  In	Sediment depos Accumulating? Extensive?  822981 822981 1 1 Industrial (SAAR 1343) Seess Step 1 runof Discharge?  Settlement of sediments (%)	9mm)  If quality only onservation?	Low flow Vel m/s Deposition Index  Yes V  Predict Impact

HIGHWAYS AGENCY	Highw	ays Ag	gency Wate	r KISK ASSESSM	ent Tool version 1.0 Nover	mber 200	09				
AGENCY				Soluble - Acute Impa				Sediment - Chron	ic Impact	:	
	Annual Ave	crage Cor Copper	ncentration Zinc	Copper	Zinc			Sediment depos	ition for th	ie eita ie i	indued as:
	Step 2	0.04	0.14 ug/l	Pass	Pass	Alert.	Protected Area.	Accumulating?	Yes		Low flow Vel m/s
	Step 3	0.02	0.08 ug/l					Extensive?	No	11	Deposition Index
Location Details	,										
Road number			A9		HA Area / DBFO	number					
Assessment type				ve assessment (singl	le outfall)		T				-
OS grid reference of assessm			Easting	289126			Northing	823007			
OS grid reference of outfall str	ucture (m)		Easting	289126	List of outfall	o in	Northing	823007		-	
Outfall number			8D		cumulative asse						
Receiving watercourse			Allt nan Ceatha	arnacn				1			
EA receiving water Detailed R	liver Network II				Assessor and affi			LN AMJ\	'		
Date of assessment			24/06/2016		Version of assess	sment		1			
Notes											
Step 1 Runoff Quality	AADT . 10	0,000 and	-50.000	Olii	Colder Wet ▼			retalnaia (CAAD 1212	0		
Otop 1 Italion Quality	AADT >10	,000 and	<50,000	Climatic region	Colder Wet -	ка	infall site A	rdtalnaig (SAAR 1343.	911111)		
Step 2 River Impacts	Annual 95%i	le river f	flow (m <sup>3</sup> /s)	0.044	(Enter zero in Annual 95%	/ ilo rivo	rflowbox to or	oooo Stop 1 rupoi	f au ality o	alu)	
								I	i quality of	iiy)	
	Impermeable	road ar	rea drained (h	a) 2.195	Permeable area draining	to outfa	III (ha) 0				
	Base Flow In	dex (BF	-I)	0.28	Is the discharge in or with	in 1 km	upstream of a	protected site for o	onservatio	on?	Yes -
For discount of the control	Matar barda										
For dissolved zinc only	Water hardn	ess ———	Low = <50mg Ca	CO3/I • D							
For sediment impact only	Is there a dov	wnstrea	ım structure, la	ike, pond or canal th	at reduces the velocity with	in 100m	of the point of	discharge?	N	0 -	D
	Tier1 Es	stimated	d river width (m	n) 5							
	○Tier2 Be	ed width	n (m)	3	Manning's n 0.07	D	Side slope (m	/m) 0.5	Lonas	lope (m/m	0.0001
					, J.			,			<u>,                                     </u>
Step 3 Mitigation					E	Estimate	ed effectiveness			Dradia	t Impact
			Brief descrip	tion	Treatment for		enuation for	Settlement of	╗	Predic	t impact
					solubles ( %)		es - restricted arge rate ( l/s )	sediments ( %)			
Existing measures					0	Unlimit	od	0	Sh	ow Deta	ailed Results
	D' A D/D-1-		-1(0.00/ 7.45	0 - 1 000()			. 14	D	_		
Proposed measures Filter I	Drains & Dry/Dete	ention Por	nd (Cu 0%, Zn 45	%, Sed 80%)	45	Unlimit	ed 🔻 D	80		Exi	t Tool
A UIGUWAYE											
HIGHWAYS AGENCY	Highw	ays Aç			entTool version 1.0 Nover	mber 200					
			S	Soluble - Acute Impa	act	mber 200		Sediment - Chro	nic Impact	:	
			ncentration	Soluble - Acute Impa Copper	act Zinc			Sediment - Chron	-		judged as:
	Annual Ave	copper 0.93	ncentration Zinc 2.83 ug/l	Soluble - Acute Impa	act			Sediment depos Accumulating?	ition for th	0.03	Low flow Vel m/s
AGENCY	Annual Ave	erage Cor Copper	ncentration Zinc	Soluble - Acute Impa Copper	act Zinc			Sediment depos	ition for th	nis site is j	1 -
AGENCY  Location Details	Annual Ave	Copper 0.93 0.36	ncentration Zinc 2.83 ug/l 1.08 ug/l	Soluble - Acute Impa Copper	Zinc Pass	Alert.		Sediment depos Accumulating?	ition for th	0.03	Low flow Vel m/s
AGENCY  Location Details  Road number	Annual Ave	Copper 0.93 0.36	ncentration Zinc 2.83 ug/l 1.08 ug/l	Soluble - Acute Impa Copper Pass	Zinc Pass HA Area / DBFO	Alert.		Sediment depos Accumulating?	ition for th	0.03	Low flow Vel m/s
AGENCY  Location Details  Road number  Assessment type	Annual Ave	Copper 0.93 0.36	ncentration Zinc 2.83 1.08 ug/l A9 Non-cumulati	Copper  Pass  ve assessment (single	Zinc Pass HA Area / DBFO	Alert.	Protected Area.	Sediment depos Accumulating? Extensive?	ition for th	0.03	Low flow Vel m/s
AGENCY  Location Details  Road number  Assessment type  OS grid reference of assessm	Annual Ave Step 2 Step 3	Copper 0.93 0.36	A9 Non-cumulating	Pass  ve assessment (single 288557	Zinc Pass HA Area / DBFO	Alert.	Protected Area.	Sediment depos Accumulating? Extensive?	ition for th	0.03	Low flow Vel m/s
AGENCY  Location Details  Road number  Assessment type	Annual Ave Step 2 Step 3	Copper 0.93 0.36	A9 Non-cumulatin Easting Easting	Copper  Pass  ve assessment (single	Zinc Pass HA Area / DBFO	Alert.	Protected Area.	Sediment depos Accumulating? Extensive?	ition for th	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number	Annual Ave Step 2 Step 3	Copper 0.93 0.36	A9 Non-cumulati Easting Easting 9A	Pass  ve assessment (single 288557   288557	Pass  HA Area / DBFO le outfall)	Alert.	Protected Area.	Sediment depos Accumulating? Extensive?	ition for th	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse	Annual Ave Step 2 Step 3  ent point (m) ucture (m)	Copper 0.93 0.36	A9 Non-cumulatin Easting Easting	Pass  ve assessment (single 288557   288557	HA Area / DBFO le outfall)  List of outfalk cumulative asse	Alert. number	Protected Area.	Sediment depos Accumulating? Extensive? 823906 823906	ition for the Yes	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R	Annual Ave Step 2 Step 3  ent point (m) ucture (m)	Copper 0.93 0.36	A9 Non-cumulati Easting Easting 9A Unnamed Wat	Pass  ve assessment (single 288557   288557	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	Alert.  number  s in  ssment  liation	Protected Area.	Sediment depos Accumulating? Extensive?	ition for the Yes	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse	Annual Ave Step 2 Step 3  ent point (m) ucture (m)	Copper 0.93 0.36	A9 Non-cumulati Easting Easting 9A	Pass  ve assessment (single 288557   288557	HA Area / DBFO le outfall)  List of outfalk cumulative asse	Alert.  number  s in  ssment  liation	Protected Area.	Sediment depos Accumulating? Extensive? 823906 823906	ition for the Yes	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Ave Step 2 Step 3  sent point (m) ucture (m)	Copper 0.93 0.36	A9 Non-cumulati Easting Easting 9A Unnamed Wat	Pass  ve assessment (single 288557   288557	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	Alert.  number  s in  ssment  liation	Protected Area.	Sediment depos Accumulating? Extensive? 823906 823906	ition for the Yes	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Ave Step 2 Step 3  sent point (m) ucture (m)	Copper 0.93 0.36	A9 Non-cumulati Easting Easting 9A Unnamed Wat	ve assessment (single 288557 288657	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	Alert.  number  s in  ssment  liation  sment	Protected Area.  Northing Northing	Sediment depos Accumulating? Extensive? 823906 823906	ition for th Yes No	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving water course EA receiving water Detailed R Date of assessment	Annual Ave Step 2 Step 3  sent point (m) ucture (m)	0.93 0.36	A9 Non-cumulati Easting Easting 9A Unnamed Wat	Pass  ve assessment (single 288557   288557	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	Alert.  number  s in  ssment  liation  sment	Protected Area.  Northing Northing	Sediment depos Accumulating? Extensive?  823906 823906	ition for th Yes No	0.03	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Ave Step 2 Step 3  sent point (m) ucture (m)	0.93 0.36	A9 Non-cumulati Easting Basting 9A Unnamed Wat	ve assessment (single 288557 288657	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	Alert.  number  s in ssment liation sment  Ra	Northing Northing Infall site	Sediment depos Accumulating? Extensive?  823906 823906 LIN AMJV 1	ition for the Yes No	nis site is j 0.03 64	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  AADT >10  Annual 95%i	0.93 0.36	A9 Non-cumulati Easting 9A Unnamed Wat  24/06/2016	ve assessment (single 288557 288557 28000000000000000000000000000000000000	HA Area / DBFO le outfall)  List of outfall  Cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 959	Alert.  number  s in  ssment   Ra	Northing Northing Infall site  A  arrifow box to as	Sediment depos Accumulating? Extensive?  823906 823906 LIN AMJV 1	ition for the Yes No	nis site is j 0.03 64	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Ave Step 2 Step 3  Step 4  Step 4  Step 4  Step 4  Step 3  Step 4  Step 5  Step 2  Step 3  Step 2  Step 3  Step 4  Step 4  Step 4  Step 4  Step 5  Step 5  Step 5  Step 5  Step 6  Step 5  Step 6  Step 7  Step 6  Step 6  Step 7  Step	Copper 0.93 0.36 0.36 0.36 0.36 0.36 0.36 0.36 0.3	A9 Non-cumulati Easting Basting 9A Unnamed Wat  1<50,000  Town (m³/s)  Trea drained (h:	ve assessment (single 288557 288557 288657 28000 2000 2000 2000 2000 2000 2000 20	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95%  Permeable area draining	Alert.  number  s in ssment  Ra  Ra  Wile rive to outfal	Northing Northing infall site Aprilow box to as all (ha)	Sediment depos Accumulating? Extensive?  823906 823906 1 LN AMJV 1 ardtalnaig (SAAR 1343	yes No	nis site is j 0.03 64	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Ave Step 2 Step 3  ent point (m) ucture (m)  AADT >10  Annual 95%i	Copper 0.93 0.36 0.36 0.36 0.36 0.36 0.36 0.36 0.3	A9 Non-cumulati Easting Basting 9A Unnamed Wat  1<50,000  Town (m³/s)  Trea drained (h:	ve assessment (single 288557 288557 28000000000000000000000000000000000000	HA Area / DBFO le outfall)  List of outfall  Cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 959	Alert.  number  s in ssment  Ra  Ra  Wile rive to outfal	Northing Northing infall site Aprilow box to as all (ha)	Sediment depos Accumulating? Extensive?  823906 823906 1 LN AMJV 1 ardtalnaig (SAAR 1343	yes No	nis site is j 0.03 64	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Ave Step 2 Step 3  Step 4  Step 4  Step 4  Step 4  Step 3  Step 4  Step 5  Step 2  Step 3  Step 2  Step 3  Step 4  Step 4  Step 4  Step 4  Step 5  Step 5  Step 5  Step 5  Step 6  Step 5  Step 6  Step 7  Step 6  Step 6  Step 7  Step	Copper 0.93 0.36 0.36 0.30 0.30 0.30 0.30 0.30 0.3	A9 Non-cumulati Easting Basting 9A Unnamed Wat  1<50,000  Town (m³/s)  Trea drained (h:	ve assessment (single 288557   288557   288557   280557	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95%  Permeable area draining	Alert.  number  s in ssment  Ra  Ra  Wile rive to outfal	Northing Northing infall site Aprilow box to as all (ha)	Sediment depos Accumulating? Extensive?  823906 823906 1 LN AMJV 1 ardtalnaig (SAAR 1343	yes No	nis site is j 0.03 64	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only	Annual Ave Step 2 Step 3  sent point (m) ucture (m)  AADT >10  Annual 95%i Impermeable Base Flow In Water hardne	Copper 0.93 0.36 0.36 0.36 0.36 0.36 0.36 0.36 0.3	A9 Non-cumulati Easting Easting 9A Unnamed Wat  24/06/2016  1<50,000  Tolor (m³/s) rea drained (h:-1)  Low = <50mg Ca	ve assessment (single	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95% Permeable area draining Is the discharge in or with	Alert.  number  s in ssment  Ra  Wile rive to outfal in 1 km	Northing Northing Infall site  Arflow box to as all (ha)  upstream of a	Sediment depos Accumulating? Extensive?  823906 823906 LN AMJV 1  rdtainaig (SAAR 1343 ssess Step 1 runol protected site for co	9mm)  f quality or onservation	nis site is j 0.03 64 64	Low flow Vel m/s Deposition Index  Yes
AGENCY  Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Ave Step 2 Step 3  sent point (m) ucture (m)  AADT >10  Annual 95%i Impermeable Base Flow In Water hardne	Copper 0.93 0.36 0.36 0.36 0.36 0.36 0.36 0.36 0.3	A9 Non-cumulati Easting Easting 9A Unnamed Wat  24/06/2016  1 <50,000  Those with the structure, last and	ve assessment (single 288557   288557   288557   28057   280557	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95%  Permeable area draining	Alert.  number  s in ssment  Ra  Wile rive to outfal in 1 km	Northing Northing Infall site  Arflow box to as all (ha)  upstream of a	Sediment depos Accumulating? Extensive?  823906 823906 LN AMJV 1  rdtainaig (SAAR 1343 ssess Step 1 runol protected site for co	yes No	nis site is j 0.03 64 64	Low flow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only	Annual Ave Step 2 Step 3  sent point (m) ucture (m)  AADT >10  Annual 95%i Impermeable Base Flow In Water hardn Is there a dov	Copper 0.93 0.36 0.36 0.36 0.36 0.36 0.36 0.36 0.3	A9 Non-cumulati Easting Easting 9A Unnamed Wat  24/06/2016  1<50,000  Tolor (m³/s) rea drained (h:-1)  Low = <50mg Ca	ve assessment (single 288557   288557   288557   28001   1.715   0.3   0.5   0.5	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95° Permeable area draining Is the discharge in or with	Alert.  Is in ssment liation ement Ra Wile rive to outfall in 1 km in 100m.	Northing Northing Infall site  Arflow box to as all (ha)  upstream of a	Sediment depos Accumulating? Extensive?  823906 823906  LN AMJV 1  rotalnaig (SAAR 1343 ssess Step 1 runol protected site for co	9mm)  f quality or onservation	nis site is j 0.03 64 64	Low flow Vel m/s Deposition Index  Yes
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only	Annual Ave Step 2 Step 3  Step 4  Step	Copper 0.93 0.36 0.36 0.36 0.36 0.36 0.36 0.36 0.3	A9 Non-cumulati Easting Easting 9A Unnamed Wat  24/06/2016  1<50,000  Those width (mark)  Low = <50mg Ca  m structure, lad d river width (mark)	ve assessment (single 288557   288557   288557   28057   280557	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95% Permeable area draining Is the discharge in or with	Alert.  number  s in ssment  Ra  Wile rive to outfal in 1 km	Northing Northing Infall site  Arflow box to as all (ha)  upstream of a	Sediment depos Accumulating? Extensive?  823906 823906  LN AMJV 1  rotalnaig (SAAR 1343 ssess Step 1 runol protected site for co	9mm)  f quality or onservation	nis site is j 0.03 64 64	Low flow Vel m/s Deposition Index  Yes
AGENCY  Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Ave Step 2 Step 3  Step 4  Step	D  O  O  O  O  O  O  O  O  O  O  O  O  O	A9 Non-cumulati Easting Easting 9A Unnamed Wat  24/06/2016  1<50,000  Those width (mark)  Low = <50mg Ca  m structure, lad d river width (mark)	ve assessment (single 288557   288557   288557   28001   1.715   0.3   0.5   0.5	HA Area / DBFO le outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 959 Permeable area draining Is the discharge in or with at reduces the velocity within	Alert.  number  s in ssment liation  Ra  Ra  in 100m	Northing Nor	Sediment depos Accumulating? Extensive?  823906 823906 823906 1 LN AMJV 1  rdtalnaig (SAAR 1343 ssess Step 1 runol protected site for codischarge?  //m)  0.5	9mm)  f quality or onservation	nis site is j 0.03 64 64	Low flow Vel m/s Deposition Index  Yes
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AGENCY  Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Ave Step 2 Step 3  Step 4  Step	D  O  O  O  O  O  O  O  O  O  O  O  O  O	A9 Non-cumulati Easting Easting 9A Unnamed Wat  24/06/2016  1<50,000  Those width (mark)  Low = <50mg Ca  m structure, lad d river width (mark)	ve assessment (single	HA Area / DBFO le outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 959 Permeable area draining Is the discharge in or with at reduces the velocity within	Alert.  number  s in  ssment   Ra  Ra  in 100m  Attitude Attitude   Attitude   Attitude   Alert.  Aler	Northing Nor	Sediment depos Accumulating? Extensive?  823906 823906 823906 1 LN AMJV 1  rdtalnaig (SAAR 1343 ssess Step 1 runol protected site for codischarge?  //m)  0.5	9mm)  f quality or onservation	nis site is j 0.03 64 64 64 64 66 66 67 67 67 67 67 67 67 67 67 67 67	Ves
AGENCY  Location Details Road number Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only  Step 3 Mitigation	Annual Ave Step 2 Step 3  Step 4  Step	D  O  O  O  O  O  O  O  O  O  O  O  O  O	A9 Non-cumulati Easting Easting 9A Unnamed Wat  24/06/2016  Iow (m³/s) rea drained (harmonic fil) Low = <50mg Ca im structure, la d river width (min)	ve assessment (single	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95° Permeable area draining Is the discharge in or with at reduces the velocity within Manning's n  0.07	Alert.  number  s in ssment lilation ment  Ra  Wille rive to outfal in 100m  to outfal Attus Attus solubil	Northing Northing Infall site  Arflow box to as all (ha)  O upstream of a  Side slope (made of effectivenessenuation for	Sediment depos Accumulating? Extensive?  823906 823906 1 LN AMJV 1  rdtainaig (SAAR 1343 ssess Step 1 runol protected site for co	9mm)  f quality or onservation  Long s	nis site is j 0.03 64 64 64 64 64 64 64 66 66 67 67 67 67 67 67 67 67 67 67 67	Ves
AGENCY  Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Ave Step 2 Step 3  Step 4  Step	D  O  O  O  O  O  O  O  O  O  O  O  O  O	A9 Non-cumulati Easting Easting 9A Unnamed Wat  24/06/2016  Iow (m³/s) rea drained (harmonic fil) Low = <50mg Ca im structure, la d river width (min)	ve assessment (single	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95° Permeable area draining Is the discharge in or with at reduces the velocity within Manning's n  0.07	Alert.  number  s in ssment lilation ment  Ra  Wille rive to outfal in 100m  to outfal Attus Attus solubil	Northing Northing  Infall site  A  Infall site	Sediment depos Accumulating? Extensive?  823906 823906 1 LN AMJV 1  rdtainaig (SAAR 1343 ssess Step 1 runol protected site for co	9mm)  f quality or onservation  Long s	nis site is j 0.03 64 64 64 64 64 64 64 66 66 67 67 67 67 67 67 67 67 67 67 67	Yes Y

HIGHWAYS AGENCY	Highways	Agency Wate	r Risk Assessment	Tool version 1.0 Nove	mber 200	•					
AGENCY			Soluble - Acute Impact				Sedime	nt - Chroni	ic Impac	1	
	Annual Average Copp		Copper	Zinc			Sedin	ent deposi	tion for th	nis site is	iudged as:
	Step 2 1.49		Pass	Pass		Pass		nulating?	Yes	0.03	Low flow Vel m/s
	Step 3 0.28	0.87 ug/l					Exten	sive?	No	25	Deposition Index
Location Details											
Road number		A9		HA Area / DBFO	number						
Assessment type			ve assessment (single ou	utfall)		N I a settado a se		200000			•
OS grid reference of assess		Easting	288557			Northing		823906			
OS grid reference of outfall st	tructure (m)	Easting	288557	List of outfall	e in	Northing		823906		1	
Outfall number		9B Unnamed Wat	lorgo, roo	cumulative asse							
Receiving watercourse  EA receiving water Detailed	Divor Notwork ID		tercourse	Assessor and affi	liation			LINIANANA		l	
Date of assessment	NIVEI NELWOIK ID	0.4/00/0040		Version of assess				LN AMJV			
Notes		24/06/2016		version or assess	SITIETIL			1			
140163											
Step 1 Runoff Quality	AADT >10,000 a	nd <50,000 🔻	Climatic region (	Colder Wet 🔻	Rai	nfall site	Ardtalnaig	SAAR 1343.9	lmm)		Ţ
	AADT	110 100,000	Cilinatic region	Coldor Trot	Itai	inali site	7 trutturius 9	0.0.0.0.0	,		
Step 2 River Impacts	Annual 95%ile rive	erflow (m <sup>3</sup> /s)	0.001 (E	inter zero in Annual 959	%ile rive	flow box to	o assess St	ep 1 runoff	guality o	nlv)	
							0	ор ао	quality 0	,,	
	Impermeable road			ermeable area draining	to ou trai	(IIa) _	U				
	Base Flow Index (	BFI)	0.3 Is	the discharge in or with	nin 1 km	upstream o	f a protecte	d site for co	nservati	on?	No - D
For dissolved zinc only	Water hardness	Low = <50mg Ca	aCO3/I								
Tor dissolved zinc only	vvator maraness	Low = <50ing Ca	1003/1								
For sediment impact only	Is there a downstr	eam structure, la	ake, pond or canal that re	educes the velocity with	in 100m	of the point	t of dischar	je?	N	0 -	D
	Tier1 Estima	ted river width (m	n) 0.5								
	○ Tier 2 Bed wi	dth (m)	3 M:	anning's n 0.07	D	Side slope	e (m/m)	0.5	Longs	lope (m/r	n) 0.0001
									= 1		
Step 3 Mitigation					_	d effectiven				Predic	ct Impact
		Brief descrip	tion	Treatment for solubles (%)		nuation for s - restricte		ement of nents ( %)			• • • • • • • • • • • • • • • • • • • •
				Solubles (70)		rge rate ( l/s		10110 ( 70)	SH	ow Det	ailed Results
Existing measures				0 D	Unlimite	d 🖵 🛭	0	D			
Proposed measures Filter	r Drains & Wet/Retention	Pond & Swale (Cu 7	70%, Zn 81%, Sed 84%)	81	Unlimite					Ev	it Tool
											1001
A HIGHWAYS	Highways	Agen cy Wate	r Risk Assessment	Tool version 1.0 Nover	mber 200	9					
HIGHWAYS	Highways		r Risk Assessment	Tool version 1.0 Nove	mber 200	9	Sedime	nt - Chroni	ic Impaci	t .	
	Annual Average	Concentration		Tool version 1.0 Nover	mber 200	9	_	nt - Chroni			
	Annual Average Copp	Concentration er Zinc	Soluble - Acute Impact Copper	Zinc			Sedin	ent de posi	tion for th	nis site is	<u> </u>
	Annual Average	Concentration er Zinc 5 0.17 ug/l	Soluble - Acute Impact			D/S Structure	Sedin	ent de posi nulating?			judged as: Low fow Vel m/s Deposition Index
	Annual Average Copp Step 2 0.05	Concentration er Zinc 0.17 ug/l	Soluble - Acute Impact Copper	Zinc			Sed in	ent de posi nulating?	tion for th	nis site is	Low flow Vel m/s
AGENCY	Annual Average Copp Step 2 0.05	Concentration er Zinc 0.17 ug/l	Soluble - Acute Impact Copper	Zinc	A le rt.		Sed in	ent de posi nulating?	tion for th	nis site is	Low flow Vel m/s
AGENCY  Location Details	Annual Average Copp Step 2 0.05	Concentration er Zinc 5 0.17 ug/l 2 0.08 ug/l  A9  Non-cumulati	Soluble - Acute Impact Copper	Zinc Pass HA Area / DBFO	A le rt.		Sed in	ent de posi nulating?	tion for th	nis site is	Low flow Vel m/s
AGENCY  Location Details  Road number	Annual Average Copp Step 2 0.06 Step 3 0.02	Concentration er Zinc 6 0.17 ug/l 2 0.08 ug/l	Soluble - Acute Impact Copper Pass	Zinc Pass HA Area / DBFO	A le rt.	D/S Structure	Sed in	ent de posi nulating?	tion for th	nis site is	Low flow Vel m/s
AGENCY  Location Details  Road number  Assessment type  OS grid reference of assessr OS grid reference of outfall st	Annual Average   Copp   Step 2	Concentration er Zinc 5 0.17 ug/l 2 0.08 ug/l  A9  Non-cumulati	Soluble - Acute Impact Copper Pass	Zinc Pass HA Area / DBFO	A lert.	D/S Structure	Sed in	ent de posi nulating? sive?	tion for th	nis site is	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number	Annual Average   Copp   Step 2	Concentration   Fig.	Copper Pass  ve assessment (single ou 287855	Zinc Pass HA Area / DBFO	A lert.	D/S Structure	Sed in	ent deposit nulating? sive?	tion for th	nis site is	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse	Annual Average Copp Step 2 0.00 Step 3 0.00  ment point (m) tructure (m)	Concentration er Zinc is 0.17 ug/l is 0.08 ug/l  A9  Non-cumulati E asting E asting	Copper Pass  ve assessment (single ou 287855	Zinc Pass  HA Area / DBFO  utall)  List of outfalls  cumulative asse	A lert.  numb er  s in ssment	D/S Structure	Sed in	sive?  824213	tion for th	nis site is	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse EA receiving water Detailed	Annual Average Copp Step 2 0.00 Step 3 0.00  ment point (m) tructure (m)	A9   Non-cumulati   E asting   983   Boqbain Burn	Copper Pass  ve assessment (single ou 287855	Zinc Pass  HA Area / DBFO  utail)  List of outfalls  cumulative asse  Assessor and affi	A lert.  number s in ssment	D/S Structure	Sed in	ent deposit nulating? sive?	tion for th	nis site is	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessr OS drid reference of outfall st Outfall number Receiving water ourse EA receiving water Detailed Date of assessment	Annual Average Copp Step 2 0.00 Step 3 0.00  ment point (m) tructure (m)	Concentration   Fig.	Copper Pass  ve assessment (single ou 287855	Zinc Pass  HA Area / DBFO  utall)  List of outfalls  cumulative asse	A lert.  number s in ssment	D/S Structure	Sed in	sive?  824213	tion for th	nis site is	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse EA receiving water Detailed	Annual Average Copp Step 2 0.00 Step 3 0.00  ment point (m) tructure (m)	A9   Non-cumulati   E asting   983   Boqbain Burn	Copper Pass  ve assessment (single ou 287855	Zinc Pass  HA Area / DBFO  utail)  List of outfalls  cumulative asse  Assessor and affi	A lert.  number s in ssment	D/S Structure	Sed in	sive?  824213	tion for th	nis site is	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse E A receiving water Detailed I Date of assessment Notes	Annual Average Copp Step 2 0.00 Step 3 0.00  ment point (m) tructure (m)  River Network ID	Concertration er Zine i 0.17 ug/l 2 0.08 ug/l  A9 Non-cumulati E asting E asting B agbain Burn  27/07/2016	Pass  ve assessment (single ou 287855 287855	Zinc  Pass  HA Area / DBFO  utfall)  List of outfall:  cumulative asse  Assessor and affi  Version of assess	A lert.  number  s in  ssment  liation  sment	D/S Structure  Northing	Sed in Acount	sent de positional de la positional de l	Yes No	nis site is	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessr OS drid reference of outfall st Outfall number Receiving water ourse EA receiving water Detailed Date of assessment	Annual Average Copp Step 2 0.00 Step 3 0.00  ment point (m) tructure (m)  River Network ID	Concertration er Zine i 0.17 ug/l 2 0.08 ug/l  A9 Non-cumulati E asting E asting B agbain Burn  27/07/2016	Pass  ve assessment (single ou 287 855 287 855	Zinc Pass  HA Area / DBFO  utail)  List of outfalls  cumulative asse  Assessor and affi	A lert.  number  s in  ssment  liation  sment	D/S Structure	Sed in Acount	sive?  824213	Yes No	nis site is	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving water Detailed I Date of assessment Notes  Step 1 Runoff Quality	Annual Average   Copp   Step 2 0.00   Step 3 0.00   Step 3 0.00   Copp   Step 2 0.00   Copp   Step 3 0.00   Copp 3	A9   Non-cumulati   E asting   B3   Bogbain Burn   27/07/2016     10   450,000   -	Pass  Ve assessment (single ou 287855   287855    Climaticregion	Zinc  Pass  HA Area / DBFO  utfall)  List of outfalls  cumulative asse  Assessor and affi  Version of assess  Colder Wet	A lert.  number  s in ssment liation sment Rai	Northing Northing	Sed in Acount Exten	sent de positiva de la constanta de la constan	ves No	nis site is 0.05 4	Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse E A receiving water Detailed I Date of assessment Notes	Annual Average   Copp   Step 2 0.00   Step 3 0.00   Step 3 0.00   Copp   Step 3 0.00   Copp	Concertration er Zine is 0.17 ug/l is 0.09 ug/l  A9  Non-cumulati E astinq E astinq 9B3 Boqbain Burn  27/07/2016	Ve assessment (single ou 287855   287855   Climatic region   Country   Count	Zinc  Pass  HA Area / DBFO  utfall)  List of outfalls  cumulative asse  Assessor and affi  Version of assess  Colder Wet  Inter zero in Annual 955	A lert.  number  s in  ssment  liation  sment  Rai	Northing Northing Northing	Sed in Acount Exten	sent de positiva de la constanta de la constan	ves No	nis site is 0.05 4	Low flow Vel m/s
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Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving water Detailed I Date of assessment Notes  Step 1 Runoff Quality	Annual Average   Copp   Step 2 0.00   Step 3 0.00   Step 3 0.00   Copp   Step 3 0.00   Copp	Concertration er Zine   0.07	Ne assessment (single ou   287 855   287 855	Zinc Pass  HA Area / DBFO  utfall)  List of outfall  cumulative asses  Assessor and affi Version of assess  Colder Wet  inter zero in Annual 955  ermeable area draining	number s in ssment liation sment Rai	Northing Northing Northing Infall site	Sed in Acount Exten	ent de positive?  sive?  824213  824213  LN AMJV  1  SAAR 1343.9	ition for the Yes No	nis site is 0.05 4	Low fow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving waterourse E A receiving water Detailed D ate of assessment Notes  Step 1 Runoff Quality	Annual Average   Copp   Step 2 0.00   Step 3 0.00   Step 3 1.00   Copp	A9	Ve assessment (single ou   287 855   287 855	Zino Pass  HA Area / DBFO  Itali)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  Inter zero in Annual 9599 ermea ble area draining the discharge in or with	Alert.  number  number  sis in  ssment  liation  Raii  Raii  river  to outfal	Northing  Northing  Infall site  If low box to to the purpose of t	Addalnaig	sent de positive? sive?  824213 824213 LN AMJV 1 SAAR 13439 ep 1 runoff	ition for the Yes No	nis site is 0.05 4	Low fow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse EA receiving water Detailed I Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only	Annual Average   Copp   Step 2 0.00   Step 3 0.00   Step 3 1.00   Copp	A9	ve assessment (single ou 287 855 287 855 Climatic region 0.016 (Ea) 0.0982 Pe 0.027 Is	Zino Pass  HA Area / DBFO  Itali)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  Inter zero in Annual 9599 ermea ble area draining the discharge in or with	Alert.  number  number  sis in  ssment  liation  Raii  Raii  river  to outfal	Northing  Northing  Infall site  If low box to to the purpose of t	Addalnaig	sent de positive? sive?  824213 824213 LN AMJV 1 SAAR 13439 ep 1 runoff	ition for the Yes No	nis site is 0.05 4	Low fow Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse EA receiving water Detailed I Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only	Annual Average Step 2 0.00 Step 3 0.00  ment point (m) tructure (m)  AADT >10,000 a  Annual 95%ile riv Impermeable road Base Flow Index (  Water hardness Is there a downstr	A9	Ve assessment (single ou   287 855   287 855	Zino Pass  HA Area / DBFO  Itali)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  Inter zero in Annual 9599 ermea ble area draining the discharge in or with	Alert.  number  number  sis in  ssment  liation  Raii  Raii  river  to outfal	Northing  Northing  Infall site  If low box to	Addainaig  a ssess St  a protecte  t of discharge	sent de positive? sive?  824213 824213 LN AMJV 1 SAAR 13439 ep 1 runoff	ves toon for the vest of the v	nis site is 0.05 4	Low fow Vel m/s Deposition Index
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Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse EA receiving water Detailed I Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only	Annual Average    Step 2	A9	Ve assessment (single ou   287 855   287 855	Assessor and affi Version of assess  Colder Wet  Cinter zero in Annual 953  ermea ble area draining the discharge in or with  anning's n 0.07	Alert.  number  number  Raii  Raii  number  Raii  in 100m	Northing  Northing  Infall site  If low box to the point of the point	Ardtalnaig (  Ardtalnaig (	sent de positive?  824213 824213 824213 LN AMJV 1  SAAR 1343.9 ep 1 runoff d site for co	ves toon for the vest of the v	nis site is 0.05 0.05 4 4	Low fow Vel m/s Deposition Index  No    No
AGENCY  Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse E A receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only	Annual Average    Step 2	A9	ve assessment (single ou 287855   28785	Assessor and affi Version of assess  Colder Wet  Enter zero in Annua 195* ermea ble area draining the discharge in or with anning's n  Treatment for	Alert.  number  Raii  Raii  Raii  Attent  Attent  Alert.	Northing  Northing  Infall site  If low box to the point of the point	Addtainaig of a protecte tof discharge (m/m)	sent de positive?  824213 824213 824213 LN AMJV 1  SAAR 1343.9 ep 1 runoff d site for co	ves toon for the vest of the v	nis site is 0.05 0.05 4 4	Low fow Vel m/s Deposition Index
AGENCY  Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse E A receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only	Annual Average    Step 2	A9	ve assessment (single ou 287855   28785	HA Area / DBFO     It is to foutfall     List of foutfall     Cumulative asses     Assessor and affi     Version of assess     Colder Wet     Inter zero in Annual 95     ermea ble area draining     the discharge in or with     educes the velocity with     anning's n   0.07	Alert.  number  Raii  Raii  Raii  Raii  Atte  Soluble	Northing Northing Northing If low box track to the point Side slope If effective n	Ardtalnaig  D assess St  o  if a protecte  t of discharge  ess  Setting	sent de positive?  B24213  B24213  B24213  LN AMJV  1  SAAR 1343.9  ep 1 runoff  d site for co	ven for the ven fo	nis site is 0.05 4 4	Low fow Vel m/s Deposition Index  No    No    Output  Nou
AGENCY  Location Details Road number Assessment type OS grid reference of assessr OS grid reference of outfall st Outfall number Receiving watercourse E A receiving water Detailed Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only	Annual Average    Step 2	A9	ve assessment (single ou 287855   28785	Assessor and affi Version of assess  Colder Wet  Enter zero in Annua 195* ermea ble area draining the discharge in or with anning's n  Treatment for	Alert.  number  Raii  Raii  Raii  Raii  Atte  Soluble	Northing Northing Northing If all site If low box tr If (ha) Upstream of the point Side slope d effectiven nuation for so restricted.	Ardtalnaig (  Ardtalnaig (  Ardtalnaig (	sent de positive?  824213 824213 824213 LN AMJV 1  SAAR 1343.9 ep 1 runoff d site for co	ven for the ven fo	nis site is 0.05 4 4	Low fow Vel m/s Deposition Index  No    No



HIGHWAYS AGENCY	Highways A	geney wate	T I THOR AGGCCCOIN	ent Tool version 1.0 Nove	mber 200	19			
AGENCY			Soluble - Acute Impa			;	Sediment - Chroni	c Impact	
	Annual Average Coppe		Copper	Zinc			Sediment deposit	ion for this	site is judged as:
	Step 2 1.32	4.01 ug/l	Pass	Pass		Pass	Accumulating?	Yes	0.06 Low flow Vel m/s
	Step 3 0.50	1.52 ug/l					Extensive?	No	54 Deposition Index
Location Details									
Road number		A9		HA Area / DBFO	number				
Assessment type OS grid reference of assessm	ant point (m)		ve assessment (singl	le outfall)		Northing	004004		
OS grid reference of outfall str	,	Easting Easting	286349 286349			Northing Northing	824831		
Outfall number	ucture (III)	9D	200349	List of outfall	sın	Northing	824831		
Receiving watercourse		Unnamed Wat	tercourse	cumulative asse					
EA receiving water Detailed R	iver Network ID		ici codi sc	Assessor and affi	liation	l	LN AMJV		l
Date of assessment	aro. romone is	24/06/2016		Version of assess			1		
Notes		24/00/2010					l.		
Step 1 Runoff Quality	AADT >10,000 and	1 <50,000 ▼	Climatic region	Colder Wet ▼	Rai	infall site Ar	rdtalnaig (SAAR 1343.9	mm)	-
Step 2 River Impacts	Annual 95%ile river	flow (m3/s)	0.001	(Enter zero in Annual 959	%ile rive	rflow box to as	sess Step 1 runoff	quality only	/)
	Impermeable road a	rea drained (h	a) 2.894	Permeable area draining	to outfa	ll (ha) 0			
	Base Flow Index (B		0.3	_			vatanta d nito for an		? No - D
	base Flow Illuex (b	rı)	0.3	Is the discharge in or with	iin i kin	upstream of a p	orolected site for co	nservation	? No - D
For dissolved zinc only	Water hardness	Low = <50mg Ca	aCO3/I						
For sediment impact only	la thora a downstra	om etrueture. Ie	ake pend or sen al th	at raduace the valority with	in 100m	of the point of a	diach arga?	No	▼ D
For sediment impact only		d river width (m		at reduces the velocity with	111 10011	ror tre point or c	ilscriaige?	140	
						6:1 1 /	( ) [05		
	C Tier 2 Bed widt	n (m)	3	Manning's n 0.07	D	Side slope (m/	/m) 0.5	Long slop	oe (m/m) 0.0001
Step 3 Mitigation					Estimate	ed effectiveness			
<u> </u>		Brief descrip	tion	Treatment for	_	enuation for	Settlement of	T	Predict Impact
				solubles ( %)		es - restricted	sediments ( %)		
Existing measures				0 1	Unlimite	rge rate ( l/s )	•	Show	w Detailed Results
				ь п			0 D		
Proposed measures Filter I	Orains & Wet/Retention P	ond (Cu 40%, Zn 6	52%, Sed 84%)	62	Unlimite	ed 🔻 🗅	84		Exit Tool
HIGHWAYS									
AGENCY		S	Soluble - Acute Impa		mber 200		Sediment - Chroni	c Impact	
AGENCY	Annual Average C	oncentration			mber 200			-	site is judged as:
AGENCY	Annual Average Copper Step 2 0.43	oncentration Zinc 1.29 ug/l	Soluble - Acute Impa	act	mber 200		Sediment deposit	ion for this	0.03 Low flow Vel m/s
	Annual Average Coppe	oncentration Zinc	Soluble - Acute Impa Copper	act Zinc	mber 200		Sediment deposit	ion for this	<del></del> i -
Location Details	Annual Average Copper Step 2 0.43	2	Soluble - Acute Impa Copper	Zinc Pass			Sediment deposit	ion for this	0.03 Low flow Vel m/s
Location Details Road number	Annual Average Copper Step 2 0.43	Zinc   1.29   ug/l   0.71   ug/l	Soluble - Acute Impa Copper Pass	Zinc Pass HA Area / DBFO			Sediment deposit	ion for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type	Annual Average C	oncentration Zinc 1.29 1.29 1.71 1.71 1.72 1.75 1.75 1.75 1.75 1.75 1.75 1.75 1.75	Copper  Pass  ve assessment (single	Zinc Pass HA Area / DBFO		Pass	Sediment deposit Accumulating? Extensive?	ion for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm	Annual Average C Coppe Step 2 0.43 Step 3 0.23  ent point (m)	A9 Non-cumulating	Pass  ve assessment (single 285340	Zinc Pass HA Area / DBFO			Sediment deposit Accumulating? Extensive?	ion for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type	Annual Average C Coppe Step 2 0.43 Step 3 0.23  ent point (m)	oncentration Zinc 1.29 1.29 1.71 1.71 1.72 1.75 1.75 1.75 1.75 1.75 1.75 1.75 1.75	Copper  Pass  ve assessment (single	Zinc Pass HA Area / DBFO	number	Pass Northing	Sediment deposit Accumulating? Extensive?	ion for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Annual Average C Coppe Step 2 0.43 Step 3 0.23  ent point (m)	A9 Non-cumulativ Easting Easting	Pass  ve assessment (single 285340	Pass  HA Area / DBFO le outfall)	number	Pass Northing	Sediment deposit Accumulating? Extensive?	ion for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Annual Average C Copper Step 2 0.43 Step 3 0.23  ent point (m) ucture (m)	A9 Non-cumulati Easting Easting 10A	Pass  ve assessment (single 285340	HA Area / DBFO le outfall)  List of outfall	number s in	Pass Northing	Sediment deposit Accumulating? Extensive?	ion for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving watercourse	Annual Average C Copper Step 2 0.43 Step 3 0.23  ent point (m) ucture (m)	A9 Non-cumulati Easting Easting 10A	Pass  ve assessment (single 285340	HA Area / DBFO le outfall)  List of outfall cumulative asse	number s in essment	Pass Northing	Sediment deposit Accumulating? Extensive?  823987 823987	ion for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving watercourse EA receiving water Detailed R	Annual Average C Copper Step 2 0.43 Step 3 0.23  ent point (m) ucture (m)	A9 Non-cumulati Easting Easting 10A Bogbain Burn	Pass  ve assessment (single 285340	HA Area / DBFO le outfall)  List of outfall cumulative asse  Assessor and affi	number s in essment	Pass Northing	Sediment deposit Accumulating? Extensive?  823987 823987	ion for this	0.03 Low flow Vel m/s
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment	Annual Average C  Coppes Step 2 0.43 Step 3 0.23  Step 1 0.23  Step 3 0.23  Step 1 0.23	A9 Non-cumulati Easting Easting 10A Bogbain Burn	Pass  ve assessment (single 285340	HA Area / DBFO le outfall)  List of outfall cumulative asse  Assessor and affi	number s in ssment liation sment	Pass Northing Northing	Sediment deposit Accumulating? Extensive?  823987 823987	ion for this Yes No	0.03 Low flow Vel m/s
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Location Details Road number Assessment type OS grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average C  Step 2 0.43 Step 3 0.23  Step 1 0.23  Step 2 0.43  S	A9 Non-cumulati Easting 10A Bogbain Burn  21/06/2016  1<0/td>  1/08/2016  10A  21/06/2016  10 <	ve assessment (single 285340   285340	HA Area / DBFO le outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 959 Permeable area draining Is the discharge in or with at reduces the velocity with  Manning's n 0.07	number s in sssment liation ment Rai liation min 1 km in 100m Attt soluble	Northing Northing Northing Infall site  Ar  If flow box to as If (ha)  O  upstream of a p  of the point of of Side slope (mu  and deffectiveness enuation for ese - restricted	Sediment deposit Accumulating? Extensive?  823987 823987 823987  LN AMJV 1  rdtalnaig (SAAR 1343.9  sess Step 1 runoff protected site for co	mm) quality only  No  Long slop	Deposition Index  Low flow Vel m/s Deposition Index  No Vel m/s  Proposition Index
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality Step 2 River Impacts  For dissolved zinc only For sediment impact only  Step 3 Mitigation	Annual Average C  Step 2 0.43 Step 3 0.23  Step 1 0.23  Step 2 0.43  S	A9 Non-cumulati Easting 10A Bogbain Burn 21/06/2016  A9 Non-cumulati Easting 10A Bogbain Burn 21/06/2016  As a structure, lad driver width (m.)	ve assessment (single 285340   285340	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95's Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n  0.07  Treatment for solubles (%)	number s in sssment liation Rai liation sment  Rai ation 1 km in 100m  Attute discha	Northing Northing Northing  Infall site  All  If I was to as as a control of a purchase of a purchase of a purchase of the point of a control of the point of a purchase of the point of the po	Sediment deposit Accumulating? Extensive?  823987 823987 823987  LN AMJV 1  citalnaig (SAAR 1343.9  sess Step 1 runoff  protected site for co	mmn) quality only  No  Long slop	Deposition Index  Low flow Vel m/s Deposition Index  No Vel m/s Deposition Index
Location Details Road number Assessment type OS grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average C  Step 2 0.43 Step 3 0.23  Step 1 0.23  Step 2 0.43  S	A9 Non-cumulati Easting 10A Bogbain Burn 21/06/2016  A9 Non-cumulati Easting 10A Bogbain Burn 21/06/2016  As a structure, lad driver width (m.)	ve assessment (single 285340   285340	HA Area / DBFO le outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95' Permeable area draining Is the discharge in or with at reduces the velocity with  Manning's n  0.07	number s in sssment liation ment Rai liation min 1 km in 100m Attt soluble	Northing Northing Northing  Infall site  All  If flow box to as all (ha)  If the point of a purpose of the purpose of the point of a purpose of the point of a purpose of the purpose of	Sediment deposit Accumulating? Extensive?  823987 823987 823987  LN AMJV 1  rdtalnaig (SAAR 1343.9  sess Step 1 runoff protected site for co	mmn) quality only  No  Long slop	Deposition Index  Low flow Vel m/s Deposition Index  No Vel m/s Deposition Index  No Vel m/s Deposition Index

HIGHWAYS AGENCY Highways Agency Water Risk Assessment Tool version 1.0 November 2009										
AGENCY			Soluble - Acute Impa			;	Sediment - Chroni	c Impact		
	Annual Average C Coppe		Copper	Zinc			Sediment deposit	ion for this site is judged	as:	
	Step 2 0.33	1.01 ug/l	Pass	Pass		Pass	Accumulating?		w Vel m/s	
	Step 3 0.13	0.39 ug/l					Extensive?	No 27 Deposi	ion Index	
Location Details										
Road number		A9		HA Area / DBFO	number					
Assessment type OS grid reference of assessm	ont point (m)	_	ive assessment (sing	le outfall)		Northing	004407		~	
OS grid reference of outfall str	,	Easting Easting	284357 284357			Northing Northing	824187 824187			
Outfall number	ucture (III)	10B	204357	List of outfall	sın	Northing	024107	ı		
Receiving watercourse		Allt Slochd Mh	nuic	cumulative asse						
EA receiving water Detailed R	iver Network ID	, till Gloci id IVII	idio	Assessor and affi	liation	l	LN AMJV	ļ.		
Date of assessment	aro. romon is	21/06/2016		Version of assess			1			
Notes		21/00/2010					l.			
Step 1 Runoff Quality	AADT >10,000 an	d <50,000 🔻	Climatic region	Colder Wet ▼	Rai	infall site Ar	rdtalnaig (SAAR 1343.9	nm)	-	
Step 2 River Impacts	Annual 95%ile river	flow (m <sup>3</sup> /s)	0.012	(Enter zero in Annual 959	%ile rive	rflow box to as	sess Step 1 runoff	quality only)		
	Impermeable road	area drained (h	a) 5.378	Permeable area draining	to outfa	II (ha) 0				
	Base Flow Index (B		0.25	_			vatanta d nito for an		0 - D	
	Dase Flow Index (D	" 1)	0.23	Is the discharge in or with	IIII I KIII	upstream or a p	orotected site for co	inservation:	0 - D	
For dissolved zinc only	Water hardness	Low = <50mg Ca	aCO3/I							
For sediment impact only	In there a down atra	om etrueture. Is	ake pend or can al th	at reduces the velocity with	in 100m	of the point of a	diach arga?	No 🔻 🗅		
For sediment impact only		ed river width (n		at reduces the velocity with	111 10011	ror tre point or c	ilscriaige?	NO V		
						6:1 1 /	( ) [05	, , , =		
	○ Tier 2 Bed wid	tn (m)	3	Manning's n 0.07	D	Side slope (m/	/m) 0.5	Long slope (m/m)	0.0001	
Step 3 Mitigation				-	Estimate	ed effectiveness		7		
<u> </u>		Brief descrip	otion	Treatment for	_	enuation for	Settlement of	Predict Imp	act	
				solubles ( %)		es - restricted	sediments (%)			
Existing measures				0 1	Unlimite	rge rate ( l/s )	•	Show Detailed	Results	
				, D			0 D	-		
Proposed measures Filter I	Orains & Wet/Retention F	ond (Cu 40%, Zn 6	62%, Sed 84%)	62	Unlimite	ed 🔻 🗅	84	Exit Too	ı	
HIGHWAYS AGENCY	Highways A	gency Wate	r Dick Access							
	Annual Average C	oncentration r Zinc	Soluble - Acute Impa Copper	Zinc	mber 200			ion for this site is judged		
	Coppe   Step 2   0.73	oncentration r Zinc 2.19 ug/l	Soluble - Acute Impa	act	mber 200		Sediment deposit	ion for this site is judged Yes 0.03 Low flo	w Vel m/s	
Location Details	Coppe	oncentration r Zinc	Soluble - Acute Impa Copper	act Zinc	mber 200		Sediment deposit	ion for this site is judged Yes 0.03 Low flo		
Location Details Road number	Coppe   Step 2   0.73	oncentration r Zinc 2.19 ug/l	Soluble - Acute Impa Copper	act Zinc			Sediment deposit	ion for this site is judged Yes 0.03 Low flo	w Vel m/s	
	Coppe   Step 2   0.73	oncentration r Zinc 2.19 ug/l 0.42 ug/l	Soluble - Acute Impa Copper	Zinc Pass HA Area / DBFO			Sediment deposit	ion for this site is judged Yes 0.03 Low flo	w Vel m/s	
Road number Assessment type OS grid reference of assessm	Coppe   Step 2   0.73   Step 3   0.14	oncentration r Zinc 2.19 0.42 ug/l  A9 Non-cumulati	Soluble - Acute Impa Copper Pass	Zinc Pass HA Area / DBFO		Pass Northing	Sediment deposit	ion for this site is judged Yes 0.03 Low flo	w Vel m/s	
Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Coppe   Step 2   0.73   Step 3   0.14	A9 Non-cumulati Easting Easting	Soluble - Acute Impo Copper Pass	Pass  HA Area / DBFO le outfall)	number	Pass	Sediment deposit Accumulating? Extensive?	ion for this site is judged Yes 0.03 Low flo	w Vel m/s	
Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number	Coppe   Step 2   0.73   Step 3   0.14	noncentration r Zinc 2.19 ug/l 0.42 ug/l  A9  Non-cumulati Easting Easting 10C	Pass  ive assessment (sing 284210 284210	HA Area / DBFO le outfall)  List of outfall	number	Pass Northing	Sediment deposit Accumulating? Extensive?	ion for this site is judged Yes 0.03 Low flo	w Vel m/s	
Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse	Step 2 0.73 Step 3 0.14  ent point (m) ucture (m)	A9 Non-cumulati Easting Easting	Pass  ive assessment (sing 284210 284210	HA Area / DBFO le outfall)  List of outfall cumulative asse	number s in	Pass Northing	Sediment deposit Accumulating? Extensive?  824529 824529	ion for this site is judged Yes 0.03 Low flo	w Vel m/s	
Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R	Step 2 0.73 Step 3 0.14  ent point (m) ucture (m)	oncentration r Zinc ug/l 2.19 ug/l 0.42 ug/l  A9 Non-cumulati Easting Easting 10C Allt Slochd Mh	Pass  ive assessment (sing 284210 284210	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	number s in essment	Pass Northing	Sediment deposit Accumulating? Extensive?	ion for this site is judged Yes 0.03 Low flo	w Vel m/s	
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Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R	Step 2 0.73 Step 3 0.14  ent point (m) ucture (m)	oncentration r Zinc ug/l 2.19 ug/l 0.42 ug/l  A9 Non-cumulati Easting Easting 10C Allt Slochd Mh	Pass  ive assessment (sing 284210 284210	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	number s in essment	Pass Northing	Sediment deposit Accumulating? Extensive?  824529 824529	ion for this site is judged Yes 0.03 Low flo	w Vel m/s	
Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment	Step 2 0.73 Step 3 0.14  ent point (m) ucture (m)	noncentration r Zinc ug/l 2.19 ug/l A9 Non-cumulati Easting Easting 10C Allt Slochd Mh	Pass  ive assessment (sing 284210 284210	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	number s in ssment liation sment	Pass Northing Northing	Sediment deposit Accumulating? Extensive?  824529 824529	ion for this site is judged Yes 0.03 Low flo No 16 Deposi	w Vel m/s	
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Road number Assessment type OS grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Step 2 0.73 Step 3 0.14  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness Is there a downstre @ Tier 1 Estimate	A9 Non-cumulati Easting Lasting Loc Allt Slochd Mh Low = <50,000  Low = <50mg Ca am structure, last driver width (n	ive assessment (sing 284210 284210 284210 2006 7.915 0.22 2006 ake, pond or canal th n) 1.5 3	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95: Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n 0.07	number s in sssment liation ment Rai liation min 1 km in 100m Attt soluble	Northing Northing Northing Infall site  Ar  If flow box to as If (ha)  O  upstream of a p  of the point of of Side slope (mu  and deffectiveness enuation for ese - restricted	Sediment deposit Accumulating? Extensive?  824529 824529 LN AMJV 1  rdtalnaig (SAAR 1343.9  sess Step 1 runoff protected site for co	ion for this site is judged Yes 0.03 Low Ifo No 16 Deposition of the No 16 Dep	w Vel m/s ion Index	
Road number Assessment type OS grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only  Step 3 Mitigation	Step 2 0.73 Step 3 0.14  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness Is there a downstre @ Tier 1 Estimate	A9 Non-cumulati Easting Lasting Loc Allt Slochd Mh Low	ive assessment (sing 284210 284210 284210 2006 7.915 0.22 2006 ake, pond or canal th n) 1.5 3	HA Area / DBFO  List of outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  [Colder Wet]  (Enter zero in Annual 95 Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n  [Treatment for solubles (%)	number s in sssment liation Rai liation sment  Rai ation 1 km in 100m  Attute discha	Northing Northing Northing  Infall site  Ar  If flow box to as  If (ha)  O  upstream of a p  of the point of of Side slope (mu  and effectiveness enuation for es - restricted urge rate ( \( \frac{1}{2} \) \( \frac{1}{2} \)	Sediment deposit Accumulating? Extensive?  824529 824529 824529 LN AMJV 1  rotalnaig (SAAR 1343.9  sess Step 1 runoff protected site for co	ion for this site is judged Yes 0.03 Low Ifo No 16 Deposition of the No 16 Dep	w Vel m/s ion Index	
Road number Assessment type OS grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only  Step 3 Mitigation  Existing measures	Step 2 0.73 Step 3 0.14  Lent point (m) Liver Network ID  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B  Water hardness Is there a downstre Tier 1 Estimate Tier 2 Bed wid	A9  Non-cumulati Easting Easting 10C Allt Slochd Mh  21/06/2016  Altow (m³/s) area drained (h  FI)  Low = <50mg Ca am structure, la driver width (n th (m)	ive assessment (sing 284210 284210 284210 2006 7.915 0.22 2006 ake, pond or canal th n) 1.5 3	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95's Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n  0.07  Treatment for solubles (%)	number s in sssment liation ment Rai liation min 1 km in 100m Attt soluble	Northing Northing Northing  Infall site  All  If I was a control of a pupstream o	Sediment deposit Accumulating? Extensive?  824529 824529 LN AMJV 1  rdtalnaig (SAAR 1343.9  sess Step 1 runoff protected site for co	ion for this site is judged Yes 0.03 Low Ifo No 16 Deposition of the No 16 Dep	w Vel m/s ion Index	

HIGHWAYS AGENCY Highways Agency Water Risk Assessment Tool version 1.0 November 2009										
AGENCY			Soluble - Acute Impa			;	Sediment - Chroni	c Impact		
	Annual Average C Coppe		Copper	Zinc			Sediment deposit	ion for this site is jud	dged as:	
	Step 2 0.38	1.14 ug/l	Pass	Pass		Pass	Accumulating?		ow flow Vel m/s	
	Step 3 0.07	0.22 ug/l					Extensive?	<b>No</b> 7 D	Deposition Index	
Location Details										
Road number		A9		HA Area / DBFO	number					
Assessment type OS grid reference of assessm	ant paint (m)	1	ve assessment (singl	le outfall)		Northina	00.4700			
OS grid reference of outfall str	,	Easting Easting	284079 284079			Northing Northing	824790 824790			
Outfall number	ucture (III)	11C	204079	List of outfall	sın	Northing	024790			
Receiving watercourse		Allt Slochd Mh	uic	cumulative asse						
EA receiving water Detailed R	iver Network ID	, till Gloci id IVIII	idi C	Assessor and affi	liation	l	LN AMJV	ļ		
Date of assessment	. ro. romoni is	21/06/2016		Version of assess			1			
Notes		21/00/2010								
Step 1 Runoff Quality	AADT >10,000 an	id <50,000 ▼	Climatic region	Colder Wet ▼	Rai	infall site A	rdtalnaig (SAAR 1343.9	mm)	<b>-</b>	
		_								
Step 2 River Impacts	Annual 95%ile river	rflow (m <sup>3</sup> /s)	0.005	(Enter zero in Annual 959	%ile rive	rflow box to as	sess Step 1 runoff	quality only)		
	Impermeable road a	area drained (h	a) 2.826	Permeable area draining	to outfa	II (ha) 0				
	Base Flow Index (B		0.22	_		-	aretested site for so	naan sation 2	No - D	
	Dase I low lindex (D	,, ,,	0.22	Is the discharge in or with	IIII I KIII	upstream or a p	Diotected site for co	iiseivalioii :	No - D	
For dissolved zinc only	Water hardness	Low = <50mg Ca	aCO3/I							
For sediment impact only	le there a downetre	am etructura la	ake pond or can all th	at reduces the velocity with	in 100m	of the point of a	discharge?	No 🔻	D	
For sediment impact only		ed river width (m		at reduces the velocity with	111 10011	ror tre point or c	alscraige?	140		
						6:1 1 /				
	○ Tier 2 Bed wid	tn (m)	3	Manning's n 0.07	D	Side slope (m.	/m) 0.5	Long slope (m/m)	0.0001	
Step 3 Mitigation					Estimate	ed effectiveness		7		
<u> </u>		Brief descrip	tion	Treatment for	_	enuation for	Settlement of	Predict	Impact	
				solubles ( %)		es - restricted	sediments ( %)			
Existing measures				0 1	Unlimite	rge rate ( l/s )		Show Detai	iled Results	
				, D			0 D			
Proposed measures Filter I	Orains & Wet/Retention P	ond & Swales (Cu	70%, Zn 81%, Sed 97%)	) 81	Unlimite	ed 🖵 🗈	97	Exit	Tool	
HIGHWAYS										
AGENCY	Highways A			ent Tool version 1.0 Nove	mber 200		Sadiment Chroni	o Impost		
	Highways A		er Risk Assessmo Soluble - Acute Impa Copper		mber 200		Sediment - Chroni	c Impact		
	Annual Average C	oncentration r Zinc	Soluble - Acute Impa Copper	act Zinc	mber 200		Sediment deposit	ion for this site is ju	-	
	Annual Average C Coppe Step 2 0.91	concentration r Zinc 2.74 ug/l	Soluble - Acute Impa	act	mber 200			ion for this site is jud	ow flow Vel m/s	
AGENCY	Annual Average C	oncentration r Zinc	Soluble - Acute Impa Copper	act Zinc	mber 200		Sediment deposit	ion for this site is jud	-	
	Annual Average C Coppe Step 2 0.91	concentration r Zinc 2.74 ug/l	Soluble - Acute Impa Copper	act Zinc			Sediment deposit	ion for this site is jud	ow flow Vel m/s	
AGENCY  Location Details	Annual Average C Coppe Step 2 0.91	Concentration   Concentratio	Soluble - Acute Impa Copper	Zinc Pass HA Area / DBFO			Sediment deposit	ion for this site is jud	ow flow Vel m/s	
Location Details Road number Assessment type OS grid reference of assessm	Annual Average C Coppe Step 2 0.91 Step 3 0.17  ent point (m)	r Zinc 2.74 ug/l ug/l A9 Non-cumulati	Soluble - Acute Impa Copper Pass	Zinc Pass HA Area / DBFO		Pass Northing	Sediment deposit	ion for this site is jud	ow flow Vel m/s	
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Annual Average C Coppe Step 2 0.91 Step 3 0.17  ent point (m)	A9  Non-cumulati Easting  Easting	Copper  Pass  ve assessment (single	Pass  HA Area / DBFO le outfall)	number	Pass	Sediment deposit Accumulating? Extensive?	ion for this site is jud	ow flow Vel m/s	
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str	Annual Average C Coppe Step 2 0.91 Step 3 0.17  ent point (m)	A9  Non-cumulati Easting Easting	ve assessment (single 283972	HA Area / DBFO le outfall)  List of outfall	number	Pass Northing	Sediment deposit Accumulating? Extensive?	ion for this site is jud	ow flow Vel m/s	
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse	Annual Average C Coppe Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)	A9  Non-cumulati Easting  Easting	ve assessment (single 283972	HA Area / DBFO le outfall)  List of outfall cumulative asse	number s in	Pass Northing	Sediment deposit Accumulating? Extensive? 825054 825054	ion for this site is jud	ow flow Vel m/s	
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R	Annual Average C Coppe Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)	r Zinc ug/l 2.74 ug/l 0.52 ug/l  A9  Non-cumulati Easting Easting  11D  Unamed Wate	ve assessment (single 283972	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	number s in essment	Pass Northing	Sediment deposit Accumulating? Extensive?	ion for this site is jud	ow flow Vel m/s	
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving water Detailed R Date of assessment	Annual Average C Coppe Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)	A9  Non-cumulati Easting Easting	ve assessment (single 283972	HA Area / DBFO le outfall)  List of outfall cumulative asse	number s in essment	Pass Northing	Sediment deposit Accumulating? Extensive? 825054 825054	ion for this site is jud	ow flow Vel m/s	
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R	Annual Average C Coppe Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)	r Zinc ug/l 2.74 ug/l 0.52 ug/l  A9  Non-cumulati Easting Easting  11D  Unamed Wate	ve assessment (single 283972	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	number s in essment	Pass Northing	Sediment deposit Accumulating? Extensive? 825054 825054	ion for this site is jud	ow flow Vel m/s	
Location Details Road number Assessment type OS grid reference of assessm Outfall number Receiving water Detailed R Date of assessment	Annual Average C  Coppe Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)	Non-cumulati Easting Easting Unamed Wate	ve assessment (single 283972	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi	number s in ssment liation sment	Northing Northing	Sediment deposit Accumulating? Extensive? 825054 825054	ion for this site is ju Yes 0.03 L No 11 D	ow flow Vel m/s	
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes	Annual Average C  Coppe Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)	Non-cumulati Easting Easting 11D Unamed Wate	ve assessment (single 283972 283972 2870000000000000000000000000000000000	HA Area / DBFO le outfall)  List of outfall cumulative asses  Assessor and affi Version of assess	number s in ssment liation sment	Northing Northing	Sediment deposit Accumulating? Extensive?  825054 825054  LN AMJV 1	ion for this site is ju Yes 0.03 L No 11 D	ow flow Vel m/s	
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river	Non-cumulati	ve assessment (single 283972 283972 2800000000000000000000000000000000000	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 955	number s in essment liation sment Rai	Northing Northing Infall site A	Sediment deposit Accumulating? Extensive?  825054 825054  LN AMJV 1	ion for this site is ju Yes 0.03 L No 11 D	ow flow Vel m/s	
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river	A9 Non-cumulati Easting Easting 11D Unamed Wate 21/06/2016	ve assessment (single 283972 283972 283972 200000000000000000000000000000000000	HA Area / DBFO le outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 959 Permeable area draining	number s in sssment liation sment Rai	Northing Northing Infall site Arriflow box to as III (ha) 0	Sediment deposit Accumulating? Extensive?  825054 825054  BENERAL SECTION AND AND AND AND AND AND AND AND AND AN	ion for this site is ju Yes 0.03 L No 11 D  mmn)  quality only)	ow flow Vel m/s Peposition Index	
Location Details Road number Assessment type Os grid reference of assessm Os grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river	A9 Non-cumulati Easting Easting 11D Unamed Wate 21/06/2016	ve assessment (single 283972 283972 2800000000000000000000000000000000000	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 955	number s in sssment liation sment Rai	Northing Northing Infall site Arriflow box to as III (ha) 0	Sediment deposit Accumulating? Extensive?  825054 825054  BENERAL SECTION AND AND AND AND AND AND AND AND AND AN	ion for this site is ju Yes 0.03 L No 11 D  mmn)  quality only)	ow flow Vel m/s	
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Location Details Road number Road number OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness	A9  Non-cumulati Easting Easting  Lind (50,000  )  21/06/2016  Low = <50mg Ca	ve assessment (single 283972 283972 283972 287000000 0.001 1.804 0.22	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining is the discharge in or with	number s in ssment liation Rai Wile rive to outfa	Northing Northing  Infall site A  If I was a site of a part of a p	Sediment deposit Accumulating? Extensive?  825054 825054 LN AMJV 1  rettalnaig (SAAR 1343.9	ion for this site is ju Yes 0.03 L No 11 D  mmn)  quality only)	ow flow Vel m/s eposition Index	
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving waterourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness Is there a downstre	A9  Non-cumulati Easting Easting  11D  Unamed Wate  21/06/2016  21/06/2016  21/06/2016  A9  Non-cumulati Easting Easting  Loward Wate  21/06/2016  Ad <50,000  Triflow (m³/s)  area drained (h  BFI)  Low = <50mg Ca  am structure, Ia	ve assessment (single 283972 283972 283972 287000000 0.001 1.804 0.22 0.0001 vectors and the control of the con	HA Area / DBFO le outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 959 Permeable area draining	number s in ssment liation Rai Wile rive to outfa	Northing Northing  Infall site A  If I was a site of a part of a p	Sediment deposit Accumulating? Extensive?  825054 825054 LN AMJV 1  rettalnaig (SAAR 1343.9	ion for this site is ju Yes 0.03 L No 11 D  mmn)  quality only)	ow flow Vel m/s eposition Index	
Location Details Road number Road number OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness Is there a downstre © Tier 1 Estimate	A9  Non-cumulati Easting Easting Unamed Wate  21/06/2016  21/06/2016  A9  Non-cumulati Easting Lasting Lasting Easting Loward Wate  21/06/2016  Low = <50mg Call Carrier Sommer Call Carrier Sommer Call Carrier Sommer Call Carrier Sommer Call Carrier Width (market)	ve assessment (single 283972 283972 283972 283972 28700015e	HA Area / DBFO  List of outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95' Permeable area draining Is the discharge in or with	number s in sssment liation sment Rai	Northing Northing Infall site Arriflow box to as Ill (ha) 0 upstream of a poorting of the point of of	Sediment deposit Accumulating? Extensive?  825054 825054  LN AMJV 1  rottalnaig (SAAR 1343.9  seess Step 1 runoff protected site for co	ion for this site is ju Yes 0.03 L No 11 D  mmn)  quality only)	ow flow Vel m/s eposition Index	
Location Details Road number Road number OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness Is there a downstre	A9  Non-cumulati Easting Easting Unamed Wate  21/06/2016  21/06/2016  21/06/2016  Low = <50mg Camera drained (hose)  Low = <50mg Camera drained (hose)  Low = <50mg Camera drained (hose)	ve assessment (single 283972 283972 283972 287000000 0.001 1.804 0.22 0.0001 vectors and the control of the con	HA Area / DBFO le outfall)  List of outfall  cumulative asse  Assessor and affi  Version of assess  Colder Wet  (Enter zero in Annual 95°  Permeable area draining is the discharge in or with	number s in ssment liation Rai Wile rive to outfa	Northing Northing  Infall site A  If I was a site of a part of a p	Sediment deposit Accumulating? Extensive?  825054 825054  LN AMJV 1  rottalnaig (SAAR 1343.9  seess Step 1 runoff protected site for co	ion for this site is ju Yes 0.03 L No 11 D  mmn)  quality only)	ow flow Vel m/s eposition Index	
AGENCY  Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness Is there a downstre © Tier 1 Estimate	A9  Non-cumulati Easting Easting Unamed Wate  21/06/2016  21/06/2016  21/06/2016  Low = <50mg Camera drained (hose)  Low = <50mg Camera drained (hose)  Low = <50mg Camera drained (hose)	ve assessment (single 283972 283972 283972 283972 28700015e	HA Area / DBFO  List of outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 959 Permeable area draining Is the discharge in or with at reduces the velocity with  Manning's n  0.07	number s in ssment liation Rai Rai in 100m	Northing Northing  Infall site  All of the point of of Side slope (m.	Sediment deposit Accumulating? Extensive?  825054 825054  LN AMJV 1  rottalnaig (SAAR 1343.9  seess Step 1 runoff protected site for co	mm)  quality only)	ow flow Vel m/s eposition Index	
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Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness Is there a downstre © Tier 1 Estimate	A9  Non-cumulati Easting Easting Unamed Wate  21/06/2016  21/06/2016  21/06/2016  Low = <50mg Camera drained (hose)  Low = <50mg Camera drained (hose)  Low = <50mg Camera drained (hose)	ve assessment (single	HA Area / DBFO  List of outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 959 Permeable area draining Is the discharge in or with at reduces the velocity with  Manning's n  0.07	number s in sssment liation ment Rai liation min 1 km in 100m Attt soluble	Northing Northing Northing Infall site  A  If flow box to ass If (ha)  O  upstream of a p  of the point of of Side slope (m.  ad effectiveness enuation for es - restricted	Sediment deposit Accumulating? Extensive?  825054 825054  LN AMJV 1  rottalnaig (SAAR 1343.9  seess Step 1 runoff protected site for co	ion for this site is ju Yes 0.03 L No 11 p  mm)  quality only)  nservation?  Long slope (m/m)	No V D	
Location Details Road number Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only For sediment impact only  Step 3 Mitigation	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness Is there a downstre © Tier 1 Estimate	A9 Non-cumulati Easting Lasting Loward Vate Loward Vate Loward Scottles Loward Scottles Loward Carantel Loward	ve assessment (single	HA Area / DBFO le outfall)  List of outfall cumulative asse Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95's Permeable area draining Is the discharge in or with at reduces the velocity with Manning's n  0.07  Treatment for solubles (%)	number s in sssment liation Rai liation sment  Rai ation 1 km in 100m  Attute discha	Northing Northing Northing  Infall site  All  Information of a property of the point of a property of the property o	Sediment deposit Accumulating? Extensive?  825054 825054 825054  LN AMJV 1  rdtalnaig (SAAR 1343.9  sess Step 1 runoff  protected site for conditional conditions of the condi	mm)  quality only)  No Predict	No V D	
Location Details Road number Assessment type OS grid reference of assessm OS grid reference of outfall str Outfall number Receiving watercourse EA receiving water Detailed R Date of assessment Notes  Step 1 Runoff Quality  Step 2 River Impacts  For dissolved zinc only  For sediment impact only	Annual Average C Step 2 0.91 Step 3 0.17  ent point (m) ucture (m)  AADT >10,000 an  Annual 95%ile river Impermeable road a Base Flow Index (B Water hardness Is there a downstre © Tier 1 Estimate	A9 Non-cumulati Easting Lasting Loward Vate Loward Vate Loward Scottles Loward Scottles Loward Carantel Loward	ve assessment (single	HA Area / DBFO  List of outfall)  List of outfall cumulative asses  Assessor and affi Version of assess  Colder Wet  (Enter zero in Annual 95' Permeable area draining Is the discharge in or with  at reduces the velocity with  Manning's n  0.07	number s in sssment liation ment Rai liation min 1 km in 100m Attt soluble	Northing Northing Northing  Infall site  All  Information of a property of the point of a property of the property o	Sediment deposit Accumulating? Extensive?  825054 825054 825054  LN AMJV 1  rdtalnaig (SAAR 1343.9  sess Step 1 runoff protected site for co	mm)  quality only)  No Predict	No VI mpact	



HIGHWAY	YS Highw	vays Ager	ncy Wate	r Risk Assessn	nentTool version 1.0 Nove	mber 200	09				
AGENCY				Soluble - Acute Imp				Sediment - Chron	ic Impact		
	Annual Av	Copper Z	ntration inc	Copper	Zinc			Sediment depos	ition for th	is site is	iudged as:
	Step 2		.18 ug/l	Pass	Pass		Pass	Accumulating?	Yes	0.02	Low flow Vel m/s
	Step 3	0.22 0	.65 ug/l					Extensive?	No	37	Deposition Index
Location Details					114.4 (DDEO			1			
Road number		A9			HA Area / DBFO	number	•				
Assessment type OS grid reference of asse	coment point (m)			ve assessment (sin	gle outfall)		Monthing	005000			_
OS grid reference of outfa			sting	283470 283470			Northing Northing	825663 825663			
Outfall number	iii structure (111)	11J	•	283470	List of outfall	s in	Northing	825663		1	
Receiving watercourse			Slochd Mh	uic	cumulative asse			*			
EA receiving water Details	ed River Network I		Cioci la IVII	idio	Assessor and affi	liation		LN AMJV			
Date of assessment	od rater riethen.		06/2016		Version of assess			1			
Notes		2.17	30/2010								
Step 1 Runoff Quali	ity AADT >10	0,000 and <50	,000	Climatic region	Colder Wet 🔻	Ra	infall site A	rdtalnaig (SAAR 1343.	9mm)		-
							_				
Step 2 River Impact	S Annual 95%	ile river flow	(m <sup>3</sup> /s)	0.002	(Enter zero in Annual 95°	%ile rive	erflow box to as	sess Step 1 runof	f quality or	nly)	
	Impermeable	e road area	drained (h	a) 1.184	Permeable area draining	to outfa	all (ha) 0				
	Base Flow Ir			0.21	Is the discharge in or with			aratastad sita for a	an convotic	n 2	No ▼ □
	Dusc 1 low ii	Idex (BI I)		0.21	is the discharge in or with	IIII I KIII	upstream or a	protected site for ci	Jiiseivauc	,,,,	
For dissolved zinc only	Water hardn	ess Low	= <50mg Ca	aCO3/I							
For sediment impact or	alv Is there a do	wnstreams	tructure Is	ke pond or canal t	hat reduces the velocity with	in 100m	of the point of	discharge?	N	n -l	D
or sealment impact of		stimated riv			naticadocs are velocity with	10011	rorate pointer	alsoriarge :	L.		
	_			3	Manning's n 0.07	D	0: 11 (	/m) 0.5			
	O Hel 2 B	ed width (m	)	. 3	Manning's n 0.07		Side slope (m	/m)   0.5	Longs	lope (m/r	n) 0.0001
Step 3 Mitigation					*	Estimate	ed effectiveness				
		Br	ief descrip	tion	Treatment for	Atte	enuation for	Settlement of	7	Predic	ct Impact
					solubles ( %)		es - restricted arge rate ( l/s )	sediments ( %)			
Existing measures					0	Unlimit		0	Sh	ow Det	ailed Results
			=						_   _		
Proposed measures F	ilter Drains & Dry/Det	ention Pond (C	ù 0%, Zn 45	%, Sed 80%)	45	Unlimit	ed	80		Ex	it Tool
HIGHWAY	YS Highw	vays Ager	ncy Wate	r Risk Assessn	nentTool version 1.0 Nove	mber 200	09				
AGENCY				Soluble - Acute Imp				Sediment - Chron	ic Impact		
	Annual Av	erage Concer		Copper	Zinc			C			budged as.
	Step 2		.10 ug/l	Pass	Pass		Pass	Sediment depos Accumulating?	Yes	0.01	Low flow Vel m/s
	Step 3		.80 ug/l					Extensive?	No	50	Deposition Index
Location Details											
Road number		A9			HA Area / DBFO	number	•				_
Assessment type		r.		ve assessment (sin	gle outfall)		far as				-
OS grid reference of asse			sting	282598			Northing	826257			
OS grid reference of outfa Outfall number	iii structure (m)	L.	sting	282598	List of outfall	e in	Northing	826257			
Receiving watercourse		11k	utary of All	t Caraash	cumulative asse						
EA receiving water Details	ad Pivar Naturark I		utary or Air	il Coisacii	Assessor and affi	liation		LN AMJV			
Date of assessment	ed Idvel Ivetwork i		06/2016		Version of assess			LIN AIVIJV			
Notes		21/	30/2010		V C131011 01 433636	JIIIOI K		l'			
Step 1 Runoff Quali	ity AADT >10	0,000 and <50	,000	Climatic region	Colder Wet -	Ra	infall site A	rdtalnaig (SAAR 1343.	9mm)		-
Step 2 River Impact	S Annual 95%	ile river flow	$(m^3/s)$	0.001	(Enter zero in Annual 959	%ile rive	erflow box to as	sess Step 1 runof	f quality or	nly)	
	Impermeable	e road area	drained (h	a) 1.248	Permeable area draining	to outfa	all (ha) 0				
	="		aramoa (ri		_						N.
	Base Flow In	idex (BFI)		0.22	Is the discharge in or with	iin 1 km	upstream of a	protected site for c	onservatio	on?	No ▼ D
For dissolved zinc only											
. o. alocolitoa ziilo oliily	Water hardn	ess Low	= <50mg Ca	aCO3/I							
-					hat radiuses the vellerity with	in 100	of the paint - f	diagharas?			
For sediment impact or	nly Is there a do	wnstream s	tructure, la	ake, pond or canal t	hat reduces the velocity with	in 100m	n of the point of (	discharge?	N	0 -	D
-	nly Is there a do	wnstream s	tructure, la	ake, pond or canal to							
-	nly Is there a do	wnstream s	tructure, la	ake, pond or canal t	hat reduces the velocity with  Manning's n 0.07	in 100m	of the point of o			lope (m/r	
For sediment impact or	nly Is there a do	wnstream s	tructure, la	ake, pond or canal to	Manning's n 0.07	D	Side slope (m	/m) 0.5			
-	nly Is there a do	wnstream s stimated riv sed width (m	tructure, la er width (n	ake, pond or canal th	Manning's n 0.07	Estimate	Side slope (m	/m) 0.5		lope (m/r	
For sediment impact or	nly Is there a do	wnstream s stimated riv sed width (m	tructure, la	ake, pond or canal th	Manning's n 0.07	Estimate Atte soluble	Side slope (m ed effectiveness enuation for les - restricted	/m) 0.5		lope (m/r	n) 0.0001
For sediment impact or  Step 3 Mitigation	nly Is there a do	wnstream s stimated riv sed width (m	tructure, la er width (n	ake, pond or canal th	Manning's n 0.07  Treatment for solubles ( %)	Estimate Atte soluble discha	Side slope (m ed effectiveness enuation for es - restricted arge rate ( \( V_S \) )	Settlement of sediments ( %)	Longs	ope (m/r	n) 0.0001
For sediment impact or	nly Is there a do or Tier 1 E Or Tier 2 B	wnstream s stimated riv sed width (m	tructure, la er width (n )	ake, pond or canal the state of	Manning's n 0.07	Estimate Atte soluble	Side slope (m  ed effectiveness enuation for les - restricted arge rate ( Vs )  ed	/m) 0.5  Settlement of	Longs	ope (m/r	n) 0.0001



#### **Accidental Spillage Calculation Criteria A.2.**

Drainage Network ID	Road Length (Km)	Туре	Spillage Accident Rates (SS)	AADT24- 2WAY	%HGV	Ppol	p <sup>inc</sup>	Overall Probability	Designated Area	Pass/Fail	Annual Probability (1 in x years)
1 B	0.5677	No Junction	0.29	16213	12	0.75	8.8E-05	8.8E-05	Yes	Pass	11405
1 C	0.725	No Junction	0.29	16213	12	0.75	0.00011	0.00011	Yes	Pass	8930
1 E	0.397	No Junction	0.29	16213	12	0.75	6.1E-05	6.1E-05	Yes	Pass	16308
1 F	0.2317	No Junction	0.29	16213	12	0.75	3.6E-05	3.6E-05	Yes	Pass	27943
	0.9954	No Junction	0.29	16213	12	0.75	0.0002				
	0.5375	Slip Road	0.83	16213	12	0.75	0.0002				
2 A (Mainline & Junction A18)	1.352	Slip Road	0.83	16213	12	0.75	0.0006	0.0016	Yes	Pass	608
	1.108	Side Road	0.93	16213	12	0.75	0.0005				
	0.6967	No Junction	0.29	16213	12	0.75	0.0001				



Drainage Network ID	Road Length (Km)	Туре	Spillage Accident Rates (SS)	AADT24- 2WAY	%HGV	P <sub>pol</sub>	p <sup>ine</sup>	Overall Probability	Designated Area	Pass/Fail	Annual Probability (1 in x years)
3A B1	0.9943	No Junction	0.29	16213	12	0.75	0.00015	0.00015	Yes	Pass	6512
3A C	0.8248	No Junction	0.29	16213	12	0.5	8.5E-05	8.5E-05	No	Pass	11775
3B B	1.881	No Junction	0.29	16213	12	0.75	0.00029	0.00029	Yes	Pass	3442
4 A	0.9187	No Junction	0.29	16213	12	0.75	0.00014	0.00014	No	Pass	7047
	0.1779	No Junction	0.29	16213	12	0.75	3E-05	0.00007704	N.	D	40000
5 A	0.159	Slip Road	0.83	16213	12	0.75	7E-05	0.000097764	No	Pass	10229
5 B	0.2927	No Junction	0.29	16213	12	0.75	5.1E-05	0.00000004	NI:	D	45004
5 B	0.04	Slip Road	0.83	16213	12	0.75	1.8E-05	0.000062891	No	Pass	15901



Drainage Network ID	Road Length (Km)	Туре	Spillage Accident Rates (SS)	AADT24- 2WAY	%HGV	Ppol	p <sup>ine</sup>	Overall Probability	Designated Area	Pass/Fail	Annual Probability (1 in x years)
5 C	0.3477	No Junction	0.29	16213	12	0.5	3.37429E-05	0.000002694	No	Pass	10789
50	0.2	Slip Road	0.83	16213	12	0.5	5.89407E-05	0.000092684	NO	Pass	10789
5 D	0.4323	No Junction	0.29	16213	12	0.75	6.7E-05	6.7E-05	No	Pass	14977
5 E	0.1929	No Junction	0.29	16213	12	0.75	3E-05	3E-05	No	Pass	33564
5 F	0.4414	No Junction	0.29	16213	12	0.75	6.8E-05	6.8E-05	No	Pass	14668
5 G	0.0632	No Junction	0.29	16213	12	0.75	9.8E-06	9.8E-06	No	Pass	102444
	1.292	Slip Road	0.83	16213	12	0.75	0.0006				
Granish Junction	0.2195	Side Road	0.93	16213	12	0.75	0.0001	0.001633050	No	Doos	616
Opt C34	0.5675	Roundabout	3.09	16213	12	0.75	9.2E-6	0.001623050	No	Pass	616
	0.05985	No Junction	0.29	16213	12	0.75	9.24402E-06				



Drainage Network ID	Road Length (Km)	Туре	Spillage Accident Rates (SS)	AADT24- 2WAY	%HGV	Ppol	p <sup>inc</sup>	Overall Probability	Designated Area	Pass/Fail	Annual Probability (1 in x years)
6A A	0.548	No Junction	0.29	16213	12	0.5	5.6E-05	5.6E-05	No	Pass	17722
6A C	0.5705	No Junction	0.29	16213	12	0.5	5.9E-05	5.9E-05	No	Pass	17023
6A E	0.131	No Junction	0.29	16213	12	0.5	1.3E-05	1.3E-05	No	Pass	74135
6B A	0.8196	No Junction	0.29	16213	12	0.5	8.4E-05	8.4E-05	No	Pass	11849
6B B	1.182	No Junction	0.29	16213	12	0.75	0.00018	0.00018	No	Pass	5478
7 A	1.076	No Junction	0.29	16213	12	0.75	0.00017	0.00017	No	Pass	6017
7 B	2.148	No Junction	0.29	16213	12	0.75	0.00033	0.00033	No	Pass	3014
8 A	0.627	No Junction	0.29	16213	12	0.75	9.7E-05	9.7E-05	Yes	Pass	10326



Drainage Network ID	Road Length (Km)	Туре	Spillage Accident Rates (SS)	AADT24- 2WAY	%HGV	P <sub>pol</sub>	p <sup>ine</sup>	Overall Probability	Designated Area	Pass/Fail	Annual Probability (1 in x years)
8 C	0.2302	No Junction	0.29	16213	12	0.75	3.6E-05	3.6E-05	Yes	Pass	28125
8 D	0.8715	No Junction	0.29	16213	12	0.75	0.00013	0.00013	Yes	Pass	7429
9 A	0.737	No Junction	0.29	16213	12	0.75	0.00011	0.00011	Yes	Pass	8785
	0.338	Side Road	0.93	16213	12	0.75	0.000167417				
	0.61	No Junction	0.29	16213	12	0.75	9.42164E-05				
9 B	1.61	Slip Road	0.83	16213	12	0.75	0.000711709	0.0012	No	Pass	866
	1.178	No Junction	0.29	16213	12	0.75	0.000181946				
9 B2	0.229	No Junction	0.29	16213	12	0.75	2.4E-05	2.4E-05	No	Pass	42409



Drainage Network ID	Road Length (Km)	Туре	Spillage Accident Rates (SS)	AADT24- 2WAY	%HGV	P <sub>pol</sub>	p <sup>inc</sup>	Overall Probability	Designated Area	Pass/Fail	Annual Probability (1 in x years)
	0.807	No Junction	0.29	16213	12	0.75	0.00012			1	0005
9 B3	0.361	Side Road	0.93	16213	12	0.75	0.00017	0.0003	No	Pass	3295
9 D	0.9808	No Junction	0.29	16213	12	0.75	0.00015	0.00015	No	Pass	6601
10 A	0.06808	No Junction	0.29	16213	12	0.75	1.1E-05	1.1E-05	No	Pass	95101
10 B	0.5228	No Junction	0.29	16213	12	0.75	8.1E-05	8.1E-05	No	Pass	12384
10 C	0.9113	No Junction	0.29	16213	12	0.75	0.00014	0.00014	No	Pass	7105
11 C	0.2588	No Junction	0.29	16213	12	0.75	4E-05	4E-05	No	Pass	25017
11D	0.7374	No Junction	0.29	16213	12	0.75	0.00011	0.00011	No	Pass	8780



Drainage Network ID	Road Length (Km)	Туре	Spillage Accident Rates (SS)	AADT24- 2WAY	%HGV	Ppol	p <sup>inc</sup>	Overall Probability	Designated Area	Pass/Fail	Annual Probability (1 in x years)
11 J	0.4123	No Junction	0.29	16213	12	0.75	6.4E-05	6.4E-05	No	Pass	15703
11 K	0.5725	No Junction	0.29	16213	12	0.75	8.8E-05	8.8E-05	No	Pass	11309



#### References **5**.

<sup>&</sup>lt;sup>1</sup> The Highways Agency, Scottish Executive, Welsh Assembly Government and The Department Regional Development Northern Ireland (2009). Design Manual for Roads and Bridges, Volume 11, Section 3, Part 10, Road Drainage and the Water Environment.

<sup>&</sup>quot; CIRIA 2015. The SuDS Manual (C753). London: CIRIA