

# Nigg Development Masterplan Prìomh Phlana Leasachaidh Neig



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## Executive Summary

### Geàrr-chunntas Gnìomhach

#### The Study

The purpose of the Development Masterplan for the former oil fabrication yard, oil terminal and surrounding land at Nigg is to outline a 'vision' and feasible options for the development of the site as a multi-user industrial facility. The Nigg yard has substantially been vacant for the past five years and unlocking development potential at Nigg will contribute substantially to the economy of the North of Scotland. The aim of the Nigg Development Masterplan is to maximise the site's strategic development potential and employment opportunities over the next 15 to 20 years.

Halcrow was appointed in March 2008 by Highlands & Islands Enterprise (HIE) in partnership with The Highland Council (THC), to prepare the Nigg Development Masterplan. This report is the culmination of several months' investigations into the baseline development context, market appraisal, technical assessment, consultation and development Master Planning. It is a practical document designed to be market-facing and value-creating to breathe new life into the site and make a significant contribution to the economic regeneration of the inner Moray Firth and the region as a whole. The Masterplan has been undertaken in collaboration with MacKay Consultants who undertook the market appraisal, as well as the client steering group.

The Nigg Development Masterplan is intended to inform and provide the rationale that underpins the requirement to pursue the Compulsory Purchase Order (CPO) procedure under consideration by The Highland Council to facilitate and enable the site to be brought back into economic use.

#### Approach

The options for the development of the Nigg site and proximal sites to the east have been informed by:

A **Baseline Appraisal** of the development context of the site. This has confirmed that infrastructure and utilities can be provided to allow inward investment and the creation of indigenous business opportunities. This analysis has been used to inform the 'base case' for physical development at Nigg;

The **Market Assessment** prepared by MacKay Consultants. This shows that the Nigg site is well placed to accommodate a number of market sectors, particularly from the oil and gas and renewable energy (wind and marine) sectors. The graving dock and strategic deep water location are recognised as the site's distinguishing

features, and should be used to competitive advantage. A number of markets have been examined in terms of market viability in the context of the Nigg site;

A **Technical Assessment** in relation to the site content, cost and value engineering, project delivery and associated impacts. Paramount in this has been the need to accommodate land uses in a cost effective manner through the designation of general activity zones and individual plots. This has followed sound site planning and management principles and has been accommodated within a flexible framework that is responsive to changing sectoral trends.

## Options

Consideration is given to feasible **options** to bring the site into use as a multi-user industrial facility. Possible uses and opportunities have been considered for each component parts of the site, both individually, as well as collectively as a single unit. The options are based on the market assessment for the next 15 to 20 years prepared by MacKay Consultants, as well as the engineering information available at the time of writing, to ensure its validity and fitness for purpose.

Two principle options emerged which considered each of the three components of the Nigg site (oil terminal; fabrication yard; and proximal land to the east of the fabrication yard) both individually and collectively as a single unit. Option 1 diversifies the activities at Nigg whilst building on its oil and gas industry reputation and introduces a renewable energy mix. The renewable energy sector is the focus for Option 2 with the majority of the site allocated for this activity. These options are appraised and the strengths and weaknesses of each are considered. The Highland Council subsequently agreed at their Planning, Environment & Development Committee on the 18<sup>th</sup> March 2009 to continue developing both Options in the Masterplan to maintain flexibility in developing the site as a multi-user facility. Subsequent representations have indicated that there may be market interest in a single-user site and this Masterplan should be interpreted with a sufficient degree of flexibility to avoid precluding such an outcome.

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%.

The guidance reflects the policy advice given in Scottish Planning Policy, and will supplements Policy 23 of The Highland Council's Highland wide Local Development Plan which states:



### **Policy 23 Nigg**

The Council will support the development of the Nigg Yard and proximal lands in line with its approved Masterplan (outlined above). The Council intends to adopt The Nigg Development Masterplan as Supplementary Guidance.

This guidance is to be adopted as statutory Supplementary Guidance under the Planning Etc. (Scotland) Act 2006.

The Highland Council will monitor the effectiveness of the guidance and review its contents at regular intervals to ensure it remains relevant and compliant with Scottish Government Policy and Highland Council Policies and Strategies.

### **Report Structure**

The Report is structured as follows:

**Section 1 Introduction**

**Section 2 Site Appraisal** – outlines the physical, environmental and socio-economic context of the site.

**Section 3 Policy and Regulatory Context** – outlines the national, strategic and local policy and regulatory framework relevant to the Nigg site.

**Section 4 Market Review** – contains a synopsis of the market assessment undertaken by Mackay Consultants

**Section 5 Technical Assessment** – deals with detailed technical and feasibility issues relating to infrastructure and service provision on the site, as well as the planning history and an outline of CPO procedures.

**Section 6 Strategic Framework & Options** – this section contains the development principles on which the Development Masterplan is based, partly informed by a consultation workshop. Consideration is given to the options to bring the site into potential use as a multi-user industrial facility and considers the development components of the development framework.

**Section 7 Way Forward** – provides the key findings and next steps in the Masterplan process.

# 1 Introduction Ro-ràdh

## 1.1 Background

In March 2008 Halcrow Group Ltd (Halcrow) was commissioned by Highlands & Islands Enterprise (HIE), in partnership with The Highland Council (THC), to prepare a Development Masterplan for the Nigg complex (comprising the oil terminal and former fabrication yard), including the surrounding area to the east of the site. The Nigg site has been substantially vacant for the past five years.

The focus of the Development Masterplan will be on the Nigg complex and the proximal sites identified as industrial allocations within the adopted Highland-wide Local Development Plan. This Plan builds upon the "*Review of Ports and Sites in the Inner Moray Firth*" previously prepared by Halcrow in 2004, and approved as interim supplementary guidance to the development plan by The Highland Council in June 2006. Development at Nigg is central to the future economic development in the region and sub-region and forms an important part of the economic development and regeneration strategies in the area.

The Development Masterplan will review feasible options to bring the site into use. The assessment is based upon civil engineering knowledge to ensure its validity and fitness for purpose. The aim is to unlock the development potential of the site in order that it can positively facilitate, contribute to and enable regeneration of the area.

HIE has jointly commissioned a market appraisal undertaken by MacKay Consultants. This market appraisal is to assess and advise upon forecasts of activity in the identified market options (including the oil & gas sector and the energy & renewables sectors) for the next 15-20 years. In addition, it is to consider the economic impacts of these uses in terms of likely direct and indirect employment, along with the GVA contribution to the local economy. This market appraisal is to inform the types of sector and sub-sector that are sustainable in the study area.

## 1.2 Context

The Nigg complex comprising the Nigg Fabrication Yard and the Oil Terminal was built to service the construction and repair of the largest maritime structures. It extends to approximately 100 hectares (ha) combining extensive fabrication/warehousing buildings, generous yards, graving dock and quayside and oil terminal in a strategic North Sea location. In addition to the Nigg complex, the Nigg Development Masterplan also considers the proximal



land to the east extending to approximately 234 ha. The total Nigg Development Masterplan area therefore amounts to approximately 334 ha.

The Nigg Yard was established as a fabrication facility in 1972 by Brown and Root – Wimpey Highland Fabricators Limited. The site covers approximately 70 ha and sits on an area of reclaimed land to the east of Nigg Bay at the mouth of the Cromarty Firth.

An oil terminal occupies an area approximately 30 ha beyond the northern boundary of the fabrication yard. This terminal has been constructed by Talisman Energy (UK) Ltd who lease the land from KBR. A 30 hectare strip of land across the south of the site, which includes the west yard and the graving dock is owned by a local trust (Wakelyn Trust) who lease the land back to KBR. The lease is due to expire in 2031 with break options operable by KBR in 2021. Rent reviews are five yearly.

The Inner Moray Firth sub-region experienced a catastrophic contraction of its oil and gas fabrication sector during 1999 – 2000. The closure of the yards at Nigg and Ardersier caused the loss of approximately 5,000 jobs and some £100 million per annum expenditure from the economy. It is understood that a significant number still work in the oil and gas industry worldwide and have retained their homes in the area.

KBR appear to have no remaining commercial interest in the Nigg complex – the yard has remained substantially vacant since 2002/03. The Nigg complex was offered for disposal on the market in February 2005, but despite some market interest, it remains unsold. There is no indication at this stage to suggest that an early disposal and negotiated settlement of the Nigg complex will be reached.

The Nigg complex (terminal and yard), as well as the proximal land to the east, comprise a unique facility of strategic economic significance to the Highlands. The Nigg complex is the only large scale industrial site that has the potential to be used as a flexible multi-user engineering and processing complex capable of serving a wide range of industrial uses. The Highland Council's non-statutory Supplementary Guidance, the Inner Moray Firth Ports and Sites Strategy 2050 (June 2006) considers the importance of Nigg in terms of its potentially significant contribution to the national, sub regional and local economies. It should be noted that The Highland Council would presume against any development which involves the decommissioning or dismantling of vessels or structures containing nuclear or hazardous toxic waste materials, and the potential uses have been considered accordingly.

Inverness and the Inner Moray Firth are designated as a key regional economic development zone in Scotland. There is a need to promote

economic growth. It is therefore important to bring the Nigg complex back into positive economic use and to avoid the continued deterioration of the existing infrastructure. To assist in potentially unlocking the site for development the Council is considering pursuing Compulsory Purchase Order (CPO) procedure. In anticipation of this procedure, this Nigg Development Masterplan is intended to inform and provide the rationale that underpins the CPO procedure. Whilst it is preferable to persuade all parties to progress matters by amicable agreement, this route could be supported by a compelling case for a CPO if any party is unwilling to agree.

### 1.3 Study Objectives

Specific outputs of the study include the following three main components:

A **Market Appraisal** to review and assess market forecasts to inform appropriate uses that may be accommodated on the site (MacKay Consultants).

A **Technical Assessment** to assess infrastructure and engineering capacity and capability of the site to accommodate appropriate uses (Halcrow).

A **Masterplan Framework** to prepare a development Masterplan which provides a 15-20 year strategic framework for the appropriate uses to be accommodated on the site taking into account physical and environmental constraints (Halcrow).

### 1.4 Methodology

The approach undertaken in the preparation of the Development Masterplan for the Nigg Fabrication Yard and associated sites has involved a review of previous reports and submissions, published projections and market reports as a desk research exercise. In addition interviews were undertaken with private sector operators in key industrial markets; interviews with port/site owners in the context of maritime engineering and infrastructure capacity; consultation with relevant community councils and stakeholders; and consideration of port management and operations. This approach was agreed with the client steering group and confirmed at the inception meeting.

The separately commissioned market assessment undertaken by MacKay Consultants informed the range of uses chosen for the various development options at Nigg. The requirements of these uses ('user requirements') in terms of accessibility, port characteristics and buildings and structures were then considered in the context of the current engineering and infrastructure provision at Nigg. Based on the findings of the market assessment and the engineering and infrastructure considerations, the Development Plan was

prepared which identifies options for the development of the Nigg site and the proximal sites to contribute to the economy.

This is a common approach in Master Planning ports, harbours and major sites typically requiring a review of current operations, technical and environmental constraints and existing and predicted markets, in order to develop several possible future scenarios. A range of options for infrastructure and estate developments (supply) required to meet projected markets (demand) is developed and the relative positive and negative aspects of each option are considered through an appropriate level of engagement and consultation with stakeholders the preferred option can be identified and a development framework can be developed.

This Development Masterplan identifies options for the development of the Nigg site and the proximal sites to contribute to the economy of the North of Scotland. These options have subsequently been consulted upon (first stage public consultation end 2008/early 2009) and a Strategic Environmental Assessment (SEA) has been undertaken to inform the Development Masterplan.

This Final Nigg Development Masterplan has been modified to incorporate comments received at the second stage public consultation, as well as mitigation measures identified through the Strategic Environmental Assessment (SEA) process. The Development Masterplan has also been modified to incorporate an update of the Market Assessment undertaken by MacKay Consultants.

The draft Nigg Development Masterplan (November 2008) was published by The Highland Council for the first stage Public Consultation at the end of 2008/early 2009. 23 responses were received and generally the Masterplan was welcomed. The responses and comments received during this public consultation exercise have informed the Final Draft Masterplan. See Appendix 3.

This Final Nigg Development Masterplan (September 2009) has now been modified to incorporate comments received following the second round of public consultation (1<sup>st</sup> June to 7<sup>th</sup> August 2009) on the Final Draft Development Masterplan and Strategic Environmental Assessment (SEA). It incorporates mitigation measures identified through the SEA process.

The Strategic Environmental Assessment (SEA) to accompany and inform the final version of the Nigg Development Masterplan has been prepared in parallel. The SEA Scoping Report was submitted to the Scottish Government Gateway at the end of 2008 which has informed the Environmental Report which will accompany the Nigg Development Masterplan. A Flood Risk

Assessment (FRA) and the first stage Appropriate Assessment (AA) has also been prepared, which in association with the Environmental Report (ER), have informed the mitigation measures that are incorporated within this modified version of the Masterplan. See Appendix 4. Alongside the Masterplan should be read the Nigg Development Masterplan Appropriate Assessment (Revised January 2013)

[<http://www.highland.gov.uk/yourenvironment/planning/nigg.htm>]. This identifies the likely significant effects on nearby internationally designated nature conservation sites and sets out mitigation that is required to safeguard their conservation objectives and qualifying interests. A summary of the Appropriate Assessment is included in this Masterplan at Appendix 5

This Final Nigg Development Masterplan (incorporating second stage public consultation responses and SEA mitigation measures) was recommended for approval by The Highland Council prior to submission of the approved Masterplan and SEA to Scottish Ministers following completion and joint sign off, with SNH, of the Appropriate Assessment.

The Highland Council propose to finally adopt the Nigg Development Masterplan as supplementary guidance to the development plan. Subject to the progress on negotiations in 'unlocking' the development potential of the Nigg site, The Highland Council propose to progress with CPO procedures; albeit the preferred outcome is a negotiated solution.

## 2 Site Appraisal Measadh Làraich

### 2.1 Introduction

This section considers the Nigg site (fabrication yard and oil terminal) as well as the proximal sites to the east within a development context. Consideration has been given to physical characteristics, access and transportation, infrastructure considerations, environmental considerations and the socio-economic context. The purpose of considering these issues is to understand the potential opportunities or constraints with regard to the future development of the Nigg site.

### 2.2 Site Context, Description and Characteristics

The Nigg site is located in the north of Scotland at Nigg Point on the south-west coast of the Fearn Peninsula, approximately 61 kilometres (km) from Inverness. It is accessed by the B9175 which currently bisects the Nigg site and joins the A9 approximately 6 km to the north. The nearest serving railway station is at Fearn which is approximately 9.5 km from the site (Figure 2.1).

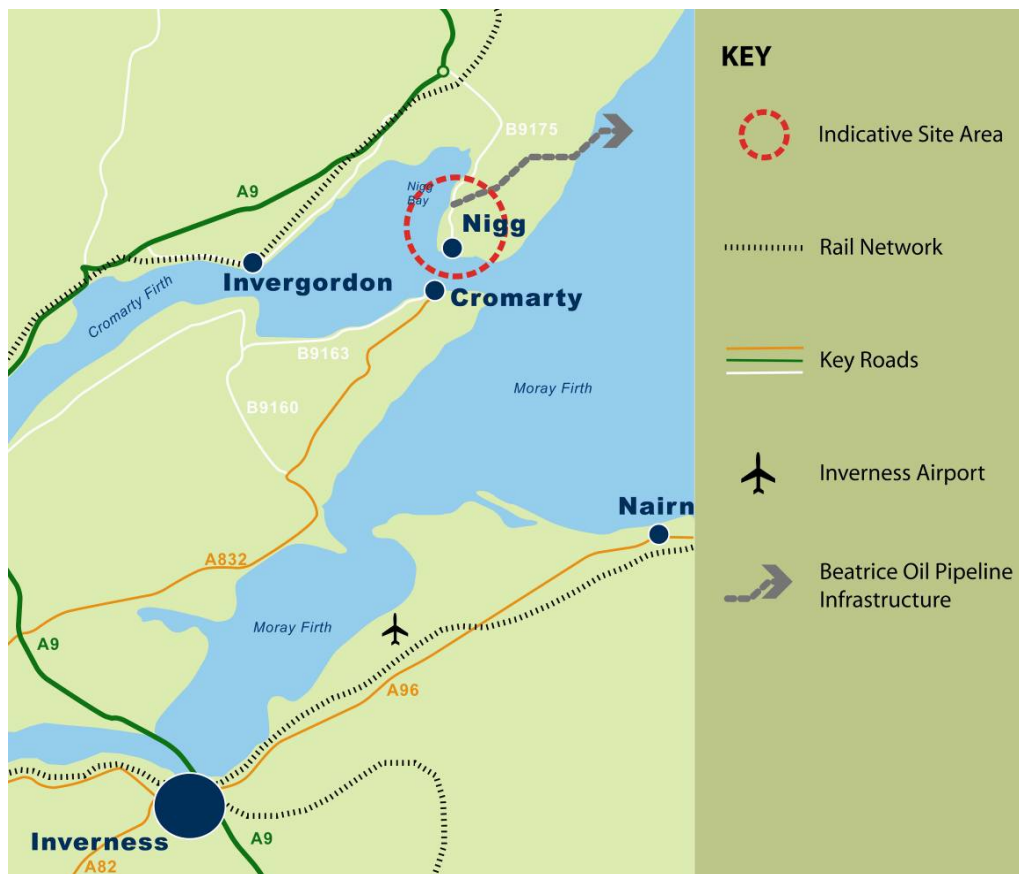


Figure 2.1 – Location of Nigg within Inner Moray Firth

The Nigg site extends to approximately 334 ha and is bounded to the north by the Sands of Nigg to the west and south by the Cromarty Firth and to the north and east by privately owned land (Figure 2.2).

The three main components of the Nigg site comprise:

1. Nigg Fabrication Yard;
2. Oil Terminal; and
3. Proximal land to the east

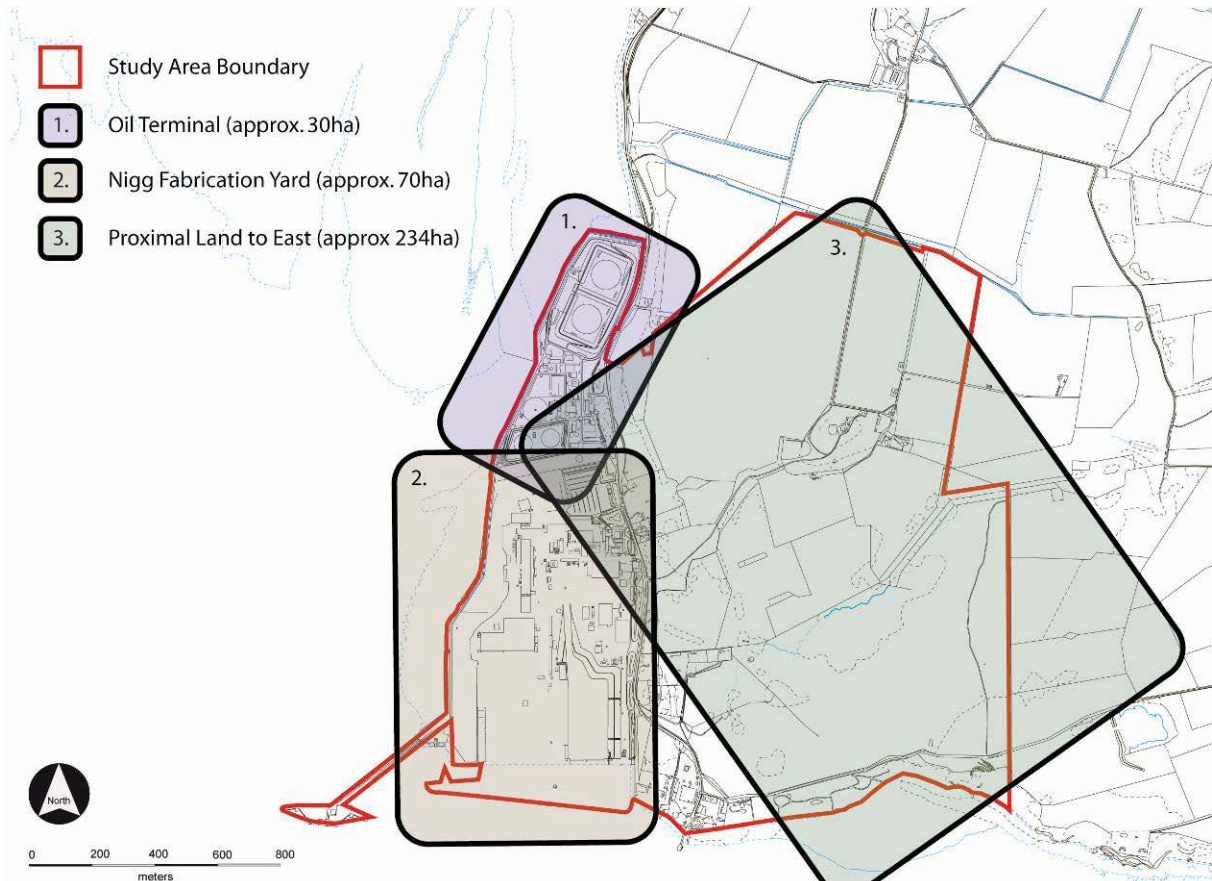


Figure 2.2 – Nigg Site Areas

## 2.3 Land Use, Occupation and Ownership

### 2.3.1 Overview

Nigg Point is well-known as a regionally significant industrial area. The general land use pattern comprises industrial land to the west of the B9175, with undeveloped land, agricultural land and private residences to the east.



Within the industrial area, specific operations include:

The **Nigg Oil Terminal** to the north of the study area, including an access road along the western boundary to the jetty. This facility was commissioned in 1982 to receive, treat, store and transfer oil primarily received from the Beatrice oil field by sub sea pipeline. In addition, oil was brought to the terminal from other oil fields, notably by shuttle tankers from the Kittiwake oil field. The deep sea jetty which forms part of the terminal infrastructure has been used in the past for ship to ship transfer of oil. The terminal site extends to approximately 30 ha.

The former **Nigg Fabrication Yard** located on land to the south, including reclaimed land and graving dock. The Nigg Fabrication Yard was established in 1972 and employed over 5,000 people at its peak. The site has not been fully operational since 2000. The last oil production facility was fabricated in 2003 and the land has been virtually dormant since then. The site extends to approximately 70 ha. This area includes 16 ha of reclaimed land to the south used for skid-loading and dry-docking.

**Land to the east of the B9175** has been safeguarded for future industrial use, but development has not yet been taken up. Further detail is provided in the policy considerations. This area extends to approximately 234 ha, and is presently greenfield land primarily used for livestock grazing.

### 2.3.2 Landownership

Occupied land is primarily under Kellogg Brown & Root (KBR) ownership with the exception of the southernmost parcel of reclaimed land owned by the Wakelyn Trust. The majority of the land to the east of B9175 is owned by Dow Chemicals/Cromarty Petroleum. The remaining land is under mixed ownership.

Current known lease agreements within existing industrial areas are summarised below:

#### **Nigg Oil Terminal**

All built structures and operations at the Nigg Oil Terminal are owned and occupied by Talisman Energy Inc (Talisman) with land leased from KBR. The current lease is valid until February 2009. Upon termination of their lease, Talisman retains responsibility for decommissioning and removal of all buildings and tanks. The jetty is owned by KBR and operated by Talisman.

Oil production has declined in recent years as Beatrice reaches the end of its life. This has resulted in a decreased volume of oil piped to and stored at the

Nigg Oil Terminal. In response, Talisman occasionally leases one of its two oil tanks to private companies for storage.

In November 2007 Talisman announced their intention to sell the operation of the Beatrice oilfield, including the Nigg Oil Terminal. The preferred bidder is Ithaca Energy (Ithaca). The sale was nearing conclusion in October 2008. Ithaca intends to expand operations around Beatrice to include the Jacky field and some additional prospects. New operations will link to the existing Beatrice pipeline infrastructure to the Nigg Oil Terminal. Talisman will retain the abandonment liability as a condition of this sale even after the termination of their lease.

### **Nigg Fabrication Yard**

Land and operations at the former Nigg Fabrication Yard are owned by KBR. Reclaimed land is owned by Wakelyn Trust and was leased to KBR in 1972. The lease is valid until December 2031, with a break clause available in December 2011 and December 2021.

Individual leases have previously been established for individual fabrication shops and sheds, including the lease of Shed 4 to Global Energy (formerly Isleburn Mackay and Macleod). This lease was valid until May 2005, with the possibility of two one-year extensions. It is unknown whether this has been extended beyond 2007, but is recognised that some activity was in operation at the time of the site visit (April 2008).

Landownership and leased area boundaries are illustrated on Figure 2.3.

### **2.3.3 Oil Terminal Land Use**

The Oil terminal site is a comprehensive facility with the ability to receive, treat, store and transfer oil. It is serviced by a sub sea pipeline to the Beatrice oil field that runs underground across the site and across the peninsula to the North Sea. Moving the oil terminal facility would be very costly due to the requirement to connect to this pipeline.

The deep sea jetty is accessed by a road to the south of the site running along the western boundary of the Fabrication site and allow for ship to ship transfer. Several oil pipes also run along the road edge on the surface for the offloading of tankers to the facility. This is also another restriction which encourages retaining the oil terminal in its current location.

The buildings on the site are in good condition and the site is maintained well. There are service roads around the site to access all the tanks for inspection and maintenance. The facility is running below its full capacity and therefore no additional facilities or tanks are required. See Figure 2.4.

### 2.3.4 Fabrication Yard Land Use and Movement

Figure 2.5 shows the existing buildings on the site. These vary in size and condition. A full building survey of each would need to be undertaken to establish the exact condition and any refurbishment requirements necessary. Many small buildings and sheds have already been demolished.

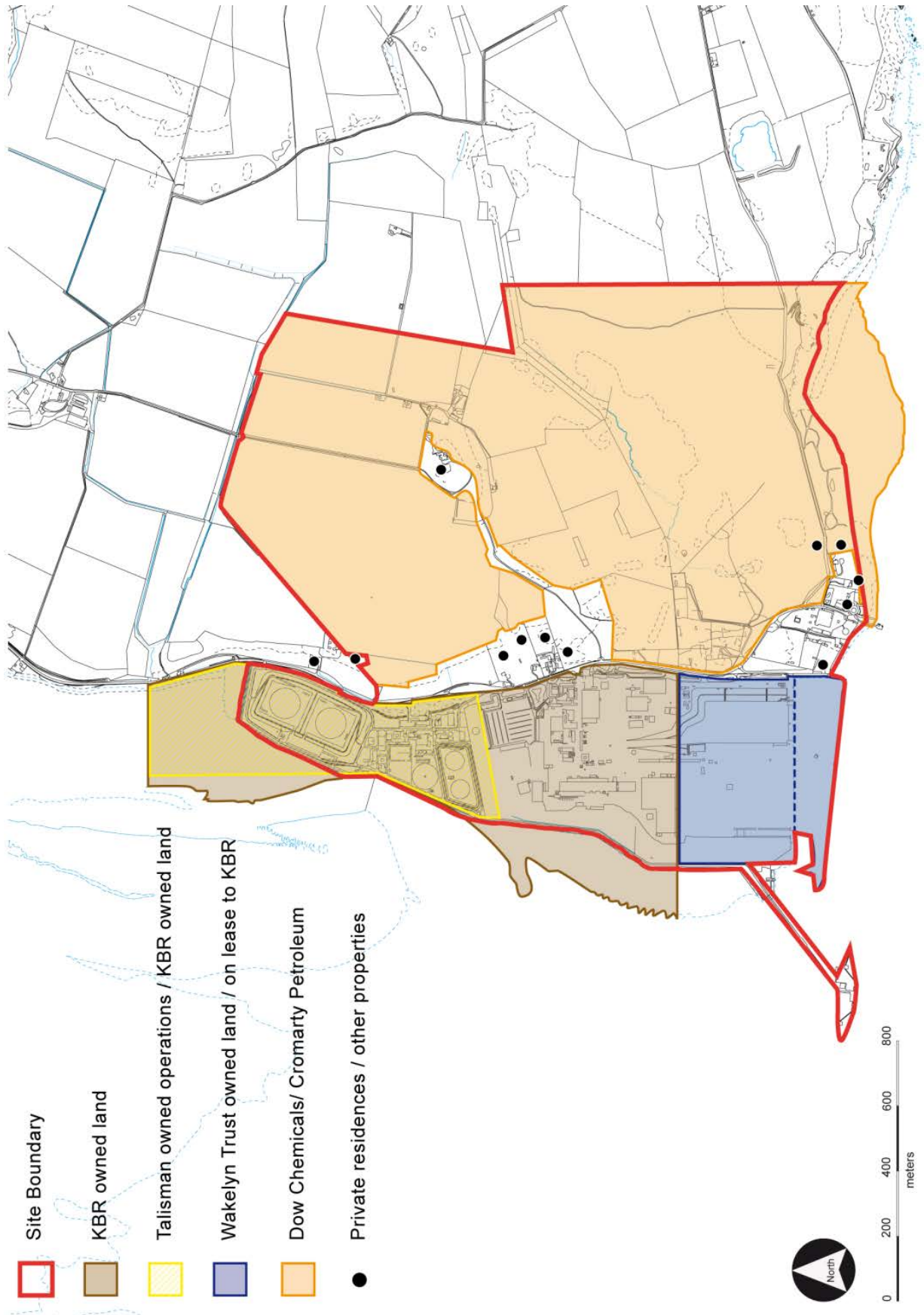
There is a requirement for laydown area for each of the market sector uses. The laydown areas should be easily accessible by road as well as the quay in most cases. It would be advantageous if these areas were covered. The existing surface on the majority of the site is hardcore/soil. A proposed vehicular route layout is shown that connects the site from north to south with branches to the east and west. This should be finished with a tar surface. See Figure 2.6.

### 2.3.5 Implications

KBR have had no commercial interest in the site for a considerable period of time and have been marketing it without success since 2005. To date, Cromarty Firth Port Authority and subsequently DSM, a Birmingham-based demolition and decommissioning company, have been identified as preferred bidders and failed to complete sale negotiations.

Contention over obligations relating to landownership has had a significant impact on the delay of development within the study area to date. This contention is largely centred on the reclaimed land to the south west of the study area. Without resolution, it appears likely that this could continue to delay development until KBR's lease reaches its break option in 2021, with significant negative implications for local and regional economies.

In an attempt to accelerate the reinstatement of industrial operations at Nigg, The Highland Council intend to use this study to inform a Compulsory Purchase Order action to overcome the development stalemate resulting from landownership issues and secure the land for regeneration.



**Figure 2.3 – Landownership**  
**Figure 2.4 – Oil Terminal – Land Use**





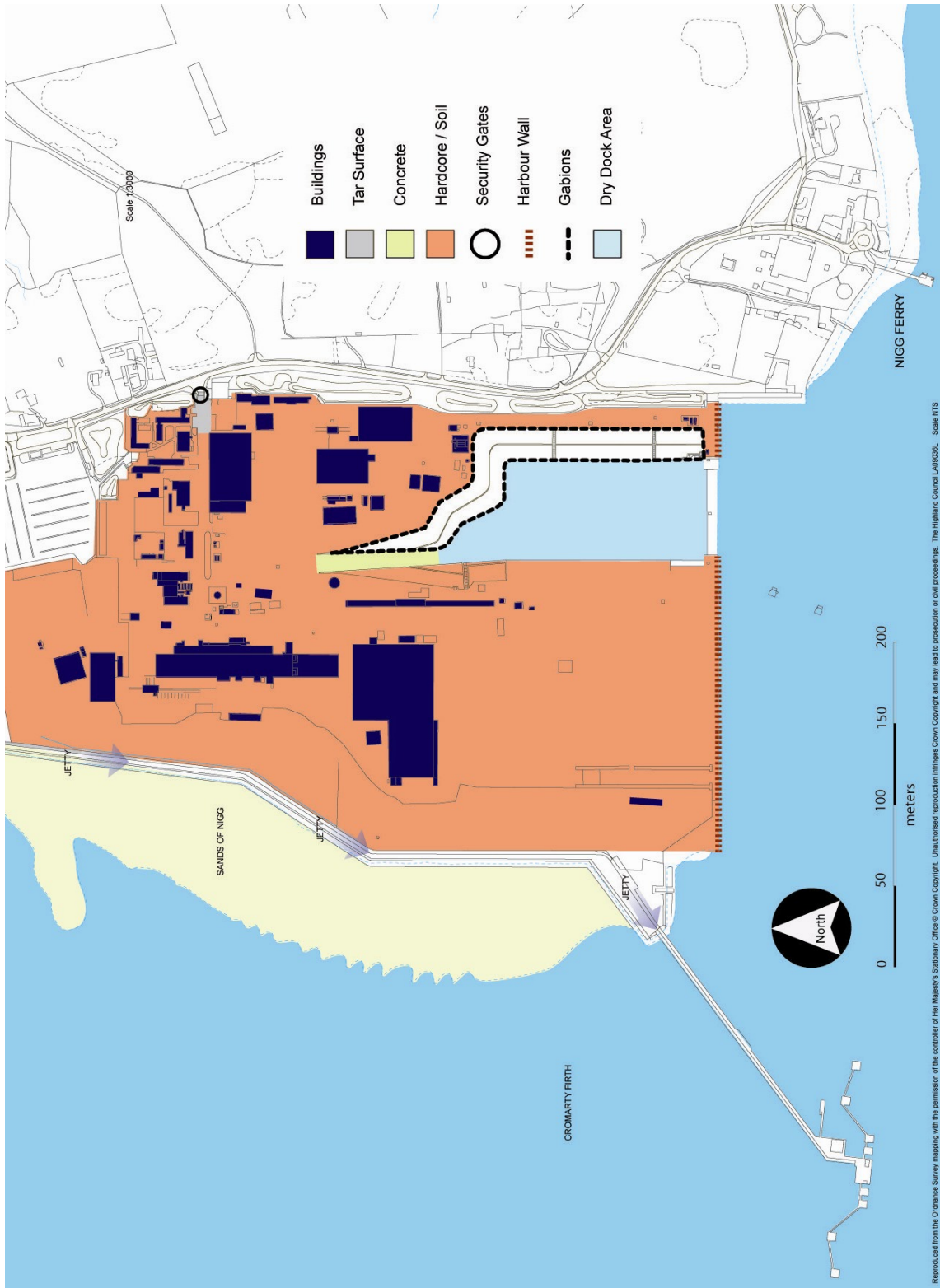


Figure 2.5 – Fabrication Yard – Existing Yard Buildings



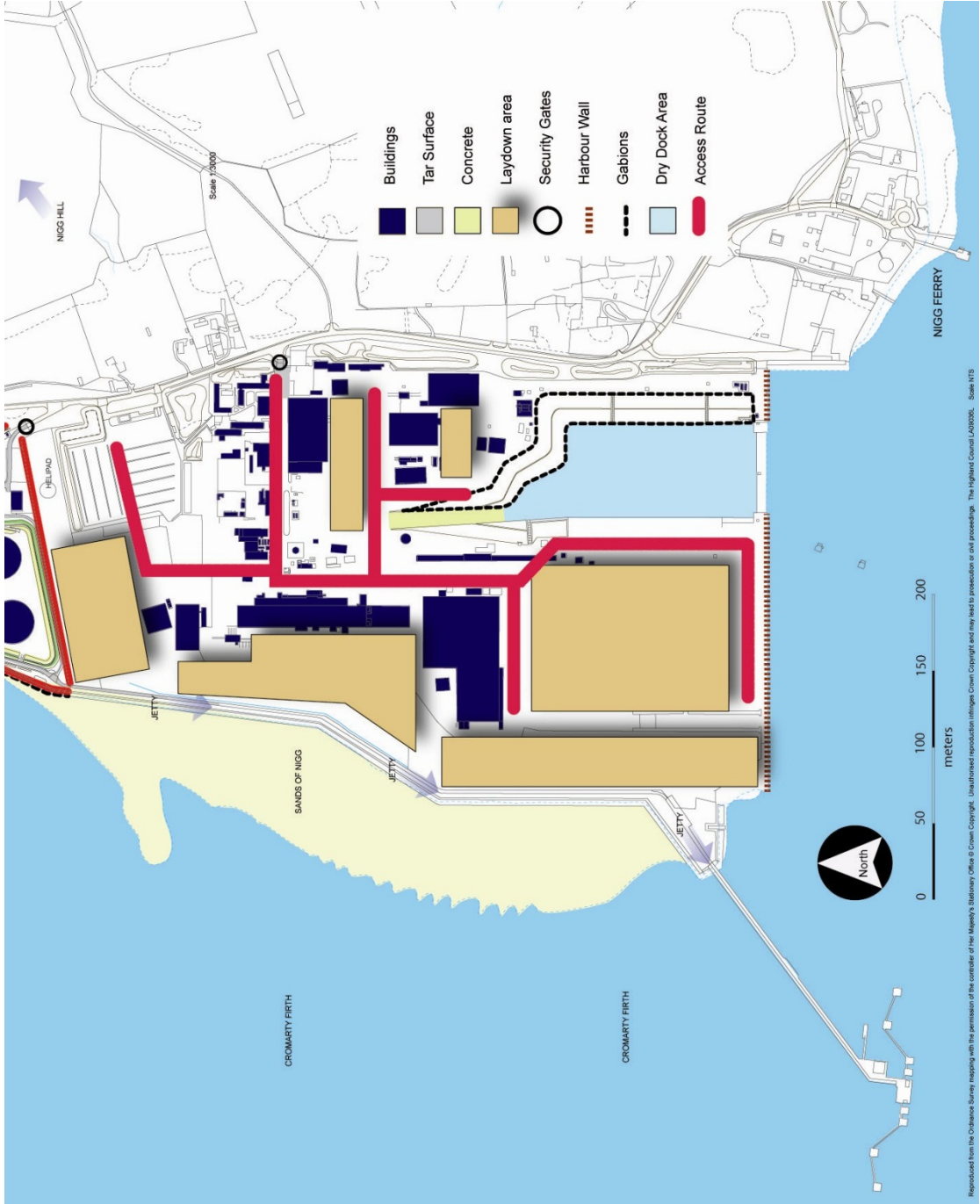


Figure 2.6 – Fabrication Yard – Movement and Open Space

## 2.4 Connections and Movement

### 2.4.1 Air

The nearest commercial airport to Inverness is located at Dalcross, 12.9 km east of the city. A private helipad is located within the industrial area of the site.

### 2.4.2 Rail

The Far North Line Inverness-Wick service stops at Fearn, approximately 9.5 km from the study area, and at Invergordon, approximately 22.5km from the study area.

A feasibility study carried out by Scott Wilson in 2005 concluded that a rail line between Fearn and Nigg Point would be technically and operationally feasible. The new terminus could be located within the study area and link directly to the existing rail infrastructure. If plans are progressed to develop a direct rail link to Nigg point, the existing level crossing at Arabella on the B9175 would remain and additional level crossings would be required. Any impacts on the Cromarty Firth SPA and SSSI would also need to be considered.

The Masterplan is currently not proposing any rail link to the North Highland line though this does not preclude a study being carried out into this at a future date. It is expected that the bulk of materials coming into and leaving Nigg will be by sea. Further study of any rail link proposals (including costs) would be required, out with the scope of this document.

### 2.4.3 Sea

The jetty is owned by KBR and operated by Talisman under normal operational circumstances for loading of oil to ships for international transport, as well as ship-to-ship transfer.

From the Fabrication Yard, access to the sea is gained from the berthing face on the southern edge of the site and from the west face of the graving dock when the gate is open. Access to the sea from the west is constrained by an access road and significant pipe infrastructure necessary for oil terminal operations.

### 2.4.4 Bus

The study area is currently not served by local bus services. A service from Nigg village to Tain, with onward connections to Inverness currently operates on Tuesdays and Saturdays only.

## 2.4.5 Road

The B9175 connects Nigg Point to the A9 to the north. Remaining road provision in the area comprises un-adopted and private roads. See Figure 2.7.

There are two direct access points to the existing industrial sites within the study area. Internal roads are also provided for operations within the Nigg Oil Terminal. This includes an access road along the western study area boundary to the jetty which is used solely for Talisman operations.

The current access road is thought to be suitable for movements of heavy goods vehicles although the entrance is reported as being restrictive and a detailed study should be undertaken to establish whether improvements are necessary.

There are likely to be some impacts on the local road network due to increased traffic flows associated with plant accessing and egressing the site and materials being delivered to and removed from the site. The magnitude of the impact will depend on the number and size of vehicles using the road network, the number of movements required and the timing of vehicle movements.

## 2.4.6 Ferry

In addition to access for industrial operations, a ferry service operates seasonally between Nigg Ferry and Cromarty. It has the capacity to carry 50 passengers and 2 cars. Since the conclusion of operations at the Fabrication Yard, this link has continued to provide a link for tourists/cyclists on the National Cycle Network and North Sea Cycle Circuit.

The B9175 serves as part of the National Cycle Network Route 1, connecting across the Cromarty Firth via the ferry service when in season. This route also forms part of the North Sea Cycle Circuit.

## 2.5 Infrastructure Considerations

This section provides an overview of the key issues and implications resulting from existing buildings, services and infrastructure within the study area. The Oil Terminal, Fabrication Yard and the proximal land to the east are each considered in turn.

## 2.5.1 Oil Terminal

The main infrastructure of the existing Oil Terminal comprises:

- No. 119,000 m<sup>3</sup> Crude Oil Storage Tanks.
- 16 in. diameter pipeline 77km long from the Beatrice field to the terminal.
- No. 30,000 m<sup>3</sup> tanks as part of plant used to separate and treat oil including ballast water from tankers. The terminal has formal consent from SEPA to discharge 16,000 m<sup>3</sup>/day of treated water into the Firth.
- Access road to jetty.
- Deep water jetty extending out to sea some 500 metres to provide 13 metres of water at low tide at the jetty head and fully fendered to receive tankers up to 290 metres in length.

The terminal is capable of processing up to 100,000 barrels per day (15900 m<sup>3</sup>/day) but currently production is in the order of 2,000 bpd (318m<sup>3</sup>/day). Halcrow has not seen any reports providing opinion as to the engineering condition of the existing main infrastructure which makes up the oil terminal at Nigg.

## 2.5.2 Former Fabrication Yard

Jacobs Babbie (Jacobs) was commissioned by Cromarty Firth Port Authority to undertake a review of existing reports on the condition of the former fabrication yard, to carry out site inspections and to provide an initial engineering appraisal of the buildings and infrastructure.

Halcrow has briefly reviewed the preliminary report prepared by Jacobs in March 2005. A note of the report is contained in Appendix 1. Key issues from the Jacobs report with regard to the condition of the existing infrastructure of the Nigg Fabrication Yard include the following:

### **Buildings**

- the large structural steel framed buildings are in reasonable structural condition, as appear to be the associated cranes, capable of being reconditioned and brought back into use;
- materials of any buildings clad using asbestos cement sheeting would need to be removed under licence to an approved site;
- services associated with buildings to be retained will need to be checked to confirm that they are fit for continued use and compliant with the relevant Regulations and Standards. See Figure 2.8.

## Site services

- *foul drainage*: primarily on-site pumping stations flowing to on-site treatment plant comprising three units capable of serving a population of between 1200 and 1500 people. 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;
- *storm water drainage*: 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 soak away. It is reported that the systems operate effectively with only minor silting of the pipework requiring occasional jetting;
- *electricity*: mains electricity is provided via Scottish & Southern Energy at 33kV to a substation on-site where it is transformed to 11kV and distributed locally around the site. A total power supply of 7 Megawatts is reported to have been available at one time through KBR's agreement with S&SE. The present day availability needs to be verified.

## Water supply

Jacobs do not refer to the water supply to the site in their 2005 report. However, Scottish Water advises that there is a 100mm diameter mains water supply to the site which is metered by Scottish Water. This supply would appear to be adequate for industrial uses which do not require large volumes of processing water.

The distribution system on the site tends to follow the main access routes and feeds into the buildings. In all probability the system will not comply with BS6700 and would require to be relocated, pressure tested and properly labelled. Given the age of much of this network, complete replacement should be anticipated.

Although not seen by Halcrow, it is understood that an industrial tank located on the hillside above the yard was once used to supply water for fire fighting. The condition of this system is unknown. Consideration would have to be given to the installation of a modern fire fighting system for the site.

### **Other services**

The distribution systems for compressed air, propane and oxygen gases and fuel oil would each require verification and pressure testing before use. As the large proportion of these have been buried since the site was first developed in the 1970's complete replacement should be anticipated.



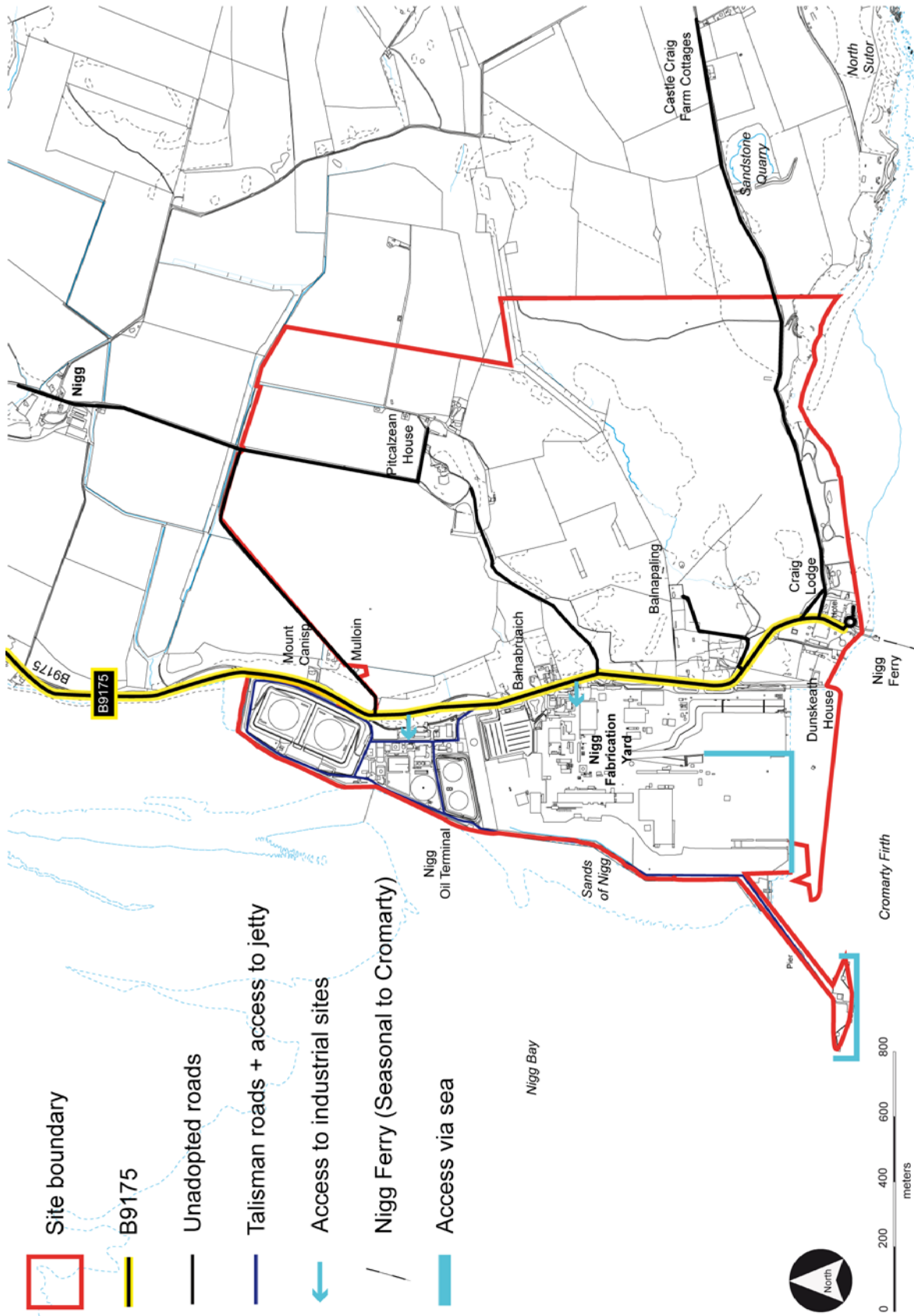
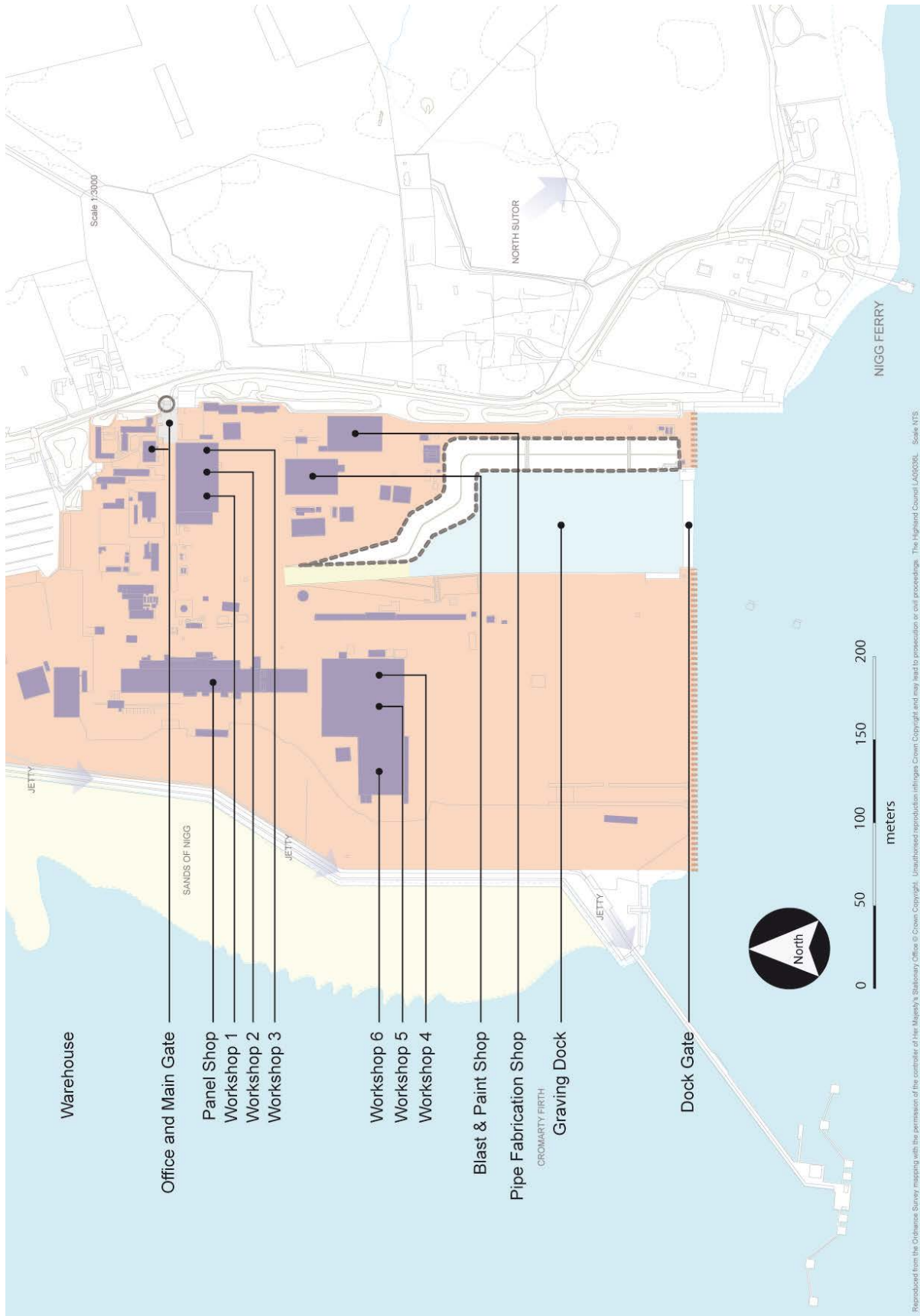


Figure 2.7 – Transport and Access Summary



**Figure 2.8 – Former Fabrication Yard - Existing Built Structures**

### 2.5.3 Nigg Graving Dock

The details and condition of the Nigg Graving Dock, as well as the method of operating the dock, are contained in Appendix 2. The key points to note with regard the Nigg Graving Dock include:

- the graving dock covers an area of 4.35ha and is 306m long with a maximum depth of 15m at high tide;
- the quay wall has been designed to permit a distributed loading of 90 tonne/m<sup>2</sup> on the landward side up to the front face of the west quay wall;
- the design life of the wall is specified by KBR to be 20 years. However, the wall designer has advised that the wall has a structural life of at least 50 years;
- the floor and access ramps to the dock permit use by crawler cranes and multi-axle trailers. Foundations have been constructed on the dock floor founded on the weathered sandstone bedrock;
- the dock gate is a reinforced concrete caisson structure. The condition of the exposed concrete of the gate is considered by Halcrow to be reasonable for a structure of this age. It was last used in 2003, but since that date has been located across the dock entrance with its ballast chambers flooded;
- the water at present trapped in the dock is stagnant, has a high salt concentration and is oxygen depleted so that it cannot support any sea life;
- dewatering is done using 600mm diameter electrical pumps owned by KBR which are capable of dewatering down to within 500mm of the dock floor within 48 hours. The last 500mm is dewatered using stripping pumps placed in prepared sumps in the dock floor and can take a further 12 hours to completely empty it. See Figure 2.9.



**Figure 2.9 – Nigg Graving dock circa 1996, view looking south**

#### 2.5.4 Nigg External Quay Walling

There is some 430 metres of wharfage to the open sea at Nigg. Mostly this consists of sheet piled walling where depths of up to 4.5m below low water level exist naturally. The condition of the sheet piling is a concern since it visibly suffers in parts from collision damage and from Accelerated Low Water Corrosion (ALWC). It is reported by Jacobs to be in poor condition visually. Halcrow has however seen reports to suggest that the extent of ALWC is such that the structural integrity of the quay is likely to remain intact at the present time. However, it would be necessary to carry out a detailed inspection of the entire structure and to take measurement of residual metal thicknesses before this conclusion could be confirmed. Early intervention to prevent progress of ALWC by installing cathodic protection would be recommended.

Behind the south facing external quay an area 93m x 17m has been strengthened and identified as the load-out quay consisting of 'H' piles supporting a reinforced concrete deck. Halcrow has reported that this load-out quay has a general imposed load capacity of 15 tonnes/m<sup>2</sup>, which is considered satisfactory for multi-axle trailer operations. Certain locations above the 'H' piles are understood to be able to take the loadings from crawler cranes anticipated right up to the face of the load-out quay.



## 2.5.5 Ground Contamination

KBR commissioned Atkins in May 2006 to investigate and report on the current contamination levels over the site. Halcrow has not yet been given formal access to this Atkins report by KBR.

However, Jacobs did gain access to earlier reports prepared for KBR in relation to ground contamination notably a WS Atkins Phase 1 Environmental Site Assessment report produced in 2002, from which the following abstracted information is considered most relevant:

- There has been a history of significant hydrocarbon contamination at the Nigg Site believed to have been mainly caused by a leaking diesel oil storage facility located in the vicinity of the Paint Blast shop. This was first identified around 1985 when work to map and remove the hydrocarbon contamination was started.
- A groundwater recovery system was installed by ERS and operated between 2001 and 2004 and removed significant quantities of contamination.
- Prior to installing the system, specific target levels of ground water contamination were agreed with SEPA such that, when these were reached, the system was 'switched off'. Halcrow understands that some monitoring of ground water contamination took place after the switch off and that the target levels were found to have been maintained. It might reasonably be expected that with time the groundwater hydrocarbon contamination levels would continue to reduce naturally but there is no guarantee that local hot spots will not remain.
- Atkins understood there to be a history of removing soil from the dock floor and other areas which had become contaminated and that this soil was deposited on the site in a lined remediation pit located to the northwest of Shop 6. This pit and the condition of the liner would require to be investigated further.
- There are other anticipated sources of contamination arising out of past site activities including fuel distribution systems, painting and shot blasting operations and asbestos repair work. Jacobs noted these had been identified by KBR for further investigation on the contamination issues. Their findings have not been available for this report.
- It is reasonable to assume that the scale of the site does not rule out the possibility of local hot spots appearing in the future which have not been picked up during any intrusive site investigation.

There will therefore be a continuing need to work with the Highland Council and SEPA in order to agree how to address the environmental issues identified. It seems reasonable to assume that if the nature of future uses of the site is similar to the industrial uses of the past then it should be possible to agree an acceptable environmental management plan for the site.

It is noted that drawing down the level of the dry dock will cause ground water which is potentially contaminated with hydrocarbon to enter the dock and hence escape to the sea. Given that target levels have been agreed and are being maintained it should be possible to agree a system for dewatering which is acceptable to SEPA. Any floating hydrocarbons visible on the surface of the flooded dock would require to be removed using oil boom techniques in advance of emptying.

### 2.5.6 Proximal Land to the East

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

The topography is potentially problematic in that only a comparatively small part 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. Access to the sea is across a beach to the south of the site. Consent was previously granted for access to deep water across the beach at this point. Alternative access to the sea might best be provided via a crossing of the public road and access to the east side of the graving dock where a new purpose built quay wall could be provided. Access to the sea through land out with the direct control of KBR or Dow Chemicals may lead to complications and is therefore not favoured where alternative means of access is available.



## 2.6 Environmental Considerations

### 2.6.1 Overview

This sub-section considers the relevant designated areas which have informed the Nigg Development Masterplan and identifies the legislative requirements in place to ensure the preservation of a high-quality local environment. Reference should also be made to the Nigg Development Masterplan Appropriate Assessment (Revised January 2013) – see summary at Appendix 5.

It is important to note that previous industrial use at Nigg was set within a high quality local environment, demonstrating the capability for the land to accommodate large scale industry and for that development to be sensitive to key landscape<sup>1</sup> and ecological features, cultural heritage and the historic environment.

Environmental considerations discussed here are based on the potential impact of regenerating the site to accommodate future development on the surrounding landscape and ecology. The scope of these considerations is predicated on future industrial uses sited within the existing development framework, with potential to extend onto land already safeguarded by local planning policy for industrial use.

### 2.6.2 Environmental Designations

The study area is situated within a wider landscape underpinned by a number of designated areas as outlined in Table 2.1 and illustrated on Figure 2.10.

### 2.6.3 Proximal Land to the east

Development on the proximal land to the east of the development site should be treated with caution to avoid impacts on biodiversity as recommended by the accompanying Strategic Environmental Assessment (SEA). An ecological survey should be prepared for this land; this should include survey of the wooded area to ensure there is no significant wildlife value, e.g. bat roosting. If there is found to be wildlife value, avoidance and mitigation measures will be necessary. The EIA and Construction and Environmental Management Plans will also need to incorporate this land and proposed suitable mitigation measures.

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<sup>1</sup> Including 'seascape'.

<b>Site Name</b>	<b>Designation</b>	<b>Approx. Distance of study area from designated area boundary</b>
<b>Cromarty Firth</b>	Ramsar Site	Partly within
<b>Cromarty Firth</b>	Special Protection Area (SPA)	Partly within
<b>Cromarty Firth</b>	Site of Special Scientific Interest (SSSI)	Partly within
<b>Nigg and Udale Bays</b>	National Nature Reserve (NNR)	250m
<b>Nigg and Udale Bays</b>	RSPB Reserve	adjacent
<b>Moray Firth</b>	Special Area of Conservation (SAC)	adjacent
<b>Moray Basin Firth and Bays</b>	Important Bird Areas	adjacent
<b>Rosemarkie and Shandwick Coast</b>	SSSI	Partly within

**Table 2.1 – Environmental designated sites within 2 km of the site**

Any development within the study area has the potential to impact on these designated areas during construction and operational phases.

It is important that the Masterplan includes all possible measures to minimise loss of habitat and to remediate those areas which have been damaged wherever feasible.

Biodiversity and wildlife should be protected. Proposals to enhance or restore priority habitats and species should be incorporated in the development of the Masterplan.

Extension of industrial operations onto land to the east of the B9175 will need to be mitigated to appropriately respond to environmental receptors, but has already been deemed acceptable in principle through the local plan designation.

Likely impacts of future industrial development are considered below.



Figure 2.10 – Environmental Designations and Considerations

## 2.6.4 Landscape and Recreational Amenity

Historically, the Cromarty Firth has been an important source of recreation for local people. 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 tourist attraction. In addition, the wide range of bird life in the Firth attracts ornithologists.

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, which is part of an RSPB reserve. A hide and car parking exist at both sites and each attracts more than 5,000 visitors per annum.

Temporary disruption to recreation could be offset by the local economic development benefits presented by redevelopment and post-construction improvements to the wider infrastructure.

## 2.6.5 Noise and Vibration

Construction and operation may reintroduce significant noise levels, which could impact on nearby residents or local wildlife. This includes existing residential premises within the study area, in adjacent villages of Nigg and Pitcalnie and, potentially, villages on the south side of the Firth, notably Cromarty, as well as marine life and bird populations. Noise mitigation measures will be required in any future design brief.

The Appropriate Assessment of the Masterplan recommended, as a result of SNH, that a Noise Management Plan would be prepared to mitigate the impacts of construction noise on internationally designated species and habitats. This will be provided as part of the Construction and Operation Environmental Management Plan. Any construction or piling below the High Water mark will follow existing procedures to apply to Marine Scotland and the Cromarty Firth Port Authority. This consents process would take environmental considerations such as noise into account.

## 2.6.6 Water Quality and Flooding

The internationally designated marine sites (Cromarty Firth SPA/Ramsar and the Moray Firth SAC) will be of particular consideration for any development. The marine water environment in this area provides habitat for a number of important bird populations and European protected species, including the most northerly of the two known semi-resident populations of bottlenose dolphins (*Tursiops truncatus*) in the UK.



In addition to the Cromarty Firth, there are at least two small unnamed watercourses running within 1km of the study area. Depending on the type and level of industry, development could lead to a risk of pollution, particularly to these nearby waterways.

SEPA's indicative flood maps show that some pockets of the development area are at risk of flooding from the sea and rivers.

This includes tidal surges and unusually high tides. 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, including the flood-proofing of existing and new buildings.

The strategic framework will be outlined in the Strategic Environmental Assessment (SEA) and the project details addressed in the Environmental Impact Assessment (EIA). During these processes it is recommended for example, that SEPA is consulted regarding the type of practices that could be considered at this site<sup>2</sup>, and that consideration is given to the guidance in Planning Advice Note (PAN) 69 as published by the Scottish Government. In addition to details of mitigation measures within the SEA and EIA, site-specific Flood Risk Assessments will be required for planning applications.

Since publication of the final report in November 2008, Halcrow has gained access to reports which describe work done to date to assess the extent of the ground contamination caused by historical leaking of diesel fuel supply lines within the southern and eastern parts of the site. This work is now summarised by Halcrow in Appendix 5. A Flood Risk Assessment for the site has also been undertaken and this is described in Section 5.3.

### 2.6.7 Contaminated Land

It is known that there has been and potentially still is hydrocarbon and chemical contamination present on site. Any existing contamination present will be influential in determining negotiating positions in the future in terms of land value and liabilities.

Any redevelopment should be subject to a full contamination study, investigation and possibly remediation strategy. Control measures for dealing with contaminated land (i.e. hydrocarbon spills on site) will be necessary during redevelopment and, depending on the nature of industry attracted to the site, operational regulations to prevent any further contamination will need to be included in the future site design.

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<sup>2</sup> [www.sepa.org.uk/flooding/flooding\\_publications.aspx](http://www.sepa.org.uk/flooding/flooding_publications.aspx)

## 2.6.8 Environmental Consents and Licences

The aim of environmental legislation is to clearly assess the impacts of any development in the study area and to introduce mitigation strategies early in the development process. Depending on the nature of the work to be undertaken and the specific relationship of industrial activity with the surrounding landscape, a range of environmental consents and licenses could be required. The precise mix would be determined through early consultation with relevant agencies (e.g. SNH, SEPA, etc.). Since the first draft was published a Strategic Environmental Assessment (SEA), an Appropriate Assessment (AA) and a Flood Risk Assessment (FRA) have been prepared. These are described further in section 5.3. Further studies at the planning application stage could potentially include:

- Project-specific Environmental Impact Assessments (EIA)
- SEPA Controlled Activities Regulations (CAR) water use licences,
- Food and Environmental Protection Act (FEPA) consent,
- Coastal Protection Act (CPA) Section 34 Consents; or
- European Protected Species licences.

## 2.6.9 Other possible environmental impacts

The following impacts and their proposed mitigation were described in the Appropriate Assessment:

### **Vessel disturbance to marine mammals**

To avoid disturbance to marine mammals, including the Bottlenose Dolphins of the Moray Firth SAC a Boat Traffic Management Plan may need to be prepared.

However it is dependent upon further work needed to determine the 'carrying capacity' of vessels using the area and at what point the number and type of vessels poses a risk to marine mammals. Any such Management Plan would need to be signed off by the Cromarty Firth Port Authority and other port authorities in the Moray Firth in collaboration with Marine Scotland and SNH. Possible impact on harbour (common) seals, which are found in the Cromarty Firth and which are a qualifying interest of the Dornoch Firth and Morrich More Special Area of Conservation, are considered in the Appropriate Assessment. Possible mitigation is set out there to be included in the Construction and Operational Environmental Management Plans.

### **Dredging**

Dredging currently takes place only after obtaining a Food and Environment Protection Act (FEPA) licence, but licensing requirements are expected to increase with the implementation of the Scottish Marine Bill. A range of



specific environmental mitigation measures are provided in the Appropriate Assessment.

### **Disturbance to European Protected Species**

A bat survey will be needed to ensure that any renovation of existing buildings on the site will not adversely affect bats.

There are also possible impacts associated with the ballast water discharge and ship-to-ship oil transfer. However these activities currently already take place under existing legislative requirements and are outwith the scope of the Highland Council as Planning Authority to mitigate.

## **2.6.10 Cultural Heritage and Historic Environment assets and values**

Consideration should be given to cultural heritage, historic environment assets and values. This is stipulated through the EC Environmental Impact Directive No. 85/337/EEC on the assessment of the effects of certain public and private projects on the environment.

## **2.6.11 Health and Safety Executive Representation**

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 state 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 provided should provide for buildings of less than 100 occupants and less than 3 occupational storeys within any inner zone of a 3-zone map.

It can be seen from the table below that development can occur in any of the 3 zones due to the Level 1 Sensitivity. The following matrix is used to decide the type of advice which is expected to be DDA = Don't Advise Against development.

<b>Level of Sensitivity</b>	<b>Development in Inner Zone</b>	<b>Development in Middle Zone</b>	<b>Development in Outer Zone</b>
1	DAA	DAA	DAA
2	AA	DAA	DAA
3	AA	AA	DAA
4	AA	AA	AA

## 2.7 Socio – economic Considerations

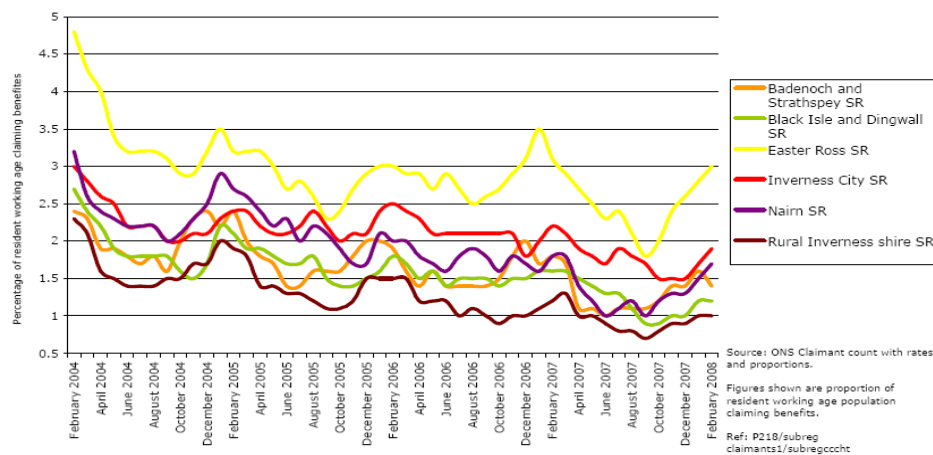
The study area includes a limited number of private residences, but does not include any substantive formal settlements. For the purpose of this study, however, it is critical to examine the socio-economic impact of the longstanding industrial uses within the study area on the wider East Highland area 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 unemployment, 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 2.113).

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<sup>3</sup> Figure 2.11 has been extracted from Highlands and Islands Enterprise (May 2008) Draft Inverness and East Highland Social and Economic Audit and Atlas 2008.

Claimant count by sub-region



**Figure 2.11 – Claimant Count for Inverness and East Highlands (February 2004 – February 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.

### 2.7.1 Implications

Reinstatement of industrial activity at Nigg is likely to generate a significant amount of employment which will inevitably have implications for the wider population. 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.

## 3 Policy and Regulatory Context Co-theacsa Poileasaidh is Riaghlaidh

### 3.1 Introduction

This section details the regulatory and policy framework which applies to the Nigg site. This is based upon a desk-top review of relevant national, strategic and local documents, including the existing and emerging National Planning Framework, the Development Plan and Supplementary Guidance (SG). The relevant planning history of the Nigg study area has also been considered.

Finally, the Compulsory Purchase Order (CPO) procedure is briefly outlined, as this is a procedure currently under consideration by The Highland Council in order to unlock the development potential of the site and assist in the regeneration of the area.

### 3.2 National Policy and Guidance

Strategic thinking for development in Scotland and the Inner Moray Firth is set out at national level in the Government Economic Strategy (GES) (2007). The aim of the GES is to focus Scottish Government and public services on creating a more successful country through increasing sustainable economic growth. Five Strategic Objectives are identified to make Scotland:

1. Wealthier and fairer.
2. Smarter.
3. Healthier.
4. Safer and Stronger.
5. Greener.

Five Strategic Priorities are identified as the channels through which growth is most effectively driven:

1. Learning skills and well being.
2. Supportive business environment.
3. Infrastructure development and place.
4. Effective government.
5. Equity.

The second **National Planning Framework** (NPF2) sets out Scotland's spatial development until 2030. Consultation on NPF2 ended in April 2008. All responses have been analysed and revisions are now being made to the Framework in the light of these responses. The proposed framework will be laid before Parliament in the Autumn and the final version of the NPF2 will be published in early 2009. The Nigg site is highlighted as a development priority

to support The Scottish Government's central purpose - promoting sustainable economic growth.

The first NPF (2004) recognised the importance of city-regions as the main drivers of the national economy. Inverness and Inner Moray Firth are identified as one of the nine key economic development zones within Scotland, where clustering of key industries, reuse of vacant and derelict sites and economic diversification should be concentrated. Given the scale of development potential at the Nigg site, its regeneration would provide a significant opportunity for growing the regional economy.

The NPF2 further highlights this opportunity by describing the former fabrication yard as having *“potential as a facility for decommissioning oil and gas installations and for the manufacture and support services required by the renewable energy industry...its deep water is an asset of strategic importance”* [emphasis added]. Notably, the Scottish Council for Development and Industry (SCDI) made representations to NPF2, supporting development at Nigg.

The Highland Council also made the following representations on NPF2 in relation to Nigg:

- Redevelopment of the Nigg Fabrication Yard into positive and productive use as a multi-use facility, in an integrated manner, including addressing contamination and drainage issues, in the interest of the economic development of the area.
- Redevelopment would allow the yard to be brought back into positive use at an early date in the interests of the economic development of the area.
- Designation as a national development would make a significant contribution to Scotland’s sustainable economic development. It would also make a significant contribution to the achievement of climate change and renewable energy by potentially providing a fabrication yard for wind turbine/mast production and bio fuels.
- Matters to be addressed at the consent stage include:
  1. Physical attributes of the site (detailed assessment of key development areas; identification of site upgrade requirements including utilities, transport and communications infrastructure).
  2. Assessment of marine attributes (including water depth).
  3. Environmental assessment.
  4. Identification of industrial activities suitable for utilisation in the area.

### **Low Carbon & Renewables Enterprise Area**

Scottish Government has also established a Low Carbon & Renewables Enterprise Area at Nigg which puts in place a non-statutory planning protocol committing all partners to work together to facilitate the planning process in the designated Enterprise Areas.

Key national policy and guidance relevant to this study includes:

#### **Scottish Planning Policy: Subject Policies**

Economic Development	Renewable Energy
Flooding and Drainage	Landscape and Natural Heritage
Historic Environment	Coastal Planning
Transport	

#### **Planning Advice Notes (PAN)**

PAN33 Development of Contaminated Land (Revised Oct 2000)	PAN75 Planning for Transport
PAN61 Planning and Sustainable Urban Drainage Systems (Being consolidated)	PAN 1/2011 Planning and Noise
PAN 2/2011 Planning and Archaeology	PAN79 Water and Drainage (Being consolidated)
PAN73 Rural Diversification	PAN58 Environmental Impact Assessment
PAN51 Planning, Environmental Protection and Regulation (Revised 2006)	PAN 83 Master Planning
	PAN60 Planning for Natural Heritage

### **3.3 Development Plan**

The development plan relevant to the site is the Highland-wide Local Development Plan (HwLDP) 2012.

Following adoption of the Highland-wide Local Development Plan, the Ross and Cromarty East Local Plan (as continued in force) holds no direct policy



content in relation to Nigg Yard, all detail being superseded by the Highland-wide Local Development Plan.

The HwLDP Vision and Strategy for the Inner Moray Firth supports the growth of jobs and population within the Easter Ross area with specific policy advice directly related to the development of the Nigg site contained in Policy 23 Nigg and within this Development Masterplan.

The list below does not detail all the policies in the development plan which may be relevant; it is limited to those most likely to be relevant and important to the assessment of an application.

### **Highland-wide Local Development Plan 2012**

The following policies are particularly relevant to any proposals that may come forward on the site;

*Policy 23 Nigg* supports the development of the Nigg Yard and proximal lands in line with the Council approved Masterplan.

*Policy 28 Sustainable Design* outlines the Council's support for developments which promote and enhance the social, economic and environmental wellbeing of the people of Highland. The policy lists a range of criteria against which proposals will be assessed.

*Policy 29 Design Quality and Place Making* requires new development to be designed to make a positive contribution to the architectural and visual quality of the place in which it is located and to consider the incorporation of public art as a means of creating a distinct sense of place and identity.

*Policy 30 Physical Constraints* requires developers to consider whether their proposals would be located in area of constraints as set out in Physical Constraints: Supplementary Guidance. Where a proposed development is affected by any of the constraints detailed within the guidance, developers must demonstrate compatibility with the constraint or outline appropriate mitigation measures to be provided.

*Policy 31 Developer Contributions* allows the Council to seek from the developer a fair and reasonable contribution in cash or kind towards additional costs or requirements for improved public services, facilities or infrastructure.

*Policy 41 Business and Industrial Land* directs new business and industrial development to strategic and industrial sites/locations as listed in that policy, Nigg is one of the identified sites for this purpose.

*Policy 42 Previously Used Land* supports development proposals that bring previously-used land back into beneficial use provided site investigations and risk assessments demonstrate the site condition as suitable for the proposed development.

*Policy 49 Coastal Development* requires that development proposals for the coast or for installations in nearshore waters should, in both their location and their design, show consideration to the range of existing interests.

*Policy 51 Trees and Development* support development which promotes significant protection to existing hedges, trees and woodlands on and around development sites. The Council's Trees, Woodland and Development Interim Supplementary Guidance identifies the main principles for the protection and management of trees and woodland in relation to new development.

*Policy 56 Travel* requires development proposals that involve travel generation to include sufficient information with the application to enable the Council to consider any likely transport implications, and, amongst a number of requirements, requires that such developments can be served by the most sustainable modes of travel.

*Policy 57 Natural, Built and Cultural Heritage* requires all development proposals to be assessed taking into account the level of importance and type of heritage features, the form and scale of the development, and any impact on the feature and its setting in the context of the policy framework of heritage features.

*Policy 58 Protected Species* requires that where there is good reason to believe that a protected species may be affected by a development, a survey should be carried out to establish any such presence. If necessary a mitigation plan should accompany any planning application. Developments that are likely to have an adverse effect on protected species that cannot be mitigated are unlikely to be permitted.

*Policy 59 Other Species* requires that regard to the presence of and any adverse effects of development proposals, either individually and/or cumulatively, on the Other Important Species defined in the policy if these are not already protected by other legislation or by nature conservation site. Conditions and agreements will be used to ensure detrimental affect on these species is avoided.

*Policy 64 Flood Risk* states that development proposals within or bordering medium to high flood risk areas will need to demonstrate compliance with

Scottish Planning Policy through the submission of suitable information which may take the form a Flood Risk Assessment.

*Policy 65 Waste Water Treatment* requires that that any private system should discharge to land rather than water and that any proposal will not result in or add to significant environmental or health problems.

*Policy 66 Surface Water Drainage* requires all proposed development must be drained by Sustainable Drainage Systems.

*Policy 72 Pollution* requires that proposals that may result in significant pollution such as noise, air, water and light will only be approved where a detailed assessment report on the levels, character and transmission and receiving environment of the potential pollution is provided by the applicant to show how the pollution can be appropriately avoided and if necessary mitigated. Major Developments and developments that are subject of Environmental Impact Assessment will be expected to follow a robust project environmental management process, following the approach set out in the Council's Guidance Note "Construction Environmental Management Process for Large Scale Projects" or a similar approach.

*Policy 73 Air Quality* Development proposals which, individually or cumulatively, may adversely affect the air quality in an area to a level which could cause harm to human health and wellbeing or the natural environment must be accompanied by appropriate provisions.

The council-subsidised seasonal ferry service between Cromarty and Nigg is identified in the Local Plan as a transport link. It is used by cyclists along the National Cycle Network and North Sea Cycle Circuit.

### 3.4 Planning History

The development plan for Nigg Point calls for diversification of uses on the site. The original planning permission for development of the **Fabrication Yard**, granted on 10 December 1971, specified "Construction of depot for fabrication of offshore platform structures". A subsequent approval in 1996 permitted the upgrading of the graving dock for "steel fabrication, pipework installation, outfitting of floating production systems and other marine structures" (RC/1996/96). Also in 1996, permission was given to include decommissioning of redundant North Sea oil production structures; however this permission was never taken up and lapsed on 27 August 2001.

The narrow nature of existing permissions requires subsequent planning permission to be sought for alternative uses, including many of those listed in

the report Review of Ports and Sites in the Inner Moray Firth undertaken by Halcrow in January 2004 and explored in detail later in this current study. Expected planning requirements were set out by the Highland Council in the Nigg Fabrication Yard report submitted to the Planning, Environment and Development (PED) Committee 15 August 2007 and subsequently at the 13 December 2007 PED Committee.

The proximal land to the east land also received outline planning permission on 8 October 1980 for works associated with the erection of a petrochemical processing plant. This permission has never been taken up, but has been recognised and safeguarded by planning policy at national and local levels.



Figure 3.1 – Local Plan Designations (Nigg Point)

### 3.5 Supplementary Guidance

The 'Inner Moray Firth Ports and Sites Strategy 2050' study was approved as non-statutory supplementary planning guidance (SPG) in support of the Development Plan by the Highland Council in June 2006. The guidance specifically identifies Nigg as a major site with the following potential:

*'The complex of land and marine facilities at Nigg should become the main Port Authority operational base with further development of berthing adjacent cargo/container handling, marshalling and lay down areas to the east of the Yard. A multi-functional engineering centre of excellence will be developed to capture a growing share of rig IRM, North Sea oil decommissioning and onshore/marine renewable energy manufacturing installation and maintenance contracts. The wider site will function as an Energy Park in its own right providing production storage and trans shipment facilities for hydrocarbons, bio-fuels, hydrogen and other renewable fuel stocks'*

The Highland Council also published 'Designing for Sustainability in the Highlands' in 2006. This document sets out key principles for consideration in masterplans and planning applications for small and large scale developments. These include:

1. Enhance the Highlands' economy and communities.
2. Make the best use of the site.
3. Design within the Highland context.
4. Conserve and enhance the biodiversity of the Highlands.
5. Minimise energy use.
6. Design to conserve water.
7. Design in sustainable waste and sewage facilities.
8. Use sustainable materials.
9. Encourage sustainable transport choices.

### 3.6 Compulsory Purchase Order (CPO) Procedure

The Nigg Development Masterplan is intended to inform and provide the rationale that underpins the requirement to pursue the proposed Compulsory Purchase Order (CPO) procedure which is under consideration by The Highland Council.

Members have urged that all avenues be pursued to bring the Nigg Fabrication Yard into use as soon as possible. Section 189 of the Town and Country Planning (Scotland) Act 1997 (the Act) authorises a local authority to acquire compulsorily any land (including buildings) which:



- Is suitable for and required in order to secure the carrying out of development, redevelopment or improvement;
- Is required for a purpose which is necessary to achieve in the interests of proper planning of an area.

The four procedural phases of CPO are:

Phase 1	Consideration
Phase 2	Publication of Intention
Phase 3	Evaluation
Phase 4	Promotion of CPO and Back to Back Agreement

The current CPO stage is Phase 1 (Consideration). Before progressing to Phase 2 (Publication) the Nigg Development Masterplan is to be available, as this would outline to prospective developers what the planning authority would expect from them.

In determining whether CPO powers may be necessary (Phase 1- Consideration) regard will be had to:

- The condition of the land
- The current use of the land
- The current ownership of the land
- The development plan and other relevant Council policies
- Any other material considerations

The Nigg Development Masterplan considers each of the above matters to inform and provide the rationale for the Highland Council in determining whether CPO powers may be necessary.

### **3.7 Summary of Main Findings**

Key issues from the above physical site analysis have been compiled into a summary SWOT analysis (Table 3.1) and site Appraisal Schedule (Table 3.2).

Strengths	Weaknesses
<p>Site Location</p> <p>Strong policy support for re-development.</p> <p>Graving dock can perform as a dry or wet dock (one of Europe's largest with 121m wide entrance dock gate).</p> <p>Existing road access</p> <p>Existing site and building structure generally in good condition with development potential.</p> <p>Purpose built office facilities car parking available</p> <p>430m quay wall</p> <p>Tarmac access/ramp to dock base</p> <p>Length of berthing face</p> <p>Existing berthing jetty (300m long, 17m deep) and access road</p> <p>Existing plant and machinery within the Fabrication Yard</p> <p>Site size, scale and available utilities</p> <p>Effluent/wastewater treatment plant on site</p> <p>Environmental capacity of the site to accommodate a range of development</p> <p>Labour pool available (historic profile)</p>	<p>Remote from main markets in Europe</p> <p>Semi vacant site with low activity</p> <p>Topography of eastern parts of the study area</p> <p>Eastern part of site no access to Firth</p> <p>Need for site preparation grading and consolidation for access to plots</p> <p>Investment required for improved site services</p> <p>Nearest railway station is at Fearn (9.5km by road)</p> <p>Time and cost to empty dock</p> <p>Resumption of activities would trigger a review of the SEPA discharge consent</p> <p>5m depth on front sheet piled wall outside graving dock</p> <p>Lack of adequate deep water berthage that is continuously available</p> <p>Land contamination may remain</p> <p>No clear plan/programme has been agreed for the site</p>

Opportunities	Threats
<p>Brownfield site supported by NPPG2 (business and industry)</p> <p>Safeguarded land to east for petrochemical development</p> <p>Established oil storage facility with scope to increase usage</p> <p>Established ship to ship transfer facility</p> <p>Dry dock availability</p> <p>Relatively low site start up costs to kick start development</p> <p>Employment potential particularly related to IRM work and rig conversions.</p> <p>Proximity of Invergordon could lead to complementary services.</p> <p>Opportunity to construct additional berthage</p>	<p>Obsolescence of plant and machinery and building envelop unless early maintenance and re-use</p> <p>Attitude and actions of owners and those from who land is leased</p> <p>Possible reduction of developer interest due to perceived lack of momentum at Nigg</p> <p>Lack of a 'project champion' to promote the redevelopment of the site</p> <p>Conflict with Environmental Designations</p>

**Table 3.1 – Physical Site SWOT ('Base Case')**

This analysis has been used to form the 'base case' for physical development at Nigg. The establishment of new industrial activity at Nigg would deliver strategic policy aims for the area including diversifying economic activities and supporting local community development.

Potential uses which are in keeping with existing planning permissions could be fast-tracked for development on site. New industrial uses will be supported by The Highland Council where additional permissions are required as stated in the Local Development Plan. Given the lengthy delay in development on the Dow Chemicals site, there is a strong case for expanding industrial activities to the east in order to make best use of safeguarded industrial land and offer an attractive and competitive location to new markets.

It should be noted that recent changes to the statutory planning system include new requirements for what are now known as "major developments" in the planning hierarchy and reference should be made to Scottish Government guidance in this regard.

Physical & Environmental						
Context (site & surrounding area)			Identity (local character)			
Local Area	Site Description	Port Characteristics	Services	Buildings	Spaces	Landscape and Environment
<p>The site is in the north of Scotland at Nigg Point on the south-west coast of the Fearn Peninsula, approximately 61 km from Inverness.</p>	<p>The general land use pattern comprises industrial land to the west of the B9175. A deep sea jetty forms part of the site stretching south adjacent to the Faourication Yard. Approximately 30ha area owned by KBR and released to Talisman until 2009, renewable on a yearly basis thereafter. It has annual break clauses operable by the tenant only, and is held on a ground rent. The facilities constructed on-site are owned by Talisman, but are potentially available for future lease or purchase by arrangement.</p>	<p>300m single berth jetty. The main approach channel in the Cromarty Firth is approximately 200m distant and can accommodate ships of up to 17m draught.</p>	<p>Oil Terminal serviced by:</p> <ul style="list-style-type: none"> <li>Underwater pipeline linking to Beatrice Field</li> <li>Allocated adjacent anchorage</li> <li>Jetty capable of handling tankers of up to 160,000 tonnes dwt.</li> <li>Two 710,000 bbls crude oil storage tanks</li> <li>Crude oil export capability of up to 50,000 bbls/hr</li> <li>Two 50,000 bbls per day separator/dehydrator tanks</li> <li>Two 200,000 bbls ballast water storage tanks</li> <li>Water treatment plant with discharge consent for 100,000 bbls per day</li> </ul>	<p>Tanks and office buildings</p>	<p>Space provided between the storage tanks (bermed areas for spillage control)</p>	<p>Some areas of grass, tree and shrub planting around the bermed areas.</p>
				<p>Nearest Rail Station at Fearn (10 km) for connections along Far North Rail Line. Invergordon station also accessible (22km)</p>	<p>Access road along the western boundary of the site extending to the jetty to the south (adjacent to the Fabrication Yard), 8km from A9 via B9175, 61km from Inverness.</p>	<p>Some pavements at the site entrance. Not pedestrian friendly.</p>
<b>Nigg Oil Terminal</b>						

Site Appraisal Schedule Table 3.2

Physical & Environmental									
Context (site & surrounding area)					Identify (local character)			Connections & Movement	
Local Area	Site Description	Port Characteristics	Services	Buildings	Spaces	Landscape and Environment	Rail	Vehicular	Pedestrian
<p>The site is in the north of Scotland at Nigg Point on the south-west coast of the Fearn Peninsula, approximately 61 km from Inverness.</p>	<p>The general land use pattern comprises industrial land (including reclaimed land) to the west of the B9175 with access to the sea to the south and west. The site includes a graving dock and quay wall.</p> <p>Approximately 70ha area owned partly by KBR (40ha) and Wakeyin Trust (30ha). The area owned by the Wakeyin Trust is leased to KBR on a ground lease to 2031 with break clauses operable by the tenant only in 2011 and 2021. The site is held on a ground rent and is subject to 5 yearly rent reviews.</p>	<p>121m graving dock gate, 300m berth with 12MCD Quay wall length 430m. Nigg graving dock can accommodate up to 9, 5m draught. Graving dock requires 24 hours to empty. Area of graving dock is 4, 35ha. Quaysides of 725m for draughts from 4, 5m to 9, 5m.</p>	<p>Fabrication Yard serviced by:</p> <ul style="list-style-type: none"> <li>7Mw @ 415 volts and 50-Hz electricity supply</li> <li>4 inch water main supply at a pressure of 55psi</li> <li>Compressed air at a pressure of 7 bar</li> <li>Propane gas delivered at 14 psi and oxygen</li> <li>24 hour security and CCTV system</li> </ul>	<p>One of the largest graving docks (4 35ha) and assemblages of purpose built fabrication buildings in Europe together with extensive quayside areas.</p>	<p>Extensive quayside areas (hardened in part for heavy lifting). Approximately 29ha of yard space supporting amenities and infrastructure.</p>	<p>No landscape value on site (reclaimed land). Views from the site.</p>	<p>Nearest Rail station at Fearn (10 km) for connections along Fearn North Rail Line. Invergordon station also accessible (22km).</p>	<p>Access to the site from the B9175 with an area of tarmac at the site entrance. The rest of the site is unsurfaced hardzone with an indication of vehicular routes. 8km from A9 via B9175 from 61km from Inverness.</p>	<p>Some pavements at the site entrance. Not pedestrian friendly due to heavy traffic and machinery</p>
<p>Proximal Land to the East</p>	<p>This part of the site includes undeveloped land, agricultural land and private residences to the east. There is access to the sea to the south. The site is steeply sloping in a south westerly direction especially to the east of the site.</p>	<p>N/A</p>	<p>Electricity, water and drainage to private residences</p>	<p>Residential properties</p>	<p>Large area of open space.</p>	<p>Agricultural land (greenfield) as well as undeveloped land and historic woodland.</p>	<p>Nearest Rail station at Fearn (10 km) for connections along Fearn North Rail Line. Invergordon station also accessible (22km).</p>	<p>Local roads. Main road is the B9175</p>	<p>Local footpaths.</p>

Site Appraisal Schedule Table 3.2(continued)

## 4 Market Review

### Ath-bhreithneachadh Margaidh

#### 4.1 Introduction

This section provides an overview and key conclusions derived from the Market Report (by MacKay Consultants) which was undertaken to inform the exercise to determine possible uses for the Nigg site.

The Nigg Fabrication Yard was an important part of the Highland economy for over 20 years, employing about 5,000 people at its peak and many more indirectly. The Nigg yard and surrounding area is now an underutilised asset and every effort should be made to help realise its development and regeneration potential.

The brief for the study states that *“it is important that the plan should review all feasible options to bring the site into use as a multi-user industrial facility. This assessment should be based on up-to-date civil engineering knowledge to ensure its validity and fitness for purpose. Included in the work should be forecasts of activity in the identified market options for the next 15-20 years”*.

The brief also gives a long list of possible “industrial activities” at Nigg. For ease of analysis these are grouped into five categories:

1. Oil and gas-related.
2. Wind energy-related.
3. Marine energy-related.
4. Ship Repair, dismantling and related markets.
5. Other Potential Markets.

Assessments of these markets, including conclusions and recommendations derived from the Market Assessment Report are presented in this section.

#### 4.2 Oil and Gas-related markets

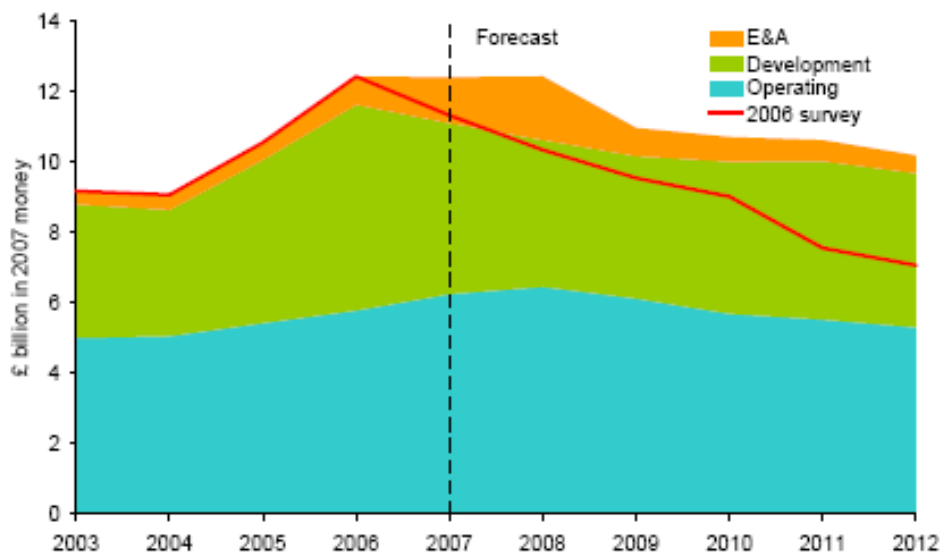
##### 4.2.1 Overview

As discussed previously, development at Nigg is historically linked with the oil and gas industry, notably including the fabrication of key platform jackets and other oil and gas related production of oil within the United Kingdom Continental Shelf (UKCS), commonly referred to as the North Sea, which has declined dramatically in recent years. However, with regards to this study, it is important to consider ongoing development activity and related capital expenditure in the oil and gas markets to assess future development opportunities.



Figure 4.1 shows substantial increases in expenditure in both 2005 and 2006, in marked contrast with the declines in oil and gas production. Capital expenditure (excluding exploration and appraisal) was +29% higher in 2006 than in the previous year and +35% higher in 2005 than in 2004. Notably, this increase in expenditure does not indicate an increase in development activities. The upturn can instead be attributed to two key factors:

- the significant increase in oil and gas prices which, in many cases, extend the economic viability of existing assets; and
- cost inflation in the industry.



**Figure 4.1 – UKCS Capital Expenditure 2003 - 20124**

Economic forecasts indicate a modest increase in capital expenditure over the next few years, with potentially positive implications for facilitating the redevelopment of the Nigg site.

The oil and gas market activities examined as part of the Master Planning process include:

- Platform Construction;
- Inspection, Repair and Maintenance (IRM);
- Rig conversion and modification;
- Decommissioning;
- Subsea modules;
- Pipe spooling;
- Oil storage; and

- Ship to ship transfer.

These are examined in more detail below.

## 4.2.1 Platform Construction

Nigg was one of the major facilities in the UK for this work until the yard's closure. There is still some demand for platforms and modules but, as investment is driven by the discovery of oil, the North Sea is a smaller market than in the past and more sporadic. None of the companies interviewed by MacKay Consultants expressed an interest in this market.

## 4.2.3 IRM

The base at Invergordon has been conducting IRM work for many years and occupies a powerful position in the UK market for maintenance of offshore exploration rigs. With mobile rigs currently in operation requiring annual surveys, this should prove to be a fairly stable market as long as oil continues to be sought and is in production in the UKCS.

There may be opportunity for some IRM work to be done at Nigg, specifically where it requires the use of dry dock facilities such as for the more substantive 5-yearly surveys. Invergordon currently lacks any dry dock facilities, and typically loses out on all this type of work to dry docks in the Netherlands and Norway. Notably, Port Services (Invergordon) have been approached by rig operators requiring dry-docking facilities and would be interested in an alternative to the declining but busy facilities in Rotterdam.

The operational costs at Nigg are a consideration. While it is recognised that this is likely to be too expensive for small contracts, it can be justified for major contracts such as rig conversions.

Fluctuation within this sub-sector is largely due to the varying levels of exploration and appraisal (E&A) drilling on the UKCS, which in turn has been heavily influenced by the levels of world oil and gas prices. If prices continue to rise, this will have a positive impact on exploration. However, there is a general expectation of declining production from the UKCS.

## 4.2.4 Rig conversions and modifications

As the UKCS oil industry matures, it is common for existing rigs to be converted for use in deeper water. This activity requires the use of a dry dock, and is normally undertaken by facilities in The Netherlands and Norway. Nigg could be converted to accommodate this activity, with concern regarding the

cost of operating the dry dock being offset by the fact that some competing dry dock facilities are becoming increasingly unsuitable.

It is likely that this activity will be most productive in the short term in line with increased expenditure driven by rising oil and gas prices. However, activity is expected to decline in the next 15 to 20 years as output falls within the UKCS.

#### 4.2.5 Decommissioning

DSM was seeking to undertake decommissioning work at Nigg. Forecasts have suggested a growth in decommissioning given the declining production within the UKCS. To the contrary, increasing oil and gas prices have provided a catalyst for substantial technological improvements which enable fields to produce for longer.

This has, in turn, delayed the growth in decommissioning activity around the world. Regardless, there is a slow and steady increase in this market sector which MacKay Consultants expects to continue up to 2011 and beyond.

#### 4.2.6 Subsea modules

The subsea market has become more important on the UKCS as more fields are developed using increasingly sophisticated subsea systems rather than platforms. A facility at Nigg could win a share of this work, but it is unlikely that this activity would prove to be a sustainable market for Nigg in the longer term. Moreover the market is estimated to have peaked in 2006 and is predicted to decline beyond 2011.

#### 4.2.7 Pipe Spooling

Facilities at Nigg could accommodate pipe spooling, but physical site limitations would likely rule out the possibility of pipe bundling. Regardless, the market is extremely competitive, with established facilities at Technip at Highland Deephaven commanding the lion's share of the current market.

#### 4.2.8 Oil Storage

The oil terminal currently operated by Talisman Energy is used mainly to store and offload oil from the 'Beatrice' field in the Moray Firth. Oil is transferred from Beatrice via a dedicated pipeline.

Production from 'Beatrice' has already been extended beyond its expected lifespan, and output has fallen significantly in recent years. To subsidise the reduction in output, existing tanks at Nigg have been made available for lease for other purposes.

Ongoing exploration, including the nearby discovery of the 'Jacky' field could extend the life of the pipeline connection to Nigg. There has also been a discovery of 'Lybster' which will be brought onshore and then taken by road tanker to Nigg. This combined throughput is expected to top 10,000 bpd compared with the current 2,000 bpd, but these levels are well below the terminals capacity of 100,000 bpd.

#### 4.2.9 Ship to ship transfer

Third party ship to ship oil transfers have taken place at the Nigg oil jetty including the provision of pollution control measures. Nigg could therefore provide an alternative location, or competition to existing proposals for the Firth of Forth. This has been considered in the Market Assessment report by MacKay Consultants (June 2008), which suggests that Nigg may be a preferable location to the Firth of Forth but that Sullom Voe and Flotta (Shetland and Orkney) would be preferable in turn to Nigg due to their closer proximity to oilfields in the Northern North Sea, and any such activities at Nigg may well be limited.

### 4.3 Wind and Energy Markets

#### 4.3.1 Overview

The UK Government has introduced a policy to create a low carbon economy and cut the UK's carbon dioxide emissions, with renewables anticipated to contribute up to 30 - 40% of all electricity generation by 2020. Activities in the market will be driven by support and investment from the Emissions Trading Scheme.

Scotland has set ambitious targets above those seen in rest of the UK (50% by 2020, 31% by 2011), and is currently ahead of its own schedule. There are currently more than 700 operational turbines in Scotland with 200 or so approved. Applications have been received for a further 1,700 turbines, indicating a potential boom in the market in the near future.

Activities which could be accommodated at Nigg have been identified as:

- On-shore wind energy equipment (towers, turbines and blades) and its assembly; and
- Off-shore wind energy (as above plus substantial foundations).
- 

#### 4.3.2 On-shore wind energy

Activity within the on-shore wind energy market is at an advanced stage in the UK, with most of Scotland's onshore developments lying north and south of the central belt. A number of projects are expected within the Highlands. A report for Scottish Enterprise concluded that total UK onshore wind expenditure is expected to reach nearly £3.5 billion by 2009. £2.2 billion of that total is accounted for by Scottish projects.

There is also the wider EU onshore market to consider and, demonstrated by CamCal's contract award for 49 towers for a project in Turkey, it is possible for Scottish-based companies to secure business in global markets.

Forecasts for this sector are strong, showing a continued increase particularly in the short to medium term.

It is important to note that this is a market which was seen as attractive in the past and led to investment by Vestas a Danish company and the public sector in a wind tower manufacturing facility in Argyll. Unfortunately the market has developed such that wind towers can now be manufactured elsewhere in Europe and the Baltic states and delivered to the UK at prices which the UK manufacturer cannot compete with. This, combined with the fact that the anticipated market growth of onshore wind farms in the UK has not materialised, has meant that closure of the Argyll plant now seems inevitable.

For the above reason it seems that the Nigg site could focus in the first instance, on the assembly of components which, in some cases may be manufactured and bought in from Europe including the Baltic States.

### 4.3.3 Off-shore wind energy

The UK's first offshore wind farm was commissioned in December 2000 and this sub-sector has continued to grow robustly ever since, catalysed by the two UK offshore renewable rounds staged to date. However, only one development currently under construction is located in Scottish waters. No other projects are proposed for Scotland. This is in contrast to the English and Welsh markets where several hundred turbines are proposed in the next 3-5 years.

Various 'out of round' projects have also been undertaken. This includes the proposed deepwater windfarm project located on the Beatrice oilfield (DOWNVinD Project) which may define the renewables future for Nigg.

Political support for the off-shore wind energy market is slowly gaining momentum, including the release in late 2007 of Trade Secretary John Hutton's vision for the installation of 7,000 off-shore wind turbines by 2020.

This has led to economic forecasts for market expansion in the medium to long term. Based on UK targets for offshore wind energy, appropriately resourced UK fabrication yards (of which Nigg is a prime contender) could secure long-term contracts spanning one to two decades. In principle, there would appear to be ample work to be shared around the various facilities. However, while Nigg has established the beginnings of a track record in wind-related manufacture and assembly and has excellent offshore-honed skills and corporate base to offer, it can be expected to face fierce competition from established continental Europe turbine manufacturers.

#### **4.4 Marine Energy Markets**

Marine renewables are part of the mix that the UK Government hopes will help Britain meet its objectives to reduce carbon emissions. Scotland is a likely major centre of activity for marine renewables because of its considerable wave and tidal resources. It also has potentially transferable oil and gas-related skill sets and experience.

Marine power generation technologies are in their infancy and it may take at least another five years before commercial scale devices have been technically and commercially proven, although a faster rate of development would be welcome and should be considered.

At present, Scotland has only one marine-based power generator located on the west side of Islay, which was commissioned in 2002. There is growing provision for the testing of devices e.g. in Orkney. However, despite the limited progress to date and the lack of a clear investment horizon, it is important to factor marine renewables into the Masterplan for Nigg, as an optimal location, and early engagement is a means of establishing relationships which should bear fruit in the medium to long term, in particular as prototype manufacture is ongoing on the Moray Firth.

It is difficult to forecast the pace at which marine renewables will establish and create a market as figures are not readily released from any of the companies involved. Marine renewables could become a significant income generator for Scottish-based companies once the prototyping and demonstrator phases have passed over the next decade. There is potential for the value of the sector to exceed £500million.

An ongoing debate over what is considered to be environmentally acceptable will also need to be addressed before the market can move forward. This will have a material impact on the pace at which marine renewables mature and therefore whether their commercial scale manufacture can be factored into the medium and longer-term future for Nigg. It does not, however, rule out



the use of Nigg for the construction and even dock-based trialling of prototype devices prior to deployment in an open sea/full tidal flow environment.

## 4.5 Ship repair, dismantling and related markets

The following market activities have been investigated in detail:

- Ship repair;
- Marine recycling; and
- Ship building (including offshore floaters, offshore vessels and merchant vessels).

### 4.5.1 Ship repair

Despite a strong annual growth rate (2%), opinions vary as to the state of ship repairing in Europe. The success of UK facilities is facing pressure from Baltic, East Mediterranean and Black Sea competitors.

The nature of the industry is such that work is fairly irregular, often cyclical in nature. Additionally, the time between work orders and execution is a narrow window, making it difficult to forward plan. Contracts are not only won on the basis of price but on the time taken to perform the work and the costs involved in directing ships from their normal route.

As a result, ship repair and maintenance companies usually operate in localised markets. Given the amount of time required to divert ships to the north of Scotland and the operating costs of the dry dock, these market characteristic would tend to militate against the Nigg facility.

### 4.5.2 Marine recycling

The breaking up and recycling of marine vessels in the UK often faces environmental and political opposition and work is often significantly delayed in order to secure necessary permits. Previously, the majority of vessels were taken to Asian countries for decommissioning. International policy is now discouraging this practice.

Nigg could be a suitable destination for recycling ships, but would face competition from facilities with large dedicated dry docks such as those in France.

### 4.5.3 Ship building

Shipbuilding is highly cyclical and can be influenced by external and internal factors. However, according to the Community of European Shipyards

Association's annual report of 2007, there have been three years of increase in new orders – reaching a growth pattern of 20% annually.

There are further large increases recorded for 2007. CESA records that European yards had a commercial new builds collective turnover of 9 billion Euros in 2005 compared with 15.2 billion in 2007 and an increase in commercial new build orders from 37.6 billion to 58.6 billion over the same period.

The two largest market segments for European yards have for the past several years remained Container and Passenger ships, Passenger ships and Ferries further expanding in 2007. Other Non-Cargo Vessels, in particular Offshore Support Vessels more than doubled their current product portfolio since 2005.

Both CESA in 2007-2008 and SSA in 2006 reported that commercial build orders remain difficult to win outside the super yacht, work boat and leisure boat industry. The UK did not rank on the CESA new builds order chart for 2007 due to the small number of orders.

Market activity has been influenced by sector costs, including the increasing price of steel and the strength of the Euro against the US Dollar (since ships are universally traded in USD for export). As a result, it has become more difficult for European shipyards to remain cost competitive. European shipyards have shifted focus on to high-value market segments such as cruise ship and other high-tech niche markets such as naval shipping.

UK yards are working at a disadvantage and this can be seen following the practice of UK offshore support vessel owners placing orders for construction in Iberia, Norway and Holland.

The UK previously catered to the offshore floating exploration and storage vessels and oil and gas supply boats market in the North Sea, but has been out of these markets now for a number of years. This sub-sector is exclusively catered for in Europe and the Far East.

European shipyards are highly sensitive to unexpected cyclical developments. Macro economic factors that account for the cyclical nature of the shipbuilding industry are linked to the demand for international seaborne trade and to interest rates. The growth of world trade and relatively low interest rates contributed to the recovery of demand in the shipbuilding industry since 2004 until the credit crunch began in the autumn of 2008 – which may still develop into a full-blown global recession. The chance that new ship orders will decrease by 10-15% on top of cancellation of existing orders is very possible.

## 4.6 Other Potential Markets

Other market activities which have been examined include:

- Oil refining and petrochemicals;
- Renewable energy generation;
- Bio fuels;
- Waste to energy;
- Provision of port facilities; and
- Provision of training facilities.

It is important to note the range of additional market sectors which could be accommodated at Nigg. This demonstrates the potential ability of the site to diversify its industry and enhance future economic development.

Notably, renewable energy generation (e.g. biomass production or waste incineration) could complement market development presently taking place at Invergordon thereby creating a cluster of activity in Easter Ross. Additionally, training facilities and activities could be accommodated as part of a range of market activities and would have significant and positive impacts on the local community.

Activity involving decommissioning of either nuclear or hazardous wastes at the site would not be supported in line with Council policy.

## 4.7 Comparators

The UK has in the past and is presently responding to changes in the oil and gas market sectors through the re-development of former fabrication yards. Most recently these include:

For oil and gas:

- Tyneside;
- Teesside;
- Hartlepool; and
- Hunterston;

For former shipyards:

- Cammell Laird, Merseyside;
- Harland & Wolff, Belfast;

- Humberside; and
- Barrow-in-Furness.

It is therefore possible to identify a number of comparators, within the UK and elsewhere, which could provide key lessons to build upon in the regeneration of Nigg. Three projects are summarised below:

- Fife Energy Park (UK);
- Arnish Yard (UK); and
- The Luneort Project (Germany).

These case studies provide examples of projects which have been delivered in the last 5 years. Although these projects have used much public investment, Nigg will be a mix of private and public investment as the type and arrangement of facilities provided and the unique selling points offered by each component part of the Nigg site has the potential to attract both private and public investment and development.

#### 4.7.1 Fife Energy Park

Scottish Enterprise Fife with support from Fife Council are redeveloping the former Kvaerner fabrication yard at Methil into an energy park, seeking investment from both the renewable and oil and gas sectors. The vision for the Park is one of world leading capability for Scotland, delivering excellence in engineering, assembly, innovation and supporting technologies for all Energy Sectors, building upon the key attributes and competitive edge of the Park.

£10million investment has been dedicated to the project. It was anticipated that, upon completion, the Park would inject more than £172 million into Scotland's economy by 2015, create several hundred jobs and generate more than £65 million of new investment for the Levenmouth area.

The site extends to 54 ha and includes an area with ready-to-use industrial space (Figure 4.2), including:

- Offices;
- Engineering and machine shops;
- Fabrication shops;
- Paint shop; and
- Craneage.

Feasibility studies were undertaken to consider:

- The development of a steel import/export quay; and

- The construction of a common user marine facility where Energy Devices could be assembled and launched.

Consideration was also given to re-open the original finger docks to construct dry dock or shipway launch schemes for wave energy devices. Various options were considered and eventually a side transfer gantry launch was proposed based on the dimensions of a specific energy device. Specific geotechnical investigations were also undertaken in support of various planning applications.

A 36.5ha area has been dedicated to development plots which are available for lease. All development areas have access to a shared area directly in front of the quayside.

A number of tenants already occupy the site, including offshore, wave energy and oil and gas focussed companies.

The park will offer a robust development framework. While hard infrastructure is established, with road access to each plot, a range of plot sizes are available which allows developers to build their own facilities specific to the type of work to be undertaken. Other attributes of the Park which are comparable with the Nigg site include:

- Deep quayside access.
- Quayside length.
- Large scale covered manufacturing facilities.

Lessons can be drawn from:

- The flexibility offered to the private sector by the ownership and management structure. Individual plots are leased to developers;
- In return for investment, the management team offers investors advice on securing public finance or services including a relocation grant from Scottish Government, applying for public funding or securing planning consents;
- Undertaking specific feasibility studies to consider the development of specific infrastructure to respond to the needs of the renewables and energy sector targeted for occupation on the site;
- Undertaken specific studies (e.g. geotechnical) to support planning applications on site;

- Zoned industrial areas ranging from 2 to 25 acres to accommodate businesses operating in Scotland's renewable energy sector – approximately 500,000 sq ft of high specification business space ideally suited to those operating in the energy sector.



Figure 4.2 – Fife Energy Park Example5

#### 4.7.2 Arnish

Over £5million was invested by Highlands and Islands Enterprise to regenerate the former fabrication yard at Arnish on the Isle of Lewis. The Master Plan focussed development plots around shared infrastructure to allow multiple users access to the sea.

CamCal currently operate the site constructing on-shore turbines for a Turkish project, demonstrating the geographical potential of the market. Facilities include:

- 11,000 sqm covered workshop and store space;
- 10,000 sqm of lay-out area; and
- 100m long quay, up to 9m deep at high tide.

5 Image extracted from Fife Energy Park website: <http://www.fife.gov.uk/minisites/index.cfm?fuseaction=page.display&pageid=5926D14A-D927-116C-43F56E86526238D2&siteid=592084A3-FA5F-AC19-025B3EB2AF7B08B1>





**Figure 4.3 – Arnish Example**

### 4.7.3 The Luneort Project (Germany)

In a bid to establish itself as a world-class wind energy technology centre, the Federal State of Bremen has invested heavily into facilities at Bremerhaven to provide manufacturers with tailor-made industrial and research facilities. The Luneort project at Bremerhaven has received €250million investment since 2003, and represents collaborative working between federal government and the private sector to deliver hard and soft infrastructure. The site is now operating at near-capacity, producing large (currently 5MW) turbine power-heads, blades, towers and substructures for installation in Germany and the North Sea.

Comparably, the Luneort site is situated with ample access to the quayside and landholdings which extend to 60 ha. A strong mix of facilities and infrastructure is provided on-site (Figure 4.4), including:

- 'Production Halls' for 5MW turbines;
- Research and development centre;
- Offices;
- Training facilities;
- Internal crane runways;
- Access to motorway network (4km);
- On-site rail link; and
- Heavy-load quayside.

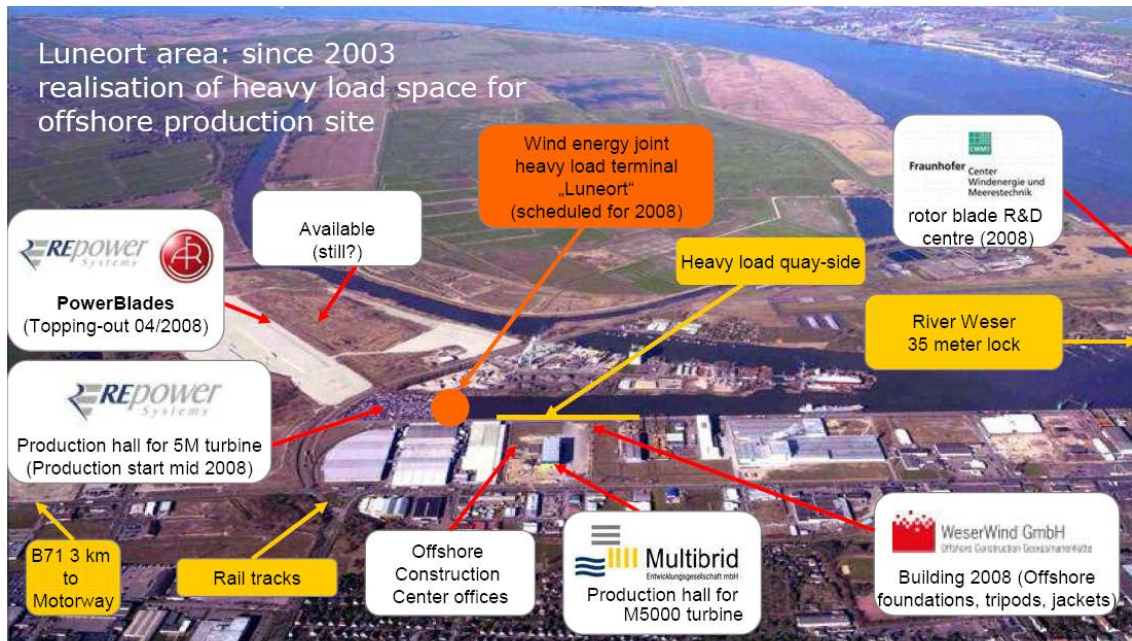


Figure 4.4 – Luneort Project Example6

In spite of the extraordinary capacity offered by facilities at Bremerhaven, it is still incapable of meeting the volume of demand for offshore turbines expected over the next 20 years.

Given the delay in delivering off-shore within the UK, Nigg is well-placed to accommodate long-term off-shore development, focussing specifically on assembly. Development at Nigg could echo the quality of infrastructure currently operating at Luneort and, critically, establish a place for Scotland within the offshore market.

## 4.8 Summary of Main Findings

### 4.8.1 Summary

Market assessments show that Nigg is well placed to accommodate a number of market sectors, particularly from the oil and gas and renewable energy (wind and marine) sectors. The oil and gas, wind energy and marine energy markets are best placed to drive re-development at Nigg. The dry dock is recognised as the site's distinguishing feature, and should be used to competitive advantage.

6 Image extracted from Windenergie Agentur (2008) "Northwest Germany: A Region for Offshore Wind" [presentation], available from: [http://www. we-at-sea.org/docs/Wab%20presentatie. pdf](http://www.we-at-sea.org/docs/Wab%20presentatie.pdf)

- Within the oil and gas market, ongoing operations at the oil terminal will include oil storage and ship to ship transfers in the short to medium term. Although oil production in the UKCS is expected to fall, expenditure is on the rise and the fabrication yard could be regenerated to undertake rig conversion in the short term and decommissioning in the long term.
- The wind energy market is set to boom, driven by national policy targets and investment. The existing fabrication yard is easily converted to accommodate turbine assembly, catering to the on-shore market in the short to medium term and the off-shore market in the medium to long term.
- Scotland is well placed to deliver marine energy technology, which could also be accommodated at Nigg as the market develops.

Other potential market activities, including renewable energy generation and provision of training facilities, were also identified which could be easily accommodated to provide further economic diversification and ensure the long-term future of the site and the surrounding communities.

## 4.8.2 Implications

Arguably, no single market sector is likely to take up development of the site in its entirety, providing the opportunity to examine development of the site to accommodate a range of uses and users. It is also evident that there is a degree of technological interface between various of the sectors and similarity of the skill sets required. It would therefore seem sensible to seek to establish a facility which appeals to distinct, but compatible market sectors.

International comparators corroborate this, providing evidence that former fabrication yards present a scale which is capable of accommodating multiple users within a single site under a single management structure. This requires public sector investment from the outset in order to establish the infrastructure required to catalyse the right mix of development. The outcome of such investment is proven through the comparators examined above, with the establishment of robust development frameworks which can offer sustainable development opportunities in the long-term.

## 4.9 Market Assessment Update

The updated Market Assessment prepared separately by MacKay Consultants shows that the Nigg site is well placed to accommodate a number of market sectors, particularly from the oil and gas and renewable energy (wind and marine) sectors.

Nigg and the wider Cromarty Firth continue to offer a considerable upstream oil and gas capability, both in terms of companies with ability and the skills base to match.

With regard to renewable energy MacKay Consultants considers that there are realistic market opportunities for Nigg, both on-and offshore wind, with particular emphasis offshore, but timing the start of significant engagement will be important. The UK currently lacks facilities capable of the large scale of aggregation and deployment of turbines, especially in the offshore context. The UK also currently lacks a significant manufacturing capability, either home grown or imported via inward investment.

With regard to marine renewables, MacKay Consultants considers that it is important to factor this activity into the Masterplan despite the lack of a clear investment horizon for marine renewables, except that the first Crown Estate Round covering a small part of the Pentland Firth has been launched and a framework for demonstrators elsewhere has been published. Nigg is physically well placed for the construction and load-out of such devices for deployment, especially around the Scottish coastline.

There are, of course, physical challenges. For Nigg to function efficiently as a base for large-scale manufacture and completion of wind turbines, whether large units for offshore deployment or much smaller ones for onshore location, it is already accepted that significant reconfiguring of the existing site would be required, including the addition of proximal land to the east. There are models such as Germany's Luneort project that will provide vital pointers as to how Nigg could be adapted.

In the opinion of MacKay Consultants, offshore renewables especially are at a similar stage to the oil and gas industry in the early 1970s. This was a period when bold decisions were made at central government and regional level to establish offshore fabrication facilities and develop a UK capability. Although beset by significant labour and quality control issues Nigg was among the most successful and longest lived of those yards.

## **4.10 Technical Assessment**

### **4.10.1 Introduction**

This section focuses on those market sectors from which demand for a facility is most evident, which are deemed to be compatible and which are most likely to catalyse the comprehensive regeneration of Nigg. An important next step is consideration of the physical implications of such a multi-user development

concept. This is a critical step in determining the most appropriate mix of land uses to ensure Nigg is re-established as a multi-user, multi-facility site.

The overall site is considered in terms of the requirements of specific market sectors followed by a discussion on the general site infrastructure provision and servicing. Indicative costs are provided against the main identified elements of work in order to provide broad guidance only. These preliminary costs are then summarised at the end of the section but it is emphasised that the costs are only a sample menu of the main elements costed and should not be added together to provide preliminary costs for budgeting purposes. Further detailed investigation would be necessary before the costs presented could be finally confirmed.

#### 4.10.2 Oil related market needs

A number of oil and gas related market sectors were identified to have significant potential in driving future development at Nigg. These include:

- Inspection, repair and maintenance;
- Rig conversion;
- Decommissioning;
- Subsea module fabrication;
- Oil storage; and
- Ship to ship transfer.

These are each considered in turn in the paragraphs below.

#### 4.10.3 Inspection Repair & Maintenance of Oil Rigs (IRM)

The market analysis has reported that although Invergordon has the capacity to handle the present volume of IRM work, there have been times in the past when additional facilities would have led to increased IRM business opportunities in the Cromarty Firth. It is anticipated that if and when the oil price falls again, a similar situation could arise and it would therefore seem sensible to consider the possible transfer of some of the 'oversized' or 'less-conventional' work to Nigg and to configure the site facilities to address the opportunity.

The majority of IRM work can be undertaken in a wet dock situation and whilst the existing graving dock and quay wall might be considered suitable for this purpose, it is probable that it would be in use as a dry dock.

To attract such business an additional external quayside providing a draught of 10m at low water would be desirable to enable IRM work to be reliably and competitively undertaken. Provision for heavy lift loading from craneage



would be required and the provision of services at the quayside including electricity, gas, water and fuel oil would be essential for IRM activities.

#### 4.10.4 Rig conversion

Oil drilling rigs require to be inspected every 5 years in order to meet the requirements of their sea worthiness classification. This work occasionally requires the use of dedicated dry dock facilities. Once dry docked, inspection and repairs to the parts normally submerged can safely take place and opportunity can be taken to carry out improvement and conversion work. This allows proper environmental consenting and control of processes such as paint removal and application so that contamination of the dock floor is prevented which could threaten future dock flooding. Legislation has now changed so that work can be done in the wet if appropriate measures are taken to avoid environmental contamination.

Topside repairs and conversions can also take place with advance contracts having been put in place to prefabricate modules within the fabrication and assembly shops adjacent to the dock. Heavy lifts using mobile cranes brought into the site for the specific contract would be practical and it is understood that a new heavy lift crane has recently been purchased by Port Services Invergordon which could be expected to be available for hire as required.

Transport of modules to the quayside would most likely be by multi-axle trailers which could also be hired in.

Depending on the frequency of use and availability of hired-in plant consideration may have to be given to the purchase of multi-axle vehicles and cranes for the site.

#### 4.10.5 Oil Platform decommissioning

The market report has identified this as an opportunity which could secure the future of the Nigg site which appears well placed to service this market.

The basic requirements for decommissioning are well documented and can be summarised as follows:

- A strong deepwater quay adjacent to a large area of hardstanding. A depth of the order of 25m would allow heavy lift vessels to moor alongside. Alternatively sections of floating platform, weighing up to say 7,000 tonnes, would need to be removed from the main structure in a sheltered coastal environment and transferred to barges. These barges might be expected to have a maximum draught of around 9 metres.



- Water depth in excess of 9m in a sheltered location would allow cargo barges to dock and then transfer their loads onto the quayside either as a single module using skids or by cutting into sections which can be transferred by heavy lift craneage or multi axle vehicles. Typical dimensions for cargo barges are 100m x 30m with the larger barges some 190m x 50m.
- Smaller loads can be delivered by supply boat and these can be readily accommodated at the water depths given above.
- In practice offshore lifting capacity is limited to between 5,000-7,000 tonnes and elements larger than this need to be broken down in situ for transport onshore.
- An alternative is the lifting of entire topsides/ jackets and new generation lifting vessels are being developed for this purpose. However very deep water is required to receive these onshore such as might be available in a Norwegian Fiord.
- A typical minimum requirement for hardstanding might be 50,000 m<sup>2</sup> with a more comfortable allowance 100,000 – 200,000 m<sup>2</sup>. This would allow separate areas for dealing with decks, jackets and smaller elements.
- Typical load bearing capacity for the quayside and hardstanding might be 10 tonnes/m<sup>2</sup> with an additional capacity at the quayside for accommodating transfer loads.
- Depending on detailed SEPA requirements the hardstanding may need to be sealed i.e. concrete surfaced with closed drains.
- Under cover storage would be an advantage but is not essential.
- Availability of a dry dock gives greater versatility (e. g. an ability to accommodate large floating structures).

The existing Nigg facilities provide a good basis to accept barge transported elements for decommissioning activity, including<sup>7</sup>:

- Some 160,000m<sup>2</sup> of un surfaced hard standing in front of the fabrication shops
- Water depth within the wet dock of 9. 1m below chart datum
- 240m quay length within the graving dock
- 1,000 tonnes heavy lift crane capacity at the quayside
- 17,000m<sup>2</sup> assembly buildings (Shops 4, 5 and 6) at the back of the quayside hardstanding

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<sup>7</sup> Information derived from KBR presentation to NSIG, 29 July 2004

There is also deep water within the Cromarty Firth to allow sheltered transfer of loads. Acceptance of heavy lift vessels would require major capital investment to create the necessary 25m draught identified and is not considered justified by Halcrow at this stage. There is also a sand bar at the mouth of the Soutars that may restrict draught below 25m. This should be further examined.

Nigg benefits also from having an existing 9.1m water depth within the graving dock which could accommodate cargo barges as identified above. However this may not be available if it is being used as a dry dock so that loads would have to be received via the south facing external quay where only 4.5m of water exists at low tide causing the deeper draughted transfer barges to bottom out. This may be acceptable if an appropriate type of barge was used and the sea bed prepared in advance of each delivery. However this is far from ideal. It may be possible to dredge the area in front of the existing wall to achieve up to 5 metres depth but given the condition of the wall piling as reported earlier in this report, this is not recommended. In any case a 5 metre depth is still considered to be overly limiting.

Elsewhere in this report it is suggested that consideration be given to providing a new quay with a channel dredged out to give 10m depth at low tide alongside the quay for IRM work. If, for example, this quay were 200m long, this would service the decommissioning market as well as the IRM market. This length would also permit the largest transfer barges for modules weighing up to 10,000 tonnes to come alongside. For outline budget costing purposes, a new external quay 200m in length and dredged to provide 10m draught alongside might cost in the order of £19.5 million.

The market seems to be moving towards transferring as large a part of a platform as possible inshore. Further analysis is necessary in order to develop an acceptable system for cutting up and transferring parts of this floating structure in a safe and environmentally secure method into individual modules weighing up to 7,000 tonnes.

As mentioned in section 3, KBR applied for and gained conditional planning consent in August 1996 to develop the Nigg yard to address the decommissioning market. However this opportunity was never realised and the planning consent has now lapsed. A copy of the application and consent has been provided to Halcrow and the methodology proposed by KBR has been used as a basis to prepare outline cost estimates for similar site preparation works. The intention of KBR had been to receive large parts of offshore structures into a corner of the dry dock which would have been prepared in advance. The structure would then be cut up into manageable

sections within the dry dock and transported using multi axle trailers to the main decommissioning area of the site for further controlled dismantling.

Based on this plan an outline cost estimate of some £1.8million is derived by Halcrow for preparing a dedicated decommissioning area similar to that identified by KBR in their planning application. This estimate is included in Table 5.2 and excludes the use and therefore any preparation of the dry dock to receive structures.

It is noted that consent was granted to KBR conditional on the following:

- A waste management licence should be held by the applicant in advance
- No chemical processing of recovered waste materials should take place on the site
- No discharges of ballast water or any other substance either to the landward area or to the dry dock or harbour area
- No de-scaling of Low Specific Activity (LSA) scale on the site. Proposals for dealing with LSA had to be agreed in advance with SEPA
- An environmental contingency plan and associated monitoring regime should be approved in advance.

#### 4.10.6 Module & Subsea fabrication

At the present time this work is undertaken on site by Global Energy (Global) utilising fabrication and assembly Shop 4 and loading out by heavy lift craneage on to barges moored alongside the south facing quay at high water. Due to restricted draught at Nigg, the barge then typically travels to Invergordon for transfer of the module on to a sea going vessel. The largest module fabricated and loaded out to date by Global using this technique has weighed some 500 tonnes which is considered to be at or near the limit using the described methodology.

Global advise that they would be interested in tendering for much larger module fabrications (up to 10,000 tonnes) and this would require the load out facility to be improved so that larger vessels, particularly barges, could come alongside the quay and the module be skidded on to the vessel.

Whilst the market here is very buoyant, the competitiveness of their tendering at present is constrained through not having a secure lease of the facility from KBR (beyond a year) and the availability of hired in craneage and multi-axle trailers.

The facilities within fabrication shops 4 and 5 are considered adequate at present for their purpose. The operator has had to create a dedicated paint shop area within Shop 4. This is likely to be unsatisfactory, in terms of modern Environmental and Health & Safety legislation and a dedicated new paint shop might be considered a worthwhile investment. Halcrow has prepared an indicative budget estimate of £1,400,000 to provide a typical new blast and paint facility of plan area 50m x 25m.

It is noted that in addition to oil related work, there are opportunities to fabricate modules in connection with shipbuilding and fit out activity taking place in the UK and worldwide.

#### 4.10.7 Oil storage and ship to ship transfers

For the purposes of this review all oil storage and ship to ship transfers as they are currently undertaken by existing facilities at the oil terminal have been viewed together. It is envisaged that with the proposed change of lease arrangements of the oil terminal to Ithaca, there will be a new business opportunity for the existing oil terminal facility for the foreseeable future.

No immediate investment is therefore identified as being required at this time in order to meet the market needs identified.

### 4.11 Wind Energy

#### 4.11.1 On shore wind tower manufacture

The focus of on-shore wind related activity should be on assembly of wind towers. This work can be highly profitable and involves welding the individual cans together to make up the tower in addition to assembly of access ladders, platforms and other kit.

It is anticipated that this work would initially be undertaken in existing fabrication shops 4, 5 and 6; however these facilities could be in high demand for other potential users of the site. Depending on the volume of work received, activity could expand such that dedicated facilities would be required. The Dow Chemicals owned land could be an appropriate expansion area provided that access to the sea can be achieved from the east of the graving dock.

#### 4.11.2 Offshore wind turbine assembly and load out

The market report has identified this sector as having growth potential and that Nigg should be very well placed to exploit this opportunity.

In the recent past Global Energy has been involved in the assembly and load out of the two 5MW demonstrator turbines for the Beatrice off-shore wind farm so many lessons have been learned in this process.

Turbine assembly work would sensibly take place, at least initially, near to the south-facing load out quay where Global has already installed an integration frame. Access to the area of hardstanding adjacent to the external south facing quay could however become restricted as the identified alternative, and possibly more profitable, markets expand.

Clearly the renewable energy market has potential for Nigg beyond merely the assembly of components imported from elsewhere. If this growth were to take place at the same time as the predicted growth in oil platform decommissioning, then consideration could be given to developing a purpose-built wind and renewable energy park at a suitable location on the site. The land currently in the ownership of Dow Chemicals could be developed for this purpose provided access to the sea can be achieved to the east of the dry dock.

#### **4.12 Marine Energy**

The market in marine generated (wave and tidal) renewable energy remains in its infancy. In due course if Nigg has become established in the renewable wind energy market there is little doubt that the resultant knowledge and experience will be directly transferable to the marine renewable energy market. Whilst specific opportunities may be hard to define at the present time it is considered essential that suitable land with access to the open sea is retained at the site for possible future renewable energy business opportunities

#### **4.13 Sea Access Proposals**

Access to deep water has emerged as a key consideration for many of the above industrial activities. In order to accommodate multiple users and increase the competitiveness of the Nigg site, it would be desirable to make investments to improve sea access.

To assist the IRM, decommissioning and module fabrication activities described above, investment in a new external south facing quay facility to provide 10m draught at low water would be desirable. The condition of the sheet piling is noted as being of some concern and in the longer term, as the identified markets grow, it can reasonably be anticipated that there will be a demand for deeper water.

An outline cost of £19.5 million is estimated for providing a 30m wide by 200m long berth immediately south of the present sheet piling, including dredging to give 10 m depth alongside at low water. The cost of investing in repairs and cathodic protection of the existing berthing face could be offset against the cost of this proposed deepened berth. Further advantages of this berth would include its ability to handle the requirements for most identified sea going vessels likely to be utilised and would be available even when the dry dock was in use.

The volume of work anticipated particularly within the wind energy markets would require significant uptake of land. The Dow Chemicals site to the east seems well placed to provide such expansion.

As it would be impractical to transport large assemblies and components around the graving dock, the need arises to access the sea from the east of the graving dock. This would be best achieved by the construction of a purpose-built quay wall. The quay would be similar to the quay on the west side. It is appreciated that the use of such a quay would be limited to when the dry dock is not in use. An outline cost estimate of £4.3million is provided for the construction of this new dock wall.

It should be noted that the route to the quay wall would cross the public access road to Nigg ferry. In view of the relatively low volume of traffic anticipated, a traffic light controlled crossing should prove acceptable to the Roads Authority and to local residents. An outline cost estimate for providing such a crossing is £80,000.

#### **4.14 Dry Dock Proposals**

From research, a market has been identified for work on oil rigs which requires the use of a dry dock. The Nigg dry dock has not been previously identified as attractive to this market due to speed and reliability of operation combined with reluctance on the part of the present site owners to use the dock for this purpose.

As previously described, the dry dock takes 48 hours to empty and, the cost of the complete single in/out cycle of use of the dock gate and associated system<sup>8</sup> is in the order of £125,000 at today's prices (Table 5.2). To renovate the dock gate and associated equipment from its present condition could cost

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<sup>8</sup> Assuming the starting point is where the dock is flooded and the gate is anchored clear of the entrance.



a further £200,000<sup>9</sup> and this investment would need to be considered as a priority at the outset of development.

Depending on the frequency of use, the cost of operating the dry dock could reduce; however, it is not anticipated that this cost would reduce significantly compared with its current operating cost unless the regular turnaround was less than 3 months duration where 10 – 15% might be saved.

It has been reported elsewhere that this cost is seen by the market as competitive relative to other dry dock provisions, e.g. Kepple Verolme in Rotterdam, wherever the dry docking time is expected to exceed 3 weeks. This apparently is due to lower labour costs in the UK.

The above costs do not take account of any need to prepare the floor of the dry dock in advance to receive any specific structure. If required this cost would need to be added to the particular project cost when the work is tendered. In general however the floor of the dry dock is considered satisfactory to receive the loads from rig jack up legs. It is noted however that the imposed loads from the jack up legs should be assessed on each occasion to ensure that they do not threaten the foundation of the concrete quay wall.

The above costs also do not take into account the costs associated with dealing with the risk of hydrocarbon contamination. Since publication of the final report in November 2008, Halcrow has gained access to reports which describe work done to date to assess the extent of the ground contamination caused by historical leaking of diesel fuel supply lines within the southern and eastern parts of the site. This work is now summarised by Halcrow in Appendix 5.

It is noted here that the normal size of drilling rigs operating in the North Sea would suggest that two rigs could enter the dock at one time. Although introducing difficult management challenges, if this could be arranged then the economics should appear attractive.

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<sup>9</sup> This sum includes an allowance for dredging the approach channel including dredger mobilisation costs, mobilising tugs, underwater repairs to gate seals, overhaul of winches and pumps, bringing heavy lift craneage to the site, preparing the floor of the dock by removing obstructions such as previous foundations, upgrading services within the dock and the contracting and training of personnel to be dedicated to providing the dock opening service to meet future demand.

## 4.15 General Site Servicing

Several general matters need to be considered in relation to sub-division of the site into individual fully serviced plots to accommodate different users. A key challenge for the promoters of the new Nigg site is to minimise the required investment commensurate with maximising the use of the existing facilities to accommodate the market demands identified.

### 4.15.1 Road access

The B9175 public access road to the site from the A9 trunk road is considered adequate although consideration may need to be given to better traffic management during main site starting and stopping times when stacking and speeding traffic are considered to have been a serious nuisance to local residents in the past.

Internally it is considered sensible to improve an initial length of road say 200m or thereby by bringing it up to a standard suitable for adoption albeit formal adoption would not be considered beyond any security barrier to the general public. In addition a well laid out visitor car park would be required for formal business visitors and others.

Beyond this surfaced length of access road it is considered essential that a properly delineated access route is provided for use by all traffic and also to provide a proper corridor for the distribution of main site services such as water, gas, electricity, telephones, compressed air and fuel oil.

In deciding where to delineate access routes the need not to be too prescriptive should dominate thinking at this stage. As an initial priority 1 exercise, the only delineated access to be provided might be to the dry dock, to the fabrication/assembly buildings 4, 5 & 6 and to the external quay area to the south of the site.

At Arnish, the decision was taken to delineate the access routes using a substantial cast in situ concrete kerb (approx 600mm wide x 400mm deep) located either side of the defined running surface. The running surface was then made up of approximately 150mm of type 1 crushed rock sub-base material which is free draining and able to withstand the anticipated loading with acceptable deformation.

This form of construction could be considered for the delineated roads on the future Nigg site.

The finished level of the kerb and running surface would be approx 100mm above adjacent ground level. This road should be a minimum of 7.3m wide

increasing in width at turning areas or areas of traffic conflict such as at the quayside load out areas. The services would be located out with the running surface immediately behind the proposed kerb log with locations of tobys, manholes, access chambers, meters clearly marked on the kerb.

Later bituminous surfacing of these delineated access roads can be considered where the edge could be used as the foundation for a precast concrete kerb and the bituminous road-base and surfacing laid directly on top of the sub-base.

As a second, later stage (priority 2) investment in a delineated unsurfaced access to the northern part of the site is recommended to access serviced plots located and sized to fulfil the requirements of new users to the site.

An outline cost estimate of £250,000 is provided for constructing some 650metres of delineated road (priority 1) and £85,000 for some 85metres (priority 2) (Table 5.2).

With regard to access to the land owned by Dow Chemicals east of the public road, consideration should be given to identifying a point of access and providing a traffic light controlled crossing of the road. An outline cost of £80,000 is provided for such a crossing.

#### 4.15.2 Site services

As described above it is considered essential that the locations of all mains site distribution services are clearly defined and that the proposed delineated roadway would be the favoured location. Site service improvement proposals include:

- A new electricity distribution system to meet anticipated demands.
- A new telephone network
- A new distribution water main.

The precise requirements here are unknown but outline costs for typical installations are provided in Table 5.2 so that the order of magnitude can be considered now ahead of detailed investigation, design and refinement.

It will also be necessary to provide an adequate fire fighting main around the site. The condition of the tank which has been reported by others as located on the hillside above the site would need to be considered since the cost of providing a system based on using potable water is unlikely to prove viable where such an alternative exists. Halcrow has not inspected the tank in question.

Site services such as diesel oil fuel, propane and oxygen gas and compressed air might best be provided for each end user on an individual basis. However it may well prove to be more beneficial to provide gas and fuel services centrally and to construct a dedicated fuel storage compound and gas storage compound to take advantage of purchasing supplies in bulk. However this has not been evaluated by Halcrow at this stage.

### 4.15.3 Site security

It is envisaged that the site would remain an overall secure site and that the existing perimeter security fencing, gatehouse, barrier, etc, would be renovated to control vehicle and pedestrian access to the site. The existing external car park should be reduced in size appropriate for say a workforce of 1,000 and would be reconfigured to cater for public transport and cyclists as well as private cars and vans. Security of the car park would also need to be addressed.

For practical reasons consideration might be given to relocating the gatehouse and barrier further into the site. In this way the existing main office building and visitors' car parking area are free of the need and inconvenience of having to pass through formal site security.

Port security is also now a required consideration with European Legislation having been introduced at ports to control the threat of terrorism and illegal immigration (International Ship and Port Facility Security (IPAS) Code). It is normal for large ports to address the requirement by creating a secure disembarking area within the port where people and cargo, which might reasonably be expected to arrive from high risk areas, can disembark in a controlled manner.

Essentially the requirement is for a quayside surrounded by a high security perimeter fence with gated access and a gatehouse which can be manned temporarily to meet the anticipated need and where people and cargo disembarking can be properly recorded and controlled.

It is suggested that this facility might sensibly be provided over a section of the south facing external quayside. Removable wide gates (say 20m overall opening width) would need to be provided so that access to the quayside for load outs was not restricted at other times.

Outline cost estimates for upgrading the existing dilapidated security fence and for providing a new secure port area are provided in Table 5.2.

## 4.16 Summary of Main Findings

The main findings of this section are summarised below, where the engineering requirements to effectively serve each of the main markets are presented as a series of bullet points and outlined in a User Requirement Framework (Table 5.1).

### **Rig Inspection Repair & Maintenance (IRM):**

- Sea access to quayside with 10 metres of water depth at low tide.
- Quay with ability to withstand loads from heavy lift craneage (1,000 tonne capacity mobile crane).
- Quay with mains services readily at hand (electricity, water and fuel).

### **Oil Rig Inspection and conversion**

- Dry dock for 5 year classification inspection with reliable and economic operating characteristics and able to receive platforms having maximum draught of 10 metres.
- Quayside with heavy lift craneage capacity and mains services alongside (water, electricity, fuel oil, welding gases, compressed air).
- Fully equipped, steelwork module fabrication and assembly workshops located nearby with multi-axle trailer and /or crane access to dry dock quayside.
- Fully equipped grit blast and paint shops.
- Ready availability of 1,000tonne craneage and multi axle trailer(s).

### **Oil Platform decommissioning**

- Sheltered water close to the decommissioning site with good access to the open sea and to the site and having 25 metre minimum draught.
- Ready availability of offshore heavy lift craneage capable of lifting up to 7,000 tonnes.
- Barge capable of transporting up to 7,000 tonne sections of platform.
- Quayside with minimum of 10metre draught and having heavy lift craneage capacity.
- Ready availability of 1,000tonne craneage and multi axle trailer(s).
- Prepared concrete slab and hardcore areas capable of supporting modules of up to 10,000 tonnes in weight.
- Sealed drainage system to capture and contain any contaminated run off or wash down water.
- dedicated containers for sorted waste products for recycling or controlled removal to licensed tips off site.
- offices, laboratories and personnel showering facilities.

### **Module & Subsea fabrication**

- Fully equipped steelwork module fabrication and assembly workshops with multi-axle trailer and /or crane access to load out quayside.
- Fully equipped grit blast and paint shop.
- Ready availability of 1,000tonne craneage and multi axle trailer(s).
- Potentially for larger modules, (up to 10,000 tonnes), external skids for assembly and skidding on to barge.
- Quayside having a minimum draught of up to 10metres alongside and able to accommodate heavy lift craneage.

### **On shore wind tower manufacture**

- Quayside able to accommodate heavy lift craneage for importing "cans" and exporting assembled towers.
- Fully equipped fabrication and assembly workshops.
- Good multi-axle trailer access from workshop to load out quayside or to public road network.
- Fully equipped grit blast and paint shop.
- Ready availability of multi axle trailer(s) and heavy lift craneage.

### **Offshore wind tower manufacture**

- Quayside able to accommodate heavy lift craneage for importing blades, rotars, nacelles and "cans" and exporting assembled towers.
- Secure temporary storage area for components.
- Fully equipped fabrication and assembly workshops for towers.
- Fully equipped grit blast and paint shop.
- Good multi-axle trailer access from workshop to load out quayside.
- Ready availability of multi axle trailer(s) and heavy lift craneage.
- Substantial laydown area for assembling components adjacent to load out quay.



Market Sector	Areas	Accessibility	Port Characteristics	Building and Structures	Comments
<b>Oil and Gas markets</b>					
IRM	At least 2 ha of hard standing open storage, manoeuvring space of 2 ha/ lay down area	Access at quayside	Wet or Dry dock of approximately 10m draught, 120m length, 22 breadth, craneage an issue. Min 100m berthing face	Support buildings; availability of crane barges. Heavy lifting pad (50 tonne loads)	Activities include, shot blasting, painting and night working is common. All have environmental implications
Rig conversion	At least 2 ha of hard standing open storage, manoeuvring space of 2 ha/ lay down area	Access to dry dock and quayside	Wet or Dry dock of 8 -12m draught, 120m length, 22 breadth, craneage an issue. Min 100m berthing face	Existing fabrication buildings and paint shop required	Multi axle trailer access
<b>Decommissioning</b>					
Removal & steel recycling	At least 5 HA lay down / storage areas (450m by 100m) near quayside plus hard standing areas for access, scaffolding and craneage - 1 HA per structure	Barges could offload at the existing quay wall or taken to graving dock	Lifting technology - up to 8, 5m draught, 80m beam, 300m length, cargo barges 10m draught	Secure storage - health and safety	Lifting kit of up to 10,000 tonnes, barges (500t). Under cover storage would be desirable
Liquid Waste	Tank Farm	By Sea (Tankers)	Oil Tankers (Nigg Terminal) 16-17m draught	Site storage- health and safety; pollution control	Talisman have discharge license
<b>Subsea</b>					
	5 HA	Sea access and load out facilities	Not defined	A new paintshop facility would be desirable	Increasingly important market
<b>Pipe Spooling</b>					
	1500m long - unobstructed path to barge	long lengths of pipes	2,000sqm Pipe Frame (1500m length) Depth 8-10m	Welding shops	Unlikely market
<b>Oil Storage</b>					
Storing oil	Tank Farm	By Sea (Tankers)	Oil Tankers (Nigg Terminal) 16-17m draught	Site storage- health and safety; pollution control.	Talisman have discharge license
Ship to ship transfer	Jetty	Clear route	Oil Tankers (Nigg Terminal) 16-17m draught	pollution control	Future opportunities are good. License required

Table 5.1 – User Requirement Framework

Market Sector	Areas	Accessibility	Port Characteristics	Building and Structures	Comments
<b>Wind and Marine Energy Markets</b>					
Fabrication/Manufacture/ Assembly/ Transportation	Existing Fabrication Yards/shops. Port facility. Additional land uptake and facilities to the east of the site. Area required depends on size of modules (20 – 60ha).	Road (for steel plate) Access road: 5m width, max longitudinal slope of 8 degrees, max lateral slope 0- 2 degrees, min spec (axle load) 15t. Access to the sea from the east (including a road crossing)	Dry dock - 400m quayside 6-10m draught; Ro facilities - 100t load link span. 75t -450t coaster craneage. Deep water quays. Heavy load preparation.	Existing Fabrication shops. On shore craneage (500t). Concrete plinth. Large lay down area (6,000sq m). 10,000 sqm covered workspace.	Monopile activity may require land of 3ha (storage). Tug operations
<b>Ship Repair, Dismantling and related markets</b>					
Ship Repair	Not defined	Not defined	Wet or dry dock	Not defined	unlikely market
Marine Recycling	Not defined	Not defined	Not defined	Not defined	
Ship Building	Not defined	Not defined	Dry dock/ graving dock	Not defined	
<b>Other potential markets</b>					
Oil refining and petrochemicals	Not defined	Not defined	Not defined	Not defined	unlikely market
Renewable energy generation	Dependent on type of facilities to be accommodated	Not defined	Not defined	Not defined	
Bio fuels	Not defined	Not defined	Not defined	Not defined	unlikely market
Waste to Energy	Difficult to ascertain, dependent on scale of facilities to be accommodated	Not defined	Not defined	Not defined	
Training facilities	Building footprint and associated parking area	Road access - close to site entrance	N/A	Existing office accommodation	New facility desirable - could seek to link to local universities/colleges

Table 5.1 – User Requirement Framework (continued)

Table 5.2 provides a summary of outline cost estimates prepared by Halcrow for the main elements of infrastructure described in the foregoing section and is presented as a menu of typical costs. As stated earlier these estimates are included to provide the reader with order of magnitude costs to assist in the next stage of decision making. The estimates will require to be supported by further investigation, design and detailed costing before they could be relied upon for investment purposes.

<b>Item</b>	<b>Description</b>	<b>Outline Cost</b>
<b>1</b>	<b>Sea Access Proposals</b>	
	Provide 30m wide by 200m long berth in front of existing sheet piled south facing quay. Include dredging to -10m chart datum	£19,500,000
	New load out berth on east side of dry dock, 60m long plus returns	£4,300,000
	Install secure port facilities at south quay including provision of security fencing, gateways, gatehouse and services	£60,000
<b>2</b>	<b>Dry dock operating costs</b>	
	Cost estimate for normal entry/exit cycle assuming gate is in place over mouth of dock i.e. to de-ballast gate, tow to offshore temporary mooring, moor same, release from moorings, tow back, relocate in place, empty dock, reflood dock de-ballast gate, tow to offshore temporary mooring, moor same, release from moorings, tow back, relocate in place.	£125,000
	Extra over above for surveying and dredging channel to open sea to depth of -10 chart datum	Range £20,000 - £50,000
	Extra over above for tug mobilisation costs	Range £15,000 - £30,000

Item	Description	Outline Cost
	Extra over one off first time contingency allowance for overhauling winches and pumps, testing same, replacing gate seals, carrying out minor concrete repairs to gate and valves, repairs and maintenance to offshore dolphins and roundheads either side of dock entrance, for special measures to comply with SEPA requirements and for training operatives	£200,000
	Budget rate for removing contaminated ground from dry dock	Approx £400/m <sup>3</sup>
<b>3</b>	<b>Decommissioning-related works</b>	
	Site preparation of area 450m x 90m (prepare hardstanding, reinforced concrete slab and bund walling on impervious liner, sealed drainage system, security fencing)	£1,800,000
<b>4</b>	<b>Buildings</b>	
	New paint/blast shop assume 25m x 50m plan area	£1,400,000
	Budget rate for asbestos cement cladding removal and re-cladding with double skin cladding	£300 (per m <sup>2</sup> of floor area)
	Budget rate for the demolition of redundant buildings	£12 (per m <sup>3</sup> of enclosed volume)
<b>5</b>	<b>Road Access</b>	
	Budget price for 200m of new road 7.3 m wide with 2 m surfaced footways either side to adoptable standard	£650,000
	Priority 1 – delineate a route from end of surfaced road to quayside and linking in with fabrication shops 4, 5 and 6	£250,000

Item	Description	Outline Cost
	Priority 2 - delineate a route from end of surfaced road into land to be serviced to north of site	£85,000
	Budget price for typical Traffic light controlled crossing of public road to service Dow Chemicals land	£80,000
<b>6</b>	<b>External car park and security</b>	
	Reconfigure external car park for anticipated 1,000 workforce including provision for buses and cyclists, lighting and security	£300,000
	Renovations to security fencing around entire site perimeter including new access gates	£200,000
	Renovations to existing gatehouse	£15,000
<b>7</b>	<b>Site Services and Utilities</b>	
	Install new LV distribution cables in newly delineated road verge. Include 5 new substations	£75,000
	Budget price for renovating and upgrade existing substations to modern safety standards (19 No)	£75,000
	Install new water main in delineated roads	£90,000
	Install new telephone distribution network in delineated road	£30,000
	Overhaul existing foul water pumping and treatment system	£60,000
	Clean out existing SW drainage system and replace covers to catchpits, etc.	£10,000

**Table 5.2 – Outline Cost Menu**

## 5 Strategic Framework and Options Frèam is Roghainnean Ro-innleachdail

### 5.1 Introduction

The purpose of this section is to provide the rationale behind the development of a physical strategic framework for Nigg which has informed the generation of options for the future development of the site.

The development of the strategic framework is based upon the 'supply' and 'demand' Master Planning methodology derived from outputs summarised in the previous sections of this report:

**Sections 2 and 3** – 'Baseline' of the site appraisal, policy and regulatory context and the technical assessment which provides a clear picture of the 'supply side' of the equation, that is, the existing site regarding land uses, ownership access services and port characteristics.

**Section 4 and 5** – 'Market and Technical Assessments' refers to the 'demand side' requirements of uses and users in relation to their site specific needs such as building sites, port requirements and utility requirements.

The Nigg site this section outlines the **strategic framework** (development strategy and principles) - in shaping the feasible options for development at Nigg. The Nigg site is considered in three parts: the oil terminal and associated tank farm; the fabrication yard; and the proximal land to the east of the fabrication yard.

Consideration is given to the **options** to bring the site into use, ranging from a single user to a multi-user industrial facility. Possible uses and opportunities are considered for each of the sites individually, as well as collectively as a single unit. The options are based on the market assessment for the next 15 to 20 years prepared by MacKay Consultants, as well as the engineering information available at the time of writing, to ensure its validity and fitness for purpose.

This section therefore considers the following main issues:

- Consultation
- Strategic Framework
- Masterplan Components
- Option Generation (i. e. user requirements and compatibility)
- Option Appraisal (appraisal mechanism, positive and negative aspects) access options against strategy and principles, multifunction/multi user, single user.



## 5.2 Consultation

A public consultation event was held at Victoria Park, Ross County Football Ground (Ross Suite), Dingwall on Tuesday 27 May 2008. This facilitated workshop event was aligned with the project team's completion of the baseline study which examined the development context and current situation of the study area.

Key findings were presented to an invited audience and critical issues were discussed in facilitated workshops to ensure all baseline aspects had been examined.

Workshops were centred on four key themes:

- market sectors;
- buildings, infrastructure & accessibility;
- environment; and
- socio-economic.

The consultation event also provided the opportunity for the expectations and aspirations of the community to be discussed openly in order to ensure the final Masterplan responded to them appropriately.

Feedback from the event was very positive. The baseline information provided by the consultants was endorsed by attendees, and development at Nigg was clearly supported by an overwhelming majority.

Workshop discussions were diverse, and generally provided broad and useful insight to the project team. Key points to inform the current Masterplan exercise include:

- The need to present a development framework which is robust enough to provide confidence to the local population that development will offer long-term, sustainable employment opportunities;
- Promotion of the site as a multi-user, multi-facility development opportunity;
- The need to demonstrate an understanding of how industrial uses may change over time and understand how growth can be best accommodated;
- The need to recognise opportunities presented by existing regional market activities, particularly at Invergordon, and promote collaboration with such activities rather than competition;

- The need to rationalise infrastructure provision as well as demolition of existing buildings to ensure future uses on the site can be accommodated efficiently;
- The alignment of land uses and transport development, including appropriate access arrangements for industrial activity and traffic management along key routes to and from the area;
- The need to safeguard the existing natural environment against irresponsible development through the identification of appropriate uses and companies; and
- Promotion of a step change for both social and economic development in order to ensure long term sustainable growth.

### 5.3 Further Studies

In addition to the SEA Environmental Report a Flood Risk Assessment (FRA), as required by SEPA, has been undertaken, together with an Appropriate Assessment (AA), which will all be agreed between the Highland Council and statutory consultees prior to the adoption of the Masterplan. These reports have informed the mitigation measures that are required for inclusion in this final version of the Nigg Development Masterplan.

The SEA Environmental Report recommends minor changes to the development principles of the Masterplan. There are no detailed physical mitigation measures recommended at this strategic development framework stage. The Flood Risk Assessment findings conclude that the Nigg site will not be under a significant flood risk before 2035, to the end of its expected life and therefore no mitigation work is recommended. The recommended minimum formation level for masterplanning the site is +3.58mOD, based on a 1:50-year water level design event in 2035 (i.e. including sea level rise). For the specific requirements of SPP7 (2), sites are required to be defended to the 1:200-year event (0.5% annual probability), but sea level rise is not required to be allowed for. Given that the 1:200-year level is slightly higher than +3.58mOD, it is recommended that +3.62mOD is the minimum formation level of the site.

The site generally lies at +3.75mOD and above, and so it is concluded that the site will not be under a significant flood risk before 2035, to the end of its expected life.

The Masterplan should not hinder any potential future mitigation requirements, in particular the protection of specific buildings on site.

## 5.4 Strategic Framework

The **strategic framework** is considered in terms of the development strategy and the development principles.

The **development strategy** for the Nigg site is based on unlocking the development potential, of the site, focussing on the platform fabrication yard, the oil terminal and associated tank farm and the substantial area of land to the north-east of the fabrication yard. The development strategy considers the existing development plan land use allocations and subsequently the possible feasible and sustainable uses and opportunities for each component of the site both individually and collectively as a single unit.

The vision for the Nigg site is as a multi-user industrial facility. There would appear to be a market opportunity based on the current Market Assessment undertaken by MacKay Consultants to establish a multi-functional fabrication facility at the Yard.

This could be set up on the basis of a multi-user access to the site main infrastructure components, such as the graving dock, quayside loading and storage areas, utilities and deep water berthing, with the existing buildings either leased as they are, or custom subdivided to reflect market- demand. The proximal land to the east of the Yard would provide additional development opportunities should the size and layout of the Yard prove a constraint. The proximity of the land to the east may be used to advantage by effectively offering the opportunity to extend the core site of the Nigg complex.

The range of uses considered as part of a multifunctional facility have been informed by the Market Assessment Report which ranks the 'industrial activities' in the following order of importance:

1. Rig conversions and modifications (oil & gas related).
2. Oil platform and module decommissioning (oil & gas related).
3. Oil terminal operations (oil & gas related).
4. Wind turbine components (wind energy market).
5. Fabrication of components for aircraft carriers and related work (ship repair, dismantling & related markets).

These uses are strategically important to the area and have the potential to create sustainable employment over a 15 to 20 year period. The main elements of the strategy are to create a physical and sector-based focus at Nigg raising the profile of specialised business activity in the area and leading eventually to increasing employment levels.

The purpose of the **development principles and objectives** is to provide clear guidance to the Masterplan exercise. Rather than quantitative targets, these principles serve as indicators of desirable characteristics that the Masterplan should demonstrate. The development principles and objectives are an 'option appraisal' tool in assessing and determining the preferred option. The development principles and objectives are described below in Table 6. 1.

<b>Development Principle 1: Site Content and Operations</b>	
Development Objectives	<p>To create a development site that is capable of accommodating a range of uses and has the flexibility to attract and sustain both large scale inward investment as well as small-scale local business enterprise.</p> <p>To ensure the plan acknowledges user interaction and operational linkages through designated 'activity zones'.</p> <p>To create an integrated and coherent Master Plan based on a simple grid framework to:</p> <ul style="list-style-type: none"> <li>• Maximise development areas</li> <li>• Create development plots which can be sub-divided or amalgamated into smaller or larger plots as necessary.</li> <li>• Accommodate user requirements with expansion areas available where possible.</li> <li>• Ensure adequate road alignments to service all plots and accommodate HGV's and abnormal loads.</li> <li>• Create unconstrained road and marine access to berthing quays and transit areas where possible.</li> </ul> <p>To renovate the graving dock to operate competitively.</p> <p>To retain the oil storage facility already in operation in its current location, making best use of existing infrastructure.</p> <p>To retain the oil jetty.</p> <p>To provide an adequate access adjacent to the quayage and dock walls to be shared by all users of the site where possible.</p> <p>To utilise existing buildings as much as possible through refurbishment.</p> <p>To make provision for the creation of additional berthing faces to the south and east with access to deep water where possible.</p>

<b>Development Principle 2: Cost and Value Engineering</b>	
Development Objectives	<p>Minimising up-front costs, focussing only on those enabling works required to make an early start to the project, for example by:</p> <p>Maximising use of existing built structures while ensuring that they are suitably refurbished and secure prior to letting, as the basis for a future facilities management plan</p> <p>Keeping new permanent road alignments to a minimum to facilitate movement around the site with additional road surfacing and final determination of road and utility alignments until a later phase.</p> <p>Undertaking phased provision of utilities.</p>
<b>Development Principle 3: Project Delivery</b>	
Development Objectives	<p>To demonstrate economic efficiency by maintaining a high level of flexibility by using existing resources, i.e. infrastructure, services, plant and buildings to create a competitive location.</p> <p>To phase implementation (plot demarcation, infrastructure and utility provision) to reflect user requirements as currently stated and / or predicted. It is anticipated that provision of sites and services will be primarily demand-driven.</p> <p>To maximise opportunities for employment and inward investment.</p>
<b>Development Principle 4: Impact and Implications of the Master Plan</b>	
Development Objectives	<p>To ensure that material prepared is in a form that can ultimately inform and provide the rationale that underpins the requirement to pursue the proposed Compulsory Purchase Order procedure under consideration by The Highland Council.</p> <p>To provide a strategic framework for appropriate uses for the next 15 -20 years.</p>
<b>Development Principle 5: Integrating the spaces</b>	
Development Objectives	<p>To make new connections into an opportunity to obtain new spaces</p> <ul style="list-style-type: none"> <li>Any development east-wards should seek to minimise potential environmental impact in terms of landscape, visual,</li> </ul>

	<p>habitats, species and access routes.</p> <ul style="list-style-type: none"> <li>• Review adjacent sites proximal to the east of Nigg Yard to determine how their proximity may be used to advantage by effectively offering the opportunity to extend the core Nigg complex.</li> <li>• The creation of new opportunity sites should also be a means to free spaces for development of the core site.</li> </ul> <p>To consolidate and enhance movement and connections</p> <ul style="list-style-type: none"> <li>• Review and consider extension of the existing network of connections (road and rail) (e.g. link to Far North Rail from Nigg Complex).</li> </ul>
<p><b>Development Principle 6: Integrating the port/harbour/major site with its surroundings</b></p>	
<p>Development Objectives</p>	<p>To take care in the treatment of separating uses/elements</p> <ul style="list-style-type: none"> <li>• New buildings/structures to provide a balance between its multi-functional industrial activity, its wider rural context and providing an assurance of security.</li> </ul> <p>To exploit all the potentialities of the water</p> <ul style="list-style-type: none"> <li>• To share the use of the water (e. g. oil terminal; ship to ship, etc. )</li> <li>• To favour movements of the inhabitants by water (e. g. Nigg ferry service)</li> </ul>
<p><b>Development Principle 7: Integrating functions</b></p>	
<p>Development Objectives</p>	<p>To organise and benefit from blending</p> <ul style="list-style-type: none"> <li>• To use all technical solutions and to search for innovations (e. g. numerous technical solutions such as treatment of existing buildings, lighting, port equipment, surfacing, etc to reduce nuisances and to make the context between the port/harbour/major sit and its surroundings possible.</li> <li>• To structure maritime/multi-use industrial activities to maximise complementary benefits (e. g. join efforts in the fields of R&amp;D, communication, training, international prospecting, etc. )</li> </ul> <p>To make temporary uses a means to manage the site</p> <ul style="list-style-type: none"> <li>• Rather than selling or granting concessions for certain spaces</li> </ul>



	<p>or buildings pending their allocation, their temporary occupation may enable certain functional and temporary needs to be satisfied.</p> <ul style="list-style-type: none"> <li>Partners/users should therefore give themselves flexibility to anticipate cycles of port/harbour/major site development and not compromise future development by irreversible modifications that 'freeze' the site.</li> </ul>
<p><b>Development Principle 8: Protect and where appropriate enhance the environment</b></p>	
<p>Development Objectives</p>	<p>To reduce reciprocal impacts</p> <ul style="list-style-type: none"> <li>To engage in a pro-active environmental approach (SEA , EIA and AA) and ensure the following measures are adhered to <ul style="list-style-type: none"> <li>Provide appropriate protection of designated areas and protected species</li> <li>Avoid loss of important habitats for biodiversity, including ancient and semi natural woodland</li> <li>Minimise impacts on local landscape character</li> <li>Minimise risks to high quality local aquatic environment</li> <li>Minimise impacts on the historic environment, including scheduled monuments and unscheduled heritage, in particular the site and setting of Dunskeath Castle.</li> </ul> </li> <li>To work on the 'buffer' and transitional zones (e. g. green buffer zones stemming from the preservation of predominantly rural zones or creation of green spaces).</li> </ul> <p>To communicate and to get certain uses accepted</p> <ul style="list-style-type: none"> <li>To make all the concerned parties aware of the environmental strategy of the part/harbour/major site so it's positive contribution to economic growth and the quality of life of its inhabitants can be understood.</li> </ul> <p>To provide Management plans</p> <ul style="list-style-type: none"> <li>Construction Environmental Management Plans and Operation Environmental Management Plans will be a requirement for all new development on site. The details for what these plans should cover should be set out in an Environmental Impact Assessment.</li> </ul> <p>To reflect policy guidance</p>

	<ul style="list-style-type: none"> <li>The masterplan should reflect The Highland Council’s ‘Designing for Sustainability in the Highlands: Development Plan Policy Guidance (2006).</li> </ul>
<b>Development Principle 9: Integrating societies</b>	
Development Objectives	<p>To prepare for tomorrow’s jobs</p> <ul style="list-style-type: none"> <li>To adapt the professional training sectors (e. g. in active collaboration with the academics in research and training, ports and multi-functional uses on the Nigg site should contribute to put in place specific training curricula. The contents of the course programmes should be regularly adjusted in order to correspond better to the requirements of a port-multi-functional use economy in constant development).</li> </ul> <p>To integrate the port/harbour/major site within the life of the local communities</p> <ul style="list-style-type: none"> <li>To make development projects, as far as possible, upstream to attract the support of the inhabitants by for example, landscaping treatment, port heritage, etc.</li> </ul> <p>To open the port/harbour/major site to the local populations</p> <ul style="list-style-type: none"> <li>The creation of cycle/pedestrian routes (e. g. enhance the existing National Cycle Route)</li> </ul> <p>To determine the overall tourism offer</p> <ul style="list-style-type: none"> <li>To consider the tourist potential; for example, Nigg ferry service between Nigg and Cromarty</li> </ul> <p>To ensure there is a co-operative dialogue between stakeholders to communicate that the Masterplan will seek to protect or enhance the environment</p>

**Table 6.1 – Development Principles and Objectives**

## 5.5 Master Plan Components

Taking into account the development strategy and principles described previously and informed by previous research on locational characteristics and market assessment, a series of major ‘**activity zones**’ have been defined. These activity zones show the predominant industry sector for which a case can be made in market demand terms and on the basis that the location is capable of accommodating related service. This related both to the physical capacity of each component part of the Nigg site (i. e oil terminal; Nigg Yard, and proximal land to the east), as well as the compatibility of sectors and the opportunity for supply chain linkages.

The locational characteristics and physical capacities of each of the Nigg component sites are outlined in Table 3.2 Nigg Site Appraisal. The user requirements of the priority market sectors identified by the Market Assessment Report are outline in Table 5.1.

The major ‘activity zones’ that have been identified are:

- Oil terminal operations (oil storage etc)
- Rig conversion and modifications
- Oil platform and module decommissioning
- Renewables (wind turbine components)
- Fabrication of components (e. g aircraft carriers and related work)

The ‘activity zones’ have been considered in terms of two scenarios (two options) **Scenario 1 (Option 1)** – multi functional uses comprising oil and gas activities and renewables;

**Scenario 2 (Option 2)** – multi functional uses focusing upon the renewables sector (manufacture components, assembly and distribution).

These two scenarios/options are considered in further detail in the earlier sections on option generation and appraisal.

## 5.6 Options generation

A use analysis summary table was prepared to summarise key conclusions coming from previous market and technical assessments (Table 6.1).

Potential market sectors were described as either unlikely, possible or probable opportunities for Nigg based on current and forecast market conditions as detailed in the Market Assessment Report prepared by MacKay Consultants and considered earlier in this report.

Physical site requirements were then examined for those sectors which had the most potential to drive development at Nigg. Requirements were described as being unachievable, achievable or project-specific, based on the technical assessments set out earlier in this report.

Market sector / sub-sector	Market Potential Summary	Expected Physical Site Implications	Development Planning Issues / Opportunities
<b>Oil + Gas Markets</b>			
Platform construction	Previously undertaken at Nigg Fabrication Yard. Activity is driven by the exploration and decision to produce oil. Diminishing oil resources in the UKCS and increased use of subsea modules (see below) illustrates expected continued long term decline of market sub-sector. Most, if any, opportunities likely to be in the short term.		
IRM	<p>Unlikely</p> <p>Linked to exploration activity currently driven by increasing oil prices. This is a fairly stable sub-sector as mobile rigs are required to have annual surveys undertaken, and dry dock surveys undertaken every 5 years. Annual surveys are already carried out at Invergordon; contracts for dry dock surveys could be used in conjunction with facilities at Nigg. Early concern regarding the cost of operating the dry dock gate at Nigg could be offset by competing dry dock facilities in the Netherlands becoming increasingly unavailable due to demand. Activity will be shared with that at Invergordon, with work expected to extend into the medium to long term.</p> <p>Possible</p>	<p>Existing graving dock is suitable, though renovations may be required to make activity economically viable.</p> <p>It is not envisaged that dry dock would be used for IRM work as a priority. Access could be gained at quayside, where 10m water depth would be required. Provision of utility services (electricity, gas, water and fuel oils) desirable.</p>	<p>This activity is in accordance with the 1971 and 1996 planning permissions.</p>
Rig conversion	<p>Conversions required for rigs drilling in deeper water, which is an increasing trend in this 'mature oil and gas province'. Competing facilities in the Netherlands are increasingly becoming unavailable due to demand. This is seen as a market opportunity which could come to fruition in the short term.</p> <p>Probable</p>	<p>Achievable</p> <p>Dry dock facility required, though renovations may be required to make activity economically viable. Any alterations to floor of dry dock would most likely be project specific.</p> <p>Activity could be undertaken in existing fabrication buildings close to dock, and the construction of a dedicated paint shop facility would be an advantage.</p> <p>Transfer of heavy components to/from the quayside would require heavy lift crane and multi axle trailers which could either be purchased or hired in.</p> <p>Achievable</p>	<p>This activity is in accordance with the 1971 and 1996 planning permissions.</p>

Table 6.2 – Use Analysis Summary Table (continued)

Market sector / sub-sector	Market Potential Summary	Expected Physical Site Implications	Development Planning Issues / Opportunities
Decommissioning	<p>Operations have slowed due to the increase in oil prices extending the viable life of fields in the North Sea. This sub-sector likely to be affected by cost inflation. Given the current rate of activity, expected to pick up in the long term.</p> <p>Worth thinking about the other elements of decom i.e. the need/ opportunity to deal with 'drill cuttings' from old and newly drilled wells. This was a sector we looked at previously. Could use the excess capacity of the tank farm on the Tallsman site ... but involves some contamination risk</p> <p>Probable</p>	<p>Deep water (25m) would be required for heavy lift vessels to moor, but 10m is considered reasonable to allow cargo barges access to the site. If the dry dock is not in use, barges could be taken into the graving dock for offloading at the existing quay wall.</p> <p>Alternatively, as discussed previously, structures could be floated in at high tide and cut in the dry dock prior to transfer to the dedicated area.</p> <p>Storage and cutting up operations on land could be undertaken on dedicated areas 450m by 100m near quayside. Under cover storage would be desirable, but is not essential.</p> <p>Achievable</p>	<p>This activity would require subsequent planning permission as the 1996 permission was never taken up and has now lapsed.</p>
Subsea	<p>An alternative to platforms, this is a more viable market sub-sector with a number of fields currently under development. Global have recently leased facilities at the site for this sub-sector activity, operating as subcontractors to main suppliers for a number of projects and suppliers on others. There is potential to continue this arrangement; however, as with platform construction continued market decline is forecasted as oil supplies in the UKCS diminish, so activity would likely take place in the short to medium term.</p> <p>Possible</p>	<p>Improved sea access and load out facilities would be required as described previously.</p> <p>A new dedicated paint shop facility would also be desirable.</p> <p>Achievable</p>	<p>This activity would require subsequent planning permission as it is out with the scope of the 1971 and 1996 permissions.</p>
Pipe spooling	<p>Expenditure in this sub-sector is continuing to decrease so activity would take place in the short term if at all. Competition exists locally.</p> <p>Unlikely</p>	<p>Achievable</p>	
Oil storage	<p>This is already undertaken at Nigg Oil Terminal; the life of the yard has been significantly extended due to increasing oil prices. Activity is likely to continue into the medium to long term.</p> <p>Probable</p>	<p>None.</p> <p>Achievable</p>	<p>This activity is in accordance with 1960 and 1981 planning permissions.</p>
Ship to ship transfer	<p>This is already undertaken at Nigg Oil Terminal (jetty), and would likely be linked to continuing activities undertaken at the oil terminal. Activity is likely to continue into the medium to long term.</p> <p>Probable</p>	<p>None.</p> <p>Achievable</p>	<p>This activity is in accordance with 1960 and 1981 planning permissions.</p>

Table 6.2 – Use Analysis Summary Table (continued)



Market sector / sub-sector	Market Potential Summary	Expected Physical Site Implications	Development Planning Issues / Opportunities
<b>Wind Energy Markets</b>			
Onshore wind energy	This sub-sector is highly driven by changes at the national policy level. Due to size of modules, it is likely that the point of production / assembly will need to be near the point of operation, however some opportunity exists more regionally. The limited number of sites for onshore wind farms would mean this sub-sector is likely to extend to the short and medium term.	Short term work can be undertaken in existing fabrication shops 4, 5 and 6. Should activity expand to include manufacture of wind turbine components (e.g. blades and nacelles), the additional land uptake and provision of dedicated facilities would be required. The Dow Chemicals site is best placed to accommodate this growth, with additional facilities provided on a project-specific basis. Access to the sea from the east (including road crossing) would be required.	This activity would require subsequent planning permission as it is out with the scope of the 1971 and 1996 permissions.
	Possible	Achievable	
Offshore wind energy	This is a relatively new sub-sector, only recently receiving political support and therefore will likely come to fruition in the medium to long term. Local operations of offshore wind farms will require significant upgrading to the energy distribution infrastructure. Forecasts are extremely good for this activity, paralleled to the start of the oil boom in the 1970s. Competition will be fierce, particularly with European fabrication yards. It is likely that physical requirements will require significant public investment to ensure viability and competitiveness.	Existing integration frame located at south-facing load out quay would meet short-term needs. Expected growth in volume of activity would require additional land uptake and provision of dedicated facilities. The Dow Chemicals site is best placed to accommodate this growth, with additional facilities provided on a project-specific basis. Access to the sea from the east (including road crossing) would be required.	This activity would require subsequent planning permission as it is out with the scope of the 1971 and 1996 permissions.
	Probable	Achievable	
<b>Marine Energy Markets</b>			
Marine renewables	This market sector is at the very early stages of development. However, given increased investment in renewables development, it is likely to produce significant results in the medium to long term.	Difficult to ascertain due to relative immaturity of market and technology development, though likely to be similar to other renewable energy requirements. Investment likely to be project specific.	This activity would require subsequent planning permission as it is out with the scope of the 1971 and 1996 permissions.
	Probable	Achievable	
<b>Ship Repair, Dismantling and Related Markets</b>			
Ship repair	Relatively steady, although unpredictable market. Success dependent on three factors: price quoted, time of immobilisation (dry docked) and time deferred from normal route (site location). Nigg is not a strong contender.		This activity is in accordance with the 1971 and 1996 planning permissions.
	Unlikely		

Table 6.2 – Use Analysis Summary Table (continued)

Market sector / sub-sector	Market Potential Summary	Expected Physical Site Implications	Development Planning Issues / Opportunities
	Some opportunity does exist in the short term to use Nigg as a subcontractor site for elements of the modules for the one-off construction of two new aircraft carriers for the Royal Navy. This is currently dependent on the ability to secure a short term lease for use of the facilities at Nigg.	None.	
	Possible	Achievable	
Marine recycling	Market activity often subject to significant delays in obtaining relevant licenses in the UK. Competition is fierce from operators in France and the Far East. There is a potential to link this with decommissioning work for oil vessels in the medium term.		
	Possible		
Ship building (including offshore floaters, OSVs and merchant vessels)	Market activity is volatile and cyclical. Strong track record in Europe and the Far East, with existing facilities already in place; not a strong sub-sector in the UK.		
	Unlikely		
<b>Other Potential Markets</b>			
Oil refining and petrochemicals	Grangemouth is currently capable of serving the Scottish market. A viable possibility would be establishing an export facility, but usual location related to proximity to market, not point of crude oil production due to transport costs. A market does exist for refining "heavy oils" associated with extending the life of existing fields. However, fierce competition exists in Asia.		
	Unlikely		
Renewable energy generation	Market development taking place in Invergordon. Cluster activities could be supported at Easter Ross in the short to medium term e.g. biomass	Difficult to ascertain, dependent on type of facilities to be accommodated.	This activity would require planning permission.
	Possible	Project specific.	
Bio fuels	This market is in its infancy. There is uncertainty whether demand will be met by local production or imported product.		
	Unlikely		

Table 6.2 – Use Analysis Summary Table (continued)

Market sector / sub-sector	Market Potential Summary	Expected Physical Site Implications	Development Planning Issues / Opportunities
Waste to energy	<p>Current shortage of waste facility options to serve the Highlands which could be met through incineration. Plans currently exist for a facility at Invergordon which would satisfy that demand. If these plans are rejected due to significant local opposition, Nigg could be considered as an alternative location in the short to medium term, though similar opposition will likely be faced.</p> <p>Possible</p>	<p>Difficult to ascertain, dependent on scale of facilities to be accommodated.</p>	<p>This activity would require planning permission.</p>
Provision of port facilities	<p>These are already provided at Invergordon. Some possibility exists for small-scale local shell fishery in the short to medium term.</p> <p>Unlikely</p>	<p>Project specific.</p>	
Training facilities	<p>Currently undertaken on-site by Global Energy, with expansion predicted. This sub-sector could be easily accommodated with any activity to provide opportunities to the local community and strengthen local social capital. Facilities would be most beneficial in the short to medium term to develop local skills.</p> <p>Probable</p>	<p>If multi use / multi user facility developed, then a new training facility would likely be highly desirable and easily accommodated into any configuration.</p> <p>Achievable</p>	<p>This activity would require planning permission. Potential to seek affiliation with local university / colleges.</p>

**Table 6.2 – Use Analysis Summary Table**

A land use compatibility table (Table 6.3) further analyses the information set out in Table 6.2, focusing solely on those uses which were deemed 'probable' in the market analysis and 'achievable' in terms of physical site requirements. Each potential use was then assessed in terms of its compatibility with subsequent uses based largely on physical site requirements including:

- Type of sea access (direct/indirect/none required);
- Use of dry dock facilities;
- Likely land uptake (area); and
- Additional service and utility requirements.

The Market Assessment identifies the following activities as priorities:

- Rig conversion and modifications
- Oil platform and module decommissioning
- Oil Terminal operations
- Wind turbine components
- Fabrication of components and related work

Rig conversion/modification work and decommissioning are considered compatible. There is little or no conflict between them, particularly in terms of the use of the site. The rig work would be done in the dry dock and the decommissioning is capable of being undertaken elsewhere on the site. Oil storage at the Nigg terminal will continue for many years. It is currently on a very small scale, but a significant increase is expected in the near future when the terminal handles oil from new fields. The Nigg Terminal has the potential to be related to the Nigg Yard in the longer term.

Renewable sector activities are realistic market opportunities for Nigg, for both onshore and offshore wind farms. Such activities will require considerable laydown areas and good accessibility to both bring in and distribute the components. The Luneort site at Braemarhaven is a good example of where a 40-60 hectare designated heavy industrial site with the Bra fishport complex of the Braemarhaven is currently successfully being developed for the renewable market. Both Nordex and Vestas have already made extensive use of the port for exporting turbines overseas. Luneort possesses excellent road and rail access. The Nigg site currently has road and deep water sea access and has the potential of rail access to the far north rail network. The 'integrated approach' at Luneort – large (currently 5 MW) turbines powerheads, blades, towers and substructures can be manufactured, integrated and loaded out to sea. This 'integrated approach' is capable of being achieved at Nigg (including the proximal land to the east) subject to investment in infrastructure.

We understand that there is some discussion about a ‘green energy park’ comprising approximately 15 potential projects. No information was available at the time of writing.

	Oil Storage	Ship to Ship Transfer	Rig Conversion	Decommissioning	On-shore wind energy	Off-shore wind energy	Marine renewables	Training facilities
Oil Storage								
Ship to Ship Transfer	+							
Rig Conversion	+	+						
Decommissioning	+	+	+					
On-shore wind energy	+	+	-	-				
Off-shore wind energy	+	+	-	-	+			
Marine renewables	+	+	-	-	+	+		
Training facilities	+	+	+	+	+	+	+	

**Table 6.3 – Land Use Compatibility**

This assessment provides a way forward in terms of options generation by identifying two multi- functional scenarios:

1. Oil and Gas plus renewables (Blue)
2. Renewable energy focus (Green)

The first centres on compatible oil and gas uses with some renewable uses (shown in blue) and the second on primarily renewable energy uses (shown in

green). Notably, oil storage and ship to ship transfer facilities are retained in both options as set out in the development principles, and training facilities can be accommodated in any scenario as discussed in the market sector analysis.

## 5.7 Concept Master Plan Framework

### 5.7.1 Option 1 – Oil & Gas and Renewables

The **vision** is one of world leading capability for Scotland building upon and delivery excellence in oil and gas and engineering. There is recognition of the growing future market of the renewable energy sector through the designation of land for the laying out of wind energy components for both onshore and offshore windfarms. This option only considers the assembly and laying out of renewable components. It does not consider the manufacturing, fabrication and finishing of renewable energy components and devices. A multi-functional/multi-user facility at Nigg would potentially respond to fluctuations in the economy.

The Nigg site offers the following **physical opportunities** for building upon and consolidating its oil and gas activities, as well as responding to the growing renewable energy market:

#### **Site layout and expansion capability –**

- The 'oil terminal' component of the Nigg site is likely to continue for many years. It is currently on a small scale but has the potential to expand in the future without any significant future investment;
- Nigg is physically well placed for the load-out of wind energy / marine energy components for development, especially around the Scottish coastline as well as potentially elsewhere in the UK;
- Opportunity to invest in a modern training facility at Nigg;

#### **Marine access –**

Access to deep water alongside a quay;

- Graving dock facility – due to the costs of dewatering the graving dock this suggests that from a commercial perspective it could only be used for major contracts such as conversions;
- The Nigg site has the potential to enhance and increase its deep water berthage that is continuously available subject to varying levels of investment. Four options were considered as part of the 'Review of Ports and Sites in the Inner Moray Firth' report undertaken by Halcrow for HIE/DFTI in July 2003. These options are still relevant today when considering enhanced marine access. The feasibility of these options in

legal, landownership and engineering terms would require to be confirmed;

**Road and rail access -**

- The Nigg site appears well placed in terms of supply chain logistics with direct road and sea access;
- Enhanced sea berthage and access, as well as potential rail access would provide 'competitive advantage' but will be driven by market demand and funding;

**Infrastructure Capacity -**

- The Nigg Yard retains a considerable amount of residual infrastructure. The value of this infrastructure in terms of supporting the range of oil and gas activities suggested is not altogether obvious – especially at the detailed level in regard to large scale infrastructure components, specific buildings and equipment;
- It is recommended that there be some limited expenditure in enabling the existing yard, its components and equipment to be brought to appropriate Health and Safety standards to allow its reuse;

**Environmental considerations -**

- Fundamental requirement that all facilities proposed to enable oil and gas and renewable activities (e.g. facilities equipped for the processing of metals, other materials and components) pay due regard to all relevant health, safety and environmental requirements;
- Environmental considerations will be considered in the SEA (ongoing), EIA (at project level) which will inform and shape the Nigg Development Master Plan.

This option is illustrated in Figure 6.1.



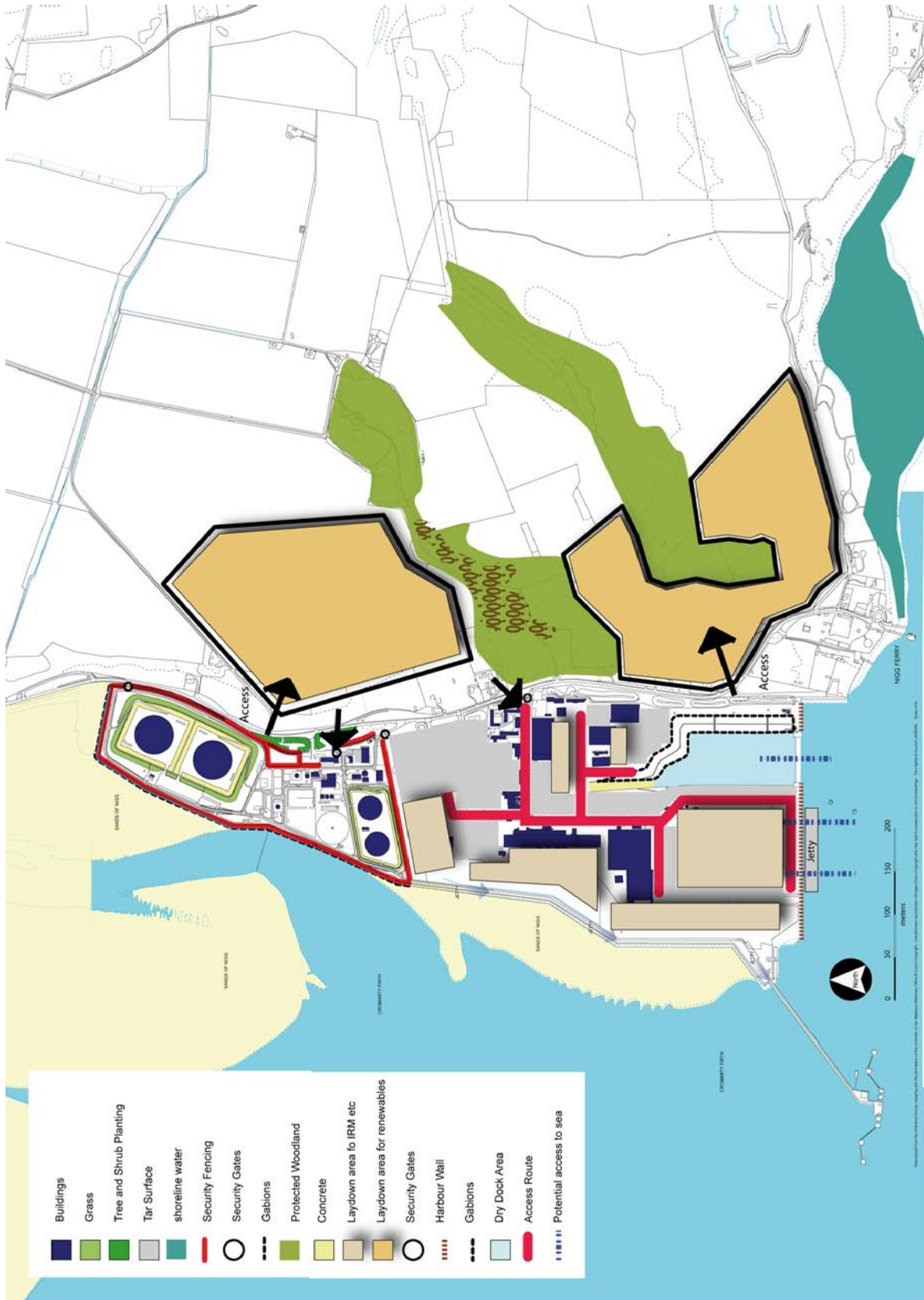


Figure 6.1 – Option 1 Concept Master Plan

## 5.7.2 Option 2 – Renewable Energy Focus (“Green Energy Park”)

The **vision** for the Park is one of world leading capability for Scotland delivering excellence in engineering, assembly, innovation and supporting technology for all energy sectors, building upon the key attributes and potential competitive edge of the Park.

The UK currently lacks facilities capable of such large scale aggregation and deployment of turbines, especially in the offshore context. There are a number of locations that are being developed as ‘energy parks’ to handle such projects – Fife Energy Park in Levenmouth and Luneort Complex at Bremerhaven in Germany – which provide good examples of an integrated approach to offshore turbine/energy component manufacture and integration nationally and internationally.

Appropriately resourced UK fabrication yards, of which Nigg is considered to be a prime contender, have the potential to secure long-term ‘renewable energy’ manufacture and assembly work over the next 10 to 15 years based on UK offshore wind alone.

‘Renewable energy’ projects which would constitute a ‘green energy park’ at Nigg could include:

### **Component manufacturing process**

- Milling, planing, shaping, turning/boring, metal forming and shaping;
- Bending and folding, flame cutting, plasma cutting, plate bending, profiling and cutting, punching and nibbling, rolling and stretch forming;

### **Fabrication and assembly**

- Electrical, electronic, heavy fabrication, hydraulics, power control systems, switch gear, adhesive bonding;

### **Finishing and quality process**

- Inspection, testing and quality assurance;
- Engineering metrology, surface treatment

Nigg currently has the following unique attributes and competitive advantage which can be built upon:

- Deep water access
- Graving dock facility
- Site capable of expansion
- Heavy lift gear and workshop facilities

- Load-areas
- An early track record in wind-related manufacture and assembly
- Excellent off-shore honed skills and corporate base.

The Nigg site offers the following **physical opportunities** for development a 'green energy park' which are considered in further detail in the preceding section:

**Site layout and expansion capability –**

- The Nigg site is sufficiently large to allow holding a significant number of wind component units in readiness for load-out;
- To accommodate storage of wind component units undercover, bearing in mind that weather was a significant factor with regard to completing the Beatrice demonstrator and there is, as yet, very limited installation vessel capability worldwide;
- Opportunity to expand site to potentially respond to technological advances in turbine unit sizes ranging from 5MW to 10MW;
- Opportunity to accommodate manufacturing units to develop power heads, towers and components;

**Marine access –**

- Access to deep water quayage;
- Opportunity for trans-shipment;

**Road and rail access –**

- The Nigg site appears well placed in terms of supply chain logistics, with direct road and sea access;
- The potential rail access to the Far North Link in the long term would enhance access provision and potentially increase the competitive advantage of the site;

**Infrastructure capacity**

- Opportunity to reconfigure the site and prime the Nigg Yard and proximal land to the east with the necessary investment in additional infrastructure (e.g. additional assembly pads, appropriately configured sheds, etc.);
- **Environmental Considerations**
- The 'green energy park' would need to mitigate any potential environmental impacts;
- The SEA currently being undertaken will provide the framework in which subsequent EIAs at project level will be undertaken as each component of the 'green energy park' is progressed;

- The requirements for a range of environmental-related studies, plus geophysical and other necessary prerequisite assessments will be identified as part of the SEA/EIA and development process.
- This concept is illustrated in Figure 6.2, and a both options are compared in parallel in Table 6.4.

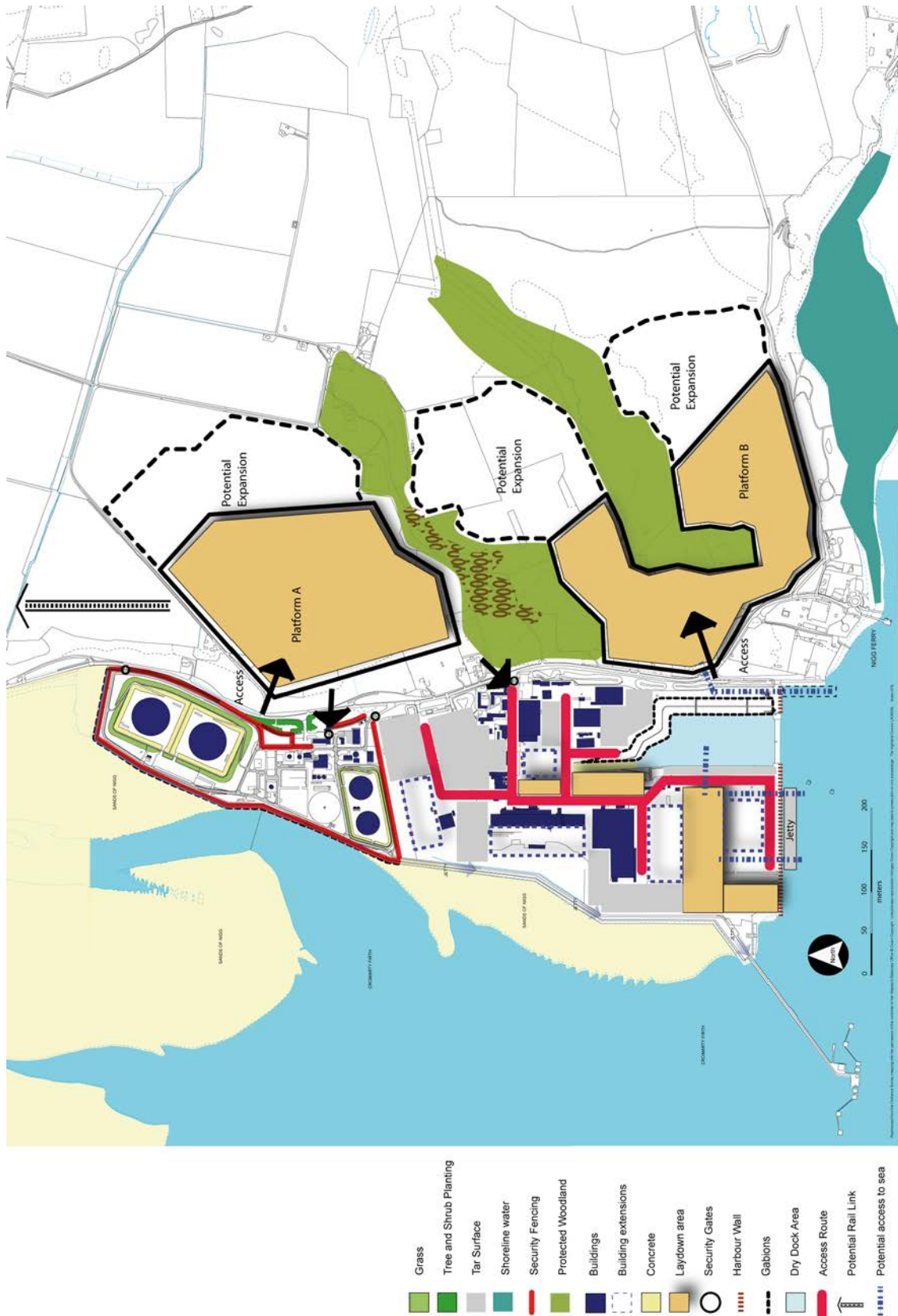


Figure 6.2 – Option 2 Concept Master Plan

	<b>Option 1</b>	<b>Option 2</b>
<b>Buildings</b>	Refurbishment of existing buildings where required.	Refurbishment and extension of existing buildings where required to accommodate additional covered areas for manufacturing and assembly.  Opportunity for intensification of activity on site due to opportunities for expansion onto proximal land to the east. Storage buildings will be required on the land to the east.
<b>Laydown area</b>	Large areas for laydown for IRM, decommissioning, subsea and rig refit required on the Nigg Yard Fabrication site.  Possible storage area for renewables on the land to the east.	Laydown/ storage area on land to the east with potential expansion further east as required to respond to wider renewable activities (e.g. manufacture of components and devices). More intensive use than option 1.
<b>Rail Link</b>	Aspirational, subject to growth and market demand.	Rail access would allow the 'green energy park' to be increasingly competitive in the national/international market – provide a 'competitive edge'. Renewable components would benefit from a range of transport options.
<b>Sea access</b>	Potential sea access via Jetty and graving dock..	Potential sea access to Jetty to east of graving dock. Increased opportunity for berthage would potentially add to 'competitive advantage' of the 'green energy park'.

**Table 6.4 – Option Comparison**



## 5.8 Physical Considerations of Options

Each option is considered in terms of:

- General land use arrangement
- Movement and connections
- Infrastructure requirements
- Capital investment

### 5.8.1 Option 1 – Oil & Gas Focus (Secondary renewable energy sector)

#### General Land Use Arrangement

Option 1 seeks to diversify activities at Nigg whilst building on its long-standing reputation within the oil and gas industry. The renewables energy sector is provided for within this framework, but is not intended to be a key development priority.

Along with continued operations at the Oil Terminal, industrial activities will include:

- IRM
- Rig Conversion
- Decommissioning
- Subsea module fabrication; and
- Renewable Wind Energy (on and off-shore) – Secondary

The general land use arrangement would see oil and gas sectors accommodated on the former fabrication yard site, with the renewables sector expanding into land to the east of the B9175. See Figure 6.3. The land to the east could be developed independently but in conjunction with the Nigg Yard, taking account of landscape character, visual impact and biodiversity.

#### Movement and Connections

Regarding infrastructure, this comprises primarily road access and sea access.

**Road access** has been considered in two parts; the first relates to the general site access (B9175) which links the site from the A9 and the second relates to the internal roads within the industrial site.

The first element of road infrastructure refers to adopted B9175 which provides access to the site. It has already been described in the Baseline review. This road provided adequate access to the Nigg complex when fully operational. This should therefore form the 'base case'. It is recommended



that further investigation be undertaken to determine the suitability of the B9175 to accommodate the uses proposed in the option on the basis that the uses proposed as part of this option are considered comparable with the 'base case'.

It is not proposed to undertake any significant reconstruction of the access road in the early years of the Development Master Plan. Nevertheless, consideration should be given to realignment of the B9175 to allow incorporation of adjoining areas into the main part of the Nigg Yard site if this will meet demand for a particular proposed site function.

The second element of road infrastructure refers to the internal road system which would run from the existing security gate at Fabrication yard, distribute traffic round the site as a whole and provide service to individual plots.

Since the site is comparatively flat throughout and has good load-bearing capacity, few problems are envisaged in the early stages of its development in creating a suitable distributor road alignment and individual plot access. For this reason it is considered unnecessary to create a fully engineered surface road to adoptable standards throughout its whole length at this stage. Accordingly, the Master Plan has been designed to accommodate a standard 7.3m carriageway industrial access road, with a single 2m footpath over the first 200m from the security gates. Beyond this initial section it would be adequate and more cost effective to provide surface demarcation only of the road on gravel.

The method proposed for the majority of the road is to deploy industrial standard conventional road works furniture to demarcate the main distributor route and to provide appropriate temporary signs and surface markings to indicate suitable direction of travel, speeds, site access points and other features requiring caution. Phasing of road demarcation/construction would reflect the phasing of the development as a whole.

At present, vehicular access to the jetty to the west of the site is gained by way of a track, which runs down the western boundary of the site. It is not proposed to modify this at the early stages of development. Access to the Oil terminal site and associated distributor routes would not require modification. Access to the land to the east of the B9175 would be provided along similar lines to that in the Fabrication yard.

Regarding **sea access**, the Master Plan has sought to acknowledge user requirements for berthing as noted during the market appraisal exercise. In particular, the main plots and users have access via the 'public' road adjacent

to the berthing faces on the south wall and the west face of the dry dock to permit the unloading or loading of materials/parts.

### **Infrastructure Requirements**

User plots are defined by a re-aligned hard surface road infrastructure which provides access to the sea for all users. The renovated dry dock will operate with priority given to IRM and Rig Conversion works. Loading and berthing for decommissioning and subsea module fabrication will be gained via the reinforced berthing wall, accommodating loads of up to 10,000 tonnes. Loading arrangements for the expansion area to the east is provided via a new quay wall to the east of the dry dock and is gained via a new signalised road crossing.

Provision for a utility way-leave (to accommodate water, sewerage and power lines) has been made, running parallel to the main distributor road which rings the Nigg Fabrication site. With regard to power requirements, should the site be developed as a number of smaller units, separate metering would be required. Supply to individual tenants would be made and low voltage and metering would then be on an individual basis as is the case on a typical business park.

### **Capital Investment**

Table 5.2 outlines the capital investment for the various elements of Option 1:

- Sea access proposals;
- Dry dock operating costs;
- Decommissioning related works;
- Buildings;
- Road access;
- External car park and security; and
- Site services and utilities

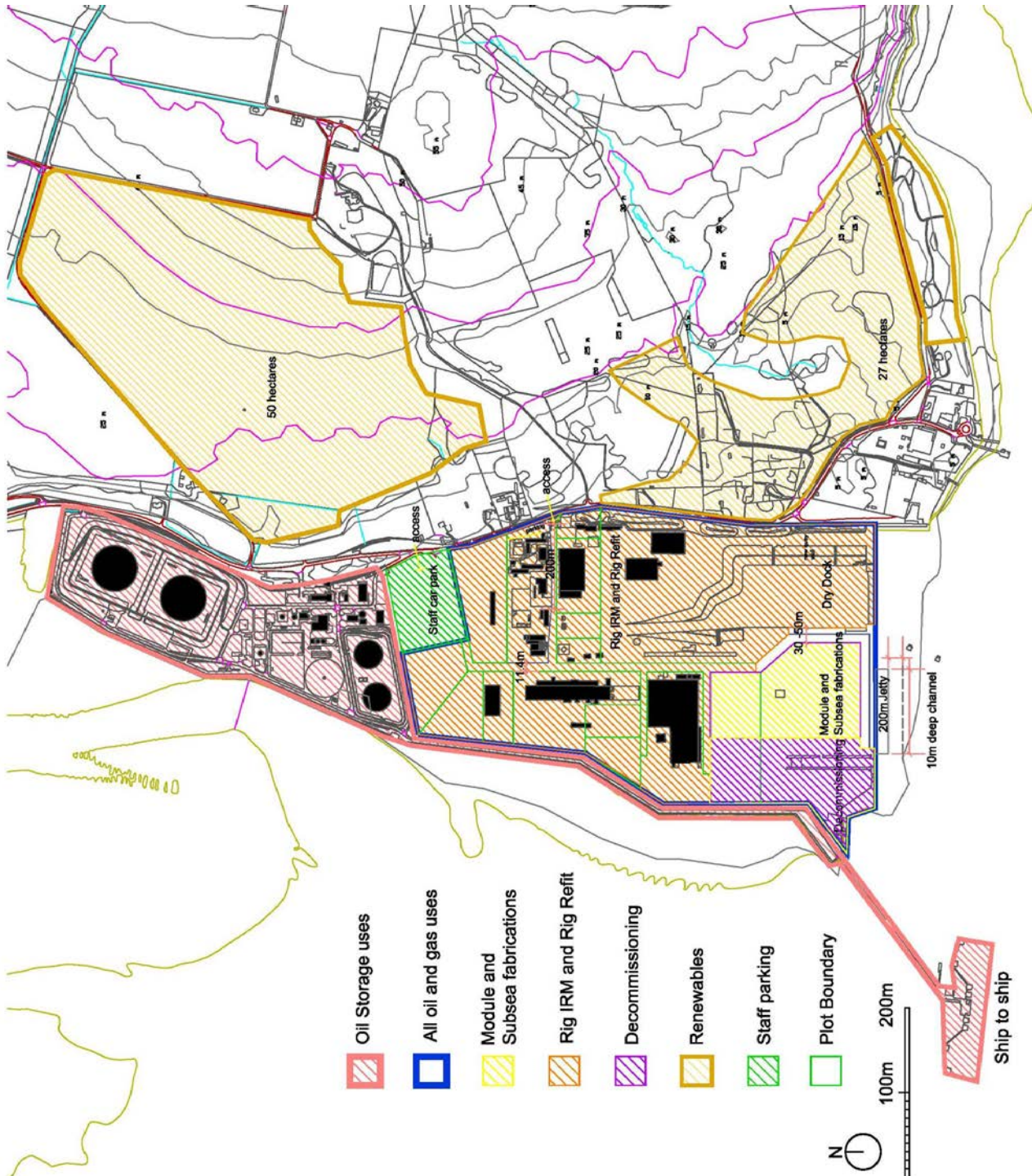


Figure 6.3 – Option 1 – Oil Gas and Renewables

## 5.8.2 Option 2 – Renewable Energy Focus

Option 2 focuses upon the renewable energy sectors that is 'Green Energy Park'. See Figure 6.4

### **General Land use arrangement**

The renewable energy projects that would constitute a 'Green Energy Park' and shape the general land use arrangement of the Nigg site includes:

- Manufacture of renewable components and devices
- Fabrication and assembly of renewable components and devices
- Finishing and quality processes

The manufacturing activities would be concentrated within the existing Nigg Yard to utilise the existing buildings and infrastructure as required.

Reconfiguring of the existing site would be required for Nigg to function efficiently as a base for large scale manufacture and completion of wind turbines and marine energy components and devices, whether large units for offshore deployment or smaller devices for onshore location. The proximal land to the east could primarily enable laying down and storage (potentially under cover), as well as possibly expanding manufacturing activities from the main Nigg complex concentrated alongside the B9175. The land to the east could be developed independently but in conjunction with the Nigg Yard.

### **Movement and Connections**

- Road access – The Nigg site has good road access which was capable of accommodating the 'base case' activities during a fully operational Nigg complex.
- Sea access – The Nigg site has good access to deep water berthage. Options have been considered in terms of increasing deep water berthage both as part of the earlier Halcrow study in July 2003, as well as part of this study (See Technical Assessment). Sea access can be achieved from the proximal land to the east via the B9175 although this option is not under consideration. There is the potential for direct sea access to the south of the land to the east. It is understood that planning permission did exist for such an access but this has subsequently lapsed.
- Rail access – There is the potential to connect to the far north rail. This should be considered as a long term opportunity that would enhance the competitive edge of the 'Green Energy Park'.
-

## Infrastructure Requirements

- The Nigg Yard retains a considerable legacy of residual infrastructure and this provides the opportunity for upgrading and enhancement to sustain renewable manufacturing activities.

It has not been able to determine within the scope of this commission and with the information available as the value of the existing infrastructure in terms of prospective demand. It is recommended that further investigations be undertaken, particularly with regard to the proximal land to the east.

## Capital Investment

Table 5.2 outlines the capital investment for the various elements of Option 2 'Green Energy Park':

- Sea access proposals;
- Dry dock operating costs;
- Buildings;
- Road access;
- External car park and security; and
- Site services and utilities



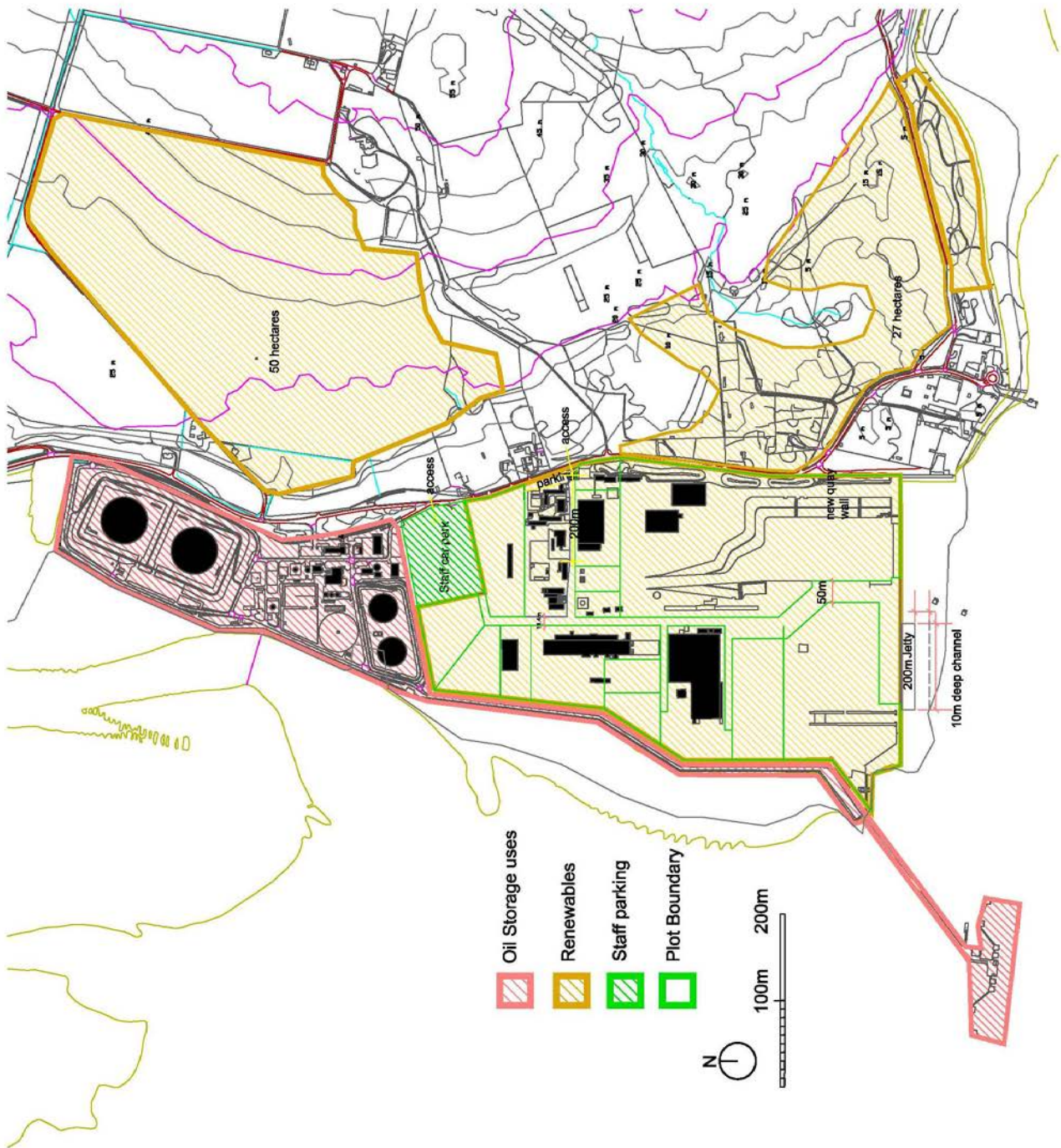


Figure 6.4 – Option 2 – Renewables - 'Green Energy Park'

A difference between the two options is the **use** of the plots (and how the whole facility is managed), with effectively a similar road layout, new berths, new load out areas etc being identified in each. There are other 'distinguishing features' of the options which will be considered further in this report.

Option 1 can potentially be considered as a single **major** owner or occupier which would take primary management responsibility to run the site e. g. oil, decommissioning, renewables and design the core of the site to address their specific requirements, leaving the remainder as 'white land' for future design and delivery on demand. A comparator here could be Luneort in Bremen or The Shetland Decom Base.

Option 2 could be a more flexible layout (possibly smaller scale), with smaller plots across the site as a whole, with a greater emphasis on the Management Company to organise the ongoing development of the site. Comparators could be the Fife Energy Park.

Tables 6.5, 6.6 and 6.7 consider the development options in terms of the individual component parts of the Nigg complex – Yard, Terminal and proximal land to the east.

	<b>Option 1 – Oil &amp; Gas and Renewables</b>	<b>Option 2 – Renewables - 'Green Energy Park'</b>
<b>Theme</b>	Specialist Heavy Industrial site with Graving Dock plus renewable (assembly)	Renewables (manufacture; assembly; finish; distribution)
<b>Activities</b>	Multi purpose fabrication facility e. g. IRM, Sub Sea work, RE devices (on and off shore wind, wave and tidal power)  Decommissioning Centre (rigs, jackets, topsides) and other related activities, e.g. ship breaking)	Manufacture  Components  Assembly  Distribution
<b>Enabling Projects / Actions</b>	Assess integrity of south berthing face  Establish feasibility (demand) for additional berthage  Required refurbishment of existing buildings  Develop Master Plan for site sub	Assess integrity of south berthing face  Establish feasibility (demand) for additional berthage  Required refurbishment of existing buildings  Develop Master Plan for site



	division into special operation zones. (i.e. Nigg Development Master Plan)	sub division into special operation zones. Consider expansion east on proximal land. Consider rail provision
<b>Key Players</b>	HIE, THC to consider options for a joint way forward Establish KBRs long term strategy Consider practicalities of site acquisition, JV Consortium, CPO and back to back agreement.	HIE, THC to consider options for a joint way forward Establish KBRs long term strategy Consider practicalities of site acquisition, JV Consortium, CPO and back to back agreement
<b>Residual Issues</b>	Confirm KBRs liability and reinstatement cost estimates Determine residual diesel contamination and time/cost implications of remediation Consider practicalities of multi user access arrangements	Confirm KBRs liability and reinstatement cost estimates Determine residual diesel contamination and time/cost implications of remediation Consider practicalities of multi user access arrangements

**Table 6.5 – Nigg Yard Land Use Framework**

	<b>Option 1 – Oil &amp; gas and renewables</b>	<b>Option 2 – Renewables – ‘Green Energy Park’</b>
<b>Theme</b>	Oil terminal with deep water jetty	<i>No change from option 1 – ‘Green Energy Park’</i>
<b>Activities</b>	Oil-gas separation plant Oil transshipment Ship to ship transfers Liquid waste treatment plant (servicing NNS platforms) Bio fuels plant potential	
<b>Enabling Projects / Actions</b>	Relining of tankage if liquid Waste Treatment to be pursued	

	<b>Option 1 – Oil &amp; gas and renewables</b>	<b>Option 2 – Renewables – ‘Green Energy Park’</b>
	<p>Additional bulk storage (liquid/solid) to be investigated</p> <p>Potential for treatment of drill cuttings to be subject to detailed investigation</p>	
<b>Key Players</b>	<p>Talisman to clarify strategy options for site and operations</p> <p>Talisman seek partner to exploit other business opportunities e. g. oil traders re transshipment; platform operator re treatment of liquid waste, discussion with oil majors and independents</p>	
<b>Residual Issues</b>	<p>Fully integrated decommissioning facility with Nigg Yard to be investigated</p> <p>Scope for integration with ‘Green Energy Park’ concept e.g. Green Energy Centre (bio-diesel, clean water export)</p> <p>Long term use of Beatrice field by reinjecting liquid waste.</p>	

**Table 6.6 – Nigg Terminal Land Use Framework**

	<b>Option 1 – Oil &amp; gas and renewables</b>	<b>Option 2 – Renewables - ‘Green Energy Park’</b>
<b>Theme</b>	Agricultural and undeveloped land with some residential use	Agricultural and undeveloped land with some residential use
<b>Activities</b>	<p>Agriculture</p> <p>Historic woodland</p> <p>Private Residences</p>	<p>Agriculture</p> <p>Historic woodland</p> <p>Private Residences</p>
<b>Enabling Projects / Actions</b>	<p>Access to the sea to the south</p> <p>Berthing facility/ quaywall required</p>	<p>Manufacture of renewable components</p>

	<b>Option 1 – Oil &amp; gas and renewables</b>	<b>Option 2 – Renewables - 'Green Energy Park'</b>
	Laydown space to be defined Storage facilities to be provided Vehicular access to the site area suitable for long axle vehicles	Assembly of renewable components Distribution of renewable components
<b>Key Players</b>	Dow Chemicals/ Cromarty Petroleum	Dow Chemicals/ Cromarty Petroleum
<b>Residual Issues</b>	Connection and integration with the Nigg Yard Crossing of the B9175 Potential increased threat to sites designated for environmental qualities Investigate the potential for environmental restoration and enhancement Site levels	Connection to the sea Rail access Connection and integration with the Nigg Yard Crossing of the B9175 Potential increased threat to sites designated for environmental qualities Investigate the potential for environmental restoration and enhancement Site levels

**Table 6.7 Proximal Land to the East Land Use Framework**

### 5.8.3 Other potential development options

For the purpose of this study it is necessary to identify a clear mix of uses in order to catalyse regeneration on-site and establish a way forward for industrial and community development at Nigg. A successful Master Plan should avoid prescribing against any development which would meet the development principles and prove to be compatible with the strategic and physical requirements of the site. It should therefore be recognised that alternative development options are possible depending on the specific requirements of individual developers. Representations made during the second phase of consultation have indicated that there may be a market interest in a single-user site and the Masterplan should be interpreted with sufficient degree of flexibility to avoid precluding such an outcome.

The team understands that an alternative Master Plan option is being investigated by private interests. If and when this is brought forward, it should be considered in light of the information and assessment criteria outlined in this study. For this reason this alternative Master Plan can be identified as a potential third development

option. However, as information relating to its formulation and emerging content was not provided to the study team, it has not been considered further at this stage.

## 5.9 Options appraisal

Development Principles and Objectives

Mix of uses

Physical layout

Cost

Management

It is important to emphasise that the element that differentiates the options are not simply the physical layout, content and cost, but also the ownership and occupancy and management methods to be employed. The **evaluation criteria** are defined, against which the performance of each of the options can be assessed. Ideally these criteria should be quantifiable but this will not be so in all factors. The list includes:

ability to address market opportunities  
certainty/risk  
public acceptability,  
environmental considerations,  
ease of delivery,  
capital costs, running costs, deliverability ,  
need for public sector intervention,  
reactive/proactive approach to development.

These have been used to form a matrix and a general description of each option's performance has been summarised and conclusions drawn. For example, due to the good and bad points about each option, a hybrid solution might be more appropriate and that can then form the basis of the Master Plan. The SWOT of each of the options forms part of this assessment. See Tables 6.8 and 6.9. An option appraisal matrix is contained in Table 6.10 as a preliminary comparison and assessment of the development options. Positive and negative aspects of each option are considered. Both options are considered at this stage to have the potential of contributing to the economy of the North of Scotland. These development options should form part of the subsequent consultation of the Nigg Development Master Plan and considered as part of the SEA. Subject to further consultation the Nigg Development Master Plan can be progressed towards adoption as a supplementary guidance.

**Table 6.8 – Option 1 SWOT Analysis (Oil and Gas focus with renewables secondary)**

Strengths	Weaknesses
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<p>Dry dock</p> <p>Tarmac access/ramp to dock base</p> <p>Existing plant and machinery within the Fabrication Yard</p> <p>Only minor upgrades required to fabrication shops, warehouses and offices</p> <p>Available utilities</p> <p>Existing berthing jetty for ship to ship transfer already in place</p> <p>Oil storage facility already in place</p> <p>Effluent / wastewater treatment plant on site</p> <p>Road access to the site</p> <p>Established planning permissions for majority of uses.</p> <p>Labour pool available (historic profile)</p>	<p>Remote from main markets in Europe</p> <p>Eastern part of site lacks any access to Firth</p> <p>Need for site preparation grading and consolidation for access to plots</p> <p>Some investment required for improved site services</p> <p>Nearest railway station is at Fearn (9.5km by road)</p> <p>Resumption of activities would trigger a review of the SEPA discharge consent</p> <p>4.5m depth on front sheet piled wall outside graving dock – 10m would be preferred depth</p> <p>Lack of adequate deep water berthage that is continuously available.</p>
<b>Opportunities</b>	<b>Threats</b>
<p>Market opportunity to establish a multi-user site</p> <p>Land to east safeguarded for petrochemical development</p> <p>Strong short term market demand for subsea market already on site</p> <p>Scope to increase oil storage usage</p> <p>Increases in oil prices extend viable life of North Sea fields.</p> <p>Established ship to ship transfer facility</p> <p>Relatively low site start up costs to catalyse development</p> <p>Employment potential particularly related to IRM work and rig conversions</p> <p>Complementary services between Nigg and Invergordon</p> <p>Provision of additional berthage possible</p>	<p>International competition in Norway</p> <p>Obsolescence of plant and machinery and building envelope unless early maintenance and re-use (low)</p> <p>Medium to long term investment remains uncertain particularly in relation to the platform construction market (medium)</p> <p>Lack of corporation by established owners/management.</p> <p>Reduced developer interest due to perceived lack of momentum at Nigg</p>
<b>Strengths</b>	<b>Weaknesses</b>
<p>Graving dock can perform as a dry or wet dock</p>	<p>Planning permissions not in place</p>

<p>Large setting out area close to dock and berthage</p> <p>Tarmac access/ramp to dock base</p> <p>Length of berthing face</p> <p>430m quay wall</p> <p>Existing berthing jetty (300m long, 17m deep) and access road</p> <p>Site location</p> <p>Site size, scale and available utilities</p> <p>Existing site and building structure generally in good condition with development potential.</p> <p>Existing plant and machinery within the Fabrication Yard</p> <p>Effluent/wastewater treatment plant on site</p> <p>Environmental capacity of the site to accommodate a range of development</p>	<p>Remote from main markets in Europe</p> <p>Semi vacant site with low activity</p> <p>Topography of eastern parts of the study area</p> <p>Eastern part of site no access to Firth</p> <p>Need for site preparation grading and consolidation for access to plots</p> <p>Some investment required for improved site services</p> <p>Nearest railway station is at Fearn (9.5km by road)</p> <p>Time of cost of emptying dock</p> <p>Resumption of activities would trigger a review of the SEPA discharge consent</p> <p>4.5m depth on front sheet piled wall outside graving dock</p> <p>Lack of adequate deep water berthage that is continuously available</p> <p>Land contamination may remain</p>
<p><b>Opportunities</b></p>	<p><b>Threats</b></p>
<p>Brownfield site supported by NPPG2 (business and industry)</p> <p>Safeguarded land to east could be used as laying out/storage space</p> <p>Market opportunity to establish a multi-user site</p> <p>Key sectoral opportunities in the medium to long term for renewables</p> <p>Established oil storage facility with scope to increase usage</p> <p>Established ship to ship transfer facility</p> <p>Dry dock availability</p> <p>Government support for renewables</p> <p>Opportunity to construct additional berthage</p>	<p>International competition</p> <p>Obsolescence of plant and machinery and building envelope unless early maintenance and re-use (low)</p> <p>Attitude and actions of owners/management</p> <p>Reduced developer interest due to perceived lack of momentum at Nigg</p>

**Table 6.9 – Option 2 SWOT Analysis (Renewable Energy ‘Green Energy Park’)**

**Table 6.10 – Option Appraisal Matrix**

= does not meet the criteria     
  = satisfies the criteria     
  = exceeds the criteria

Assessment Criteria	Option 1 Oil & Gas and Renewables		Option 2 Renewables – ‘Green Energy Park’	
	Nigg component sites	Nigg complex including land to the east	Nigg component sites	Nigg complex including land to the east
<b>Development Principle 1 – Site content and operations</b>				
<b>Assessment Criteria</b>				
<i>Accommodate</i>				
<i>Accommodate</i>				
<i>Create in</i>				
<i>Renovate</i>				
<i>Retain oil</i>				
<i>Retain oil</i>				
<i>Provide a</i>				
<i>Utilise ex</i>				
<i>Creation</i>				
<b>Development Principle 6: Integrating the port/harbour/major site with its surroundings</b>				
<i>To take care in the treatment of separating uses/elements</i>				
<i>To render the site visible</i>				
<i>To exploit all potentialities of the water</i>				
<b>Development Principle 7: Integrating functions</b>				
<i>To organise and benefit from blending</i>				
<i>To make temporary uses a means to manage the site</i>				
<b>Development Principle 8: Protecting and where Appropriate Enhancing the Environment</b>				
<i>To reduce reciprocal impacts</i>				
<i>To communicate and to get certain uses accepted</i>				
<i>To provide management plans</i>				
<i>To reflect policy guidance</i>				
<b>Development Principle 9: Integrating societies</b>				
<i>To prepare for tomorrow's jobs</i>				
<i>To integrate site within the life of the local community</i>				
<i>To open the site to local population</i>				
<i>To determine the overall tourism offer</i>				
<i>To ensure there is a co-operative dialogue between stakeholders to communicate that the Masterplan will seek to protect or enhance the environment</i>				
<i>Provide s</i>				
<i>Provide s</i>				
<b>Development Principle 5: Integrating the Spaces</b>				
<i>Make new connections to obtain new spaces</i>				
<i>Consolidate and enhance existing connections</i>				



## 6 Way Forward

### 6.1 Introduction

This section summarises the key issues emanating from the work undertaken over the past several months in preparing the Nigg Development Master Plan. It also outlines a series of recommendations and next steps in the process of unlocking the development and regeneration potential at Nigg.

### 6.2 Summary

The Nigg Development Master Plan builds upon the 'Review of Ports and Sites in the Inner Moray Firth' which was subsequently approved as supplementary planning guidance to the development plan by The Highland Council in June 2006.

The Plan is informed by:

- The baseline work undertaken in determining the existing parameters for development of the Nigg site (Interim Report)
- The Market Assessment undertaken by MacKay Consultants
- The Technical and Engineering Assessment
- The Strategic Environmental Assessment (SEA) Environment Report (including Flood Risk Assessment and Stage 1 Appropriate Assessment)
- Public Consultation (Stage 1)
- Public Consultation (stage 2)

These reports and assessments are based upon existing knowledge and experience of the site and surrounding area, as well as technical information available and accessible at the time of writing. Best endeavours have been undertaken, both by the consultant and the client team to obtain relevant and pertinent technical reports on the site. However, where this has not been possible the information is based upon preliminary site visits, discussions with relevant stakeholders and existing knowledge and experience.

The Master Plan subsequently considered the priority land uses identified by the Market Assessment Report as sustainable over the next 15 to 20 years, as well as the physical and technical requirements of these uses as informed by the technical and engineering assessment. In considering both the market assessment and the technical assessment feasible options were considered in the re-development of the Nigg site.

Two principle options emerged which considered each of the three components of the Nigg site (oil terminal; fabrication yard; and proximal land to the east of the fabrication yard) both individually and collectively as a single

unit. These options were appraised and the strengths and weaknesses of each were considered. These options for development of the Nigg site and the proximal sites are considered to have the potential of contributing to the economy of the North of Scotland and are worthy of consultation as part of the Nigg Development Master Plan process. Positive and negative aspects of each have been considered.

The framework maintains flexibility in developing the site as a multi-use facility. Operations at Nigg Yard/Oil Terminal have the potential to return into sustainable productive use albeit currently no evidence to date despite extensive marketing.

The economic impacts of the range of uses identified, along with the GVA contribution to the local economy, was considered in the Market Assessment Report prepared by MacKay Consultants. A redeveloped Nigg site is considered to have the potential to provide employment for an average of 750 to 800 people (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%.

### **6.3 Way Forward**

This Nigg Development Masterplan sets the framework for the evolution of ideas and the vision for the options illustrated in physical management and sector specialisation terms.

The options have been refined in response to public consultation and SEA which has informed this Nigg Development Masterplan.

### **6.4 Concluding Statement**

Halcrow is grateful for the assistance received during the course of this Development Masterplan, particularly from HIE and The Highland Council (THC), as well as the stakeholders that participated in the Consultation Workshop.

## Appendix 1 NIGG FABRICATION YARD – CONDITION OF EXISTING INFRASTRUCTURE (summary of Jacobs Report March 2005)

### Buildings

There are various buildings on the site; some of which were erected in the early 1970s and some more recently in the late 1980s. See Figure 2.5. These notably include:

- 6 fabrication workshops;
- A panel shop;
- A pipe fabrication shop;
- A blast and paint shop;
- A storage warehouse; and
- An office building.

The Jacobs' report notes that the large structural steel framed buildings are all in reasonable structural condition. The oldest fabrication and assembly buildings date back to the early 1970's and were clad using asbestos cement sheeting. This material is regarded as a hazardous waste material and if the decision is taken to demolish these buildings the cladding would require to be removed under licence to an approved disposal site.

The larger more modern buildings on the site are clad with profiled metal sheeting and are in a significantly better condition as a result. Fabrication and assembly shops 4,5 & 6 in particular are fitted out with travelling gantry cranes and, although not certified for use at the present time, these cranes appear to be in reasonable condition and capable of being re-conditioned and brought back into useful service. It is noted that Shop 4 is leased at the present time by Global Energy (formerly Isleburn Mackay & Macleod) on an annual lease basis. This company fabricates structural steel modules at Nigg for use in the active sub-sea offshore oil market. Jacobs note that the air and gas supplies to Shop 4 were modernised circa 2002.

There are old buildings on the site which have brick/ blockwork walls or timber framed walls and are of flat roof construction. These were used variously in the past as temporary offices, canteens or stores but the flat roofs have deteriorated to a point where demolition of the timber walled buildings may now be appropriate. Where buildings are to be retained it would be necessary to check the condition of all services within each building and to upgrade as necessary so that they are warranted as fit for continued use and compliant with the relevant Regulations and Standards. This is particularly necessary in the case of the electrical distribution

cablings, fixtures and fittings and for all internal propane and oxygen gas distribution networks.

## Site services

### Foul Drainage

The site foul water drainage system mainly consists of a series of pumping stations which deliver flows to the on site treatment plant located close to the sea to the east of the graving dock. The plant consists of three process units each reported to be capable of serving a population of 1200 to 1500. At present only one of the units is in operation to serve the current population which is less than 100.

The final effluent is discharged to the Cromarty Firth via a consented outfall. The plant is reported to currently meet the consented discharge criteria and should adequately serve any future occupation of the site after thorough overhaul. A regular system of operation and maintenance would require to be put in place. The condition of the intermediate submersible pumps in the system would need to be verified. It is unlikely that Scottish Water would adopt the facility without further detailed investigation and negotiation.

### Storm water drainage

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. As the majority of the site is formed in unsealed compacted sand, it can be expected that surface gullies and catchpits would silt up and that surface water would as a result take time to percolate into the receiving piped drainage systems causing water to pond on the surface after heavy rainfall. This is not reported however to have been a concern to past operations.

### Electricity

Mains electricity is provided via Scottish & Southern Energy at 33kV to a substation on the site where it is transformed to 11kV and distributed locally around the site. Jacobs report that the high voltage equipment is generally satisfactory by modern standards, although would it require to be inspected and overhauled. A total power supply of 7Megawatts is reported to have been available at one time through KBR's agreement with S&SE. The present day availability needs to be verified.

From the primary substation there are 3No. 11kV cable ring networks that collectively feed 19 substations located around the yard. The substations and equipment will require maintenance work, but are understood to be otherwise in

reasonable condition. The low voltage distribution network feeding each of the buildings is likely to meet modern day safety standards. Detailed appraisal and testing would be required to confirm the operational condition of the system.

It is also reported that there exists 6 standby generators on the site. Most seem to date back to the early 1970's and no information regarding their usage or maintenance history was made available. Jacobs report that they may have reached the end of their useful life but this would require to be verified later.

The lighting systems within the main assembly shops are reported to have been renewed in the 1980's but it is unclear to what extent this renewal work has been undertaken or what maintenance has been undertaken since.

The assembly shops have a fire alarm system linked back to a control panel. Jacobs conclude that the system would require to be tested and commissioned in accordance with BS5839.

## Appendix 2 NIGG GRAVING DOCK – DETAILS, CONDITION & METHOD OF OPERATION

From information previously supplied to Halcrow by KBR it is understood that the dock covers an area of 4.35ha and is 306m long with a maximum depth of 15m at high tide. There is a vertical quay wall over a length of 230 metres on the West side which was constructed in 1997. Halcrow has made contact with the wall designers and established that the quay wall has been designed to permit a distributed loading of 90 tonne/m<sup>2</sup> on the landward side up to the front face of the wall. It is noted that the design life of the wall was specified by KBR to be 20 years. Nonetheless the wall designer has advised that the wall was designed to BS8110 so that in his opinion the structural life of the wall should be at least 50 years.

6 No. service points providing electricity, compressed air, oxygen and propane are located at regular intervals along the west side of the graving dock.

The floor and access ramps to the dock permit use by crawler cranes and multi-axle trailers. Foundations have been successfully constructed on the dock floor in the past where they have been founded on the weathered sandstone bedrock.

The dock gate is a reinforced concrete caisson structure. The condition of the exposed concrete of the gate is considered by Halcrow to be reasonable for a structure of this age. There is no visual spalling of concrete or rust staining of concrete faces to suggest extensive corrosion of steel reinforcement. It was last used in 2003, but since that date has been located across the dock entrance with its ballast chambers flooded. It is noted that the level in the dock is currently held at around chart datum level which is just above lowest astronomical tide level. There are flap valves on the outer face of the low level pipes which connect the water in the dock to the external sea so that these will only open on the relatively rare occasion that the external sea level falls below chart datum. For this reason the water at present trapped in the dock is stagnant, has a high salt concentration and is oxygen depleted so that it cannot support any sea life. It is important to maintain the external sea level at or above the level in the dock so that there is always a net inward horizontal force on the gate thus pushing it against the rubber lip seal located on the dock cill and roundhead perimeter.

KBR has released a method statement to Halcrow describing how the dock gate was operated by them and this statement has been used to provide the following summary:

- To operate the dry dock temporary pumps are required to de-ballast the caisson and two inshore tugs are necessary to tow the floated gate out and moor it against the mooring dolphins located south of the entrance to the dock.

- To relocate the gate, a diving inspection of the cill should take place with any silt build up removed using hand held airline methods. In addition to the perimeter seal there is also a 'D' seal which is located in the centre of the base of the gate and compresses under the weight of the gate. This seal is fixed in sections and historically parts of the 'D' seal have become detached when the gate was floated. KBR is understood to retain sections of replacement 'D' seal in their store at Nigg and prior to relocating the gate, divers would either need to recover any sections of dislodged seal or fit new replacement sections.
- The gate is finally located in position by slowly pumping water into the caisson cells at low tide whilst using the tugs in combination with shore mounted winches, to manoeuvre the gate horizontally.
- Dewatering is done using 600mm diameter electrical pumps owned by KBR which are capable of dewatering down to within 500mm of the dock floor within 48 hours. The last 500mm is dewatered using stripping pumps placed in prepared sumps in the dock floor and can take a further 12 hours to completely empty it. It is noted that the speed of dewatering is governed by the rate of fall of the ground water level behind the new dock wall. This level has to be carefully monitored during de-watering to ensure that the differential head of water never exceeds 3 metres so that the risk of horizontal wall movement under the hydrostatic head is minimised.
- The condition of the pumps and winches is unknown but it might be anticipated that they would require complete overhaul and, in the case of the winches, they would require to be certified for the loading envisaged.
- There is a risk that silt and sea deposits could build up in front of the gate cill and require to be removed prior to floating the gate. When the yard was in full operation a dredger was brought in from Westminster dredging to maintain the channel level at 9 metres below low water level out to the open sea. Frequency of dredging varied and it was mainly done when the dredger was operating in the area at the company's sister yard at Ardersier which required regular dredging. KBR has advised Halcrow verbally however that the normal build up of silt could be removed relatively easily by air lifting using divers

Halcrow is aware that there is evidence of accelerated low water corrosion (ALWC) at the roundheads either side of the gate entrance and at the mooring dolphins. ALWC is recognised as relatively common in marine steel structures and results in the loss of steel mainly at around the critical low water level. This can be repaired by welded over-plating and arrested by introducing cathodic protection but otherwise is a



progressive attack leading eventually to structural failure. At the present time the extent of ALWC attack is considered to be relatively slight but further inspection and testing would be required to verify this. In any case early intervention to arrest the process would be recommended.

Dock floor services are understood to include oxygen, air, water, electric and propane. The present condition of these services is unknown but the fact that they have been submerged for the past 5 years would suggest that they are likely to require replacement. The dock floor is made up generally of about 500mm to 1,000 mm of imported hardcore over sandstone bedrock in the northern half and over sand over rock in the southern half. It should be expected that there could be existing hard foundations scattered over the floor of the dock where structures were once supported including cranes. The position of these foundations would need to be known in order that they were removed as necessary to admit any new structure into the dry dock.

It is also possible that the material in the floor of the dock could contain contamination from past use and some chemical investigation of the soils would be advisable.

In order to prove the operation of the dry dock gate, seals and associated pumps and winches it would be sensible to undertake a trial run. This would also allow an inspection of the dock floor and sampling and chemical testing of the floor material. Halcrow has also recently gained access to additional information in relation to the dry dock from a member of the contractor team which undertook the construction of the dock wall in 1996/97. We are advised now that this contract also included clearing of the dock floor, installing submersible pumps in frames and wells to speed the dewatering process, replacement and renovation of the gate seals and the installation of graded rock armour protection to the other sloping sides of the dock to stabilise them and prevent erosion when the gates were left open for prolonged periods. We are told further that the gate had not been floated for 8 years prior to these works and that there was a considerable build-up of sea debris on the sea side of the wall which proved difficulty and costly to remove.

## Appendix 3 SUMMARY OF MODIFICATIONS IN RESPONSE TO THE FIRST STAGE PUBLIC CONSULTATION

Item number	Comment	Amend	Amendments to Masterplan
<b>LANDOWNERS AGENTS</b>			
12	DSM in a position to take on responsibility for the future of Nigg as preferred developer. DSM welcomes the flexibility of the principles and development Strategy.	text	Add text – flexible commercial enterprises as well as decommissioning
15	Dow believes the Masterplan must acknowledge the range of appropriate alternative business, industrial, storage and distribution uses that could be developed successfully at this location in isolation from Nigg.	text	Add text – appropriate alternative business, industrial, storage and distribution (show Dow Chemical land as an option developed independently from Nigg).
19	KBR feel that the document fails to acknowledge the possibility that operations at Nigg Yard/Oil Terminal could recommence in isolation of the ongoing Masterplan process.	text	Add text – Nigg Yard/Oil Terminal operations could recommence in isolation of Masterplan and in their own right.
<b>ORGANISATIONS</b>			
8	SEPA would expect the final SPG to include clear guidance to developers on what is actually expected of them.	text	Add text – Clear guidance to be given to developers – (refer to SEA). Specify that development should minimise negative impacts on the environment and offer environmental improvements.

9	SNH want to see chart on p117 showing Masterplan going out for consultation after the SEA has been carried out.	text and chart	Remove chart on p117.
18	Historic Scotland highlighted their statutory remit.	text	Add mitigation measures as described by Historic Scotland
2	HSE stipulate the consultation distance is 1000m. No available 3 zone map.	text and drawing if 3 zone map can be produced by HSE.	Consultation distance of 1000 meters.  Work places provided to be in building for less than 100 occupants and less than 3 storeys within the inner zone of a 3 zone map.
20	HIE's energy team support of proposals. Development of marine energy sector is positive.	noted	
<b>MSPs</b>			
17	Jamie stone MSP believes graving dock is one of the finest in the world – a National asset.	text	Add text – Emphasise the strategic position of the graving dock. Note that marine based renewable energy devices and modular ship assembly are possibilities.
21	Rob Gibson MSP supports the Green Energy centre approach.	noted	
<b>COMMUNITY COUNCILS</b>			
13	Nigg and Shandwick CC states that the planning process should be used to protect local residents and the environment.	text if available	Get information from THC on the road safety improvements – if available - Transport Strategy document.

<b>INDIVIDUALS</b>			
1	Stuart Clifford MA believes options are 'rusty'	noted	
3	James Filler	text and drawing if revised junction dwgs available	Improved road junction with B9175 to be shown on the plans following input from the Local Transport Strategy.
14	Gwyneth Lock Add Former coastal mining station	Drawings Add revised junction dwgs if available	Show Coastal Mining Station Improvements to the vehicular access to the site (larger turning circles) Consider reducing the amount of sea access.
16	Christine Asher	text	Update text at 2.6.2 Adjust text at 2.6.3 with correct date.
23	John Wood	noted	Add text to show the potential environmental economic and social impacts of future developments. Long term sustainability to be a focus.
<b>OTHER ORGANISATIONS</b>			
6	Falck Renewables Plc supports a redevelopment which encompasses a renewable energy facility.	noted	
4	RSPB require more biodiversity and wildlife information within the document. Enhancement or restoration of priority habitats and species in accordance with the UK BAP and Ross & Cromarty East LBAP.	text	Add text – Biodiversity and wildlife to be mentioned more in the document. Proposals to enhance or restore priority habitats and species.  Add text – Hides are in place and operational all year round at Udale Bay and Nigg Bay – 5000 visitors a year each.

5	Cromarty Firth Port Authority. Old Training school owned by KBR to be added.	noted, drawings	Add location of Old Training School on plan.  Add any sectoral changes noted by MacKay Consultants and amend on plan.
7	Scottish Wildlife Trust would like to see improvements in the environmental setting.	text	Masterplan to include all possible measures to minimise further loss of habitat and to remediate those areas which have been damaged wherever possible.
10	A Lowe – APT states that the document is too complex.	noted	
10A	A Low – APT would like more plain English used in the document.	text	Amended document to plain English where required.
11	Archaeology Scotland request that full consideration be given to cultural heritage or historic environment assets and values.	text	Add text – consideration to be given to cultural heritage or historic environment assets and values. Para 2.6

## Appendix 4 SUMMARY OF SEA MITIGATION MEASURES

The Masterplan has been modified in response to the environmental process and changes have been made as follows:

Development Principle 5 has been reworded to recognise potential environmental impacts of the use of surrounding Greenfield land.

Development Principle 6 has been reworded.

Development Principle 8 has been reworded to read 'effectively communicate on all environmental issues' and subsequently reworded.

Development Principle 8 has been expanded to include principles for:

- Construction Environmental Management Plans and Operation Environmental Management Plans that will be a requirement for all new development on site.
- The Master Plan should adopt measures of mitigating environmental impacts from the proposed development at Nigg
- The Master Plan reflects The Highland Council's 'Designing for Sustainability in the Highlands: Development Plan Policy Guidance (2006)'
- The Master plan provides appropriate protection of the designated ancient woodland

The Flood Risk Assessment findings are referenced in the Masterplan. It has been concluded that the site will not be under a significant flood risk before 2035, to the end of its expected life and therefore no mitigation work is recommended. This is dependent on the OD level of the site being +3.73m. Should further investigation show the site to be lower, particular if lower than the minimum formation level of +3.58 OD level then some limiting mitigating measures may be necessary to protect key areas. The Master Plan should not hinder any future mitigation requirements in particular the protection of specific buildings on site.

Development on the proximal land to the east of the development site should be treated with caution to avoid impacts on biodiversity. An ecological survey should be prepared for this land; this should include survey of the wooded area to ensure there is no significant wildlife value, e.g. bat roosting. If there is found to be wildlife value, avoidance and mitigation measures will be necessary. The EIA and Construction and Environmental Management Plans will also need to incorporate this land and propose suitable mitigation measures.

## Appendix 5 Non-technical Summary

Halcrow Group Limited has prepared an Appropriate Assessment (AA), on behalf of The Highland Council, of the Nigg Development Masterplan. The Nigg Development Masterplan outlines a vision for the future development and use of a former industrial site at Nigg in the north of Scotland, at Nigg Point on the south-west coast of the Fearn Peninsula. The aim of the AA is to identify and document any potential adverse effects of the Nigg Development Masterplan on sites protected for their international nature conservation interest, referred to in this report as 'international' sites.

The site comprises an oil terminal, the Nigg Fabrication Yards and some proximal land to the east. These study areas are shown in the following plan:



The Nigg Development Masterplan outlines two principal options to bring the site back into productive industrial use, as follows: -

Option 1 diversifies the activities at Nigg whilst building on its oil and gas heritage and industry reputation and introduces a renewable energy component.

Option 2 the renewable energy sector is the focus for Option 2 with the majority of the site allocated for this activity.

Both options consider each of the three components of the Nigg site (oil terminal; fabrication yard; and proximal land to the east of the fabrication yard), both individually and collectively as a single unit.



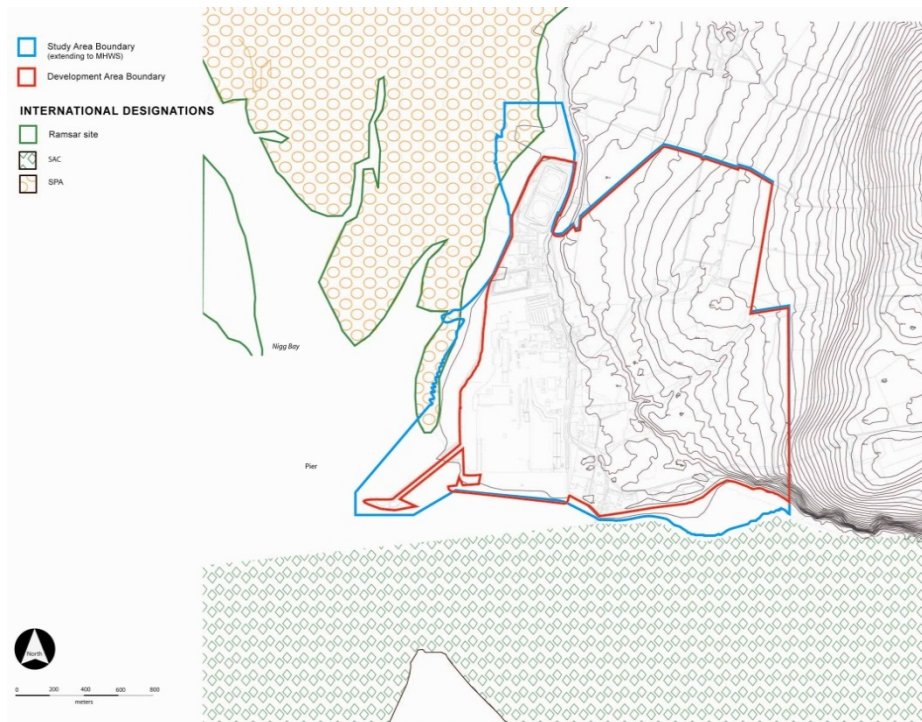
Underlying these site options are a series of development principles and objectives that apply to both of the options. Some of these principles and objectives were 'screened out' of this report as they were not seen to be applicable to the international sites. The AA report assesses both options and the development principles and objectives underlying the options in matrices and provides a summary of the results.

The AA has been carried out in accordance with the 'Habitats Regulations', which transpose the requirements of the European 'Habitats Directive' into domestic legislation. The methodology of the AA was devised using interim guidance produced by the Scottish Executive. The baseline data collected for the AA screening has been retained to ensure the background information sits alongside this final assessment.

In accordance with the SEA Scoping and initial consultations with Scottish Natural Heritage (SNH) in March and April 2009, and pre-application advice from SNH (August 2012) it was decided that the international sites to be considered in this screening exercise (as they could potentially be affected by the Masterplan) should be:

- Cromarty Firth Special Protection Area (SPA)
- Cromarty Firth Ramsar
- Moray Firth Special Area of Conservation (SAC)
- Dornoch Firth and Morrich More Special Area of Conservation (SAC)

These sites (excluding the Dornoch Firth and Morrich More SAC) and their relation to the development area boundary are shown in the following plan:



Where the conclusions on likely significant effects were classified as 'uncertain' in the report, this was regarded as a 'likely significant effect', as a significant effect could not be ruled out.

## Summary of results

The key findings of the screening stage were that both options for development of the Nigg Yard study area, oil and gas focus with renewables secondary and renewable energy focus could potentially impact on all four international nature conservation designations. Impacts would primarily be through construction noise and vibration disturbance and vessel disturbance to Cromarty Firth's qualifying bird species and the Moray Firth SAC's bottlenose dolphins and the harbour (common) seals of the Dornoch Firth and Morrich More SAC.

Due to the close proximity of the development site or connectivity to the international sites and the proximity of the international sites to each other, many potential impacts were found to apply to all four international sites. Exceptions to this rule are noise pollution and vessel disturbance, which are likely to affect designated species rather than habitats. Vessel disturbance to bottlenose dolphins, the species for which the Moray Firth SAC is designated, could be exacerbated by the mix of other vessel traffic that already uses the area. Noise from vessels using Nigg Yard could also be added to by construction and operational usage of the site. Noise and light disturbance was also found to potentially affect the qualifying bird species of Cromarty Firth SPA and Ramsar site. Ship movements, lighting and terrestrial and

underwater noise, as well as injury/mortality from propellers, could potentially affect the qualifying species of harbour (common) seal of the Dornoch Firth and Morrich More SAC using haul out sites near Foulis, in the Cromarty Firth.

One of the biggest potential risks to all qualifying features of all three international sites in close proximity to the site is pollution. This can be in the form of direct pollution from vessels using Nigg Yard or accidental pollution from the Yard itself. There are particularly high pollution risks associated with ship-to-ship oil transfer and ballast water discharge. Ballast water could also potentially introduce invasive species that could directly affect the habitats and species in the area.

Indirect pollution into the marine environment can arise from surface run-off or groundwater contamination from on-site oil storage or pollution spillage. The risks of this are potentially significant. The Flood Risk Assessment shows that the site is at risk from tidal flooding due to sea level rise but this is in the longer term than the 25 year design life of the site. The greatest risk identified by the Flood Risk Assessment was coastal surge. The area is also predicted to continue having heavy rainfall events due to climate change. Both tidal surge and heavy rainfall and storm events could potentially mobilise contaminants present on the site, either through tidal inundation or surface run-off and groundwater contamination, thereby conducting the pollutants into the marine environment.

In terms of in-combination impacts on the international sites, the principal combined impacts on the sites were found to be from general vessel traffic using the Moray and Cromarty Firths and pollution from various sources entering these areas. For example, vessel traffic in the Moray Firth can be influenced by shipping and other vessels passing to and from Inverness and other local ports. Pollution may also arise from sewerage outfalls waste and bilge and ballast water discharge from vessels, marine litter, agricultural run-off, aquaculture discharge and urban run-off.

Dredging for a new berthing area could also potentially cause a direct loss of substrate and SAC habitat and increase suspended and deposited sediment. The disposal of dredged material could lead to further habitat loss or degradation unless avoidance or mitigation measures are put in place.

Avoidance and possible mitigation measures for Masterplan

The following measures could potentially be implemented to address the key environmental impacts discussed in this report:

## 1 Water pollution impacts

To address any issues of residual pollution on the site, a Contamination Study will need to be conducted that covers all areas of the oil terminal and fabrication yard. A Remediation Strategy would follow this. Various targeted mitigation measures, such as use of bunds to contain potential spills, should be implemented after a full Environmental Impact Assessment (EIA) has been undertaken. Replacing old or unsuitable equipment could reduce pollution risk, as could avoiding the use of harmful chemicals wherever possible. Consultation with SEPA and use of their Pollution Prevention and Control guidelines should also be undertaken. In their consultation response to the Flood Risk Assessment for the site, SEPA request that the minimum formation level of the site be 3.62 m AOD, stipulated as a requirement in the FRA, be clearly stated in the Masterplan itself.

The following discrete types of impact have been separated to show the potential influence on water pollution:

### **Drainage of graving dock**

The process of discharging the current water stored in the graving dock under plans to renovate the dock (under Development Principle 1: Site Content and Operations) would require obtaining a discharge licence from SEPA. Thereafter the application is put through a determination process which includes consultation with the public and other required bodies, such as the Health and Safety Executive (HSE). An application has a four months determination period. This may be extended by notice from SEPA or by agreement with the applicant in special circumstances i.e. there is a lack of information on the initial application.

### **Ship-to-Ship oil transfer**

Ship-to-ship transfer by vessels operating out of Nigg currently complies with international regulations which are described in section 4.5. These are the:

- Marine Pollution Merchant Shipping (Ship-to-Ship Transfers) Regulations 2008, which was consulted upon from May to August, 2008. Changes to the Regulations as a result of this consultation have still not been finalised at the time of writing this report.
- International Convention for the Prevention of Pollution from Ships; MARPOL73/78.

To protect the international sites, ship to ship transfers will need to continue to comply with the environmental safety requirements of the Cromarty Firth Port Authority.

### **Oil pollution from the Masterplan area of Nigg Yard**

An Oil Spill Contingency Plan (OSPC) should be prepared to ensure that any spillages, should they occur, are minimised in terms of their extent or severity. The Plan should be consistent with the existing Cromarty Firth Port Authority OSPC Plan and the National Contingency Plan and be approved by THC in consultation with SNH and SEPA.

### **Ballast water discharge**

Ballast water discharge is regulated by the Maritime and Coastguard Agency. It is controlled under the International Maritime Organisation's Ballast Water Management Convention (BWMC) (International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004). At present ballast water is managed under a voluntary code to comply with the BWMC and the OSPAR Convention. However, ballast water discharge standards are being made mandatory under the BWMC. The Maritime and Coastguard Agency's Marine Guidance Note 363, 'The Control and Management of Ships' Ballast Water and Sediments', outlines the discharge standards and how they are expected to change under the BWMC and guidance on the main requirements of the convention. There are no additional local measures enforced by the Cromarty Firth Port Authority or any other body to manage ballast water. To protect the integrity of the Moray Firth SAC and the Cromarty Firth SPA/Ramsar it is important that ships continue to comply with Marine Guidance Note 363 until the BWMC is ratified.

Both ship-to-ship oil transfer and ballast water discharge are associated with the oil terminal, owned by Ithaca and the Wood Group. However, the adoption of the Masterplan can to some extent influence these activities in the future, hence the inclusion of these issues in this report.

## **2 Dredging and Disposal**

Dredging/disposal and its impacts on the international sites are outside the remit of the Highland Council and the Masterplan. However, it is an activity that is likely to keep taking place at Nigg Yard and it is also likely to cause direct impacts on the marine environment; it is therefore important for the AA to consider its impacts on the international sites.

Dredging and disposal has the potential to cause direct damage to habitats, increase turbidity and also mobilise pollutants present in suspended sediment. There is the potential of development to affect the subtidal sandbanks qualifying features in the SAC through disturbance and smothering associated with dredging and disposal operations. Capital and maintenance dredging are not currently subject to any licensing control in Scotland, although capital dredging is subject to EIA. However, the Marine (Scotland) Act 2010, increases licensing requirements for dredging.

Mitigation safeguards to protect the international sites should include the following measures, in addition to retaining the current Food and Environment Protection Act (FEPA) license and following established dredging protocols:

- no disposal of dredging within 200m of an area with dolphins. Installed hydrophones will help establish dolphin positions.
- Marine Mammal Observers (MMOs) should be on board dredging boats to help avoid disturbance impacts.
- although cetaceans use the inner Moray Firth all year round, dredging should not be carried out in the May to September period, due to the increased use of the inner Moray Firth by cetaceans.
- monitor the disposal of dredged material for environmental impact (during and after operations) if the disposal license requires monitoring.
- sample the material to be dredged to ascertain its nature and possible environmental impact from dredging and disposal.
- minimise the footprint of the area affected by dredging machinery.
- monitor how disposal sites might affect dolphin and bird species and their habitats.
- develop and use guidelines about specific routes for vessels to follow to minimise impacts on cetaceans and SPA/ Ramsar bird species and their habitats.

A dredging and disposal plan should be developed and integrated into the Construction Environmental Management Plan and Operational Environmental Management Plan.

### 3 Vessel disturbance

Shipping is currently regulated by the International Maritime Organisation, which now includes a formal correspondence group on shipping noise and marine mammals. Cetaceans are protected from disturbance by the Scottish Habitats Regulations and there are duties under Article 6.2 of the Habitats Directive for Ministers to take measures to avoid significant disturbance of species for which Natura sites have been designated. However, general shipping is not considered as significant disturbance<sup>10</sup>, whereas powerboat racing and wildlife tourism boats can pose more of a direct threat. This may be due to the noise frequency of recreation boat engines or propellers or the direct harassment of marine mammals by some boat operators. To mitigate these impacts, the Marine Wildlife Watching Code and Dolphin Space Programme are in use in the Moray Firth.

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<sup>10</sup> Email correspondence from Marine Scotland, 30/9/09.



Before Nigg Yard is fully operational it should be possible to extrapolate approximate vessel numbers and vessel types that will use the site during construction and when the site is fully operational. Close consultation with the Moray Firth Partnership and SNH could help develop an avoidance and mitigation strategy to prevent impacts from vessels on marine mammals or the Cromarty Firth's qualifying bird species. However, it may be difficult to isolate which traffic is associated with the re-development of Nigg Yard and exactly how many vessels may constitute a problem to qualifying species over and above existing levels. It is outside the scope of the Masterplan to have direct influence over all vessel traffic that could potentially disturb European Protected Species but there may be indirect ways in which the impacts of traffic associated with the redeveloped site can be minimised. Traffic numbers will continue to be monitored by the Cromarty Firth Port Authority and the status of the international sites will continue to be monitored by SNH, MFP and others – liaison between all parties should ensure significant impacts are avoided.

In addition to the liaison between key interest groups a Boat Traffic Management Plan should be prepared. This Plan will carry out an assessment of the boat numbers and types using the facility. Through modelling, the Plan will determine what effect these additional boat numbers will have on vessel densities in the SAC and, if necessary, mitigation measures to manage boat traffic will be put in place. This will be informed by SNH Commissioned Report 468, "The development of a framework to understand dolphin behaviour and from there predict the population consequences of disturbance for the Moray Firth bottlenose dolphin population" (2012)<sup>11</sup>. The Plan will be approved and enforced either by THC through the planning legislation and/or through the Scottish Government Ports and Harbours Division through a Harbour Order or a Harbour Revision Order. The Masterplan has now been updated to reflect this precautionary mitigation.

The development of appropriate mitigation is also required to avoid causing injury or death to harbour (common) seal from vessels entering and leaving Nigg Yard which use port deployed ducted propellers. Since 2008 an increasing number of seal carcasses have been washed up at various locations throughout the UK showing a common corkscrew type injury, which is considered to have been caused by the seal being drawn into the ducted propellers or azimuth thrusters used by vessels during berthing operations. Mitigation for harbour (common) seals should be developed and integrated into the Construction and Operation Environmental Management Plans.

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11 <http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=1958>



## 4 Noise pollution

Proposals in the masterplan have the potential to affect dolphins through underwater noise and disturbance associated with the construction and operation of the facility. In particular piling works for new jetties and quayside requires appropriate mitigation to be developed. To prevent noise pollution from construction or operational use of the site a Construction Environmental Management Plan and an Operational Environmental Management Plan should be formulated, which takes into account the mitigation proposed in an EIA. This would involve obtaining information on existing and predicted noise sources, using Best Available Technology, following SEPA's PPC guidelines and complying with British Standards on noise. These management plans should also include a Noise and Vibration Management Plan (including monitoring measures) for assessing noise impacts. According to SEPA's guidance on noise pollution, this may include:

- restrictions on activities/ timing or location
- noise containment, e.g. use of silencing equipment, noise bunds
- external doors fitted with self-closing mechanisms

The Noise and Vibration Management Plan should address piling, construction and vibration noise. It is a current requirement to apply for consent from Marine Scotland and the CFPA for any piling or marine construction works below the High Water Mark and it will be a requirement to continue this consents process.

Mitigation measures to reduce disturbance to Natura interests to acceptable levels should be implemented prior to works commencing on the site. The Plan should be approved by THC in consultation with SNH. Generic guidance on minimising the risk of injury to marine mammals from piling noise is available on [jncc.defra.gov.uk/.../JNCC\\_Guidelines\\_Piling%20protocol\\_August%202010.pdf](http://jncc.defra.gov.uk/.../JNCC_Guidelines_Piling%20protocol_August%202010.pdf)

The following additional mitigation can be used to mitigate noise produced by pile-driving:

### **Timing of works**

Liaison with SNH suggested the timing of pile-driving and construction could be crucial to whether the internationally designated species are affected or not. The following months should ideally be avoided:

- May through to September (cetaceans use inner Moray Firth more during this time)
- October through to March (qualifying bird species use Cromarty Firth more during this time)

### **Underwater bubble curtains**

The use of specialist bubble curtain equipment can inhibit sound transmission through water and therefore reduce overall sound pressure levels during pile-driving. Research has shown that a bubble curtain can effectively lower sound levels within 1km of the pile-driving and the experiment represented a success for mitigating the impacts of noise on dolphins.

### **Vibratory pile driving**

Vibratory pile drivers/extractors could be used in place of hydraulic or diesel hammers. This may reduce general underwater noise levels.

## **5 Additional mitigation for SPA/ Ramsar bird species**

The AA recommended that, as a precautionary measure, the EIA and Construction and Operational Environmental Management Plans would need to show how and when common terns, or any other SPA/Ramsar qualifying bird species, may be using the oil terminal and surrounds and devise appropriate mitigation. Common terns are a qualifying interest of the SPA and can become highly territorial and protective of their nests and young from April through to July inclusive. Appropriate management would be required to avoid conflict with the work force on the site. Periods best to avoid construction are between October and March to avoid the time when the Cromarty Firth is most used by qualifying SPA/ Ramsar bird species. In addition the development area may coincide with flight paths habitually used by birds from the SPA/Ramsar to gain access to adjacent intertidal feeding grounds and/or roosting areas. The CEMP and OEMP should therefore consider the need for light management measures to prevent lighting glare from disorientating passing birds or from disrupting feeding and/or roosting behaviours.

## **6 Bats in existing site buildings**

As a precautionary measure, a survey of bats that may be using existing built structures should be carried out prior to permission being granted for planning applications and a licensed bat ecologist should devise an appropriate removal or mitigation strategy.

## Summary of impacts on international sites

The following table summarises the potential impacts of the Masterplan on the Moray Firth SAC, Cromarty Firth SPA and Ramsar site and Dornoch Firth and Morrich More SAC:

International Site (s) affected	Nature of effect	Conclusion of AA – adverse effect on site integrity? ✓ x ?	Mitigation needed? ✓ x
Moray Firth SAC/Dornoch Firth and Morrich More SAC	Vessel disturbance or injury to marine mammals	?	✓
Cromarty Firth SPA/Ramsar/ Moray Firth SAC	Run-off or groundwater pollution affecting marine environment	x	✓
Cromarty Firth SPA/Ramsar Moray Firth SAC.	Water pollution risk from drainage of graving dock	x	✓
Cromarty Firth SPA/Ramsar Moray Firth SAC.	Noise pollution and vibration from renovation	x	✓
Cromarty Firth SPA/Ramsar Moray Firth SAC	Chemical, oil and litter pollution from vessels	?	✓
Cromarty Firth SPA/Ramsar Moray Firth SAC/Dornoch Firth and Morrich More SAC	Noise disturbance from vessels	?	✓
Cromarty Firth SPA/Ramsar Moray Firth SAC	Chemical, oil and litter pollution from vessels	?	✓

Cromarty Firth SPA/Ramsar	On site breeding common terns Lighting effects	?	✓
European Protected Species: Bats	Possible construction noise and light disturbance to roosts Disturbance to flight lines	x	✓
Cromarty Firth SPA/Ramsar Moray Firth SAC.	Dredging to a depth of 10m may; <ul style="list-style-type: none"> <li>• increase suspended sediment</li> <li>• mobilise pollutants</li> <li>• disrupt supporting habitat/food supply for qualifying species</li> <li>• disposal of dredged material could also cause habitat loss/ degradation</li> </ul>	?	✓
Cromarty Firth SPA/Ramsar Moray Firth SAC.	Pollution Risk from vessels (including ship-to-ship)	?	✓
Cromarty Firth SPA/Ramsar Moray Firth SAC.	Pollution Risk (chemical and biological) from ballast water	?	✓

## Appendix 6 SUMMARY UPDATE OF TECHNICAL ASSESSMENT

### REVIEW OF STATUS OF GROUND CONTAMINATION CAUSED BY HISTORICAL DIESEL FUEL SPILLAGES AND POTENTIAL IMPACT ON PROPOSED END USES

#### Background

This appendix should be regarded as an addendum to the Masterplan as published by Halcrow in November 2008. Since that time Halcrow has gained access to several reports as listed at the end of this Appendix all of which address the subject of hydrocarbon ground contamination and the residual risks both in terms of acquiring the site and in terms of the risks to users of the site. The review has been prepared by Mr S R Innes of Halcrow who is a qualified civil engineer with over 30 years experience in the general provision of design services to the construction industry but who, it is emphasised, is not an expert in chemical contamination. The aim here was to study what has been done and to consider the potential impacts from an engineering viewpoint on the proposed end uses for the site as identified in the Masterplan.

#### Summary review of reports now disclosed to Halcrow

The present owners of the former oil platform fabrication site, or their predecessors, identified in the 1990's that there had been a loss of some 40,000 gallons of diesel from corroded buried pipelines within the southern and eastern sections of the site. Investigations were undertaken and boreholes sunk to extract soil and ground water samples which were tested and confirmed that the diesel had contaminated the ground over a significant plan area of the site (the plume). The extent of the hydrocarbon plume as identified in 2005 is shown in figure 4 in the Atkins report which is reproduced overleaf for ease of reference. Environmental Reclamation Services Ltd (ERS) were commissioned by the site owners and an active programme of soil and groundwater remediation began in the 1990's and continued to around 2001 when it is understood that contamination levels had been reduced to an agreed target level and remediation stopped.

Following KBR's decision to sell the site, Atkins was commissioned in 2005 to undertake further intrusive investigations and concluded that the hydrocarbon plume was present within a zone of silty sandy soils approximately 1-2 metres thick and in the groundwater. There was evidence from the sampling undertaken that natural remediation was taking place (biodegradation). ERS was commissioned by KBR in 2006 to undertake ground water monitoring and this was continued until July 2008. From this and other work, according to ERS, Atkins concluded in 2008 that mass

reduction in contaminants by biodegradation was not as predicted. They therefore recommended further work including ground water monitoring, assessing the quality of the water in the graving dock, reaching agreement with The Highland Council and SEPA regarding target levels for remediation and, if found necessary in due course, constructing a physical barrier to prevent migration from the plume core to the graving dock.

From their monitoring work, including the testing of samples taken of the water in the graving dock, ERS reported in September 2008 that there was no increase or decrease in the hydrocarbon plume, that the water in the graving dock did not contain significantly elevated concentrations of hydrocarbons and that the potential for biodegradation to occur in the plume remains. They recommended further site investigation and monitoring of the plumes mobility and hydrocarbon concentration and the agreement of targets with The Local Authority and SEPA within a conceptual site model. ERS noted that revisions to the risk assessment guidelines in Scotland were imminent and were likely to reflect a less onerous position so that the development and agreement of the conceptual site model should await the publication of the revision.

As part of the due diligence exercise currently underway in order to achieve their stated intention to purchase the site, the Highland Council commissioned RPS in late 2008 to undertake a Phase 1 Environmental Assessment for the Nigg site with the overall objective of providing an initial assessment of potential environmental liabilities associated with environmental compliance and soil and groundwater contamination at the site. In reviewing the work undertaken by Atkins and ERS as outlined above, RPS reached certain conclusions and in their final report dated March 2009 made recommendations as follows:

1. RPS noted that the results from the above work by Atkins and ERS showed that significant free product and dissolved hydrocarbon contamination remained at concentrations that could significantly impact on human health and groundwater. They recommended that the existing data is reviewed and a Detailed Qualitative Risk Assessment (DQRA) undertaken using the current human health, soil and groundwater screening criteria.
2. It was noted that boreholes had only extended to a depth of 6metres and they therefore recommended that deeper intrusive boreholes be installed to determine the absence/presence of deeper contamination.
3. Noting that there was no apparent means at present of confirming the rate and effectiveness of biodegradation of contaminants, RPS recommended that a defined remediation and monitoring plan be agreed with SEPA.
4. RPS noted that one effect of dewatering of the graving dock is potentially to spread contamination along a pathway which may not previously have been

recognised. They therefore recommended further intrusive investigations be carried out to the south/south east of the original plume and along the side of the graving dock to bedrock depth to confirm the presence of hydrocarbon contamination.

5. Finally RPS recommended a more rigorous assessment of the pathways and associated risk of contamination of the Cromarty Firth and the SSSI.

## Impact on proposed end uses

It has generally been concluded from the above studies that the volatile hydrocarbons recorded in the plume area could potentially pose a risk to site workers via contact with hydrocarbon impacted surface soils and inhalation (inside site buildings) of volatile vapours. In addition the free product hydrocarbons and the dissolved hydrocarbons recorded are likely to pose a potential threat to the Cromarty Firth and SSSI. Further assessment and/or remedial actions have been recommended but in the meantime consideration needs to be given to the impacts on the proposed end uses.

In order to deal with the risk to site workers of volatile vapours entering affected buildings, Atkins recommend that, if the pipework fabrication shop, blast/paint shop or fabrication workshops 1 to 3 are occupied in the future, it might be necessary to remove the existing floor slabs in order to install appropriate gas protection measures.

The consultant also notes that there is an estimated 16,500m<sup>3</sup> of soils requiring remediation and until this remediation is completed to agreed target levels accepted by the Regulators, there is the ongoing risk of contamination of the Cromarty Firth and associated SSSI. Drawing down of the graving dock provides one pathway for the contaminants to reach the marine environment and therefore any proposed future use of the dry dock will need to take careful account of this risk. With the information currently to hand Halcrow is not in a position to assess the risk but it is worth noting that the levels of dissolved hydrocarbon in the water contained in the graving dock when measured by ERS were considered insignificant.

Finally it is noted that it is reported by Atkins that the buried corroded fuel lines which were the source of the contamination are now redundant with the exception of a line to the former equipment warehouse.



## References:

1. Atkins – *Environmental Site Assessment – Nigg Fabrication Yard, Nigg, Tain, Ross-shire – Final Report* – Prepared for KBR Caledonia Ltd - December 2005
2. ERS - *Nigg Fabrication Yard – Factual Report*- Prepared for KBR Inc - August 2008
3. ERS – *Nigg Fabrication Yard – Interpretative Report* – Prepared for KBR Inc - September 2008
4. RPS – *Phase I Environmental Due Diligence* – prepared for The Highland Council – March 2009



## Getting Involved

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