



**Northern Leg, Southern Leg and  
Fastlink**

**Detailed Ground Investigation  
Environmental Report**


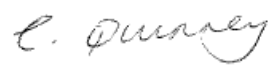
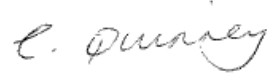
**Final Report**

**April 2008**

**Aberdeen Western Peripheral Route  
Detailed Ground Investigation Environmental Report 2008**

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## **Contents**

<b>1</b>	<b>Introduction</b>	<b>4</b>
1.1	Background	4
1.2	Method	5
<b>2</b>	<b>Description of Proposed Ground Investigation Works</b>	<b>6</b>
2.1	Types of Ground Investigation	6
2.2	Programme and Hours of Working	8
<b>3</b>	<b>Scope of Environmental Issues</b>	<b>9</b>
3.1	Method	9
3.2	Consultation	11
3.3	River Dee Special Area of Conservation	12
<b>4</b>	<b>Existing Environment and Assessment of Potential Impacts</b>	<b>13</b>
4.1	Introduction	13
4.2	Land Use	13
4.3	Water Environment	15
4.4	Ecology	24
4.5	Landscape and Visual	33
4.6	Cultural Heritage	33
4.7	Air Quality	38
4.8	Noise	39
4.9	Plans and Policies	44
4.10	Traffic and Access	45
4.11	Conclusion of Environmental Impacts	46
<b>5</b>	<b>References</b>	<b>47</b>

# Aberdeen Western Peripheral Route

## Detailed Ground Investigation Environmental Report 2008

### List of Tables

Table 3.1	Scope of Environmental Issues
Table 3.2	Issues Scoped out of Environmental Appraisal
Table 3.3	Key Issues Raised by Consultees
Table 4.1	Surface Water Quality Status
Table 4.2	Geotechnical works located within Close Proximity of Known Areas of Ecological Importance.
Table 4.3	Geotechnical Works located within 25m of Archaeological Sites.
Table 4.4	Predicted Noise Levels (LAeq,T)
Table 4.5	Properties within 10m/20m/40m/80m

### Appendices

Appendix 1	Contract Drawings (Exploratory Hole Location Plans): B1033200/DGI/SF/01-09; B1033200/DGI/CD/01-07, B1033200/DGI/DK/01-14
Appendix 2	Environmental Constraints Drawings: B1033200/DGI/ENV/FL/ 01-06; B1033200/DGI/ENV/SL/ 01-08; B1033200/DGI/ENV/NL/ 01-07
Appendix 3	Map showing River Dee SAC Boundary
Appendix 4	Schedule of Environmental Mitigation Measures
Appendix 5	Consultee Responses
Appendix 6	SEPA Pollution Prevention Guidelines 1 & 5: General Guide to the Prevention of Water Pollution; and Works in, near or liable to affect Watercourses
Appendix 7	Summary of Plans and Policies
Appendix 8	Ground Investigation Techniques
Appendix 9	Archaeological Specification
Appendix 10	River Dee SAC Method Statement
Appendix 11	Method Statement for Red Squirrel Dreys
Appendix 12	Pumping Tests

## **1 Introduction**

### **1.1 Background**

The Aberdeen Western Peripheral Route (AWPR) is a new 46km dual carriageway proposed jointly by the Scottish Government, Aberdeen City Council and Aberdeenshire Council. The proposed scheme comprises three sections:

- Northern Leg from North Kingswells to Blackdog
- Southern Leg from Charleston to North Kingswells, and
- Fastlink from Stonehaven to Cleanhill.

The Geotechnical Ground Investigation for the Fastlink and Southern Leg is scheduled to commence in late May 2008 and will run for 9 to 12 weeks. The Ground Investigation is to be procured as three separate contracts, which will run simultaneously.

GI works will be undertaken between Stonehaven and the A90 at Blackdog (Exploratory Hole Location Plans B1033200/DGI/FL/01-17, B1033200/DGI/NL/01-07), including the section from Charleston to Cleanhill (Exploratory Hole Location Plan B1033200/DGI/SL/01-05). These works are necessary to provide preliminary information on ground conditions to facilitate the design of the engineering works and associated structures.

This Ground Investigation Environmental Report complies with the framework set out in the Environmental Impact Assessment (Scotland) Regulations 1999 which implements the European Council Directive No. 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. A further breakdown of the legal requirements for environmental impact assessment is given in section 3.

A preliminary Ground Investigation (GI) for the proposed Aberdeen Western Peripheral Route (AWPR) Southern Leg and Fastlink was undertaken in May 2006. An Environmental Report was prepared prior to these works being carried out in order to assess the potential environmental impacts and provide details on appropriate environmental mitigation measures (Preliminary Ground Investigation Environmental Report, May 2006, Jacobs Babbie).

As a result of access constraints in May 2006 and design alterations since then, further investigative works were proposed (Phase 2) and an Environmental Report produced (October 2006). The Phase 2 works, however, did not go ahead at this time and are therefore included in the Detailed Ground Investigation works assessed in this report.

This Environmental Report assesses the potential environmental impacts and provides details on appropriate environmental mitigation measures. A copy of this Environmental Report will be issued to contractors tendering for the GI during the Contract Tender phase to inform them of potential environmental constraints. It will be a contractual requirement for the successful tenderer to comply with the requirements of this Report; however, the contractor will be responsible for developing and agreeing their own detailed Method Statements with the appropriate regulatory authorities. This will ensure that appropriate mitigation will be in place throughout the GI works programme.

The term 'Client' in this report refers to Transport Scotland, Aberdeen City Council and Aberdeenshire Council. The term 'Managing Agent' as used in this report refers to staff of Aberdeenshire Council and Aberdeen City Council who are specifically seconded to

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

deliver the AWPR. 'Engineer's Representative' refers to Jacobs who is acting as Agent to the Client and Managing Agent.

The Contract Drawings accompanying this report are provided in Appendix 1 and show the locations of GI boreholes, trial pits and areas of ecological and archaeological sensitivity. The Environmental Constraints Drawings show additional constraint information in relation to the GI works.

It should be noted that the Contract Drawings refer to the GI works in a different manner to the Environmental Constraints Drawings, Appendix 2, which correlate with those in the AWPR Environmental Statement 2007. In the Contract Drawings, the section from Stonehaven to North Kingswells is referred to as the Fastlink, whilst the section between Charleston and Cleanhill is referred to as the Southern Leg. These drawings should be referred to in conjunction with the mitigation measures listed in Appendix 4.

It should be noted that the exact locations of boreholes and trial pits indicated in this report may be subject to change following further ecological and archaeological surveys. Potential changes in the borehole and trial pit locations are anticipated to be within a short distance of the existing locations identified in this report. New locations will be decided upon under the supervision of the Ecological and Archaeological Clerks of Works and therefore further consultation with statutory consultees is not expected to be required. However, where changes in exploratory hole locations may impact on protected species or their habitats, Scottish Natural Heritage (SNH) will need to be consulted to determine the need for any licenses and/or additional mitigation measures.

### 1.2 Method

Environmental baseline information and potential impacts have been identified for GI works along the Fastlink, Southern Leg and Northern Leg through:

- Liaison with geotechnical engineers and review of proposed exploratory hole locations;
- Consultations with statutory and non-statutory consultees (March-May 2006, October 2006 (SEPA only) and April 2007);
- Review of Aberdeen Western Peripheral Route Ground Investigation Environmental Report (Babtie Group, 2004);
- Review of Aberdeen Western Peripheral Route Preliminary Ground Investigation Environmental Report (Jacobs Babtie, May 2006);
- Review of Aberdeen Western Peripheral Route Preliminary Ground Investigation Environmental Report (Jacobs UK Ltd, October 2006);and
- Review of Aberdeen Western Peripheral Route Environmental Statement (Jacobs, August 2007).

The information provided in this report has been collated principally from environmental surveys carried out as part of the Environmental Impact Assessment for the Aberdeen Western Peripheral Route. Consultation with relevant stakeholders was also undertaken.

## 2 Description of Proposed Ground Investigation Works

### 2.1 Types of Ground Investigation

The GI at exploratory hole locations will include some or all of the following operations:

- light cable percussion boreholes;
- rotary cored boreholes;
- static cone penetration tests;
- machine excavated trial pits;
- hand augered boreholes;
- pavement cores;
- installation of standpipe piezometers;
- downhole geophysics within boreholes;
- peat probing; and
- Pumping tests.

Appendix 8: Ground Investigation Techniques provides photographs of example rigs that would be used during the GI works, as described below.

#### Light Cable Percussion Boreholes

The majority of the cable percussion boreholes will be undertaken using tripod rigs, which will be brought to the site by Land Rovers. This method of investigation will involve setting up the rig over the exploratory hole location and driving metal casing to variable depths. The holes will be approximately 200mm in diameter. Soil samples will be recovered. Holes will either be backfilled with excavated material or an instrument such as a standpipe piezometer will be installed to monitor groundwater. All spoil will be removed on completion.

For a small number of boreholes, a more sensitive method of borehole drilling is required as a result of environmental factors. These borehole positions may be undertaken using a small, track mounted, cable percussive rig. The method of operation will be similar to that described above, with holes approximately 100mm in diameter being formed. Soil samples will also be recovered and the hole backfilled with the excavated material.

Some of the exploratory hole investigations will require both soil samples and rock cores to be taken. Cable percussion methods will be used at these locations, followed by rotary methods.

#### Rotary Cored Boreholes

The rotary cored boreholes will be undertaken by a rotary rig mounted on a lorry, tractor or tracks. This method of investigation will involve setting up the rig over the exploratory hole location and drilling to variable depths, dependant on ground conditions. The drill will be powered by an engine on the lorry/tractor. The holes will be approximately 120mm in diameter. Rock cores will be extracted. The hole will be backfilled with a standpipe piezometer or cement grout.

Water will be used as a flushing medium. If the GI contractor wishes to abstract water from, or discharge waste water to nearby watercourses, then SEPA should be consulted to determine the requirements for any licensing and/or mitigation measures (see section 4.3). The Dee District Salmon Fisheries Board should also be consulted where abstraction or discharge of waste water will affect a salmonid watercourse. Waste water will not be discharged directly to watercourses and sumps/settlement ponds, sediment / filter fences will be used where appropriate.

### **Static Cone Penetration Tests**

Static Cone Penetration Tests will be undertaken from a lorry or track mounted rig. This method of investigation will involve setting up the rig over the exploratory hole location and pushing rods to variable depths, dependent on the ground conditions. The drill will be powered by a power unit on the rig. The holes will be approximately 50mm in diameter. Soil samples may be extracted. The hole is normally backfilled by natural consolidation of the soil.

### **Machine Excavated Trial Pits**

Machine excavated trial pits will involve the use of a JCB or tracked excavator driven by an engine. This will involve excavating a pit approximately 3.0m long by 1.0m wide to a depth of approximately 3.0m to 4.5m. The excavated material will be placed to one side. Topsoil will be excavated and stored separately from the main bulk of spoil. Soil samples will be recovered. The spoil will be used to backfill the hole which will be compacted in layers before replacing the topsoil and turf on top.

### **Hand Augered Boreholes**

Hand augered boreholes may be necessary where access is restricted and will involve the use of light hand-operated equipment. This method of investigation will involve setting up the hand auger over the exploratory hole location and manually driving drill rods to a depth of up to 5.0m, dependant on ground conditions. Holes of up to 150mm in diameter can be made. Soil samples will be recovered. The hole will be backfilled with excavated material or monitoring instruments will be installed.

### **Pavement Cores**

Road cores will be undertaken at specific locations in order to obtain samples of the existing carriageway construction. This method of investigation will involve traffic management and the use of light weight hand portable equipment to extract cores up to 300mm diameter to depths of up to 1m, dependent on conditions. The hole will be backfilled with specialist materials such as sand grout.

### **Installation of Standpipe Piezometers**

Standpipe piezometers (an instrument used to measure water level and the pressure of fluid or the compressibility of the ground when subjected to pressure) will be installed in various exploratory holes along the route in order to obtain groundwater information. This installation method, undertaken by cable percussion or a rotary rig, will involve inserting a porous tip into the borehole generally around 200mm from the base of the hole. The tip is then surrounded by a filter medium (sand or gravel) delivered into the hole via a tremmie pipe to a depth of around 1000mm. Following this, the sand is sealed off with bentonite. The borehole will then be sealed and backfilled by pumping down cement or pre-mixed bentonite grout.



### **Downhole Geophysics within Boreholes**

Downhole geophysical logging will be undertaken in various exploratory holes within cuttings to investigate the in situ properties of the underlying rock mass. The equipment will be brought to site by Land Rover type vehicles. This method of investigation will involve setting up a winch and cable system above the exploratory hole location. The cable will be attached to a downhole instrument tool (caliper, followed by optical and/or acoustic televiwer) which will be lowered into the hole to record various properties of the rock mass in the form of electronic signals. These signals will be transmitted via the cable to a data recorder at the surface.

### **Peat Probing**

Peat probing will be undertaken along various stretches of the proposed route to determine the depth and extent of soft soil deposits. This method of investigation will involve probing a given area at specific centres with a sharpened steel rod, or probe, which is driven into the soil by hand until it meets resistance. Probes are approximately 25mm in diameter and about 1200mm in length. The rod is attached to a shaft with a 'T-Bar' handle to which shaft lengths may be attached or removed. A pair of pipe wrenches will be required to add/remove lengths of shaft.

### **Pumping Tests**

Pumping tests involve carrying out a series of tests to enable the determination of the properties of local aquifers. Pumping tests include 'step tests' and 'constant head tests'. Step tests require the application of four different rates of water pumping for one hour intervals and recording the drop in water level corresponding to each rate. Constant head tests involve applying a single pumping rate over a period of 24 hours and recording the drop in groundwater levels. In both cases, groundwater levels are expected to recover to original levels within 24 hours. Groundwater extracted via pumping tests may be discharged to land or water (subject to the necessary approvals). Further information on pumping tests is provided in Appendix 12.

Groundwater levels will be monitored monthly for 12 months after completion of the GI works (expected to be between August 2008 and July 2009). This monitoring involves use of a simple hand held dip meter to determine the water level.

## **2.2 Programme and Hours of Working**

The Fastlink and Southern Leg ground investigation will run for 9 to 12 weeks, starting in late May 2008. The GI will be undertaken as three separate contracts, all running simultaneously.

The time required to investigate each exploratory hole location will vary according to the ground conditions encountered. It is estimated that each cable percussion borehole and each rotary cored borehole could take up to a maximum of 5 days to complete. Trial pits take between 1 to 2 hours to complete by a pitting crew, completing up to 10 pits in a day; however, more than one pitting crew is expected to be operation at any time. Normal working hours shall be Monday to Friday between 0700 and 1900 hours and Saturday between 0700 and 1700 hours, with no working on Sundays or public holidays. Works within the vicinity of the River Dee SAC are subject to additional restrictions. Work in this area is to be carried out during daylight hours only, and is to start no earlier than 2 hours after dawn and finish no later than 2 hours before dusk between March and October; and to start no earlier than 1 hour after dawn and finish no earlier than 1 hour before dusk during November to February.

## 3 Scope of Environmental Issues

### 3.1 Method

This chapter considers the environmental issues requiring further investigation and scopes out those likely to have no potential impacts. A statutory Environmental Impact Assessment (EIA) is not required as the nature of the investigations do not fall under Schedules 1 or 2 of the Environmental Impact Assessment (Scotland) Regulations 1999. In order to address the environmental issues associated with the proposed investigations, guidance set out in Planning Advice Note 58 Environmental Impact Assessment (EIA) has been used (Scottish Executive, 1999).

Aspects of the environment to be addressed in any statutory EIA under the EIA Regulations (Schedule 4 [3]) include:

- population;
- fauna and flora;
- soil;
- water;
- air;
- climatic factors;
- material assets;
- architectural and archaeological heritage;
- landscape; and
- the inter-relationship between the above factors.

Using the guidance on EIA, the above issues were considered against the proposed activities involved in the GI. As a result of this process and consultation responses, issues in Table 3.1 were identified to form the scope of the environmental appraisal. The reasons why these issues were identified are also provided in Table 3.1. The issues scoped out as not requiring to be addressed in the environmental appraisal are shown in Table 3.2, along with the reasons for this decision.

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

**Table 3.1 – Scope of Environmental Issues**

Environmental Issues covered in this statement	EIA Regulations Environmental Aspects	Reason for Inclusion in Scope of EA
Land use and access (4.2)	Population Soil	GI will involve access onto and investigations on ecologically sensitive areas, agricultural land and woodland and forestry (amenity and commercial), which has the potential to have adverse impacts on these areas and access to them.
Water environment (4.3)	Water	GI will involve work in close proximity to watercourses and the use of materials which have the potential to cause pollution of water.
Ecology (4.4)	Fauna Flora	GI will involve work in close proximity to a variety of designated nature conservation sites and protected species in the area, specifically:  Special Area of Conservation (SAC – statutory site protected by European Legislation);  Sites of Interest to Natural Science and District Wildlife Sites (SINS and DWS protected by local planning policy)
Cultural heritage (4.5)	Architectural and Archaeological heritage	Sites of cultural heritage interest lie within the vicinity of the GI works.
Air quality (4.6)	Air Climatic factors	Drilling operations and excavations undertaken as part of the GI investigations may generate dust which could be a nuisance for residential and ecologically sensitive areas in close proximity.
Noise (4.7)	Population	The on-site operations will generate noise (particularly cable percussive boreholes).
Planning issues (4.8)	Various factors	Although the GI is not subject to planning conditions, there may be planning constraints that the relevant Councils would wish the Contractor to take into consideration.
Traffic and Access	Population	Drilling operations and excavations undertaken in the vicinity of existing roads may result in disruption.

**Table 3.2 – Aspects Scoped Out of Environmental Report**

Environmental Aspect	Reason for Exclusion from Scope of EA
Material Assets	No material assets in addition to those discussed under the relevant sections are likely to be affected by the investigations. Agricultural land, forestry, public utilities, infrastructure and public access are considered in the land use section.
Landscape	As the GIs are temporary and will not involve a large amount of equipment located in one place for any length of time, no significant impacts on landscape are anticipated. However, please note that landscape and visual impact mitigation measures (E60 –E62) to further reduce the potential for landscape impacts are included in Schedule of Environmental Mitigation Measures (Appendix 4) of this report.

# Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

## 3.2 Consultation

A number of consultees were consulted during January 2004 and May 2006 for the Preliminary GI proposals.

The organisations consulted for this GI Environmental Report in March 2006 comprised Aberdeen City Council and Aberdeenshire Council, Scottish Natural Heritage (SNH), Historic Scotland, the Scottish Environment Protection Agency (SEPA) and the River Dee District Salmon Fisheries Board. The information provided by consultees was used to:

- ensure that statutory consultees are informed of the proposed works;
- obtain baseline information regarding existing environmental site conditions;
- establish key environmental issues and identify the potential impacts to be considered; and
- recommend appropriate environmental mitigation measures.

Due to the close proximity of proposed works to Limpet Burn, SEPA were consulted in October 2006 and were provided with a detailed plan of the proposed works and mitigation measures. The proposals were approved by SEPA (ref Appendix 5).

Further consultation with the rest of the consultees was not considered to be required as the majority of the exploratory hole locations proposed for investigation had already been reviewed by consultees during the March and May 2006 consultations.

Archaeological information for the southern section of the GI works is limited at this stage. During the March-May 2006 consultation, Historic Scotland advised that, during the GI works, trial pits should be monitored due to the potential presence of archaeological deposits.

A summary of consultees' responses to date is provided in Table 3.3. Full responses are provided in Appendix 5. Although no formal letter was received, issues that were raised through discussions with SEPA have been incorporated within this report and incorporated into the mitigation measures.

**Table 3.3 – Key Issues raised by Consultees**

Consultee	Issue Raised						
	Land Use	Water Quality	Fisheries	Ecology/ Nature Conservation	Cultural Heritage	Air Quality	Noise
Aberdeen City Council Archaeology Department					•		
Aberdeenshire Council Archaeology Department					•		
Dee District Salmon Fisheries Board (DDSFB)			•				
Historic Scotland					•		
Scottish Environment Protection Agency		•					
Scottish Natural Heritage (SNH)		•		•			

### **3.3 River Dee Special Area of Conservation**

SNH and the Dee District Salmon Fisheries Board (DDSF) were consulted in March 2006 regarding the potential impacts of the GI activities on the River Dee Special Area of Conservation (SAC) during the preliminary GI works. (Refer to Appendix 3 – Map showing boundary of River Dee SAC). A draft Method Statement for the River Dee SAC, as agreed by the Contractor, was sent to SNH and DDSFB for comment. Liaison with SNH specifically addressed whether an Appropriate Assessment would be required under the Habitats Regulations 1994, which implement the Habitats Directive (92/43/EEC). These Regulations state that an Appropriate Assessment would be required if there was potential for significant adverse impact on any qualifying species in the River Dee SAC.

SNH advised in their response of 24 March 2006:

“SNH considers that it is unlikely that any qualifying feature will be affected significantly either directly or indirectly. This view is subject to the Method Statement and proposed mitigation measures being implemented as described” (Refer to Appendix 5).

The Method Statement has been updated for the Detailed GI works within the vicinity of the Dee SAC (Refer to Appendix 10: River Dee SAC Method Statement).

## 4 Existing Environment and Assessment of Potential Impacts

### 4.1 Introduction

This section provides baseline information on the key environmental issues, the potential impacts, mitigation measures proposed and residual environmental impacts.

### 4.2 Land Use

#### Baseline Conditions

Land use within the vicinity of the GI works is predominantly agricultural land. Residential areas in the vicinity include Stonehaven, Cookney, Burnhead, Kingswells and Dyce. Other land uses have been classified into the following categories:

- amenity/ footpaths/ recreational open space;
- woodland and plantation forestry; and
- public utilities and infrastructure.

#### Assessment of Impacts

The investigations will involve temporary disturbance to areas of agricultural land through the need to gain access to exploratory borehole locations, and by the physical damage caused by drilling and/or excavations. These types of impacts will occur for all types of investigations. All soil excavated which is not required for analysis will be reinstated.

Works carried out on agricultural lands could potentially contribute to the transmission of animal and plant diseases, should the appropriate mitigation measures not be adequately implemented.

Some trees may need to be felled to gain access to borehole sites. This could potentially significantly increase the risk of windthrow in some areas, particularly where older trees are exposed.

The footpaths indicated on the Scottish Paths Record provided by Aberdeenshire and Aberdeen City Councils and as shown on the environmental Constraints Drawings, should be unaffected. There may be short term disruption to several pathways within the study area however; no long term significant impacts on land use are anticipated.

Based on a desk top study consisting of historical map reviews and consultations, the exploratory holes are not within the vicinity of any known contaminated land or landfill sites. One potentially contaminated site has been identified at a disused railway line at Milltimber.

The exploratory holes are not in the vicinity of either the BP or Shell pipelines; therefore no supervision by BP or Shell engineers will be required.

#### Mitigation

The following mitigation measures shall be implemented during the GI:

## **Land Use**

E 1 - Minimise site disturbance to the most practicable extent possible.

E 2 - Contractors working on agricultural properties shall follow the Scottish Executive's Codes of Recommendations for the Welfare of Livestock, Animal Health and Biosecurity (2002). Ensure that all vehicles, trailers, machinery and equipment have been cleansed and disinfected before going onto and upon leaving farm properties.

E 3 – Contractors vehicle movements should avoid as far as possible contact with farm livestock, and where livestock are encountered restrict movement to speeds which avoid stressing the animals.

E 4 - All livestock should be removed from fields in which GI work is being undertaken by the landowner, and Contractors should take all steps necessary to avoid livestock straying (e.g. comply with farm etiquette, close all gates and comply with access good practice). Compensation may be payable to landowners in instances where undue disturbance and damage has been caused by Contractors.

E 5 – Any tree felling conducted in order to clear sites for GI or to gain access to GI locations should be avoided as far as possible.

E 6 - Existing access tracks should be used where ever possible:

E 7 - Where tree felling is unavoidable, Contractors shall check as to whether a felling licence is required, and if so shall obtain one from the Forestry Commission

## **Soils**

E 8 – Minimise the amount of exposed ground and the stockpiles of excavated material.

E 9 – Divert runoff around stockpiles of excavated material; cover stockpiles to prevent dust generation or sediment in run-off as required.

E 10 – Appropriate measures will be put in place to minimise sediment laden runoff from GI sites where required. These will include visqueen sheeting, sand bags, straw bales and grass filter strips.

E 11 – During excavation, turf shall be stripped in grass areas, topsoil and sub-soil layers shall be removed and stored in separate stockpiles and used in site restoration works

## **Residual Impacts**

With the effective implementation of the appropriate mitigation measures listed above, impacts on existing land use and the risk of windthrow is likely to be minimised. Windthrow damage may still occur as a residual impact, should tree felling be required. In some cases, there may be visible evidence of topsoil disturbance; however this is not anticipated to have a significant impact on land use.

### 4.3 Water Environment

#### Baseline Conditions

The freshwater environment is important in terms of ecology and nature conservation, recreational value, public health issues, commercial interests (e.g. fisheries) and public amenity. For the purpose of this report, waterbodies refers to all water features including rivers, streams and lochs.

The main surface water features in the study area are the River Don and the River Dee, which includes Crynoch Burn. The River Dee is also designated as a SAC for its populations of salmon, otter and freshwater pearl mussels.

SEPA's water quality classification (SEPA, 1995) classifies river water quality according to the following categories:

A1: Excellent	C: Poor
A2: Good	D: Seriously Polluted
B: Fair	

The Water Framework Directive (WFD), which is transposed into Scottish Law by the Water Environment and Water Services Act 2003 (WEWS), requires surface waters to be classified according to their ecological status using a range of parameters including chemical, ecological, physical, morphological and hydrological indicators. Furthermore, there is a requirement under the WFD that natural water features will have to reach good ecological status by 2015 (WFD, 2000/60/EC).

Good ecological status has not yet been defined and has therefore not yet been integrated into the current SEPA classification system. In the meantime, SEPA have set out criteria and a provisional classification based on the risk of the water body not achieving good ecological status by 2015 (SEPA 2004).

#### SEPA Water Framework Directive Provisional Classification

1A : At risk	2A : Not at risk (Probably)
1B : At risk (Probably)	2B : Not at risk

The Water Environment (Controlled Activities) (Scotland) Regulations (2005) (CAR) control all engineering activity in or near watercourses, and implement the requirements of the WFD and WEWS.

The majority of GI works will be undertaken in rural areas where numerous farmsteads have access to private groundwater supplies.

For further details of baseline conditions, please refer to the Environmental Statement (Jacobs, 2007).

Table 4.1 lists watercourses in the vicinity of GI works, shows their current water quality status, and the presence or absence of salmonids.



**Aberdeen Western Peripheral Route  
Detailed Ground Investigation Environmental Report 2008**

**Table 4.1: Surface Water Quality Status and presence of salmonids**

Water bodies	Salmonid River	2006 SEPA Water Quality Rating	SEPA Water Framework Directive Rating	Designations
Megray Burn	No	N/A	N/A	N/A
Limpet Burn	N/A	N/A	N/A	N/A
Coneyhatch Burn	N/A	N/A	N/A	N/A
Green Burn and Ditch	N/A	N/A	N/A	N/A
Fishermyre Wetland	N/A	N/A	N/A	N/A
Allochie Burn	N/A	N/A	N/A	N/A
Burn of Muchalls	No	A2	2B	Drains from Red Moss of Netherley SAC
Back Burn	Yes (trout present)	A1	N/A	N/A
Burn of Elsick	N/A	A2	N/A	N/A
Burn of Blackbutts, Cookney Ditch, Stoneyhill Ditch, Balnagubs Burn, Whiteside Burn, Crossley Burn, Cairns Burn, Circle & Square Burn, Wedderhill Burn, Craigentath Burn	N/A	N/A	N/A	N/A
Cowford Pond	N/A	N/A	N/A	N/A
Burnhead Burn	N/A	N/A	N/A	N/A
Blaikiewell Burn	Yes (trout present)	N/A	N/A	Drains into River Dee SAC
Crynoch Burn	Yes	A2	1A/1B	River Dee SAC
Kingcausie	N/A	N/A	N/A	N/A
River Dee	Yes	A1	1B	River Dee SAC
Milltimber Burn	N/A	N/A	N/A	Drains to River Dee SAC
Culter House Burn	Dry	N/A	N/A	N/A
Beans Burn (Upper reaches of Murtle Den Burn first tributary)	N/A	N/A	N/A	N/A
Upper Beanshill Burn (upper reaches of Murtle Den Burn (Northern tributary))	N/A	N/A	N/A	N/A
Gairn Burn, Moss of Auchlea Drainage System, Westholme Burn, and Borrowstone Burn	N/A	N/A	N/A	N/A
Ord Burn	N/A	N/A	N/A	Drains to Culter/River Dee SAC
Silver Burn	Yes (trout present)	N/A	N/A	DWS Drains to Culter/River Dee SAC

**Aberdeen Western Peripheral Route  
Detailed Ground Investigation Environmental Report 2008**

<b>Water bodies</b>	<b>Salmonid River</b>	<b>2006 SEPA Water Quality Rating</b>	<b>SEPA Water Framework Directive Rating</b>	<b>Designations</b>
River Don	Yes	A2	N/A	Salmon Fisheries River District Wildlife Site (DWS) Local Nature Reserve (LNR) District Wildlife Site (DWS)
Kepplehill Burn and field ditch	N/A	N/A	N/A	Its upper catchment is part of Brimmond Hill District Wildlife Site (DWS) and Site of Interest to Natural Science (SINS).
Gough Burn	N/A	N/A	N/A	Forms part of a Gough Burn DWS and SINS
Parkhead Burn and field ditch	N/A	N/A	N/A	N/A
Craibstone Burn and field ditch	N/A	N/A	N/A	N/A
Green Burn	N/A	N/A	N/A	N/A
Walton field ditch	N/A	N/A	N/A	N/A
Howemoss Burn	N/A	N/A	N/A	N/A
Bogenjoss Burn	N/A	N/A	N/A	N/A
Goval Burn	Yes	B	N/A	N/A
Mill Lade	N/A	N/A	N/A	N/A
Corsehill Burn	N/A	N/A	N/A	N/A
Red Moss Burn	N/A	N/A	N/A	Drains the southern part of Red Moss, then flows into Corby Loch (which is part of the Corby, Lily and Bishops Loch SSSI)
Blackdog Burn and field ditch	N/A	A2	N/A	N/A
Middlefield Burn	N/A	A2	N/A	N/A
Craibstone Pond	N/A	N/A	N/A	N/A
Corsehill Pond	N/A	N/A	N/A	N/A
Lochgreens Pond	N/A	N/A	N/A	N/A
Corby/Lily Loch	N/A	N/A	N/A	SSSI

N/A – not applicable

## **Assessment of Impacts**

There is potential for adverse impacts on water quality during the GI as a result of ground disturbance, excavation and drilling activities generating sediment runoff into water bodies, which may also be polluted with hydrocarbons (e.g. diesel or oil from machinery), drilling fluids or grout. Water flush methods will be used to cool the drill bit and lift cuttings to the surface. The majority of flush water remains down the hole and is absorbed into the ground so there will be little or no discharge of water to the surface.

Water required for GI activities may require to be sourced through abstraction from nearby local watercourses. The amounts of water abstracted will be unlikely to significantly affect the quantity of water necessary for the sustainable functioning of freshwater ecosystems. Should it not be possible to abstract water from local resources due to site constraints, there may be occasions where clean (potable) water will need to be brought to site in tankers.

Private water supplies may experience a drop in yield if pumping tests are located nearby and use the same aquifer. If any impairment to private water supplies occurs during pumping tests, an alternative supply (bottled water or suitably sized tanker) dependent on individual needs will be provided at the Contractors expense for the duration of testing and until groundwater yields have fully recovered.

There is unlikely to be any other potential impacts on groundwater from the GI fieldwork due to the limited size and scale of the work proposed at each site. However, generic mitigation measures to prevent pollution of surface and ground water as detailed below will be implemented to ensure the protection of supply.

There is potential for the accidental spillage of materials, e.g. fuel, grout, used during the operations.

Due to the limited scale and temporary nature of the work proposed at each site, there is no potential for adverse flood impacts in the proximity of the boreholes as a result of works.

Borehole information is required at Limpet Burn, therefore several boreholes will be located adjacent to the watercourse within the 10m buffer zone (refer to mitigation measure E14). Due to the close proximity, there is an increased risk of pollution to this watercourse. As advised by SEPA, during consultation in October 2006, that the works should not proceed if the ground is found to be waterlogged and no sediment should be allowed to enter the burn. Should boreholes require being located within 10m of any other watercourses, there will be an increased risk of pollution and the same control measures as detailed for Limpet Burn shall apply. The Contractor must follow the mitigation measures as detailed in PPG 1: General Guide to the Prevention of Water Pollution and PPG 5: Works in, near or liable to affect Watercourses (Appendix 6). An Ecological Clerk of Works (ECoW) will be present to oversee the works at Limpet Burn and to ensure that the necessary mitigation is in place before works commence (e.g. sediment control measures).

No GI works will be undertaken within the River Dee SAC boundary. The nearest borehole is located approximately 10m to the south of the boundary (Refer to Appendix 2). The ECoW will be present to monitor the works within the vicinity of the River Dee (refer to Appendix 10 for the River Dee SAC Method Statement).

## **Statutory Obligations**

In order to undertake the drilling activities, the GI may require abstraction from watercourses or the discharge of waters used on site. Conditions or licences for abstraction or discharges under the Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR) are managed by SEPA, which allows them to ensure compliance with environmental quality standards to protect the water environment.

The CAR licensing regime provides three levels of authorisation over point source discharges, abstractions, impoundments and engineering activities. These are: General Binding Rules (GBRs), Registration, or Licence. General Binding Rules (GBRs) cover specific low risk activities. GBR activities that are undertaken in accordance with conditions stipulated by SEPA (2006) do not require an application for authorisation as compliance with a GBR is considered to be authorisation.

SEPA (D. Ogilvie, pers. comm, September 2006) have confirmed that the GI works fall within the category of low risk. Based on this advice and with reference to The Water Environment (Controlled Activities) (Scotland) Regulations 2005 – A Practical Guide (SEPA), it is recommended the GBRs are applied during the proposed works. The GBRs that apply to the GI works fall under the “Pollution Control”, “Abstraction” and “Engineering” regimes, as listed below:

- inland abstractions of less than 10m<sup>3</sup>/day (GBR2);
- drilling and pumping of boreholes for abstracting less than 150m<sup>3</sup>/year for testing purposes (GBR3 and GBR4);
- minor bridges – no construction in channel (i.e. set-back abutments) and for the purpose of a footpath, cycle route or single-track road (GBR6); and
- discharges of surface water run-off (GBR10 and GBR11).

With the implementation of the Schedule of Environmental Mitigation Measures (refer to Appendix 4), the Pollution Prevention Guidelines 1: General Guide to the Prevention of Water Pollution, and Pollution Prevention Guidelines 5: Works in, near or liable to affect Watercourses (Appendix 6), no significant adverse impacts are anticipated as a result of works in the vicinity of waterbodies. With the exception of Limpet Burn, it is anticipated that all works will be undertaken outwith a 10m buffer zone from the top bank of waterbodies. The ECoW will be present to oversee the works carried out at Limpet Burn and to ensure the necessary mitigation measures are implemented.

Should boreholes require to be located within 10m of any other watercourses, there will be an increased risk of pollution and the same control measures as detailed for Limpet Burn shall apply.

The GBR rules from the CAR listed below have been incorporated into the Schedule of Environmental Mitigation Measures (refer to Appendix 4).

### **GBR2: Abstraction of less than 10m<sup>3</sup> in any one day.**

1. There must be a means of demonstrating that the abstraction is less than 10m<sup>3</sup> in any one day (e.g. measuring the rate of abstraction) or a means of demonstrating that the maximum volume that could be abstracted cannot exceed 10m<sup>3</sup> in any one day. For example, this could be demonstrated by the number of people served.

2. Water leakage must be kept to a minimum by ensuring that all pipework, storage tanks and other equipment associated with the abstraction and the use of the water are maintained in a state of good repair.

**GBR3: The construction or extension of any well or borehole where such works are either not intended for the purpose of abstraction, intended for the abstraction of less than 10m<sup>3</sup>/day or intended for the abstraction of less than 150m<sup>3</sup>/year for the purpose of test pumping or sampling. This includes the installation or modification of any machinery or apparatus by which additional quantities of water may be abstracted.**

1. Drilling fluids may be introduced into the well or borehole if necessary to facilitate the drilling of the well or borehole provided that this does not result in pollution of the water environment.
2. Potable water may be introduced into the well or borehole to test the hydraulic properties of the aquifer.
3. Apart from the above conditions, the well or borehole must be constructed to ensure that water of a different chemical composition does not enter the body of groundwater.
4. When the well or borehole is not being used for abstraction, it must be back-filled or sealed to avoid loss of groundwater from any aquifer.

**GBR4: The abstraction from a borehole, and any subsequent discharge of abstracted water, where the total volume abstracted is less than 150m<sup>3</sup> in any one year and the purpose of the abstraction is either to test the yield of the borehole or well or the hydraulic properties of the aquifer or to sample the water quality.**

1. The abstraction must not cause the entry of water of a different chemical composition to enter into the body of groundwater.
2. When the borehole is not being used for abstraction, it must be back-filled or sealed to avoid loss of groundwater from any aquifer.

**GBR6: Minor bridge construction. A minor bridge is defined in CAR as a bridge having no part of its structure within the channel of a river, burn or ditch and constructed for the purpose of supporting a footpath, cycle route or single-track road.**

1. The works must not prevent the passage of migratory fish.
2. The works must not result in the heightening of any bank or the narrowing of the watercourse.
3. Within 12 months of the work starting, the bed and banks of the river, burn or ditch must be reinstated to their previous condition as far as possible.
4. All reasonable steps must be taken to ensure that the works do not result in increased erosion of the bed and banks of the river, burn or ditch.
5. No construction in the channel. This means the bed of the watercourse and the lower half of the banks. The abutments and support for the bridge should not normally come into contact with the water in the channel.

**GBR6: Temporary bridge construction or removal. In addition to the conditions above for minor bridge construction, the following will apply.**

1. The GBR applies only to temporary bridges over a river of less than 5m wide.

2. If the temporary bridge involves the construction of a culvert, the culvert must not extend more than 10m along the length of the river, burn or ditch.
3. Within 12 months after the removal of the bridge, the bed and banks must be reinstated to their condition before the works started.

**GBR10: Discharge of surface water run-off from a surface water drainage system to the water environment from construction sites, buildings roads, yards and any other built-up areas.**

1. If the surface water run-off is from areas constructed after 1 April 2007 or from a construction site operated after 1 April 2007, these sites must be drained by a Sustainable Drainage System (SUDS) (or equivalent from construction sites). The only exceptions are (i) if the run-off is from a single dwelling and its curtilage and (ii) the discharge is to coastal water.
2. The discharge must not result in pollution of the water environment.
3. The discharge must not contain any trade effluent and must not result in visible discolouration, iridescence, foaming or sewage fungus in the water environment.
4. The discharge must not result in the destabilisation of the banks or bed of the receiving surface water.
5. The discharge must not contain any water run-off from any of the following areas constructed after 1 April 2007:
  - Fuel delivery areas and areas where vehicles, plant and equipment are refuelled.
  - Vehicle loading or unloading bays where potentially polluting matter is handled.
  - Oil and chemical storage, handling and delivery areas.
6. All treatment systems (including oil interceptors, silt traps and SUDS) must be maintained in a good state of repair.
7. All reasonable steps must be taken to ensure that any matter liable to block, obstruct, or otherwise impair the ability of the surface water drainage system to avoid pollution of the water environment is prevented from entering the drainage system.

**GBR11: Discharge into a surface water drainage system.**

1. Oil, paint thinners, pesticides, detergents, disinfectants or other pollutants must not be disposed of into a surface water drainage system or onto any surface which drains into a surface water drainage system.
2. Any matter liable to block, obstruct or otherwise impair the ability of the surface water drainage system to avoid pollution of the water environment must not be disposed of into a surface water drainage system or onto a surface that drains into a surface water drainage system.
3. Sewage and trade effluent must not be discharged into any surface water drainage system.

## **Mitigation**

The GBR mitigation measures described above will be implemented in conjunction with the following conditions.

### **General Provisions**

E 12 – The Contractor will be required to comply with the requirements of the Water Environment (Controlled Activities) (Scotland) Regulations 2005 and SEPA Guidance Notes PPG1 & PPG5 (General Guide to the Prevention of Water Pollution & Guidelines for works in, near or liable to affect watercourses) and will discuss with SEPA any specific guidance or requirement concerning operations and protection of the water environment.

E 13 – An environmental management action plan/work Method Statement will need be drawn up by the GI contractor to deal with any incident with the potential to adversely affect the water environment. The plan should include a list of key internal and external contacts, including the regulatory authorities, and clearly set out reporting procedures and the management actions to be undertaken if a potential pollution incident occurs. The plan should set out emergency response procedures, and include maps showing the location of site drainage, storage areas and spill kits/emergency equipment etc.

E 14 – The Contractor shall not proceed with works adjacent to Limpet Burn if the ground conditions are found to be waterlogged, as identified by the Client's Ecological Clerk of Works.

E 15 – The Contractor shall prevent as far as possible any soil erosion and siltation of waterbodies, as well as pollution of water, where this may adversely affect ecological quality or cause obstruction or interference with water flow.

E 16 – The Contractor shall prevent any interference with the supply to or abstraction from underground water resources (including percolating water), and shall prevent any pollution of ground water arising from GI activities.

E 17 – Work Method Statements shall include emergency procedures to intercept any spillages and mobilise resources quickly and notify all relevant parties, including SEPA if appropriate, immediately so that pollution prevention measures can be put in place. The Engineer's Representative shall approve all Method Statements.

E 18 – Method Statements for erosion and sediment control shall be provided by the Contractor and approved by the Engineer's Representative, which shall detail inter alia the methodology for crossing burns, ditches, the disposal of drilling wastewater and emergency procedure should drilling works hit a confined aquifer.

E 19 – The Contractor shall ensure water abstraction from watercourses will not exceed 10m<sup>3</sup> per day.

E 20 – The Contractor shall ensure any imported water used in drilling operations shall not exceed the following levels of pollutants: Chlorine – 2ug/L , Ammonia (unionized) – 15ug/L, and shall ensure any such water is not discharged directly to waterbodies. The Contractor shall sample and test potable water supplies in advance of extracting water from them. Test results shall be provided to the Engineer's Representative for acceptance.

E 21- If ground water extracted for GI purposes (e.g. pumping tests) results in a drop in yield for any private water supply, Contractors shall ensure an alternative water supply of sufficient quality and quantity (including the importation and delivery of clean potable



water) to meet reasonable domestic needs is provided for the duration of testing and until groundwater yields have fully recovered.

### **Working near Waterbodies**

E 22 – Other than for access purposes, the Contractor shall maintain a minimum buffer zone of 10m from any rivers, burns, waterways, drains, lochs or other waterbodies. No site works, plant or vehicles shall be permitted within this distance. The Ecological Clerk of Works may specify an extension of this buffer zone to 30m, depending on the sensitivity of nearby ecological communities. Where it is not possible to maintain a 10m buffer zone (e.g. Limpet Burn), an Ecological Clerk of Works will be present to oversee the works and to ensure that necessary mitigation measures are in place before works commence (e.g. sediment control measures).

E 23 – No material will be stockpiled within 10m of any waterbodies.

E 24 – GI works adjacent to waterbodies should be accessed, as far as possible, along a perpendicular route to the watercourse and avoiding movement within a 10m riparian margin.

E 25 – Where possible, vehicle access to GI sites shall utilise existing bridge crossings to limit impacts on the banks, edges, beds or any other parts of waterbodies.

E 26 – Should access to borehole locations require the crossing of waterbodies (either through water or via temporary access platforms), the Contractor shall be required to agree the crossing method with the Client's Ecological Clerk of Works and provide Method Statements if requested and limit crossings within waterbodies to the same point or path for all vehicles. The Method Statements should comply with the General Binding Rules (GBRs), as implemented by the Water Environment (Controlled Activities) (Scotland) Regulations 2005. The Dee District Fisheries Board should be consulted in relation to works affecting salmonid watercourses.

E27 - Runoff from the site must not be discharged directly to nearby/adjacent waterbodies. Settlement ponds/sumps, sediment/filter fences or other method approved by the Engineer's Representative and Client's Ecological Clerk of Works must be used to protect all waters.

E 28 – Working on wet ground should be avoided where possible. Should it be considered necessary to carry out work on a wet area, geotextile matting and lighter vehicles shall be used to minimise ground disturbance and damage to soils. A Method Statement shall be provided by the Contractor and approved by the Engineer's Representative.

E 29 – The Contractor shall not disturb the bed or banks of the watercourse during extraction of water from waterbodies.

E 30 – Potential impacts on water quality will be mitigated through adherence to good site practices including transportation and storage of materials in sealed, and where required, bunded containers.

### **Residual Impacts**

With the effective implementation of the appropriate mitigation measures, no significant residual impacts on the water environment are anticipated.



## **4.4 Ecology**

### **Baseline Conditions**

Extensive field survey information gathered for and published in the AWPR Environmental Statement 2007, in addition to consultation with relevant organisations, has been used to identify habitats of ecological interest along the proposed route. There are a number of ecologically sensitive sites and protected species in the area where the GI works will be undertaken, which are outlined below.

### **Special Area of Conservation (SAC)**

SACs are areas designated under the European Community Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora (92/43/EEC), commonly known as the Habitats Directive. The following SACs lie within the general vicinity of proposed GI works:

- River Dee (includes Crynoch Burn); and
- Red Moss of Netherley

The River Dee is a major east coast Scottish river that is valued for its high water quality (class A1, SEPA 2006), ecological integrity and recreational amenity. The River Dee SAC includes the Crynoch Burn and has been designated for its populations of Annex II species, freshwater pearl mussel (*Margaritifera margaritifera*), its Atlantic salmon (*Salmo salar*) population, which provides a significant proportion of the Scottish salmon resource, and otter (*Lutra lutra*). The River Dee corridor also provides valuable habitat including riparian woodland that supports a variety of breeding and over-wintering birds.

Red Moss of Netherley SAC has been designated due to the presence of active bog and degraded lowland raised bog with capabilities for regeneration (Annex I Habitats). The nearest GI works would be located approximately 400m to the east of the Red Moss of Netherley SAC and therefore no impact upon this habitat is predicted.

### **District Wildlife Sites**

District Wildlife Sites (DWS) are considered to represent the best examples of the habitat types in a local area. There are several DWS within, or adjacent to, the corridor route (refer to Contract Drawings in Appendix 1). Those within the vicinity of the GI works are as follows:

- Deeside old Railway DWS;
- River Dee Valley DWS;
- Rotten O'Gairn DWS;
- Moss of Auchlea;
- West Hatton Woods DWS;
- Gough Burn DWS;
- Kittybrewster and Inverness Railway DWS; and
- River Don DWS.

### **Ancient Woodland Inventory Sites**

Woodlands (i.e. continually wooded since before 1600ad and not obviously planted) and woodland plantations (i.e. ancient woods in which the tree cover has been replaced, often with non native species) that have been in existence for a long time are considered to be more valuable for conservation purposes than woodlands of more recent origin and are listed on the Ancient Woodland Inventory (AWI). The AWI woodlands listed below are found within the vicinity of and are directly affected by the GI works.

- Megray Wood;
- Greenhowe Wood;
- Clochandighter;
- Cleanhill Wood;
- Guttrie Hill Wood;
- Milltimber Wood;
- Gairnhill Wood;
- West Hatton Wood;
- Parkhead Wood;
- Craibstone;
- East Woodlands;
- Monument Wood; and
- Littlejohns Wood.

The Environmental Constraints drawings (Appendix 2) show AWI sites and all other woodland as the mitigation and licensing requirements are the same for both during the GI works.

### **Protected Species**

The following species are protected by law and have all been recorded in the area of proposed GI works:

- Bats (*Pipistrellus pipistrellus*, *Pipistrellus pygmaeus*, *Pipistrellus nathusii*, *Myotis daubentonii*, *Myotis nattereri*, *Plecotus auritus*, *Nyctalus leisleri*);
- Otters (*Lutra lutra*);
- Water voles (*Arvicola terrestris*);
- Red squirrel (*Sciurus vulgaris*);
- Birds (numerous species);
- Badgers (*Meles meles*);
- Freshwater pearl mussel (*Margaritifera margaritifera*); and
- Water shrew (*Neomys fodiens*).

Detailed surveys of the route corridor were undertaken as part of the Stage 3 Environmental Impact Assessment for the AWPR proposal. Much of this survey information is provided in the AWPR Environmental Statement (Jacobs, 2007) and Additional Survey Reports for Breeding Birds and Bats (Jacobs, 2007). Summaries of the major findings are presented below. All information regarding sensitive species and

## **Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008**

habitats within the route corridor will be forwarded to the Ecological Clerk of Works, who will supervise implementation of the mitigation measures.

### **Bats**

All species of bats in the UK are fully protected under the Wildlife and Countryside Act (as amended) 1981 and their legal protection is strengthened by the Conservation Regulations (Natural Habitats & c.) 1994. This makes it an offence to intentionally kill, injure, disturb or take a bat or to intentionally or recklessly damage, destroy or obstruct access to their places or shelter. It is highly likely that there are bat populations in the area as suitable habitat (such as trees) is available.

In the Northern Leg, tree roosts were located in close proximity to the proposed GI works at North Kingswells Junction, at Parkhill Pumping Station in the Goval area and at Cranfield adjacent to the proposed junction. In addition, mature trees with roost potential were recorded in a number of the woodland areas and adjacent to the River Don.

In the Southern Leg, a bat roost was identified at Eastland House in Kingcausie Estate (which was also found to contain numerous trees with roost potential), a mixed bat roost in the International School in Milltimber and a roost in a tree in Fairley Home Farm Woods.

In the Fastlink, a bat roost was identified in farm buildings at Mains of Ury near the A90 and another is located at North Cookney Croft, Environmental Statement 2007 Additional Survey Report: Bats (Jacobs, 2007).

### **Otters**

Otters are fully protected under the Wildlife and Countryside Act 1981 (as amended) and their legal protection is strengthened by the Conservation Regulations (Natural Habitats & c.) 1994. The Act makes it an offence to intentionally kill, injure or trap an otter or be in possession of an otter or any part of one. It is also an offence to intentionally damage, destroy or obstruct access or disturb any otter shelter (holt or couch). Otter activity has been recorded throughout the route corridor; holts, couches and potential lying up sites adjacent to the proposed GI works have been identified at the River Don, Goval Burn, the River Dee, Kingcausie Burn, the Burn of Muchalls, the Burn of Elsick and Crossley Burn.

### **Water Voles**

Water voles are protected under the Wildlife and Countryside Act (as amended) 1981 and are a Biodiversity Action Plan (BAP) priority species due to their decline in recent years. Although there is much suitable habitat present for water voles, the presence of mink has restricted them from occupying most of the proposed route corridor. Within the route water vole were found only around Fishermyle in the Fastlink.

### **Red Squirrels**

Red squirrels are listed in the UK Biodiversity Action Plan and North East Scotland Local Biodiversity Action Plan as a priority species. They are fully protected under schedule 6 of the Wildlife and Countryside Act 1981 (as amended). The Act makes it an offence to intentionally kill, injure or trap a red squirrel or be in possession of a red squirrel or any part of one. It is also an offence to intentionally damage, destroy or obstruct access or disturb any red squirrel shelter (nest or drey).

The red squirrel's preferred habitat is mature coniferous woodland, although they can also be found in mixed and broadleaved woodland where tree species have smaller seeds.

## **Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008**

Red squirrels have been recorded throughout the route corridor. In the Northern Leg, red squirrels have been recorded in the Craibstone area, Kirkhill, Standingstones and Monument Woods, East Woodlands and Littlejohns Wood. In the Southern Leg, red squirrels have been recorded in Duff's Hill plantation, Cleanhill Wood and Kingcausie, Guttrie Hill Wood, Kingshill/Gairnhill Woods, woods adjacent to Fairley Home Farm. In the Fastlink, red squirrels have been recorded in Megray Wood only.

### **Birds**

All wild birds (including their nests and eggs) are protected under the Wildlife and Countryside Act 1981. A number of important bird populations have been recorded within the route corridor and their habitat must be protected. In particular Sites of Ornithological Value have been identified in Craibstone, Standingstones Wood, Bogenjoss, East Woodlands and Monument Wood, Red Moss (West), Lily/Corby Lochs and Cranfield. In the Southern Leg, Blue Hill, Haremoss, South Greenloaning, Cleanhill Wood and Blaikiewell Burn, the River Dee, Beanshill, East Silverburn and Auchlea Moss are Sites of Ornithological Value (SOVs). In the Fastlink, Limpet Burn, North and South Fishermyre, Cookney and Harecraig are all SOVs.

### **Badgers**

Badgers are known to be present across most of the route corridor area. Site survey by Jacobs and the contractor's Ecological Clerk of Works will provide information on the presence of badgers near proposed GI sites. Badgers are afforded full legal protection, under the Protection of Badgers Act (PBA) 1992. The PBA (1992) consolidates all previous legislation including the Badgers Act 1973 (as amended) and the Badgers (Further Protection) Act 1991. Under the PBA (1992), it is an offence to:

- wilfully kill, injure, take or attempt to kill, injure or take a badger;
- possess a dead badger or any part of a badger;
- cruelly ill-treat a badger;
- use badger tongs in the course of killing, taking or attempting to kill a badger;
- dig for a badger;
- sell or offer for sale or control any live badger;
- mark, tag or ring a badger; and
- interfere with a badger sett by:
  - damaging a sett or any part thereof;
  - destroying a sett;
  - obstructing access to a sett;
  - causing a dog to enter a sett; or
  - disturbing a badger while it occupies a sett.

### **Freshwater Pearl Mussels**

The freshwater pearl mussel is classed as Vulnerable on the International Union for the Conservation of Nature and Natural Resources/World Conservation Monitoring Centre Red Data List (IUCN/WCMC RDL). It is listed on Annexes II and IV of the EC Habitats Directive and Appendix II of the Bern Convention and is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981. Scotland is the remaining European stronghold for the mussel, supporting functional populations in over 50 rivers, mainly in the

Highlands. Within the route corridor only the River Dee supports freshwater pearl mussels.

### **Water Shrew**

The water shrew is the least abundant and least widespread of the British shrews, but it is not considered rare. In some areas, it has declined drastically in numbers due to the destruction of its habitat by the draining of waterways and wetlands, and pollution. The water shrew and its habitat are fully protected by Schedule 6 of the Wildlife and Countryside Act 1981 and listed on Appendix III of the Berne Convention. There is much suitable habitat in the route corridor including the banks of streams, rivers, ponds and drainage ditches, as well as reed-beds and fens.

### **Assessment of Impacts**

#### **Protected Species**

Without the application of appropriate mitigation, the proposed works have the potential to affect protected species and their habitat. Table 4.2 provides summary details of protected species habitats with potential for disturbance during the GI fieldwork and thus the potential for licensing requirements. Refer to the appropriate GI and Environmental Statement (Jacobs, 2007) Figures for locations of known roosts, holts, couches and setts. Woodland areas of importance to red squirrels and SOVs have not been included in the table as these have been described previously in this section. All works near to or within woodland should be in accordance with the Red Squirrel Method Statement, as enclosed in Appendix 11.

#### **Terrestrial Habitats**

Tree and scrub removal or disturbance to vegetation may be required for vehicles to gain access to some exploratory hole locations. These activities could potentially result in adverse impacts on protected species or permanent habitat loss.

#### **Aquatic Habitats**

Please refer to the Water environment section 4.3 for potential impacts of GI works and mitigation to be implemented in relation to waterbodies.

**Table 4.2: Geotechnical Works Located within Close Proximity of Known Areas of Ecological Importance**

Section	Species	Site Name	Exploratory Hole No.	Distance from Exploratory Hole	Licence Required?
Northern Leg	Badger	Monument wood, Main sett H1, outlier sett H4, disused setts (x2)	NL30, NL31	Approximately 30m	Pending ECoW check; possibly/move GI west/south (NL30) and futher north/south (NL31)
	Badger	East Woodlands, outlier sett H5	BHDK160, BHDK161	Approximately 30m	Pending ECoW check; possibly/move GI east/south

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Section	Species	Site Name	Exploratory Hole No.	Distance from Exploratory Hole	Licence Required?
	Badger	East Woodlands, outlier sett H6	BHDK157, BHDK158	Approximately 50m	No, check by ECoW
	Badger	Pitmedden, outlier sett I5	NL34	Approximately 20m	Pending ECoW check; possibly move further west/ south
	Bat	Parkhill Pumping Station, Goval (roost)	NLTP76	Approximately 50m	No
	Otter	Goval Burn Couch C3	NL55, NL56	Approximately 50m	No, assuming no works within 10m of Goval Burn
	Badger	Goval; subsidiary sett K2c	NL57	Approximately 50m	No, check by ECoW
	Bat	Cranfield (roost)	NLTP126, NLTP125,	Approximately 50m	No
	Badger	Blackdog; outlier sett O6	NL77	Approximately 30m	Pending ECoW check; possibly move further north
Southern Leg	Badger	Merchants Croft; outlier setts I6, I7 & I8	TPCD091, BHCD052, BHCD053, TPCD094	30-50m	Pending ECoW check; unlikely
	Bat	Eastland House (roost)	TP1011	30m	No
	Otter	Kingcausie, potential holt H3	TPCD184, BHCD103	40m	Pending ECoW check; unlikely
	Otter	River Dee, couch C12	BHCD111	10m	Yes/move GI south 20m
	Freshwater Pearl Mussel	River Dee	BHCD111, BHCD110	30m	No
	Bat	Milltimber (roost)	BHCD20, TPDK027	50m	No
	Badger	Silverburn; outlier sett N3	TPDK102, TPDK106	50m	No, check by ECoW
	Bat	North Kingswells Junction (roost)	TPDK237	40m	No
	Badger	West Hatton; outlier sett R8	TPDK192, TPDK186, TPDK188, TPDK185	30m	Pending ECoW check; possibly/move GI east/north
Fastlink	Badger	Forester's Croft; outlier sett B2	FLP039	20m	Pending ECoW check; possibly/move GI north/west
	Badger	Forester's Croft, Main sett B1	FLBH24	50m	No, check by ECoW
	Otter	Burn of Muchalls (potential couch) C4	FLTP113	50m	Pending ECoW check; unlikely

**Aberdeen Western Peripheral Route  
Detailed Ground Investigation Environmental Report 2008**

Section	Species	Site Name	Exploratory Hole No.	Distance from Exploratory Hole	Licence Required?
	Otter	Crossley Burn (potential couch) C10	FLBH117	0m	Pending ECoW check to confirm however, considered unlikely

**Mitigation**

The following ecological mitigation measures will be implemented during the GI. The safeguards described in the Water Environment section of this document and the River Dee SAC Method Statement (Appendix 10) will also act as mitigation measures for aquatic habitat and species.

An Ecological Clerk of Works will also be on site full time to oversee the works on behalf of the Contractor. The Ecological Clerk of Works will have access to previous survey information and will undertake a survey of the immediate area before the GI fieldwork begins. The Client's Ecological Clerk of Works will be on site particularly in areas of greatest ecological sensitivity and will advise of any further mitigation measures required.

E 31 – GI works will be undertaken in compliance with the requirements of the Ecological Clerks of Works employed by the Client and the Contractor.

E 32 – The Engineer's Representative will be notified and provide a copy of the Schedule of Works to the Ecological Clerk of Works employed by the Client and the Contractor seven days prior to requiring their presence on site, and this information will be updated regularly.

E 33 – Where practicable, ensure that work compounds and access tracks, etc., are not located in, or adjacent to, areas of ecologically sensitive habitat.

E 34 - Establish site boundary markings and fence off environmentally sensitive areas out with the working corridor to safeguard features of interest/value, as identified by the Client's Ecological Clerk of Works.

E 35 - Cover pits and open pipes or provide mammal ramps to prevent animals falling in holes or excavations and becoming trapped if left open overnight.

E 36 - Prior approval is required for any site clearing works in conjunction with the Client appointed Ecological Clerk of Works who shall undertake advance flora and fauna surveys of access tracks and at exploratory hole locations.

E 37 - Tree clearance shall be kept to the minimum amount required and existing trees that do not require felling shall be protected by the Contractor's compliance with British Tree Standard 5837:2005 Trees in relation to construction - Recommendations. Should it be considered that tree clearance is required, the Contractor shall liaise with the Engineer's Representative to determine whether alternative exploratory hole positions can be scheduled or if exploratory hole positions can be deleted.

E 38 – Proposed access routes shall be of the shortest practicable length and constructed in the least environmentally damaging manner. Routes shall be agreed with landowners and jointly inspected by the Ecological Clerks of Works in advance of any GI related works.



E 39 – Tree removal and vegetation disturbance associated with GI works should avoid the bird breeding season (beginning of March – end of July) where possible. The Contractor shall liaise with the Client's Ecological Clerk of Works regarding the timing of tree removal or selection of another appropriate site. Where tree removal is required during the bird breeding season, a survey of each tree to be removed should be undertaken by the Client's Ecological Clerk of Works. See also E44, E45, E46, E49, E50 and E51.

E 40 – The Contractor shall provide the Engineer's Representative and the Client's Ecological Clerk of Works with a works programme detailing when work will be taking place in environmentally sensitive sites.

### **SAC, DWS**

E 41 – The Contractor shall notify the Dee District Salmon Fisheries Board, SNH, and SEPA at least 7 days in advance of any works in the vicinity of the River Dee.

E 42 – The River Dee SAC Work Method Statement (Appendix 10) shall be implemented by the Contractor. As noted in the Method Statement, should the Contractor propose any changes to the described method of working they will have to take consideration of the constraints imposed and environmental objectives to be met and agree this with the key stakeholders, the Dee District Salmon Fisheries Board, SNH, SEPA and the Engineer's Representative.

E 43 – The Contractor shall notify the Engineer's Representative's and the Client's Ecological Clerks of Works prior to when GI works are in, or in the vicinity of, areas designated as District Wildlife Sites.

### **Protected Species**

The Method Statement for Red Squirrel Dreys (Appendix 11) also forms part of the mitigation measures and shall be adhered to by the Contractor.

E 44 – The Contractor shall prevent damage to known bat roosts or potential bat roost sites identified. All trees to be felled shall be surveyed in advance by the Client's Ecological Clerk of Works to ascertain their potential as roosting habitats for bats.

E 45 – The Contractor shall ensure that trees to be felled which provide potentially suitable habitat for roosting bats, but which appear to show no signs of past/current occupation, shall be felled under the supervision of an experienced and licensed bat worker provided by the Engineer's Representative and, if possible, outside of the times when hibernating bats (November to March) or bats with dependent young (May through to August) may be present. The Contractor shall comply with the requirements of the experienced, licensed bat worker provided by the Engineer's Representative.

E 46 – The Contractor shall ensure that any GI works likely to cause disturbance or destruction (including tree felling) are not located within 50m from any identified potential badger setts, otter holts or couches or water vole habitat. Should works within 50m be necessary, the Contractor shall consult the Client's Ecological Clerk of Works and SNH, and obtain all necessary licence(s) from the Scottish Government.

E 47– Information regarding the locations of known or potential badger setts and otter holts shall be provided, in confidence, to the Contractor in order to ensure that they are not accidentally disturbed or destroyed during the GI.



## **Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008**

E 48 – Supervision and guidance on working near badger setts or otter territories shall be provided by the Client's Ecological Clerk of Works.

E 49 - Tree felling shall be avoided as far as possible from mid-December to mid-September (squirrel breeding season), in areas known to have red squirrels. See also E50, E51 and E53.

E 50 – There is to be no felling of trees known to have squirrel dreys.

E 51 – No GI works are to be carried out within 50m of trees known to have squirrel dreys.

E 52 – The Contractor shall appoint an Ecological Clerk of Works suitably experienced in red squirrels. The Ecological Clerk of Works shall be approved by the Client.

E 53 – The Contractor shall undertake a walkover survey, prior to the commencement of works, with the Engineer's Representative and Client's Ecological Clerk of Works in areas of potential red squirrel activity/ habitat, to identify possible effects and agree any mitigation measures required. Such measures may include, but will not be limited to, the relocation or deletion of exploratory hole positions from the contract.

E 54 – No work shall be carried out at night time near (within 100m of) watercourses known to support otters. Work will start no earlier than two hours after dawn and finish no later than two hours before dusk, between March and October (no earlier than 1 hour after dawn and finish no earlier than 1 hour before dusk during November to February), and will not continue for periods of more than 12 hours.

### **Woodland Areas**

E 55 – Only the Client's Ecological Clerk of Works shall spray mark trees identified for removal.

E 56 – Only individuals appropriately qualified in tree felling and clearance (i.e. with current Chain Saw Certificates) shall fell and remove trees identified in E54 above.

E 57 – The Contractor shall prepare a Method Statement on tree felling, removal and disposal of felled tree material for approval by the Client's Ecological Clerk of Works. This shall include a requirement to liaise with the Client's Ecological Clerk of Works on whether methods such as stump removal and coppicing are most appropriate for the site. The method for tree removal will be agreed with the Client's Ecological Clerk of Works and the landowner before work is carried out.

E 58 - Where considered necessary by the Client's Ecological Clerk of Works, appropriate protection such as padding may be utilised to protect trees from damage by vehicles.

E 59 - Where practicable, no materials or vehicles are to be parked within the dripline of tree canopies in accordance with British Tree Standard.

Refer to Section 4.4.3 for water environment mitigation measures E12 – E30.

### **Residual Impacts**

While there may be some unavoidable adverse effects resulting from GI works on features and species of ecological importance, these will be of very limited duration and provided that the mitigation measures proposed above are followed it is not anticipated that such effects will be significant.

## **4.5 Landscape and Visual**

No significant impacts on the landscape character or visual amenity are anticipated. However, mitigation measures E60, E61 and E62 (as listed in Appendix 4) are included to further reduce the potential for any impacts.

## **4.6 Cultural Heritage**

### **Baseline Conditions**

Preliminary archaeological assessments (refer to Section 6: References) comprising desk based assessments, site walkovers and detailed consultations have been undertaken by Jacobs archaeologists as part of the Environmental Assessment for the overall scheme. The following sources were consulted:

- Historic Scotland;
- Local Authority Archaeologist, Aberdeenshire Council;
- Local Authority Archaeologist, Aberdeen City Council;
- National Monuments Record of Scotland (NMRS);
- Aberdeen City Sites and Monuments Record;
- Aberdeenshire Sites and Monuments Record; and
- Online sources including Scottish Cultural Resources Access Network (SCRAN) and the National Library of Scotland (including Map Library).

Climatic improvements after the end of the last Ice Age enabled more extensive occupation by nomadic hunter-gatherer groups in the Mesolithic period (c.6000 BC to 4000 BC). Sites dating from this period are characterised by scatters of flint artefacts, such as those found during walkover surveys to the west of Peterculter. The Neolithic period (c.4000BC to c.2000BC) saw clearance of forested land for agriculture and the development of a more sedentary existence. Sites dating to this period identified within the vicinity of the GI works include cairns on the south-west slope of Cloghill and Cantlayhills Cairn.

The Bronze Age (c.2000BC to c.1400BC) saw the introduction of individual inhumations or cremations, the deposition of metalwork in wet areas and the construction of ritual monuments such as standing stones and stone circles. A possible ritual landscape dating to this period has been identified on Binghill, immediately North of Milltimber and extensive prehistoric remains have also been identified on Beans Hill.

Few sites dating to the Roman period have been identified in the area. Known sites in the area include casual finds of single artefacts or hoards of coins, an inscribed stone and the postulated line of a road from Menmuir to Aberdeen via Stonehaven.

Sites dating to the Medieval period are also poorly represented. Known sites include ridge and furrow ploughing (a practice beginning in the medieval period and continuing into the 18th century), the remains of a Norman motte on Camp Hill, a possible deserted medieval village at Cowie and a single shard of pottery.

The cultural heritage of the area is dominated by post-medieval and more modern sites. The vast majority of sites are buildings or agricultural features (consumption dykes, stone walls, clearance cairns) or sites related to extractive industries (quarries and sand pits). Structures relating to improvements in the transport infrastructure such as turnpike roads and railways are also found in the area.

# Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

## Assessment of Impacts

Sites of cultural heritage importance located within 25m of proposed GI works are shown in Table 4.3.

**Table 4.3: Geotechnical Works Located within 25m of Archaeological Sites**

Cultural Heritage Site No.	Site Name	Importance	Exploratory Hole No.
8	Hill Of Megray, Earthwork	Regional	FLTP043, FLBH23, FLTP045, FLTP041, FLBH22, FLTP040, FLTP038, FLTP037, FLTP039, FLBH24
23	Moss of Cowie Bronze Sword	Local	FLTP073
24	Hillocks, Graves	Local	FLTP073,
67	Red Moss Wetland	Local	FLTP174, FLBH89, FLTP167
91	East Crossley Hut Circle	National	FLTP259
94	Wetshaw Croft (1)	Less than Local	FLTP272, FLBH129, FLTP276
97	Wetshaw Croft (2)	Local	FLTP276
119	Backburn Moss Wetland	Local	FLTP086, FLBH47, FLTP081, FLTP082, FLTP083, FLBH46, FLBH50, FLTP087, FLTP088, FLTP066, FLTP080, FLBH49, FLTP092, FLBH53, FLTP91, FLTP90, FLBH52, FLTP089, FLTP097, FLBH58, FLBH51, FLBH54, FLTP085, FLBH59, FLTP073, FLBH48, FLTP084, FLTP069, FLTP067, FLTP068, FLTP071, FLTP074, FLBH43, FLBH42, FLBH41, FLTP070, FLTP072, FLTP076, FLTP101, FLBH55, FLTP075, FLBH44, FLBH45, FLBH39, FLBH40, FLTP078, FLTP077, FLTP079, FLTP099
120	Burniehead Standing Stone	Less than Local	TPCD138
121	Blaikiewell, Cairns (1)	Local	TPCD150, TPCD150, BHCD081, BHCD080, TPCD153, TPCD154, BHCD082, BHCD084, BHCD083, FLTP298, FLTP299, TPCD151, BHCD079, TPCD152, BHCD084, BHCD078, BHCD079, FLTP299, TPCD151, BHCD083, BHCD078, BHCD082, TPCD154, TPCD153, BHCD081,  TPCD152, BHCD080, FLTP298
122	Burnhead Cropmark	Local	TPCD128, BHCD070, TPCD134, TPCD132, TPCD133, TPCD133, TPCD129
129	Auchintoul Croft	Local	BHCD040, TPCD083, BHCD039
145	Great South Road	Local	TPCD018, TPCD019, TPCD027
153	Hare Moss Wetland	Unknown	TPCD036, TPCD031, TPCD039, TPCD038, BHCD015, TPCD037, TPCD033, TPCD034, TPCD035, TPCD041, TPCD032, TPCD021, BHCD036, TPCD040, TPCD047, TPCD030, BHCD018, BHCD016, TPCD042, TPCD043, BHCD017, BHCD021, TPCD046, BHCD020, TPCD045, TPCD009, BHCD019, BHCD003, TPCD044, TPCD020, BHCD004, TPCD010, TPCD008, TPCD007, TPCD006, BHCD005, BHCD008, TPCD014, TPCD013, TPCD015,

**Aberdeen Western Peripheral Route  
Detailed Ground Investigation Environmental Report 2008**

Cultural Heritage Site No.	Site Name	Importance	Exploratory Hole No.
			TPCD016, TPCD025, TPCD011, TPCD029, TPCD019, TPCD027, TPCD017, TPCD026, TPCD024, TPCD028, TPCD020, BHCD009, BHCD006, TPCD018, BHCD011
156	Kingcausie House Designed Landscape	Regional	BHCD096, TPCD163, TPCD168, OS11-1, BHCD094, TPCD169, TPCD161, BHCD099, BHCD091, TPCD166, TPCD167, BHCD094, BHCD095, TPCD170, TPCD177, TPCD178, TPCD176, BHCD090, BHCD088, DS11, BHCD092, BHCD098, TPCD136, TPCD133, TPCD125, TPCD124, TPCD120, TPCD155, BHCD086, BHCD087, TPCD157, TPCD164, TPCD160, TPCD159, BHCD089, TPCD158, TPCD156, TPCD162, TPCD165, BHCD093, BHCD085, BHCD095, BHCD097, TPCD174, TPCD175, TPCD176, BHCD098, BHCD100, TPCD178, TPCD177, BHCD099, BHCD090, DS11, TPCD171, BHCD094, TPCD169, BHCD096, TPCD163, OS11-1, BHCD094, TPCD166, TPCD161, BHCD091, TPCD170, TPCD192, BHCD100, BHCD064, TPCD193, TPCD196, BHCD107, TPCD200, BHCD108, BHCD105, TPCD187, TPCD173, TPCD190, TPCD172, TPCD191, TPCD188, TPCD184, TPCD183, TPCD182, BHCD103, BHCD104, TPCD186, TPCD181, TPCD168, TPCD189, TPCD182, BHCD107, TPCD200, BHCD108, BHCD105, TPCD187, TPCD189, TPCD164, TPCD192, TPCD167, TPCD188, TPCD196, TPCD183, TPCD190, BHCD103, BHCD104, TPCD186, TPCD181, TPCD171, TPCD172, TPCD173, BHCD097, TPCD174, TPCD175, TPCD184, TPCD156, BHCD093, TPCD191, TPCD162, TPCD193, TPCD158, BHCD089, TPCD159, TPCD160, BHCD092, TPCD157, BHCD086, BHCD064, BHCD087, TPCD165, TPCD155, BHCD088, TPCD120, TPCD124, TPCD125, TPCD133, TPCD136, BHCD085
164	Greengate Boundary Stone	Less than Local	PS59
170	Parkhill Pumping Station	Regional	NLTP85, NL60A, DN5,
209	Charlestown Farmstead	Local	OS58-2
239	Waterside Enclosure	Regional	TPDK007
246	Deeside Railway	Local	BHDK012, TPDK021, TPDK022
257	Scottish North Eastern Railway	Local	TPA9004
273	Milltimber, Arrowhead (Findspot)	Local	TPDK007
286	Nether Beanshill Well	Less than Local	BHDK036
296	Aberdeenshire Canal	Regional	NL43
314	Red Moss	Local	NL67A, BHDK179, BHDK178, BHDK180, DN4, NL68, NL67B, NLTP110, BHDK177, NLTP111,

**Aberdeen Western Peripheral Route  
Detailed Ground Investigation Environmental Report 2008**

Cultural Heritage Site No.	Site Name	Importance	Exploratory Hole No.
			NLTP120, NLTP113, NLTP114, NL66, NLTP112, NLTP119, NLTP118, NLTP117, NLTP116, NL67, NLTP115, NLTP109
335	Area of Archaeological Potential	Unknown	NL50, NL45, NL46, NL48, NL47, NL49, NL51, NL53, NL52, NL54, NL55
347	Westfield Farm Flints	Regional	TPDK089
348	Aberdeen-Inverourie canal	Local	NL44
349	Beans Hill Rig (4)	Local	TPDK091, BHDK060, TPDK090, TPDK089, TPDK088, TPDK087
367	Upper Kirkton / Nether Kirkton Area of Archaeological Potential	Unknown	NL40A
411	Hill of Muchalls Battlefield	Local	FLBH52, FLBH54, FLBH53, FLTP107, FLTP91, FLTP90, FLTP092, FLTP089, FLTP097, FLTP095, FLBH59, FLTP093, FLTP094, FLBH58, FLTP103, FLBH55, FLBH61, FLTP106, FLBH56, FLTP104, FLBH57, FLTP096, FLTP099, FLBH60, FLTP102, FLTP100, FLTP101, FLTP098, FLTP105
429	Croft of Hatton	Less than Local	TPDK187
441	West Hatton Dyke (2)	Local	TPDK202
443	West Hatton Dyke (1)	Local	TPDK203, TPDK202
450	Denhead of Cloghill Dyke (3)	Local	TPDK209, BHDK123, TPDK209, BHDK122, TPDK208
451	Denhead of Cloghill Dyke (4)	Local	BHDK124
462	Cloghill – Consumption Dyke	Less than Local	TPDK217
490	Cowie Village (Site of?)	Local	FLTP016, FLTP006, FLTP021,
496	Sunnyside Field System	Local	DS4, TPCD061, TPCD062, OS4-2, OS4-1, BHCD031
497	Sunnyside Field Clearance	Less than Local	TPCD069
501	Ferniebrae Dyke	Less than Local	ELTP42
502	Whitestone Dyke	Less than Local	BHCD059, BHCD060, TPCD110
505	Blaikiewell Dyke	Less than Local	FLTP288
518	Kingcausie Shed	Less than Local	BHCD104
520	Nether Beanshill Dyke	Local	BHDK035, TPDK044, TPDK056

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Cultural Heritage Site No.	Site Name	Importance	Exploratory Hole No.
522	Silverburn bridge	Local	BHDK67, BHDK68, TPDK118, TPDK120

There is potential for GI works to have direct impacts on archaeological deposits associated with these sites. Measures to mitigate these potential impacts are outlined below.

### Mitigation

The concentration of known sites of cultural heritage importance in close proximity to the GI works indicates that the area has a high potential for the presence of unknown archaeological deposits. A watching brief on all GI locations will be undertaken to identify any archaeological deposits that may be uncovered. This has been agreed in consultation with Historic Scotland and the Regional Archaeologists for Aberdeenshire and Aberdeen City (refer to Appendix 9).

The Contractor must apply the following measures during the GI to mitigate the potential for direct impacts on known cultural heritage resources:

E 63– The locations of GI will be reviewed and potential impacts identified by the Client’s archaeologist.

E 64 – The Contractor shall liaise with the Client’s archaeologist in consultation with Historic Scotland on behalf of Transport Scotland in order to determine the location of Phase 2 work sites, temporary fencing requirements, and access restrictions prior to the commencement of works and in general to ensure the avoidance of damage to known sites of cultural heritage importance.

E 65 – The Contractor shall provide a detailed programme of works to the Client’s archaeologist at least 14 days in advance of carrying out intended works to ensure that all relevant GI works can be properly monitored by the Client’s archaeologist. At least 1 days notice to changes in this programme shall be provided thereafter.

E 66 – The mechanical excavation of GI sites shall be continuously monitored by the Client’s archaeologist. Where any remains are identified in the course of the watching brief, the Client’s archaeologist shall notify the Contractor and the Engineer’s Representative in charge of the geotechnical investigations and shall investigate and record the remains by the methodology set out below:

- Archaeological investigation and recording shall be undertaken in such a manner as to minimise the delay and disruption to the GI investigation. However, if necessary the archaeologist may instruct short suspensions of mechanical excavation, and may ask for backfilling to be delayed, to allow recording work to be undertaken.
- Where archaeological deposits of minor or unclear significance are identified, the GI investigation may continue to the full intended extent.
- Where any archaeological deposits uncovered are of greater significance, and in the judgement of the Client’s archaeologist the completion of the investigation would cause an unacceptable impact, the archaeologist may instruct the abandonment of the trial pit. It may be necessary to re-site GI locations subject to the approval of the Engineer’s Representative and agreement by the relevant landowner.
- Where there is any doubt or dispute about the need for this, the archaeologist shall seek advice from their project supervisor.

- All archaeological works will be undertaken in accordance with the requirements of the Institute of Field Archaeologists' Standard and Guidance on Archaeological Watching Briefs.

### **Residual Impacts**

With the effective implementation of the appropriate mitigation measures, no significant residual impacts on cultural heritage are anticipated as a result of the proposed works.

## **4.7 Air Quality**

### **Baseline Conditions**

Background levels of nitrogen dioxide and fine particles (PM10), which are the key traffic-related pollutants, have been defined using maps published by the National Air Quality Archive (NAQA) ([www.airquality.co.uk](http://www.airquality.co.uk)). Objectives for the concentrations of these pollutants are prescribed within the Air Quality (Scotland) Regulations 2000 and the Air Quality (Scotland) Amendment Regulations 2002.

The NAQA data indicates that away from busy roads, air quality in this area is good. Closer to roads, the concentrations of these pollutants might be elevated, but recent air quality review and assessment reports prepared by Aberdeen City Council (Updating and Screening Assessment of Air Quality in Aberdeen, August, 2003) and Aberdeenshire Council (Local Air Quality Management Progress Report, 2005) indicate that the objectives are unlikely to be exceeded except in Aberdeen City Centre.

Existing levels of dust in areas proposed for works will depend on local activities and the occurrence of dry weather, as well as other meteorological factors. There are likely to be occasional dust events related to, for example, local farming activities, but these are unlikely to be prolonged.

### **Assessment of Impacts**

The GI works will involve a small number of vehicles and their resultant exhaust emissions are expected to be negligible. There is the potential for dust to be generated as the exploratory holes are being drilled and investigated and as vehicles move along access routes to GI sites. Dust can cause a nuisance by soiling windows, cars and structures. Other receptors include footpath users and local residents. Close to dust sources, there is the potential for health impacts associated with PM10 and damage to particularly sensitive vegetation. As it is difficult to quantify dust emissions or to predict changes to dust soiling or PM10 concentrations with any confidence, it is common practice to provide a qualitative assessment based largely on experience elsewhere.

It is assumed that any receptors within 100m of a dust source may experience some dust soiling. Receptors within 25m of a dust source have an increased risk of dust soiling and PM10, although this is not to be taken as an indication of likelihood. Any dust incidents arising from GI works would be highly dependant on weather conditions such as prolonged dry spells and prevailing winds blowing in the direction of receptors. The proposed investigations would be of a short duration for each exploratory hole and are of a temporary nature. There may be short term localised impacts on dust levels, however no significant impacts on air quality are anticipated.



## **Mitigation**

The following mitigation measures will be implemented during the GI:

E 67 – In dry weather dust suppression measures shall be used as appropriate, such as watering of exposed excavated soils and access tracks.

E 68 – Vehicles and machinery shall be properly maintained and are not to be left idling when not in use.

## **Residual Impacts**

With the effective implementation of the appropriate mitigation measures, no significant residual impacts on air quality are anticipated.

## **4.8 Noise**

### **Baseline Conditions**

Existing background noise levels will vary from site to site. Areas predominantly rural in character would be expected to have low background noise levels. Existing noise levels are likely to be higher at locations dominated by road traffic, e.g. close to the B979, A93, A96, A944, A947 and A90.

### **Assessment of Impacts**

Noise will be generated from on-site operations, particularly when the casing for cable percussive boreholes is being driven into the ground as this will involve metal hitting off metal. The noise will, however, not be continuous.

Noise generated during the GI could have a temporary impact on noise sensitive locations, depending on several factors; including:

- distance of the sensitive location to noise source;
- ambient and background noise levels;
- ambient meteorological conditions; and
- frequency, duration and time of noise impact.

Noise generated by drilling or the operation of equipment is unavoidable but will be of short duration. Measured and predicted noise levels for properties at varying distances with the potential to be subjected to noise from the GI are shown in Table 4.4. Noise is not anticipated to cause an adverse impact on local ecology due to the short duration of the works and daytime operation.

Operation of the drilling equipment will generate minor and localised vibration. Due to the small diameter of the boreholes and drilling techniques that will be employed (rather than pile driven action) and short duration of the works, it is not anticipated that vibration levels during drilling will cause any adverse impact on adjacent terrestrial or aquatic ecological communities. Particular requirements for additional mitigation applicable to the River Dee SAC are given in Appendix 10.

There is low risk of potential impacts on local residents or surrounding buildings and infrastructure.



**Table 4.4: Predicted Noise Levels (L<sub>Aeq,T</sub>)**

Machinery used in GI	10m	20m	40m	80m
Cable Tool Boring Rig: Predicted Noise Level L <sub>Aeq,T</sub> (dB) (Defra update Ref Table 2 No 43)	68	62	56	50
Trial Excavator: Predicted Noise Level L <sub>Aeq,T</sub> (dB) Defra update Ref Table 2 No 8)	74	68	62	56
Boart Longyear Deltabase: 510 Predicted Noise Level L <sub>Aeq,T</sub> (dB) (Defra update Ref Table 2 No 44)	77	71	65	59
Dando 250 Boring Rig: Predicted Noise Level L <sub>Aeq,T</sub> (dB) (Defra update Ref Table 2 No 44)	77	71	65	59
All Plant Operating Simultaneously: Predicted Noise Level L <sub>Aeq,T</sub> (dB)	81.2	75.2	69.2	63.1

There will be impacts from noise generating operations throughout the works and this may potentially give rise to noise nuisance at nearby properties. Properties located within 10m, 20m, 40m and 80m are listed in Table 4.5 below. It is unlikely that GI activities would be operating simultaneously or for periods longer than 11 hours at a time, therefore cumulative noise level effects are anticipated to be relatively low.

**Table 4.5: Properties with 10m/20m/40m/80m**

Northern Leg	Southern Leg	Fastlink
<b>Properties within 10m</b>		
NU-LOOK WINDOWS, HAREBURN TERRACE, AB238BE		
<b>Properties within 20m</b>		
2 LOCHGREENS COTTAGES, AB217AS **	THE BEECHES, AB125YD ** ≠	
GOVAL VILLA, AB210HS **	BRACKENDALE, AB158QQ	
	ARDENLEA, AB158RT ≠	
<b>Properties within 40m</b>		
4 WALTON VIEW, AB219TL	CROFT HOUSE, CULTER HOUSE ROAD, AB130EP ≠	NORTH COOKNEY CROFT, AB393SB ** ≠
1 WALTON FARM COTTAGES, AB219TT	AONACHRIGH, AB158QQ	NORTH COOKNEY FARM, AB393SL
2 WALTON FARM COTTAGES, AB219TT	DENHEAD OF CLOGHILL, AB158SA	

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Northern Leg	Southern Leg	Fastlink
FARM HOUSE CRAIBSTONE, AB219TR	GRIANAN, AUCHLUNIES, AB125YA ** ≠	
EAST LODGE CRAIBSTONE, AB219SJ	LYTHEWOOD, AB158QQ	
BLACKDOG CROFT, BLACKDOG, AB238BT	GAIRN PARK, AB158QJ ≠	
1 HAREBURN ROAD, AB238AR	BENVIEW, AB158QQ ≠	
2 HAREBURN ROAD, AB238AR **	WESTHOLME, AB158RX ** ≠	
4 HAREBURN ROAD, AB238AR	EAST KINGSFORD, AB158QR	
STEPHENSON & KELLY, AB238YY	HEATHERKNOWE, AB125YA	
BLACKDOG HEIGHTS, AB238BT **		
3 HAREBURN ROAD, AB238AR		
LYNDMOOR, AB210HA **		
BUNGALOW, PARKHILL, AB217AJ		
SCHOOLHOUSE, PARKHILL, AB217AL		
<b>Properties within 80m</b>		
6 FORRIT BRAE, AB219SL	BOYNE VILLA, AB123LL	9 POLBARE CLOSE, AB393LG
10 FORRIT BRAE, AB219SL	LOCHINCH CROFT, AB123LL	7 POLBARE CLOSE, AB393LG
2 FORRIT BRAE, AB219SL	CHARLESTON, JULLANNVILLE, AB12 3LL	5 POLBARE CLOSE, AB393LG
4 FORRIT BRAE, AB219SL	EASTLAND COTTAGE, KINGCAUSIE, AB125FS ≠	3 POLBARE CLOSE, AB393LG
8 FORRIT BRAE, AB219SL	BURNHEAD, AB125YX	4 NEW MAINS OF URY COTTAGES, AB393QA
3 WALTON VIEW, AB219TL	BLAIR-CRYNOCH, AB125YX	5 NEW MAINS OF URY COTTAGES, AB393QA
2 WALTON VIEW, AB219TL	RED TILE LODGE, AB125YT	NEW MAINS OF URY FARMHOUSE, AB393QA
1 WALTON VIEW, AB219TL ** ≠	CLIANTHUS LODGE, AB125YT	11 POLBARE CLOSE, AB393LG
MILL OF CRAIBSTONE COTTAGE, AB219TS	DAMANSARA HEIGHTS, AB125YX	KEMPSTONE HILL, AB393QE ≠
VETERINARY SERVICES, SCOTTISH AGRICULTURAL COLLEGE, MILL OF CRAIBSTONE, AB219TB	8 BURNHEAD, AB125YX	ELRICK COTTAR HOUSE, AB393RU ≠

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Northern Leg	Southern Leg	Fastlink
GRAMPIAN SERVICE BROKERAGE LTD, MILL OF CRAIBSTONE, AB219TB	TARNS, AB125YX ≠	CURLEWS COTTAGE, AB393RU
SIGEN POWER CELLS, THE ANNEXE, MILL OF CRAIBSTONE, AB219TB	BURNHEAD COTTAGE, AB125YX ** ≠	HOMEWOOD COOKNEY, AB393SL
MILL OF CRAIBSTONE HOUSE, AB219TS	DALMOINE, AB125YX	MEADOWBANK, AB393SD
8 CRAIBSTONE FARM COTTAGES, AB219TR **	WHITESTONES, AB125YT	
7 CRAIBSTONE FARM COTTAGES, AB219TR	SUNNYSIDE AUCHLUNIES COTTAGE, AB125YA **	
3 CRAIBSTONE FARM COTTAGES, AB219TR	BIRKEN BRAES, AB125XT	
5 CRAIBSTONE FARM COTTAGES, AB219TR	RYLANDS, AB12 5YD	
4 CRAIBSTONE FARM COTTAGES, AB219TR	69B CULTER HOUSE ROAD, AB130EP ** ≠	
6 CRAIBSTONE FARM COTTAGES, AB219TR	69A CULTER HOUSE ROAD, AB130EP ** ≠	
2 CRAIBSTONE FARM COTTAGES, AB219TR	AIRYPARK COTTAGE, AB130ER	
CENTRE FOR RURAL BUILDING, AB219TR	LITTLE AIRYPARK COTTAGE, AB130ER	
2 WESTER HATTON COTTAGES, AB238YY	HILLVIEW HOUSE, CONTLAW ROAD, AB130EL	
1 WESTER HATTON COTTAGES, AB238YY	1 HILL FARM, AB130ET	
6B HAREBURN ROAD, AB238AR	2 HILL FARM, AB130ET ≠	
6A HAREBURN ROAD, AB238AR	TIGH-NA-BRUAICH, AB158QQ ** ≠	
CRANFIELD FARM, AB238NR	BLACKTOP, AB158QY	
THE GABLES, AB238BT	BROOMHILL, AB158QL ≠	
SANDY BRUCE TRUCKING LTD UNIT C, BLACKDOG CENTRE, AB238BT	BROOMWOOD, AB158QL	
JOHN GILBERT TRANSPORT TRAINING, BLACKDOG CENTRE, AB238BT	PINEVIEW, AB158RT	
ROSEDEN, BLACKDOG, AB238BT	HILLVIEW, AB158SL	
7 HAREBURN ROAD, AB238AR	THE STEADINGS, WOODSIDE OF CLOGHILL, AB158SA	
5A HAREBURN ROAD, AB238AR	THE COACHHOUSE, CLOGHILL, AB158SA	

**Aberdeen Western Peripheral Route  
Detailed Ground Investigation Environmental Report 2008**

Northern Leg	Southern Leg	Fastlink
5B HAREBURN ROAD, AB238AR	HIGHFIELD, AB158RX	
BIRCHVILLE, CORSEHILL, AB217XA **	THE CORNER COTTAGE, AB158RX	
WESTACRE, AB217AS	BRODIACH COTTAGE, AB158RT	
CLEWISTON, AB217AS	BONVISTA, CLOGHILL, AB158SA	
CAPALABA, MOSS BELT, AB217AS **		
ROWAN VILLA, AB217AS		
MOSS BELT, AB217AS		
NAURCRIS, AB210EY **		
1 GOVAL COTTAGE, AB210HS		
2 GOVAL COTTAGE, AB210HS		
PARKHILL COTTAGE, PARKHILL PUMPING STATION, AB210HQ ** ≠		
STATION HOUSE, PARKHILL, AB217AJ		
PARKHILL SAWMILL, AB217AL		
KINNAIRD, PARKHILL, AB217AL		
4 LITTLE GOVAL COTTAGES, PARKHILL, AB217AL		
BURNSIDE, PARKHILL, AB217AL		
1 LITTLE GOVAL COTTAGES, PARKHILL, AB217AL **		
3 LITTLE GOVAL COTTAGES, PARKHILL, AB217AL		
2 LITTLE GOVAL COTTAGES, PARKHILL, AB217AL		
BEECH COTTAGE, PARKHILL, AB217AL		

≠ Baseline measurements

\*\* Sample receptor property

## **Mitigation**

There are no accepted criteria for noise generated from construction. The following mitigation measures will be implemented during the GI:

E 69 - The Contractor shall follow any requirements in relation to construction noise specified in the Contract Documents or by Aberdeen City or Aberdeenshire Councils where appropriate.

E 70 - The Contractor shall operate within working hours as specified in the Contract and adhere to the guidance contained with BS 5228 Noise and Vibration control on Construction and Open Sites, British Standards Institute : Part 1: 1997 (with Amendment 1) (ISBN 0 580 26845 4).

## **Residual Impacts**

With the effective implementation of the appropriate mitigation measures, no significant residual impacts on noise are anticipated.

## **4.9 Plans and Policies**

### **Baseline Conditions**

The GI is not subject to planning permission. However, consultations were undertaken with the planning authorities of Aberdeen City Council and Aberdeenshire Council to identify any sensitive areas they would wish the Contractor to avoid. In identifying these and other potential areas important to planning issues, a review has been undertaken of the relevant development plans.

Development plan coverage for the route corridor is provided by the following plans and policies:

- North East Scotland Together (NEST) Aberdeen and Aberdeenshire Structure Plan 2001 – 2016;
- Adopted Aberdeenshire Local Plan (2006);and
- The Finalised Aberdeen Local Plan – Green Spaces – New Places (2004).

### **Assessment of Impacts**

Policies and proposals which could be affected by the GI are listed in Appendix 7 and include those relating to the:

- protection of the general environment;
- protection of sites of nature conservation importance; and
- protection of sites of archaeological or historic interest.

No significant impacts are envisaged, as important sites will either be unaffected or avoided and sensitive areas of land reinstated.

## **Mitigation**

Mitigation for environmental impacts, including those on nature conservation and archaeology, are listed under specific topic heading elsewhere in this report.

## **Residual Impacts**

With the effective implementation of the appropriate mitigation measures, no significant residual impacts on plans and policies are anticipated.

### **4.10 Traffic and Access**

#### **Baseline Conditions**

The main roads in the GI corridor are:

- B979;
- B9077.
- A90;
- A93;
- A944;
- A96, and
- A947.

In addition to these main roads, there are numerous local roads across the GI works corridor.

#### **Assessment of Impacts**

Potential impacts associated with the accessing sites for the GI are

- traffic and heavy vehicles to and from borehole locations
- disruption to roads due to GI works and associated traffic management

It is anticipated that there will be minimal overall traffic generation during the GI fieldwork at each site associated with vehicular movements to and from the site. Large vehicles will be required initially to deliver temporary office cabins, containers and plant. During the works vehicles will be moving around the site on a daily basis to move drilling crews and supervision staff to work areas. Traffic management may also be required occasionally where road cores are required, there is limited access to a field or where borehole locations are adjacent to roads.

#### **Mitigation**

The following mitigation measures will be implemented during the GI:

E 71 - Where possible, the Contractor will utilise existing roads, tracks and field boundaries to access exploratory hole location sites.

E 72 – The Contractor shall liaise with the Landowners, Client's Ecological Clerk of Works and the Engineer's Representative to discuss and agree particular requirements with regard to access and reinstatement.

#### **Residual Impacts**

With the effective implementation of the appropriate mitigation measures, no significant residual impacts on traffic and access are anticipated.

#### **4.11 Conclusion of Environmental Impacts**

The overall residual impact to the environment from the ground investigation works described in section 2 and associated site access is not anticipated to be significant, provided that appropriate mitigation measures are implemented and adhered to.



## **5 References**

Aberdeen City Council (2004) The Finalised Aberdeen Local Plan – Green Spaces – New Places.

Aberdeen City Council (2003) Updating and Screening Assessment of Air Quality in Aberdeen.

Aberdeenshire Council (2005) Local Air Quality Management Progress Report.

Aberdeenshire Council (2006) Adopted Aberdeenshire Local Plan.

Babtie Group (2004) Aberdeen Western Peripheral Route Ground Investigation Environmental Report.

British Standards Institute (1997) BS 5228: Noise and Vibration control on Construction and Open Sites Part 1 (with Amendment 1), ISBN 0 580 26845 4.

British Standards Institute British Tree Standard 5837:2005 Trees in relation to construction recommendations, ISBN 0 580 46418 0

Highways Agency (2002) Design Manual for Roads and Bridges, Volume 11 (Section 3 Part 2: Cultural Heritage).

Historic Scotland (1996) Memorandum of Guidance on Listed Buildings and Conservation Areas.

Institute of Field Archaeologists (1994) Standard and Guidance on Archaeological Desk-Based Assessments.

Jacobs (August 2007) Aberdeen Western Peripheral Route Environmental Statement.

Jacobs (October 2007) Aberdeen Western Peripheral Route Environmental Statement 2007 Additional Survey Report: Bats

Jacobs (October 2007) Aberdeen Western Peripheral Route Environmental Statement 2007 Additional Survey Report: Breeding Birds

Jacobs Babtie (May 2006) Aberdeen Western Peripheral Route Southern Leg and Fastlink, Preliminary Ground Investigation Environmental Report.

Jacobs Babtie (October 2006) Aberdeen Western Peripheral Route Southern Leg and Fastlink, Preliminary Ground Investigation (Phase 2) Environmental Report.

North East Scotland Together (NEST) Aberdeen and Aberdeenshire Structure Plan 2001 – 2016, Aberdeen City Council and Aberdeenshire Council.

Scottish Office (1994b).Policy Advice Note (PAN) 42: Archaeology – The Planning Process and Scheduled Monuments Procedures

Scottish Office (1999) National Planning Policy Guideline (NPPG) 18: Planning and the Historic Environment.

## **Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008**

Scottish Office (1994a) National Planning Policy Guideline (NPPG 5): Archaeology and Planning.

SEPA, The Environmental Agency, Environment and Heritage Service, Pollution Prevention Guidelines 5 (PPG) 5: Works in, near or liable to affect Watercourses

SEPA (2006) The Water Environmental (Controlled Activities) (Scotland) Regulations 2005: A Practical Guide.

**Appendix 1**

**Contract Drawings (Exploratory Hole Locations Plans)**

## Appendix 2

### Environmental Constraints Drawings

## Appendix 3

**Map showing River Dee SAC Boundary**

## Appendix 4

### Schedule of Environmental Mitigation Measures

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Mitigation Item No.	Mitigation Measure	Timing of Mitigation Measure	Approvals and Additional Consultation Required
<b>Land Use</b>			
E1	Minimise site disturbance to the most practicable extent possible.	Prior to, during and post works	
E2	Contractors working on agricultural properties shall follow the Scottish Executive's Codes of Recommendations for the Welfare of Livestock, Animal Health and Biosecurity (2002). Ensure that all vehicles, trailers, machinery and equipment have been cleansed and disinfected before going onto and upon leaving farm properties.	Prior to, during and post works	
E3	Contractors vehicle movements should avoid as far as possible contact with farm livestock, and where livestock are encountered restrict movement to speeds which avoid stressing the animals.	Prior to, during and post works	
E4	All livestock should be removed from fields in which GI work is being undertaken by the landowner, and Contractors should take all steps necessary to avoid livestock straying (e.g. comply with farm etiquette, close all gates and comply with access good practice). Compensation may be payable to landowners in instances where undue disturbance and damage has been caused by Contractors.	Prior to and during works	Liaison with landowners
E5	Any tree felling conducted in order to clear sites for GI or to gain access to GI locations should be avoided as far as possible.	Prior to and during works	
E6	Existing access tracks should be used where ever possible:	Prior to works	Felling licences from Forestry Commission
E7	Where tree felling is unavoidable, Contractors shall check as to whether a felling licence is required, and if so shall obtain one from the Forestry Commission	During works	
<b>Soils</b>			
E8	Minimise the amount of exposed ground and the stockpiles of excavated material.	During works	
E9	Divert runoff around stockpiles of excavated material; cover stockpiles to prevent dust generation or sediment in runoff as required.	During works	
E10	Appropriate measures will be put in place to minimise sediment laden runoff from GI sites where required. These will include visqueen sheeting, sand bags, straw bales and grass filter strips.	During and post works	
E11	During excavation, turf shall be stripped in grass areas, topsoil and sub-soil layers shall be removed and stored in separate stockpiles and used in site restoration works	During and post works	Approval by Client's Ecological Clerk of Works
<b>Water Environment</b>			



## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Mitigation Item No.	Mitigation Measure	Timing of Mitigation Measure	Approvals and Additional Consultation Required
E12	The Contractor will be required to comply with the requirements of the Water Environment (Controlled Activities) (Scotland) Regulations 2005 and SEPA Guidance Notes PPG1 & PPG5 (General Guide to the Prevention of Water Pollution & Guidelines for works in, near or liable to affect watercourses) and will discuss with SEPA any specific guidance or requirement concerning operations and protection of the water environment.	Prior to and during works	Liaison with SEPA
E13	An environmental management action plan/work Method Statement will need be drawn up by the GI contractor to deal with any incident with the potential to adversely affect the water environment. The plan should include a list of key internal and external contacts, including the regulatory authorities, and clearly set out reporting procedures and the management actions to be undertaken if a potential pollution incident occurs. The plan should set out emergency response procedures, and include maps showing the location of site drainage, storage areas and spill kits/emergency equipment etc.	During works	Notify Engineer's Representative, Client's Ecological Clerk of Works and SEPA.
E 14	The Contractor shall not proceed with works adjacent to Limpet Burn if the ground conditions are found to be waterlogged, as identified by the Client's Ecological Clerk of Works.	Prior to and during works	Approval by Client's Ecological Clerk of Works
E15	The Contractor shall prevent as far as possible any soil erosion and siltation of waterbodies, as well as pollution of water, where this may adversely affect ecological quality or cause obstruction or interference with water flow.	During works	
E16	The Contractor shall prevent any interference with the supply to or abstraction from underground water resources (including percolating water), and shall prevent any pollution of ground water arising from GI activities..	During works	
E17	Work Method Statements shall include emergency procedures to intercept any spillages and mobilise resources quickly and notify all relevant parties, including SEPA if appropriate, immediately so that pollution prevention measures can be put in place. The Engineer's Representative shall approve all Method Statements.	Prior to and during works	Approval by Engineer's Representative
E18	Method Statements for erosion and sediment control shall be provided by the Contractor and approved by the Engineer's Representative, which shall detail <i>inter alia</i> the methodology for crossing burns, ditches, the disposal of drilling wastewater and emergency procedure should drilling works hit a confined aquifer.	Prior to and during works	Liaison with Engineer's Representative, SEPA and Client's Ecological Clerk of Works
E19	The Contractor shall ensure water	During works	

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Mitigation Item No.	Mitigation Measure	Timing of Mitigation Measure	Approvals and Additional Consultation Required
	abstraction from watercourses will not exceed 10m <sup>3</sup> per day.		
E20	The Contractor shall ensure any imported water used in drilling operations shall not exceed the following levels of pollutants: Chlorine – 2ug/L , Ammonia (unionized) – 15ug/L, and shall ensure any such water is not discharged directly to waterbodies. The Contractor shall sample and test potable water supplies in advance of extracting water from them. Test results shall be provided to the Engineer's Representative for acceptance.	During works	Approval by Engineer's Representative
E21	If ground water extracted for GI purposes (e.g. pumping tests) results in a drop in yield for any private water supply, Contractors shall ensure an alternative water supply of sufficient quality and quantity (including the importation and delivery of clean potable water) to meet reasonable domestic needs is provided for the duration of testing and until groundwater yields have fully recovered.	During works	
<b>Working near Waterbodies</b>			
E22	Other than for access purposes, the Contractor shall maintain a minimum buffer zone of 10m from any rivers, burns, waterways, drains, lochs or other waterbodies. No site works, plant or vehicles shall be permitted within this distance. The Ecological Clerk of Works may specify an extension of this buffer zone to 30m, depending on the sensitivity of nearby ecological communities. Where it is not possible to maintain a 10m buffer zone (e.g. Limpet Burn), an Ecological Clerk of Works will be present to oversee the works and to ensure that necessary mitigation measures are in place before works commence (e.g. sediment control measures).		
E23	No material will be stockpiled within 10m of any waterbodies.	During works	
E24	GI works adjacent to waterbodies should be accessed, as far as possible, along a perpendicular route to the watercourse and avoiding movement within a 10m riparian margin	Prior to and during works	
E25	Where possible, vehicle access to GI sites shall utilise existing bridge crossings to limit impacts on the banks, edges, beds or any other parts of waterbodies.	Prior to and during works	
E26	Should access to borehole locations require the crossing of waterbodies (either through water or via temporary access platforms), the Contractor shall be required to agree the crossing method with the Client's Ecological Clerk of Works and provide Method Statements if requested and limit crossings within waterbodies to the same	Prior to and during works	Liaison with Client's Ecological Clerk of Works and Dee District Salmon Fisheries Board

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Mitigation Item No.	Mitigation Measure	Timing of Mitigation Measure	Approvals and Additional Consultation Required
	point or path for all vehicles. The Method Statements should comply with the General Binding Rules (GBRs), as implemented by the Water Environment (Controlled Activities) (Scotland) Regulations 2005. The Dee District Fisheries Board should be consulted in relation to works affecting salmonid watercourses.		
E27	Runoff from the site must not be discharged directly to nearby/adjacent waterbodies. Settlement ponds/sumps, sediment/filter fences or other method approved by the Engineer's Representative and Client's Ecological Clerk of Works must be used to protect all waters.	During works	Approval by Engineer's Representative and Client's Ecological Clerk of Works.
E28	Working on wet ground should be avoided where possible. Should it be considered necessary to carry out work on a wet area, geotextile matting and lighter vehicles shall be used to minimise ground disturbance and damage to soils. A Method Statement shall be provided by the Contractor and approved by the Engineer's Representative.	During works	Approval by Engineer's Representative.
E29	The Contractor shall not disturb the bed or banks of the watercourse during extraction of water from waterbodies.	During works	
E30	Potential impacts on water quality will be mitigated through adherence to good site practices including transportation and storage of materials in sealed, and where required, bunded containers.	During works	
<b>Ecology &amp; Nature Conservation</b>			
E31	GI works will be undertaken in compliance with the requirements of the Ecological Clerks of Works employed by the Client and the Contractor.	Prior to, during and post works	
E32	The Engineer's Representative will be notified and provide a copy of the Schedule of Works to the Ecological Clerk of Works employed by the Client and the Contractor seven days prior to requiring their presence on site, and this information will be updated regularly.	Prior to, during and post works	
E33	Where practicable, ensure that work compounds and access tracks, etc., are not located in, or adjacent to, areas of ecologically sensitive habitat.	Prior to, during and post works	
E34	Establish site boundary markings and fence off environmentally sensitive areas out with the working corridor to safeguard features of interest/value, as identified by the Client's Ecological Clerk of Works.	Prior to and during works	Liaison with Client's Ecological Clerk of Works
E35	Cover pits and open pipes or provide mammal ramps to prevent animals falling in holes or excavations and becoming trapped if left open overnight.	During works	
E36	Prior approval is required for any site	Prior to and	Landowner approval prior to

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Mitigation Item No.	Mitigation Measure	Timing of Mitigation Measure	Approvals and Additional Consultation Required
	clearing works in conjunction with the Client appointed Ecological Clerk of Works who shall undertake advance flora and fauna surveys of access tracks and at exploratory hole locations.	during works	any clearance works
E37	Tree clearance shall be kept to the minimum amount required and existing trees that do not require felling shall be protected by the Contractor's compliance with British Tree Standard 5837:2005 Trees in relation to construction recommendations. Should it be considered that tree clearance is required, the Contractor shall liaise with the Engineer's Representative to determine whether alternative exploratory hole positions can be scheduled or if exploratory hole positions can be deleted.	Prior to and during works	Landowner approval prior to any tree clearance works
E38	Proposed access routes shall be of the shortest practicable length and constructed in the least environmentally damaging manner. Routes shall be agreed with landowners and jointly inspected by the Ecological Clerks of Works in advance of any GI related works.	Prior to and during works	Approval by Ecological Clerk of works (Client's and Contractor's)
E39	Tree removal and vegetation disturbance associated with GI works should avoid the bird breeding season (beginning of March – end of July) where possible. The Contractor shall liaise with the Client's Ecological Clerk of Works regarding the timing of tree removal or selection of another appropriate site. Where tree removal is required during the bird breeding season, a survey of each tree to be removed should be undertaken by the Client's Ecological Clerk of Works. See also E44, E45, E46, E49, E50 and E51.	Prior to and during works	Approval by Client's Ecological Clerk of works
E40	The Contractor shall provide the Engineer's Representative and the Client's Ecological Clerk of Works with a works programme detailing when work will be taking place in environmentally sensitive sites.	Prior to and during works	Liaise with the Engineer's Representative and the Client's Ecological Clerk of Works
<b>SAC/DWS</b>			
E41	The Contractor shall notify the Dee District Salmon Fisheries Board, SNH, and SEPA at least 7 days in advance of any works in the vicinity of the River Dee.	Prior to and during works	Notify the Dee District Salmon Fisheries Board, SNH, and SEPA
E42	The River Dee SAC Work Method Statement (Appendix 10) shall be implemented by the Contractor. As noted in the Method Statement, should the Contractor propose any changes to the described method of working they will have to take consideration of the constraints imposed and environmental objectives to be met and agree this with the key stakeholders, the Dee District Salmon Fisheries Board, SNH, SEPA and the Engineer's Representative.	During works	

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Mitigation Item No.	Mitigation Measure	Timing of Mitigation Measure	Approvals and Additional Consultation Required
E43	The Contractor shall notify the Engineer's Representative and the Client's Ecological Clerks of Works prior to when GI works are in, or in the vicinity of, areas designated as District Wildlife Sites.	Prior to and during works	Notify Client's Ecological Clerk of Works
Protected Species (Refer to Appendix 11 Method Statement for Red Squirrel Dreys)			
E44	The Contractor shall prevent damage to known bat roosts or potential bat roost sites identified. All trees to be felled shall be surveyed in advance by the Client's Ecological Clerk of Works to ascertain their potential as roosting habitats for bats.	Prior to and during works	Approval by Client's Ecological Clerk of Works
E45	Ensure that trees requiring to be felled with potentially suitable conditions for roosting bats but which appear to show no positive signs of past/current occupation shall be felled under the supervision of an experienced, licensed bat worker provided by the Engineer's Representative and, if possible, outside of the times when hibernating bats (November to March) or bats with dependent young (May through to August) may be present. The Contractor shall comply with the requirements of the experienced, licensed bat worker provided by the Engineer's Representative.	Prior to and during works	Liaise with Client's Ecological Clerk of Works and licensed bat worker
E46	The Contractor shall ensure that any GI works likely to cause disturbance or destruction (including tree felling) are not located within 50m from any identified potential badger setts, otter holts or water vole habitat. Should works within 50m be necessary, the Contractor shall consult the Client's Ecological Clerk of Works and SNH, and obtain all necessary licence(s) from the Scottish Government.	Prior to and during works	Liaise with Client's Ecological Clerk of Works and SNH
E47	Information regarding the locations of known or potential badger setts and otter holts shall be provided, in confidence, to the Contractor in order to ensure that they are not accidentally disturbed or destroyed during the GI.	Prior to and during works	Liaise with Client's Ecological Clerk of Works
E48	Supervision and guidance on working near badger setts or otter territories shall be provided by the Client's Ecological Clerk of Works.	Prior to and during works	Liaise with Client's Ecological Clerk of Works
E49	Tree felling shall be avoided as far as possible from mid-December to mid-September (squirrel breeding season), in areas known to have red squirrels. See also E50, E51 and E53	Prior to and during works	Approval by Client's Ecological Clerk of Works
E50	No felling of trees known to have squirrel dreys.	Prior to and during works	Approval by Client's Ecological Clerk of Works
E51	No GI works to be carried out within 50m of trees known to have squirrel dreys.	Prior to and during works	Approval by Client's Ecological Clerk of Works
E52	The Contractor shall appoint an Ecological Clerk of Works suitably experienced in red squirrels. The Ecological Clerk of Works	Prior to works	Approval by Client

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Mitigation Item No.	Mitigation Measure	Timing of Mitigation Measure	Approvals and Additional Consultation Required
	shall be approved by the Client.		
E53	The Contractor shall undertake a walkover survey with the Engineer's Representative and Client's Ecological Clerk of Works in areas of potential red squirrel activity/habitat, to review exploratory hole positions and agree any mitigation measures required. Such measures may include, but will not be limited to, the relocation or deletion of exploratory hole positions from the contract.	Prior to and during works	Liaise with Client's Ecological Clerk of Works
E54	No work shall be carried out at night time near (within 100m of) watercourses known to support otters. Work will start no earlier than two hours after dawn and finish no later than two hours before dusk, between March and October (no earlier than 1 hour after dawn and finish no earlier than 1 hour before dusk during November to February), and will not continue for periods of more than 12 hours.	Prior to and during works	Liaise with Client's Ecological Clerk of Works
<b>Woodland Areas</b>			
E55	Only the Client's Ecological Clerk of Works shall spray mark trees for removal.	Prior to, during and post works	Approval by Client's Ecological Clerk of Works
E56	Only individuals appropriately qualified in tree felling and clearance (i.e. with current Chain Saw Certificates) shall fell and remove trees identified in E54 above.	Prior to and during works	
E57	The Contractor shall prepare a Method Statement on tree felling, removal and disposal of felled tree material for approval by the Client's Ecological Clerk of Works. This shall include a requirement to liaise with the Client's Ecological Clerk of Works on whether methods such as stump removal and coppicing are most appropriate for the site. The method for tree removal will be agreed with the Client's Ecological Clerk of Works and the landowner before work is carried out.	Prior to, during and post works	Approval by Client's Ecological Clerk of Works and landowner
E58	Where considered necessary by the Client's Ecological Clerk of Works, appropriate protection, such as padding, may be utilised to protect important trees from damage by vehicles.	Prior to and during works	Liaise with Client's Ecological Clerk of Works
E59	Where practicable, no materials or vehicles are to be parked within the dripline of tree canopies.	Prior to, during and post works	
<b>Landscape &amp; Visual</b>			
E60	Pits or boreholes shall be backfilled as soon as work has been completed.	Post works	Approval by Client's Ecological Clerk of Works
E61	Sites are to be restored as close as possible to original condition.	Post works	Approval by Client's Ecological Clerk of Works
E62	A terrestrial photographic condition survey of the access routes shall be undertaken by the Contractor prior to and after the	Prior to, during and post works.	

## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Mitigation Item No.	Mitigation Measure	Timing of Mitigation Measure	Approvals and Additional Consultation Required
	investigation. The photographic survey shall be of a sufficient detail and coverage such that any surface disturbance at exploratory boreholes and along access tracks can be clearly identified on both pre and post construction photographs.		
<b>Cultural Heritage</b>			
E63	The locations of GI will be reviewed and potential impacts identified by the Client's archaeologist.	Prior to works	
E64	The Contractor shall liaise with the Client's archaeologist in consultation with Historic Scotland on behalf of Transport Scotland in order to determine the location of Phase 2 work sites, temporary fencing requirements, and access restrictions prior to the commencement of works and in general to ensure the avoidance of damage to known sites of cultural heritage importance.	Prior to and during works	Liaison with Client's archaeologist (in consultation with Historic Scotland)
E65	The Contractor shall provide a detailed programme of works to the Client's archaeologist at least 14 days in advance of carrying out intended works to ensure that all relevant GI works can be properly monitored by the Client's archaeologist. At least 1 days notice to changes in this programme shall be provided thereafter	Prior to works	
E66	<p>The mechanical excavation of GI sites shall be continuously monitored by the Client's archaeologist. Where any remains are identified in the course of the watching brief, the Client's archaeologist shall notify the Contractor and the Engineer's Representative in charge of the geotechnical investigations and shall investigate and record the remains by the methodology set out below:</p> <p>Archaeological investigation and recording shall be undertaken in such a manner as to minimise the delay and disruption to the GI investigation. However, if necessary the archaeologist may instruct short suspensions of mechanical excavation, and may ask for backfilling to be delayed, to allow recording work to be undertaken.</p> <p>Where archaeological deposits of minor or unclear significance are identified, the GI investigation may continue to the full intended extent.</p> <p>Where any archaeological deposits uncovered are of greater significance, and in the judgement of the Client's archaeologist the completion of the investigation would cause an unacceptable impact, the archaeologist may instruct the abandonment of the trial pit. It may be necessary to re-site GI locations subject to the approval of the Engineer's Representative and agreement by the</p>	During Works	Presence of Client's archaeologist



## Aberdeen Western Peripheral Route Detailed Ground Investigation Environmental Report 2008

Mitigation Item No.	Mitigation Measure	Timing of Mitigation Measure	Approvals and Additional Consultation Required
	<p>relevant landowner.</p> <p>Where there is any doubt or dispute about the need for this, the archaeologist shall seek advice from their project supervisor.</p> <p>All archaeological works will be undertaken in accordance with the requirements of the Institute of Field Archaeologists' Standard and Guidance on Archaeological Watching Briefs.</p>		
<b>Air Quality</b>			
E67	In dry weather dust suppression measures may be used. For example watering of exposed excavated soils and access tracks.	Post works	Approval by Client's Ecological Clerk of Works
E68	Vehicles and machinery shall be properly maintained and are not to be left idling when not in use.	Prior to and during works	
<b>Noise &amp; Vibration</b>			
E69	The Contractor shall follow any requirements in relation to construction noise specified in the Contract Documents or by Aberdeen City or Aberdeenshire Councils, as appropriate.	Prior to, during and post works	Liaise with Aberdeen City and Aberdeenshire Councils
E70	The Contractor shall comply with working hours as specified in the Contract and adhere to the guidance contained with BS 5228 Noise and Vibration control on Construction and Open Sites, British Standards Institute : Part 1: 1997 (with Amendment 1) (ISBN 0 580 26845 4).	Prior to and during works	
<b>Traffic and Access</b>			
E71	Where possible, the Contractor will utilise existing roads, tracks and field boundaries to access exploratory hole location sites.		
E72	The Contractor shall liaise with the Landowners, Client's Ecological Clerk of Works and the Engineer's Representative to discuss and agree particular requirements with regard to access and reinstatement.	Prior to, during and post works	Liaise with Engineer's Representative, Client's Clerk of Works and landowner.

## Appendix 5

### Consultee Responses

## Appendix 6

**SEPA Pollution Prevention Guidelines 1: General Guide to the  
Prevention of Water Pollution**

**SEPA Pollution Prevention Guidelines 5: Works in, near or  
liable to affect Watercourses**

## Appendix 7

### Summary of Plans and Policies

## Appendix 8

### Ground Investigation Techniques

## Appendix 9

### Archaeological Specification

## Appendix 10

### River Dee SAC Method Statement

## Appendix 11

### Red Squirrel Method Statement