

**WAT-G-040**

**EASR Guidance:**

**Permit application guide for abstractions and impoundments**

Version 1.0, August 2025

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# 1 Purpose

This document provides information and guidance for anyone undertaking:

* The abstraction of surface water (including canals and lades) or groundwater more than or equal to 50m3/day.
* The construction, modification and removal of impoundments.

These activities require a permit under The Environmental Authorisations (Scotland) Regulations (EASR).

This guidance does not apply to third party abstractions from infrastructure or pipework which conveys water already abstracted from the water environment. These abstractions do not require EASR authorisation.

This permit can apply to the abstraction of groundwater from the dewatering (passive or otherwise) of road, rail or other cuttings. Once an operational final passive drainage system is in place for the cutting, such as a pipe network to collect run off and seepage, the activity will be treated as land drainage works and as the permit can be surrendered.

# 2 Understanding the risks to the water environment

Abstractions can reduce the flow in streams and rivers, reduce the water levels is nearby wells or boreholes, reduce the flow to or cause an impact on the groundwater dependent wetlands or cause saline intrusion into the aquifer.

# 3 Pre-application

You should contact us prior to making any application as this will minimise the risks of an application either being rejected for being incomplete, at the wrong level of authorisation, require amendment, or being refused for not meeting the relevant assessment criteria. The pre-application discussions can also help you to carry out best practice and efficient water use. SEPA cannot pre-judge the outcome of any application in advance of the formal determination.

# 4 Linked activities

You can apply for the abstraction of water and new associated impoundments, on the same application form, if they are linked. Any new impoundment must be associated with and necessary for the same abstraction purpose.  An applicant can apply to abstract water from multiple different locations, as long as the abstracted water is for the same purpose or use. Abstractions and impoundments can be considered to be linked if they are operated as a single scheme, by the same authorised person, for the same purpose. This could be through a common pipe or distribution network supplying a single factory, treatment works or power station. This could also be number of mobile plants operated by one person or by one company, and a number of impoundments managed as part of an estate.

Each part of the application will be independently assessed and following determination and processing, a permit may be granted for these linked activities.

Where activities can't be linked, (for example, where water is abstracted for different water uses, an impoundment is not associated with an abstraction), a separate application form must be submitted for each activity.

# 5 Permit Assessment

The permit assessment process involves a number of tests that have to carried out for every permit-level activity. As part of your application you will need to supply appropriate information to allow us to assess the impact on both the environment and other users.

## 5.1 Non-technical summary

In this section of the application form the applicant should provide any supporting information that helps to explain the total quantities that are being requested, in addition to information you will include in the relevant table(s). This should particularly explain any unusual feature of your water usage, any local factors that we need to know about, reasons for selecting a particular depth of application of water, irrigation practice, extent of any re-use and recirculation etc. More information on sector specific usage and the information required can be found in [Appendix 1](#_APPENDIX_1:_Main).

## 5.2 Impact on the water environment test (abstractions and impoundments)

This is the key test which determines whether water resources are available to meet the applicant’s requirements and under what conditions these activities can be authorised (if at all). It also considers the impact on other receptors. For example, existing water users where we must consider whether the proposal will significantly impact upon any abstractions (particularly those with prescribed flow conditions) or discharges. Further details for surface waters is given in [Appendix 2](#appendix_2). Further details for groundwater is given in section [Appendix 4](#_Appendix_4:_Assessing).

## 5.3 Protected areas test (abstractions and impoundments)

The assessment of impact on protected areas is a simple screening process for all applications to determine whether or not a proposed activity and the method of undertaking the water activity, either on its own or in combination with other activities, is:

* Likely to have a significant effect on the qualifying interests of any river or freshwater loch SAC or SPA.
* Likely to damage any water dependent, notified feature of any river or freshwater loch SSSI.

This test ensures that SEPA meets its environmental and conservation duties.

More information and the distances that a proposed abstraction or impoundment can impact on a protected area can be found in WAT-G-008 EASR Guidance: Assessment of impact on Protected areas from inland water activities.

## 5.4 Are you using water efficiently (abstractions only)

Efficiency of water use is an important consideration in the determination of the appropriate volumes and rates of abstraction to include in a permit. Under EASR, SEPA must ensure that appropriate measures are taken to secure efficient and sustainable water use. We also need to understand the social and economic value of water that is abstracted or impounded for use.

All water users undertaking an abstraction activity must take all reasonable steps to secure efficient and sustainable water use. You need to justify the quantities that you are applying for. Where the volume of water applied for exceeds the scale of use, we will want to discuss this with you to seek a better understanding of any local factors contributing to the difference. We will use published data and research to see if your justification is reasonable.

## 5.4.1 Reasonableness

The duty is on the applicant to demonstrate that all reasonable steps to secure efficient use have been taken. Reasonableness needs to take account of:

* Impact on resource availability. For example, if the proposal is close to the threshold for an environmental standard a more stringent approach may be justifiable.
* Consumptiveness of the proposed water use. Proposals involving highly consumptive use may justify a more stringent approach than for non-consumptive uses. ‘Consumptiveness’ describes the volume of water removed from the environment without return.
* Sustainability. Inefficient abstraction may result in otherwise unnecessary use of energy for pumping, or chemicals for treatment.
* Applicant’s circumstances. Any water efficiency requirements will need to be commensurate with these, although time limitations on the operation of less efficient machinery may be appropriate.
* Age of the plant. It is reasonable to expect new installations/equipment to be more efficient than older plant.

# 6 Management agreements

Where a water user has entered into a non-statutory agreement with a landowner, District Salmon Fishery Board or other third party, or where a group of water users are reliant on the same source, they may have come to some agreement as to how they each use the water to ensure they are all able to meet their requirements. While these agreements are non-statutory in that they are not set in regulation, they form an important part of managing the operations. For example, a group of industrial users on a stretch of river may have an agreement as to how much each of them abstracts to enable downstream users to guarantee their water supply. If your abstraction or impoundment activity is part of such a non-statutory agreement then please attach a copy of any written agreement.

# 7 Means of demonstrating volume abstracted

For all abstractions there is a requirement to demonstrate how you intend to measure the volume of water abstracted. This could be through, for example, using a water meter, or based on the intake design capacity, pipe or pump capacity and duration of abstraction. Depending on the sensitivity of the location and your operation, you may be required to carry out environmental monitoring as well as monitoring of the volumes abstracted. If necessary, this will be discussed with you during the determination of your application.

# 8 Invasive Non-Native Species

Activities associated with abstraction and impoundment can cause the spread of Invasive non-native species (INNS) if not appropriately undertaken. For example, moving pumps for spray irrigation or transferring water between water courses or using equipment in a water course and not adequately cleaning it before it is moved to a different water body. For more information see EASR-G-001, EASR Guidance: Invasive Non-Native Species (INNS).

A requirement of an application for an EASR abstraction permit is to provide, for mobile spray irrigation abstractions and water transfers, information detailing how each activity is to be carried out to prevent the spread of invasive non-native species.

For mobile spray irrigations that move their pumps between different water bodies this will normally involve adequately draining and cleaning the pumps and pipework in line with:

* [Check clean dry procedure](https://www.nonnativespecies.org/biosecurity).
* [GPP5](https://www.netregs.org.uk/).

# 10 Data returns

In the majority of cases a permit holder will be required to submit data returns which provide details of the quantities of water abstracted. Table 1 indicates the sectors likely to be required to provide data returns.

Table 1: Data Returns

|  |  |  |  |
| --- | --- | --- | --- |
| Sector | When Required | Data Recording | Returns Required |
| All Agriculture (inc. irrigation) | All permits | Daily totals | 31st December |
| Golf Courses | All permits | Daily totals | 31st January |
| Public Water Supply | All permits | Daily totals | 31st March |
| Hydropower | All permits | Daily totals | 31st January |
| Distillers | >1000m3/day or >25% Q95 | Daily totals | 31st January |
| Fish Farms | >1000m3/day or >25% Q95 | Daily totals | 31st January |
| Industrial/Commercial | >1000m3/day or >25% Q95 | Daily totals | 31st January |
| Mining | >1000m3/day or >25% Q95 | Daily totals | 31st January |
| Other | >1000m3/day or >25% Q95 | Daily totals | 31st January |

The analysis of data returns will be carried out annually, as an assessment of compliance to complement site inspections carried out at other times during the year.

# 11 Impoundments

## 11.1 Justification test

SEPA expects the construction of all new impoundments to follow good practice to ensure sustainable use of the water environment. In particular, the applicant must demonstrate that there is a need for the impoundment and that other options have been considered.

## 11.2 Demonstrated need

An impoundment will not be authorised where there is no clear demonstrated need for it. Activities carried out without a demonstrated need can negatively impact ecological quality and tie up capacity in the water environment, making it no longer available for activities with real needs. Therefore, in order to demonstrate best practice, the applicant must satisfy SEPA that the application is associated with a real need for an impoundment. See Table 2 for guidance.

**Table 2: Guide for justification of demonstrated need for new impoundments**

| **Proposed Activity** | **Likelihood of Justification** |
| --- | --- |
| New impoundments required for water abstraction Issues to consider:  Are there other alternatives to an impoundment e.g. side intake? For further information see WAT-G-036: EASR Guidance: Intakes and Outfalls.  Water may be able to be taken from an existing abstraction point. However, before abstraction volumes are increased SEPA should be contacted to discuss implications for existing water users and impact on the water environment. | Strong Justification |
| New on-line flood management impoundments (intermittent & permanent storage)\*. Issues to consider:  Broadly speaking, there are two types of on-line impoundments used for flood management. The more common type uses intermittent storage (achieved using a hydraulic control structure) that does not impound water under normal flows but holds back water during higher flows. The hydraulic control structure can be designed to allow for free passage of fish, other wildlife and sediment. New impoundments that use permanent storage (i.e. create a reservoir) should only be considered where intermittent storage isn’t feasible.  Within the range of options available for flood risk management, the use of new impoundments should only be considered where other, less damaging, measures have been ruled out due to cost or technical unfeasibility. Where flood storage using an impoundment is deemed necessary, options to use existing reservoirs within catchments to provide storage volume should be explored.  All flood management projects should adhere to the principles of sustainable flood management. This includes looking at all options and ensuring the best environmental option is chosen.  SEPA has a duty to promote sustainable flood management under section 2(4) of the [Water Environment and Water Services (Scotland) Act 2003](http://www.netregs.org.uk/legislation/scotland.aspx) WEWS). The Scottish Government is currently developing guidance for local authorities on flood management that will include guidance on sustainable flood management. | Strong justification |
| New impoundments for habitat restoration Issue to consider:  Impoundments can be used for habitat restoration projects, particularly for the restoration of wetlands. It should be demonstrated that habitat is in fact degraded habitat and that an impoundment is the best option for restoration.  On-line impoundments in rivers for habitat restoration are unusual and would only represent the best option in a very limited number of cases. | Potential Justification in wetlands Unlikely to be justified in rivers |
| New impoundments for fisheries management In some cases impoundments are used to increase fish catches in rivers. This is unlikely to represent good practice. Where habitat restoration is provided as the justification, other options should be assessed e.g. restoring riparian vegetation or installing in-stream habitat features/structures such as large woody debris or croys, etc. Habitat enhancement for fisheries improvements must be looked at on the catchment scale - this is in line with the Scottish Government document [A Strategic Framework for Scottish Freshwater Fisheries](http://www.scotland.gov.uk/Publications/2008/06/26110733/0). | Unlikely to be justified |
| New impoundments for sediment traps Issue to consider:  Impoundments can be used to trap sediment in order that it can be easily removed from behind the impoundment. This can be for a number of reasons e.g. where excess sediment is causing an increase in flood risk or is degrading river habitat. It should be shown that there is an increase in sediment supply to the channel, and the cause of this increase, together with options on how to best address the cause, should be investigated. For further information see WAT-G-026: Engineering: Activity Guide: Sediment management | Unlikely to be justified. Strong evidence of genuine need would be required |
| New impoundments for erosion control Issue to consider:  New structures - Impoundments can be used to control erosion rates, in particular around bridges. Where a new bridge or structure is being constructed this is unlikely to be justified. New bridges or other structures should be constructed to minimise the risk of erosion therefore reducing the need for erosion control works (For further information see WAT-G-024: EASR Guidance: Engineering: Activity Guide: Crossings).  Existing structures - Where erosion control is required, all other options (such as bank or bed reinforcement) should be assessed before an impoundment is considered. For guidance, see WAT-G-029: EASR Guidance: Engineering: Sustainable bank protection. It may be justified in cases where there is a risk to infrastructure and property / important habitat / species due to channel instability. | Unlikely to be justified. Strong evidence of genuine need would be required |

\*(Note: off-line impoundments used for flood management are controlled through the Engineering regime).

## 11.3 Mitigation test

Appropriate mitigation is essential in minimising the impact of an impoundment on the water environment and is a key element of good practice. Table 3 will be used SEPA as a checklist of mitigation measures that should be considered. Where we consider that mitigation is required but if it is not adequately provided this test is failed. Details of each mitigation option are provided later in this section.

**Table 3: Mitigation considerations**

| **Test** | **Points to consider** | **Appropriate?** | **In place?** |
| --- | --- | --- | --- |
| Fish Passage | Are structures or other mechanisms proposed so as to enable salmonid fish, eels, and lampreys to access waters upstream and downstream of the impounding works (e.g. fish pass, bypass channel, etc)? |  |  |
| Downstream Flows | * Does the impoundment provide a downstream Q95 flow? * Will the volume and timing of flow in the downstream river be sufficient to enable and, where relevant, trigger fish migration? * Is the magnitude and frequency of short-duration higher flows sufficient to maintain river habitats through stimulating sediment movement? |  |  |
| Sediment Management | Has the developer provided information on sediment continuity? |  |  |
| Physiochemical Measures | Is the impoundment >25Ml, with a set compensation flow where that compensation flow is not delivered from the surface of the waterbody?  Are there downstream engineering structures to ensure adequate dissolved oxygen and temperature? |  |  |
| Loch Level Regime | * Will the rate and range of any artificial drawdown be appropriately managed to maintain aquatic plant and animal communities in the shore zones of impoundments with gently shelving shore zones? * Will fish be able to access relevant feeder-streams draining into the reservoir at appropriate times for spawning and migration? * Will the seasonal pattern of water levels during each year be managed so as to enable the establishment and retention of aquatic plant and animal communities in the shore zone of the impoundment? |  |  |
| Erosion Control | * Lochs: Is the rate of artificial drawdown appropriately managed to minimise erosion? Can loch shore management be improved (riparian planting / exclusion of livestock) to minimise erosion? * Downstream watercourse: Can sediment management be addressed (see above) to minimise erosion? Can riparian management be improved (riparian planting / exclusion of livestock) to minimise erosion? Is bank reinforcement required? * Erosion at impoundment: what are the options for dissipating water energy and bank and bed reinforcement? |  |  |
| Construction-phase Method Statement | Have satisfactory proposals been suggested to minimise damage to habitat and risk of pollution? |  |  |

## 11.4 Fish passage

In all cases there is a presumption that salmonid fish and eel passage is incorporated into any new impoundment structure. Passage for lampreys may also be required on any designated lamprey site. One of the most significant impacts resulting from any impoundment structure is the break in continuity in the river system and enabling fish access to the habitats upstream and downstream is key to mitigating this.

There are a number of designs for fish and eel passes, and a short description of the main fish pass types are given in Appendix [3](#_Appendix_2:_Fish). Ensuring the correct design from the outset is important as it can be difficult and costly to amend designs following construction. Where there are any concerns or queries regarding a proposed design these will be discussed with SEPA at the pre-application stage.

For large scale structures (typically associated with hydropower or public water supply) it may be appropriate to request a fish survey including an estimate of population density for all migratory species such as salmon, sea trout, lampreys and eels. In combination with post development monitoring any adverse impact on population can be determined.

Where a developer believes that fish passage is not necessary, a survey is required to show there are not species present for which fish passage would normally be expected. Where a survey is carried out, this should be designed to identify beyond reasonable doubt the presence or absence of species. Survey protocols should therefore state that they have followed SFCC (Scottish Fisheries Coordination Centre) guidelines (or similar standards) and should cover a minimum of 100 square metres at each location. Sites should be chosen to ensure that a representative range of habitat types are included and that appropriate habitat types for the species in question are covered. Sites with a high proportion of bedrock and uniform depth should be avoided where possible. A minimum of contextual information should also be provided to allow interpretation of the survey, including a site photograph.

## 11.5 Downstream flows

There should always be a flow downstream of an impoundment in order to protect the aquatic ecology of the downstream waters.

If the impoundment has no abstraction associated with it, the downstream flow regime will not be significantly altered as a result of the structure and no further consideration of downstream flows is necessary.

Where the impoundment has an abstraction associated with it, a Q95 flow should be delivered as a minimum, either as a hands-off flow or compensation flow. In many cases this will be delivered via a notch structure in the impoundment, meaning that as the flow in the river rises so the volume of water passing across the impoundment will also rise, providing a variation in flow.

Further consideration of compensation flows or freshets may be necessary where the impoundment is greater than 1m and either has (a) an abstraction associated with it or (b) no provision for variable downstream flows.

Please note that, especially for larger structures or those located in waters with associated fisheries or conservation interests, there may be further flow conditions applied. These flow conditions will be developed in consultation with the local District Salmon Fisheries Board and other relevant third parties. This may include seasonal flow conditions, periods of shut down, variable or stepped flows as well as freshet releases.

## 11.6 Sediment management

Impoundments can trap sediment, disrupting its natural movement and causing erosion of the bed and banks downstream. This can lead to serious negative impacts and cause damage to or loss of ecologically important channel habitats (morphology). The effects can be long-lived and sometimes irreversible and can be detected several kilometres downstream of the impoundment. For more information on sediment management and see WAT-G-026 EASR Guidance: Engineering: Activity Guide: Sediment management.

## 11.7 Physiochemical measures

These should only be considered for impoundments which store greater than 25Ml and where:

* A compensation flow is to be set; and
* This flow may be delivered from points behind the structure other than the surface level.

Where there is no compensation flow, or it is delivered from the surface level, there is unlikely to be any impact from low dissolved oxygen or temperature.

Low dissolved oxygen and temperature may be an issue where water behind large impoundments becomes stratified and the main water releases are taken from depth. Where it is not practicable to release water from the surface layers of the reservoir, engineering modifications to the downstream river may sometimes be possible to help improve oxygenation (i.e. by creating an area of turbulent flow immediately downstream of the point of release).

## 11.8 Loch level regime

Impoundments that store large volumes of water may create an unnatural level regime, where the water levels are drawn down to supply power or drinking water during certain periods. This can have a significant impact on the littoral zone surrounding the waterbody.

This test is only applicable to those impoundments that store more than 25Ml. Where this is the case there is a requirement under the Reservoirs (Scotland) Act 2011 to register your reservoir with SEPA. More information about this can be found on [the reservoirs section of our website.](https://www.sepa.org.uk/regulations/water/reservoirs/)

## 11.9 Erosion control

Erosion can occur at the impoundment structure itself. Most erosion will occur when high flows spill over the impoundment and scour the bed and bank below. Hard reinforcement of the bed and banks or energy dissipation structures are likely to be required at the impoundment structure itself. It is up to the applicant to determine appropriate solutions.

Erosion can also occur further downstream of an impoundment. This can be caused when sediment supply is reduced at downstream reaches because it is trapped behind the impoundment. When sediment is reduced in a river, erosion of the bed and banks increases. This is because the river cannot use its energy to move sediment and so uses its energy in erosion. Erosion can be reduced by considering sediment transport past the impoundment. For further guidance see WAT-G-026 EASR Guidance: Engineering: Activity Guide: Sediment management.

## 11.10 Construction-phase method statements

Every reasonable effort should be taken during the construction phase of a project to minimise both damage to habitat and risk of pollution.

The purpose of the method statement is to explain exactly how the applicant and any contractors will ensure this requirement is met. As a minimum, an outline method statement is required at the time of application. The outline method statement requires details of timings, temporary works, site drainage, pollution prevention measures, fish migration measures and measures to protect habitats during works.

If concerns exist with regard to any of these issues, a more detailed method statement will be requested with specific working methods and other measures detailed prior to authorisation being issued. Additional guidance on construction works is available in WAT-G-034: Construction works and silt/pollution mitigation.

# 12 Flood risk

SEPA’s regulatory duties under EASR only extend to the protection of the water environment from harm e.g. adverse impacts upon ecology and habitats. EASR is not a regulatory function for controlling flood risk and SEPA will not seek to control or regulate flood risk through EASR. SEPA will not set conditions specifically for the control of flood waters, or the successful operation of any flood defences.

There may be circumstances where flood related matters inform the determination of an application.

* Works which will cause harm (breach an environmental standard e.g. 500m test). An applicant will be expected to justify the proposed works and demonstrate that good practice will be adhered to (see ‘Good Practice Test’). Justification for higher impact engineering may include benefits to flood risk management e.g. installation of properly designed flood defence structures to protect a community from flooding. Works which cause environmental harm but are poorly justified are more likely to require amendment or may even be refused, to avoid unnecessary or unjustified adverse impacts to the water environment.
* Where an application is likely to cause a high degree of environmental harm, e.g. downgrade a waterbody, an assessment of the balance between negative and positive impacts of the proposal will be undertaken. The flood risk impact (increases or decreases in risk) resulting from the proposal may be fed into the balancing assessment. Should the wider benefits of the proposal be outweighed by the adverse environmental impacts then the application may need to be amended or potentially refused to avoid unnecessary or unjustified adverse impacts to the water environment.

For further information on flood risk issues see our website.

# 13 Surrenders and structure removal/medication

An operator may surrender an authorisation at any time, and under EASR SEPA has an obligation to assess the risks associated with the cessation of the activity. The removal of an already authorised activity will be dealt with as a permit surrender. A surrender application may include method statements and details of any remedial works that are necessary to avoid risk of adverse impact on the water environment from removal.

## 13.1 Abstractions

When SEPA receives an application for surrender of an abstraction authorisation we must be satisfied that the abstraction has ceased and seek to have any structures associated with the abstraction removed and the affected area restored (unless greater environmental damage is caused by the removal).

## 13.2 Impoundments alterations (removal and modification)

In principle, SEPA is supportive of proposals to remove impoundments. We will not normally require any authorisation for the maintenance of existing structures provided the design and footprint of the structure remains the same, and the same (or equivalent) materials are used. If the work involves the replacement of a structure then a permit will be required.

More detailed information and guidance for impoundment removal or modifications can be found in our supporting guidance WAT-G-042: EASR Guidance: Impoundment alterations (removal and modifications).

# Appendix 1: Main usage sectors

The following notes support the key sectors and the information we require.

## A1.1: Agricultural irrigation

SEPA uses a method of calculating the optimum irrigation need, based upon crop types and areas, soil types and agro-climatic conditions. If you want further information on this methodology please contact your local SEPA Office.

### A1.1.1 Crop type and area

Please give details on crop type, areas to be irrigated and the maximum annual depth of irrigation. These figures should represent the crops that you would grow in the same season and ensure that you give a combination of crops and areas likely to give rise to the maximum irrigation demand in any season.

### A1.1.2 Soil type

Please provide details on which soil type is applicable to the farming unit you are applying for. if more than one soil type is relevant, please indicate the approximate split across the unit.

## A1.2: Agricultural water use

The number of livestock supplied gives an indication of the expected volumes of water required. The Scottish Agricultural College has provided estimates of daily drinking water requirements for different classes of stock.

### A1.2.1 Number and type of livestock

Please indicate the type of stock reared, giving the highest demand scenario in terms of likely water use (i.e. highest numbers of livestock with the greatest water demand) at any one time. The livestock diet, such as straw or silage can impact on the typical water requirements. Please use the final column to indicate any special factors such as this, along with details of any special feeds or housing requirements, influencing water consumption.

### A1.2.2 Washing and cleaning

Please give an indication of your requirement for cleaning, washing and dairy use etc. This can be by power hose or non-power hose. Please provide the maximum anticipated usage per day along with any comments you believe inform this value.

## A1.3 Golf course irrigation

### A1.3.1 Irrigation per annum

Please indicate the areas of tees, greens, fairways and other areas irrigated (where relevant) giving information about total annual requirements.

### A1.3.2 Irrigation per day

Please indicate the areas of tees, greens, fairways and other areas irrigated (where relevant) giving information about total maximum daily requirements.

## A1.4: Industrial use

SEPA will assess your water usage against best practice guidance using published research where this is available.

### A1.4.1 Process outline

Please give brief details of your main production process and water usage within this, e.g. the proportions of cooling and process water, product type, main process steps etc.

### A1.4.2 Water per unit of production and annual production

Please select which industry sector within the table is appropriate for your site. For this sector, give the known or estimated water use per unit of production, using the most appropriate unit output measure for your particular processes/usage. For example, for brewing - m3 of water used per m3 of beer produced, fibreglass – m3 of water used per tonne of product, fish farm – m3 of water used per tonne fish produced, distilleries - m3 of water used per litres of alcohol produced, power production – m3 of water use per Giga Watt hours etc.

For quarries or mines undertaking dewatering operations, those quantities need not be included in this table. Only include the quantities used for processing, washing, dust suppression etc. The quantities pumped for dewatering purposes should be separately identified in the ‘other’ section and appropriate details provided within Table H.

Note that where industrial premises also have their own private water supply for domestic/sanitary purposes, Table E should be completed for this element.

## A1.5: Private water supplies

This section is for all ‘domestic’ type supplies not supplied by Scottish Water.

### A1.5.1 Nature of supply

Please give the type of establishment that will be supplied with water. This may include households, estate supplies (which may supply houses and farms), small water supply schemes not provided by Scottish Water, private supplies to hotels, schools, factories, commercial premises, light industrial estates etc. For industrial premises, include in this table all non-process water use.

### A1.5.2 Details of supply

Please indicate the number of properties served and the total population i.e. the number of people within all of the properties served. Where farm dwellings are included then the element described here should only relate to the domestic property. Any livestock drinking water and wash water should be described in Table B: Agricultural water supply. Where the supply is for hotels, prisons etc then the maximum occupancy for the year should be provided. If this section includes the domestic element of a factory or industrial estate then the non-domestic water use should also be completed in the relevant table of this application form. If the private water supply does not fit into any of the categories described on this section of the form please describe your circumstances in ‘other’.

## A1.6: Public water supplies

### A1.6.1 Nature of abstraction

Details should be provided on the nature and characteristics of the abstraction including information on where the water is being transferred to.

### A1.6.2. Water Resources Zone

The water resources zone should be consistent with the water resources plan submitted to SEPA.

### A1.6.3 Population supplied

This is to give an indication of the scale of the application. If you are applying for a variation then this should reflect the additional population.

### A1.6.4 Components of supply

Please provide details on the activities served by the controlled activities applied for.

### A1.6.5 Water resources plan

These developments will normally only be considered where they conform to the agreed water resources development plans for the area. Please provide the details requested and in particular the reasons for any departure from the water resources plan and any other related proposals that should be taken into consideration.

## A1.7: Other

### A1.7.1 Details of water use

Please provide a description of the water use and the purpose of the abstraction, such as conservation and details of what habitat type or species is being protected.

### A1.7.2 Operational regime

Please gives details of the main elements of the process such as timings, triggers for operation, management plans and agreements etc.

# Appendix 2: Environmental standards for surface waters

The environmental standards for surface waters are used to assess whether a proposed scheme is likely to cause a deterioration in ecological status of a water body. The appropriate standard we apply when considering a water resource proposal are the river flow standard, even where this standard is higher than the classification of the waterbody concerned.

* If the standard is not breached, the proposal may be authorised without the use of the derogation assessment, provided there are no other reasons for refusal.
* If the standard is breached but this is not expected to cause deterioration of status or compromise the achievement of a Ministerial objective, apply the ‘general protection tests’ in the derogation assessment to assess whether the proposal can be authorised.
* If a standard is breached and this is expected to cause deterioration of status or compromise the achievement of a Ministerial objective, the derogation assessment will be applied to assess whether the proposal can be authorised.

Heavily modified water bodies

Heavily modified water bodies (HMWBs) by definition are bodies of water which are not achieving Good Ecological Status and are not capable of doing so without having a significant impact on the use for which the modification was made. The primary assessment of any proposal in a HMWB is against the ES which would be achieved if the waterbody were not designated as Heavily Modified. For example, the waterbody may currently achieve poor status within the affected stretch and therefore the assessment of any proposal would be against the standards for poor status. It is important to note that where a HMWB has been assessed as achieving Good Ecological Potential (GEP), it is also necessary to test whether the proposed activity would compromise the achievement of this GEP status. For example, a HMWB may have a requirement to maintain a Q95 flow in the downstream waterbody and therefore any activity which may affect the delivery of that compensation flow would have to be assessed using the derogation assessment in the same way as any breach of an identified ES

# Appendix 3: Fish and eel passage design

The design requirements for fish passes are such that the flow conditions in the pass must be well within the capacity of the fish to negotiate safely upstream or downstream in all levels of flow.

Upstream migrating fish must be able to locate the entrance to the pass and exit rapidly at the downstream end. Downstream migrating fish must also be able to locate the upstream end of the pass and be carried safely past the dam.

## Fish pass type

### Fish lift

A fish lift operates by attracting fish into a chamber where they are confined by a travelling crush from downstream. The container is raised at intervals up a shaft or rail to the top water level where the fish are released into the reservoir. While effective, fish lifts require the services of operators, and where they are to be constructed on existing dams, may require a supported culvert or aqueduct to convey the fish from the shaft to the reservoir.

### Borland fish lock

A Borland fish lock comprises a sloping or vertical shaft with water cascading down from a top chamber fed from the impoundment. Fish enter a chamber at the bottom of the shaft, a gate or valve closes this chamber, and the shaft fills until the water level reaches the top chamber and the fish can swim out. A travelling brail may be required to ascend beneath the fish to encourage their departure. This type of pass is suitable for construction within the dam; however, constructing a Borland pass within an existing dam may require a supported culvert or aqueduct to convey the fish from the shaft to the reservoir. Variations in upstream water levels are problematic for the design of this type of fish pass.

### Pool passes

Pool passes are extensively used worldwide for many fish species. The principle of the pass is to divide the height gain required to traverse the impoundments structure into a series of small steps and pools.

The traverse between pools can take various forms including notched weirs, orifices and slots, either alone or in combination, which operate across a range of flow characteristics. This particular type of pass is not suitable where upstream and/or downstream fluctuations in water level are significant due to the sensitivity of the drop and pool size to dissipate energy from the plunging flow. Vertical slot passes are good where varieties of migratory fish species are present, and are suitable where upstream and/or downstream fluctuations in water level are significant. However, they require significant flow for migratory fish.

The pools must be of sufficient size to both help dissipate the energy of the water flowing through the pass and provide a resting area for the fish.

### Baffle passes

A baffle pass allows water to spill down a sloping channel where deflectors or baffles are used to dissipate energy by the creation of helical currents and reduce the velocity of the flow such that fish can swim up the pass.

Baffle passes are one of the easiest types of pass to design and construct but they do have a number of limitations: they are generally unsuitable for watercourses carrying a significant bed material which could be deposited between the baffles; they are only suitable for species with sufficient swimming capacity; and are not suitable for small fish.

In general, the length of baffle pass should not exceed 12m without the provision of a resting pool.

### Natural fish passes

A natural bypass channel, or diversion channel, consists of an excavated channel in one of the banks of the river from upstream to downstream of the impoundment structure. The use of a diversion channel provides a natural looking pass for fish at weirs; however, the channel requires a very gentle gradient (typically 1%) and hence is generally very long.

### Easements

In narrow rivers where the differential head is low, such as some raw water intake weirs, an easement such as a pre-barrage or rock ramp can be formed downstream of the weir. This enables the water level downstream of the weir to be progressively raised in small steps over a length of channel to enable fish passage at the obstruction. A maximum design gradient of 5% is generally adopted.

## Entrance and exit locations

The location of the fish pass is important in attracting migratory fish to the pass. It is advisable to install the entrance of the fish pass as close as possible to the most upstream point reached by migrating fish. It is also preferable to site fish passes on or near the river bank since fish tend to migrate along the banks rather than in the centre of the river. Consideration should also be given to the need for auxiliary flow in cases where competing flows (such as from an adjacent outfall) may cause confusion.

Unless significant vertical drops exist, smolts will generally be carried over weirs and spillways without damage. However, downstream passage through the designed fish pass is preferable for the young fish. To encourage fish to find the upstream end of the fish pass, measures can be taken to attract fish to the pass (for example through good positioning and lighting), or to prevent fish passing over the weir. The latter usually involves the installation of screens which has the drawback of collecting debris and which require regular cleaning to ensure continued operation.

## Eel passage

Elvers and small eels, at the stages when it is essential to pass upstream, are very poor swimmers compared to the adult stages of other fish. Eels are not capable of jumping. In principle two types of passage facility can be provided for elvers and small eels – open or closed. Both types rely on providing a wetted medium with a low velocity of water.

A closed type of pass is typically a pipe or trough containing a medium of rolled geotextile, horticultural mesh etc. through which a small volume of water is passed. For larger structures, resting areas may be necessary every 2-3m. It is important to ensure that the medium extends to the upstream and downstream river bed and that it remains wetted throughout its entire length.

Open type eel pass ramps are covered in a medium similar to those mentioned above and can include Astroturf, providing a substrate for the eels to wriggle through or over.

As with all fish pass structures, maintenance is required to ensure that the pass is not damaged blocked by debris.

# Appendix 4: Assessing the impact on groundwater

## A4.1 How to calculate how much groundwater you are abstracting

Abstractions for dewatering usually consists of an initially high rate whilst the water table is drawn down in the proposed excavation area, followed by a lower rate over a longer period sufficient to prevent flooding. The initial high rate is not sustained over the life time of the project.

If you are dewatering from a sump you need to discount the rainwater collecting in the sump. This is because the abstraction of rainwater from an excavation is not a regulated water activity. Where the dewatering is via a sump the average daily groundwater volume abstracted can be calculated by:

* Determine A, the local average daily precipitation in m/d.
* Determine B, the total area that will drain into the excavation in m 2.
* Calculate C, the average volume of precipitation falling onto the excavation. C = A x B
* Calculate D, the average daily infiltration that would have occurred had there been no quarry development, in m3/d. This depends on local conditions but is normally about 30-40% of the average volume of precipitation. D = 30-40% x C
* Calculate E, the daily rainfall component in m3/d. E = C – D
* Determine F, the average daily volume of water removed from the excavation (in m3/d). for example, by measuring the discharge rate or based on pump capacity and pump hours run.
* Calculate G, the groundwater component in m3/d. G = F - E

You must supply these calculations to SEPA when you apply for a permit.

Where the dewatering is from borehole/wells within or adjacent to the excavation, all the abstracted water is considered to be groundwater.

## A4.2 Water features survey

You must carry out a water features survey to identify water features within a specified distances from the abstraction or the edge of the excavated area.

**Table 1: Water feature survey radius**

| **Proposed abstraction rate** | **Water feature survey radius** |
| --- | --- |
| Greater than 50m3/d but less than or equal to 500m3/d. | 850m |
| Greater than 500m3/d | 1200m |

The water features that should be identified are detailed in section A1.1 to A1.7. If you are near the Scotland/England border you may need to contact the Environment Agency. You must also mark on the borehole or locations you intend to abstract from.

The water feature survey report must include:

* A map based on an Ordnance Survey basemap (1:10,000 scale) with the location of all water features plotted on it; and
* a report or database summarising the details of each feature identified including 10-figure NGRs of its location. It should include photographs of each water feature where possible.

You must identify the following water features:

1. **Surface waters** (rivers, burns, lochs, transitional and coastal waters) springs

You can identify these features by consulting the Ordnance Survey map and carrying out a walkover survey.

1. **Abstractions**

You can identify these features by:

* Contacting SEPA, who hold records of the locations of authorised abstractions suppling more than 10m3/day.
* Contacting the local authority who hold records of private water supplies (PWS). The local authority records may be the location of the property supplied, rather than the location of the source of the abstraction. Confirmation of the exact location and details of the source from the owner/operator is required as part of the walkover survey. In the absence of local authority records, in areas outside the Scottish Water potable supply network, you should consult with the owners of the properties as to the source of their supply.

The information you should supply as part of the water feature survey includes the:

* Location of the abstraction source (10-figure NGR)
* Type of abstraction (e.g. borehole, well, spring, surface water, etc)
* Abstraction source construction details including borehole log (if applicable), construction details, and photographs
* Abstraction rate. if the abstraction is unmetered, then the abstraction rate may be estimated based on pump capacity and likely usage (e.g. number of people the abstraction is serving).
* Hight in m above ordnance datum (AOD) of the top of the borehole, the datum.
* Pump suction depth.
* Rest and pumped water level. Is there a dip tub installed?

1. **Groundwater Dependent Terrestrial Ecosystems (GWDTE)**

To identify whether there are GWDTE you should read our WAT-G-064, EASR Guidance: Identifying groundwater dependent terrestrial ecosystems (GWDTE).

1. **Areas of poor quality groundwater**

SEPA may have information on discharges in the area.

A further check can be undertaken by from landowner knowledge or records.

Once you have carried out your water features survey you should contact us prior to applying. We assess the likely worst-case impact on any nearby watercourses, check if there are any significant pressures on groundwater resources in the area or if there is a risk of saline intrusion (only where you are within 4km of the coast). We will then advise if you need to collect further information to support your application. The type of information we are likely to require is set out in sections A4.3 to A4.6.

You must also support any application for dewatering with an estimate of the zones of influence of the abstraction. This should be done using an industry-standard model with appropriate input parameters.

## A4.3 Information you are likely to have to supply if you are near a GWDTE

Impacts on GWDTEs may be induced by the new groundwater abstraction as a result of changes to surface water flows or groundwater levels especially where they are located close to the proposed abstraction. You should provide information to show that one of the following apply:

* A geological investigation to demonstrate that the groundwater table lies at such a depth that the groundwater that is being abstracting cannot be contributing to the wetland. Information on the standing water level in the abstraction borehole and, in most cases, an additional observation borehole is likely to be needed. The observation borehole must be located as close to the site as possible.
* A geological investigation to establish the presence of a low permeability barrier between the wetland and the groundwater body. This should be based on from the abstraction borehole log and other boreholes logs closer to the site.
* Test pumping and groundwater level monitoring to show that the long term drawdown or flow reduction which will occur if the abstraction took place will not cause a significant adverse impact in the wetland. Monitoring of water levels in the pumping borehole and in most cases an observation well into the aquifer and lying as close as possible to the edge of the GWDTE is likely to be necessary. You must also consider the seasonality of the drawdown/reduction in flow. You must also show that there will be no decrease in the supply of nutrients to the site as a result of any reduction in flow where the wetland depends on these.
* An ecological survey to demonstrate that there are no species present that are dependent on groundwater.

## A4. 4 Information you are likely to have supply if you are near another abstraction

Reduction of groundwater level by a new abstraction may, in extreme cases, result in the groundwater level being reduced close to or below the level of the pump intake of another abstraction, which prevents the extraction of groundwater.

You should provide information to show that:

* There is a low permeability barrier or a significant difference in geology between the new and existing abstraction such that there will not be a reduction in water flow or level at the other abstraction. This should be supported by a geological evidence.
* Any long-term reduction in flow or level at the abstraction would not result in a reduction in, or loss of, the water supply. For example, the drawdown is not below the pump intake depth. This should be based on evidence from test pumping and groundwater level monitoring and include information of the pumped groundwater level and the depth of the pump intake from the potentially impacted abstraction. Monitoring of groundwater levels of the pumping and potentially impacted boreholes will usually be required. However, this may not always be possible and in these cases the construction of an observation well may be needed.

For abstractions of greater than 100 m3/d) one or more observation wells may need to be constructed between the application and the existing borehole as the radius of impact of large abstractions may extend to more than a kilometre. In such cases drawdown effects on the existing abstraction may take months or even years to become fully apparent. Where there are large distances between the new and existing abstractions, drawdown effects recorded in observation wells are not conclusive evidence that the existing abstraction will be impacted, as this assumes that aquifer properties are continuous. It may be better in these cases to suggest long term monitoring of groundwater levels.

## A4.5 Information you are likely to have to supply if there is a potential impact on surface water flow

In some cases, more than 50% of surface water baseflow is provided by groundwater. This contribution is particularly important during periods of low rainfall when surface water flow is at a minimum, e.g. the summer and autumn, or when fauna are particularly sensitive to flow, e.g. spawning of salmonid species in the spring. Abstraction of groundwater may therefore have significant impacts on the surface water flow regime at sensitive times.

If your abstraction is near a surface water and SEPA have indicated that the abstraction poses a risk to the surface water you must submit:

* A geological investigation to establish the presence a low permeability barrier that would prevent a hydraulic connection between the abstraction and surface water.
* Test pumping and groundwater level monitoring to confirm a change in hydraulic properties between the abstraction and the surface water that would reduce the impact.
* Groundwater level monitoring to demonstrate that the abstraction is not drawing water from aquifer that supplies the surface water.

## A4.6 Information you are likely to have to supply if you are near the coast or an area with poor quality groundwater

The risk of saline intrusion is dependent on proximity to the coast, geological setting, depth of abstraction and abstracted volume. During your pre-application discussions we will consider if there is a risk of your abstraction causing saline intrusion or the intrusion of other poor quality groundwater. Where this is the case, you should demonstrate that the abstraction will not result in intrusion of saline water. To do this you must undertake either:

* Supply information to show that the abstraction will not cause saline or other intrusion. instruction. This should be based on pumping test data and groundwater quality monitoring and/or downhole logging for salinity and determine aquifer properties and short/medium term changes in groundwater quality. For larger abstractions the installation of observation borehole(s) closer to the source of intrusion, e.g. the sea, will normally be required. The duration of the pumping test should normally be significantly longer than that recommended in WAT-G-076, EASR Guidance: Pumping test information to support a permit application for a groundwater abstraction. Alternatively, it may be better to suggest that the abstraction has a condition for long-term monitoring with trigger levels for salinity so that abstraction can be stopped if necessary.
* Collection of geological and hydrogeological evidence (including aquifer properties) to determine the type of aquifer and assess connectivity of features between abstraction and source of intrusion.

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