The Highland Council
Comhairle na Gàidhealtachd

Nigg SEA
Baseline Information
Fiosrachadh Bunaiteach MAR Neig

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Contents
Clàr-innse

1. Environmental Baseline Issues
Cùisean Bunaiteach Àrainneachd

1.1 Overview
Thar-sealladh

Part 2 of Schedule 3 (in relation to Section 14) of the Environmental Assessment (Scotland) Act 2005 establishes that environmental reports should record

"The relevant aspects of the current state of the environment and the likely evolution thereof without the implementation of the plan or programme."

This section summarises the key environmental issues which have been identified from a review of plans and programmes and analysis of the baseline environmental conditions.

Baseline data has been identified and collated for the site and surrounding area. A desk-based data search was undertaken to establish the presence or otherwise of any critical environmental features that could potentially have an influence on the scheme.

Information regarding the site was obtained from a range of sources including:

- The Royal Society for the Protection of Birds (RSPB)
- The Multi-Agency Geographic Information for the Countryside (MAGIC)
- Ordnance Survey, Dornoch and Tain, Alness and Invergordon, Explorer Map, Sheet 438, 1:25,000 scale
- SEPA Indicative Flood Maps
- SEPA Water Quality Classification Interactive Map
- UK Biodiversity Partnership UK Biodiversity Action Plan
- Scottish Natural Heritage Site Link and SNH website
- The Royal Commission on the Ancient and Historical Monuments of Scotland (Pastmap website)
- The Joint Nature Conservation Committee website (http://www.jncc.gov.uk/page-2)
- SNH designations management plan
- The National Biodiversity Network (NBN) Gateway
- Ross and Cromarty East Local Biodiversity Action Plan
- The Highland Council, Ross and Cromarty East Local Plan – Adopted February 2007
- http://www.niggyard.com
- Cromarty Firth Data Set
- SNIFFFER Handbook of Climate Tends across Scotland

In addition to the above, local knowledge from Halcrow's Inverness-based staff was utilised, as was a series of publicly available GIS datasets from various government departments and an information pack provided by HIE outlining background information on the current and past usage of the site.

Baseline assessments for each SEA topic are presented in the following sections, including information regarding:

- Baseline Situation
- Key Issues or Qualifying Features
- Data Sources

Some data gaps identified at scoping stage have not been resolved, including:

a) No information available regarding Semi-natural and ancient woodland designated area.
b) Limited information available regarding National Nature Reserve designated area. SNH is currently reviewing this designation.
c) No known information regarding watercourses within or in proximity to site; these are not classified by SEPA.
d) No known information regarding soils composition or potential contamination for proximal land to east of B9175.
e) No site-specific data for climatic factors.
f) No site-specific noise data.
g) No site-specific emissions data.
h) No site-specific light pollution data.

The implications of missing or limited information identified above have not been deemed to be detrimental to this SEA procedure. Wherever possible, information regarding designated areas has been inferred from general management information or national databases. Routes to acquiring site-specific information are considered in the Environmental Report.

1.2 Assessment Area

Raon Measaidh

Figure 1 sets out the three key areas with regards to the baseline assessments. These are:

- **Study Area Boundary** including the expanse of area identified in the project brief. This extends to the Mean High Water Springs (MWHS).
- **Development Area Boundary** including the landward extent of the Study Area Boundary.
- **Extent of Proposed Development** indicating the areas identified for development in the Nigg Development Masterplan options.

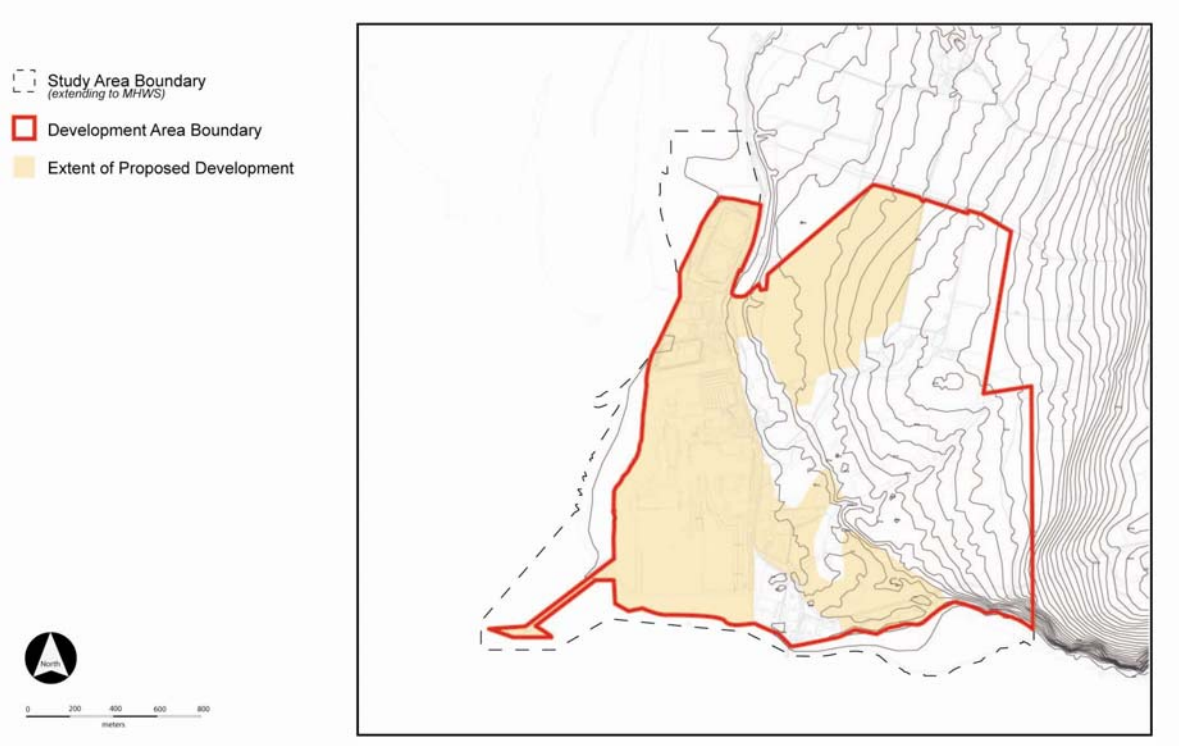

Figure 1: Assessment Boundaries

Unless otherwise indicated, baseline assessments have been made with regard to the extent of proposed development, as this is area of lands may be subject to future development.

1.3 Site History
Eachdraidh Làraich

The Nigg site comprises three key character areas. Land to the west of the B9175 includes:

- Nigg Oil Terminal; and
- Nigg Fabrication Yard.

These sites operate industrial activities related to the oil and gas sector. The terminal has stored and distributed crude oil from the North Sea via a dedicated pipeline since 1972. The fabrication yard has manufactured and maintained rig modules for operation within the North Sea from 1972 to 2003.

The study area also includes proximal land to the east of the B9175. While the majority of lands to the east have been strategically allocated for industrial use, this has never been taken up. This land is generally green field, with some existing residences concentrated along the B9175, particularly toward the south coast near the Nigg Ferry.

Table 1 and

Table 2 summarise known contaminating activities/process and sources of existing contamination within the western industrial area of the site. These are derived from the KBR Environmental Site Assessment, Nigg Fabrication Yard 2005.

Table 1: Potentially Contaminating Activities/Processes at Nigg Fabrication Yard (Source: KBR 2005)

Type	Description
Historic	
Radioactive Sources	Used for weld tests by a contractor. There are three licenses: two are likely to relate to the site and the third is on the Ithaca site.*
Notification of Industries Handling Hazardous Substances (NIHHS)	Both site and Ithaca have licenses.*
Planning Hazardous Substance Consent Part B	Covered paint spraying, degreasing and thermal spraying of aluminium.
Polychlorinated Biphenyls (transformers x 20)	Capacitors within the transformers contained PCBs until 2000, when they were replaced.
Underground tanks	Petrol tank used between 1972 – 1984. 1998 removed. Location is not known.
Current (as reported in 2005)	
Control of Major Accident Hazards (COMAH)	Formerly a lower tier (Neighbouring Ithaca has an upper tier).
Integrated Pollution Prevention and Control (IPPC)	None on site (Neighbouring Ithaca – petroleum processes.
"Hazardous" wastes	Paint cans, thinners, degreasers, oily wastes in oil drums, batteries. These wastes are no longer produced on the site and are generally 'left-over' wastes from site activities. These are stored in a number of sheds across the site. The septic tank content is emptied at regular intervals and placed into an on site sewerage treatment plant.
Above ground tanks (all bunded internally or externally)	Approx 18 tanks for diesel, oil, greases. Two tanks, located by the furnaces. All of these tanks are still present, although not in use.
Bunds along western site boundary	The bunds are derived from soils recovered during a site clean-up.

Table 2: History of identified Hydrocarbon Contamination/Remediation on Nigg Fabrication Yard (Source: KBR 2005)

Date	Comments
Early 1980s	Stock control reconciliations identified loss of diesel. Leak was traced to beneath the paint/blast shop. Contamination manifests as oil staining of the northern gabion dock wall above the garland drain and oil residues floating on the water of the drain.

Date	Comments
Mid – 1980s	30,000 gallons of oil/water recovered over one year from wells installed between the paint/blast shop and the dock.
Early 1990s	Oil/water separators added to dry-dock dewatering system to prevent free product release to Cromarty Firth.
1994	Review of historical operational information identified that 40,000 gallons of diesel was lost from fuel links between 1978 – 89 from up to seven places. B&R identified a plume of free product extending from the above ground fuel tanks to the paint/blast shop with an associated dissolved plume covering a wider area.
1994	Soil vapour extraction/air sparging system was installed in July/August 1994 in the area north and west of the pain/blast shop and was extended in November/December 1994; it was operational for approximately one year, up until mid-1996. No additional staining was observed.
1996	During the dock extensions no significant contamination to the excavated materials was recorded.
1997	A significant quantity of diesel impacted soils were removed during the widening of the dry-dock. The soils were removed from the east side of the ramp and the north wall of the dry dock (where the oil staining had been observed previously). New drainage system of a toe drain and three oil/water separators which discharge to a deep sump at the base of the dock wall.
1998	During the second widening of the ramp diesel started to seep from the eastern side of the ramp.
1999	New staining was observed along the east of the dry-dock ramp and the quantity of free produce recovered from the oil/water separator had increased.
Sept 2000	ERS investigations identify a plume of free product extending over the area to the north and east of the dry dock and an associated plume of dissolved phase diesel extending over the majority of the north eastern area of the site.
Spring 2001	Bioventing/bioslurping remediation scheme. Wells covering free phase using total fluids recovery pumps. Extracted water/diesel passes through an oil/water separator and is then treated by an air stripper. The water is treated with nutrients and bacteria before discharge to ground via soakaways. From May-August 2001 the system removed approximately 6,160 litres of diesel.
2002	Atkins investigations found elevated levels of materials within a few soil samples and elevated levels of petroleum constituents were only found in one location. PAHs, PCBs & solvents were not present at elevated levels. Atkins concluded that no additional remediation measures were required above the existing treatment system.
2004	Cessation of the remediation programme.

Information relating to these events is referred to throughout the baseline report with regard to specific SEA topic issues.

2 Biodiversity, Flora and Fauna
Bith-iomadachd, Flùranaich is Ainmhidhean

2.1 Overview
Thar-sealladh

This section outlines baseline information regarding biodiversity, flora and fauna relevant to development at Nigg, including key issues identified by international, national and other environmental designations. These are summarised in Figure 2 below.

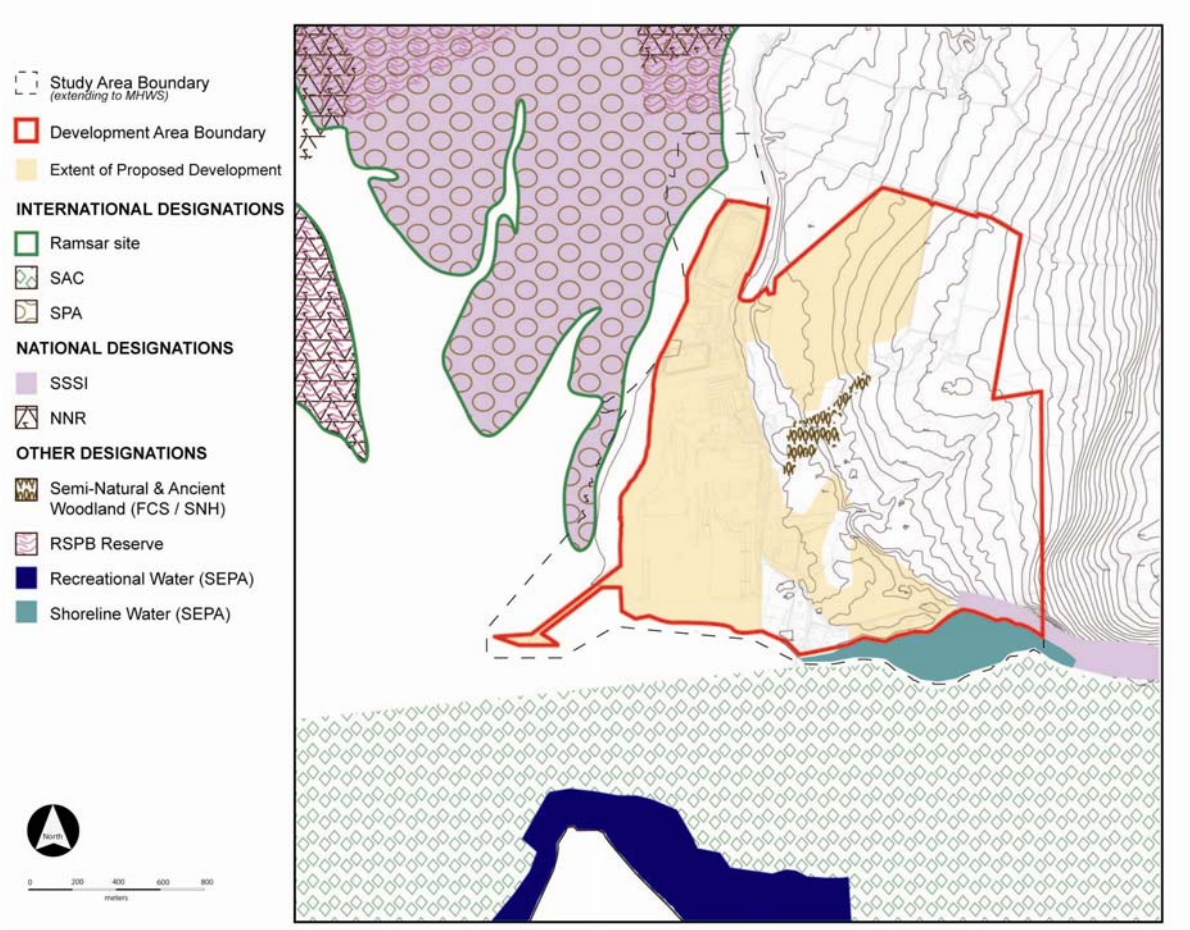

Figure 2: Plan Summary of Environmental Designations

There are no environmental designations within the extent of proposed development, though it is situated adjacent to SEPA-designated Shoreline Water at Cromarty Firth as well as a Semi-Natural and Ancient Woodland designation.

The study area boundary, extending to the Mean High Water Springs (MHWS), is situated partly within the Cromarty Firth which is a European protected Special Protection Area (SPA), an internationally recognised Ramsar Site and a Site of Special Scientific Interest (SSSI) under UK legislation. This boundary is also adjacent to the Moray Firth Special Area of Conservation (SAC).

There are other non-statutory designations nearby, namely an Important Area for Birds and National Nature Reserve.

Table 3 summarises the designated sites in proximity to the Development Area Boundary.

Table 3: Summary of Environmental Designations

Site Name	Designation	Proximity to proposed development
Cromarty Firth	Ramsar Site	100 m
Cromarty Firth	Special Protection Area (SPA)	100 m
Cromarty Firth	Site of Special Scientific Interest (SSSI)	100 m
Rosemarkie and Shandwick Coast	SSSI	Adjacent
Nigg and Udale Bays	RSPB Reserve	400 m
Moray Firth	Special Area of Conservation (SAC)	Adjacent
Moray Basin Firth and Bays	Important Bird Areas (IBA)	Adjacent
Nigg and Udale Bays	National Nature Reserve (NNR)	1,200 m
-	Shoreline Water	Adjacent
-	Recreational Water	850 m
-	Semi-natural or ancient woodland	<50m

Table 4 sets out the known ecological risks to these designations areas as a result of historic industrial activities and pollution events.

Table 4: Potential Known Pollutant Linkages to Ecologically Sensitive Areas (Source: KBR 2005)

Source	Pathway	Receptor
Petroleum hydrocarbons leaked and spilt from tanks, buried lines & vehicles migrated vertically / leached / absorbed onto soil; dissolved within groundwater and free phase on water table. (equipment workshop to paint/blast shop area).	Migration with flow of groundwater to Cromarty Firth.	SSSI & Ramsar Site
	Migration with flow of groundwater to Cromarty Firth via dock culverts – subsequent movement of waters within Firth.	Special Area of Conservation; National Nature Reserve; Shellfishery
Petroleum hydrocarbons potentially contained within the bund material on the western site boundary and in surface soils (originating from dock excavation)	As above	As above
Petroleum hydrocarbons from leaks / spills onto hardstanding.	Surface run-off entraining contaminants – impacted surface waters through drains (not attached to the interceptors or via faulty interceptors to the outfall)	SSSI & Ramsar Site
Inorganics including **metals** and **sulphates** within made ground – metal processing and/or seawater.	Migration with flow of groundwater to Cromarty Firth.	SSSI & Ramsar Site
	Migration with flow of groundwater to Cromarty Firth via dock culverts – subsequent movement of waters within Firth.	Special Area of Conservation; National Nature Reserve; Shellfishery

The following subsections provide further detail of the qualifying features for each designated site. Information below has been extracted directly from the individual site management plans.

2.2 Cromarty Firth Ramsar Site
Làrach Ramsar Caolas Chrombaidh

2.2.1 Site description

The Cromarty Firth Ramsar site is a large, narrow-mouthed estuary which supports the largest intertidal flats in the Moray Basin. The site extends eastwards for approximately 30 km from the islands at the mouth of the River Conon to the town of Cromarty, in the Ross & Cromarty District of Highland Region. The boundary of the site follows those of Cromarty Firth SSSI and the estuarine section of Lower River Conon SSSI.

2.2.2 Qualifying features

The Cromarty Firth Ramsar site qualifies under Criterion 1b by supporting outstanding examples of wetland habitat. The site holds the largest mudflats in Highland and at the mouth of the River Conon there is a rare surviving example of a transition from woodland, through scrub and freshwater fen, to brackish and finally saltmarsh communities.

The Cromarty Firth Ramsar site qualifies under Criterion 3a by regularly supporting over 20,000 waterfowl in winter. In the five-year period 1992/93 to 1996/97, a winter peak mean of 30,200 waterfowl was recorded, comprising 14,800 wildfowl and 15,400 waders.

The Cromarty Firth Ramsar site further qualifies under Criterion 3c by supporting internationally important wintering populations (1992/93-96/97 winter peak means) of greylag goose Anser anser (1,782, 2% of total Icelandic population, all of which winters in GB) and bar-tailed godwit Limosa lapponica (1,355, 3% of GB and 1% of W. European population).

2.2.3 Physical site features

Cromarty Firth is one of the major firths on the Moray Firth. It contains a range of high-quality coastal habitats including extensive intertidal mudflats and shingle bordered locally by areas of saltmarsh, as well as reedbeds around Dingwall.

Noteworthy flora includes nationally important species Zostera angustifolia and Z. noltei.

Noteworthy fauna includes a number of bird species (Table 5).

Table 5: Cromarty Firth Ramsar Site – Bird Species

Species regularly supported during the breeding season:	
Osprey , Pandion haliaetus Europe	>2 pairs, representing an average of 1.5% of the GB population (5 year mean 1992-1996)
Common tern , Sterna hirundo hirundo N & E Europe	413 apparently occupied nests, representing an average of 4% of the GB population (Seabird 2000 Census)
Species with peak counts in spring/autumn:	
Eurasian wigeon , Anas penelope NW Europe	10662 individuals, representing an average of 2.6% of the GB population (5 year peak mean 1998/9-2002/3)
Common redshank , Tringa totanus totanus	1643 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)
Species with peak counts in winter:	
Slavonian grebe , Podiceps auritus, Northwest Europe	20 individuals, representing an average of 2.7% of the GB population (5 year peak mean 1998/9-2002/3)
Greater scaup , Aythya marila marila W Europe	225 individuals, representing an average of 2.9% of the GB population (5 year peak mean 1998/9-2002/3)
Red knot , Calidris canutus islandica W & S Africa (wintering)	3327 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

Other physical site characteristics are summarised in Table 6, below.

Table 6: Cromarty Firth Ramsar Site – Physical Site Characteristics Summary

Soil & geology	shingle, sand, mud, alluvium, sandstone, gravel
Geomorphology and landscape	lowland, shingle bar, intertidal sediments (including sandflat/mudflat), enclosed coast (including embayment), estuary, intertidal rock
Nutrient status	no information
pH	circumneutral
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent

Summary of main climatic features	Annual averages (Kinloss, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/kinloss.html) Max. daily temperature: 12.2° C Min. daily temperature: 5.1° C Days of air frost: 53.5 Rainfall: 624.4 mm Hrs. of sunshine: 1261.4

Wetland Types

Code	Name	% Area
B	Marine beds (e.g. sea grass beds)	46.2
G	Tidal flats	46.1
H	Salt marshes	5.5
Other	Other	0.8
F	Estuarine waters	0.6
U	Peatlands (including peat bogs swamps, fens)	0.3
Xf	Freshwater, tree-dominated wetlands	0.2
E	Sand / shingle shores (including dune systems)	0.2
J	Coastal brackish / saline lagoons	0.1

Land tenure / ownership

Ownership Category	On-site	Off-site
NGO	+	
National/Crown Estate	+	
Private	+	
Other	+	

Social and cultural values	Aesthetic Archaeological/historical site Environmental education/ interpretation Livestock grazing Non-consumptive recreation	Scientific research Sport fishing Sport hunting Tourism Traditional cultural Transportation/navigation

Current land (including water) use

Activity	On-site	Off-site
Nature conservation	+	
Tourism	+	
Recreation	+	
Current scientific research	+	
Fishing: recreational/sport		+
Marine/saltwater aquaculture	+	
Gathering of shellfish	+	
Bait collection	+	
Arable agriculture (unspecified)		+
Grazing (unspecified)	+	+
Permanent pastoral agriculture		+
Hunting: recreational/sport	+	
Hydro-electricity/ water-power		+
Industry		+
Sewage treatment/disposal	+	+
Harbour/port		+
Transport route		+
Urban development		+
Non-urbanised settlements		+
Military activities		+
Other		+

Conservation Measures taken

Conservation measure	On-site	Off-site
SSSI/ASSI	+	
SPA	+	
Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	
Site management statement/plan implemented	+	
Other	+	
SAC	+	

Current scientific research and facilities	Fauna: Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee. There have been a large number of surveys undertaken in the Cromarty Firth area covering a number of topics including Intertidal invertebrates in Nigg and Udale Bays (Anderson 1971) Habitat: Habitat survey undertaken by Currie (1978).

Current communications, education and public awareness (CEPA) activities	The RSPB have a public hide at both Udale and Nigg Bays which are open all year. A number of fixed interpretation panels are located around the firth.
Current recreation and tourism	Terrestrial & intertidal based recreation: Walking is concentrated on Alness Point. Birdwatchers go to places where there is easy public access to the shore. All year activity. Local cruises operate from Cromarty to view the population of bottlenose dolphins resident in the Sutors area with occasional trips to the wider Moray Firth. These trips operate except during the winter months in contrast to terrestrial forms of recreation which are all year round Water-based recreation: Power-boating, water-skiing and wind-surfing are undertaken occasionally. There is a sailing club in the Firth. These operate mainly from April to September and in deep water. Wildfowling: Most of this activity occurs in Nigg and Udale Bays.

2.3 Cromarty Firth SPA
Àite Sònraichte Dìona Caolas Chrombaidh

The Cromarty Firth SPA is a large, narrow-mouthed estuary which supports the largest intertidal flats in the Moray Basin. The site extends eastwards for approximately 30 km from the islands at the mouth of the River Conon to the town of Cromarty. The boundary of the SPA follows those of the Cromarty Firth SSSI and the estuarine section of Lower River Conon SSSI.

2.3.1 Qualifying features

The area qualifies as a SPA under Article 4.1 of the EC Wild Birds Directive by providing a habitat for an internationally important assemblage of birds, including foraging grounds for a nationally important number of breeding ospreys Pandion haliaetus that nest in surrounding woodland, and a nationally important population of common tern Sterna hirundo.

The SPA further qualifies under Article 4.1 by supporting a nationally important wintering population of whooper swan Cygnus cygnus and bar-tailed godwit Limosa lapponica and under Article 4.2 by supporting an internationally important wintering population of greylag goose Anser anser (1,782, 2% of total Icelandic population, all of which winters in GB) and in excess of 20,000 waterfowl.

The SPA qualifies under Article 4.2 by supporting in excess of 20,000 waterfowl. In the five-year period 1992/93 to 1996/97, a winter peak mean of 30,200 waterfowl was recorded, comprising 14,800 wildfowl and 15,400 waders.

The assemblage contains nationally important populations of 7 species (1992/93-96/97 winter peak means): wigeon Anas penelope (9204, 3% of GB), pintail A. acuta (319, 1%), scaup Aythya marila (295, 3% of GB), red-breasted merganser Mergus serrator (204, 2%), knot Calidris canutus (4312, 1%), curlew Numenius arquata (1,313, 1%) and redshank Tringa totanus (1,149, 1%).

Other physical site characteristics are summarised in Table 7, below.

Table 7: Cromarty Firth SPA – Physical Site Characteristics Summary

Soil & geology:	
Gravel, Mud, Sand, Sandstone, Sandstone/mudstone, Shingle	
Geomorphology & landscape:	
Coastal, Enclosed coast (including embayment), Estuary, Floodplain, Intertidal sediments (including sandflat/mudflat), Lowland, Shingle bar	
Habitat classes:	**% cover**
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	92.5
Salt marshes. Salt pastures. Salt steppes	5.0
Shingle. Sea cliffs. Islets	1.0
Bogs. Marshes. Water fringed vegetation. Fens	0.3
Heath. Scrub. Maquis and garrigue. Phygrana	0.2
Humid grassland. Mesophile grassland	0.8
Broad-leaved deciduous woodland	0.2

2.3.2 Conservation Objectives

The SPA is vulnerable to industrial development (including land-claim), some of which is associated with the port of Invergordon as well as wider oil-related activities.

Both can impact on water quality in the firth. The threat of damage by mechanical cockle-harvesting has been addressed over a large part of the firth by the granting of the Nigg and Udale Bays Nature Conservation (Amendment) Order in 1996. However, the cumulative impacts of a range of small-scale activities including disturbance from wildfowling and recreational activities are recognised pressures on the site. Recent integrated management initiatives (The Cromarty Firth Liaison Group and the wider Moray Firth Partnership) provide a mechanism through which a range of interested parties can help alleviate the range of development and recreational threats to this site.

The main conservation objectives of the SPA are:

- To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
- To ensure for the qualifying species that the following are maintained in the long term:
  - Population of the species as a viable component of the site
  - Distribution of the species within site
  - Distribution and extent of habitats supporting the species
  - Structure, function and supporting processes of habitats supporting the species
  - No significant disturbance of the species

Qualifying Species include:

- Bar-tailed godwit (Limosa lapponica)
- Common tern (Sterna hirundo)
- Curlew (Numenius arquata)*
- Dunlin (Calidris alpina alpina)*
- Greylag goose (Anser anser)
- Knot (Calidris canutus)*
- Osprey (Pandion haliaetus)
- Oystercatcher (Haematopus ostralegus)*
- Pintail (Anas acuta)* Red-breasted merganser (Mergus serrator)*
- Redshank (Tringa totanus)*

- Scaup (Aythya marila)*
- Whooper swan (Cygnus cygnus)
- Wigeon (Anas penelope)*
- Waterfowl assemblage
  *(*Indicates assemblage qualifier only)*

2.4 Cromarty Firth SSSI
Ionad de Shuim Shònraichte Shaidheansail Caolas Chrombaidh

2.4.1 Site description

The Cromarty Firth is a relatively large estuary with extensive sand and mud flats which support internationally important numbers of wintering wildfowl and nationally important concentrations of wintering wading birds.

This site has the complete range of estuarine habitats including sand and mud flats, shingle banks, saltmarsh, mussel beds and coastal lagoons

2.4.2 Qualifying features

The site has been notified as an SSSI for its intertidal sand and mud flats, saltmarsh and coastal lagoons. It has also been notified for its nationally important populations of common seals and wintering whooper swan, bar-tailed godwit, wigeon, redshank and red-breasted merganser.

2.4.3 Physical site features

A linear deep-water channel extends from the narrow entrance of the firth at Cromarty westwards almost as far as Alness. To the north and south of this lie the wide shallow bays of Nigg and Udale which, together with the inner bays at Alness and Dingwall, comprise around 4,000 hectares of tidal sand and mud flats.

This is the largest extent of flats within the Moray Firth Basin and supports a rich and abundant invertebrate fauna. These, together with the extensive communities of pioneer plant species such as glasswort Salicornia spp, eelgrass Zostera spp and tasselweed Ruppia maritima, provide the food base for large numbers of over wintering wildfowl and waders.

There are extensive mussel beds in Alness Bay and in the Nigg and Udale Bay areas. Alness Bay contains a rich algal flora with some 21 species recorded.

Where rivers enter the firth saltmarsh occurs with lower saltmarsh communities best represented at Nigg Bay and around Dingwall. Upper saltmarsh is most extensive adjacent to Udale Bay and Alness Bay and in both places the marsh is of particular interest because it is ungrazed.

Areas of saltmarsh provide important roosting sites for wading birds at high tides, as do several of the promontories around the firth.

The Cromarty Firth is of outstanding interest for its over wintering populations of wildfowl and waders. The area achieves international importance with more than 11,000 wildfowl regularly recorded.

Amongst individual species, wigeon (>6,000), whooper swan (>120) and red-breasted merganser (>400) all regularly exceed 1% of north-west European populations. The area is one of the most important in Scotland for wading birds and more than 7,000 individuals are regularly recorded. Nationally important concentrations of bar-tailed godwits (>650) and redshank (>1,600) over winter.

The firth is a regionally important nesting area for shelduck, common tern and arctic tern which breed on or around areas of shingle, lagoon and saltings.

The history of the Cromarty Firth and its shores has been well documented. It has been of major importance for the economic development of the Highlands in general and Easter Ross in particular, and this is still the case.

The deep water channel and sheltered nature of the firth has meant that the Cromarty Firth has always been of considerable importance for shipping and trade, although active harbours now exist only at Cromarty and Invergordon. Most shipping is now in connection with oil developments and the cruise liner markets. Prior to the opening of the Cromarty Bridge small ferries crossed the firth; for example, Alness Ferry. Only the Nigg Ferry now operates.

Historically the sands of Nigg and Udale Bays were very important for local people as a resource of shellfish, primarily cockles and mussels. Now there is less demand and shellfish collection is not practised as frequently as it used to be. However, the high price of cockles in the early 1990's led to renewed interest in collection using land based tractor drawn dredges. The collection of ragworms as bait for fishing is also practised locally.
There are now no active fish farms in the firth; there used to be a small mussel and oyster farm on the south side between Cromarty and Jemimaville. Salmon netting stations at Dingwall and Alness have also ceased operation.

The Navy have had a presence at Invergordon since the late 19th Century although they left in 1995. The firth and the associated Moray Firth is still used for training purposes. The Cromarty Firth and Invergordon were of considerable importance during both world wars and use of the area was not confined to the Cromarty Firth, there being air fields within one kilometre of the shore at Alness, Evanton and Fearn. Alness Bay was a seaplane base during the Second World War.

Although a relatively new land use in the Cromarty Firth, oil related developments are currently the most significant economically. Developments are mainly connected with the fabrication; maintenance and decommissioning of North Sea oil structures as well as the storage and shipment of oil itself. Land is still reserved for gas/oil developments in Nigg Bay and Evanton under National Planning Policy.

A wide range of other industries have been developed on the north shore of the firth. These range from those serving shipping and the oil industry to distilleries and manufacturing. Increasingly businesses are locating close to the firth because of the clean environment. A business park has been developed close to the shore at Alness and there are simplified planning zones at Invergordon and Alness to encourage development. Development of the old Evanton airfield site is also being progressed.

Nigg Bay has been recognised as being of importance for nature conservation since the late 1940's. This is reflected by the former National Nature Reserve and the presence of the RSPB which now owns considerable intertidal areas. The RSPB has also recently acquired land behind the seawall at Meddat where the first coastal realignment project in Scotland is being undertaken.

The firth has been an important source of recreation and relaxation for local people for centuries. A wide range of recreation activities are practised such as wildfowling, boating, walking, bird watching and fishing. Bottlenose dolphins are regularly seen at the mouth of the firth and are now a major tourist attraction. In addition, the wide range of bird life in the firth attracts many bird watchers. The RSPB have a hide at Udale Bay with another planned for Nigg Bay.

2.4.4 Management objectives

There is little active management of land within the SSSI itself. At present this is largely restricted to land owned by the RSPB. Grazing of coastal marsh occurs at Udale Bay and there is a small amount of grazing also at Nigg Bay.

The RSPB's coastal realignment project is actively managing areas adjacent to the SSSI in Nigg Bay. This is an important demonstration project exploring the issues and methods appropriate to responding to sea level changes on the coast.

The RSPB are controlling the non-native marine plant, Spartina anglica, in Udale bay. There is an ongoing major programme of investment in updating and renewing many of the sewage outfalls and discharges around the firth, for example at Cromarty, Barbaraville, Culbokie and Jemimaville. This is resulting in improved water quality. Harbour activities are managed by the Cromarty Firth Port Authority.

This site has a wide range of users; nearby residents, community interests, owners and occupiers ranging from multi-national oil related companies to local farmers and fishermen. Consequently the factors that influence management of this site are very diverse especially since many land use changes within the catchment area of the firth has the potential to affect the ecology of the firth.

The Cromarty Firth Liaison Group (CFLG) was set up in 1992 to provide a forum for discussion of issues affecting the quality of the Cromarty Firth coastal environment. Many of the factors affecting the management of this site are covered in the document 'The Cromarty Firth; its resources and management'.

Furthermore, the subsequent documents of the Strategy and Action Plan provide a focus for resolution of issues and enabling of opportunities to be undertaken. This group has now merged with the Moray Firth Partnership which also has an action plan which encompasses issues affecting the Cromarty Firth.

The following other main factors affect management of the conservation interests:

- **Environmental Change**

  The site supports large numbers of birds for part of the year. Breeding success and food availability throughout the year as well as climatic factors in other parts of their range will all affect the number of birds using the site. In addition the plants and invertebrates which form the food base for the wintering bird population will vary naturally in their availability and abundance.

  Large scale trends in climate and sea level change may affect this site. For example, small change in tidal heights could affect the distribution of habitats within this site.

- **Habitat Loss**

  Reclamation of intertidal land for development and coast protection can result in the loss of intertidal habitats as well as those above high water. These habitats are important to the bird population for feeding and roosting. A large area has been reclaimed in Nigg Bay for oil related developments and intertidal land there and at Evanton remains reserved for oil and gas development including reclamation.

  There are public roads and private houses adjacent to much of the firth and coastal protection has been undertaken to protect such developments. Other sections may be needed in due course. Generally, such work has resulted in the loss of small amounts of intertidal land.

- **Recreation & Tourism**

  Recreation and human activity can cause disturbance to birds especially in severe winter weather. This prevents birds from feeding or roosting and can result in a depletion of energy reserves and possible death by starvation. Disturbance is potentially most damaging in those areas used most frequently for recreation and which are also important for roosting or feeding. There is therefore a need to ensure that any increase in recreation activities does not take place in the most sensitive areas (e.g. where there are high-tide bird roosts).
  Wildfowling, whilst practised for many years, has the potential to disturb roosting birds during the winter. There is a need to ensure that all cold weather wildfowling bans are implemented and that all wildfowling is practised sustainably.

- **Shellfish Harvesting/Bait Collection**

  Local people collect shellfish from the shore and this has been practised for a long time. Traditionally this has been done by hand but more recently extensive cockle stocks have been collected from Nigg bay using either a boat operated suction dredge or land based tractor drawn dredges. As a result of commercial cockle collection from Nigg Bay in the early 1990's the Secretary of State (at SNH's request) granted a Nature Conservation Order for Nigg and Udale Bays which was confirmed in 1996 and is still extant. This prohibits mechanical harvesting.

  Local anglers also collect bait in Nigg and Udale Bays. The current level of this activity is not thought to be damaging. However, again it is possible that this activity may well increase as controls become tighter further south.

- **Water Quality**

  High standards of water quality are essential for the continued well being of the bird population and the food base upon which they depend. Many of the developments and industries in the outer part of the firth are oil related and the risk of a major oil pollution incident is ever present.

  Historically, there have been many industrial and domestic discharges to the marine environment. This reduces water quality and could affect the food base upon which the wintering birds depend. Water quality is a key issue in the firth.

  The long term management objectives for the site are to:

  - Maintain the extent and condition of the important coastal habitats, especially saltmarsh, coastal lagoon, intertidal sand and mudflats.
  - Maintain conditions suitable for the populations of wintering birds and the population of breeding species.
  - Maintain and where possible enhance water quality in the firth.
  - Maintain a close working relationship with key partners.
  - Encourage appropriate visitor access and information/interpretation

  The key management requirements for the site are to:

  - Provide advice on development proposals and changes in land management which might affect the site through responding to statutory consultations and other requests.
  - Establish and carry out a monitoring programme to record the condition of the features of interest.

- Ensure that the national bird counts continue and that low tide counts are initiated.
- Liaise with Scottish Water over proposals for new outfalls.
- Work with the Cromarty Firth Group in order to identify joint projects and funding opportunities.
- Work with the Cromarty Firth Port Authority, SEPA and other authorities in ensuring that water quality is maintained and that oil pollution risks are minimised.
- Work with the Cromarty Firth Group project officer to complete the actions identified for SNH in the Action Plan.
- Provide environmental advice to the community environmental project at Alness Point and promote other projects which strengthen the local community's awareness of the natural heritage in the firth.
- Encourage the further development of interpretation at Alness Point, Nigg Bay and Udale Bay.
- Encourage further control of Spartina.
- Assist and grant aid RSPB's coastal realignment project and assist in disseminating findings to a wider audience.

Written consent from a relevant regulatory body, including the local planning authority or SNH, is required to undertake the following activities:

- Changes in the grazing regime, including type of stock or level or seasonal pattern of grazing
- Changes in stock feeding practice
- Application of manure, fertilisers and lime
- Application of pesticides, including herbicides (weedkillers)
- Dumping, spreading or discharge of any materials
- The introduction of any wild animal, plant or seed
- The killing or removal of any wild animal including pest control
- The destruction, removal or pruning of any plant or plant remains
- Drainage (including use of mole, tile, tunnel or other artificial drains)
- Modification of the structure of water courses including streams, ditches, drains, their banks and beds as by realignment, regarding and dredging
- Management of aquatic and bank vegetation for drainage purposes
- The changing of water levels and tables and water utilisation, including irrigation, storage and abstraction from existing water bodies
- Infilling of ditches, drains, pools, marshes
- Changes in coastal fisheries management, including sea food or marine life collection, including use of traps or fish cages
- Reclamation of land from sea, estuary or marsh
- Erection of sea defences or coast protection works
- Extraction of minerals, including shingle, sand and gravel
- Construction, removal or destruction of roads, tracks, walls, fences, hardstands, banks, ditches or other earthworks, or the laying maintenance or removal of pipelines and cables above or below ground
- Storage of materials on saltings or mudflats
- Erection of permanent or temporary structures, or the undertaking of engineering works
- Use of vehicles or craft likely to damage or disturb features of interest
- Recreational activities likely to damage flora or fauna
- Changes in waterfowl management

2.5 Rosemarkie and Shandwick Coast SSSI
Ionad de Shuim Shònraichte Shaidheansail Cladach Ros Mhaircnidh is Sheannduaig

The information presented below has been extracted from the Rosemarkie and Shandwick Coast SSSI Masterplan.

2.5.1 Site description

The Rosemarkie to Shandwick Coast SSSI is located north east of Inverness on the western shore of the Inner Moray Firth. The SSSI extends to 444.94 hectares, covering an extensive but narrow strip of coastal cliff and dunes in two sections; Rosemarkie to Cromarty on the Black Isle, and the North Sutor to Shandwick on the Tarbat peninsula.

2.5.2 Qualifying features

This SSSI is of special interest for 3 geological and 5 biological features. These features are described below and summarised in Table 8.

The geological interests are:

- **Moine**

  The Moine outcrops of rock on this site provide an insight into the history of the earth's crust beneath Eastern Scotland. Once part of an ancient mountain range formed hundreds of millions of years ago, these ancient rocks are now largely obscured by younger sedimentary rocks including Old Red Sandstone and later Jurassic sediments.

- **Callovian**

  The inter-tidal zone at Cadh'-an-Righ supports sedimentary rocks of Middle Jurassic age that contain fossils of marine creatures such as Ammonites. These rocks are important as they help understand the geography and environmental conditions that existed around 160 million years ago in the area which is now Northeast Scotland.

- **Mesozoic Palaeobotany**

  The inter-tidal zone at Eathie Fishing Station yields sedimentary rock layers of Late Jurassic age (150 million years old). These layers were deposited in a marine environment and contain the fossil remains of plants, including ancient conifers and tree ferns, washed in from the adjacent land areas. The plant fossils are in such a perfect state of preservation that they allow detailed anatomical studies down to the cellular level.

  The results of monitoring carried out in August 2001 indicate that these three geological natural features (Moine; Callovian; Mesozoic Palaeobotany) are in favourable condition. Current management, is appropriate to maintain the natural feature in favourable condition and no review of management is required. The rocks at Eathie Fishing Station GCR site are only visible at low tide but access is easy.

The biological interests are:

- **Maritime Cliffs**

  The site supports the only tall coastal cliffs in the Inner Moray Firth. They are especially well developed at the North and South Sutors where they are largely inaccessible from land.

The results of monitoring carried out in July 2002 indicate that the maritime cliff natural feature is in favourable condition. Current management, is appropriate although the site could benefit from grazing to maintain the diversity of the habitat. No review of management is required.

- **Sand-dunes**

  Dune grassland occurs in a small number of locations throughout the site but is especially well developed at Shandwick. A wide range of plants occur which are uncommon in the Highlands north of the Great Glen such as carline thistle, wild liquorice, bloody cranesbill and yellow oat grass.

  The dunes near Shandwick showed signs of localised nitrogen enrichment. The sward was uniformly closely grazed by both stock and rabbits with many unpalatable flowering species present including, ragwort, thistles and daisies. The dune feature at Shandwick is in unfavourable condition and a review of management is required. This should focus on the level of grazing at each site.

- **Upland birch woodland**

  This habitat has developed in gullies and gorges such as at Brownhill and Eathie on the Black Isle where moisture is not a limiting factor in the summer. The full range of rich, lowland woodland communities are present including oak, ash, wych elm and hazel while more acid communities with birch, rowan and pine occur on the upper margins of the woodlands. This natural feature was monitored at four locations between Rosemarkie and Cromarty in July 2002. No review of management is required.

- **Purple mountain milk-vetch**

  The nationally rare purple mountain milk-vetch occurs at three known locations on the site between Eathie and Shandwick. The plants occur on south facing, unstable, well drained ground where there is little competition from other species.

  This feature was monitored at the three locations where it had been previously recorded in May 2004. The plant was found at only two of the sites and at both the population was less than 25 plants and declining. Only one population showed evidence of regeneration. Gorse had encroached across suitable habitat at Shandwick and forestry adjacent to the Eathie site are thought to contribute to the decline of this species. The feature was found to be unfavourable condition and declining and a review of management is required.

- **Breeding cormorant**

  Cormorant breed on the cliffs at the entrance to the Cromarty Firth. The largest concentration occurs at the North Sutor where 206 nesting pairs were noted in 2002.

  This feature was monitored over a 5 year period between 1998 and 2002. The feature was found to be favourable with an average of 199 breeding pairs being well above the population necessary to be nationally significant.

Table 8: Rosemarkie to Shandwick Coast SSSI Physical Site Features Summary

Natural feature	Feature condition (date monitored)
Moine	Favourable - maintained (August 2001)
Callovian	Favourable - maintained (August 2001)
Mesozoic Palaeobotany	Favourable - maintained (August 2001)
Maritime cliff	Favourable - maintained (July 2002)
Sand dune	Unfavourable - no change (July 2002)
Upland birch woodland	Favourable - maintained (July 2002)
Purple mountain milk-vetch	Unfavourable - declining (May 2004)
Breeding cormorant	Favourable - maintained (May 2002)

2.5.3 Management Objectives

Traditionally, agriculture and fishing were important land uses on this part of the coast and gave rise to a number of tracks from farmland at the top of the cliffs to the beach below. They indicate that greater use was made of the area in the past.

There are several old salmon fishing bothies and netting stations along the coast most of which are no longer connected with the fishing industry. However, the salmon bothy at Eathie has recently been upgraded with associated interpretation.

A small part of the SSSI at the North Sutor received planning permission in the late 1970s for the construction of an underground oil storage facility. This project was started but not completed and there is a possibility that the proposal could be revisited in the future.

During the Second World War the Ministry of Defence built look out positions on the North and South Sutors. These are still present but are no longer in use or maintained. The main use of the site now is for access and recreation. Paths to the disused fishing stations and other places of interest, e.g. St Bennet's Well and various caves, are popular walking routes.

The northern part of the site is less accessible except for the path to the 'Well of Health' at Shandwick and a rough cliff top path between Nigg and Shandwick. There is a small forestry plantation within the site at Eathie.

SNH wish to work with the owner to protect the site and to maintain and where necessary enhance its features of special interest. SNH aims to carry out site survey, monitoring and research as appropriate to increase their knowledge and understanding of the site and its natural features and monitor the effectiveness of the management.

1. To maintain the geological exposures in favourable condition so that they are clearly visible and accessible for the purposes of research and education.

2. To maintain the favourable condition of the maritime cliffs and woodland features within the site by:
   - Where practical introducing grazing with cattle or sheep to control scrub encroachment by rose, bramble, bracken and gorse.

3. To undertake appropriate management so that the condition of the dune grassland natural feature comes into favourable condition by:
   - reducing the grazing pressure and nutrient input from cattle and rabbits at Shandwick to improve structural and floristic diversity of the dune grassland

4. To undertake appropriate management so that the three populations of purple milk-vetch come into a favourable condition by:
   - controlling spread of gorse near the population at Old Shandwick
   - identifying specific management options for the Nigg population
   - reducing tree cover in the vicinity of the population at Eathie

5. To encourage responsible visitor access to the site for the purposes of recreation, education and interpretation.

Written consent from a relevant regulatory body, including the local planning authority or SNH, is required to undertake the following activities:

- Cultivation, including ploughing, rotovating, harrowing and re-seeding.
- Grazing and changes to grazing management (may involve introduction, re-introduction, changes to stock numbers, types and dates, or cessation).
- The introduction of stock feeding (may include the introduction, re-introduction and changes to the type and location).
- Application of manure, fertilisers and lime.
- Application of pesticides, including herbicides (weedkillers).
- Dumping, spreading or discharge of any materials.
- Burning.
- The destruction, displacement, removal or cutting of any plant or plant remains, including tree, shrub, herb, dead or decaying wood, moss, lichen, fungus, leaf-mould and turf.
- Changes in tree and/or woodland management1.
- Drainage (including moor-gripping, the use of mole, tile, tunnel or other artificial drains).
- Extraction of minerals including peat, shingle, sand and gravel, topsoil, and sub-soil.
- Modification of natural features including clearance of boulders, large stones, loose rock or scre and battering, buttressing or grading rock-faces and cuttings.
- Removal of geological specimens, including rock samples and fossils.
- Use of vehicles or craft except on established tracks.

2.6 Nigg and Udale Bays RSPB Reserve
Raon-glèidhteachais RSPB Bhàghan Neig is Uadail

Unless otherwise indicated, the information presented below has been extracted from the Nigg and Udale bay RSPB Management Plan (2004 – 2009). The RSPB is in the process of updating this plan, but no further information is available at the time of writing.

2.6.1 Site description

The Nigg and Udale bays area approximately 200m to the north of the development boundary is an extensive area of mudflat, saltmarsh and wet grassland and is 1554ha in size

2.6.2 Important plant & animal species

The Moray Firth Wader and Wildfowl Roosts Summary (SNH 2009) identified 121 roosts in the Moray Firth between Brora and Burghead. Two roosts were identified at the Nigg site (see Figure 3):

- Site A, located on reclaimed land to the north of the Oil Terminal, has seen a major decline in use since 1995 and is now mainly used by small numbers of ringed plover, dunlin and Eurasian curlew. This decline is attributed to disturbance caused by increase vessel access to the area.
- Site B, located along the outer sea wall to the west of the Fabrication Yard, is identified as the main roost. Red knot, dunlin, bar-tailed godwit and common redshank numbers have declined in recent years, but Eurasian oystercatchers still regularly roost in large numbers. The major cause of roost decline is attributed to

the decrease in number of species feeding in the adjacent mudflats. It is not considered to be associated with disturbance on the yard as the site as been virtually dormant for the past 7-8 years.

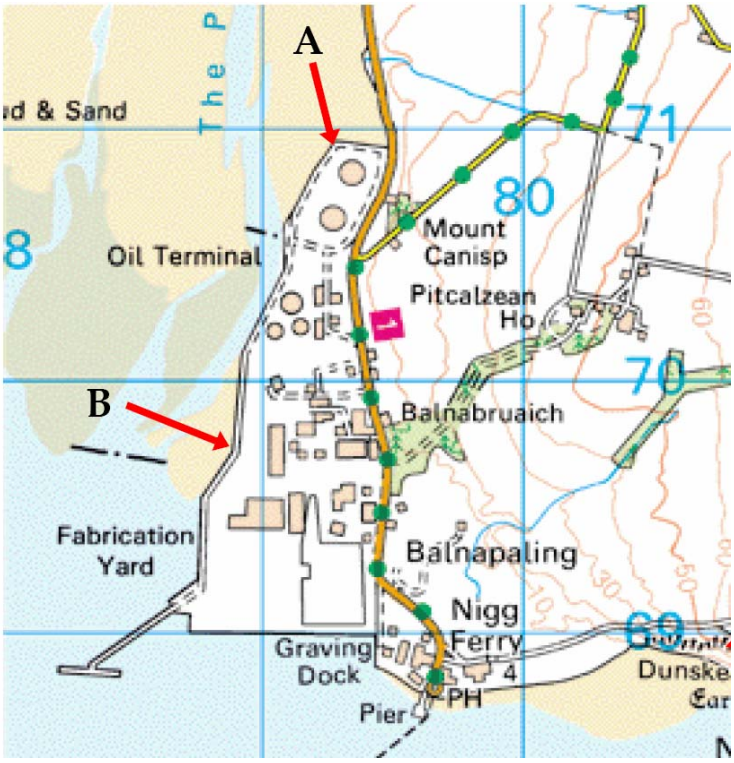

Figure 3: Known wader and wildfowl roosts at Nigg (Source: SNH 2009)

Important species information for the whole of the designated area, as presented in the management plan, is outlined below.

Spartina:
Spartina was introduced to Udale Bay in 1947 in an attempt to reclaim the saltmarsh. Studies by Aberdeen University (1974, 1978 & 1981) indicated a slow and continuing expansion of the area colonised by Spartina. Chemical spraying of the 2.5 ha Spartina began in 1993, with Glyphosate, has been undertaken annually (<0.1 ha remaining in 2003). The additive used with Glyphosate, Mixture B, is now illegal on intertidal land.

Zostera spp:
The Cromarty Firth holds the largest known stand of dwarf eel grass (Zostera noltii) in UK. Stoneman 2000 found little change in area or distribution between 1993 and 2000.

Additional species information is summarised in the Table 9, Table 10, and

Table 11.

Table 9: Plants – Nigg and Udale Bays

Species	Popn. size	Status	Comments
Intertidal Mudfalt/Sandflat			
Zostera angustifolia	-	NSc	
Zostera noltii	-	NSc	
Ruppia maritima	-	REG	

Table 10: Breeding Birds – Nigg and Udale Bays

Species	Popn. Size*	Status	Comments
Saltmarsh			
Skylark	?	FDIII, Red list, UK BAP	Skylark no's recorded for whole site, not by habitat. Will be recorded separately in future.
Potential			
Redshank	0	FDIII, Regionally important	Nigg Bay and other areas of Cromarty Firth had high density of breeding redshank in 1985 national survey. Now none – anecdotally related to high spring tides covering all saltmarsh now
Wet grassland			
Lapwing	4-12	FDIII, Regionally important	Should increase with creation of wet grassland at Bayfield.
Skylark	>30	FDIII, UK BAP, red list	Numbers at Meddat will reduce as realignment progresses
Potential			
Redshank	0	FDIII, Regionally important	Should colonise new wet grassland at Bayfield
Snipe	0	FDIII, Regionally important	May colonise new wet grassland at Bayfield

**Mean of 1998 – 2002*

Table 11: Non-breeding Birds – Nigg and Udale Bays and Cromarty Firth

Species	Status	Popn. Size* Udale	Popn. Size* Nigg	Crom Firth Popn.	Comments
Intertidal					
Osprey	Ann 1,Sch 1, SPA	0	0	-	Qualifying feature of SPA. Breeds offsite but feeds in Nigg and Udale Bays.
Common tern	Ann 1, SPA	0	0	-	Qualifying feature of SPA. Breeds offsite but feeds in Nigg and Udale Bays.
Slavonian grebe	Ann 1, Sch 1, FDIII, 2% UK	16	1	18	
Wigeon	2% UK	3847	4929	9892	Natural feature of SSSI Qualifying feature of SPA
Pintail	1% UK	7	228	235	Qualifying feature of SPA
Scaup	Sch 1, 3% UK	227	0	238	Qualifying feature of SPA
Red-breasted merganser	2% UK	24	17	160	Natural feature of SSSI Qualifying feature of SPA
Bar-tailed godwit	1% Intern	319	1475	1677	Natural feature of SSSI Qualifying feature of SPA & RAMSAR
Curlew	1% UK	240	650	1401	Qualifying feature of SPA

Redshank	1% UK	332	741	1424	Natural feature of SSSI Qualifying feature of SPA
Knot	1% Intern	797	3384	3956	Qualifying feature of SPA
Whooper swan	Ann 1, Sch 1	2	28	39	Natural feature of SSSI Qualifying feature of SPA
Greylag goose	2% UK	462	494	1842	Qualifying feature of SPA & RAMSAR
Oystercatcher		778	1392	2812	Qualifying feature of SPA
Dunlin		252	3008	3280	Qualifying feature of SPA
Shelduck		25	262	359	
Pink-footed goose		-	-	-	
Twite	FDIII, red list	0	~100	?	

** Mean of peak winter WeBS counts for 93/94 – 02/03. For WeBS count areas see Maps 12a and 12b. WeBS count area slightly larger than reserves.*

WeBS counts occur at high tide and so often miss the large numbers of greylag and pink-footed geese and whooper swans in the Bays. No systematic survey of these species has been undertaken to date.

2.6.3 Other Fauna

A study of Nigg and Udale Bays by Anderson (1970) recorded 33 species: 14 annelids, 11 mollusca and 8 crustacea. The 1980 survey by Scottish Marine Biological Association showed that Udale Bay is the most important site in the Moray Firth area on account of the large number of species in relation to the extensive intertidal area at low tide. As a result, Udale Bay is considered to be of regional importance for invertebrates. A moth night held at Nigg Bay in 2000 recorded 70 species. It is suggested that lunar yellow underwing Noctua orbona, a UK BAP species, could be present, but no record has been found yet.

Table 12: Other Fauna – Nigg and Udale Bays

Species	Status	Popn. size	Importance	Comments
Mammals				
Otter	EPS, UK BAP, Sch 5			Signs always present in both Bays
Invertebrates				
Assemblage			REG	Classified as regionally important (Anderson, 1970)

2.6.4 Physical site description

Geology & soils:

Nigg Bay and Udale Bay are comprised of Middle Old Red Sandstone basement. The Bays lie in a syncline, the axis of which runs south west through Nigg Bay, Udale Bay and across the Black Isle to Beauly. Nearly all of Nigg and Udale Bays are comprised of intertidal flats made up of estuarine sands, muds and silt. The soils above high tide are described as humus-iron podzols with some non-calcareous gleys.

Hydrology:

The tidal flats of Nigg and Udale Bays are subject to the natural fluctuations of the tide and tidal currents. Some of the channels within the bays have radically altered their course during the last 50 years. The hydrology of both salt water and incoming fresh water strongly influence the area and type of mudflat that occurs.

For MORECS square 19, which includes Nigg and Udale:

Mean annual rainfall	990 mm
Mean annual potential evapo-transpiration	505 mm
Soil moisture deficit at end of June (upper quartile)	65 mm
Commencement of deficit period	1st May

Udale Bay:
Freshwater flows through the site in the Newhall Burn. Neighbouring agricultural land drains join drains on the site, flowing out to sea. The sea wall around Gordon's Mill has a 3m wide hole in it, caused by natural erosion. The old tidal flap sluice is now completely broken, allowing seawater to enter the site at high tides.

Nigg Bay:
The Balnagown River runs through the site at Tarbat, out to sea. The field at Meddat has been isolated from the neighbouring drains and seawater enters the site through two created breaches. The hydrology and water control structures on Bayfield are shown on Map 11b. These were installed in 2003, so details of extent of flooding through the year and relative ditch levels will be manually controlled and recorded over the coming years.

2.6.5 Management objectives

1. To maintain 1570ha of intertidal habitats in favourable SSSI condition, and where possible increase the area of intertidal habitats through coastal realignment.
2. To manage the 30ha wet grassland to create suitable habitat for breeding waders, wet grassland flora and invertebrates.
3. To manage the other habitats on the reserve, scrub and tall herb fen, to maintain or enhance current condition.
4. To inform RSPB management of the site and contribute to national recording schemes, surveys and research projects
5. To build and retain RSPB supporters, prospects and members
6. To promote opportunities for lifelong learning and advocacy
7. To build and retain the support of key RSPB stakeholders
8. To maximise income and funding to support the reserve and the RSPB
9. To demonstrate coastal realignment and wet grassland management to other site managers, nature conservation advisers, politicians and statutory officers.

2.7 Moray Firth SAC
Ionad Sònraichte Glèidhteachais Linne Mhoireibh

2.7.1 Qualifying features

This site has been notified for SAC for its subtidal sandbanks and Bottlenose dolphins Tursiops truncatus.

Table 13: Moray Firth SAC – Physical Site Characteristics Summary

Notable Habitat Classes	
Class	% cover
Marine areas. Sea inlets.	100
Notable Habitat Types	
Type	% cover
Sandbanks which are slightly covered by sea water all the time	30
Estuaries 2 D	2

Large shallow inlets and bays		44.4
Notable fauna:	Bottlenose dolphin Tursiops truncatus Harbour porpoise Phocoena phocoena Common otter Lutra lutra Grey seal Halichoerus grypus Harbour seal Phoca vitulina	
Soil & geology	Biogenic reef, Boulder, Cobble, Gravel, Mud, Pebble, Sand, Sandstone/mudstone, Sedimentary, Shingle, Slate/shale	
Geomorphology & landscape	Enclosed coast (including embayment), Estuary, Intertidal rock, Intertidal sediments (including sandflat/mudflat), Open coast (including bay), Subtidal sediments (including sandbank/mudbank)	

2.7.2 Management objectives

Under the auspices of the Moray Firth Partnership, a SAC management group was set up in October 1999 with EC LIFE Project funding. The group aims to develop management measures to restore and maintain the bottlenose dolphin population at a viable level.

The dolphin population is monitored by Aberdeen University. A number of initiatives are already underway including an accreditation scheme for dolphin-watching cruise boats and codes of conduct for recreational pleasure craft. A strategy for dumping and dredging activities is also being developed to address these localised activities adjacent to the coastline.

The management aims for the site are to:

- Avoid deterioration of the subtidal sandbanks, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and
- Avoid deterioration of the Bottlenose dolphin habitats or significant disturbance to the Bottlenose dolphins, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features.

The long term objectives for the site are:

1. For the subtidal sandbanks, to maintain:
   - Extent of the habitat on site
   - Distribution of the habitat within site
   - Structure and function of the habitat
   - Processes supporting the habitat
   - Distribution of typical species of the habitat
   - Viability of typical species as components of the habitat
   - No significant disturbance of typical species of the habitat

2. For the bottlenose dolphins, to maintain:

   - Population of the species as a viable component of the site
   - Distribution of the species within site
   - Distribution and extent of habitats supporting the species
   - Structure, function and supporting processes of habitats supporting the species
   - No significant disturbance of the species

2.8 Moray Basin Firth and Bays Important Bird Areas
Raointean Cudromach Eun Linne is Bhàghan Mhoireibh

2.8.1 Site description

This IBA extends to 134,226.59ha comprises a complex area of coastline and estuary, including Loch Fleet, Dornoch Firth, Loch Eye, Cromarty Firth, Beauly Firth and Moray Firth (south shore including Burghead and Spey Bay), stretching from Helmsdale south to Spey Bay.

2.8.2 Qualifying features

The site is nominated for IBA as the coastal areas identified above form an integral unit that is internationally important for populations of wintering and passage wildfowl.

2.8.3 Physical site features

The site also contains rich invertebrate fauna, highly diverse aquatic flora including uncommon species, notable mammals including bottle-nosed dolphins and porpoises. Common seals and otter also occur.

2.8.4 Management objectives

The nomination is held through Bird Life International, with the RSPB responsible for conservation management. No other information is presently available.

2.9 Nigg and Udale Bays National Nature Reserve
Raon-glèidhteachais Nàdair Nàiseanta Bhàghan Neig is Uadail

2.9.1 Site description

The Nigg and Udale Bays National Nature Reserve (NNR) comprise largely marine and intertidal habitats within the Moray Firth. The site extends to 648.4ha over three designated areas to the north, north-west and south-west of the Nigg Development Masterplan study area.

2.9.2 Qualifying features

Scottish Natural Heritage states:

- The first NNRs were designated over 50 years ago and, at that time, they were the cornerstone of nature conservation. Over time, the system for the protection of nature has evolved to include the natural heritage outwith nature reserves, and NNRs have come to serve a broader range of purposes.
- Nigg and Udale Bays were strategically nominated for NNR at the beginning of the oil industry's expansion in the northern Highlands to safeguard key landscape features within the Moray Firth from industrial development. The site is recognised under International Union for the Conservation of Nature (IUCN) Category IV – Habitat/Species Management Area.

2.9.3 Management objectives

The site is managed by SNH. Notably, the NNR nomination is currently under review by SNH and will likely be superseded by the overlapping designations described above, with relevant management responsibilities transferred therein.

A specific site management strategy is not supplied for this site, though a number of general management objectives can be derived from IUCN guidance, provided below.

General policy objectives as set out by IUCN guidance:

- All protected areas should aim to:

- Conserve the composition, structure, function and evolutionary potential of biodiversity;
- Contribute to regional conservation strategies (as core reserves, buffer zones, corridors, stepping-stones for migratory species etc.);
- Maintain diversity of landscape or habitat and of associated species and ecosystems;
- Be of sufficient size to ensure the integrity and long-term maintenance of the specified conservation targets or be capable of being increased to achieve this end;
- Maintain the values for which it was assigned in perpetuity;
- Be operating under the guidance of a management plan, and a monitoring and evaluation programme that supports adaptive management;
- Possess a clear and equitable governance system.
- All protected areas should also aim where appropriate to:
- Conserve significant landscape features, geomorphology and geology;
- Provide regulatory ecosystem services, including buffering against the impacts of climate change;
- Conserve natural and scenic areas of national and international significance for cultural, spiritual and scientific purposes;
- Deliver benefits to resident and local communities consistent with the other objectives of management;
- Deliver recreational benefits consistent with the other objectives of management;
- Facilitate low-impact scientific research activities and ecological monitoring related to and consistent with the values of the protected area;
- Use adaptive management strategies to improve management effectiveness and governance quality over time;
- Help to provide educational opportunities (including about management approaches);
- Help to develop public support for protection.

Specifically, Category IV protected areas aim to protect particular species or habitats and management reflects this priority.

Many category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.

Category IV Primary objective

- To maintain, conserve and restore species and habitats.

Other Category IV objectives:

- To protect vegetation patterns or other biological features through traditional management approaches;
- To protect fragments of habitats as components of landscape or seascape-scale conservation strategies;
- To develop public education and appreciation of the species and/or habitats concerned;
- To provide a means by which the urban residents may obtain regular contact with nature.

Distinguishing features.

Category IV protected areas usually help to protect, or restore:

1. flora species of international, national or local importance;
2. fauna species of international, national or local importance including resident or migratory fauna; and/or
3. habitats.

The size of the area varies but can often be relatively small; this is however not a distinguishing feature. Management will differ depending on need. Protection may be sufficient to maintain particular habitats and/or species. However, as category IV protected areas often include fragments of an ecosystem, these areas may not be self-sustaining and will require regular and active management interventions to ensure the survival of specific habitats and/or to meet the requirements of particular species.

A number of approaches are suitable:

- Protection of particular species: to protect particular target species, which will usually be under threat (e.g., one of the last remaining populations);
- Protection of habitats: to maintain or restore habitats, which will often be fragments of ecosystems;
- Active management to maintain target species: to maintain viable populations of particular species, which might include for example artificial habitat creation or maintenance (such as artificial reef creation), supplementary feeding or other active management systems;
- Active management of natural or semi-natural ecosystems: to maintain natural or semi-natural habitats that are either too small or too profoundly altered to be self-sustaining, e.g., if natural herbivores are absent they may need to be replaced by livestock or manual cutting; or if hydrology has been altered this may necessitate artificial drainage or irrigation;
- Active management of culturally-defined ecosystems: to maintain cultural management systems where these have a unique associated biodiversity. Continual intervention is needed because the ecosystem has been created or at least substantially modified by management. The primary aim of management is maintenance of associated biodiversity.

Active management means that the overall functioning of the ecosystem is being modified by e.g., halting natural succession, providing supplementary food or artificially creating habitats: i.e., management will often include much more than just addressing threats, such as poaching or invasive species, as these activities take place in virtually all protected areas in any category and are therefore not diagnostic. Category IV protected areas will generally be publicly accessible.

Category IV protected areas frequently play a role in “plugging the gaps” in conservation strategies by protecting key species or habitats in ecosystems. They could, for instance, be used to:

- Protect critically endangered populations of species that need particular management interventions to ensure their continued survival;
- Protect rare or threatened habitats including fragments of habitats;
- Secure stepping-stones (places for migratory species to feed and rest) or breeding sites;
- Provide flexible management strategies and options in buffer zones around, or connectivity conservation corridors between, more strictly protected areas that are more acceptable to local communities and other stakeholders;
- Maintain species that have become dependent on cultural landscapes where their original habitats have disappeared or been altered.

Category IV provides a management approach used in areas that have already undergone substantial modification, necessitating protection of remaining fragments, with or without intervention.

Many category IV protected areas exist in crowded landscapes and seascapes, where human pressure is comparatively greater, both in terms of potential illegal use and visitor pressure.

The category IV protected areas that rely on regular management intervention need appropriate resources from the management authority and can be relatively expensive to maintain unless management is undertaken voluntarily by local communities or other actors.

Because they usually protect part of an ecosystem, successful long-term management of category IV protected areas necessitates careful monitoring and an even greater-than-usual emphasis on overall ecosystem approaches and compatible management in other parts of the landscape or seascape.

2.10 Semi-Natural and Ancient Woodland
Coille Leth-nàdarra is Àrsaidh

There is an area of designated Ancient Woodland adjacent to the eastern side of the development site, which could provide habitat for protected species and nesting birds. There is no readily available data from SNH on the nature and extent of the woodland.

2.11 Easter Ross and Cromarty Local Biodiversity Action Plan
Plana-gnìomha Bith-iomadachd Ionadail Rois an Ear is Chrombaidh

The national priority habitats and local priority species occurring in Ross and Cromarty (East) as selected by the UK Biodiversity Steering Group are listed below. Habitat Action Plans (HAPs) or Statements and Species Action Plans (SAPs) or Statements have been prepared for these habitats, and are available on the website www.ukbap.org.uk.

Each Species and Habitat Action plan provides the following information:

- Current status
- Current factors causing loss or decline
- Current action
- Action plan objectives and targets
- Proposed actions with lead agencies

Biodiversity Management Plans are being reviewed by Halcrow as part of an Appropriate Assessment for the Nigg Development Master Plan. Mitigation measures proposed by the HAPs and SAPs should be reviewed at the EIA level.

Table 14: Easter Ross and Cromarty Habitats

Sea & Coast	
Coastal salt marsh	Dornoch Firth / Morrich More
Coastal sand dunes	Dornoch Firth / Morrich More
Maritime cliff and slopes	Shandwick coast, southern Black Isle
Mudflats	Firths at eastern rim
Seagrass beds	Beauly and Cromarty Firths
Sublittoral sands and gravels	Moray Firth
River, Loch & Wetland	
Eutrophic standing waters	Loch Eye
Mesotrophic lakes	Loch Ussie
Reedbeds (N)	Near Dingwall
Farm & Croft Land	
Cereal field margins	Farmland in east

Purple moor grass and rush pastures	Upland farm and croftland
Forest & Woodland	
Native pinewood	Strathvaich pinewood, Monadh Mor, Pitmaduthy
Upland oakwood	Achilty oakwood, Drummondreach on the Black Isle
Wet woodland	Margins and floodplain alderwoods at the mouth of River Conon
Upland birch	South side of Loch Glass, Strath Vaich, Strathconon
Bog, Moor & Hill	
Blanket bog	Upland west of area
Lowland heathland	Belmaduthy, Black Isle
Upland heathland	Hillsides in upland west
Town & Village	
None	

Table 15: Easter Ross and Cromarty Species

Amphibians	
Triturus cristatus	Great crested newt UK BAP
Ants	
Formica aquilonia	Scottish wood ant UK BAP
Formica lugubris	Hairy wood ant UK BAP
Bees and Wasps	
Osmia uncinata	A mason bee UK BAP
Birds	
Alauda arvensis	Skylark UK BAP
Carduelis cannabina	Linnet UK BAP
Emberiza schoeniclus	Reed bunting UK BAP
Loxia scotica	Scottish crossbill UK BAP
Melanitta nigra	Common scoter UK BAP
Muscicapa striata	Spotted flycatcher UK BAP
Passer montanus	Tree sparrow UK BAP
Perdix perdix	Grey Partridge UK BAP
Pyrrhula pyrrhula	Bullfinch UK BAP
Tetrao tetrix	Black grouse UK BAP
Tetrao urogallus	Capercaillie UK BAP
Turdus philomelos	Song thrush UK BAP
Butterflies and moths	
Noctua orbona	Lunar yellow underwing UK BAP
Semiothisa carbonaria	Netted mountain moth UK BAP
Xylena exsoleta	Sword grass UK BAP
Aricia artaxerxes	Northern brown argus UK BAP
Boloria euphrosyne	Pearl-bordered fritillary UK BAP
Epione parallelaria	Dark-bordered beauty UK BAP
Hemaris tityus	Narrow-bordered bee hawk moth UK BAP
Paradiarsia sobrina	Cousin German UK BAP
Xestia alpicola alpina	Northern dart UK BAP
Fish	
Clupea harengus	Herring UK BAP
Gadus morhua	Cod UK BAP
Merlangus merlangus	Whiting UK BAP
Pleuronectes platessa	Plaice UK BAP
Pollachius virens	Saithe UK BAP
Raja batis	Common skate UK BAP
Scomber scombus	Mackerel UK BAP
Tracharus trachurus	Horse mackerel UK BAP
Flies	
No information available	
Fungi	

None	
Lichens	
No information available	
Mammals	
Arvicola terrestris	Water vole UK BAP
Balaenoptera acutorostrata	Minke whale UK BAP
Lepus europaeus	Brown hare UK BAP
Lutra lutra	Otter UK BAP
Phoecoena phocoena	Harbour porpoise UK BAP
Pipistrellus pipistrellus	Common pipistrelle bat UK BAP
Pipistrellus pygmaeus	Soprano pipistrelle bat UK BAP
Sciurus vulgaris	Red squirrel UK BAP
Tursiops truncatus	Bottlenosed dolphin UK BAP
Molluscs	
Margaritifera margaritifera	Freshwater pearl mussel UK BAP
Vertigo genesii	Round-mouthed whorl snail UK BAP
Vertigo geyeri	Geyer's whorl snail UK BAP
Mosses and liverworts	
No information available	
Reptiles	
None	
Sea anemones	
No information available	
Stoneworts	
No information available	
Vascular plants	
Centaurea cyanus	Cornflower UK BAP
Euphrasia heslop-harrisonii	an eyebright UK BAP
Juniperus communis	Juniper UK BAP
Lycopodiella inundata	Marsh clubmoss UK BAP
Melampyrum sylvaticum	Small cow-wheat UK BAP
Pilularia globulifera	Pillwort UK BAP
Potomogeton rutilus	Shetland pondweed UK BAP

2.12 Data Sources
Tobraichean Dàta

KBR Environmental Site Assessment, Nigg Fabrication Yard 2005
Cromarty Firth Ramsar management plan
Cromarty Firth SPA management plan
Cromarty Firth SSSI Management Plan
Nigg and Udale bay RSPB Management Plan (2004 – 2009)
UK Moray Firth SAC Natura2000 standard data form
http://www.nnr-scotland.org.uk/nnrpolicy.asp
www.ukbap.org.uk

2.13 Key Issues
Prìomh Chùisean

The study area boundary, extending to the Mean High Water Springs (MHWS), is situated partly within the Cromarty Firth which is a European protected Special Protection Area (SPA), an internationally recognised Ramsar Site and a Site of Special Scientific Interest (SSSI) under UK legislation. This boundary is also adjacent to the Moray Firth Special Area of Conservation (SAC).

The extent of proposed development is situated adjacent to SEPA-designated Shoreline Water at Cromarty Firth as well as a Semi-Natural and Ancient Woodland designation.

There are other non-statutory designations nearby, namely an Important Area for Birds and National Nature Reserve.

There are known potential pollutant linkages to these ecologically sensitive areas as a result of historic industrial activity and known pollution events on site.

3 Climatic Factors
Nithean Aimsireil

3.1 Baseline
Bun-loidhne

There is no site specific data for climatic factors relating to the Nigg site and surrounding area, however inference can be made from climatic trends for the whole of the UK, such as increased rainfall and precipitation events. These are shown in Figure 4, Figure 5 and Table 16 below.

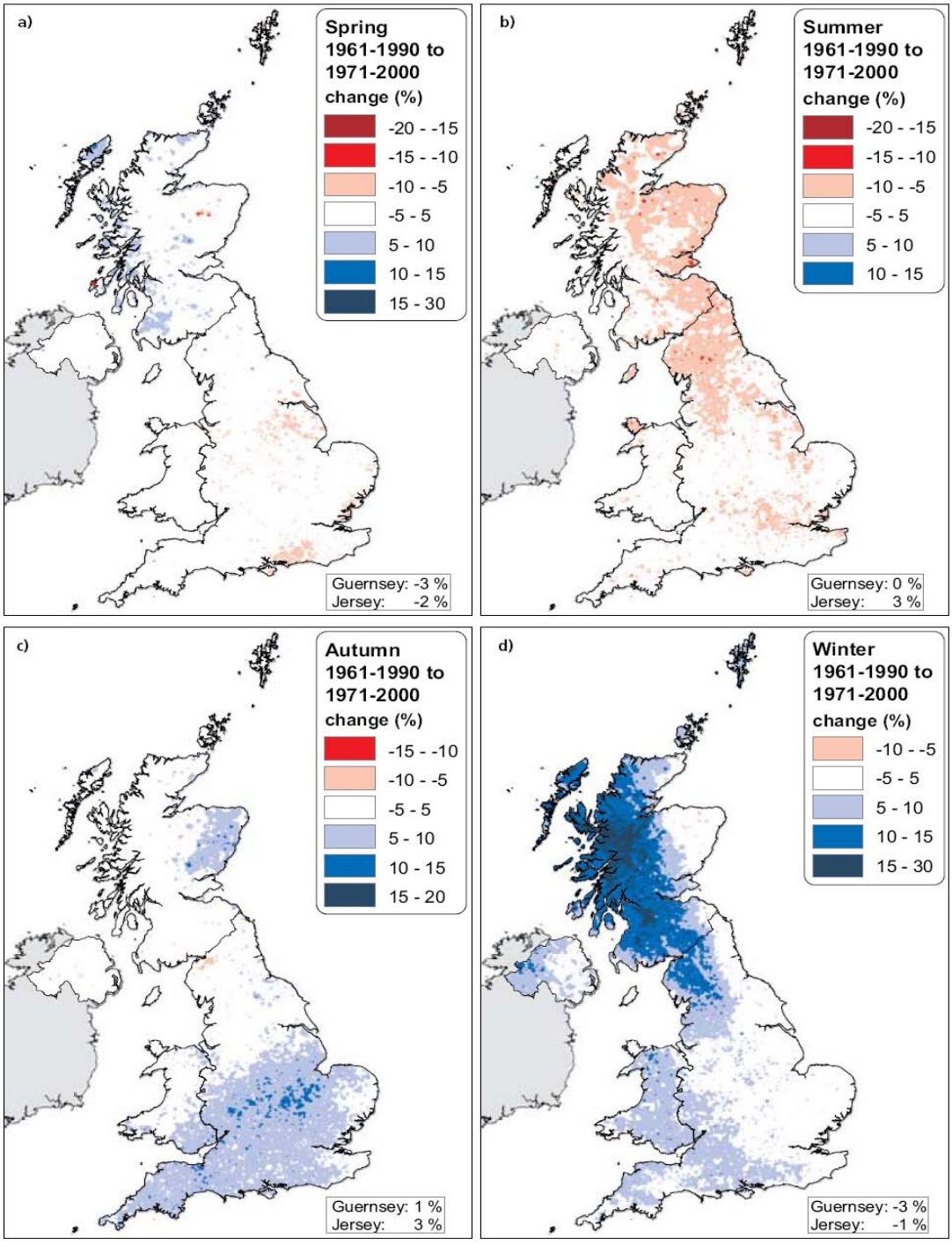

Figure 4: Precipitation Trends in Scotland (Source UKCIP 08)

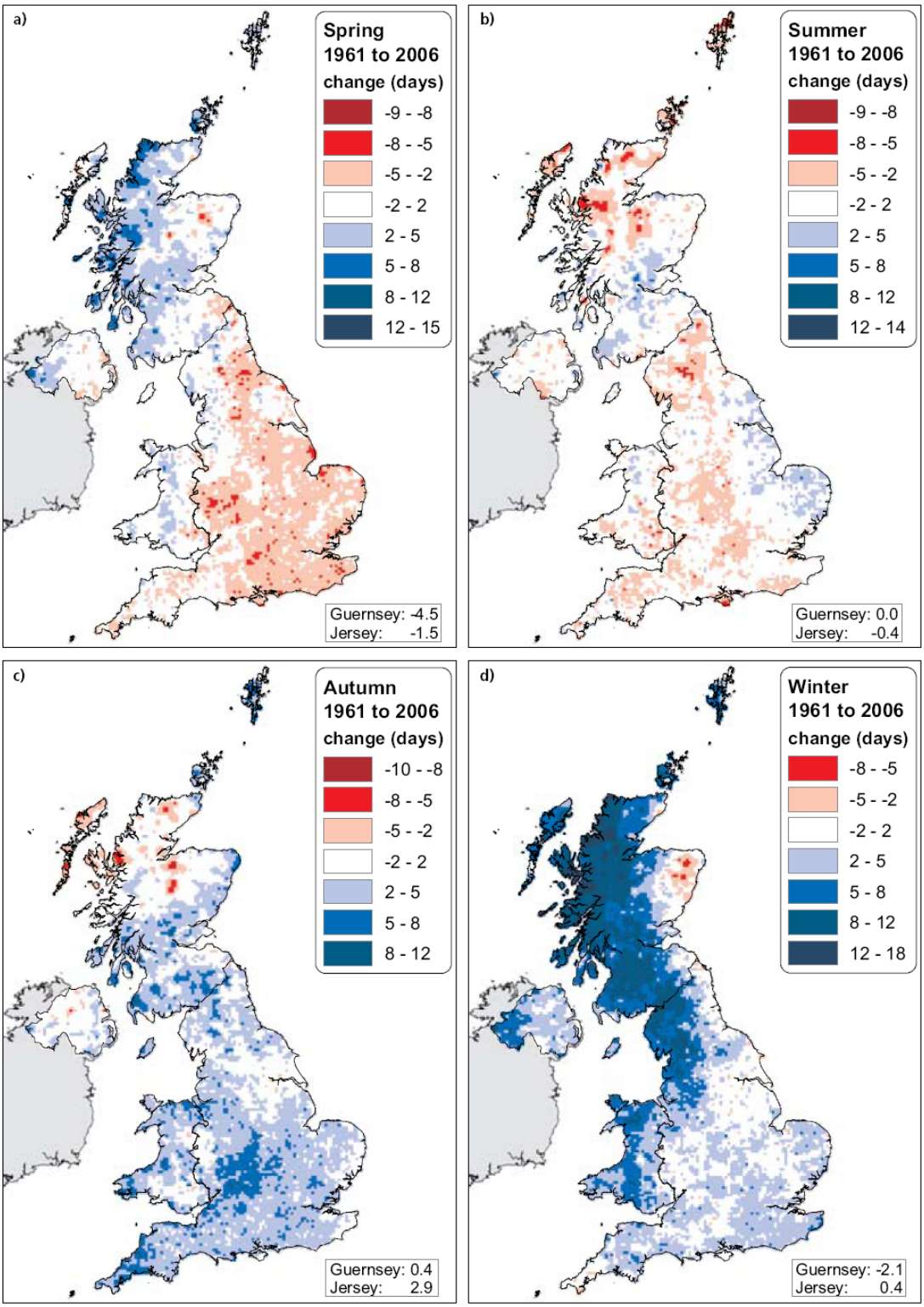

Figure 5: Rainfall Trends in Scotland (Source: UKCIP 08)

Table 16: Climate Trends across Scotland (Source: SNIFFER Handbook of Climate Trends across Scotland)

Variable	Season	Trend (UK North)	Expected Future Trend (from UKCIPO2 scenarios)
Annual Average temperature	Spring	↑	Possible increase in all seasons, greater in south than north. This matches the trends already seen.
	Summer	↑	
	Autumn	↑	
	Winter		
	Annual	↑	
24-hour maximum temperature	Spring	↑	Maximum temperatures may increase in all seasons. The range of possible increases is smallest in winter and greatest in autumn. This matches trends we have already seen.
	Summer	↑	
	Autumn	↑	
	Winter	↑	
	Annual	↑	
24-hour minimum temperature	Spring	↑	The minimum temperature may increase more in winter than summer. This generally matches the trends already seen.
	Summer	↑	
	Autumn		
	Winter		
	Annual	↑	
Daily temperature range	Spring		This range may increase most in summer. We cannot find a trend in the information we have for summer, but some regions are showing an increasing trend in other seasons.
	Summer		
	Autumn	↑	
	Winter	↑	
	Annual	↑	
Heating degree days	Annual	↓	This may reduce in the future, which is in line with the trend already seen, but the possible reduction by the 2080s is 50% to 300% greater than that experiences so far.
Growing degree days	Annual	↑	No estimates have been made in the UKCIPO2 scenarios for this measure.
Length of the growing season	Annual	↑	A possible increase in the length of the growing season of 20 to 60 days by the 2080s. We have seen a similar trend but the spatial pattern is different.
Growing season start and end dates	Start	↓	Estimates for the start of the growing season are similar to those we have already seen, but suggest a later end to the growing season than has been seen already.
	End	↑	
Extreme temperature range	Annual		No estimates have been made in the UKCIPO2 scenarios for this measure.
Length of summer heat waves and winter cold spells	Summer		No estimates have been made in the UKCIPO2 scenarios for this measure.
	Winter		
Air frost	Spring	↓	No estimates have been made in the UKCIPO2 scenarios for this measure, but the reductions in minimum temperatures expected should mean some reduction in the number of air frosts. This matches the trend already seen.
	Summer	↓	
	Autumn	↓	
	Winter		
	Annual	↓	

Variable	Season	Trend (UK North)	Expected Future Trend (from UKCIPO2 scenarios)
Ground frost	Spring	↓	No estimates have been made in the UKCIPO2 scenarios for this measure, but the reductions in minimum temperatures expected should mean some reduction in the number of ground frosts. This matches the trend already seen.
	Summer	↓	
	Autumn	↓	
	Winter	↓	
	Annual	↓	
Early and late season frosts (based on individual weather stations)	Early		No estimates have been made in the UKCIPO2 scenarios for this measure, but the reductions in minimum temperatures expected should mean some reduction in the number of early and late season frosts. This matches the trend already seen.
	Late	↓	
	Frost-free period		
Average precipitation total	Spring		Winter months may become wetter while summer months may be drier than at present. The spatial pattern of change expected is the opposite of the trend that has already been seen.
	Summer		
	Autumn		
	Winter	↑	
	Annual	↑	
Snow cover	Spring		The UKCIPO2 scenarios present a different measure but winter snowfall may reduce by 50% or more across Scotland by the 2080s Medium High scenario. The spatial pattern of possible change is again different from the trend already seen.
	Autumn	↓	
	Winter		
	Annual	↓	
Days of heavy rain each year	Spring		No estimates have been made in the UKCIPO2 scenarios for this measure.
	Summer		
	Autumn		
	Winter	↑	
	Annual	↑	
Number of consecutive dry days	Annual		No estimates have been made in the UKCIPO2 scenarios for this measure.
Average rainfall intensity	Annual		The intensity of rainfall may increase in winter months. A contrasting change between the east and west, with most extreme changes taking place in eastern Scotland, is expected.
Maximum five-day rainfall	Annual	↑	No estimates have been made in the UKCIPO2 scenarios for this measure.

3.2 Data Sources
Tobraichean Dàta

SNIFFER Handbook of Climate Trends across Scotland, available online at http://www.sniffer.org.uk/Resources/CC03/Layout_ClimateChange/12.aspx?backurl=http%3A%2F%2Fwww.sniffer.org.uk%3A80%2Fthemes%2Fclimate-change.aspx&selectedtab=completed

UKCIP 08 Report on The Climate of the UK and Recent Trends, available online at http://www.ukcip.org.uk/index.php?id=469&option=com_content&task=view

3.3 Key Issues
Prìomh Chùisean

Climate induced sea level rise will increase risk of flooding above that outlined in SEPA's flood risk maps which outline a 1 in 200 year event, but do not incorporate estimates of increased risk due to climatic factors. Halcrow has undertaken a Flood Risk Assessment

(FRA) to account for the current SEPA stated flood risk and assess the additional risk associated with climatic change, particularly with regard to the shoreline location and reclaimed nature of the site. The conclusions of the FRA are presented in Section 4.3 below.

An increased flood risk further increases the risk of contamination through pollutant linkages identified as a result of historic industrial activity and known pollution events on site.

4 Water
Uisge

4.1 Water Quality
Càileachd Uisge

The Water Environment and Water Services (Scotland) Act 2003 and The Water Environment (Controlled Activities) Scotland Regulations 2005 (CAR Regulations), which came into effect in 2006, implement part of the EC Water Framework Directive, and replace the Control of Pollution Act 1974. The Water Environment and Water Services (Scotland) Act 2003 gives Scottish Ministers powers to introduce regulatory controls over activities in order to protect and improve Scotland's water environment.

4.1.1 Existing Water Bodies

The extent of proposed development is adjacent to the Cromarty Firth estuary, which SEPA have classified as Grade A – Excellent – in their estuarine classification system.

There are at least two small unnamed watercourses running within 1km of the extent of proposed development; however, these have not yet been classified in terms of quality by SEPA.

4.1.2 Relevant Designations and Regulations

Coastal water around Cromarty (850 m south of the extent of proposed development) has been designated by SEPA as "Recreational Water" due to the frequency of human contact with the water for recreational and leisure purposes. A separate stretch of coastline adjacent to the extent of proposed development to the south east is designated as a "Shoreline Water" as its foreshores are commonly used by the public. These designations under section 32 of the Environment Act are largely employed to control sewerage-related discharge to protect environmental quality and human health.

The Shoreline and Recreational Waters designation have implications for microbial discharges, as outlined in SEPA's Regulation Method 13 – Regulation of Microbial Discharges, and the levels of appropriate sewage treatment. It is understood that upgrading of the current (private) wastewater treatment system may be required in order to bring the current network into compliance with SEPA's regulatory framework. Consultation with Scottish Water's regional Asset Planner should be undertaken, to discuss future capacity of the existing system.

The area is not classified as a Salmonid Water, under the Freshwater for Fish Directive (78/659/EEC).

Abstraction of water for construction activities from surface or ground water, engineering works affecting inland watercourses and point source discharges in the Cromarty Firth will require to be carried out under appropriate CAR licensing regimes. Furthermore, any dewatering activities on site during construction may also require consent from SEPA, including draining the graving dock.

4.2 Groundwater Contamination
Truailleadh Uisge-talmhainn

Groundwater conditions and existing known sources of contamination were investigated by Atkins in 2005. This study concluded that groundwater in and around the Nigg site generally flows to the south west / west and experiences tidal influence extending 50 – 80 metres into the site from the sea and dock. Saline waters are present in around ¾ of the site.

Inorganic and Organic contaminants, including biodegraded diesel, oil and petroleum hydrocarbons were present in groundwater investigations taken at the Nigg Yard site in 2002 (Atkins 2005), including:

- Elevated TPH in groundwater in the equipment shop & paint/blast shop areas;
- Petroleum products in groundwater near the equipment workshop; and
- Elevated copper in groundwater.

These substances are largely linked to known diesel/oil leakages throughout the site history (see

Table 2), and concentrated to the area around the paint/blast shop to the north of the dry dock. No remediation requirements were recommended beyond the existing groundwater treatments system.

No elevated concentrations of contaminants were found in groundwater at the Oil Terminal.

The risk posed by existing pollutants to controlled waters is summarised in Table 17 below.

Table 17: Potential Known Pollutant Linkages to Controlled Waters (Source: KBR 2005)

Source	Pathway	Receptor
Petroleum hydrocarbons leaked and spilt from tanks, buried lines & vehicles migrated vertically / leached / absorbed onto soil; dissolved within groundwater and free phase on water table. (equipment workshop to paint/blast shop area).	Migrated vertically/leached through unsaturated zone.	Groundwater within emplaced sand / blown sand.
	Migration with flow of groundwater into the dock and subsequently through the culverts beneath the dock gate.	Cromarty Firth
	Migration with flow of groundwater through sheet piled site boundaries.	Cromarty Firth
	Vertical migration through groundwater in sands.	Minor aquifers (MORs)
	Migration within waters of minor aquifer.	Cromarty Firth
Petroleum hydrocarbons potentially contained within the bund material on the western site boundary and in surface soils (originating from dock excavation)	Migrated vertically / leached to groundwater.	Groundwater within emplaced sand / blown sand.
	Migration with flow of groundwater through sheet piled site boundaries.	Cromarty Firth
Petroleum hydrocarbons from leaks / spills onto hardstanding.	Surface run-off entraining contaminants – impacted surface waters through drains (not attached to interceptors or via faulty interceptors) to the outfall.	Cromarty Firth
Inorganics including **metals** and **sulphates** within made ground – metal processing and/or seawater.	Leached through unsaturated zones or absorbed from seawater.	Groundwater within emplaced sand / blown sand.
	Migration with flow of groundwater into the dock and subsequently through the culverts beneath the dock gate.	Cromarty Firth
	Migration with flow of groundwater through sheet piled boundaries.	Cromarty Firth
	Vertical migration through groundwater in sands.	Minor aquifers (MORs)
	Migration within waters of minor aquifer.	Cromarty Firth

4.3 Flooding Issues

Tuiltean

SEPA's indicative flood maps show that is at significant risk of coastal flooding at the site. This includes tidal surges and unusually high tides, but does not account for potential sea level rise associated with global climate change. Therefore it can be reasonably assumed that the 1 in 200 year events depicted in SEPA flood risk maps need to be augmented by an assessment of sea level rise over the anticipated life of the Masterplan.

The majority of the Nigg site is comprised of reclaimed land. Apart from existing boulder foundations there are currently no specific flood defences in place.

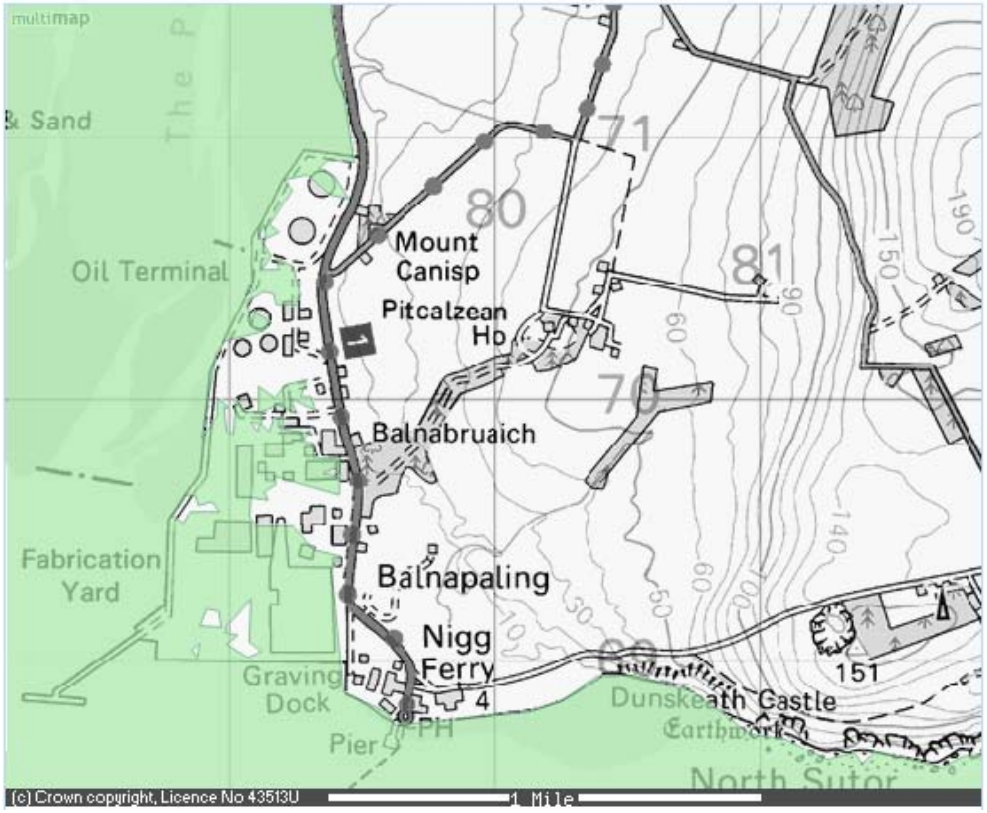

Figure 6: Area at Risk of Flooding from the Sea (Source: SEPA Flood Map)

4.4 Dredging Risks

Cunnartan Sgrìobaidh

If dredging, coastal defence upgrading or other quay side facility improvements should be necessary, it is likely that a range of surveys and mitigation measures will need to be developed, to account for potential risks associated with mobilisation of sediments.

4.5 Licenses

Ceadan

Ithaca and KBR, as operators of the Oil Terminal and Fabrication Yard respectively, hold various licenses with SEPA to discharge trade and sewerage effluent into Nigg Bay. A review of these licenses with respect to new user needs will need to be undertaken at EIA level.

4.6 Data Sources
Tobraichean Dàta

SEPA website
KBR Environmental Site Assessment, Nigg Fabrication Yard 2005

4.7 Key Issues
Prìomh Chùisean

The extent of proposed development is adjacent to the Cromarty Firth estuary, which SEPA have classified as Grade A – Excellent – in their estuarine classification system.

There are at least two small unnamed watercourses running within 1km of the extent of proposed development.

Coastline adjacent to extent of proposed development to the south east is designated by SEPA as a "Shoreline Water" as its foreshores are commonly used by the public.

Coastal water around Cromarty (850 m south of the extent of proposed development) is designated by SEPA as "Recreational Water" due to the frequency of human contact with the water for recreational and leisure purposes.

Groundwater in and around the site generally flows to the south west / west and experiences tidal influence extending 50 – 80 metres into the site from the sea and dock. Saline waters are present in around ¾ of the site.

Groundwater contamination, including petroleum hydrocarbons and inorganic materials, is present on site. This has been linked to historic industrial activity and known pollution events on site.

Ithaca and KBR, as operators of the Oil Terminal and Fabrication Yard respectively, hold various licenses with SEPA to discharge trade and sewerage effluent into Nigg Bay.

SEPA's indicative flood maps show that is at significant risk of coastal flooding at the site. Apart from existing boulder foundations there are currently no specific flood defences in place.

5 Soil
Ùir

5.1 Baseline
Bun-loidhne

The Nigg Oil Terminal and Nigg Fabrication Yard are sited on largely made ground. Placed materials includes a <0.5m thick layer of gravel underlain by emplaced sand fill approximately 2 – 5m thick. These are in turn underlain by Blown Sand, a thin veneer of Glacial Till and sandstone at depths of >7m.

The proximal land to the east is essentially green field. There is no known data regarding the physical soils composition in this area.

5.1.1 Contamination of Industrial Areas

Inorganic contaminants and organic compounds, including petroleum hydrocarbons were identified through ground investigations undertaken at the Nigg Fabrication Yard by Atkins (2005). In general, these contaminants were fairly evenly distributed across the site, with elevated concentrations to the west of the yard area.

Elevated levels of petroleum hydrocarbons were identified in the known area of contamination near the paint/blast shop to the north of the dock. Elevated levels were also recorded near the western and eastern site boundaries and were linked to surface spills or placement of materials excavated from the dock in 1997-1998.

5.1.2 Contamination of Proximal Land to the East

There is no record of past uses suggesting any ground contamination and Halcrow has not seen any evidence to suggest that there are major buried services or structures on the site to restrict future development.

5.2 Data Sources
Tobraichean Dàta

KBR Environmental Site Assessment, Nigg Fabrication Yard 2005

5.3 Key Issues
Prìomh Chùisean

Inorganic contaminants and organic compounds, including petroleum hydrocarbons, are present in soils within the industrial areas. In general, these contaminants are fairly evenly distributed across the site, with elevated concentrations near the paint/blast shop to the north of the dock and to the west of the yard area. This contamination has been linked to historic industrial activity and known pollution events on site.

6 Material Assets
So-mhaoin Stuthail

6.1 Baseline
Bun-loidhne

Material assets as an SEA Topic can cover a range of issues, from transport and energy infrastructure to raw materials and waste management. The following subsections outline three material assets, including:

- Strategic Drainage Infrastructure;
- Road Access; and
- Sea Access.

6.2 Strategic Drainage Infrastructure
Bun-structar Drèanaidh Ro-innleachdail

Foul water drainage is currently serviced primarily by on-site pumping stations flowing to on-site treatment plant comprising three units capable of serving a population of between 1200 and 1500 people. This facility currently services less than 100 people.

The final effluent discharges into the Cromarty Firth via a consented outfall. The plant should adequately serve any future occupation of the site after an overhaul.

It is understood that the on site waste water treatment plant is currently under private ownership.

The site has three distinct storm water catchments and for each catchment the flows are collected and transferred to individual storm water drains. Two of the collection systems discharge directly to the Cromarty Firth while the third system discharges to a soakaway. It is reported that the systems operate effectively with only minor silting of the pipework requiring occasional jetting

6.3 Road Access
Inntrigeadh Rathaid

The industrial land is well access from the B9175.

The topography of the proximal land to the east is potentially problematic in that only a comparatively small area of the site (i.e. the coastal strip) is relatively flat and therefore relatively easily developed and safely accessible to vehicles transporting very heavy large loads.

6.4 Access to the Cromarty Firth
Inntrigeadh gu Caolas Chrombaidh

The Cromarty Firth is a busy waterway, providing passage for a number of vessels every year from the North Sea to active ports in the area. Table 18 provides a summary of vessel movements within Cromarty Firth in 2008.

Table 18: Cromarty Firth Vessel movements from 1 January to 31 December 2008 (Source: Cromarty Firth Port Authority)

Vessel Type	Number of Movements	Busy Times
Anchor Handling Tugs	128	Throughout year
Barges	12	Throughout year
Barge carriers	2	Throughout year
Large Bulk carriers	2	Throughout year
Buoy Tenders	26	Throughout year
Coastal Tankers	44	Throughout year
Customs Cutters	4	Throughout year
Diving Support Vessels	74	Summer months
Drill ships	2	Throughout year
Dry Cargo vessels	16	Throughout year
Fishery Research vessels	8	Throughout year
Fishing vessels	2	Throughout year
Cargo ships	232	Throughout year
Jacup rigs	2	Throughout year
Fish carriers	2	Throughout year
Offshore standby vessels	18	Throughout year
Oil Tankers	28	Throughout year
Passenger Ships	104	May to September
Pipelayers	30	May to September
Platform Support vessels	14	Throughout year
Oil rigs	20	Throughout year
Ro-Ro Cargo vessels	10	Throughout year
Seismic vessels	8	Throughout year
Shuttle Tankers	26	Throughout year
Tugs	138	Throughout year
Total	**952**	

Access to the sea from the industrial areas is currently available via the dry dock (KBR operated) and jetty (Ithaca operated). The dry dock has not been utilised since around 2003, following termination of operations in the Fabrication Yard. The jetty is still active in association with Oil Yard operations, including transfer of crude oil from storage tanks and ship to ship transfer.

Potential access to the sea from the proximal land to the east could be taken across the beach to the south of the site. Consent was previously granted for access to deep water across the beach at this point.

Alternatively, access could be taken via a crossing of the public road to the east side of the graving dock where a new purpose-built quay wall could be provided.

Provision of access to the sea from the proximal land to the east via land outwith the direct control of KBR or Dow Chemicals would likely present complications with regards to land acquisition and delivery.

6.5 Data Sources
Tobraichean Dàta

Cromarty Firth Port Authority correspondence.

6.6 Key Issues
Prìomh Chùisean

Foul water drainage is currently serviced primarily by on-site pumping stations flowing to on-site treatment plant comprising three units capable of serving a population of between 1200 and 1500 people. This is currently under private ownership.

The industrial land is well access from the B9175, but there are potential challenges to ensuring the proximal land to the east can be safely accessed by vehicles transporting very heavy large loads.

The Cromarty Firth is a busy waterway, providing passage for a number of vessels every year from the North Sea to active ports in the area. Access to the sea from the industrial areas is currently available via the dry dock (KBR operated) and jetty (Ithaca operated). There is scope to increase the level of sea access via KBR and Dow Chemical owned land.

7 Air Quality and Noise
Càileachd Àidheir agus Fuaim

7.1 Air Quality Baseline
Bun-loidhne Càileachd Àidheir

The site is not included within an Air Quality Management Area (AQMA), and due to the rural nature of the surrounding area it is unlikely that there any significant sources of pollution which could be detrimental to the environment.

During the construction and operation of the site, increased traffic on the local road network and marine craft are likely to cause a rise in air pollution. Vehicle emissions would include Nitrous Oxides (NOx), Carbon Monoxide (CO), Volatile Organic Compounds (VOCs) and particulates such as PM2.5 and PM10.

Dust may also be an issue during the construction phase, depending on the location, nature and scale of the development activities. During periods of warm dry weather, mud from the wheels of construction vehicles may also have the potential to produce dust. Dust can be regarded as a nuisance but it can also have adverse impacts if it is inhaled or if it settles on vegetation. Fine particles can also be washed into and have adverse impacts on the ecology of surface waters.

Following the construction phase there is some potential for dust to be blown from areas where the surface vegetation has been stripped away. Impact from dust may therefore continue until vegetation has been re-established. It is not anticipated that impacts from dust would be a long-term or permanent issue.

7.1.1 Data Sources

Updating and Screening Assessment of Air Quality – Highland Council 2006.

7.1.2 Possible Issues

There are no key issues in relation to Air Quality for the Nigg Development Masterplan, therefore it is proposed to scope out this topic.

7.2 Noise and Vibration Baseline
Bun-loidhne Fuaim is Crith

There is currently no readily available noise data for the Nigg development Site. The following identifies the current context for industrial development and potential receptors with respect to noise.

The Nigg site is located in a relatively rural area, away from any other noticeable sources of industrial noise. The existing site is known to be a source of noise, as is the nearby Invergordon port. Of key consideration for the purposes of this study are the potential impacts of noise as a result of increased operations within the site as well as the impact of increased traffic accessing the site.

7.2.1 Receptors of Operational Noise

Residential properties in proximity to the site would be primary receptors. These include dwellings within or adjacent to the extent of proposed development at Balnabruaich, Balinpaling and Nigg Ferry (hotel). Further afield are farm buildings and villages at Nigg and Pitcalnie, located approximately 800m and 1.2km north east of the site respectively.

The town of Cromarty, approximately 1.5km from the graving dock entrance, could also be impacted upon by operational noise.

Visitors to the site are also considered to be potential receptors. Current recreational uses at the site include boating, walking, bird watching and fishing.

Finally, the nearby ecologically sensitive areas would also be receptors of noise. This could include impacts to bottlenose dolphins and over-wintering bird populations. These are qualifying features of the Cromarty Firth Special Protection Area, Ramsar and SSSI designations. Cetaceans (e.g. dolphins, harbour porpoises, whales) are also known to be present in the Moray Firth SAC.

7.2.2 Traffic

Road access to the site is via the B9175. This is the primary route to the site from the A9, approximately 7km to the north of the site. In addition to impacting on the proximal dwellings identified above, increased traffic along the B9175 would also pass through the hamlets of Arabella and Ankerville.

In addition, the Cromarty Firth provides a marine traffic route to the ports at Delny, Invergordon and Deephaven and the harbour at Cromarty. Villages on the south side of the firth may also be sensitive receptors, as noise can carry well over water.

7.2.3 Data Sources

Halcrow Environmental Baseline Report

7.2.4 Key Issues

The site is known to be a source of noise related to industrial operations and activities as well as road and marine traffic. Key receptors include residential dwellings and settlements and ecologically sensitive areas.

8 Population and Human Health
Àireamh-sluaigh agus Slàinte Dhaoine

8.1 Population Baseline
Bun-loidhne Àireamh-sluaigh

The study area includes a limited number of private residences, but does not include any substantive formal settlements. For the purpose of this study, however, it is critical to examine the socio-economic impact of the longstanding industrial uses within the study area on the wider East Highland area and, in particular, Easter Ross region.

At its peak, the Nigg Fabrication Yard employed approximately 5,000 people. Its closure had a significantly negative impact on regional employment, and recent figures indicate that this impact has persisted to present day. Easter Ross has consistently demonstrated the highest rate of unemployment within the Inverness and East Highland area (see Figure 7).

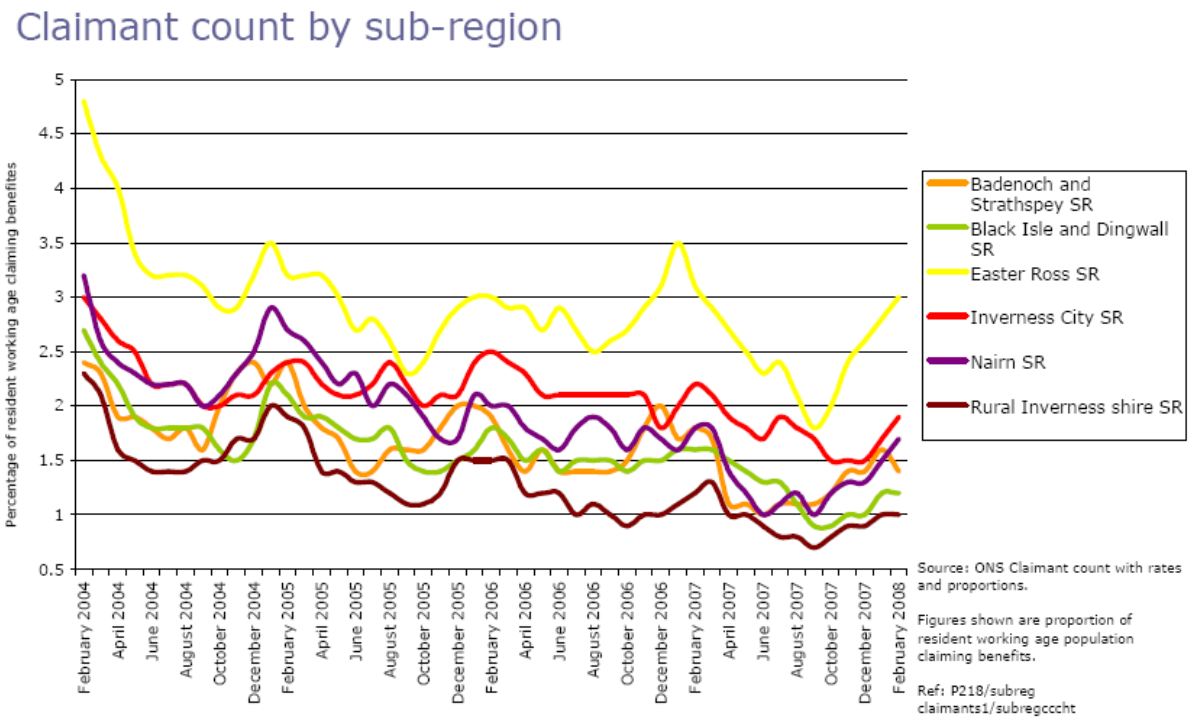

Figure 7: Claimant Count for Inverness and East Highlands (February 2004 – February 2008) (Source: Highlands and Islands Enterprise (May 2008) Draft Inverness and East Highland Social and Economic Audit and Atlas 2008)

As a result of the yard's closure, a significant number of skilled workers from the area have taken up oil-related industrial work abroad but retain close ties to the local community.

A redeveloped Nigg site is considered to have the potential to provide employment for an average of 750 to 800 full time employees (FTE) over the next 15 to 20 years. Current employment is about 150 FTE. Thus the net increase is forecast to be between 600 and 650 FTE.

The net increase in economic output (GVA) is forecast to be £60 to 65 million per year. In addition there would be the usual indirect and induced effects on the local economy. Applying a multiplier of 1.5 would increase the above employment and output estimates by +50%.

Depending on skills required some of this employment need could be filled using the local skills base, including those who presently work abroad. However, it is recognised that the existing skills base comprises, at least in part, an aging workforce, and that any employment generation in the area could result in significant in-migration which would clearly impact on the existing housing market and related infrastructure.

8.2 Human Health Baseline
Bun-loidhne Slàinte Dhaoine

8.2.1 Pollutants

There is currently no readily available data or current statistics on site specific emissions or light pollution.

Table 19 outlines the known pollutant linkages to human health as a result of historic industrial activity and known contamination events on site.

Table 19: Potential Known Pollutant Linkages to Human Health (Source: KBR 2005)

Source	Pathway	Receptor
Petroleum hydrocarbons leaked and spilt from tanks, buried lines & vehicles migrated vertically / leached / absorbed onto soil; dissolved within groundwater and free phase on water table. (equipment workshop to paint/blast shop area).	• Direct dermal contact • Direct ingestion • Direct inhalation of dust • Ingestion/dermal contact with water supply tainted by hydrocarbons in ground/water • Direct inhalation of volatile vapours	Site workers, visitors and trespassers. *Most of this source is at depth – direct ingestion or dermal contact unlikely, vapour pathway prominent*
	• Entrainment of dust by wind – then dermal contact, ingestion & inhalation • Migration on groundwater then inhalation of volatile vapours	Neighbouring workers, residents and the public. *Most of this source is at depth – so vapour pathway dominant as above.*
Petroleum hydrocarbons potentially contained within the bund material on the western site boundary and in surface soils (originating from dock excavation)	• Direct dermal contact • Direct ingestion • Direct inhalation of dust • Ingestion/dermal contact with water supply tainted by hydrocarbons in ground/water • Direct inhalation of volatile vapours	Site workers, visitors (e.g. maintenance workers) and trespassers.
	• Entrainment of dust by wind – then dermal contact, ingestion & inhalation • Migration on groundwater then inhalation of volatile vapours	Neighbouring workers, residents and the public.
Inorganics including **metals** and **sulphates** within made ground – metal processing and/or seawater.	• Direct dermal contact • Direct ingestion • Direct inhalation of dust	Site workers, visitors and trespassers.
	• Entrainment of dust by wind – then dermal contact, ingestion & inhalation	Neighbouring workers, residents and the public.

8.2.2 Health and Safety

The Health and Safety Executive (HSE) sets a consultation distance (CD) around major hazard sites and pipelines after assessing the risks and likely effects of major accidents. Major hazards comprise a wide range of chemical process sites, fuel and chemical storage sites, pipelines, explosive sites and nuclear sites. The Planning Authority is notified of this CD and has a statutory duty to consult HSE. HSE have developed a comprehensive, codified methodology, PADHI (Planning Advice for Developments near Hazardous Installations).

PADHI uses two inputs to a decision matrix to generate the response of 'Advise Against' or 'Don't Advise Against':

- The first is which zone the development is located in of the 3 zones (that make up the CD) that HSE sets around the major hazard site. This includes the Inner (IZ) Middle (MZ) and Outer (OZ)
- The second is the 'Sensitivity Level' of the proposed development which is derived from an HSE categorisation system of 'Development Types'.

Following comments received during consultation HSE has stated that the Oil Terminal is a major hazard site which has an overall consultation distance (CD) of 1000 metres. At the present time there is no 3-zone map for this site. HSE would need to review the CD in time, which may be reduced in overall size. **Proposed redevelopment should not conflict with the Oil Terminal according to HSE**. The development type is classed as Level 1 – based on normal working population including people at work and parking. The work places proposed should provide for buildings of less than 100 occupants and less than 3 occupational storeys within any inner zone of a 3-zone map.

8.3 Data Sources
Tobraichean Dàta

Highlands and Islands Enterprise (May 2008)
Draft Inverness and East Highland Social and Economic Audit and Atlas 2008
Halcrow Nigg (2008) Development Master Plan Consultation Report
KBR Environmental Site Assessment, Nigg Fabrication Yard 2005
Health and Safety Executive (March 2008) PADHI – HSE'S Land Use Planning Methodology

8.4 Key Issues
Prìomh Chùisean

An existing oil and gas related skills base remains in the local area, linked to previous operations at Nigg. Current employment at the Nigg Oil Terminal and Nigg Yard comprises approximately 150 FTE. There are currently limited local employment opportunities in Easter Ross relative to the wider local authority area as evidenced by benefits claimant count.

There is an existing pollutant linkage to human health as a result of historic industrial activities and contamination events on site. This risk is primarily limited to site workers or visitors.

9 Landscape and Cultural Heritage (including Historic Environment)
Cruth-tìre is Dualchas Cultarail (a' gabhail a-steach na h-Àrainneachd Eachdraidheil

9.1 Landscape Baseline
Bun-loidhne Cruth-tìre

Local knowledge suggests the landscape issues at the existing site are a contentious issue with local residents, with the yard particularly impacting on the views from Cromarty, but also from the villages of Saltburn and Kildary to the north of the Nigg Yard.

The Nigg Hills to the east of the extent of proposed development are designated as an Area of Great Landscape Value by the Ross and Cromarty East Local Plan.

There are no other landscape designations such as National Scenic Areas, Heritage Coasts or Country Parks at, or near, the Nigg Yard site. However, there are some local residential and farm properties to the east of the site, and visitors of the RSPB Nature Reserve and users of the Nigg – Cromarty Ferry have been identified as other potentially sensitive receptors.

The Nigg and Udale Bays, approximately 200m to the north of the extent of proposed development, are extensive areas of mudflat, saltmarsh and wet grassland. This is part of an RSPB reserve. The RSPB have a bird-watching hide at Udale Bay, which is thought to be popular particularly between October and March during the over-wintering bird season, plus another hide planned for Nigg Bay.

The Cromarty Firth has been an important source of recreation for local people for centuries. A wide range of recreation activities are practised such as wildfowling, boating, walking, bird watching and fishing. Bottlenose dolphins are regularly seen at the mouth of the firth and are now a major tourist attraction. In addition, the wide range of bird life in the Firth attracts many bird watchers.

9.2 Cultural Heritage Baseline
Bun-loidhne Dualchais Chultarail

The scoping report identified one statutory archaeological designation (a Scheduled Ancient Monument (SAM)) within the site boundary and two Listed Buildings (B Listed Pitcalzen House and C Listed Pitcalzen Coach House) within close proximity to the Development Area Boundary in addition to numerous entries on the National Monuments Record (NMR) and Scottish Sites and Monuments Record (SMR). These have been reassessed in relation to their proximity to the extent of proposed development and these are presented on Figure 8 and in Table 20.

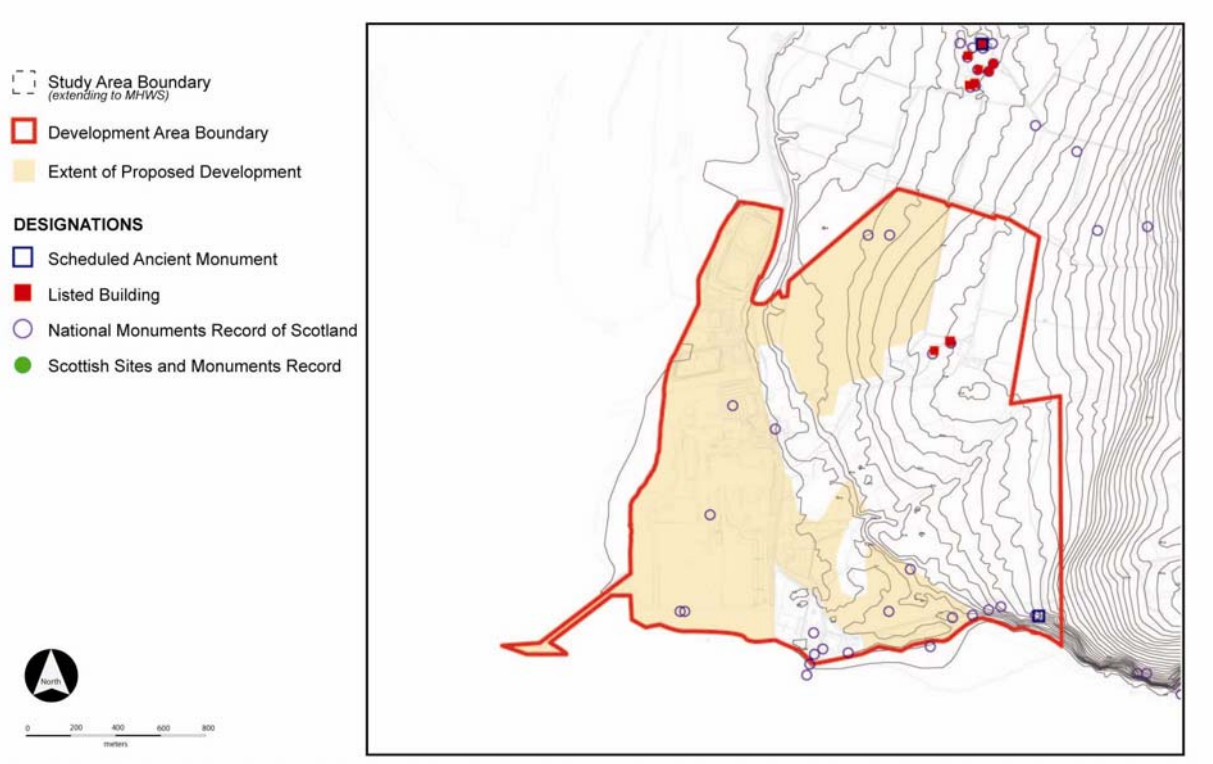

Figure 8: Built Heritage

Table 20: Designated Sites and Buildings*

Site Name	Designation	Grid Reference	Approx. Distance to Proposed Development Boundary
Dunskeath Castle	Scheduled Ancient Monument	NH 8070 6898	300 m
Nigg Church Cross-slab	Scheduled Ancient Monument	NH 8043 7170	800 m
Nigg Parish Church	A-Listed Building	NH 8045 7171	800m
Pitcalzean House	B-Listed Building	NH 80207 70234	<100m
Nigg House	B-Listed Building	NH 80427 71588	700m
Old Manse	B-Listed Building	NH 80495 71617	800m
Nigg Mains	C-Listed Building	NH 80390 71521	800m
Old Manse Steading	C-Listed Building	NH 80471 71587	800m
Nigg House Cottage Stable	C-Listed Building	NH 80427 71588	800m
Pitcalzean House, Coach House	C-Listed Building	NH 80289 70287	<100m
Mount Canisp Fish Trap	Scottish Monument	NH 7912 7066	Within
Nigg Oil Terminal Oil Fuel Berth	Scottish Monument	NH 7920 7040	Within
Nigg Oil Terminal	Scottish Monument	NH 79126 69655	Within
Nigg Oil Terminal	National Monument	NH 79253 69986	Within
Nigg Fabrication Yard Marine Construction Site	Scottish Monument	NH 7911 6944	Within
Nigg Fabrication Yard Dock	Scottish Monument	NH 7911 6944	Within
Nigg Site	Scottish / National Monument	NH 7914 6946	Within
Nigg Ferry, General View	Scottish / National Monument	NH 79 69	Within
Nigg Ferry Oil Platform Fabrication Yard	Scottish / National Monument	NH 79 69	Within
Saltings, West of Balnapaling	Scottish Monument	NH 7933 6932	Within
Urns and Cists, Balnabruaich	Scottish / National Monument	NH 7945 6987	Within
RB Coin Findspot	Scottish Monument	NH 8000 7100	Within
Round Barrow, Pitcalzean	Scottish / National Monument	NH 7990 7080	Within

Site Name	Designation	Grid Reference	Approx. Distance to Proposed Development Boundary
Lower Pitzcalzean, Circular Enclosure	Scottish / National Monument	NH 8000 7080	Within
Midden, Balnapaling	Scottish Monument	NH 7990 6900	Within
Bronze Age burial finds, North Suitor	Scottish / National Monument	NH 8000 6900	Within
Midden, Castle Craig	Scottish / National Monument	NH 8010 6920	Within
Nigg – Cromarty Anti-Submarine Defence	Scottish / National Monument	NH 8020 6883 to NH 8020 6733	Within
Quarry, Nigg Ferry	Scottish / National Monument	NH 8040 6898	Partially within

**NMR and SMR listings outwith the extent of proposed development have not been included here.*

The extent of proposed development does not have a direct impact on the Dunskeath Castle SAMs or either of the Pitcalzean House Listed buildings. Likewise, neither option indicates any potential issues affecting these sites with regard to access arrangements or movement.

Any indirect effect, particularly on the setting of these features, should be assessed at EIA stage with regards to detailed development proposals.

Given the presence of nineteen archaeological sites located within the extent of proposed development, any excavation works may have the potential for uncovering previously undiscovered features of archaeological importance.

9.3 Data Sources
Tobraichean Dàta

- Past Map
- National Monuments Record (RCAHMS)
- Highland Historic Environment Record (HER)

9.4 Key Issues
Prìomh Chùisean

The Nigg Hills to the east of the extent of proposed development are designated as an Area of Great Landscape Value by the Ross and Cromarty East Local Plan.
The extent of proposed development contains 19 sites of archaeological interest. It is also adjacent to two Listed Buildings and in proximity to a Scheduled Ancient Monument.