



# Ardersier Wastewater Treatment Works

Environmental Statement: Non-Technical  
Summary

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Scottish Water



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# Issue and revision record

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## **1.1 Introduction**

Scottish Water proposes to upgrade the Ardersier wastewater treatment works which serves a community of settlements including Ardersier, Fort George and two new developments at Inverness Airport and Whiteness. The proposed wastewater treatment process will include primary, secondary and tertiary treatment with onsite sludge thickening and disposal of sludge off-site.

This non-technical summary forms part of the Environmental Statement (ES) prepared under the Environmental Impact Assessment (Scotland) Regulations 1999, by Mott MacDonald in collaboration with Scottish Water's Shared Services team, in support of an application for planning permission.

This document briefly describes the rationale for the project, the proposed scheme, the main findings of studies undertaken to assess the likely effects of the proposal on the environment and the measures which will be taken to minimise any environmental effects.

The aim of the proposed development is to provide the A96 corridor region of Inverness with sufficient wastewater treatment capacity that development in the short term is not impeded, leaving space for expansion within the footprint of the scheme for future years.

## **1.2 Legal and Policy Framework**

Ardersier wastewater treatment works (WwTW) lies within the Highland Council's planning jurisdiction. All relevant policies and proposals have been examined in relation to the environment topics covered in the Environmental Statement.

The Highland Structure Plan, approved in March 2001, sets out the strategic land use planning framework within the Highland region.

Of particular relevance to the proposed development are the following policies within the Structure Plan;

Policy G3: Impact Assessments;

Policy N1: Nature Conservation;

Policy W11: Sewage; and

Proposal L3: Areas of Great Landscape Value.

Inverness Local Plan (adopted 2006) and the A96 Growth Corridor Framework (adopted as supplementary planning guidance 2007) are also of relevance.

### **1.3 Need for the Development**

The National Planning Framework for Scotland (2004) promotes the Inverness City-Region as one of the key development areas in Scotland over the next 20 years. The Framework identifies specifically the A96 corridor as the main area for growth in the Inner Moray Firth.

In order to provide the infrastructure to support expected development, a short list of potential sites for a new WwTW was drawn up from an assessment of the local region and land-use.

The consideration of alternatives showed, through a reasoned decision making process, that expanding the existing Ardersier WwTW is the preferred option to meet future demand in the A96 growth corridor area in the short and long term.

### **1.4 Site Description**

The site of the proposed development is at the site of an existing WwTW, located 2km northwest of the town of Ardersier on the shores of the Moray Firth to the east of Inverness. The current land uses within the footprint of the proposed scheme are the existing WwTW and open scrubland.

The site is adjacent to a Special Area of Conservation (Moray Firth SAC), and is in close proximity to a Site of Special Scientific Interest (Ardersier Glacial Deposits SSSI), Ardersier Common amenity area and Fort George Scheduled Ancient Monument.

The new WwTW has been designed to treat wastewater from industrial, commercial and residential sources up to a maximum capacity equivalent to a population of 8,831, during this phase of development.

The new WwTW will make use of the existing WwTW infrastructure, including pipework conveying wastewater from the existing network and

discharge pipelines. The new works has been designed to utilise land around the existing WwTW, with some use of surrounding scrubland and minimal encroachment onto land currently used for public amenity. Final effluent will be discharged through the existing outfall into the Moray Firth to the north of Fort George.

The treatment processes will consist of primary screening and settlement followed by secondary activated sludge assisted degradation. Bacteriological control of the final effluent will be achieved through tertiary disinfection by ultraviolet irradiation.

The bacteriological load of the treated effluent is expected to decrease significantly as a result of the improved treatment at the works.

## **1.5 Scoping and Consultation**

The Area Planning and Building Standards Manager of the Highland Council confirmed in January 2009 that in accordance with the Environmental Impact Assessment (Scotland) Regulations 1999, the proposed extension to the wastewater treatment plant and associated works at Ardersier does constitute an EIA Development.

The critical issues which required further investigation were identified as:

- Geology and soils (Ardersier Glacial Deposits SSSI)
- Ecology and Nature Conservation (The Moray Firth SAC and Inner Moray Firth SPA and their qualifying features)
- Landscape and Visual (Visual setting of Fort George Scheduled Ancient Monument)
- Cultural Heritage (as Landscape and Visual)

For each of these issues, impacts would have to be determined and the magnitude of these impacts described. For each impact identification of mitigation measures would be required with a description of residual impact from the project being summarised.

Consultations were ongoing during the site selection, project design and environmental assessment phases. Consultees have included the relevant planning authority, Scottish Natural Heritage, Scottish Environment Protection Agency, Scottish Water, The Highland Council's Archaeology Unit, Ranger Service and Roads Department,

Aberdeen University School of Biological Sciences and Ardersier Community Council. Public exhibitions were held in October 2008 and January 2010 in Ardersier, in which members of the public were invited to view the proposals as they were at that time.

Comments received from all consultations have been taken into consideration in the development of the proposal for the WwTW and in the production of the ES.

## **1.6 Environmental Impact Assessment**

The potential effects of the proposed wastewater treatment works on the environment (during construction and operation) have been fully considered and assessed under the following range of headings.

### **1.6.1 Geology, Soils and Contamination**

The potential effects associated with construction and operation of the proposed WwTW on the local geology and soils and the potential for contamination have been identified and assessed.

The desk study and initial site investigation found that part of the site is made ground which is likely to have been deposited at the site between 1965 and 1987 when the area was used as a refuse tip.

The key potential effects identified in the assessment were identified as:

- Migration of possible contaminants in the groundwater
- Surface runoff
- Flora and fauna contact with ecotoxic contaminants
- Contamination of potable water

Mitigation measures, based on best practice, have been devised to control the potential effects on the receiving environment. These measures will prevent, reduce or offset impacts on the receptors.

Mitigation measures include closely managed re-use or disposal of contaminated soils, use of appropriate construction materials for below ground construction, reinforcement above ground, location of infiltration drains and suitable emergency plans to deal with any contaminated spills on site.

Following completion of the mitigation measures provided above, it is considered that the potential risks associated with geology, soils and groundwater would be reduced to acceptable levels.

In future phases of development at this site, further investigation will be required on the material underlying the WwTW during demolition / decommissioning to confirm the risks associated with groundwater (ammoniacal nitrogen) and their possible source.

### **1.6.2 Landscape and Visual**

An impact assessment of the construction and post-construction activities of the proposed scheme was undertaken on landscape and visual amenity features.

Impacts on landscape and visual amenity from the proposed development include;

- Introduction of plant with increased height in comparison to existing structures;
- Noisy working and presence of vehicles, equipment and lighting during construction; and
- Night lighting during construction and operation of the new works.

A key issue in design of the proposed development has been the trade-off between visual intrusion from elevations of new buildings and plant and the limitation on the depth of excavation set by the water table.

The WwTW site is within a recreational/agricultural setting and is dominated by recreational, military and relatively low quality agricultural land use. The capacity of the local landscape to absorb change is considered to be significant, particularly for the small scale and low lying proposed development.

The inner Moray Firth landscape is an attractive example of east coast highland coastal landscape, however the landscape experience is dominated by the landform and the sea. The scale of the landscape is large and will not be affected by a small scale development such as the proposed new WwTW.

Impact of moderate adverse significance has been identified for views from two B&B houses, Hillhead of Ardersier Scheduled Ancient Monument (SAM), Kirkton Old Burial Ground, Cromal Mount SAM,

MOD rugby and football pitches, the B9006 road and the Candidate Core Path. These sites represent 32% of the total viewpoints affected by the proposed scheme.

Mitigation measures have consequently been recommended, to reduce the impact of the proposed scheme on landscape and visual receptors.

Visual intrusion of lighting structures has been minimised such that there is no requirement to mitigate through landscape works.

Mitigation measures for visual impact include site selection and layout to retain existing vegetation and natural features, along with construction of low earth bunds and planting to provide visual screening.

Other mitigation measures include recommendation for use of traditional earth colours and use of materials to reflect local distinctiveness. Guidelines for avoidance of visual impact during the construction phase are also given.

Through integrating the proposed mitigation measures, it is concluded that the proposed development will have an impact of low significance on the overall character of the landscape, where the proposed scheme maintains the existing landscape quality.

### **1.6.3 Hydrology and Water Quality**

An assessment has been made of the impact of construction and operation of the proposed scheme on surface water, groundwater and the local sewerage system. Baseline hydrological and water quality conditions were collaged from consultation with the Scottish Environment Protection Agency, Scottish Water and a review of relevant documents.

The impact assessment, undertaken using standard guidance, examined impacts on surface and groundwater quality and the local drainage system.

Sensitive receptors identified were the Moray Firth bottlenose dolphin population, beach users at Nairn, Rosemarkie and Ardersier and kite surfers.

Potential impacts identified included:

- Surface water quality:

- Risk of flooding of site causing pollution
- Risk of mobilisation of contaminants present in groundwater into sea
- Risk of deterioration of water quality in the Moray Firth
- Surface water quantity
  - Increased runoff from impervious areas of site
- Groundwater quality
  - Change in flow and/or direction or change in water table level due to excavation and dewatering
- Groundwater quantity
  - Risk of releasing pollutants (chemical, organic, microbial) into the groundwater reservoirs
  - Possibility of saline water intrusion due to temporary pumping
- Existing drainage system
  - Risk of increased spills from local combined sewer outfalls and emergency outfalls during construction or due to changing the operating regime

The general impact from construction on the Moray Firth and on groundwater will be low, provided best practice for construction is followed by the contractor. However further groundwater monitoring has been recommended following the results of the initial leachate testing which found one sample to be significantly contaminated.

The operational stage of the wastewater treatment works also has the potential to benefit the water environment through significantly reducing the bacterial loading and concentrations of suspended solids in the effluent.

Mitigation measures include raising the level of the site above the 1 in 250 year return period flood level, use of sustainable urban drainage systems in the site drainage design, contain and dispose of any contamination encountered to the satisfaction of SEPA and treat effluent to a tertiary standard.

Best practise construction methods should be implemented in addition to following the SEPA pollution prevention guidelines.

The significance of the impact on local water quality and on the water quality of the wider Moray Firth has been determined to be positive, of a high significance level locally and a low significance level in the wider area.

#### **1.6.4 Ecology and Nature Conservation**

A detailed assessment has been undertaken of the potential effects of the WWTW on the ecology and nature conservation features occurring within the Zone of Influence of the development.

Baseline studies identified several potentially sensitive ecological features including protected habitats (including the Moray Firth Special Area of Conservation, Inner Moray Firth Special Protection Area and Ramsar site), sandbanks, and habitats of badgers, bats, otters, dingy skipper butterflies, bottlenose dolphins, other marine mammals and fish. Potential effects on these features have been avoided or minimised by sensitive planning of the layout and design of the proposed WWTW.

The main impacts identified during the construction phase include:

- Loss, fragmentation, degradation and modification of habitat
- Disturbance, injury and /or mortality to marine and terrestrial species

These impacts may arise due to vegetation clearance, earthworks and excavations, noise, dust and vibration, water and air pollution and traffic movements.

Potential impacts during the operational phase include:

- Changes to bacteria loading in effluent affecting feeding of birds, fish and marine mammals

The impact assessment has identified no significant effects associated with the proposed development. No evidence of badger, bat or otter activity was found within the Zone of Influence.

Some action to mitigate the impact on the dingy skipper butterfly, badgers, breeding birds and marine mammals and fish is required.

The effect of the proposed development on the Moray Firth SAC and its component features of bottlenose dolphin and sandbanks is determined to be, overall, slightly positive.

Two slight adverse impacts have been noted; impact on the dingy skipper butterfly through construction activities, and impact on marine mammals and fish through construction activities, transmitted as underwater noise.

Impact on butterflies has been reduced as much as possible in design of the scheme, however there will be an inevitable minor residual impact from noise and dust during construction due to the proximity of the site to Ardersier Common.

Mitigation for transmission of underwater noise has already been considered, however there is likely to be a minor residual impact on marine mammals and fish. However it should be noted that this impact would be temporary and low in magnitude.

Residual ecological impacts after mitigation will be minimised if clearance and construction activities are carried out during the months of August to February inclusive.

This avoids noise impact on dolphins calving during the summer months, construction impact on breeding birds, and construction impact during the time when the dingy skipper butterfly is most active.

### **1.6.5 Air Emissions**

An air quality assessment of the proposed extension to Ardersier WwTW was carried out to assess the potential impacts of the scheme.

Air quality issues during construction include;

- generation of dust, which may have an impact on local habitats; and
- emissions from construction traffic, which may have an impact on sensitive receptors.

The main air quality issue during operational activities will be odour from wastewater treatment.

Impact from dust emissions from construction activities on the local environment will be mitigated by adherence to guidance for best practice in dust management by the contractor.

Construction traffic emissions will not significantly impact local air quality at receptor locations close to roads near the construction sites as overall traffic flows are not expected to lead to significant changes in air quality above baseline conditions.

While the Scottish Government have issued a guideline level for odour of  $1.5 \text{ OU}_E/\text{m}^3$  98ile, practical experience of UK wastewater treatment plant installations have shown that exposures of up to  $5 \text{ OU}_E/\text{m}^3$ , expressed as a 98 percentile of one hourly average odour concentrations do not generally cause odour nuisance (UKWIR, 2001).

Results indicate that maximum atmospheric odour concentrations at all twelve identified sensitive receptors should not exceed  $5 \text{ OU}_E/\text{m}^3$  98ile during normal operations and desludging activities, and should therefore not produce an odour nuisance.

Consequently, no mitigation measures are required for odour in the operational phase.

Although tanker loading will not occur on a daily basis, and is expected to last less than an hour, it will occur periodically. It is therefore critical that efficient odour control is provided on-site for tanker connections, that it is well maintained, and that good housekeeping practices are adhered to by the tanker drivers.

### **1.6.6 Noise and Vibration Emissions**

An assessment of the potential noise and vibration effects of the proposed extension to the existing WwTW was undertaken. The primary objective of the noise assessment was to determine the potential operational noise effects of the proposed extension to the existing WwTW as well as considering construction and decommissioning noise effects.

Road traffic noise from the B9006 contributes to the local noise climate to some extent throughout the course of a typical day although the road is considered to be lightly-trafficked. The level of road traffic noise reduces during evening and night-time periods. All other local roads are generally single track or private with a low volume of daily traffic movements.

The most significant source of noise during the construction phase is likely to be that arising from piling. The potential effects, however, depend on the method of piling used and site ground conditions. A piling method that generates the lowest possible noise levels should be

used for the proposed scheme where possible so as to minimise noise effects. Construction noise should be managed using current best practise techniques including limiting working hours, use of screening and use of noise control features on machinery.

The operational noise attributable to the proposed plant at the nearest sensitive receptors is assessed as being of minor significance and will not create a noteworthy environmental effect provided that suitable mitigation measures are followed.

Mitigation measures during operation include keeping doors closed, use of control measures such as acoustic enclosures, silencers, acoustic louvers, encasing underground plant with appropriate materials, and vibration isolation systems.

#### **1.6.7 Access and Traffic**

A desk study, consultation and site visits were undertaken to assess potential traffic and transport impacts of the proposed WwTW.

Following consultation, the number of possible routes for access to the site by construction vehicles was reduced to 3.

Of these 3 possible routes, only the Route 3 (the route utilising a section of unclassified road) was found to have significant effects from traffic associated with the proposed development.

Traffic generation during the operational phase will be significantly lower compared with the construction phase and is predicted to have a negligible impact on the local transport network.

Following the mitigation measure of infrastructure improvement, the residual impact associated with Route 3 is reduced from moderate to minor. Consequently, the residual effects of the proposed development for all 3 possible routes are assessed as at worst minor (temporary) and therefore not significant.

Temporary effects relating to an increase in general construction traffic will be regulated through an agreed construction code with appropriate traffic management methods employed.

In addition to the implementation of best practice construction methods, mitigation measures include designing a management plan for construction traffic movements, including type, routing and timing. A Traffic Management Plan (TMP) outlining measures to enhance the

efficient transportation of plant and materials to site, and minimising congestion and disruption which might affect general traffic and the emergency services, will be developed prior to the start of construction.

The scheme layout has been designed to avoid the candidate core paths network, therefore there will be no impact on this access feature.

### **1.6.8 Cultural Heritage and Archaeology**

The cultural heritage and archaeological assessment considered the possible direct effect upon features around the area of the proposed works. The collection of baseline information was completed by undertaking a desk study and followed by an assessment of the direct and indirect impacts of the proposal in consultation with the Regional Archaeologist for The Highland Council and Historic Scotland.

Four statutory designated sites;

- Fort George;
- Cromal Mount Medieval Motte;
- Hillhead of Ardersier ring ditches; and
- Ardersier Church;

and two non-designated sites;

- Inverness to Fort George Military Road; and
- Ardersier Fish Traps;

were found to be close to the proposed WwTW. These were the receptors considered in the assessment.

The main operational phase hazards were identified as;

- deterioration of the existing view to or from the receptor;
- disturbance caused noise or odours from operational activities; and
- vehicle movements in relation to the receptor.

The assessment found that the operational impact was minor or negligible at each of the receptors.

Recommended mitigation measures to maintain the visual setting of the four statutory designated sites include;

- retention of existing vegetation as screening where possible;
- use of appropriate paint colours; and
- traffic management as described in the Traffic Impact Assessment.

The construction phase hazards identified include;

- deterioration of the existing view to or from the receptor caused by construction activities;
- disturbance caused by site activities and vehicle movements in relation to the receptor; and
- vibration damage to the receptor or noise impact at the receptor due to piling or other noisy site activities.

The assessment found that the operational impact was minor or negligible at each of the receptors. The visual impact on the setting of archaeological features is considered in Chapter 8, with the conclusion of low, local long-term impact with inclusion of mitigation measures of screening, planting and use of natural colours.

Recommended mitigation measures include implementation of a construction traffic management plan in consultation with affected parties, selection of low noise construction methods and construction of bunds and planting early in the construction period.

## **1.7 Conclusion**

The proposed expansion of Ardersier WwTW will provide tertiary wastewater treatment facilities for existing and new industrial, commercial and residential developments in the A96 corridor growth area.

Mitigation measures identified in this assessment have been incorporated in the detailed design of the scheme and in the construction methodology.

Consequently, the scheme will be such that adverse environmental effects have been minimised.

A draft scheme of mitigation measures required to counteract the environmental effects of the proposed development has been compiled, and is included below.

Draft Scheme of Mitigation

Environmental Category	Hazard	Impact	Mitigation	Residual Impact
Geology, Soils and Contamination	Contamination of bedrock aquifer from spills associated with process failures eg pumps	Medium	Containment, emergency operation plan, drainage plan	Low / insignificant
	Sludge handling / transport	Medium	Containment, emergency operation plan, drainage plan	Low / insignificant
	Isolated elevated TPH concentration in groundwater at BH01	High	Further groundwater testing undertaken and initial concentration not replicated.	Low
	Ammoniacal Nitrogen Contamination in leachates and groundwater across site	Medium	Further investigation required on material underlying WwTW during demolition / decommissioning to confirm elevated Ammoniacal Nitrogen concentrations and their possible source.	Medium (Residual risk will be assessed)
	Isolated high CO2 level in BH04 during initial gas monitoring round	Low, CIRIA 'Characteristic Situation 2'	Gas protection measures include suitable slab construction, gas membrane and sealing of all joints and penetrations.	Low
	Hazardous (ecotoxic) soils at TP11 and BH04 (high concentrations of zinc and copper)	Moderate	Re-use under hardstanding and above GW table. Infiltration drainage to be located away from the source of contamination.	Low
	Contaminated leachate at TP06 (benzo(a)pyrene)	Moderate / Low	Re-use under hardstanding and above GW table. Infiltration drainage to be located away from the source of contamination.	Low
	Corrosion of construction materials	Low	Consideration of most suitable materials to be used in development at detailed design stage.	Very Low
	Contamination of drinking water pipelines	Low	Trenches should be excavated and backfilled with clean fill prior to pipes being laid to prevent contact with site soils	Low / insignificant
Landscape and Visual Amenity	Deterioration in the existing view	Medium	Screening and planting, use of natural colours	Low
Hydrology and Water Quality	Risk of flooding of site causing pollution incidents	Medium	Raise ground above 4.7m OD. Incorporate the appropriate level of SuDS in design.	Insignificant
	Damage to property of infrastructure from flood displacement	Medium	Raise ground above 4.7m OD	Insignificant
	Mobilisation of silt and/or spills of oils or	Low	Adopt standard best practice construction measures	Low

Environmental Category	Hazard	Impact	Mitigation	Residual Impact
	concrete washings etc			
	Risk of mobilisation of contaminants in soils	Low to Medium	Validation testing of material excavated from identified areas	Low
	Risk of deterioration of water quality in the discharge receiving waters	Medium	Tertiary treatment of effluent	Highly significant local improvement Low significance regional improvement
Ecology and Nature Conservation	Moray Firth SAC	Moderate to slight positive	None required	Minor positive
	Bottlenose dolphin	Moderate to slight positive	None required	Minor positive
	Sandbanks	Slight positive	None required	Minor positive
	Ardersier Common	Moderate to slight negative	See mitigation measures listed below.	Minor negative
	Trees and Forestry	Negligible	Follow BS 5837 during construction.	Negligible
	Dingy skipper butterfly	Moderate to slight negative	Vegetation clearance August to February inclusive. Agreement with contractor regarding access and working arrangements prior to start on site. Planting to include kidney vetch. Planting in the southern corner to take place over 2 years.	Minor negative
	Breeding birds	Negligible	Vegetation clearance August to February inclusive	Negligible
	Badger	Negligible	Site survey prior to construction	Negligible
	Otter	Negligible	None required	Negligible
	Bats	Negligible	None required	Negligible
	Protected bird species	Negligible	None required	Negligible
	Marine mammals and fish	Moderate to slight negative	Avoid use of machinery for piling where possible, or use machinery with low noise emissions. Use buffer blocks and minimise hammer drop height.	Minor negative
Air Quality	Odour concentrations between 2.0 and 3.3 OU <sub>E</sub> /m <sup>3</sup> 98%ile at cemetery house	Low	None required	Low
	Odour concentrations between 0 and 8 OU <sub>E</sub> /m <sup>3</sup> 98%ile at Coastal Path	Low	None required	Low
	Odour concentrations between 1.2 and 2.1 OU <sub>E</sub> /m <sup>3</sup> 98%ile at MoD Playing Fields	Low	None required	Low

Environmental Category	Hazard	Impact	Mitigation	Residual Impact
	Odour concentrations between 25 and 50 OUE/m <sup>3</sup> 98%ile at B9006 road	Minor	None required	Minor
	Dust emissions from Construction Work	Low-Medium	Best practice for dust minimisation in construction to be used by contractor	Low
	Construction Vehicle Emissions	Low	None required	Low
Noise and Vibration	Operational Noise	Minor	Control of noise at source and through pro-active management measures	Minor
	Construction Noise	Moderate	Follow British Standard 5228 for construction. Additional silencing measures can be implemented if required.	Low to Moderate
	Piling activities	Slight adverse	Avoid use of machinery for piling where possible, or use machinery with low noise emissions. Use buffer blocks and minimise hammer drop height.	Minor
Access and Traffic	Increase in general (and/or HGV) traffic volumes cause delay and congestion on public roads ('A' and 'B' type roads); <b>All 3 Routes</b>	Negligible	Traffic Management / Construction Code	None
	Increase in general traffic volumes cause temporary disruption and delay to general traffic (unclassified road); <b>Route 3 only</b>	Moderate (temporary)	Infrastructure improvement Works	Minor (temporary)
	Increase in HGV traffic volumes cause temporary disruption and delay to general traffic (unclassified road); <b>Route 3 only</b>	Negligible	Infrastructure improvement Works	None
	Road Safety (Road Traffic Accidents); <b>All 3 Routes</b>	Negligible	None required	None
	Movement of construction traffic could impact upon safety and amenity for pedestrians and cyclist; <b>All 3 Routes</b>	Negligible	Traffic Management / Construction Code	None
	Disruption to pedestrian and cycle routes; <b>All 3 Routes</b>	Negligible	None required	None
Cultural Heritage and Archaeology	Direct impact on archaeological features (Fort George Military Road)	Low	Road has already been considerably modernised, and the effects of junction improvement works likely to be insignificant.	Negligible
	Indirect impact on visual setting of archaeological features (Fort George, Cromal Mount, Hillhead of Ardersier)	Medium	Screening and planting, use of natural colours	Low impact
Socioeconomic	Risk of hazards to members of the public during construction	Low	Implement site safety measures during construction	Low impact

