The Water Environment (Controlled Activities) (Scotland) Regulations 2011

Licence Application Form D

Surface Water Abstractions and Impoundments

Section 1: Activities applied for

*Please use Application form K for the construction of deep boreholes >200m

*Please use Application form D1 for Groundwater Abstractions and Construction of boreholes <200m deep

Please indicate how many activities you are applying for under each category.	No:	National Grid Reference (10 character) of abstraction or impoundment	Name of source waterbody or impounded waters	Source type •Watercourse •Reservoir •Loch •Spring •Wetlands
1.1 Surface Water Abstractions:				
Registration	An abstraction of more than 10m^3/day and less than or equal to 50m^3/day		Attach separate Application forms for registration to this Application	
Simple Licence	An abstraction of more than 50m^3/day and less than or equal to 2000m^3/day		- -	
Complex Licence	An abstraction of more than 2000m^3/day	3	NN 47367 81960	Lochan na h-Earba (Loch Earba) / Loch
			NN 49429 80004	Loch a' Bhealaich Leamhain (Loch Leamhain) / Loch
			NN 4625 8129	Residual flow from Coire Pitridh (Shuas aqueduct inlet) / Residual watercourse and catchment below Pitridh Aqueduct will be diverted to Loch a' Meall Ardruighe Reservoir via Shuas Aqueduct.
1.2 Mobile abstraction units used to abstract water under this Application				
Mobile	Additional mobile		- -	

Plant	unit abstraction location(s)				
	If applicable, please state how many mobile abstraction units are to be used to abstract water applied for under this licence				
1.3 Impoundments:					
Simple Licence	Existing passive weir		- -		
	Existing managed weir less than or equal to 1 metre high		- -		
	Existing raised loch less than or equal to 1 metre high		- -		
	Construction of all new impoundments less than or equal to 1m high that do not affect the passage of salmon or sea trout.		- -		
	Removal or modification of an impoundment authorised under GBR1		- -		
	Removal or modification of a		- -		

	simple licence level impoundment				
Complex Licence	Construction and operation of all other impoundments		1 2 3 4	Shuas Dam NN 46462 81242 Shios Dam NN 50180 85803 Leamhain Dam NN 50522 79280 Existing Meall Ardruighe Dam NN 45320 80778	Loch Earba Loch Earba Loch Leamhain Existing Loch a' Meall Ardruighe Reservoir
	Removal or modification of a complex licence level impoundment		- -		

Section 2: Reasonable need		
2.1 Please indicate your main category or categories of use (if appropriate):		
Agricultural irrigation		Please continue to section 2.2
Agricultural water supply		Please continue to section 2.2
Golf Course irrigation		Please continue to section 2.2
Industry (other than hydropower)		Please continue to section 2.2
Private Water Supply		Please continue to section 2.2 and complete Table A
Public Water Supply		Please continue to section 2.2 and complete Table B
Other (please specify)	Hydropower	Please continue to section 2.2 and complete Table C

2.2 All users			
2.2.1 Total Quantities to be authorised Please give the total volume of usage in cubic metres to be authorised from all sources in the periods indicated	Hour (m^3) 3,060,000 (based on maximum abstraction of up to 850 m3/s)	Day (m^3) 61,000,000m^3 (maximum water stored in Leamhain)	Year (m^3) 61,000,000m^3 (water in Leamhain and Earba is re-cycled daily / weekly)

2.2.2 Please set out here any other information, e.g. supporting calculations, operational practices or other reasons, in addition to that which you include in the following tables, to show how you have arrived at the quantities set out above that you are seeking to have authorised. (Please continue on a separate sheet were necessary)	• A new pumped storage hydro scheme is being proposed, which would abstract water impounded in two new reservoirs. The lower reservoir will be formed by raising the existing Loch Earba by up to 24m from 352m to 376m AOD. The Upper reservoir will be formed by raising the existing Loch Leamhain from 635m by up to 75m to 710m AOD • In pumping mode, during periods of excess renewable power on the national electricity network, the water would flow between the new Loch Earba reservoir and the Loch Leamhain reservoir. During periods of insufficient renewable power being produced and/or high demand water would flow from Loch Leamhain down to the Loch Earba reservoir passing through the turbines and generating the electricity needed for the national grid. • The maximum capacity of the pumped storage hydro would be up to 1800MW, with maximum design flow of up to 850 ^{3}/s from Loch Leamhain to Loch Earba. The mean generating flow would be approximately 706m^{3}/s. • The total volume of water stored divided by the mean flow, gives around 23 hours of operation at maximum power. Therefore the maximum possible daily generation would be 23hrs at 706m^{3}/s and hence maximum daily abstraction from Loch Leamhain would be 61Mm^{3}. • During pumping mode, the maximum design flow from Loch Earba to Loch Leamhain would be approximately 640m3/s. Therefore it is likely that the maximum daily pumping would be 24hrs at 640m3/s and hence maximum daily abstraction from Loch Earba would be 55Mm3. • A controlled outlet on the Loch Earba reservoir, at Shios dam, would maintain a river compensation flow at the loch outlet in the order of Q95. The existing hydro intake on Loch Earba will be modified and fed by the discharge from the new dam. Compensation flow reflecting the flow from Shuas dam will be passed at the new Ardverikie hydro intake. Compensation flow is

	currently not required at the existing Ardverikie intake. A controlled outlet on the Loch Leamhain reservoir would provide compensation flows to replicate the natural burn flows at the loch outlet and freshets would be released to replicate natural flow patterns and volumes. • At present Loch Earba is controlled by an existing weir at the north end and a structure in the channel between the north and south Earba lochs. These two structures would be decommissioned. • Under extreme flood conditions, the project may be required to curtail operation of the proposed pumped storage scheme to avoid overload of the downstream catchments but there will be spillways in the dams to accommodate extreme rainfall flood conditions up to and including PMF under a conservative non operational condition. • It is proposed that the burns that flow into the south of Loch Earba shall be diverted around the proposed Shuas Dam and into the raised reservoir. These burns are named: Allt Coire Pitridh Allt Corie a' Chlachair And tributaries of the above named burns For more information on all the points above please refer to **Chapter 3 Scheme Description** of the **Earba PSH CAR Licence Application Report**
2.2.3 Please set out here what steps you have taken or intend to introduce to ensure efficient use of water (Please continue on a separate sheet if necessary)	Pumped storage hydro (PSH) is a very efficient use of stored water, as it can be re-cycled between the lower and upper reservoirs with efficiencies of up to 89% each way, giving round trip efficiency in the order of 78% in storing grid scale electrical power, with no loss of water from the system, except for evaporation from the reservoirs, a naturally occurring factor.

Table A – Private Water Supplies – including hospitals, schools, prisons, hotels, industrial premises etc.		
A.1 Please indicate nature of supply (i.e. domestic, agriculture, hospital etc.). Include all components.	There is an existing water supply feeding Ardverikie from the existing Ardverikie hydro penstock.	
A.2 Please give details of the numbers of people being supplied and details of any residential capacity etc.	No of domestic properties served	10
	Total population supplied	50 (approx varies based on Estate activities)
	For hospitals, schools, prisons, hotels etc. please provide the maximum number of person-days occupancy provided for in one year.	N/A
	Other (please specify)	

Table B – Public Water Supplies		
B.1 Please indicate the nature of the abstraction (direct into treatment and supply, raw water storage, river basin transfer etc.)	N/A	
B.2 Please give details of the supply.	B.2.1 Water resource zone to be supplied	N/A

	B.2.2 Total population supplied	N/A
	B.2.3 Components of supply (percentage domestic, industrial, agricultural etc.)	N/A
B.3 Please give details of relevant water resources planning and any other documents relating to this scheme. If the scheme departs from these plans, please give the reasons for this. Please include details of any other current proposals which could have a bearing on the outcome of this Application.	N/A	

Table C – Other	
C.1 Please give details of the water use, purpose of abstraction etc.	The purpose of the abstraction is for Pumped Storage Hydropower The avergae head of the project is 310 metres (mean) based on mid level of reservoirs i.e. Leamhain at 675m AoD and Earba at 365m AoD The average flow is 706 m^3/sec (mean), 850m^3/s (max)

C.2 Please give as much detail as possible of the operational regime intended, water storage and conservation provision etc.	As discussed above the operational regime would be as follows: During periods of insufficient renewable power being produced and/or high demand on the national electricity grid network, water would flow from Loch Leamhain down to the Loch Earba reservoir passing through the turbines and generating the electricity needed for the national grid. In pumping mode, during periods of excess renewable power on the national electricity grid network, this power would be directed to the pumps and the water would flow between the new Loch Earba reservoir and the Loch Leamhain reservoir. The active volume of stored water in Loch Leamhain would be approximately 61Mm^3. The total volume of water impounded by the Leamhain dam would be 69 Mm^3. The total active storage in Loch Earba would be approximately 62Mm^3. This is more than the 61Mm^3 PSH working volume to allow for some storage for compensation flow, the small hydro operation and to allow a buffer for seasonal variation in rainfall. The total volume of water impounded by the Shios and Shuas dams would be 71 Mm^3. Please refer to Chapter 4 Water Management of the **Earba PSH CAR Licence Application Report.**

Section 3: Applications Including Abstraction Activities			
Complete this table for all activities you are applying for. If you are applying for a licence which includes more than one abstraction activity please copy, complete and reference a separate table for each licensable activity.			
No. of Section 3 tables completed:	3	Table ref: (e.g.1 of 2, 2 of 2)	1 of 3 (lower control works)
Abstraction details:			
3.1 Abstraction Point No/Ref/Name (This should correspond to a reference on the site map in 2.4 of Form A):	Earba Powerhouse (Lower Control Works)		
3.2 Name of watercourse or loch (if applicable):	Loch Earba		

Section 3: Applications Including Abstraction Activities		
3.3 National Grid Reference of abstraction. Specify a single point or for mobile abstraction units specify the upstream (u/s) and downstream (d/s) limits.	Single point NN 4720 8170	
3.4 Please provide a full description of your proposals to construct or alter any surface water intake structure, including plans and cross sections.	Document name / reference:	Please refer to the Scheme Description Chapter (3) of the **Earba PSH CAR Licence Application Report.** Please refer to the following drawings of the Lower Control Works: Figure 2.16 & 2.17
3.5 Please provide method statements describing the method and controls of construction or alteration for any surface water intake structure	Document name / reference:	Please refer to the Outline CEMD + PPP which are included as appendices in the **Earba PSH CAR Licence Application Report**
3.6 Do you consider this abstraction would qualify as an environmental service?	☐ No ☒ Yes, provide details on separate sheet	
	Document name/ reference:	Yes. Please refer to Chapter 1 Need for Project of the **Earba PSH CAR Licence Application Report**. Which sets out the project benefits/need for project and the benefit to achieving net zero the project will bring.

Section 3: Applications Including Abstraction Activities			
3.7 Do you consider this abstraction would qualify for abated charges?	☒ No ☐ Yes, provide details on separate sheet		
	Document name/ reference:		
3.8 What is the maximum proposed rate or volume of abstraction for this abstraction activity? Conversion: 1m^3 = 1000 litres 1m^3 = 220 gallons 1m^3/hour = 0.2778 litres/sec	litres/ second:	cubic metres/ day:	cubic metres/ year:
	850,000	61Mm^3	N/A (Active storage is recyled between the two reservoirs)
3.9 Describe how you propose to monitor the volume of water abstracted?	Document name/ reference:		Please refer to Chapter 4 Water Management of the **Earba PSH CAR Licence Application Report**.
3.10 Do you intend to abstract every year or only intermittently? (Intermittent means that it is predictable in which years you will abstract. If you are applying to have the capability to abstract in any year, select annual)	☒ ANNUALLY ☐ INTERMITTENTLY, if so, please provide further details on separate sheet		
	Document name/ reference:		Please refer to Chpater 4 Water Management of the **Earba PSH CAR Licence Application Report.**
3.11 Please tick during which months the abstraction takes place and, if available, indicate abstraction volumes (m^3/month).			

Section 3: Applications Including Abstraction Activities											
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
X	X	X	X	X	X	X	X	X	X	X	X

3.12 Is any abstracted water to be discharged back into the water environment? If yes, enter the National Grid Reference (NGR) of the discharge point(s). Please note this discharge may require authorisation as a point source discharge See the CAR Practical Guide for further details.	☐ No ☒ Yes NGR: 1) NN 4944 7999 All water abstracted at the lower control works will be discharged at the upper control works and vice versa.	
3.13 Where you have selected 'yes' above specify the water returned as a percentage of take at the above grid reference(s)	NGR: 1) NN 4944 7999 100% of abstracted water returned	
3.14 If appropriate, provide information on the proposed operating regime (e.g. abstraction limits, hands off flow etc)	Document name/ reference:	Please refer to Chapter 4 Water Management of the **Earba PSH CAR Licence Application Report**.
3.15 Where a management agreement is in place which influences the abstraction, please provide details.	Document name/ reference:	N/A
3.16 If appropriate, provide information on any inter-relationships between abstraction points applied for as part of this Application (see section 3 of the guidance)	Document name/ reference:	Please refer to Chapter 4 Water Management of the **Earba PSH CAR Licence Application Report**.

3.17 Please provide for mobile spray irrigation abstractions and water transfers a method statement detailing how each activity is to be carried out to prevent the spread of invasive non-native species[1].	Document name/ reference:	Discussion ongoing

Section 3: Applications Including Abstraction Activities			
Complete this table for all activities you are applying for. If you are applying for a licence which includes more than one abstraction activity please copy, complete and reference a separate table for each licensable activity.			
No. of Section 3 tables completed:	3	Table ref: (e.g.1 of 2, 2 of 2)	2 of 3 (upper control works)
Abstraction details:			
3.1 Abstraction Point No/Ref/Name (This should correspond to a reference on the site map in 2.4 of Form A):	Leamhain Intake (Upper Control Works)		
3.2 Name of watercourse or loch (if applicable):	Loch Leamhain		
3.3 National Grid Reference of abstraction. Specify a single point or for mobile abstraction units specify the upstream (u/s) and downstream (d/s) limits.	Single point NN 4944 7999		
3.4 Please provide a full description of your proposals to construct or alter any surface water intake structure, including plans	Document name / reference:	Please refer to the Scheme Description Chapter (three) of the **Earba PSH CAR Licence**	

[1] For information see the check, clean, dry procedure as outlined in the GB non-native species secretariat website (http://www.nonnativespecies.org/checkcleandry/biosecurity-for-everyone.cfm) and guidance set out in GPP5 (http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017)

Section 3: Applications Including Abstraction Activities			
and cross sections.			**Application Report.** Please refer to the following drawings of the Upper Control Works: Figure 2.12 & Figure 2.13
3.5 Please provide method statements describing the method and controls of construction or alteration for any surface water intake structure	Document name / reference:		Please refer to the Outline CEMD + PPP which are included as appendices in the **Earba PSH CAR Licence Application Report**
3.6 Do you consider this abstraction would qualify as an environmental service?	☐ No ☒ Yes, provide details on separate sheet		
	Document name/ reference:		Please refer to Chapter 1 Need for Project of the **Earba PSH CAR Licence Application Report**. Which sets out the project benefits/need for project and the benefit to achieving net zero the project will bring.
3.7 Do you consider this abstraction would qualify for abated charges?	☒ No ☐ Yes, provide details on separate sheet		
	Document name/ reference:		
3.8 What is the maximum proposed rate or volume of abstraction for this abstraction activity? Conversion: $1m^3$ = 1000 litres $1m^3$ = 220	litres/ second:	cubic metres/ day:	cubic metres/ year:
	850,000	61Mm^3	N/A (Active storage is recyled between

Section 3: Applications Including Abstraction Activities			
gallons 1m^3/hour = 0.2778 litres/sec			the two reservoirs)
3.9 Describe how you propose to monitor the volume of water abstracted?	Document name/ reference:		Please refer to Chapter 4 Water Management of the **Earba PSH CAR Licence Application Report**.
3.10 Do you intend to abstract every year or only intermittently? (Intermittent means that it is predictable in which years you will abstract. If you are applying to have the capability to abstract in any year, select annual)	☒ ANNUALLY ☐ INTERMITTENTLY, if so, please provide further details on separate sheet		
	Document name/ reference:		Please refer to Chapter 4 Water Management of the **Earba PSH CAR Licence Application Report.**

3.11 Please tick during which months the abstraction takes place and, if available, indicate abstraction volumes (m^3/month).

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
X	X	X	X	X	X	X	X	X	X	X	X

3.12 Is any abstracted water to be discharged back into the water environment? If yes, enter the National Grid Reference (NGR) of	☐ No ☒ Yes NGR: 1) NN 4720 8170 All water abstracted at the lower control works will be discharged at the upper control works and vice

the discharge point(s). Please note this discharge may require authorisation as a point source discharge See the CAR Practical Guide for further details.	versa.	
3.13 Where you have selected 'yes' above specify the water returned as a percentage of take at the above grid reference(s)	NGR: 1) NN 4720 8170 100% of abstracted water returned	
3.14 If appropriate, provide information on the proposed operating regime (e.g. abstraction limits, hands off flow etc)	Document name/ reference:	Please refer to Chapter 4 Water Management of the **Earba PSH CAR Licence Application Report**.
3.15 Where a management agreement is in place which influences the abstraction, please provide details.	Document name/ reference:	N/A
3.16 If appropriate, provide information on any inter-relationships between abstraction points applied for as part of this Application (see section 3 of the guidance)	Document name/ reference:	Please refer to Section Chapter 4 Water Management of the **Earba PSH CAR Licence Application Report**.
3.17 Please provide for mobile spray irrigation abstractions and water transfers a method statement detailing how each activity is to be carried out to prevent the spread of invasive non-native species[2].	Document name/ reference:	Discussion ongoing

[2] For information see the check, clean, dry procedure as outlined in the GB non-native species secretariat website (http://www.nonnativespecies.org/checkcleandry/biosecurity-for-everyone.cfm) and guidance set out in GPP5 (http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017)

Complete this table for all activities you are applying for. If you are applying for a licence which includes more than one abstraction activity please copy, complete and reference a separate table for each licensable activity.			
No. of Section 3 tables completed:	3	Table ref: (e.g.1 of 2, 2 of 2)	3 of 3 Shuas aqueduct inlet
Abstraction details:			
3.1 Abstraction Point No/Ref/Name (This should correspond to a reference on the site map in 2.4 of Form A):	Shuas aqueduct inlet		
3.2 Name of watercourse or loch (if applicable):	Shuas aqueduct inlet		
3.3 National Grid Reference of abstraction. Specify a single point or for mobile abstraction units specify the upstream (u/s) and downstream (d/s) limits.	Single point NN 4625 8129		
3.4 Please provide a full description of your proposals to construct or alter any surface water intake structure, including plans and cross sections.	Document name / reference:	Please refer to the Scheme Description Chapter of the **Earba PSH CAR Licence Application Report.** Please refer to the following drawings of the Shuas Aqueduct: Figure 2.22 & Figure 2.22.1	
3.5 Please provide method statements describing the method and controls of construction or	Document name / reference:	Please refer to the Outline CEMD + PPP which are included as	

alteration for any surface water intake structure			appendices in the **Earba PSH CAR Licence Application Report**
3.6 Do you consider this abstraction would qualify as an environmental service?	☐ No ☒ Yes, provide details on separate sheet		
	Document name/ reference:		Please refer to the project beenfits/need for project and the benefit to achieving net zero the project will bring.
3.7 Do you consider this abstraction would qualify for abated charges?	☒ No ☐ Yes, provide details on separate sheet		
	Document name/ reference:		Sustainable generation
3.8 What is the maximum proposed rate or volume of abstraction for this abstraction activity? Conversion: 1m^3 = 1000 litres 1m^3 = 220 gallons 1m^3/hour = 0.2778 litres/sec	litres/ second:	cubic metres/ day:	cubic metres/ year:
	2,500 (based on 1 in 200 year event)	20,000 (based on Q1)	800,000 (based on Q50)
3.9 Describe how you propose to monitor the volume of water abstracted?	Document name/ reference:		Chapter 4 of the CAR Licence Report sets this out
3.10 Do you intend to abstract every year or only intermittently? (Intermittent means that it is predictable in which years you will abstract. If you are	☒ ANNUALLY ☐ INTERMITTENTLY, if so, please provide further details on separate sheet		
	Document name/		This water is residual

applying to have the capability to abstract in any year, select annual)	reference:	catchment collected downstream of the Pitridh aqueduct and will be blocked by the proposed Shuas dam. The Shuas aqueduct provides a route for this flow to continue into the wider Loch Laggan catchment.

3.11 Please tick during which months the abstraction takes place and, if available, indicate abstraction volumes (m^3/month).

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
X	X	X	X	X	X	X	X	X	X	X	X

3.12 Is any abstracted water to be discharged back into the water environment? If yes, enter the National Grid Reference (NGR) of the discharge point(s). Please note this discharge may require authorisation as a point source discharge See the CAR Practical Guide for further details.	☐ No ☒ Yes NGR: 1) NN 4567 8090 All water abstracted will flow into Loch Meall Ardruighe reservoir.
3.13 Where you have selected 'yes' above specify the water returned as a percentage of take at the above grid reference(s)	NGR: 1) NN 4680 8129 100% of abstracted water returned

3.14 If appropriate, provide information on the proposed operating regime (e.g. abstraction	Document name/ reference:	The water at this abstraction location is residual catchment

limits, hands off flow etc)		downstream of the Pitridh aqueduct that has no route to Loch Earba due to the proposed Shuas dam. The Shuas aqueduct provides a route for this flow to continue into the wider Loch Laggan catchment. Compenstaion flow is not applicable at this location as all water flows on downstream.
3.15 Where a management agreement is in place which influences the abstraction, please provide details.	Document name/ reference:	N/A
3.16 If appropriate, provide information on any inter-relationships between abstraction points applied for as part of this Application (see section 3 of the guidance)	Document name/ reference:	The water at this abstraction is residual catchment from dowstream of the Pitridh aqueduct collection points.
3.17 Please provide for mobile spray irrigation abstractions and water transfers a method statement detailing how each activity is to be carried out to prevent the spread of invasive non-native species[3].	Document name/ reference:	N/A

Section 4: Applications Including Impoundment Activities
Complete this table for all impoundments that you are applying for. If you are applying for

[3] For information see the check, clean, dry procedure as outlined in the GB non-native species secretariat website (http://www.nonnativespecies.org/checkcleandry/biosecurity-for-everyone.cfm) and guidance set out in GPP5 (http://www.netregs.org.uk/media/1418/gpp-5-works-and-maintenance-in-or-near-water.pdf?utm_source=website&utm_medium=social&utm_campaign=GPP5%2027112017)

a licence which includes more than one impoundment structure please copy, complete and reference a separate table for each activity			
No. of Section 4 tables completed:	3	Table ref: (e.g.1 of 2, 2 of 2)	1 of 3 (Shios Dam)
IMPOUNDMENT DETAILS:			
4.1 Impoundment No/Ref/Name: (This should correspond to the reference on the site map)	**Shios Dam**		
4.2 Type of original waterbody impounded:	☐ Watercourse ☒ Loch ☐ None		
4.3 Name of watercourse or loch impounded:	Lochan Na H'Earba		
4.4 National Grid Reference of impoundment (from mid-point of impounding structure):	Shios Dam NN 50180 85803		
4.5 Using the look up table in Section 4 of the guidance specify the Purpose Category/Categories for the use of the impounded water. Continue on separate sheet if necessary.	Primary purpose: Hydropower		
4.6 Do you consider this impoundment would qualify as an	☐ No ☒ Yes, provide details on separate sheet		

environmental service?	Document name/ reference:	Please refer to the project need Chapter 1 of the **Earba PSH CAR Licence Application Report**.
4.7 Do you consider this impoundment would qualify for abated charges?	☐ No ☒ Yes, provide details on separate sheet	
	Document name/ reference:	Hydropower / sustainable generation
4.8 Where a management agreement is in place which influences the operation of the impoundment, please provide details.	Document name / reference:	Given the existing hydro schemes downstream of Loch Earba (Ardverickie Hydro) the natural flow must be replicated as far as possible in the release from the dam structures to maintain current generation levels at these sites. An agreement between Ardverikie Hydro Ltd and Earba hydro ltd has been reached.
4.9 Please provide a full description of your proposals to construct, alter or remove the impoundment, including plans and cross sections.	Document name / reference:	Refer to Scheme Description Chapter 3 of **Earba PSH CAR Licence Application Report**.

		Please refer to the following drawings of Shios Dam: Figure 2.7 & 2.7.1 to 2.7.7
4.10 Please provide method statements describing the method and controls of construction/alteration/removal works	Document name / reference:	Please refer to the CEMD and PPP documents which are included as appendices in the **Earba PSH CAR Licence Application Report**. Furthemore detailed RAMS would be submitted before construction as part of a pre commencement condition to achieve SEPA sign off.
4.11 If applicable, what date do you intend to start construction, alteration or removal works for the impoundment?	Document name / reference:	2027
4.12 Height of impoundment structure:	All levels from EGL to TWL: Shios Dam – 27m high (349 – 376m AoD) (Upper wave wall at 377m AoD subject to final detailed design)	
4.13 Please give the level of the overflow or crest of the dam (metres AOD) if this is different to the height of the impoundment structure	Shios Dam 376m AoD (spillway for Earba located on Shios dam)	
4.14 National Grid Reference of outflow point from impounded	Shios Dam NN 50180 85803	

waterbody		
4.15 Where there is a means of drawing the impounded water down, what is the minimum draw-off level (metres AOD)?	There would be a drawdown facility located in Shios Dam which could reduce the level to 349m AoD	
4.16 Provide details of ongoing maintenance of this impoundment structure e.g. debris clearance, scour valve operation, fish pass maintenance etc.	Document name / reference:	Sediment load at the current dammed outlet is currently negligible and will be unlikely with the large loch volume and small catchment with little river morphology upstream. Refer to Geomorphology appendice of the **Earba PSH CAR Licence Application Report**.
4.17 Please provide details of any sediment management plan associated with this impoundment (see guidance in section 4.17)	Document name / reference:	Sediment load at the current dammed outlet is currently negligible and will be unlikely with the large loch volume and small catchment with little river morphology upstream however Refer to Geomorphology appendice of the **Earba PSH CAR Licence Application Report**.
4.18 Is there to be provision for fish	☒ No, please provide a justification for this on a	

passage?	separate sheet ☐ Yes, if so, please design details on separate sheet	
	Document name / reference:	The burn between Loch Laggan and Loch Earba is impassable to fish due to the gradient and waterfalls (and current lack of compensation flow)
4.19 Are there to be fish screens or other fish protection measures?	☐ No, please provide a justification for this on a separate sheet ☒ Yes, if so, please design details on separate sheet	
	Document name / reference:	Fish screens will be provided on upper and lower control works Please refer to drawings Figure 2.12 & 2.13 + Figure 2.16 & 2.17
4.20 Provide information of the proposed operating regime (e.g. compensation release, freshets, drawdown)	Document name / reference:	The release from Loch Earba at Shuas dam will replicate natural flow. Freshets will provided. Drawdown level (except in emergency) in Loch Earba will not go below the existing level of 352m AoD. Generation will be curtailed when the level in Loch Earba rises to 376m AoD

		Please refer to Water Management Chapter 4 of the **Earba PSH CAR Licence Application Report**.

4.21 For reservoirs, the total volume of water to be impounded and, if different total volume of waterbody (where known) (litres or cubic metres): (N.B. this information is not mandatory for schemes less than 25000m^3)	Total volume of impounded water (Earba): 71,000,000 m3		
4.22 Provide details on any interconnections with other impoundments, abstractions or catchments.	Document name / reference:		The existing Ardverikie Hydro intake is on the site of the Shios Dam. This will be moved downstream.
4.23 Is registration required under the Reservoirs (Scotland) Act 2011? (i.e. can the reservoir hold 25,000m^3 or more above the surrounding land?) If yes, answer the following question:	☐ No ☒ Yes		
4.23.1 Have you already registered your reservoir with SEPA under the 2011 Act?	☐ Yes	Confirm reference number?	RES/R/…….
	☒ No	Contact SEPA's Reservoir Regulatory Unit at Reservoirs@sepa.org.uk to register	

Section 4: Applications Including Impoundment Activities

Complete this table for all impoundments that you are applying for. If you are applying for a licence which includes more than one impoundment structure please copy, complete and reference a separate table for each activity			
No. of Section 4 tables completed:	3	Table ref: (e.g.1 of 2, 2 of 2)	2 of 3 (Shuas)
IMPOUNDMENT DETAILS:			
4.1 Impoundment No/Ref/Name: (This should correspond to the reference on the site map)	Shuas Dam		
4.2 Type of original waterbody impounded:	☐ Watercourse ☒ Loch ☐ None		
4.3 Name of watercourse or loch impounded:	Lochan Na H'Earba		
4.4 National Grid Reference of impoundment (from mid-point of impounding structure):	Shuas Dam NN 46462 81242		
4.5 Using the look up table in Section 4 of the guidance specify the Purpose Category/Categories for the use of the impounded water. Continue on separate sheet if necessary.	Primary purpose: Hydropower Secondary purpose:		
4.6 Do you consider this impoundment would qualify as an	☐ No ☒ Yes, provide details on separate sheet		

environmental service?	Document name/ reference:	Please refer to the project need chapter 1 of the **Earba PSH CAR Licence Application Report.**
4.7 Do you consider this impoundment would qualify for abated charges?	☐ No ☒ Yes, provide details on separate sheet	
	Document name/ reference:	Hydropower / sustainable generation
4.8 Where a management agreement is in place which influences the operation of the impoundment, please provide details.	Document name / reference:	Given the existing hydro schemes downstream of Loch Earba (Ardverikie Hydro) the natural flow must be replicated as far as possible in the release from the dam structures to maintain current generation levels at these sites. An agreement between Ardverikie Hydro Ltd and Earba hydro ltd has been reached.
4.9 Please provide a full description of your proposals to construct, alter or remove the impoundment, including plans and cross sections.	Document name / reference:	Refer to Scheme Description Chapter 3 of **Earba PSH CAR Licence Application Report**.

		Please refer to the following drawings of Shuas Dam: Figure 2.8 & Figures 2.8.1 to 2.8.4
4.10 Please provide method statements describing the method and controls of construction/alteration/removal works	Document name / reference:	Please refer to the CEMD and PPP documents which are included as appendices in the **Earba PSH CAR Licence Application Report**. Furthemore detailed RAMS would be submitted before construction as part of a pre commencement condition to achieve SEPA sign off.
4.11 If applicable, what date do you intend to start construction, alteration or removal works for the impoundment?	Document name / reference:	2027
4.12 Height of impoundment structure:	All levels from EGL to TWL: Shuas Dam – 24m high (352 – 376)	
4.13 Please give the level of the overflow or crest of the dam (metres AOD) if this is different to the height of the impoundment structure	Shuas Dam 377.5m AoD (spillway for Earba Reservoir will be located on Shios dam)	
4.14 National Grid Reference of outflow point from impounded waterbody	Shuas Dam N/A	
4.15 Where there is a means of	Shuas Dam N/A	

drawing the impounded water down, what is the minimum draw-off level (metres AOD)?	(drawdown for Earba at Shios dam)	
4.16 Provide details of ongoing maintenance of this impoundment structure e.g. debris clearance, scour valve operation, fish pass maintenance etc.	Document name / reference:	Please refer to table on Shios dam.
4.17 Please provide details of any sediment management plan associated with this impoundment (see guidance in section 4.17)	Document name / reference:	Sediment load at the outlet will be unlikely with the large loch volume and small catchment with little river morphology upstream
4.18 Is there to be provision for fish passage?	☒ No, please provide a justification for this on a separate sheet ☐ Yes, if so, please design details on separate sheet	
	Document name / reference:	The burn between Loch Laggan and Loch Earba is impassable to fish due to the gradient and waterfalls (and current lack of compensation flow)
4.19 Are there to be fish screens or other fish protection measures?	☐ No, please provide a justification for this on a separate sheet ☒ Yes, if so, please design details on separate sheet	
	Document name / reference:	Fish screens on upper and lower control works
4.20 Provide information of the	Document name /	The release from Loch

proposed operating regime (e.g. compensation release, freshets, drawdown)	reference:	Earba will be at Shios Dam. No release is planned at Shuas dam, which is effectively a saddle dam

4.21 For reservoirs, the total volume of water to be impounded and, if different total volume of waterbody (where known) (litres or cubic metres): (N.B. this information is not mandatory for schemes less than 25000m^3)	Total volume of impounded water (Earba): 71,000,000 m^3		
4.22 Provide details on any interconnections with other impoundments, abstractions or catchments.	Document name / reference:		The existing Ardverikie Hydro intake currenlty uses Loch Earba for storage as discussed for Shios Dam above.
4.23 Is registration required under the Reservoirs (Scotland) Act 2011? (i.e. can the reservoir hold 25,000m^3 or more above the surrounding land?) If yes, answer the following question:	☐ No ☒ Yes		
4.23.2 Have you already registered your reservoir with SEPA under the 2011 Act?	☐ Yes	Confirm reference number?	RES/R/…….
	☒ No	Contact SEPA's Reservoir Regulatory Unit at Reservoirs@sepa.org.uk to register	

Section 4: Applications Including Impoundment Activities			
Complete this table for all impoundments that you are applying for. If you are applying for a licence which includes more than one impoundment structure please copy, complete and reference a separate table for each activity			
No. of Section 4 tables completed:	3	Table ref: (e.g.1 of 2, 2 of 2)	3 of 3 (Leamhain dam)
IMPOUNDMENT DETAILS:			
4.1 Impoundment No/Ref/Name: (This should correspond to the reference on the site map)	Loch Leamhain Dam		
4.2 Type of original waterbody impounded:	☐ Watercourse ☒ Loch ☐ None		
4.3 Name of watercourse or loch impounded:	Lochan Bhealaich Leamhain		
4.4 National Grid Reference of impoundment (from mid-point of impounding structure):	Loch Leamhain Dam NN 50522 79280		
4.5 Using the look up table in Section 4 of the guidance specify the Purpose Category/Categories for the use of the impounded water. Continue on separate sheet if necessary.	Primary purpose: Hydropower Secondary purpose:		

4.6 Do you consider this impoundment would qualify as an environmental service?	☐ No ☒ Yes, provide details on separate sheet	
	Document name/ reference:	Please refer to the project need Chapter 1 of the **Earba PSH CAR Licence Application Report.**
4.7 Do you consider this impoundment would qualify for abated charges?	☐ No ☒ Yes, provide details on separate sheet	
	Document name/ reference:	Hydropower / sustainable generation
4.8 Where a management agreement is in place which influences the operation of the impoundment, please provide details.	Document name / reference:	The existing Allt Cam watercourse feeding Loch Pattack and the Pattack hydro scheme downstream of Loch Leamhain means that the natural flow profile must be replicated as far as possible in the release from the Leamhain dam structure. An agreement between Earba PSH and Pattack hydro will be required.
4.9 Please provide a full description	Document name /	Refer to Scheme

of your proposals to construct, alter or remove the impoundment, including plans and cross sections.	reference:	Description Chapter of **Earba PSH CAR Licence Application Report**. Please refer to the following drawings of Leamhain Dam: Figures 2.4, 2.5 and 2.5.1 to 2.5.5 as well as Figures 2.37 and 2.38 (SC8 proposals)
4.10 Please provide method statements describing the method and controls of construction/alteration/removal works	Document name / reference:	Please refer to the CEMD and PPP documents which are included as appendices in the **Earba PSH CAR Licence Application Report**. Part 2 of the PPP provides specific details about the Leamhain dam construction. Furthemore detailed RAMS would be submitted before construction as part of a pre commencement condition to achieve SEPA sign off.
4.11 If applicable, what date do you intend to start construction, alteration or removal works for the impoundment?	Document name / reference:	2027

4.12 Height of impoundment structure:	All levels from EGL to TWL: Loch Leamhain Dam – 75m (maximum range 635 – 710, 711m AoD including freeboard)	
4.13 Please give the level of the overflow or crest of the dam (metres AOD) if this is different to the height of the impoundment structure	Loch Leamhain Dam 710m AoD	
4.14 National Grid Reference of outflow point from impounded waterbody	Loch Leamhain Dam NN 50522 79280	
4.15 Where there is a means of drawing the impounded water down, what is the minimum draw-off level (metres AOD)?	Loch Leamhain Dam 636m AoD	
4.16 Provide details of ongoing maintenance of this impoundment structure e.g. debris clearance, scour valve operation, fish pass maintenance etc.	Document name / reference:	Debris on the screen is unlikely given the two way flow (pumping/genertaing) there will be routine inspection and maintenace on the screens located at the upper control works. The scour valve will be maintained for emergency reservoir safety use only and as prt of the proposed INNS mitigation, will not be operated as part of routine maintenance or as part of any freshet regime. Any necessary normal drawdown of the reservoir

		will be provided via the headrace tunnels. Refer to Geomorphology appendice of the **Earba PSH CAR Licence Application Report.**
4.17 Please provide details of any sediment management plan associated with this impoundment (see guidance in section 4.17)	Document name / reference:	Sediment load at the outlet will be unlikely with the large loch volume and small catchment with little river morphology upstream
4.18 Is there to be provision for fish passage?	☒ No, please provide a justification for this on a separate sheet ☐ Yes, if so, please design details on separate sheet	
	Document name / reference:	The burn between Loch Pattack and Loch Leamhain is impassable to fish due to the gradient.
4.19 Are there to be fish screens or other fish protection measures?	☐ No, please provide a justification for this on a separate sheet ☒ Yes, if so, please design details on separate sheet	
	Document name / reference:	Fish / smolt screens will be provided on upper and lower control works. Please refer to drawings: Figures 2.16 & 2.17 and Figures 2.12 & 2.13
4.20 Provide information of the proposed operating regime (e.g.	Document name / reference:	No releases will be made from the dam as part of

compensation release, freshets, drawdown)		the proposed INNS mitigation. The natural release from upper Loch Leamhain catchment via the diversion ditches will replicate the natural flow spectrum. Drawdown in Loch Leamhain will not go below the existing level of 636 m AoD Pumping will be curtailed when the level in Loch Leamhain rises to 710m AoD For further details refer to Scheme Description Chapter

4.21 For reservoirs, the total volume of water to be impounded and, if different total volume of waterbody (where known) (litres or cubic metres): (N.B. this information is not mandatory for schemes less than 25000m^3)	Volume of impounded water: 61,000,000 m3 Total volume of waterbody (Leamhain): 69,000,000 m3	
4.22 Provide details on any interconnections with other impoundments, abstractions or catchments.	Document name / reference:	Loch Leamhain is in the catchment for the the existing Pattack Hydro Scheme
4.23 Is registration required under the Reservoirs (Scotland) Act 2011?	☐ No ☒ Yes	

(i.e. can the reservoir hold 25,000m^3 or more above the surrounding land?) If yes, answer the following question:			
4.23.3 Have you already registered your reservoir with SEPA under the 2011 Act?	☐ Yes	Confirm reference number?	RES/R/…….
	☒ No	Contact SEPA's Reservoir Regulatory Unit at Reservoirs@sepa.org.uk to register	

Section 5: Additional information

5.1 Cumulative Chargeable Abstraction Value

Please specify the combined maximum volume of abstraction from all abstraction points subject to a subsistence charge? (Please see guidance for more details) Conversion: $1m^3$ = 1000 litres $1m^3$ = 220 gallons	N/A

5.2 Additional information submitted

Please reference additional supporting documents submitted as part of this Application	Document name: Document reference:	Earba PSH CAR Licence Application Report
	Document name: Document reference:	Earba PSH CAR Licence Application Non-Technical Summary
	Document name: Document reference:	
	Document name: Document reference:	